IDEKO

MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

Specialized in Advanced Manufacturing

01

IDEKO

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

01. IDEKO

1.1 ABOUT US...

we are a
research center
specialised in
industrial production
and manufacturing
technologies.

The research and development department encompasses the 4 RESEARCH FIELDS which makes up the backbone of our Center. They are key factors in the development of the IDEKO specialisation, they offer a comprehensive solution in manufacturing and industrial production technology and provide the necessary balance to transfer research results to the companies based on the generation of knowledge.

DYNAMICS & CONTROL

Description and optimisation of dynamic behaviour of machines and processes.

MANUFACTURING PROCESS

Design, development and improvement of production processes.

ICT & AUTOMATION

ICTs for manufacturing and industrial production technology.

DESIGN & PRECISION ENGINEERING

High-performance product design and development.

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

01. IDEKO

1.1 ABOUT US...

it became a **second degree cooperative** in 2004.

USER PARTNER

50%

DANOBAT | SORALUCE
DANOBATGROUP | GOITI | LATZ

WORK PARTNER

40%

75 SOCIOS

COLLABORATIVE PARTNER

10%

MGEP | ZEISS | ROFIN
MONDRAGON FUNDAZIOA

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

01. IDEKO

1.2 HISTORY

1986 SETTING UP OF IDEKO TECHNOLOGICAL CENTER

1992 LEADING OF EUROPEAN PROJECT SINTOMA

1997 AFFILIATION TO THE BASQUE NETWORK OF SCIENCE AND TECHNOLOGY

1999 IDEKO HEADS PRIMA, AMADEUS AND SEPMAC PROJECTS WITHIN THE 5TH FRAMEWORKS PROGRAMME OF THE EC

2003 ACHIEVED OVER 500 POINTS IN THE EFQM SELF-ASSESSMENT

2006 THE BASQUE GOVERNMENT OFFICIALLY ACKNOWLEDGES IDEKO AS A RESEARCH CENTER

2007 IDEKO JOINS IK4 RESEARCH ALLIANCE

2008 “GREEN MANUFACTURING” AND “MANUFACTURER OF THE YEAR 2008” AWARD

2009 LAUNCHING THE NEW ORGANIZATIONAL MODEL THE STATE’S ONLY REPRESENTATIVE IN THE CIRP

2010 DEVELOPMENT OF PROTOTYPES: ULTRA-PRECISION MICROMACHINING MACHINES

2011 IDEKO CELEBRATES ITS 25TH ANNIVERSARY

2013 DEVELOPMENT OF TWO PROTOTYPES IN THE FIELD OF VIBRATIONS ELIMINATION (DAS, ikDAS)

2014 IDEKO LAUNCHES INTELSUITE (COMPETITIVE INTELLIGENCE SOFTWARE)

2016 IDEKO CELEBRATES ITS 30TH ANNIVERSARY

2018 OPENING OF THE DIGITAL GRINDING INNOVATION HUB

2019 IDEKO JOINS BRTA (BASQUE RESEARCH & TECHNOLOGY ALLIANCE)

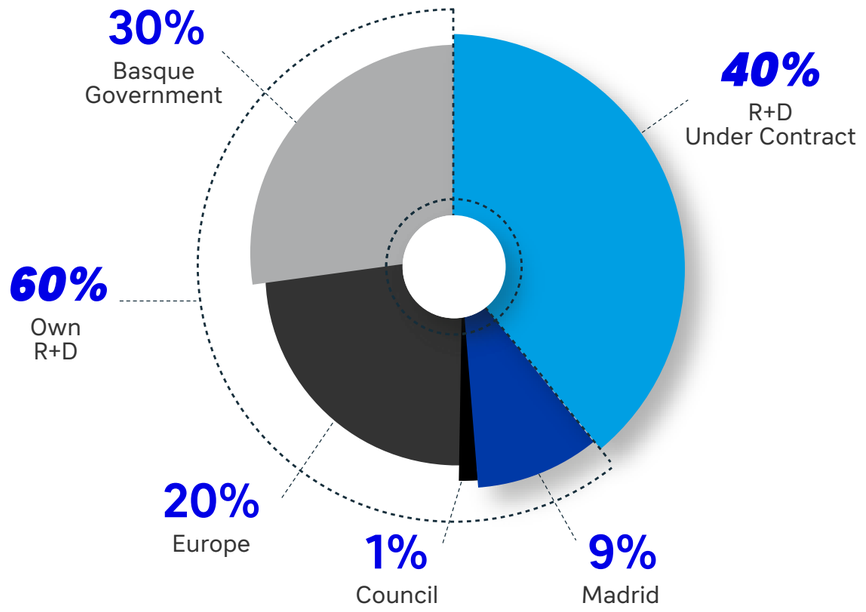
IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

1.3 IDEKO FIGURES

Incomes

9,6	MILLION € IN	2020
10,6	MILLION € IN	2019
10,2	MILLION € IN	2018
9,4	MILLION € IN	2017

ECONOMIC-FINANCIAL MANAGEMET



IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

1.3 IDEKO FIGURES

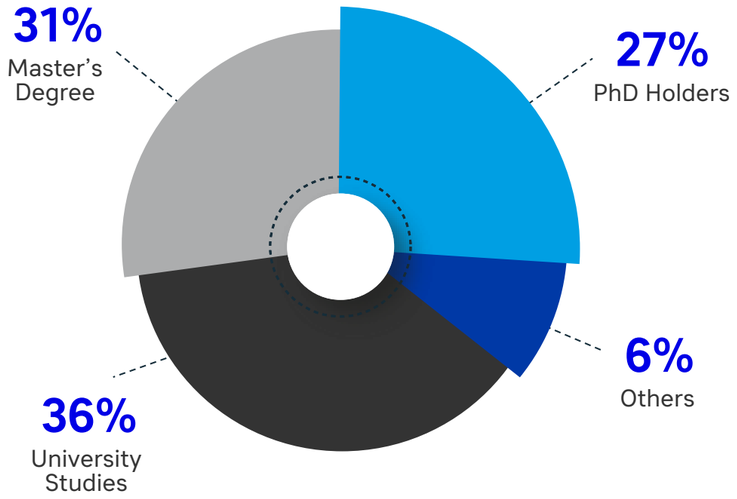
People

122 TOTAL
IDEKO STAFF

29% PHD HOLDERS

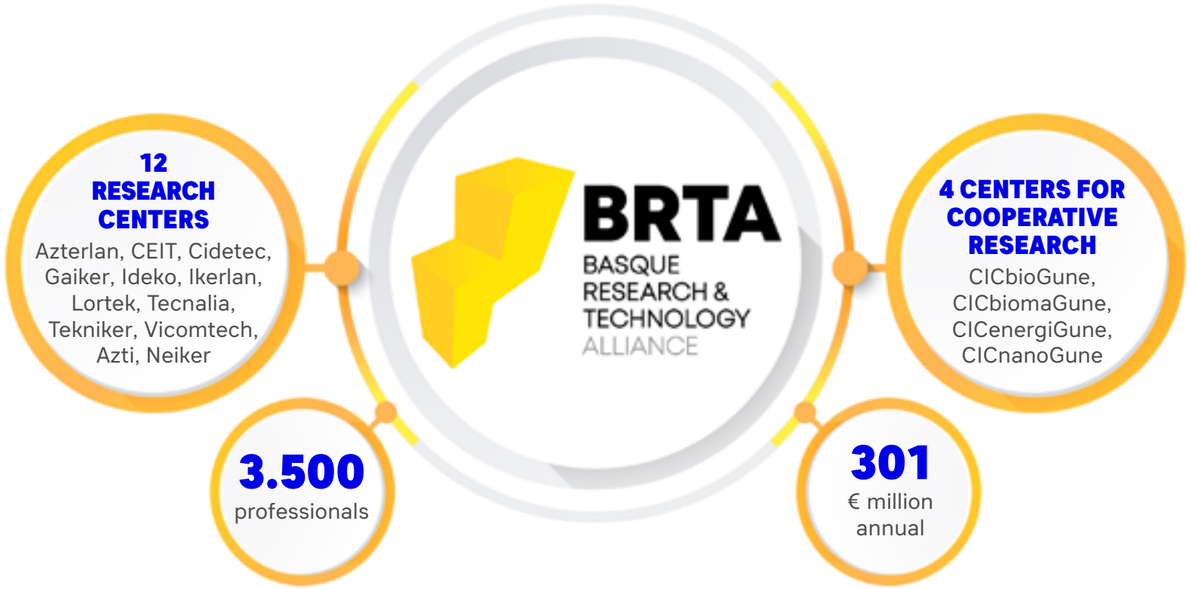
34 PATENTS

>70 EUROPEAN PROJECTS
>30 YEARS COORDINATING EUROPEAN PROJECTS



IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

1.4 BRTA
Basque Research & Technology Alliance



IDEKO is a member of the **Basque Research & Technology Alliance, BRTA;** with 16 agents belonging to the Basque Network of Science, Technology and Innovation; in addition to SPRI and the Provincial Councils of Gipuzkoa, Bizkaia and Araba.

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

1.5 MONDRAGON CORPORATION

MONDRAGON
HUMANITY AT WORK
Finanzas
Industria
Distribución
Conocimiento

Mondragon is **one of the leading Spanish business groups,** with 4 production sectors around the world:

- Finances
- Industry
- Retail
- Knowledge

TOTAL INCOMES

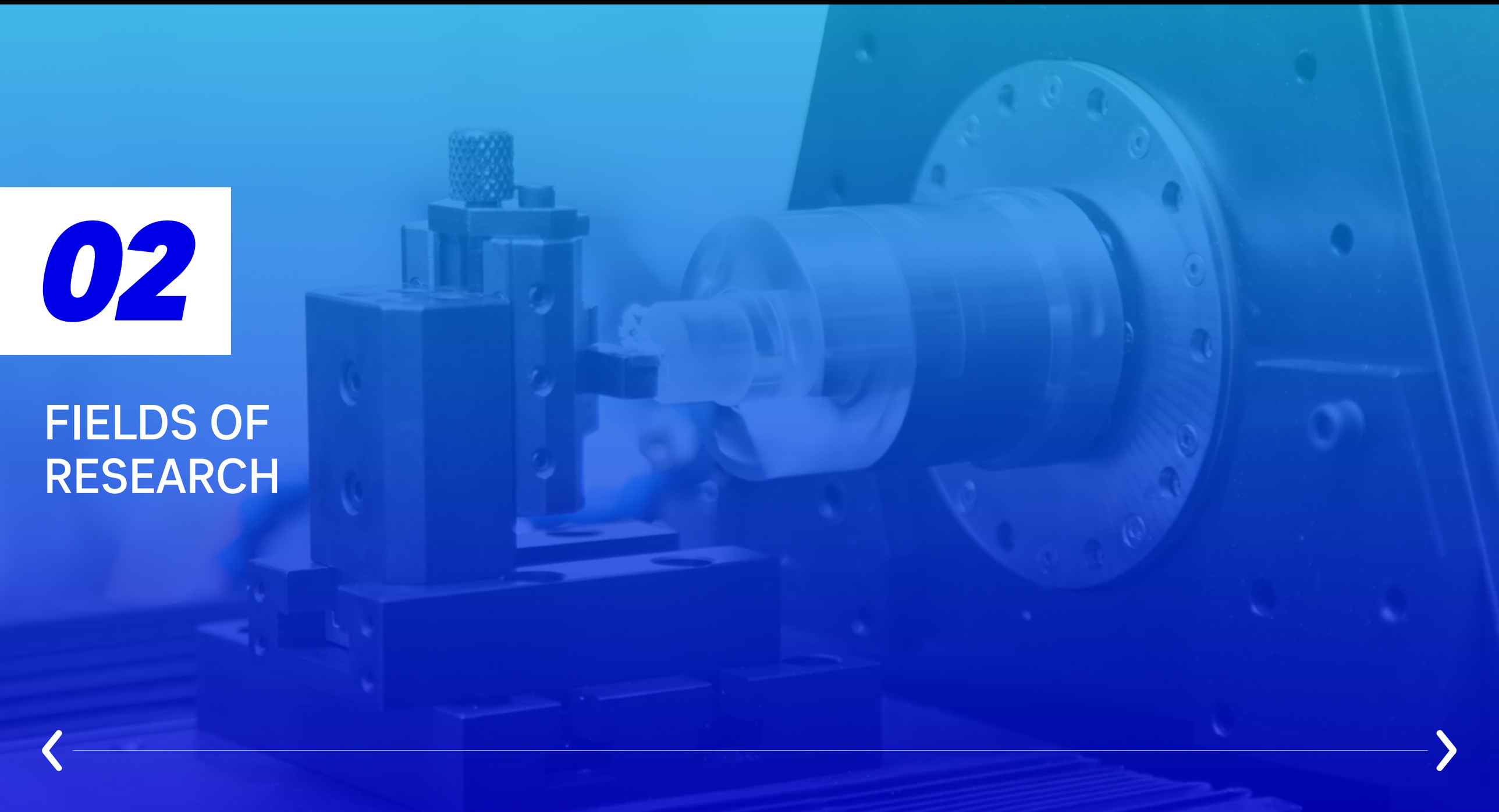
2020 11.608 million €

STAFF

2020 81.507 people

RESEARCHERS

2020 2.018 people



02

FIELDS OF RESEARCH

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

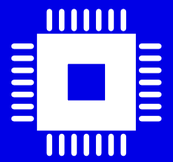
2.0 FIELDS OF RESEARCH

The sum total formed by **4 research fields** makes up the backbone of our center.
They are key factors in the development of the IDEKO specialisation.

DYNAMICS & CONTROL

MANUFACTURING PROCESSES

ICT & AUTOMATION



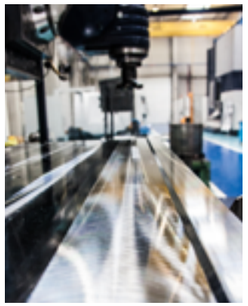
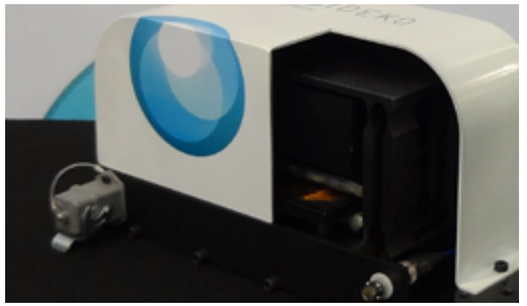
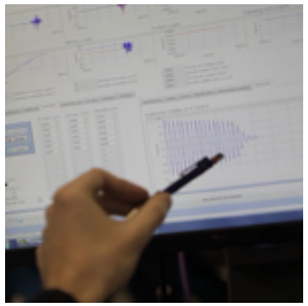
DESIGN & PRECISION ENGINEERING

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

02. FIELDS OF RESEARCH

DYNAMICS & CONTROL

Description and optimisation of dynamic behaviour of machines and processes.


The Dynamics and Control research line addresses the solution of vibration problems in all types of industrial machinery from two different and complementary approaches, on the one hand the **dynamic design of machines and drives** and on the other hand, **the diagnosis and subsequent implementation of specific development solutions that eliminate chatter** and vibrations in various machining processes.

SPECIALISATION

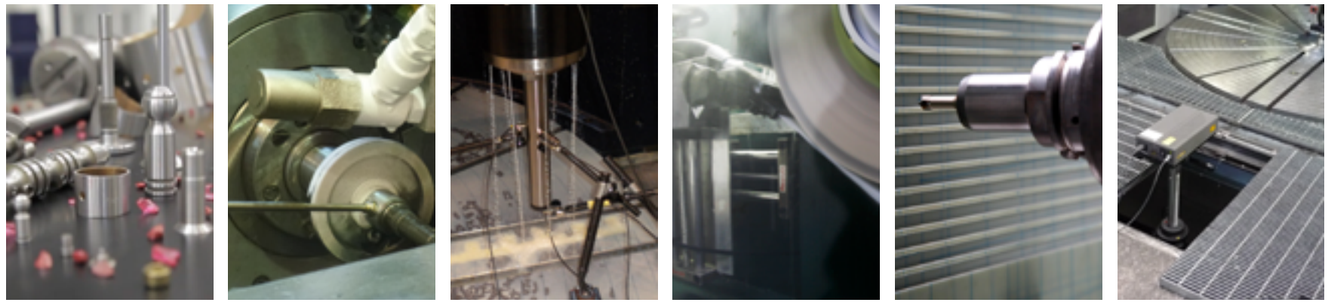
- **Development of technologies** for characterisation, modelling and design of solutions for enhanced dynamic performance of machines.
- **Chatter:** theoretical-experimental knowledge of the phenomenon of chatter in machining processes and how it is related to machine dynamics.
- **Damping** on machine structures.
- **Advanced control algorithms** for suppression of forced and self-generated vibrations.
- **Mechatronics simulation.**

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

02. FIELDS OF RESEARCH

MANUFACTURING PROCESSES

Design, development and improvement of production processes.



With the aim of solving existing problems in current industrial processes or providing machining alternatives, they bring together the development of machining technologies using **chip removal and abrasion,** such as turning, grinding, milling, folding, drilling or laser, along with **industrial production management and organization technologies,** such as simulation programs.

They include NDT technologies of part inspection and industrial processes with the aim of adding value and improving industrial production processes and ensuring quality of parts.

SPECIALISATION

- **Development** of chip removal machining technology together with **Industrial Production Management and Organisation technologies:**
  - Comprehensive design of complet machining lines.
  - Design and optimisation of specific machining processes (Milling, Grinding, Turning Technology, etc.)
- **Cutting technology:**
  - Thorough knowledge of machining processes.
- **Structural integrity part:**
  - Description of residual stresses and distortion of part related to the manufacturing process.
- **Industrial Management and Production:**
  - Design / Planning / optimisation of manufacturing lines for machining.
  - Product servitization.
- **Sustainable manufacturing:**
  - Machines and sustainable manufacturing processes.
- **Laser Technology:** cladding, cutting, surface treatment. Development of processing technology.
- **Composites technology:** Development of deposition, cutting, impregnation, curing technologies:
  - Dry carbon fibre composites.
  - Glass fibre composites.
  - Extension to thermoplastics.
- **Non destructive Testing (NDT) of surface and internal defects:**

Active Thermography Techniques:
- Inductive sources.
- Laser sources.

Ultrasound Techniques:
- Phased-array.
- EMAT.

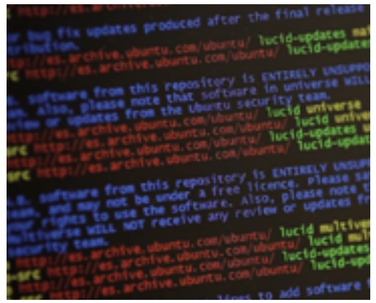
Eddy Currents.

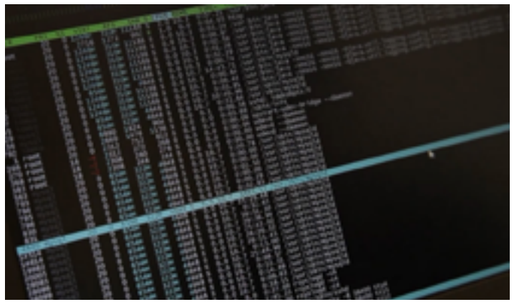
IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

02. FIELDS OF RESEARCH

ICT & AUTOMATION

ICT for manufacturing and industrial production technology.





ICT Automation Research field develops **advanced software applications and automation solutions** to provide advanced capabilities to machine manufacturers and manufacturing lines.

Thus, they research and develop ICT solutions with **applicability in manufacturing and industrial production technologies.** This area leads Industry 4.0 strategic project. To do this we have gained new profiles, established stable collaborations in complementary areas and invested in new facilities.

SPECIALISATION

Development of software tools that provide advanced capabilities to machine manufacturers and manufacturing lines.

- **Cloud Computing:** Tools for competitive intelligence, SAAS environments: HTML5, PHP, AJAX, JavaScript, Python, LAMP environments, Data Analytics – Business Intelligence.

- **Artificial Vision:**
  Recognition of artificial and natural markers.
  Registration.
  Pattern-recognition.

- **Advanced Programming:**
  Integration of solutions for other lines: .NET, Qt, C/C++, Java, Python, Perl.
  Development of advanced user interfaces: WPF, RAD Studio (Borland - delphi), KDE-Qt, GTK+.
  Procesamiento en tiempo real: GPU (Cuda), Big-Data (No-SQL), HPC (High Performance Computing).

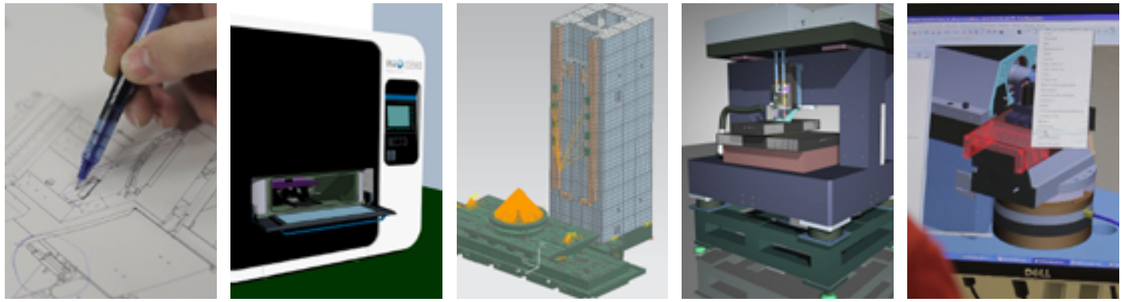
- **Added-value industrial automation:**
  Compiled cycles for Siemens, PYC for Heidenhaim, Structured Text for Beckhoff, etc.
  Predictive / Proactive Maintenance based on past events and experience.
  MT local and remote monitoring / management.

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

02. FIELDS OF RESEARCH

DESIGN AND PRECISION ENGINEERING

High-performance product design and development.



They take charge of the design and development of high performance products, and develop prototypes, structures, mechanisms and high dynamics components in machine tools are developed with the **aim of achieving ultra-precision finishes.**

The research group integrate measurement systems for accuracy and reliability through techniques such as photogrammetry, laser measurement, optics or contact sensors.
This provides a more comprehensive perspective of the topics of measurement, calibration and correction of errors.

SPECIALISATION

Development of technologies and solutions in the design of mechanisms and high-precision machines.

· **Advanced concepts of machines and components:**
Advanced mechanical and thermal simulations of behaviour of all kinds of systems.
Ecodesign of machines.

· **Contactless dimensional measurement:**
High-range according to photogrammetry techniques.
High-precision according to photonic techniques.

03

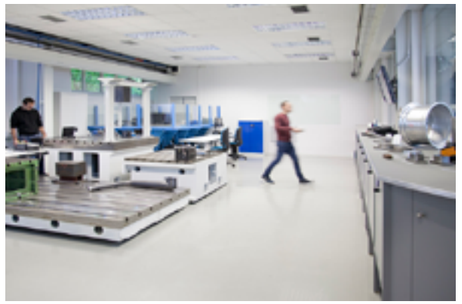
FACILITIES AND EQUIPMENT

3.0 FACILITIES AND EQUIPMENT

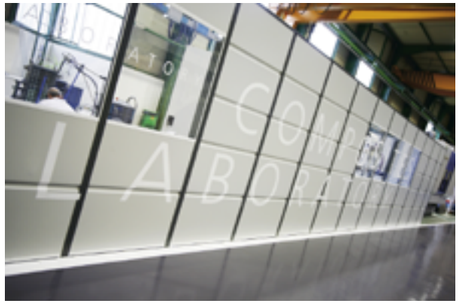
DIGITAL GRINDING INNOVATION HUB

PRECISION ENGINEERING LABORATORY

ULTRA-PRECISION METROLOGY LAB.



HIGH PERFORMANCE DYNAMICS LAB.



COMPOSITES LAB.

LASER LAB.

CNC & DIGITAL FACTORY LAB.

PROTOTYPE WORKSHOP

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

03. FACILITIES AND EQUIPMENT

3.1 DIGITAL GRINDING INNOVATION HUB

Open, integrating and multi-localized
to enhance collaboration and synergies between stakeholders

Technological and **digital** transformation of our industry.

Investment of 6M €

Ideal place to carry out **R&D projects,** validation and testing of technological developments

Forum for **demonstration** and **dissemination** of the knowledge

A place for **training** and qualification of the future professional

EQUIPMENT

- **External grinding** DANOBAT HG-72.
- **Vertical grinding** DANOBAT VG-800.
- **High precision external grinding** DANOBAT LG-1000.
- **Centerless grinding** DANOBAT ESTARTA-650.
- **Internal grinding** DANOBAT-OVERBECK IRD-400, for high precision applications.
- Horizontal high precision hard **turning** machine, DANOBAT LT-400.
- **Milling** machine with turning and grinding capacity, universal head and rotary table oriented to power generation SORALUCE FM.
- Bed type **milling** machine SORALUCE TA.

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

3.2 PRECISION ENGINEERING LABORATORY

Laboratory of
› 400 m²

Temperature and humidity,
control
and an anti-vibration system

Activities from several performance fields
related to machine testing and
ultra-precision manufacturing processes

EQUIPMENT

- Test bench for high dynamic drives with advanced controllers.
- Test bench for guides and hydrostatic and active lubrication bearings.
- Test bench for the characterisation of components.
- Measurement of submicron errors with capacitive sensors.
- Drive test bench with advanced controller.
- Guide and hydrostatic and active bearings test benches.
- Magnetic fluid test benches.

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

03. FACILITIES AND EQUIPMENT

3.3 ULTRA-PRECISION METROLOGY LABORATORY

Colaboration agreement signed with ZEISS

Ultra-precision parts **measurement**

Latest generation systems

EQUIPMENT

- Microscope Zeiss EVO 40.
- Optical profiler Sensofar Plu Neox.
- CMM Zeiss Prismo.
- MMC Zeiss O-Inspect 442.
- MMC Zeiss Contura 7106.
- Profile and roughness measuring systems.

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

03. FACILITIES AND EQUIPMENT

3.4 HIGH PERFORMANCE DYNAMICS LABORATORY

Analysis

and dynamic characterisation of devices and machines of any type or area of application

Identification and characterisation of

vibration problems

in manufacturing processes

EQUIPMENT

- Equipment for vibration measurement and analysis: electromagnetic drivers, impact hammers, accelerometers.
- Measurement of cutting forces. Kistler Torque plates (fixed and rotary plates for milling and turning, micro and macro range).
- Range of active/passive dampers.
- Platform for signal acquisition and processing for machine tools - IKDAS.

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

03. FACILITIES AND EQUIPMENT

3.5 COMPOSITES LABORATORY

Facilities of
› 100 m²

The study and improvement
of composite part manufacturing processes

Testing
the infusion process, moulding and curing

Final part inspection
equipment

Process simulation
systems

EQUIPMENT

- Our own system for the impregnation and curing of composite materials.
- Prototype for fibre deposition of up to 600 mm in width.
- Epoxy / polyester resin injection equipment (Composite Integration, Ciject Two).
- UV lamps of different intensities and wave lengths for the curing of composite materials.
- Equipment for monitoring the degree of curing from dielectric analysis (DEA).
- Heated moulds with transparent counter-mould for making flat sheets or for making prototype parts for validation of fibres and resins in the actual part.
- Deformable heated mould for manufacturing stiffeners.
- Equipment for carbon fibre bonding using ultrasound and infra-red.
- Ultrasound cutting equipment for cutting different glass, carbon and natural fibres.
- Ovens for the processing and characterisation of composite materials.
- Equipment for testing the infusion, moulding and curing process, final part inspection equipment.

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

03. FACILITIES AND EQUIPMENT

3.6 LASER LABORATORY

Laser material processing
tests
(cladding y cutting)

Research
of additive processes

Colaboration with rofin

EQUIPMENT

- 2 kW Rofin Baasel laser source (fibre laser).
- 5 kW IPG laser source.
- Diferent diameter fibres for the obtaining of different spot sizes: 150, 400µm, 1 and 1.5mm.
- Parallel kinematics machining centre with laser cladding head.
- Prototype for laser cutting.
- Own closed control system for cladding.
- Heads for cladding (high productivity or high precision) and material cutting.
- Equipment for metallographic and hardness characterisation.

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

03. FACILITIES AND EQUIPMENT

3.7 CNC & DIGITAL FACTORY LABORATORY

Develop

and experiment, within the environment of

industry 4.0

comprehensive automation solutions in the context of the current ongoing shift toward digitization of production processes

EQUIPMENT

- Siemens, Heidenhain, Fanuc, Fidia and Fagor numerical control units.
- Virtual development environment for control and simulation software and virtual commissioning of Siemens.
- Sinumerik Integrate, Tecnomatix.
- Advanced technical service post.
- Control room with videowall.
- Connectivity devices.
- Cyril sensors, Gateway M2M, NI cards, sensors.
- DANOBATGROUP analytical sandbox.
- Cloud environment Big Data Analytics.
- Hadoop Distribution, Microsoft Azure Solution, IBM Watson IoT, Qliksense.

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

03. FACILITIES AND EQUIPMENT

3.8 PROTOTYPE WORKSHOP

Workshop of
› 2.000 m²

Air conditioned
space

Validation and testing of
new machine prototypes
and precision machining processes

EQUIPMENT

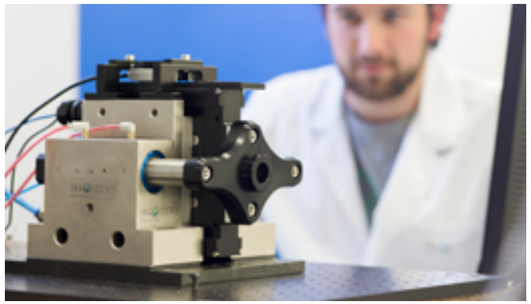
- Five continuous axis milling machine with spindlehead changing systems.
- CNC Lathe.
- Linear motor machining module.
- 2 machining centres.
- Parallel kinematics module for laser jobs.
- Test bench for measuring systems

In addition to the permanent equipment in our Prototype Workshop we have various machines and systems associated with the development of R&D&I projects in progress.

04

ADVANCED MANUFACTURING

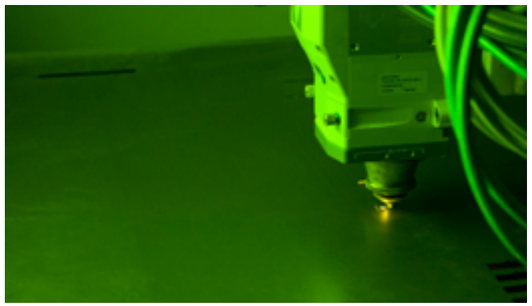
4.0 ADVANCED MANUFACTURING



IMPROVEMENT OF
PRODUCTION PROCESSES

SOLVING OF
VIBRATION PROBLEMS

ADVANCED MONITORING



EMERGING PROCESSES

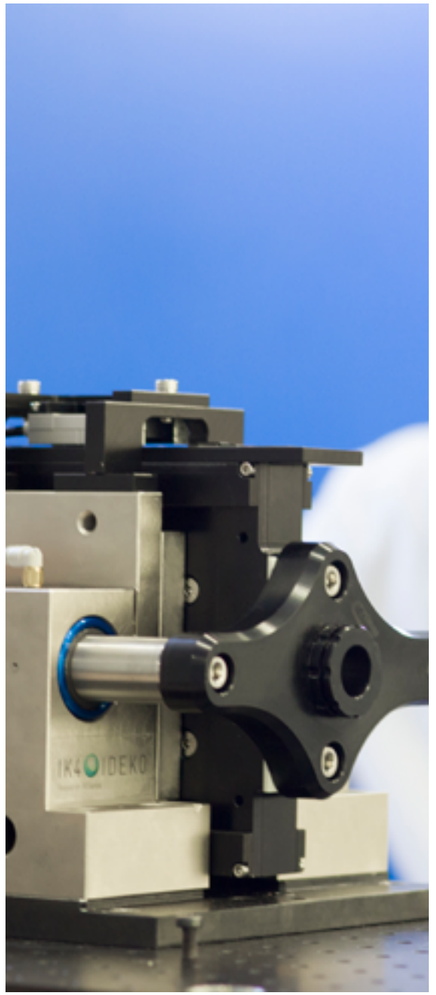
INNOVATION AREA

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

04. ADVANCED MANUFACTURING

4.1 DESIGN, SIMULATION AND IMPROVEMENT OF PRODUCTION PROCESSES AND MACHINING

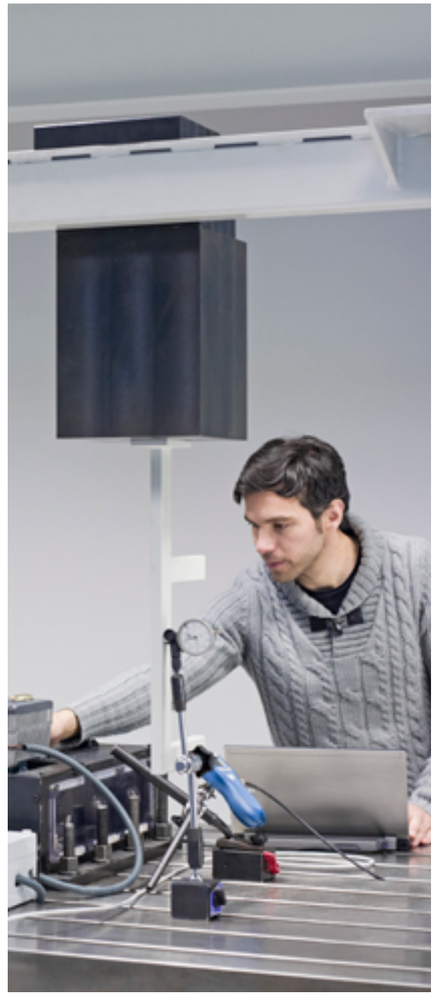
- Design and definition of manufacturing processes.
- Definition of technical specifications of the machine.
- Diagnosis, trouble shooting and machining erros.
- Design and optimisation of machining processes / production process.
- New cutting cycles to improve times and part qualities.
- Testing and checking of machines, including thermal deformations.
- Design and optimisation of machining processes.
- Simulation and optimization of plants, lines and production processes.
- Re-engineering of processes and adjustment of production flows based on Lean and Six Sigma techniques.
- Design, simulation and experimental analysis of machines and high precision mechanisms.
- Simulation of structures and mechanisms optimising the static and dynamic characteristics and thermal behaviour.
- Design of high precision guiding systems, reduction of geometrical errors on machines, precision engineering solutions for optimal design.



IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

4.2 DIAGNOSIS AND SOLVING OF VIBRATION PROBLEMS ON INDUSTRIAL MACHINERY

- Cancelling of vibrations in stock removal process.
- Development of passive and active dampers.
- Measuring of vibrations and natural frequency on industrial machinery pursuant to international standards.
- Modal analysis.
- Finite element aided dynamic design (FEM).

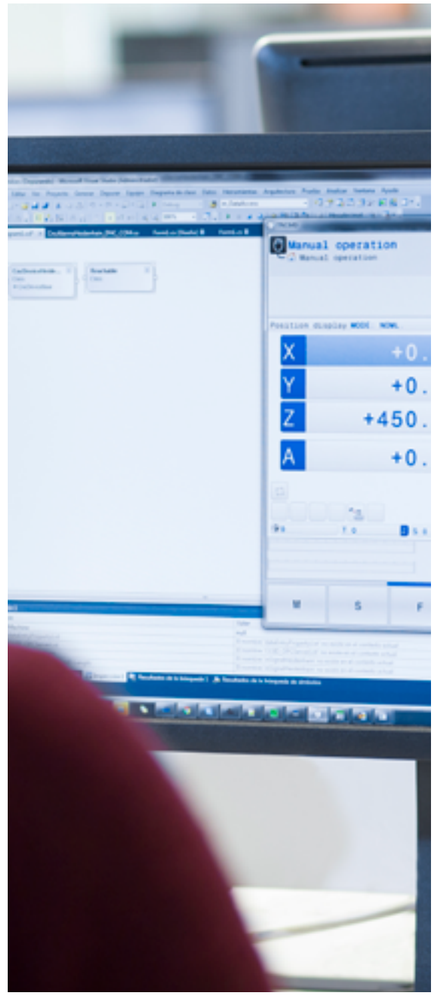


IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

04. ADVANCED MANUFACTURING

4.3 ADVANCED MONITORING, SUPERVISION AND ADAPTATIVE CONTROL FOR MANUFACTURING SMART SYSTEMS

- Design, adjustment and setting of motors and drives.
- Automation of manufacturing processes.
- Control and improvement of existing manufacturing processes though the incorporation of proprietary MES systems in the plant (alarms, maintenance and machine performance).
- Monitoring.
- User-machine interaction.

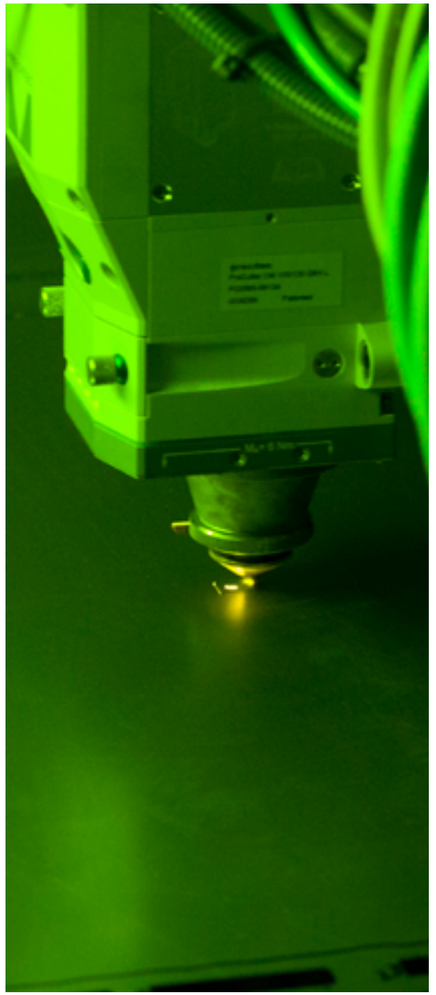


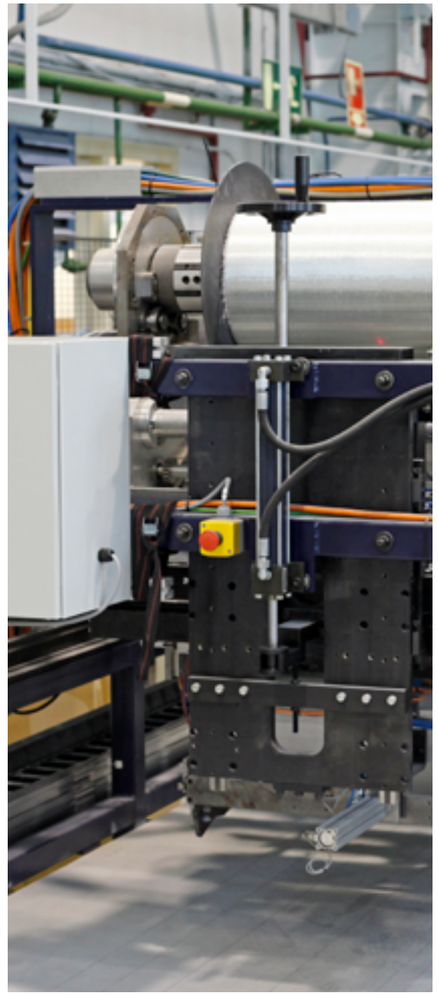
IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

04. ADVANCED MANUFACTURING

4.4 EMERGING PROCESSES. DEVELOPMENT OF NEW MATERIALS FOR NEW MANUFACTURING PROCESSES

- Definition and optimisation of process parameters in laser cutting.
- Development of manufacturing processes for composite parts.
- Performance improvements for additive manufacturing processes, with cladding.
- Development of new manufacturing processes.





IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

04. ADVANCED MANUFACTURING

4.5 INNOVATION AREA

· **Strategy and Technology Management:** Development of methods and tools aimed at Strategy and Technology Management (Strategic Plans, Technology Plans, Competitiveness Plans using our own methods:

COMODE®: development of Collaboration plans

POSITIONING®: Competitive Positioning

RE: Strategic Reflection

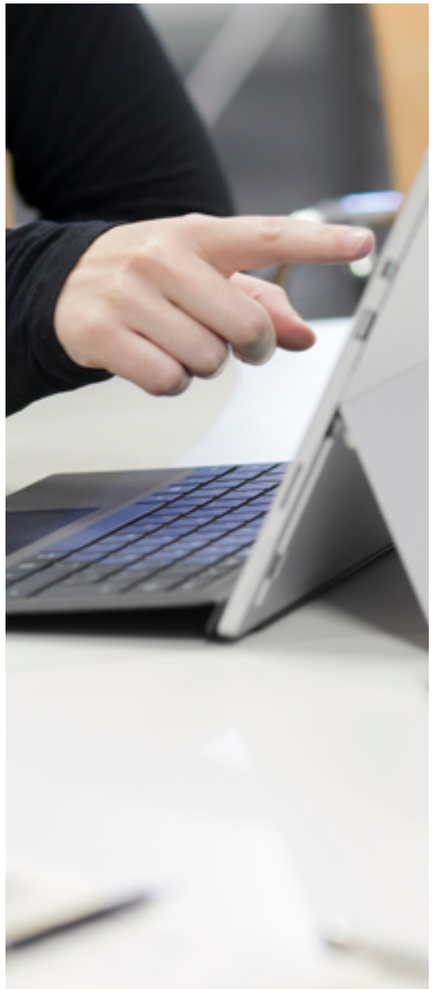
RMT: Technology Roadmaps

· **Competitive Intelligence:** Methods and tools for consultancy in competitive intelligence / CIP.

INTELSUITE software and COMPETE® (methodology and tools for the creation of CI units).

· **Diversification:** Methods and tools for spotting, definition and analysis of new business opportunities using on our own DIVERSSIA® method.

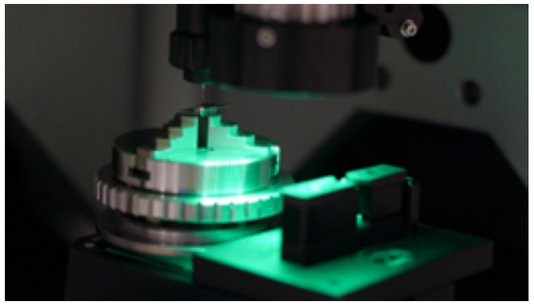
· **Exploitation of Technologies:** Methods and tools for location and development of technology based business opportunities using our own EXPLOITT® method.



05

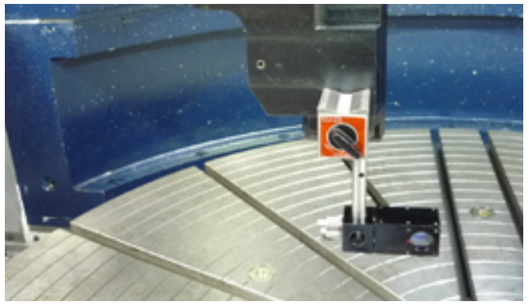
ADVANCED SERVICES

5.0 ADVANCED SERVICES

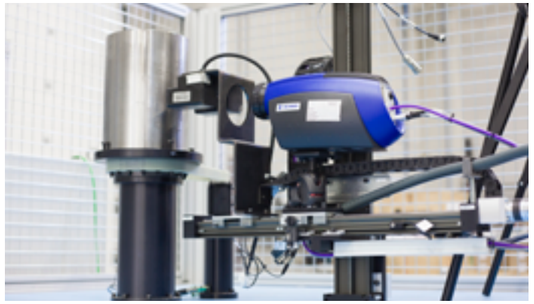


ULTRA-PRECISION
DIMENSIONAL MEASUREMENT

MEASUREMENT OF
RESIDUAL STRESSES



VERIFICATION AND DIAGNOSIS
OF MACHINE ERRORS



THERMOGRAPHY

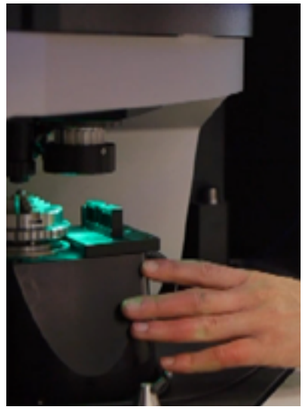
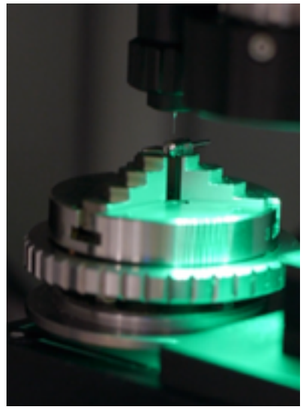
PHOTOGRAMMETRY

ULTRASOUND

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

5.1 ULTRA-PRECISION DIMENSIONAL MEASUREMENT



OUR OFFER...

· We have a complete set of Zeiss equipment for **dimensional measurement of forms, profiles and roughness of standard parts.** Measurements with sub-micron precision requirements are made with the most accurate machine on the market and the Sensofar PLU Neox optical profiler.

· In addition to this equipment, our Zeiss electronic microscope enables us to make measurements with a million increments, and to **analyse chemical compositions.**

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

5.2 MEASUREMENT OF RESIDUAL STRESSES

OUR OFFER...

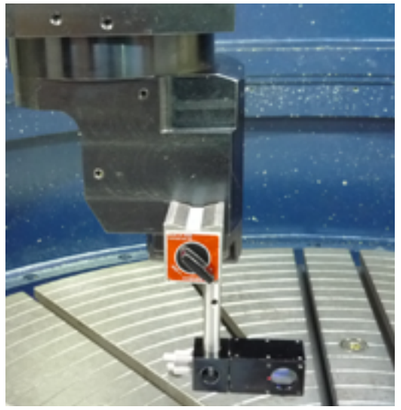
· In addition to verifying the geometry, it is increasingly important to ensure that manufactured parts do not change or suffer any damage throughout their life.

Measurement of residual stresses allows the life of the part to be **determined and ensured during fatigue processes,** preventing breakage and appearance of cracks.

· The use of our portable X ray diffractometer is the easiest non destructive method for making these measurements **directly on the part,** without the need to damage it or take samples.

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

5.3 VERIFICATION AND DIAGNOSIS OF MACHINE ERRORS



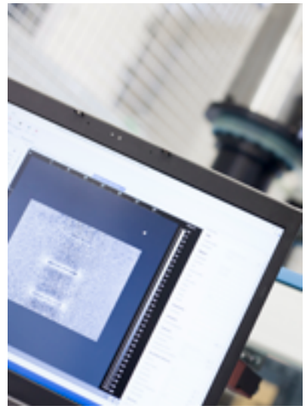
OUR OFFER...

· To guarantee quality machining operations and production processes, all machines employed require thorough verification and setting. IDEKO provides these machine verification and setting services, following standards for **linear and volume errors,** and angular positioning.

· As a complementary service, **vibration analysis** on the machine is performed.

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

5.4 NON CONTACT NDT INSPECTION. THERMOGRAPHY

OUR OFFER...

· Thermographic inspection enables **risk points and the ultimate strength of the components to be quickly and reliably established,** verifying the integrity of parts throughout their life. This is a **non destructive method** based on the response of a part to heat, and that is used instead of traditional strength tests.

· The method enables us to determine **surface and internal defects** of metal and composite material components (cracks, delaminations, voids, etc.).

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

5.5 MEASUREMENT BY VISION. PHOTOGRAMMETRY

OUR OFFER...

· **Quick and efficient measurement of large parts** can be made using photographic methods. Our photogrammetric equipment allows us to make **in-situ geometrical measurements** with a precision greater than 1/10,000, with just a prior graphic marking of the part and the taking of a series of photographs.

The system allows the dimensions to be checked against the drawing (CAD).

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

5.6 INSPECTION AND MEASUREMENT SOLUTIONS. ULTRASOUNDS

OUR OFFER...

· **Non-destructive testing (NDT) of quality of part:**

Surface defects (ultrasound, etc.)

Residual stress (diffactometry, X rays, etc.)

· **Development of contactless dimensional measuring systems** (1d / 2d / 3d) by means of laser and advanced optical techniques.

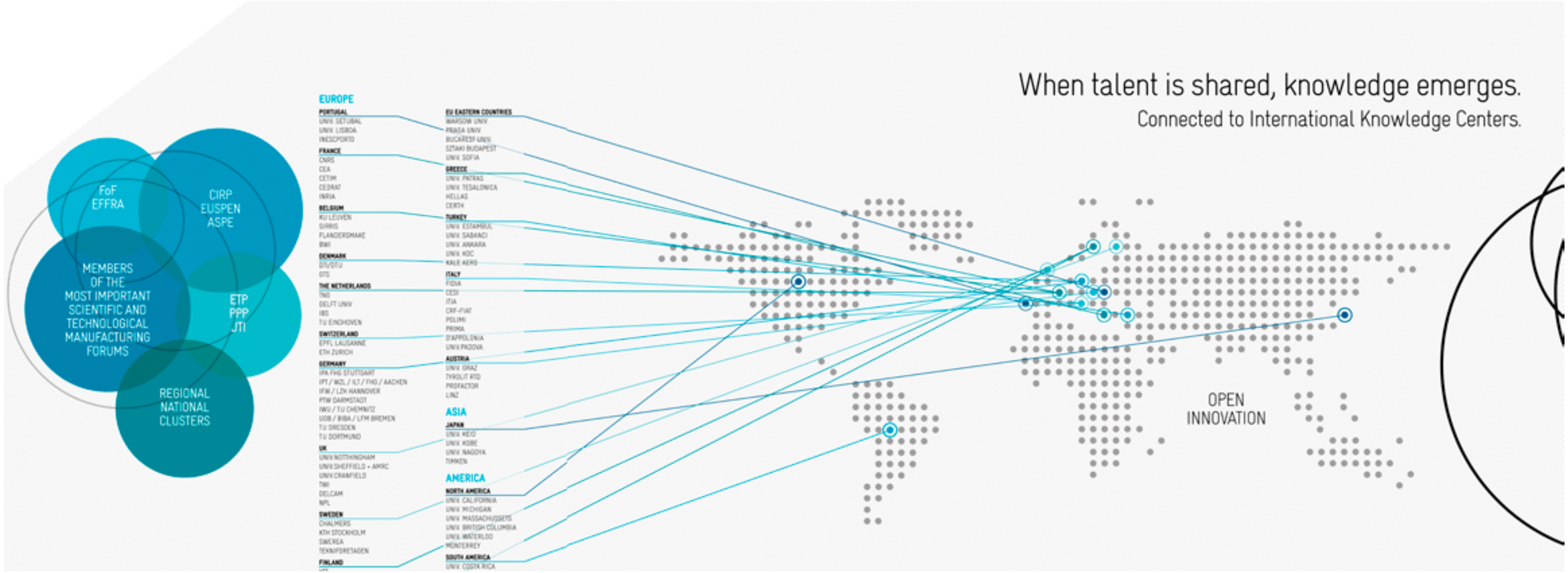
· **Development and integration** of inspection and measuring systems on machines and production lines.

06

ALLIANCES AND COLLABORATIONS

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

06. ALLIANCES AND COLLABORATIONS



IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

06. ALLIANCES AND COLLABORATIONS

ACCIONA
AFM
AIMPLAS
AITIP
AJL
AMRC
ASCAMM
BATZ
BIDASOA ACTIVA
BIGUMETRIC
BIMATEC
BOEING BRTE
BUTE
CADENAS VICINAY
CAF
CEA
CEDRAT
CEN-CENELEC
CESI
CETIM
CNR-ITIA
CNRS
CONSTRUCCIONES
ANTZIBAR
CRF
CRIF
DANOBAT
DANOBATGROUP
DELCAM
DELFT
DIAD GROUP
DRS
EATON
EDERTEK
EPFL
ETH
FAGOR
FAGOR EDERLAN TALDEA
FEDIT
FIDIA
FRAUNHOFER ILT
FRAUNHOFER IPA
FRAUNHOFER IPK
FRAUNHOFER IWU
FRAUNHOFER IZFP
FUNDICIONES ESTANDA
FUNVERA
GAMESA
GESTAMP
GKN
GOIMEK
GOITI
GRUPO FUMBARRI
GUIVISA
HEGAN
IBERIA
IBV
ICT CERAMICA
IDS
IFW
IK4
IMH
INASMET
INDUSTRIAS GARITA
INDUSTRIAS GOL
INESCOP
INGETEAM
ITP
JMA
KALE AERO
KENDU
KONDIA
KONIKER
KTH
LATZ
LEITAT
LKS
LOIRE SAFE
LOXIN
LZH
MACH4LAB
MATRICI
MONDRAGON
MONDRAGON UNIBERTSITATEA
MÜEGYETEM
NECO
NEWALL
OBEKI
OVERBECK
PATRICIO ECHEVERRIA
PHILIPS
PMG
POLI MILANO
POMPEU FABRA
PRIMA
PRODINTEC
PROFACTOR
RENAULT
ROFIN
SAKANA
SALVA
SAVERA GROUP
SENER
SIEMENS
SINTEF
SIRRIS
SORALUCE
SWEREA
SZTAKI HUNGARY
TALLERS FIESTAS
TECNALIA
TNO
TWI
ULMA
UNIV. BREMEN
UNIV. CACERES
UNIV. CARDIFF
UNIV. CARLOS III
UNIV. CHEMNITZ
UNIV. CRANFIELD
UNIV. DARMSTADT
UNIV. DUBLIN
UNIV. ESTAMBUL
UNIV. HELSINKI
UNIV. KARLSRUHE
UNIV. KOCH
UNIV. LEUVEN
UNIV. LISBOA
UNIV. LJUBLIJANA
UNIV. LUXEMBOURG
UNIV. MINHO
UNIV. NORUEGA
UNIV. NOTTHINGHAM
UNIV. PAÍS VASCO
UNIV. PATRAS
UNIV. POLITÉCNICA CATALUÑA
UNIV. POLITÉCNICA MADRID
UNIV. POLITÉCNICA VALENCIA
UNIV. PORTO
UNIV. PRAGUE
UNIV. SABANCI
UNIV. SETUBAL
UNIV. SHEFFIELD
UNIV. STUTTGART
UNIV. TAMPERE
UNIV. VARSAW
UNIV. ZARAGOZA
UNIV. WATERLOO
UROLA
VTT
WZL
ZEISS

07

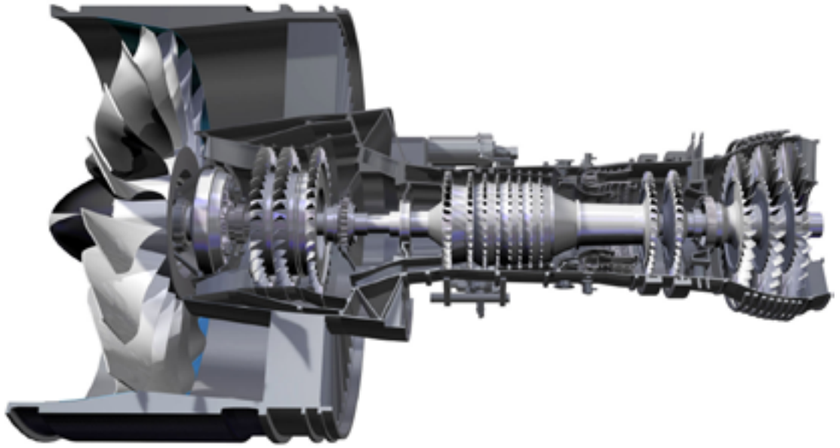
PROJECTS

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

07. PROJECTS

ForZDM

Integrated Zero Defect Manufacturing (ZDM) solution for high value adding multi-stage manufacturing systems



The global manufacturing scenario is continuously posing new requirements on production system adaptability. Increasing volatility in the local economies, shortening product life cycles, increasing degree of product customization, call for production systems that comply with these changing demands in all their basic functions, including quality and production control. ForZDM will develop an innovative Zero Defect Manufacturing methodology for reducing the number of defects and optimize production.

THE CHALLENGE...

The aim of the ForZDM project is to develop and demonstrate tools to support the rapid deployment of ZDM solutions in the industry and design more competitive and robust multi-stage manufacturing systems. The ForZDM methodology expands current single process boundaries towards a production line perspective, which allows to contrast defects before, during and after their generation through diagnosis, preventive and corrective mechanisms, applied with real-time, medium term and long term control actions.

ForZDM

4ZDM Zero Defect Manufacturing

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

DAT4.ZERO

Digitally-enhanced Quality Management System

DAT4.ZERO is a Digitally-enhanced Quality Management System (DQM) that gathers and organizes data from a Distributed Multi-sensor Network, which, when combined with a DQM Toolkit and Modeling and Simulation Layer, and further integrated with existing Cyber-Physical Systems (CPS), offers adequate levels of data accuracy and precision for effective decision support and problem-solving – utilizing smart, dynamic feedback and feed-forward mechanisms to contribute towards the achievement of Zero Defect Manufacturing (ZDM) in smart factories and their ecosystems.

THE CHALLENGE...

DAT4.ZERO identifies seven topics which constitute the technological challenges to be overcome during the DAT4.ZERO project: Quality management and ZDM, Cybersecurity and data integrity, Data management and knowledge extraction, Multi-sensor network for data gathering, Artificial Intelligence and data analytics for ZDM, CPS for feed-forward control and Modelling and simulation for rapid line reconfiguration.

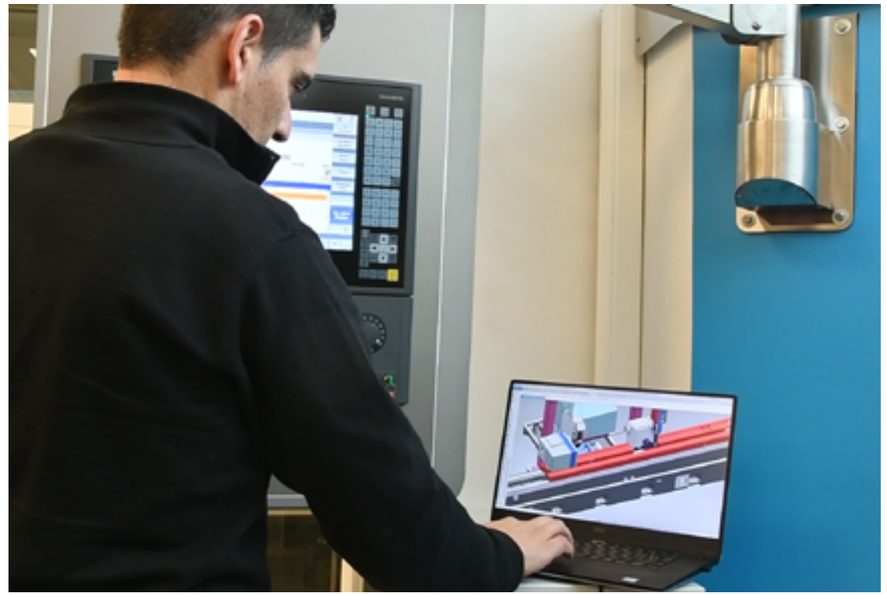
DATA.ZERO

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

07. PROJECTS

LEVEL-UP

Digital platform to extend the life of industrial equipment



With the aim of boosting the circular economy in the industry, the European Level-Up project seeks to apply the latest digital technologies to extend the useful life of production systems in metallurgy, automotive, aeronautics, railways and carpentry, among others. The project runs from October this year to 2023.

THE CHALLENGE...

The ultimate goal of the project is to modernize equipment and large capital-intensive industrial facilities to extend their operating cycle efficiently, safely and reliably through the use of advanced industry 4.0 technologies that did not exist when those production systems were launched.

Level-Up

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

TWINGOALS

Digital Twin towards Zero Defects Manufacturing (ZDM) and circular economy

Digital twins are virtual models of a process or product that digitally reproduce the behaviour and performance of its real version with near precision. In this project, digital twins of production processes, machine tools and manufacturing centres will be developed and used to solve specific problems of machine tool manufacturers and end users.

THE CHALLENGE...

The objective of this project is to develop digital tools with which virtual representation models of machines are generated to accelerate their manufacture and implementation.

The digital twins to be developed in the project will go beyond the current state of the art with a new multidisciplinary virtual modelling approach. The combination of different simulation and emulation tools will yield a holistic vision combining different engineering fields in the same simulation environment.

Twingoals

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

07. PROJECTS

MOVICOMS

Digital Twins. Modelling and virtualisation of machine tools and manufacturing cells for virtual commissioning

In recent years, machine-tool companies have faced the technological challenge of developing fully automatic digital lines and workshops. Large projects that require the definition and improvement of manufacturing processes not only at machine level but also at automated line level. Using plant simulation tools and production flows to define the most efficient solution possible, by applying Lean Manufacturing principles, is one of the keys to these types of solutions.

THE CHALLENGE...

Developing, analysing and validating the concept of Digital Twins and Virtual Commissioning and the benefits arising from their application in production systems, without it being necessary to have the physical equipment. This will remove the need to produce prototypes, reduce the amount of time necessary for development, and improve the quality of the machines. As well as faster adaptation in response to the customer"s specification changes.

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

07. PROJECTS

COGNIPLANT

Digitalization of the process industries through the development of a cognition driven monitoring and control platform

The adoption of modern process control and monitoring techniques through CPS and IoT, and the application of analytics techniques is well established in manufacturing industries such as automotive, consumer goods, or electronic sectors. However, according to SPIRE Roadmap, the digitalization of process industries still presents an untapped potential. COGNIPLANT will deliver an integrated kit for the digitalization of the process industries through the development of a cognition driven monitoring and control platform. The so called Cognitive platform will be validated by the realization of four large demonstrations which will address the following SPIRE sectors: aluminum refinery, construction components manufacturing, chemical sector and the metal sector.

THE CHALLENGE...

COGNIPLANT project's approach is summarized as follows: a hierarchical advanced monitoring and supervisory control will give comprehensive vision of the plants' production performance as well as the energy and resource consumption. Data collected from production plants' equipment and sensors will be structured in a data virtualization layer.

COGNIPLANT

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

07. PROJECTS

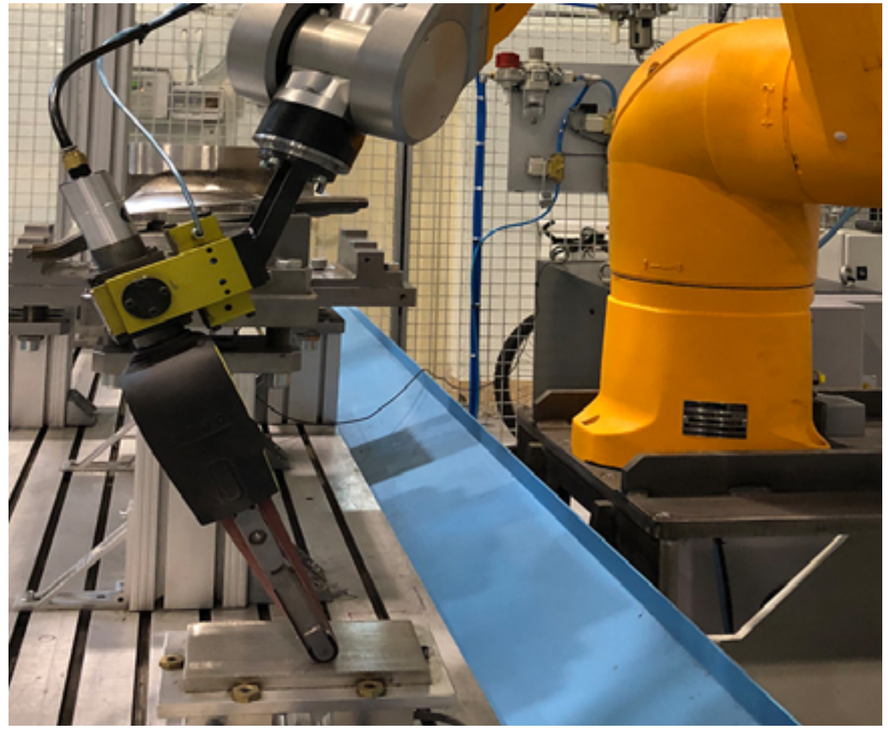
ARGRIND

Advanced robotics for accurate grinding of complex metal parts

Currently robots grind workpieces with simple shapes, items that do not have significant curvatures and do not require long grinding times or do not have to meet strict geometrical tolerances. Workpieces that do meet these requirements, we refer to as complex parts. Currently, robots do not carry out grinding operations on complex workpieces, as there are two main limitations that prevent this:

1) The CAM (Computer Aided Manufacturing) software for robotic grinding simulation does not accurately represent the grinding process.

2) Long grinding operations are seriously affected by the wear of the abrasive, which creates geometrical quality problems on the workpiece as the material is not removed uniformly.



THE CHALLENGE...

The objective of the project is to demonstrate the feasibility of a robotic system capable of grinding complex metal parts for the aerospace sector.

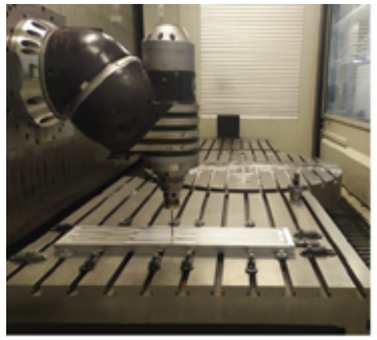
ARGRIND
Advanced robotics for accurate grinding of complex metal parts

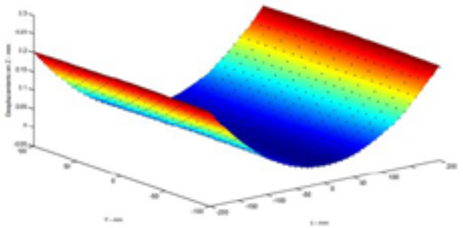
IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

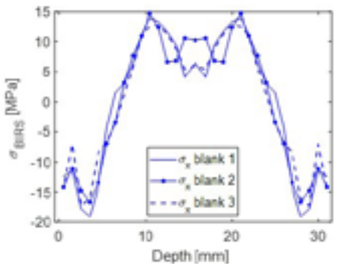
07. PROJECTS

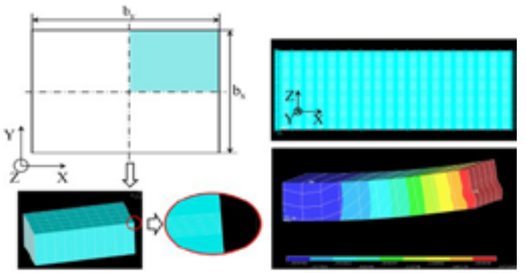
MIRAGED

Digital Twins to optimise industrial manufacturing processes









A digital twin is a virtual replica of a product or process to which real-time data is incorporated captured through sensors or Big-Data technology. Once this information is collected, it is processed with Artificial Intelligence, Cloud Computing and Machine Learning to produce a living twin on which improvements can be made and capabilities optimised. This is the context in which the MIRAGED programme is being carried out, an initiative that certifies IDEKO as a Cervera Centre of Excellence. IDEKO is participating in this initiative that seeks to better prepare all entities involved in developing systems for modelling, simulating and predicting the behaviour of machines and manufacturing processes, through the creation of virtual models and digital twins facilitating design and subsequent optimisation.

THE CHALLENGE...

Within the framework of the MIRAGED programme, IDEKO has identified a series of priority technical objectives such as the development of new advanced models that interact with the manufacturing process through the implementation of digital twins applicable to the production facility. These models and twins will be developed in the areas of expertise of the entity such as grinding, non-destructive inspection, distortion control and machine and process dynamics and control.

MIRAGED DIGITAL TWINS

CDTI Centro para el Desarrollo Tecnológico Industrial

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

07. PROJECTS

PROCODA

High-value processes based on Knowledge and Data

The purpose of PROCODA is to research the development of new complex manufacturing processes through an integrated approach based on simulation and the monitoring and analysis of data. This will be achieved by configuring a hybrid modelling (physical modelling + real data) and flexible action platform (offering online and remote action) that allows machine manufacturing companies and, especially, their users, to optimise (in time and cost) their manufacturing process dramatically, in all the development phases: design, ramp-up, production life-cycle and adaptation to new requirements, while also increasing their quality and reliability ratios.

THE CHALLENGE...

1. The generation of detailed knowledge on the fundamentals of the selected processes, of their interactions and the limitations and requirements that these introduce to the production means.
2. The incorporation of sensors and electronics in the machine elements that interact in the production processes in order to have enriched information on these processes.
3. The integration of the monitoring data, its analysis and correlation with the theoretical models of the selected processes.
4. The development of action strategies, in different temporal responses, to act on the processes in search of maximum efficiency (productivity, quality, energy efficiency or other optimisation criteria).

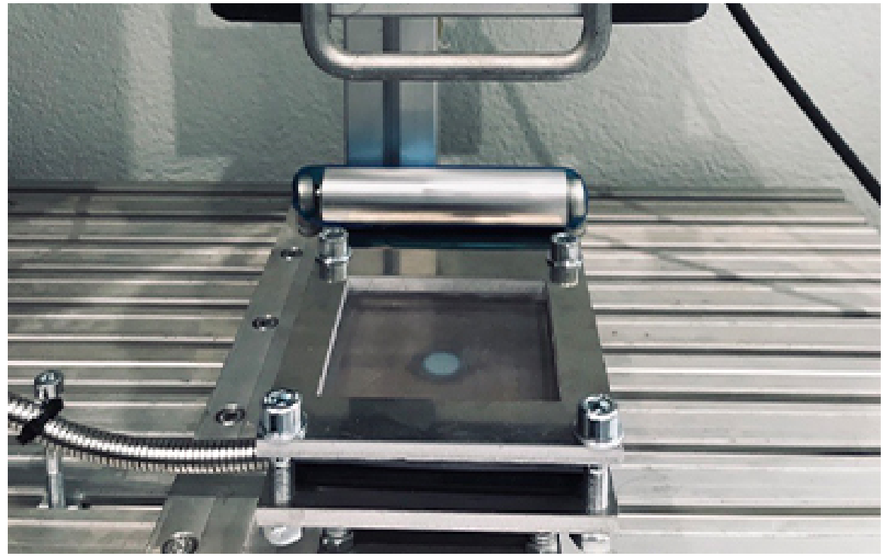
EUSKO JAURLARITZA GOBIERNO VASCO

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

07. PROJECTS

AVANSITE

New generation of sustainable composites for advanced manufacturing



AVANSITE is a collaborative scientific research project, which is developing new sustainable and recyclable compounds according to the needs of society and industry. Industry materials are needed that contribute to reducing manufacturing costs, reduce manufacturing times and energy consumption, and that allow obtaining multifunctional products that are transformed with automatable and digitizable technologies. Starting from the generation of collaborative knowledge, the AVANSITE project aims to contribute to this transition, focusing on the family of polymeric composites within the field of Advanced Materials.

THE CHALLENGE...

The main challenge that faces the AVANSITE project is that of generating scientific-technological knowledge in the field of polymer materials and composites in order to progress towards a circular economy. This will be done by addressing the development of new materials designed for obtaining functional products with advanced manufacturing technologies that make process automation and efficient resource consumption possible.

Furthermore, the project has the objective of resolving some of the challenges faced by functional polymer composites developed under the circular design concept, and will consider functionalities such as bactericide, burning behaviour and the optimisation of the composite curing-heating processes.

EUSKO JAURLARITZA GOBIERNO VASCO

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

07. PROJECTS

FAR

Advanced Manufacturing in Grinding for strategic sectors and high value-added parts

Maintaining the efficiency and capacity requirements of different industrial sectors and key companies in the Basque Country involves a continuous R&D effort throughout the development and production chain of these products, including the design and manufacture of key components such as the use of new special materials, tightening of design and manufacturing tolerances and increasing quality and reliability requirements in terms of safety. Grinding yields a finish, accuracy and productivity unmatched by other processes. The improvement of precision, process stability and part integrity are the main requirements to achieve maximum reliability and productivity in the applications, therefore the scope of action of FAR is to develop solutions meeting the above requirements on all necessary technological fronts: machine, components, Digital Grinding and processes.

THE CHALLENGE...

The main objective of FAR is to develop technologies that generate products (machines, components and processes) with high added value in the different areas of grinding applications, responding to and anticipating the high demands of strategic parts in the driving sectors of the economy: aeronautics, automotive, railways and energy generation.

EUSKO JAURLARITZA GOBIERNO VASCO

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

07. PROJECTS

DAS

Dynamic active stabilizer

Currently, chatter is considered one of the greatest challenges to be overcome to increase production in the machine tool sector. Chatter causes unacceptable surface finishes, tool breakage and a reduced life cycle of different mechanical parts of the machine. The main challenge of this project is to reduce the risk of chatter during the machining process and consequently to improve the cutting capacity of the machine.

THE CHALLENGE...

With the aim of meeting the challenge posed by modern industry, a device capable of actively increasing the dynamic rigidity of the machine has been developed which increases the cutting capacity and reduces the risk of instability caused by chatter during the machining process.

The DAS system is specially designed to eliminate structural vibrations of the machine. This unique system is fitted with sensors that measure vibration and generates counter oscillations in real time using special actuators fitted on the ram to compensate for the vibrations during the machining process.

SORALUCE

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

07. PROJECTS

ikDAS

Data acquisition system

The apparition of vibrations is one of the principal problem which face the industry and supposes a considerable limitation of its productivity, due to a no-desired functioning of equipment that reduces machines and tools life. So far, the diagnostic of vibration causes and the development of solution to eradicate them have been possible through the use of large equipment and highly skilled personnel, with a very high economic cost derived.

THE CHALLENGE...

In this context, IDEKO has developed ikDAS, a portable platform for signal acquisition with four operating modules that allow the frequency analysis of signals and the obtaining of frequency response function of key components such as structural machine parts.

The computer can acquire data from different kind of sensors, either voltage as excitation required, can be selected by means of a data acquisition software, and so later off-line, to visualize the temporal evolution of signals and perform relevant spectral analysis.

The user interface is structured through interactive dialogues that allow a quick and simple operation, so that it is not required to have extensive technical knowledge to be used.

IDEKO MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

07. PROJECTS

DWPM

Profile measuring devide for railway wheels on passing

The basque technology center IDEKO has developed a state-of-the-art inspection system using laser triangulation to secure a sound condition of train wheels. This forms a significant contribution to rail transport safety. The study of wear evolution makes it possible to programme and optimise maintenance processes, reducing the costs of such tasks.

THE CHALLENGE...

With the use of laser triangulation, the surface of the wheel can be rebuilt in 3D by extracting the typical parameters of

wheel wear. Accuracy is provided by the structure design that secures the stability of the unit as it absorbs deformations and vibrations generated by the trains on passing. This solution is compatible with easy to assemble structures as they avoid concrete structures. IDEKO has carried out a study of vibrations. This resulted in a design that is installed in a day, because of the absence of a foundation. The unit measures with the accuracy required by the market.

The main differences in relation to its predecessor are: installation in a day, resolution of the diameter, higher passing speed and easy calibration. Furthermore, the resistance and precision of the unit developed by Danobat has been maintained.

DANOBAT

IDEKO

MEMBER OF BASQUE RESEARCH
& TECHNOLOGY ALLIANCE

Arriaga kalea, 2 · E-20870 Elgoibar, GIPUZKOA | +34 943 748 000 | www.ideko.es |