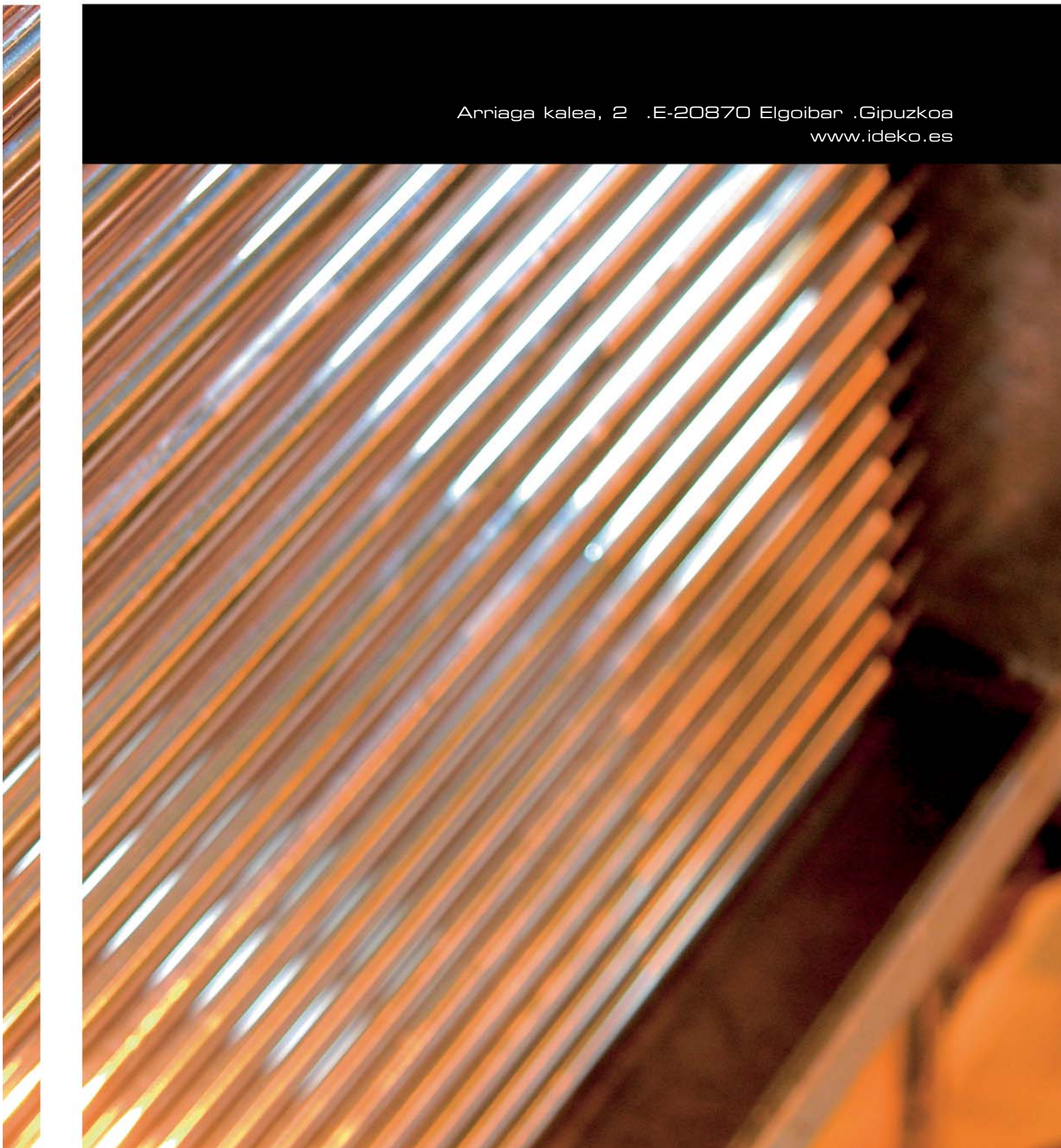
# 2005 annual report .research to innovate

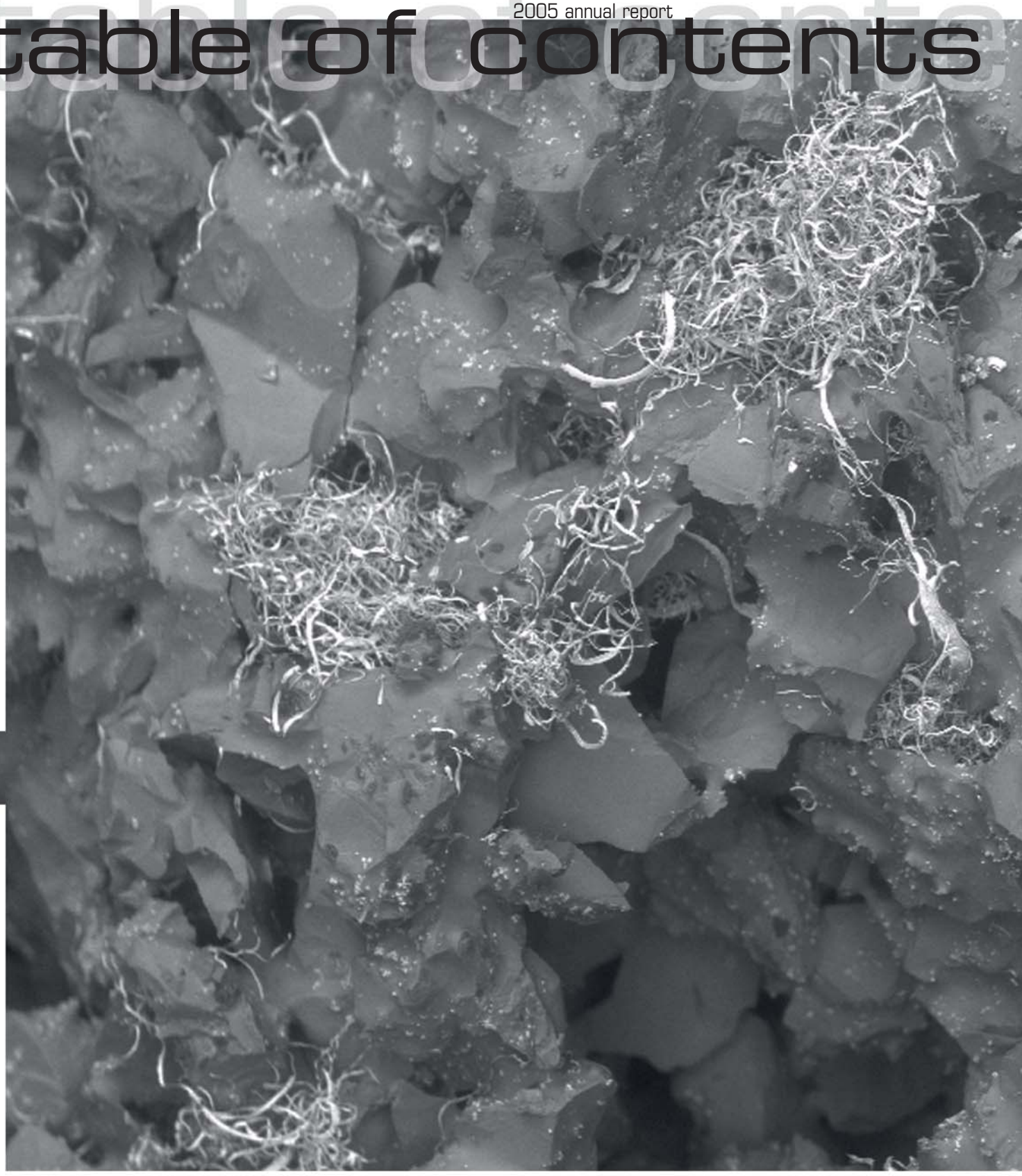
ideko

Arriaga kalea, 2 .E-20870 Elgoibar .Gipuzkoa
www.ideko.es



2005 annual report

# table of contents



# table of contents

pag.

# chairman's message

# .1 .chairman's message

The time has come to review **ideko**'s activities for the past fiscal year.

For our organization, 2005 was a key year as many of the strategies and actions developed by the Technological Centre in the past years have shown positive results. As shown by the following chapters, indicators such as the number and category of publications, the number of PhDs and PhD students, the number of patents, or the launch of technology-based companies have marked **ideko**'s activities this fiscal year. However, I would like to draw your attention to a fact that, though less remarkable, constitutes a basic axis for **ideko** and for all companies to whom the centre provides its services: the Innovation Integral Management as a strategic element for the maintenance and improvement of business competitiveness.

Since its creation, **ideko** has been framed within the Machine Tool sector and the Manufacturing Technology. These industrial sectors are characterized by mostly mature products where globalization puts pressure and where differentiation as regards competition must occur through service and technological specialization, essential aspects for keeping up competitiveness and improvement.

Aware of this need, in 2005 **ideko** started working on the establishment of an Innovation Management model for our customer companies which goes beyond our own Internal Technology Management as a Technological Centre supplying R&D and which covers the Technological and Industrialization Transfer phases to the markets that finally turn a technological innovation into a competitive advantage. We understand that innovation is a continuous process starting in the understanding of our customers' needs, followed by thinking up new ideas to satisfy those needs and culminates in their commercial exploitation in the Market which of course must be profitable; thus, it is necessary to deal with all phases in a comprehensive manner.

This is an ambitious and complicated challenge as different agents, processes and strategies of the organizations concerned are affected. However, **ideko**, as a highly-specialized Technological Centre committed to the industrial environment, considers that it is its responsibility to enable all necessary means to improve its competitiveness beyond the R&D results transfer thus reaching its industrialization in the market.

In this way, 2006 fiscal year seems to be full of expectations and illusions to fulfil. Forums and tools such as the Product Committees of our partner companies, the multi-annual joint R&D Plans, its own Product and Technology Plans, the Technology Management Process or the Technology Transfer Process which has been recently established and not yet consolidated are some of the actual events that will guide our development towards the creation of a comprehensive model for Innovation Management.

I do not want to forget about other great challenges for 2006 such as the inauguration of the building and Hi-Mach project for high-output machining and ultra precision manufacturing. The significance of this project is reflected in the facilities of more than 3,000 m2 with advanced equipment and investment of around 5.4 million Euros. All this will be conducted following our own national and international collaboration strategies, integration with our customers, professional and personal growth of our staff and the often unrecognized support of public entities which have helped **ideko** to materialize our original dreams, a reference Technological Centre as to Machine Tool and Manufacturing Technologies.

**Rafael Barrenechea**
President

2005 annual report

# fiscal year review

.fiscal year review

.06

2005 was quite active for **Ideko**, guided by its principle "research to innovate", which constantly reminds us that our research and development tasks are aimed at achieving market's innovations. Many efforts have been made in this regard, and good results have been obtained.

Throughout 2005 we thoroughly renewed our activities comprised by technology management. On the one hand, a new technology management process was developed to ensure this clear direction of our research activities towards the industrial exploitation of results. Within this process, which covers aspects such as project selection and supervision, intellectual property management, among others, there is a key issue: technology transfer. Due to the experience accumulated as a result of working close to the industry for many years and the modern methods for technology transfer, we have developed our own methodology that allows us to identify the barriers in technology transfer and to develop this activity effectively specially focusing on how to contribute to companies' training for a suitable exploitation of the technologies transferred. Furthermore, our continuous concern about the adequate management of intellectual and industrial property has driven us to establish and implement some mechanisms to protect such industrial and intellectual property, which have been spread throughout **ideko**. All these activities have enabled a significant increase in the cooperation with companies, which has originated around 60% of the total income of the centre and increased satisfaction by 7%.

Another significant work environment has been the creation of new technology-based companies supported by the technological capacity and developments dealt with by the centre. In 2005, **ideko** participated in the creation of two new technology-based companies such as Integra Conocimiento S.L., a services company for the machining industry, and Dano-Rail S. Coop., industrial company engaged in maintenance systems for the railway sector.

From our specialization in the industrial manufacturing and the cooperation with the industrial sector throughout our history, we have witnessed the incorporation to **ideko** of two new user partners in 2005: Doiki S. Coop and Latz S. Coop. As a result, the array of **ideko**'s partners has extended and covers a wide range of manufacturers within the manufacturing sector: machine tool manufacturers, wood machinery manufacturers, tools manufacturers and inspection equipment manufacturers.

All this transference and cooperation activity cannot be possible without constant research and development that allows us to reach excellence specialization in our field. For this purpose, we continue working on a great number of research projects in significant cooperation with other entities. Within this cooperation framework, we must highlight out participation in the CIC marGUNE (Manufacturing Cooperative Research Centre) as well as our close cooperation with MGEP (Engineering School of the Mondragón University), which has become **ideko**'s new partner. This research tasks, evidenced by the 4 international publications made, have given rise to the creation of 3 patents, all of which were transferred to the industry.

Our research work is supported by highly qualified staff, consisting of 86 people at the end of 2005, who continue their focused training. This permanent training is increasing the number of PhDs in the plant, who account for 12% of the staff hired.

This task is mostly supported by the different public entities which, through various programs, have significantly supported research, development and innovation at the centre. In this regard, we should mention the approval of 5 new projects in Europe, which amounts to a total of 8 projects within the VI Framework Program, not an easy program within the manufacturing environment.

Internally, we have continued working on our management system based on the EFQM model to achieve high-efficiency in our activities. We have focused on the project management environment, developing and implementing significant improvements in the means and training for integral project management, which made significant improvements to productivity levels. Thus, the staff's satisfaction survey has shown an improvement of 7.5%. Moreover, throughout 2005 we settled the foundations for ISO 14000 certification within the environmental sector.

Finally, I should mention that the works for Hi-Mach project, our major future project, commenced in 2005. This project is going to allow the extension of **ideko**'s facilities through the construction of a new building of more than 3,000 m2 with advanced facilities and equipment necessary to intensify, through constant contact with companies, the research and development of high-performance manufacturing processes as well as ultra precision technologies. This project must allow ideko to continue and go deeper into the direction of continuous support to innovation within the business sector through the incorporation of advanced technologies that allow companies to achieve the longed value added of products and services, necessary to continue being competitive now and in the future.

**Ramón Uribe-Echeberria**
Manager Director

2005 annual report

# mechanical engineering

.mechanical engineering

.08

## Personalized solutions for the demand of high value-added products

Machine Tools and Manufacturing Technologies are in general inevitably evolving in western countries towards high value-added products that allow them to preserve their position in the market against competition posed by serial and low-cost products. This need deepened during the last crisis cycle, which started to be sorted out last year.

In fact, machine tools and manufacturing systems manufacturers could see that this crisis cycle not only suits the parameters handled in previous cases but also that the emergence of Eastern Europe's countries and Asian powerful countries, such as China or India, introduce a new significant factor, which is definitely marking the future already.

Within this framework, the main manufacturers are heading towards differentiated products for strategic sectors or niches as against more general markets. This new strategy sets new ways of approaching the business in general and implies significant technological developments to provide customers with highly specialized and efficient manufacturing systems.

Through our support work to the technological development of our customer companies and their products, at **ideko**'s Mechanical Engineering Department we collaborate with our customers in the development of solutions, equipment and processes that provide the value added required by the new scenario.

From the very initial stages of machine and parts design which ensure high precision, reliability and operational capacity, based on our structural designs and our own development of the most critical components such as drives, guiding systems and spindles on which knowledge on dynamic, thermal and fluid performance developed in different research projects are applied. To the development of comprehensive production solutions regarding pieces or sets of pieces showing that the manufacturer of machinery cannot afford to be misinformed as regards to the machining process, but on the contrary must be capable of offering new processes both within the conventional environment and within that of new processes and formulas of materials' transformation. In this regard, two significant aspects of the Department's development should be mentioned:

On the one hand, the materialization in industrial products of some of the technologies developed in research projects throughout the past years, such as ecologic machining, internal swarf suction or the application of the process and machine simulation in the programming of processes from the offer phase.

On the other hand, constant research at a more basic level of new machining ways and new alternative and hybrid processes that allow, in some cases, access to currently non-exploited markets and, in other cases, to the offer of innovative solutions at a process level, always oriented to increase quality and productivity.

## The machine and process simulation from offer to tune-up

The theoretical simulation of the machine and machining process performance has been for years one of the most studied issues at universities and technological centres. For years, our research team has focused on the development of simulation models for the joint performance of machine and process, based on two processes that tend to give rise to vibrations: the universal milling process and centerless grinding process.

The development of these models is oriented to their application to the different phases of the development of the machine-process couple: from the programming of a turnkey offer of a certain piece, allowing the selection of tools and optimum working conditions free of vibration, going through the machine design phase, where, together with the usual machine modelling by MEF, these models allow knowing the output of the machine that is being designed during a specific process, to the machine and process' tune-up phase on the part of the machine's manufacturer and user for any change of reference, which allows reducing the number of tests optimizing the process in a fast and simple way.

### Projects:

Programming of a turnkey process of a machining centre avoiding unstable conditions.

Tune-up of a centerless grinding process eliminating testing and errors.

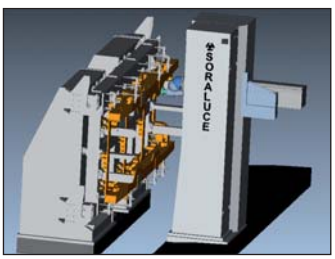
Programming of complex geometry pieces in "turnkey" projects.


## Machining of new materials: access to new markets through innovative solutions

Among our future strategies, there is the creation of technologies that allow the development of new business opportunities within the traditional sectors or in new sectors. Within this environment and in the transformation process line we are working on the development of machining solutions, which enable us to enter the speciality of machining strategic materials given their growth potential. In order to break into these new markets, our researchers develop innovative solutions intended to provide highly differentiating aspects from a productive point of view so that we can place ourselves in a vanguard position in the sectors accessed.

### Projects:

Machining with shavings suction of composites and graphite.



## The ecologic machining: conventional industrial process

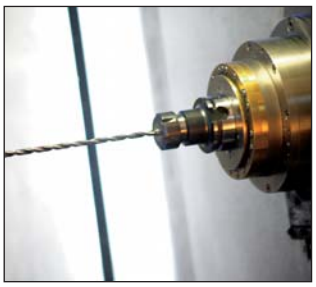
The ecologic machining line, not understood as the application of environmentally friendly cutting fluids but as the elimination of the waste produced by the cutting fluid (dry machining or MQL), is one of the stable lines in the transformation process area. At present, the degree of development reached in cutting processes with a clearly defined cutting edge allows us to affirm that this is an industrialized process, our activity being focused on the technological transfer through the development of joint projects with machining companies to solve particulars associated with each case or piece in particular.

Evolving along the line, the research activity is currently focused on the grinding process. This process is intended, through the application of mixed cooling-lubrication techniques, to eliminate the large amounts of cutting fluid used in the industry at present.

### Projects:

Full dry – MQL clutch crankcase machining.

Deep drilling of holes in automotive steel, cast or aluminium parts: crankshaft and engine block and cylinder head.



## From machining to manufacturing: integration of production processes

The search for the maximum productivity and efficiency in the manufacturing of pieces is causing the evolution of transforming processes, clearly intended to save the time and material used as well as to optimize raw materials and reduce the waste produced. In this context, the term "manufacturing" substitutes the more conventional term "machining" as transformation processes go beyond the elimination of material to integrate new technologies often in combination with conventional processes.

### Projects:

Manufacturing-repair of pieces by welding: repair of compressor blades.

Diamond dressing of CBN grinding wheels through EDM.

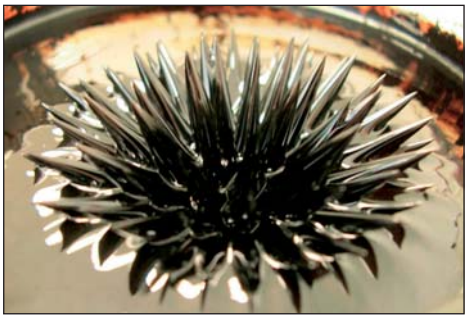
Ultrasound-assisted diamond dressing.

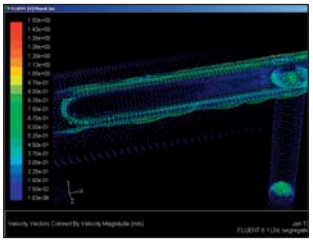
## Intelligent components for the machines of the future

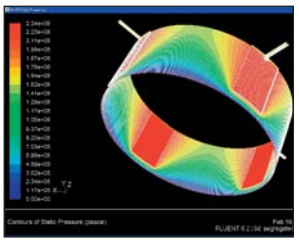
Within our development area of high-performance new machinery and components, one of our main activities is the development of technology for the design and manufacturing of the machine critical components, providing our clients with components different from commercial components for those applications requiring special qualities and performances. Focused on the development of guiding systems for hydrostatics transfer or rotation, we are currently researching the introduction of intelligent materials into these components, both in the support fluid and in controlling elements, so that we can control and change their performance within a greater range.

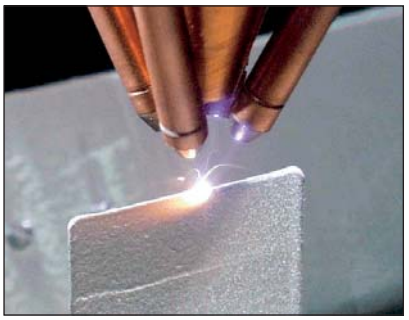
### Projects:

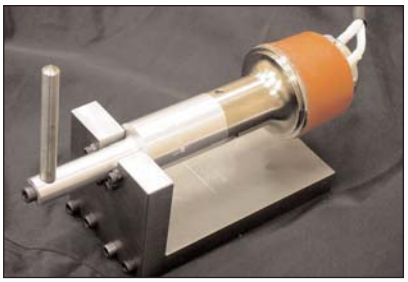
Magnetorheological fluids for hydrostatic bearings.











2005 annual report

# control engineering

.control engineering

.12

## intelligence
## behind the user interface

The use of Automation and Control technologies allows offering users of the manufacturing systems and equipment a series of functionalities and services beyond mere mechanical features. The market's demand for these functionalities is increasing as they constitute a key element in comparing the advantages of a certain offer of equipment with others. Thus, during the last EMO in Hannover it could be verified that more than one third of the weight of the current Machine Tool developments is focused on the related control and software.

This technological contribution can be made through the **incorporation of external elements** as additional equipment, optional for users, which allows reaching a service range greater than that of the "series" equipment offered. This category comprises the development of active elements, actuators with specific dynamic objectives, help software options, software for the access to production information, in-process simulators for the prevention of collisions, start up expert systems, new Internet-based services, cutting process supervising systems, component diagnosis, error and deformation offset systems through control, measurement systems with customized advanced requirements.

Moreover, the improvement in the level of services offered by default has been considerably relevant as an element for comparison among manufacturers of machinery and manufacturing equipment. The standard **equipment** serves as a showcase and is used to compare, at the same price, the technological level among manufacturers and countries. Advanced equipment, software/hardware, shows users the global command of the manufacturer's production technologies as to manufacturing systems: graphic and friendly interfaces, operating options developed considering the actual problems to be found by customers during production, a standard equipment suitable for daily operations.

The technological command is transmitted through the user interface.

At **Ideko**'s Control Engineering Department, we use a user interface providing the functionality demanded, **intelligence within control**: algorithms for the improvement of precision, control of active elements for compensation of vibrations, models for the prediction of manufacturing process' stability, supervision of the condition of tools and components, development of new and complex measurement elements. We use available state-of-the-art technology and develop and test the technology to be implemented in the future applying processing and control strategies based on Advanced Automatics going deeper into the manufacturing process knowledge to move towards optimization using drives to be applied to the next generation of machine tools and manufacturing equipment.

The results of the research conducted in another field (in a production process or in a work or design methodology) can often be transferred to an actual product through Automation and Control technologies. Thus, throughout 2005 we continued dealing with **technology transfer** projects, where we worked on new control elements, operator help systems and advanced help production software.

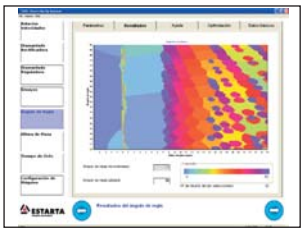
## Considering End Users: the Value-Added Advanced Software

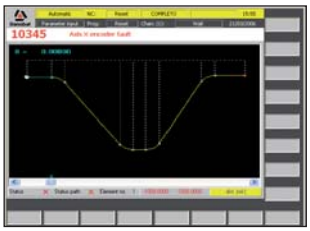
Our software development team works on the materialization of the most advanced functionality, which makes it easier for end users to manage the manufacturing systems. Modular software architecture, flexible for future modifications, constitutes an essential advantage to ensure the incorporation of new functions at a low cost, preserving control of the upcoming versions under development. An intuitive interface is crucial to achieve acceptance by end users. Intelligent software, which guides operators in the resolution of problems arising during tune-up and ensures the reduction of unproductive periods, may be a valuable competitive advantage.

### Projects:

New software generation for cylindrical grinding machines, NGGS-Next generation grinding software.

An example of technology transfer: software – SUA – Set-up Assistant, eases the tune-up of the process.






## Control Algorithms to increase Machine Functions

The application of Automation techniques of different complexity levels allows the substantial optimization of the machines and manufacturing systems' performance, thus improving the functions within different spheres: better positioning precision, greater axis speed, increase in the material start-up rate, and a wider range of stable operation. This improvement may be achieved acting intelligently and automatically on the axes working conditions (speed and acceleration) and applying advanced control strategies on active elements installed in the machine for such purpose (latest generation actuators). The command of each controlled axis' dynamics is essential in high-performance machines.

### Projects:

The adaptive control system takes maximum advantage of the axes and heads' dynamic capacities during milling operations.

The combination of piezoelectric actuators and advanced control strategies QFT allows extending the range of stable functioning, free of vibrations, during the centerless grinding process.

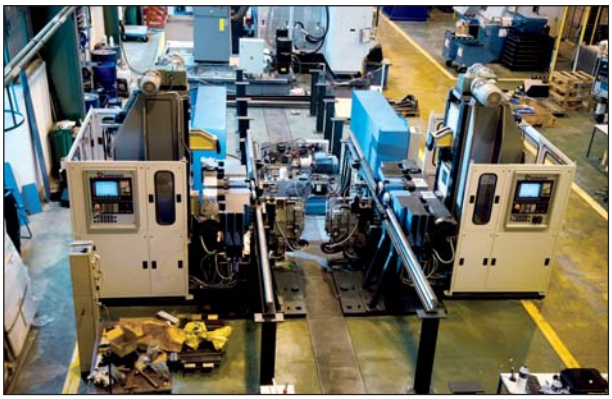
## Creating advanced solutions: measurement and automation

**Ideko** has a vast experience in the creation of advanced automation solutions for the manufacturing sector. Where the development of a new measurement solution is required, where the integration of commercial measuring equipment is not enough to meet the services required, where measurement and its treatment constitute the basis for subsequent operations and the secret where the differentiating value of the machine or manufacturing system lies, our equipment is capable of creating a comprehensive solution: sensing - measurement - integration - automation. We provide measurement solutions that turn the systems concerned into models.

### Projects:

Assembly of the system for measuring and maintenance of railway surfaces.

Incorporation of the latest technology in the measuring systems for the maintenance of turbine blades.



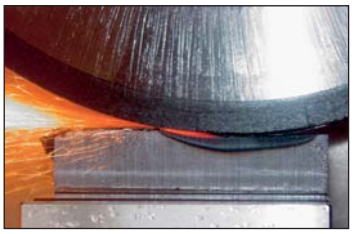
## The need for a diagnosis of an ever changing system

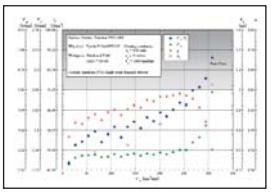
During the manufacturing process the condition of the equipment and its components is inevitably modified: tools depreciate and the transmission components deteriorate due to their ordinary use. At any moment, an unexpected inconvenience altering previous processes may occur. The evolution of these elements affects the machining results and calls for supervision systems that diagnose and compensate, where applicable, the loss of services, optimizing the productive capacity of the machine. The development of these systems requires a thorough knowledge of the manufacturing processes in its optimum condition.

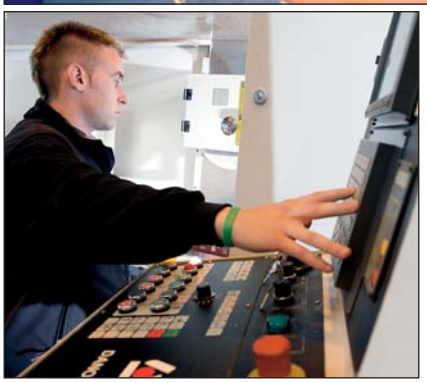
### Projects:

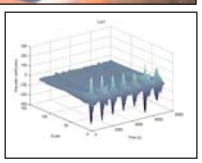
Development of supervision strategies in surface grinding. (Creep-Feed).

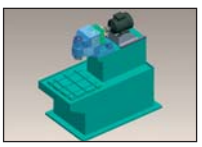
Development of a diagnosis system of mechanical transmissions.











2005 annual report

# product engineering

## integral management of product and technology

Many small and medium-sized companies, especially the smallest ones, do not have sufficient capacity or do not wish to deal with technological developments internally; however, they regard technological innovation as strategic to preserve their competitiveness. As a result, they resort to technology suppliers and acquire such technology through a technology transfer process.

For the technology transfer process to succeed (i.e. for the competitiveness of the recipient company of such technology to improve through the launch of such technology into the market) different key factors have to be considered. Some of these factors are: the definition of the technology to be transferred, the ownership agreements, the involvement of the parties in the exploitation of results and the adaptation of technology by end users.

In any event, considering that the transfer of technology constitutes a key element of technological innovation, the scope widens. Always considering the needs of each organization, the decisions on products and technology must be taken as a whole evaluating at all times the impact of incorporating such technology into related products, in current or future markets, in internal production means, among others. In this way, we understand that although the transfer of technology is essential, a wider product and technology process must be considered as the issue should not be evaluated on an individual and isolated basis.

At **Ideko**'s Product Engineering Department, we work on the Integral Product and Technology Management from different approaches:

First, we provide the necessary information to make strategic decisions or supply the organizations with customized systems that enable them to obtain such information, always supported by a structured system of permanent supervision and selection of relevant information.

Thereafter, we offer advice on the product and technology development process, including the definition of product and technology development plans that may be associated with the launch of applied research projects, technological development or technology transfer considering the offer of technology. In this way, we contribute to the creation of multi-annual R&D plans and support their development.

At the same time, we manage in a comprehensive manner the new product from the initial configuration stages, where the Competitive Intelligence aspects become important, to the environmental impact of the product's manufacturing processes and during production and use. We also work on the analysis of the product's life cycle considering economic criteria and acting on the design phase through different internal and external tools and methodologies.

Finally, we provide the entire process with methodology analyzing reference cases, identifying key factors, measuring the final impact; that is, optimizing the product and technology management process (including technology innovation and transfer) of our customer companies.

To effectively and professionally tackle all this activity we work simultaneously with companies and organizations within the academic and research sector in R&D projects. We aim at improving our academic and technological level in the understanding that this will benefit the companies hiring our services.

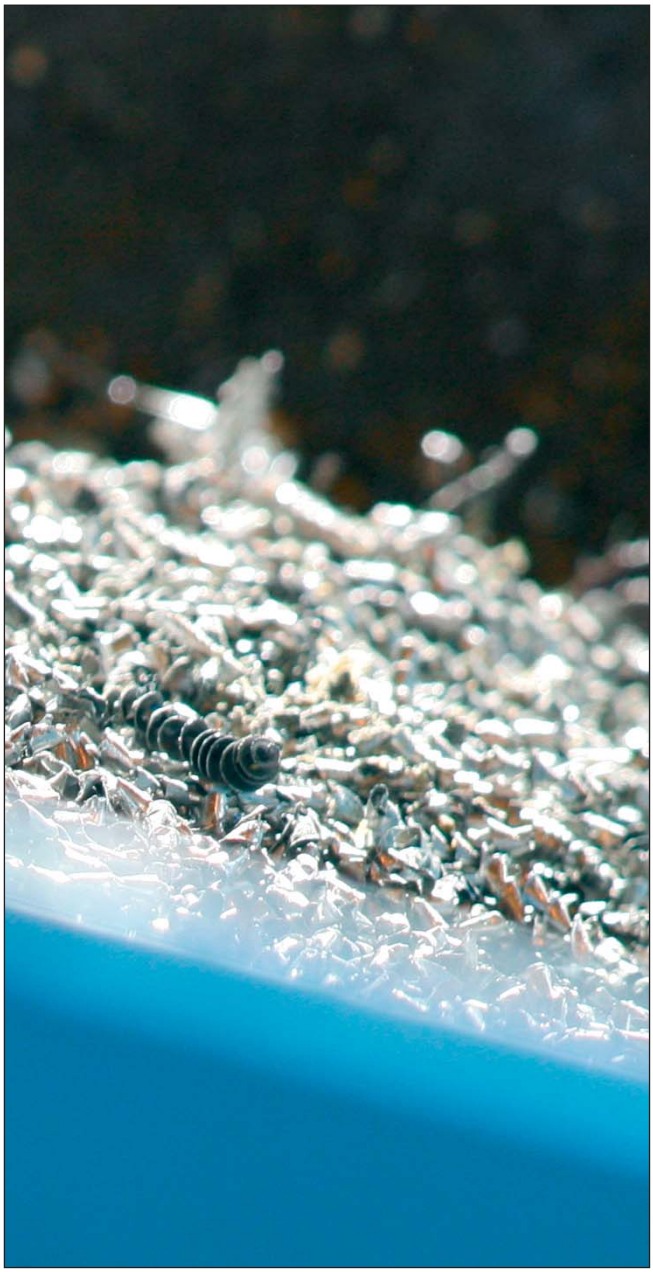
## Controlling the environmental impact of manufacturing technologies

Our goal is to incorporate the environmental variable in the design of industrial manufacturing products or manufacturing, considering the product and its impact throughout its entire life cycle as the core of analysis. One of the most important courses of action is focused on the development of new generation Ecodesign considering the advancements made at the international level as well as the producers' requirements. These new developments will have significant advancements for the optimization of environmental analysis and for the search for improvement alternatives. The concept "Product Lifecycle Management Cost" is made part of this analysis that transfers aspects not considered until now to easily quantifiable and measurable economic variables.

### Projects:

Environmental Product Lifecycle Management for competitive improvement in the Machine Tool sector.

Innovation of sustainable Machine Tool concepts based on new lifecycle analysis tools.

## Innovation management to increase competitiveness

Comprehensive Innovation Management allows the company to control some of the key aspects that affect its competitiveness. In this way, the Strategic Product and Technology Management, the Development Process of New Products, the attraction of R&D results and the resulting innovations in the market are key aspects to be controlled together with other aspects, such as internal efficiency, supplies, etc, to ensure the success of your products in the market.

### Projects:

Development of systemic diagnosis and intervention tools to improve the impact on and the quality of technological transfer in R&D business units.

Support system for Risk Management associated with the development of New Products.

## Technological Supervision and Competitive Intelligence: tools for strategic decision-making

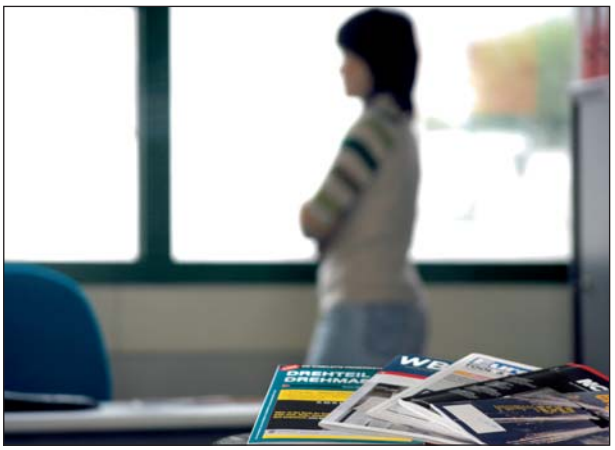
**Ideko** has vast experience in the development of Technological Supervision and Competitive Intelligence projects. Strategic decisions regarding Product and Technology development must be made professionally based on objective and relevant information. For this purpose, we provide customized solutions defining, instilling and, in some cases, feeding with information customized competitive intelligence systems. Based on the advantages provided by the new technologies in balance with the expert's knowledge, these solutions give user companies and associations the precise information in due time thus optimizing the decision making process.

### Projects:

Design and implementation of Customized Competitive Intelligence Systems for companies within the Machine Tool and Manufacturing Technologies Sector.

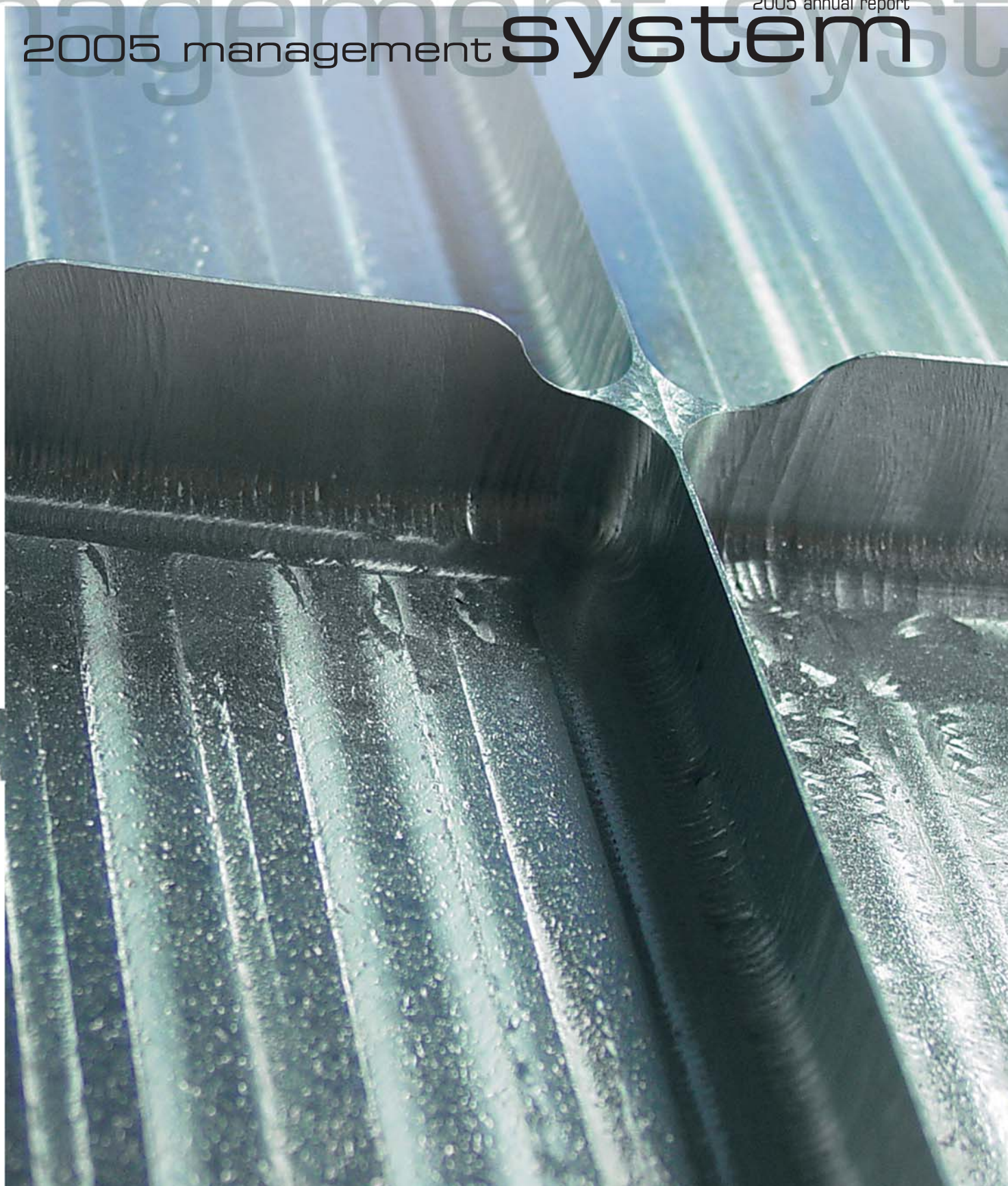
INNOGUNE, Technological Supervision Bulletin for the Metallurgical sector of small and medium-sized companies in Biscay.

Strategic Information System oriented to the Machine Tool sector.



2005 annual report

# 2005 management system



.2005 management system

.20

2005 was a year of reflection and change of several of our management system pillars: the documentary system and the project management process

The start of the year brought the renewal of the Quality Certificate under ISO 9000:2000. The renewal has served as the starting point for a change in the documentation associated with the Management System. The documentary review has sought the reduction, simplification and clarification as the main objectives. Likewise, the new documentary framework is going to enable us to conduct the integration of the Quality, Labour Health and Safety and Environment. As to the Environment, the idea is to obtain ISO 14000:2004 Certification.

The development of the integrated management system favours the way towards continuous improvement and is reflected in the coherence among **Ideko**'s strategies, purposes, process and documentary system. This coherence is analyzed based on the Management Cube tool, which was designed this year to visualize how all factors interact.

Another essential event conducted in 2005 was the review of the Project Management process, which is the core of our activity. The objective accomplished has favoured the comprehensive management of the project by the Project Heads increasing their involvement in areas like customer service, profitability and environmental impact.

At the end of the year, the team of managers conducted the EFQM self-assessment as a mechanism to determine areas to be improved in the company's management. The result was positive and has particularly improved the criteria of people and results in the company thanks to the new environmental activity which contributes to the preservation and maintenance of resources. During the strategic reflection for the definition of the Management Plan for 2006, we analyzed the inclusion of areas to be improved, detected to preserve the improvement cycle we are in.

Within the economic-financial sector, it remarks the positive evolution followed by income, the fiscal year having been closed with a global income figure of 4,935 m, which exceeds the figure for 2004 of 4,863 m.

In spite of the reduction in the proportion of income originating in Public Administrations mainly due to the delay in the launch of 3 new European projects approved in 2004, which were not commenced until the second half of 2005, one of the most remarkable aspects of 2005 focuses on the growth by 11% in the chapter on income from companies, from 2,670 m€ in 2004 to 2,961 m€ in 2005. The reason for this outstanding growth is the greater specific weight acquired by the income from projects under agreement as a result of the defined goal of **Ideko** to meet the need for technology incorporation required by our customer companies.

As a result of this symbiosis of Centre-Customer technological interests, the development of technology transfer projects is increasing. In 2005, these projects accounted for 60% of **Ideko**'s activities.

Evolution of income according to origin

| INCOME (m€) | 2004 | % | 2005 | % |
|---|---|---|---|---|
| company's income | 2.670 | 55% | 2.961 | 60% |
| administration's income | 2.193 | 45% | 1.974 | 40% |
| TOTAL | 4.863 | 100% | 4.935 | 100% |

In line with the non-profit premise of the entity, the economic results after reaching the balance between income and expenditure and once interest on contributions have been deduced are 9,759.49 €, as shown in the summarized operating account below.

Income Statement as of 31.12.05 (m €)

| | |
|---|---|
| Operating expenses | 4.478 |
| Amortizations | 447 |
| Projects' Income | 4.480 |
| Other Income | 455 |
| SURPLUS | 10 |

Compared to the statement of financial condition as of 31.12.2004, the net worth balance between assets and liabilities in 2005 increased from 6,077 m€ to 8,631 m€. The accounting of investments and financing of 2005 referred to the commencement of the construction work of the new building called HI-Mach last August as well as the accumulation of allowances granted, the collection of which is pending, increase the current fixed assets as well as the income to be distributed among several fiscal years, as shown in the auditor's report prepared by Gasso Auditores S.L. in February 2005.

Statement of Financial Condition as of 31.12.05

| | |
|---|---|
| Net Fixed Assets | 2.754 |
| Liquid Assets | 5.361 |
| Cash | 516 |
| TOTAL ASSETS | 8.631 |

( m€ )

| | |
|---|---|
| Own Funds | 2.313 |
| Income to be Allocated | 4.145 |
| Long-term claims | 376 |
| Short-term claims | 1.797 |
| TOTAL LIABILITIES | 8.631 |

( m€ )

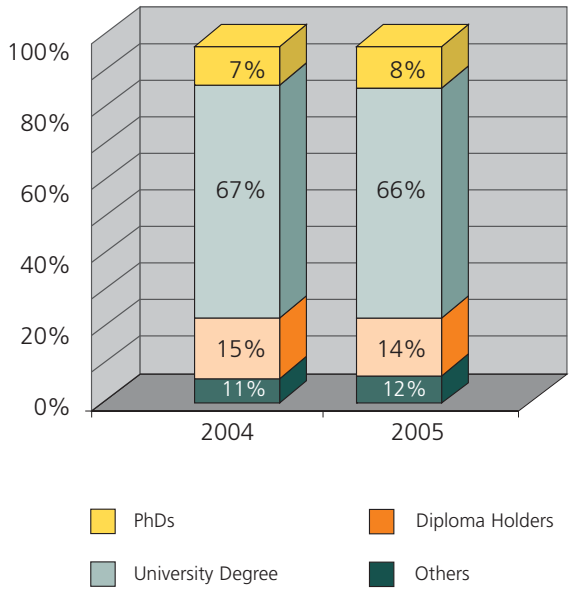
Third, we will discuss the team working at **Ideko** Technological Centre.

The 2005-2008 Strategic Plan, in pace with **Ideko** 's ideas, places, as present and future key elements of guarantee for the centre and its environment, the permanent incorporation of technological innovations to the products and processes of our customers as a result of the existence of an actual transfer of the results of our research.

Within this framework, in 2005 **Ideko** implemented specific actions for the improvement of the internal efficiency of the organization orienting the efforts and available resources to provide professionals with a permanent sensitivity and predisposition to identify our customer's needs and expectations to develop a researching attitude focused on the obtainment of results capable of being applied and industrialized.

The team, made up of 86 people, including 58 partners and employees and 28 interns, constitutes the centre's most human side and intangible asset: the people and their knowledge.

## evolution of the staff's academic profile




In this regard, there have been several articulated means and mechanisms to allow in all management sectors the generation of knowledge within suitable parameters of internal efficiency. On the one hand, this highlights the creation of mixed teams between professionals from the Centre and from companies to conduct joint developments of advanced solutions and latest generation prototypes. On the other hand, more than 9,000 hours of training activities provided through internal and external courses, technical documentation and languages and the 73% value obtained from this training confirm the efforts made to support an active training policy directly oriented to improve individual training as the base for the optimum performance of each team.

The people's commitment and satisfaction have been two leading aspects in the internal scenario of 2005. This is given by the formalization of confidentiality agreements executed with the entire staff allowing the individual commitment and an active protection of the entity's intellectual property. All this is framed within a working environment that improves satisfactorily, as evidenced by the survey of staff satisfaction conducted in the middle of the year and which collects the direct opinions of all the staff (partners, employees and interns). In this sense, we should mention the 7% improvement of the people's satisfaction ratio as compared to the previous survey. This ratio exceeded even the expected value, providing the Centre with a remarkable "healthy" working environment.

Last, we should mention the publishing and communication activities conducted by the centre during 2005. The development of a communication plan together with previous years' activities have derived in the attraction of customers, thus increasing income by 12%, and improving the customer satisfaction survey by 7%, and incorporating 3 new partners into **Ideko**.

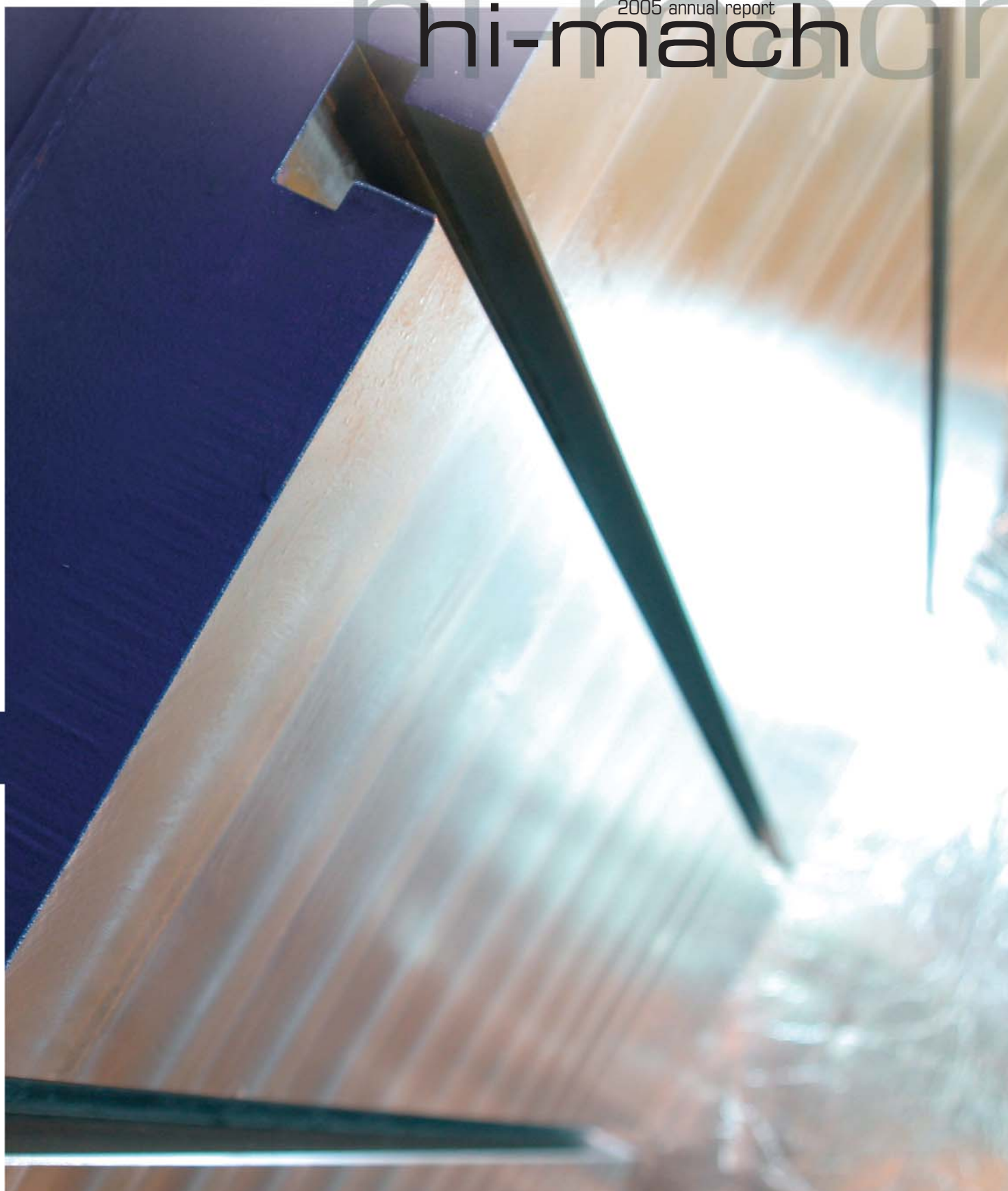
Moreover, during 2005 we cooperated with different organizations and publications for the preparation of dissemination articles (a total of 11); more than 21 press articles were published in the means of communication; we published advertising announcements in the written press and edited number 1 and 2 of our newsletter IDEKONEWS by means of which we intend to disseminate our interesting news within the sector and **Ideko** itself and the research environment among target readers from more than 200 organizations including our customers, collaborators and reference public entities.

As to dissemination and communication activities, 2006 is full of activities of this sort. The completion of the construction of the new building of HI-Mach project is expected for 2006, together with the celebration of our 20th anniversary as an R&D centre specialized in Machine Tool and Manufacturing Technologies.

Finally, **Ideko** would like to thank you for the attention you have always paid to us and we hope to be able to efficiently provide you with the most relevant aspect of our activity and have your presence as a spectator of our evolution.

2005 annual report

# hi-mach



## The starting point for the creation of a future project

2005 was the starting point for the materialization of Ideko's new future project, HI-Mach, upon the launch of the building construction works.

This new project, where **Ideko** places most part of its future development expectations, is based on the Centre's basic strategies: research for industrial application for the generation of more competitive products; the fundamental role of technology as the engine of industrial manufacturing and the relevance of the constant cooperation among suppliers of technologies and means of production and the users of these technologies and means of production.

Under this perspective, Ideko starts up the HI-Mach project, which stretches far beyond the construction of a building, and is the most significant event in 2005. The basic objectives of this project are those we have been working on for the last years:

- Promote cooperative research, creating mixed R&D teams, made up of the Centre's researchers and the customer companies' technical staff, including equipment and machinery manufacturers and users.

  The Centre's first objective is to materialize this cooperation through reaching long and medium term R&D agreements with the customer companies to establish a stable cooperation framework.

- Develop new business opportunities through the development of new technologies within the high-performance manufacturing sector and the ultra-precision technologies. Within the above-mentioned cooperation framework, **Ideko** intends to be the technological engine offering new business opportunities for its partner companies in sectors where the value added provided by technology to products imply a differentiated competitive factor.

- Increase the qualification of **Ideko**'s research team and, through cooperation and technological transfer, the technological level of our customers and partners. Within this objective, there is an intention to strengthen the exchange of researchers, the creation of publications in specialized magazines and international congresses and our attendance at reference scientific and technological forums.

In order to shape these ambitious objectives we want to have a building equipped with the latest technologies as to facilities and as to scientific equipping, according to the level of our goals.

This year, where the commencement of the work clearly shows the realization of the project, we have to mention the Public and private entities which are doing their best to turn this project into a reality. Thus, we would like to thank the support granted by the Ministry of Industry, the Basque Government, the Provincial Government of Guipuzcoa, Elgoibar City Hall, Mondragón Corporación Cooperativa and Danobat Group; without them it would have been impossible to launch this thrilling future project.

# publications and patents

## publications

.1 Ortega, N., Sánchez, J.A., López de la Calle, L.N., Marañón, J.A., Maidagan, X. "Analytical study on electro discharge Dressing (EDD) of large grit size CBN wheels. *International Journal of Electrical Machining, No.10, January 2005.*

.2 V. García Navas, I. Ferreres, J.A.Marañón, C. García-Rosales, J. Gil-Sevillano. "Tensiones residuales generadas en acero F-522 por distintos tipos de mecanizado". *Revista de Metalurgia. Madrid 41 (2005) 241-320 July-August.*

.3 Ricondo, I., Viles, E. "Six Sigma and its link to TQM, Reengineering, Lean and The Learning Organization". *International Journal Six Sigma and competitive advantage, vol.1, no.3,2005.*

.4 Bediaga, I.,Egaña,I.,Muñoa, J. "Time and frequency domain models for chatter prediction in milling" in *DAAAM scientific book 2005.*

.5 Fernández, A., González, L., Bediaga, I., Gastón, A., Hernández, A. "Automatic fault detection and diagnosis implementation based on intelligent approaches" in ETFA2005: *10th IEEE International Conference on Emerging Technologies and Factory Automation, Facolta' di Ingegneria, Catania, Italy, 19-22 September 2005.*

.6 Fernández, A., L., Bediaga, I., Gastón, A., Hernández, A. "Feasibility study on diagnostic methods for detection of bearing faults at an early stage" *44 th IEEE conference on decision and control and european control conference FC 2005, Sevilla, Spain, 12-15 December 2005.*

.7 Lizarralde,R., Barrenetxea, D.,Gallego, I., Marquinez, J.I. "Practical Application of New Simulation Methods for the Elimination of Geometric Instabilities in Centerless Grinding, 55th **CIRP** General Assembly in Antalya, TURKEY, 21-27 August, *CIRP ANNALS 2005.*

.8 Muñoa J., Zatarain, M., Bediaga, I., Lizarralde, R. "Optimization of Hard Material Roughing by means of a Stability Model" *8th cirp workshop on modeling of machining operations , Chemnitz, Germany, 10-11 May 2005.*

.9 Egaña, I., Sabalza, X. "Robust chatter reduction in centerless grinding machines by active damping" *7th International symposium on quantitative feedback theory and robust frequency domain methods, The University of Kansas, Lawrence, Kansas, 9-11 August 2005.*

.10 Garitaonandia,I., Sabalza, X.,Helena Fernandes, M., Muñoa, J., Hernández,J., Albizuri, J. "State-space modelling of a centerless grinding machine."*Eurocon 2005, Serbia & Montenegro, Belgrade, November 22-24.*

.11 Bediaga, I., Muñoa,J., Egaña,I., "Computer Model for Simulating and Optimizing Milling Process". *Eurocon 2005, Serbia & Montenegro, Belgrade, November 22-24.*

.12 Fernández, A., Bediaga, I., Gastón A., Hernández,J. "Evaluation Study on Detection Techniques for Bearing Incipient Faults" *Eurocon 2005, Serbia & Montenegro, Belgrade, November 22-24.*

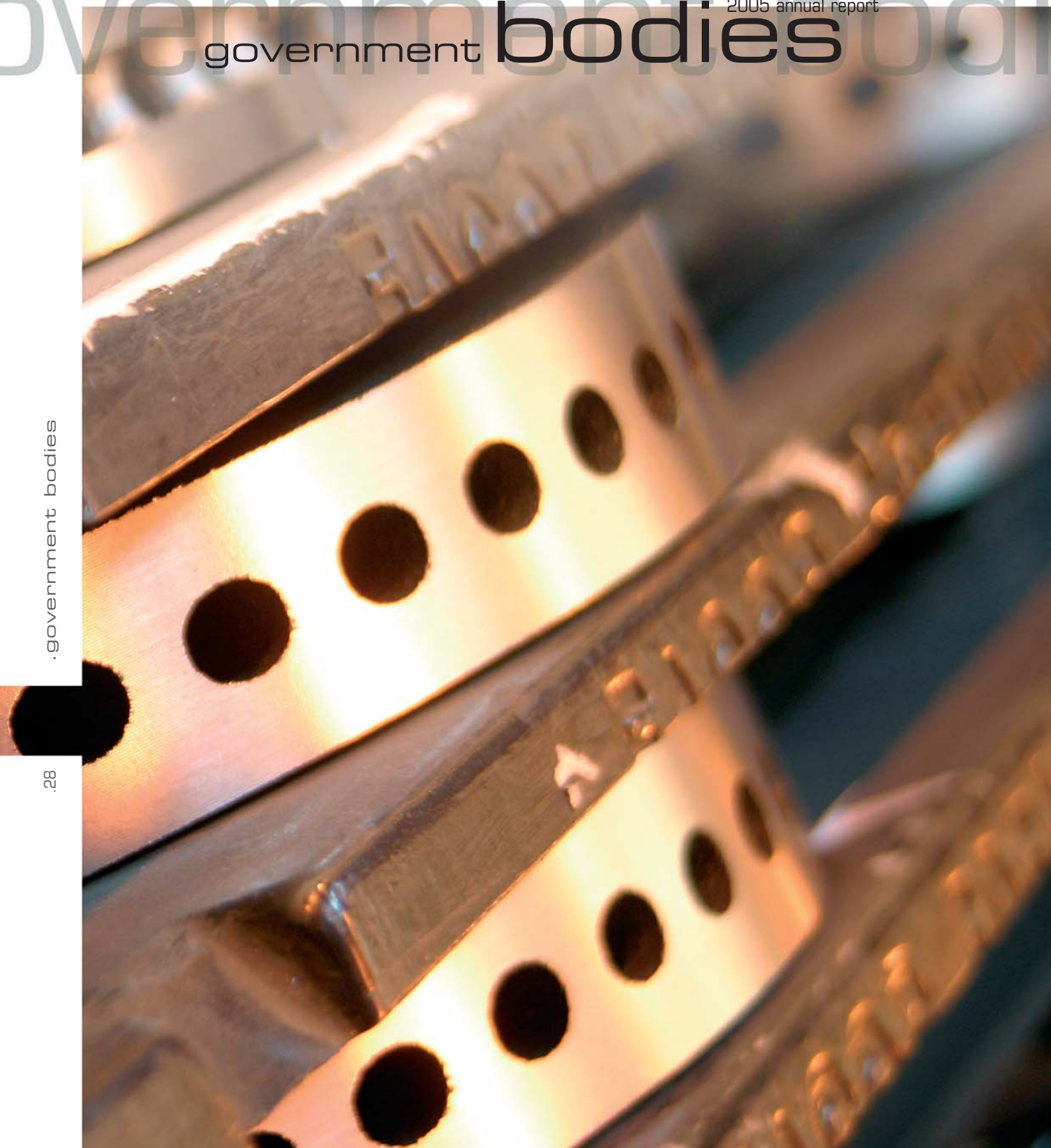
.13 Gandarias,E. Dimov,S., Pham D., Ivanov, A., Popov, D., Lizarralde, R., Arrazola, P.J. "New methods for tool failure detection in micromilling" *4M Conference Paper, October 2005.*

.14 Alzaga,X., Gandarias,A., Zelaieta,O., Lizarralde,R. *"Innovative technology for the machining of Mg components" Aeromat 2005, Orlando, Florida, 6-9 June.*

## patents

- P200502874:
  Grinding quenching cooling system.
- ES200500082:
  Cutting machine.
- ES200501099:
  System for active chatter control on machine tools.

# government bodies



## ideko's Board of Directors

Rafael Barrenechea, President
José Luis Juaristi, Vice president
Manuel Aguirre, Secretary
Antón Echeverría, Member of the Board
Garbiñe Gorostiaga, Member of the Board
Imanol Odriozola, Member of the Board
Iñaki Dorronsoro, Member of the Board
Iñigo Ucín, Member of the Board
José Manuel Segués, Member of the Board
Peio Olaskoaga, Member of the Board
Vicente Mújika, Member of the Board

## ideko's Board of Management

Ramón Uribe-Echeberria, Managing Director
Iñigo Amundarain, Quality and Organization Director
Laura de Cristobal, Financial and Human Resources Director
Rafael Lizarralde, Director of the Mechanical Engineering Department
Javier Hernández, Director of the Control Engineering Department
Nerea Aranguren, Director of the Product Engineering Department

# the future is built on today's commitments

# ideko

.entities to which we belong

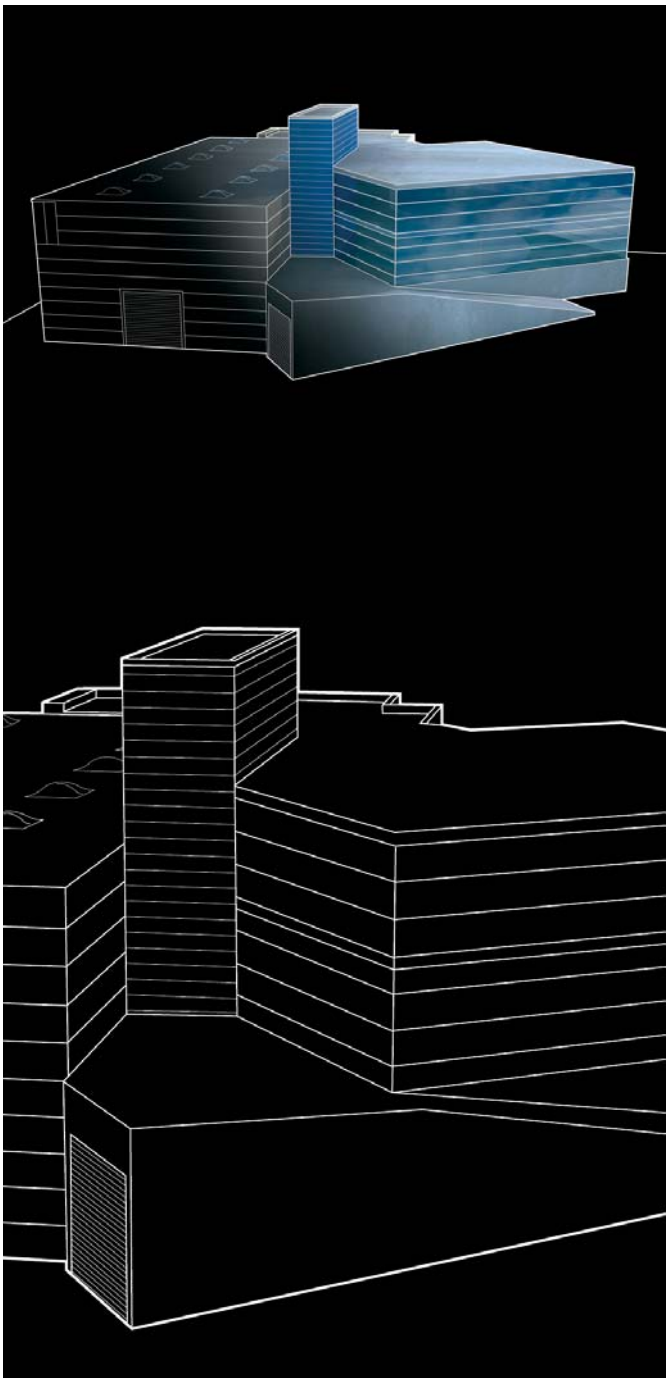
euspen

sareTEK
Zientzia, Teknologia eta Berrikuntzaren Euskal Sarea
Red Vasca de Ciencia, Tecnología e Innovación

FEDIT
CENTROS TECNOLÓGICOS DE ESPAÑA

IRP

marGUNE



GRUPO DANOBAT

MONDRAGON
CORPORACION COOPERATIVA