

Desarrollos Mecánicos de Precisión, S.L.

dmp

Science industry

**Integral solutions for
niche mechanical activities**



dmp in a few numbers



DMP is **100% owned by the “EGILE Group”** (two private shareholders)

Company capital: **€ 1,584,000.00**

DMP turnover for 2013: **14,5 M€**

Provisional turnover for 2014 : **17,5 M€**

The “EGILE Group” turnover for 2013: **32,2 M€ – 260 employees**

DMP employees: **97 employees**

(excluding the central administration personnel for EGILE and R&D externalised to EIS)

A process organisation with **40%** of indirect personnel

Average growth for the previous years and for the future: **> 20%**



Turnover
for 2013:
32,2 M€



hts
High Technology
Science
Engineering

zehatz



dmp
Dynamique des Matériaux et des Structures

Precision engineering

Health

**Aeronautics
& Safety**

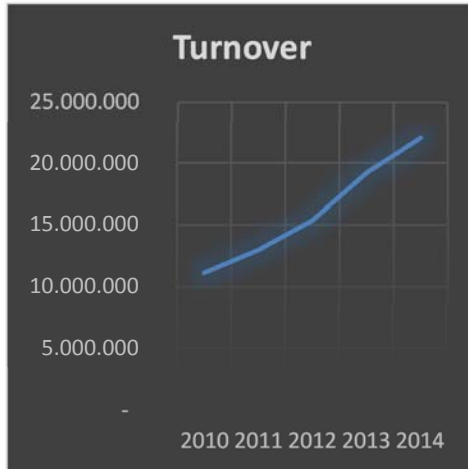
Water
&
Energy

createch
medical

leorpe

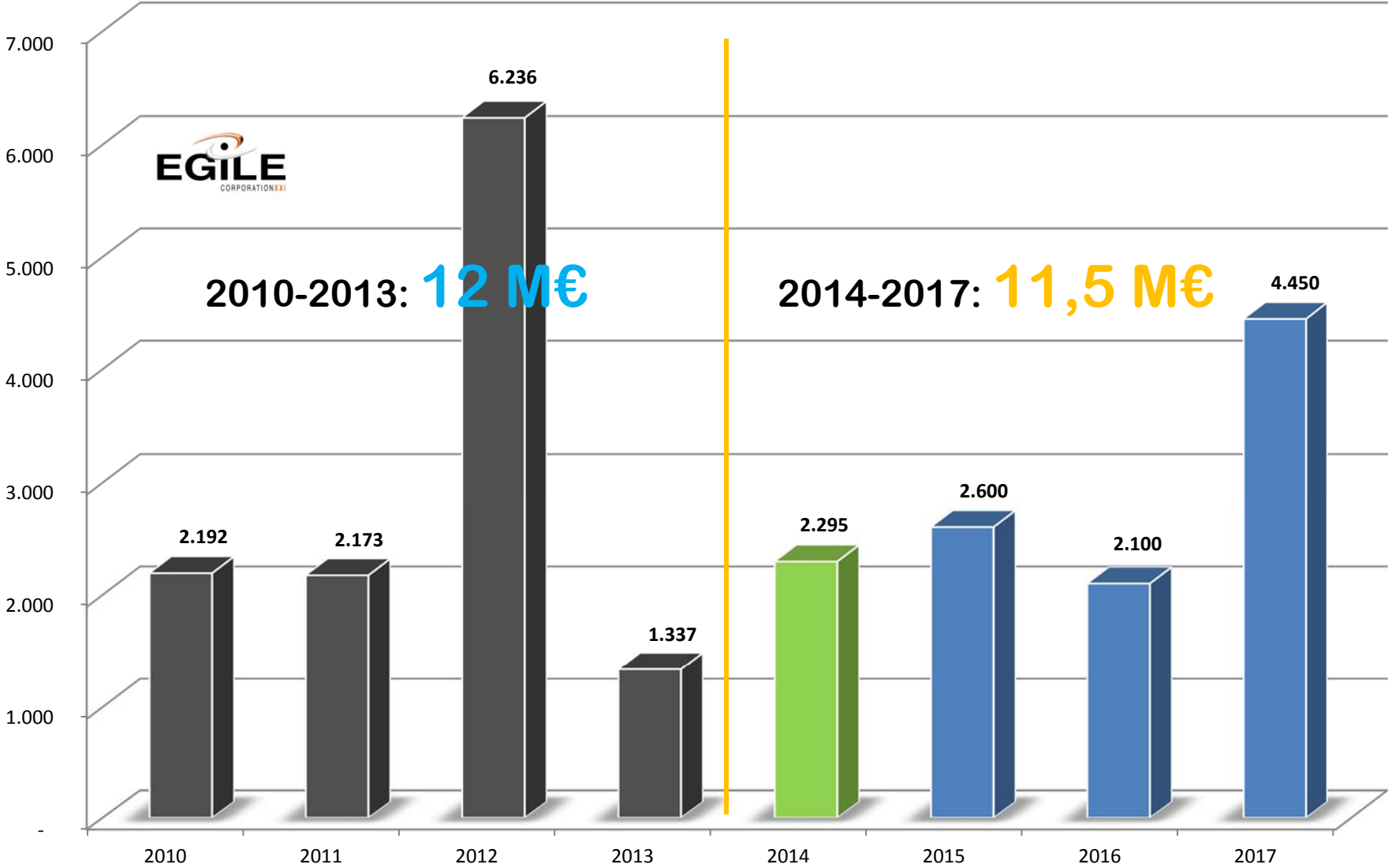
Turnover
for 2016:
49,5 M€

Center of excellence for Aerospace



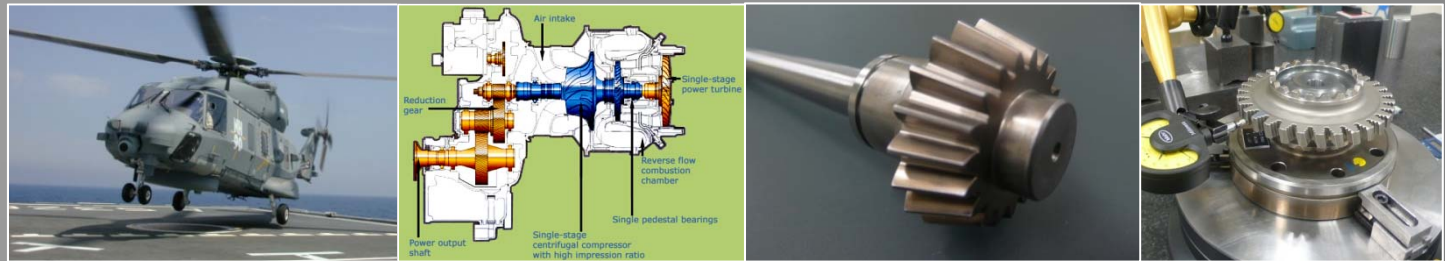
	EGILE	DMP	ZEHATZ	EIS	Total
	Administration	Recurring projects under prevision	Prototyping and non planicable projects	Engineering and R&D	Global mechanics work force
Direction	2				2
<i>Men</i>	2				2
<i>Women</i>	0				0
Commercial			2		2
<i>Men</i>			2		2
<i>Women</i>					
Structure	5	30	3	14	52
<i>Men</i>	0	20	2	13	35
<i>Women</i>	5	10	1	3	19
R&D	2	2	1	15	20
<i>Men</i>	1	2	2	13	18
<i>Women</i>	1	0	0	3	4
Production		65	23		88
<i>Men</i>		60	20		80
<i>Women</i>		5	3		8
TOTAL	9	97	29	29	164
MOD (direct)	0	63	23		86
MOI (undirect)	9	34	5	30	78
Permanent	9	91	24	28	152
Temporary	0	6	3	2	11
Men	3	81	23	24	131
Women	6	16	4	6	32

Investments (k€)



Segmentation of our Aerospace activity

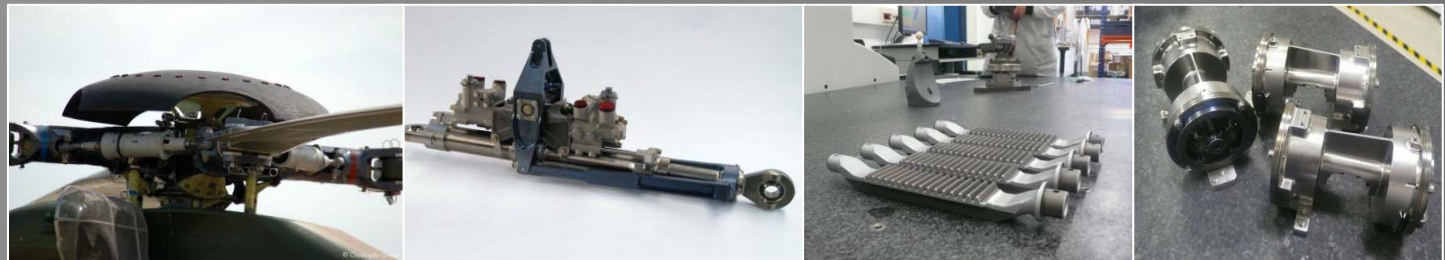
Rotating parts
and transmission



Shock absorbers
for landing gears



Flight and control
actuation systems



Nickel base parts
for engine hot
areas

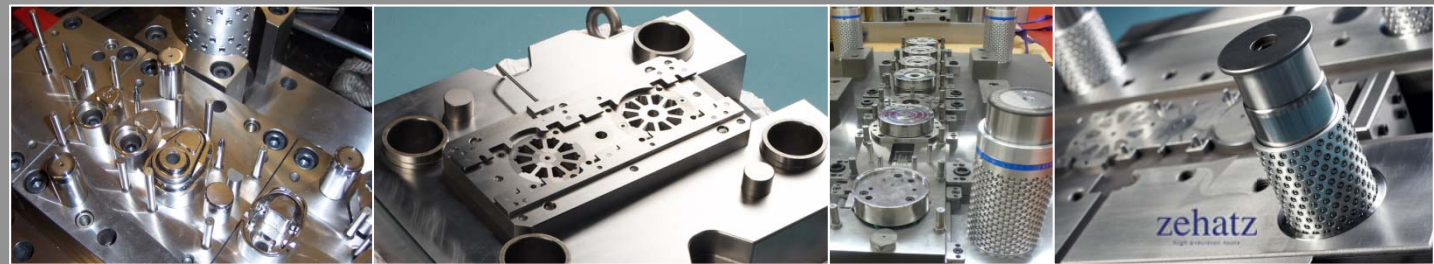


Segmentation of the diversification activity

Air-bearing components and sub-systems



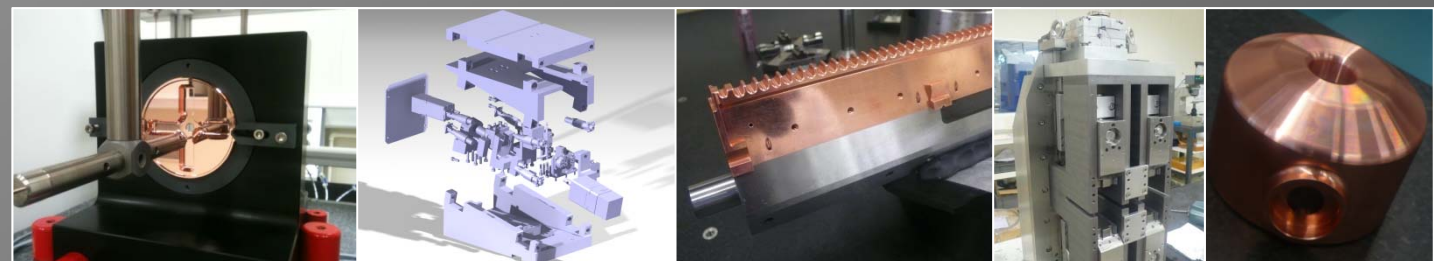
Solutions for can-tooling



Special metrological devices

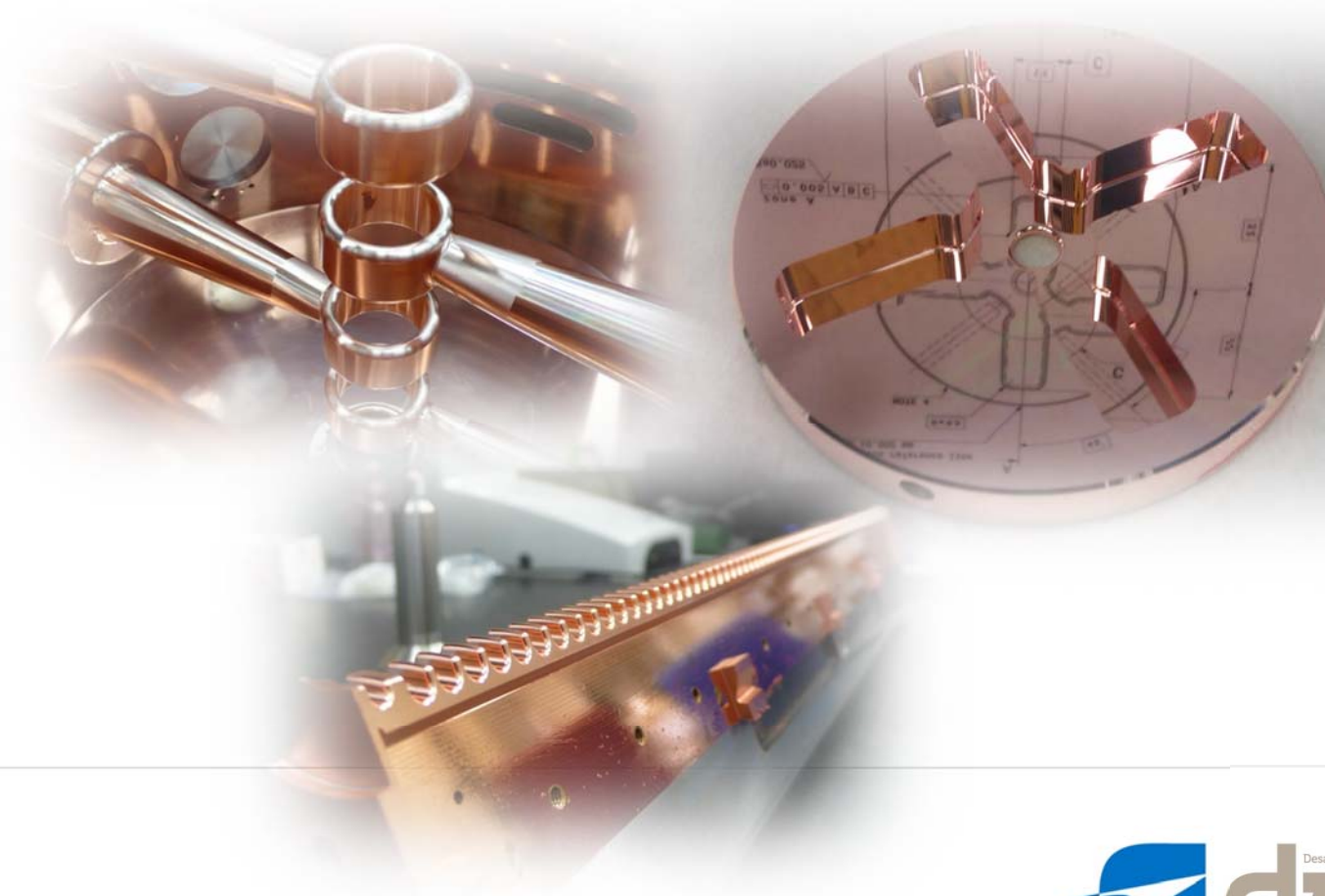


Extreme precision for Science Industry and Photolithography

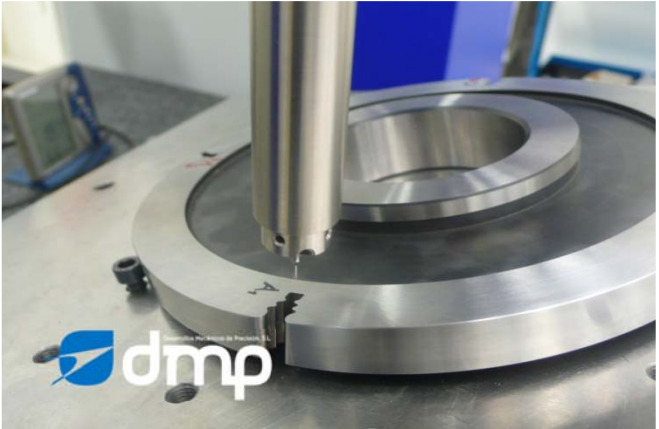
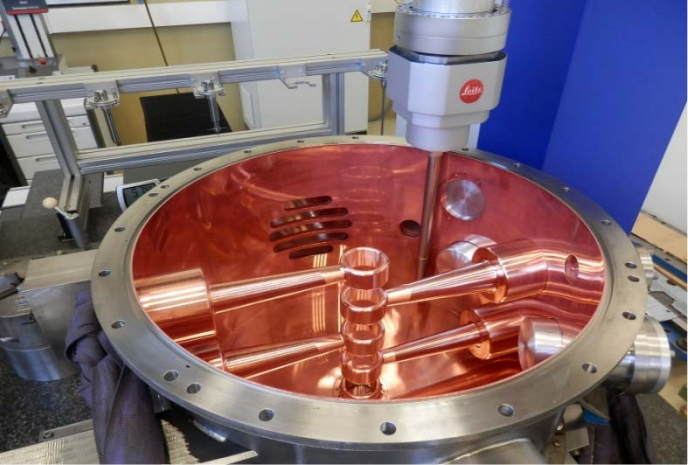
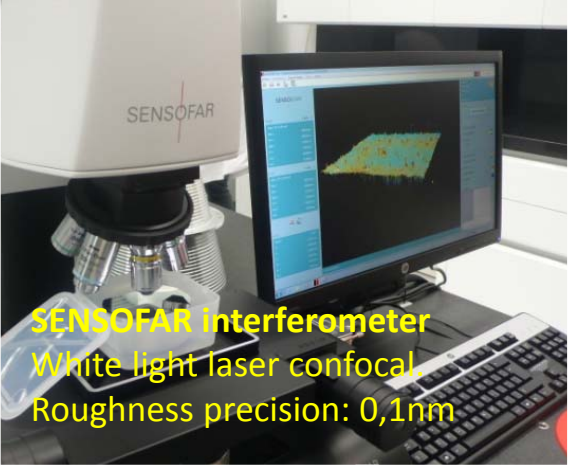


Foremost points to enable us to understand DMP's position in the Science Industry

DMP provides complete solutions for mechanically based projects by integrating extremely precise components or technological breakthroughs



In order to respond to customers' requirements, DMP guarantees that they respect all of the measurement tolerances and specifications by using the latest metrology instruments which are fully adapted to the requirements.



Overview of metrological capabilities

- **3D measurement precision: $0,3\mu\text{m}$ (+L/1.000)**
- **Maximum 3D dimensions: 3.000 x 1.200 x 1.000 mm**
- **Ra precision measurement: 0,1nm**
- **Maximum optical dimensions: 700 x 700 x 500 mm**
- **GLEASON gear measurements: $\text{Ø}350 \times 450 \text{ mm}$**
- **Quindos 7 Suite on the two 3D LEITZ units**
for measurements with a probe or by scanning all types of teeth
with a precision of $< 1\mu\text{m}$.



- **7 three-dimensional machines** (LEITZ, BROWN&SHARP, DEA, ...)

- **1 interferometer** (SENSOFAR) – White confocal laser light

- **1 3D optical machine** (MITUTOYO)

- **1 GLEASON 350 GMS** for measuring all types of gears

- **4 scanners** (and 3D assemblies with a laser head)

- **Roughness meters** (MITUTOYO)

- **Profile meters** (MAHR, MITUTOYO)

- **Measurement of internal topographic faults** (MAHR)

- **Profile projectors**

- **Endoscopes**

- **Measuring columns**

- **Tool profile measurements**

- **Thickness measurements by ultra-sound**

- **Over 2,000 patterns, templates and plug gauges**

- **7 air-conditioned workshops** (4 for metrology, 3 for production)

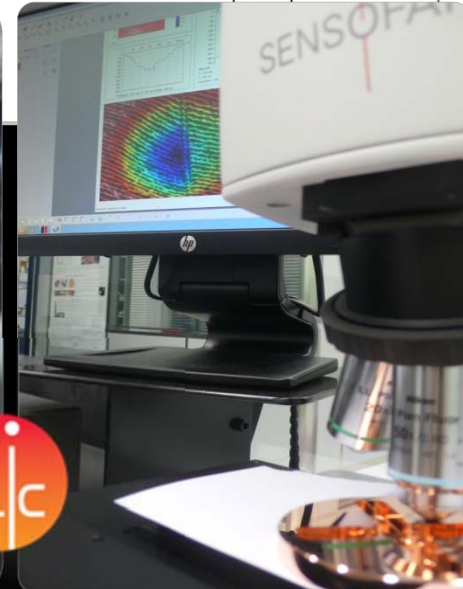
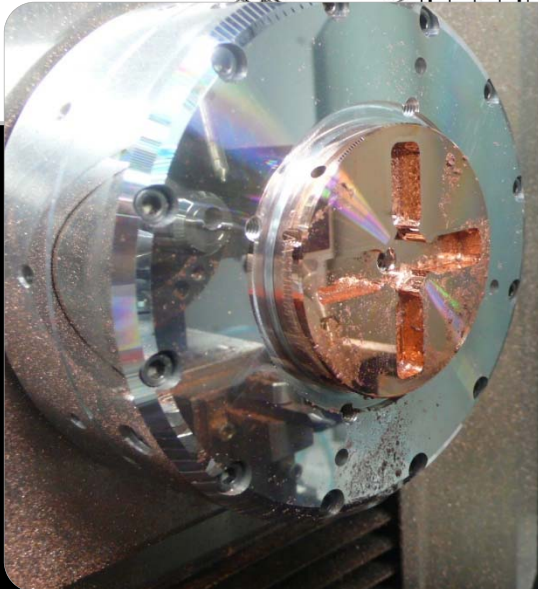
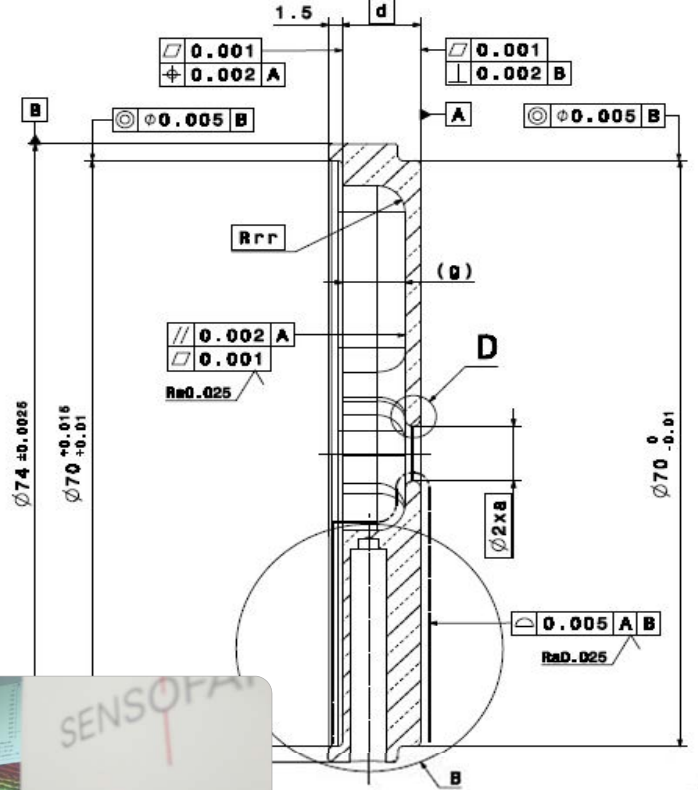
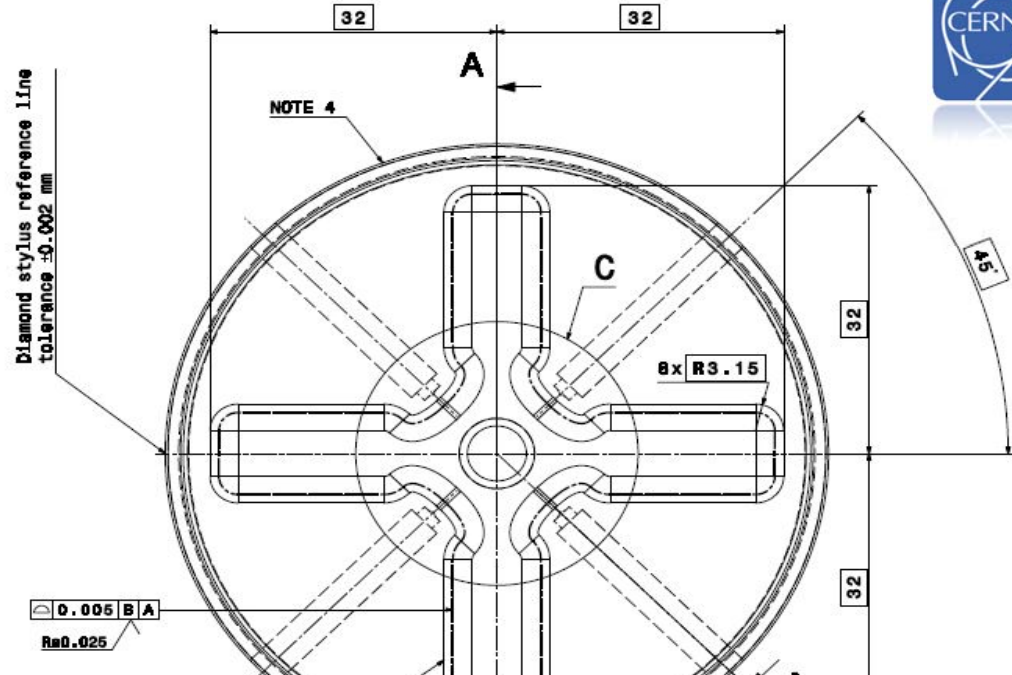
The most advanced metrology systems enable us to:

- check repeatability of the means of production prior to investment or yet in operation
- determine the influence of the parameters on the strength of the manufacturing process for extremely precise serial parts
- consider the corrective and compensation strategies in order to obtain precision levels which are over the capabilities of the means of production and their associated loss of precision
- validate any changes made to the machines in order to support technological breakthroughs
- guarantee the final results and its correlation with the measurement of our reference customers.

Example of the DMP qualification to manufacture CLIC discs:

- 1- Acquisition of the LEITZ INFINITY identical to the CERN model (5 machines sold in the world)
- 2- Purchase of an air-bearing machine equipped under request with five axes
- 3- Acceptance of machine with specific internal procedures and highlighting any limitations in the coordination of the axis and in important displacements.
- 4- Changes or adjustments to the machine based on an internal project
- 5- Development of a manufacturing process for discs by systematic characterisation of all the parameters regarding loss of precision
- 6- Development of measurement procedures on the LEITZ unit (programmes, tooling, probes) fully compatible with the CERN in order to reproduce the measurements with 100% correlation





CLIC (CERN) accelerating structure





Date: 04-11-2013

Summary of metrology control by MME group

MEASURED PART	Disc 2 - Serie 6 SUPPORT DMP	
DRAWING Nr	CLIAAS120086 nr2	
SUPPLIER	DMP	
Complete report in EDMS nr.	1302726	
Date	04-11-2013 <i>Worst defects measured</i>	
RESULTS:		
	<i>NOMINAL</i>	MEASURED
Flatness achieved Ref A	1 μm	0.9 μm
Flatness achieved plane located 8.319 mm from A	1 μm	0.7 μm
Flatness achieved plane located 6.984 mm from A	1 μm	0.2 μm
Shape accuracy achieved* waveguide (zone A)	5 μm	2 μm
Shape accuracy achieved* iris Zone A	5 μm	2 μm
Shape accuracy achieved* waveguide R0.5mm	5 μm	2 μm
Roughness achieved Ref A	0.025 μm	0.005 μm
Roughness achieved iris	0.025 μm	0.010 μm

COMMENTS (corrective actions if needed)

The disc is excellent, within the required tolerances. It presents small deviation in only one section of ... The rest of the results are really good

We have found out that the difference between DMP and CERN measurements.

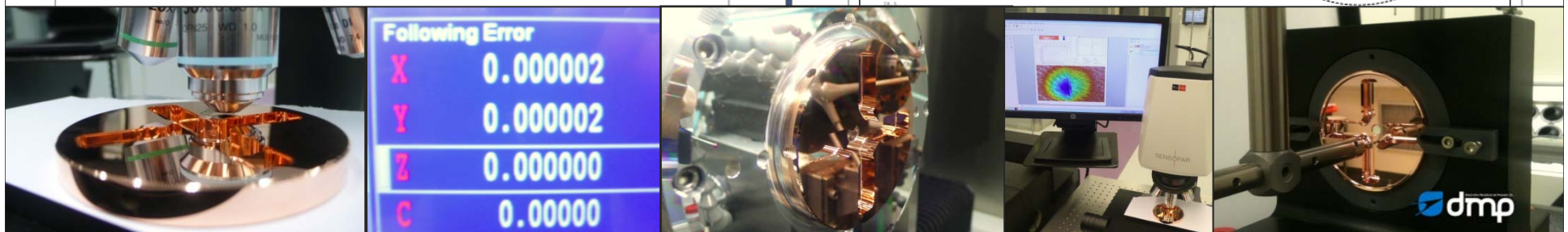
Below we can find some examples of the achieved shape accuracy:

CERN dimensional report
on qualification disc

→ Identical to the DMP report

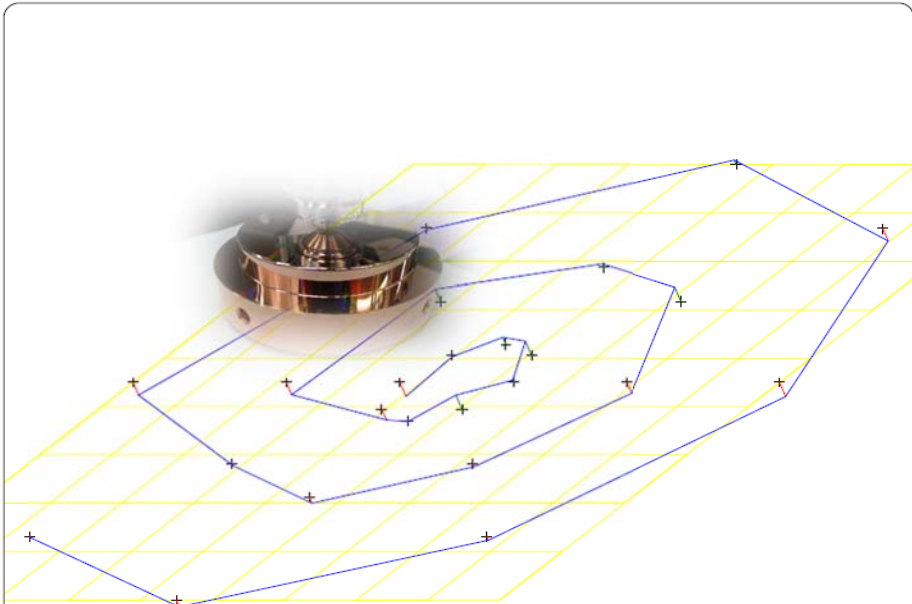


Example of what we achieve





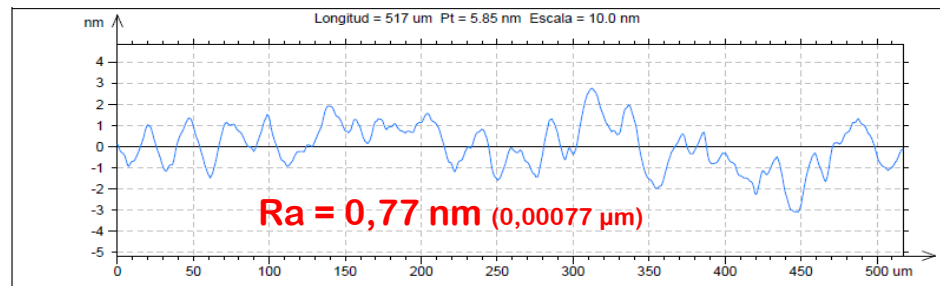
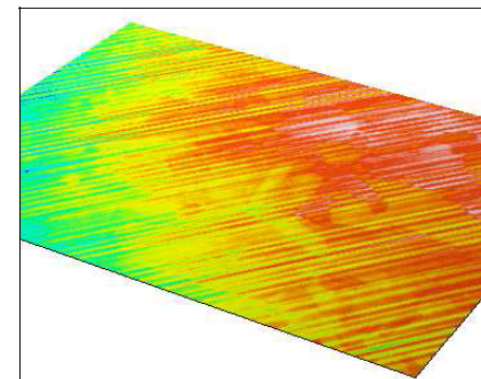
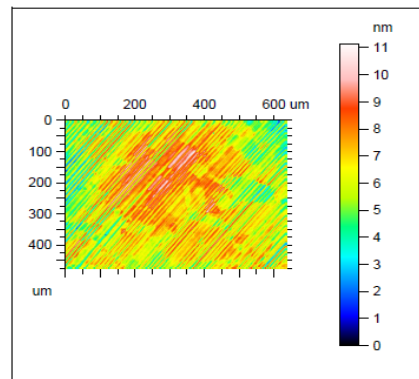
Referencia: CLIASTND0077 **Version:** A **Ser. Num.** 21
Descripcion: Anode/Cathode Disk
Operacion: Medicion rugosidad plano de apoyo
Inspector: Iñaki Hernandez
Fecha: 29/09/2014



Flatness error = 0,2 μm

Actual points : * * * Neg. Deviation : — Pos. Deviation : —

Notation : ANODE/CATHODE D Producer : CERN Draw. No. : CLIASTND0077
 Ser. No. : 2 Part No. : Department :
 Calcul. : Filtering: No Probe dia.: 2 mm
 Element : X Y Z X Y Z X Y Z
 Form : 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
 Error Magnif.: 10000 Pos. Deviat.: 0.000 -0.058 -3.530 3.5393
 No. of points: 24



Example of what we achieve

ISO 4287		
Parámetros de amplitud - Perfil de rugosidad		
Ra	0.776	nm Filtro gaussiano, 0.25 mm
Rz	4.41	nm Filtro gaussiano, 0.25 mm
Rc	2.63	nm Filtro gaussiano, 0.25 mm
Rt	4.41	nm Filtro gaussiano, 0.25 mm
Rq	0.965	nm Filtro gaussiano, 0.25 mm
Rsk	-0.0389	nm Filtro gaussiano, 0.25 mm
Rku	2.71	nm Filtro gaussiano, 0.25 mm
Parámetros de relación de material - Perfil rugosidad		
Rmr	100	% c = 1000 nm bajo el pico máximo, Filtro gaussiano, 0.25 mm
Rdc	1.48	nm p = 20%, q = 80%, Filtro gaussiano, 0.25 mm

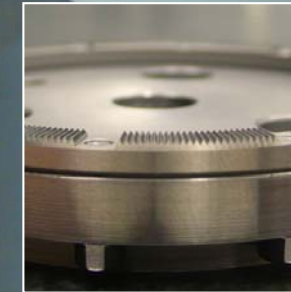
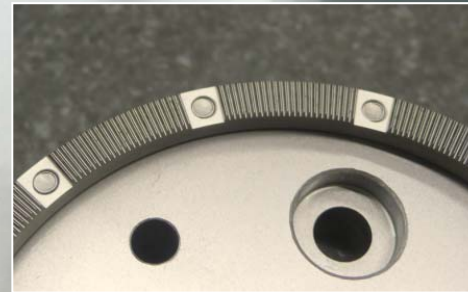
ISO 25178	
Parámetros de altura	
Sp	4.61 nm
Sv	6.52 nm
Sz	11.1 nm
Sa	1.10 nm



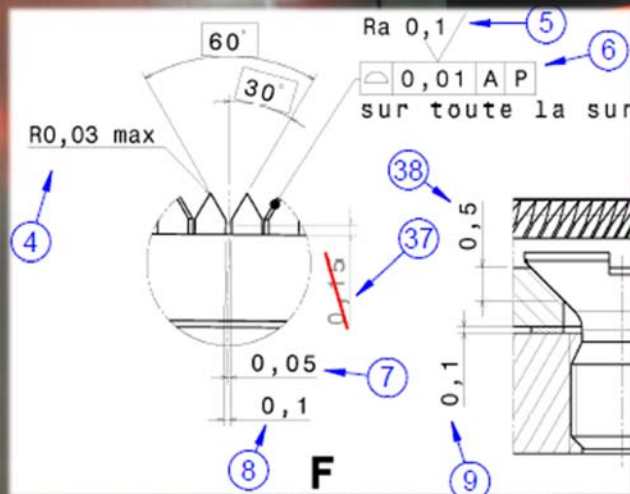
FLATNESS
ISO 1101

Inspector :Quindos
 Date:25-SEP-2014
 Time:15:11:35

Fully
customized
machine



Example of what we achieve



INVAR micro-toothing on 5 axis air-bearing machine for space cryogenic motor (CEA IRFU)

In order to manufacture complex or extremely precise components, a combination of various different technologies is quite often needed:

- Turning
- Hybrid turning (Multi-task)
- Diamond hybrid turning
- Units with 5 continuous axes (up to 180.000 rpm)
- Surface grinding
- Internal and external cylindrical grinding
- 5-axis grinding
- Coordinate grinding (GIG)
- Optical profile grinding
- Gear cutting and grinding (all types of gears)
- Wire EDM (up to 0,03 mm wire – without white coating)
- Die-sink EDM
- Broaching
- Deep drilling and drill sampling
- Honning
- Balancing

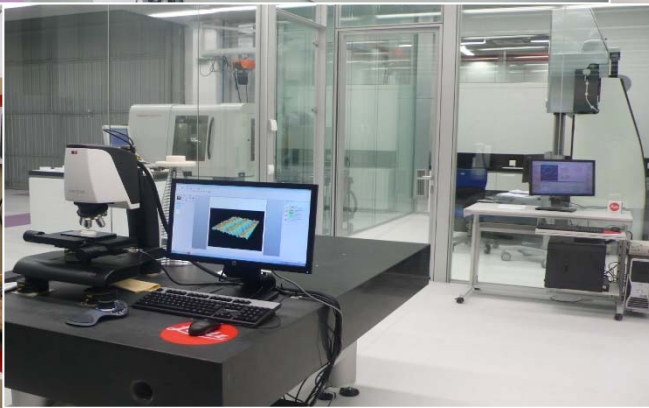
DMP integrates them all



**HARDINGE
KELLENBERGER
STUDER
DANOBAT
MATSUURA
HERMLE
MORI SEIKI
MIKRON
WFL
SPINNER
NANOTECH
MOORE
HAUSER
GLEASON
SCHENCK
AGIE CHARMILLES**



....

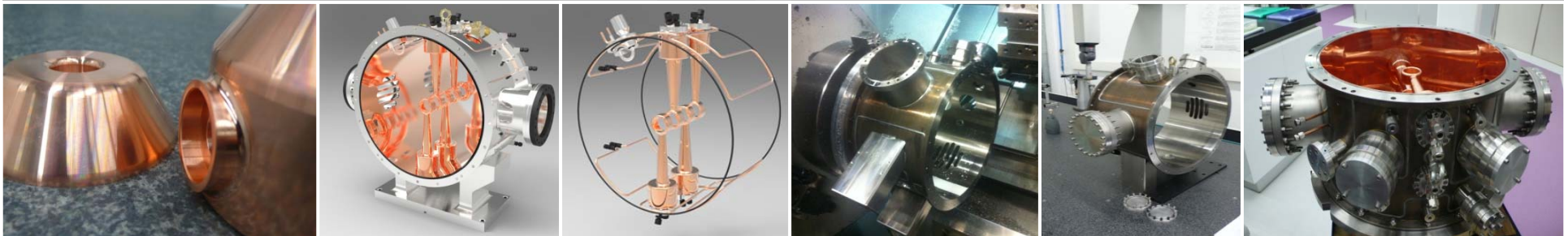


Understanding the technological limits in mechanics enables:

- Working in partnership with our customers in order to design components that can be manufactured with the best possible cost/operation relationship. To achieve this, DMP counts on a R&D department made-up of scientists and mechanical engineers in order to bridge the gap between the realities of the manufacturing process and the customers' final needs to reduce any misunderstandings and provide optimum final results.
- Full project management, from the initial design through to the testing stages, by controlling the industrial risk linked to critical components: DMP manufactures what they design, and they design what they know how to manufacture. The impact in terms of monitoring the technical implications and delivery times is important .
- Obtaining better and superior results compared to market standards (higher final product performance and improved repeatability in recurring projects).

Example of an IFMIF buncher:

- DMP manufactures the 115 sets (with over 2,500 components) for the DRIFT TUBE of the LINAC 4 at the CERN, and is recognised as the only manufacturer able to reach the level of quality required which directly affects the LINAC output power.
- Having that as a reference, DMP has acquired the IFMIF buncher market and designs full systems aided by CIEMAT.
- The manufacture of cavities is completed internally, and the mechanical welding is undertaken by LEORPE (a subsidiary of EGILE with 45 employees).
- The basic high and low power tests are completed by CIEMAT and ALBA.





High power test at ALBA at 350 KV

CAV_VOLT	350.72	kV
CAV_RV	530.73	W
CAV_FW	9.21	kW
Detuning Dephase	-17.12	degrees
AmpControl	282.46	mV
AmpRef1diag	340.92	mV
AmpFw1	340.98	mV
Vacuum Pressure	4.4e-08	mbar

Reset

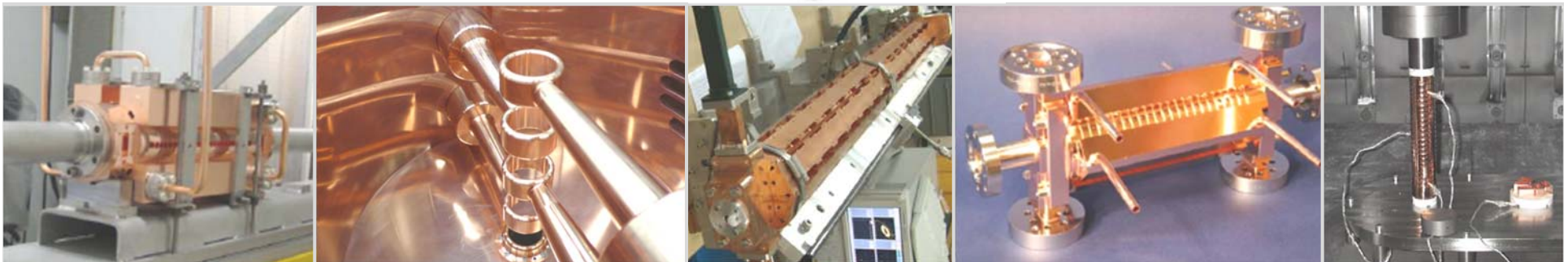
Apply

Specific areas targeted by DMP in the field of the 'Industry of Science':

- **Accelerating structures and adjoining systems:** Based on their knowledge of working OFE copper, DMP now has new standards regarding the optimisation of the mix between dimensional/geometrical tolerances and optical roughness.



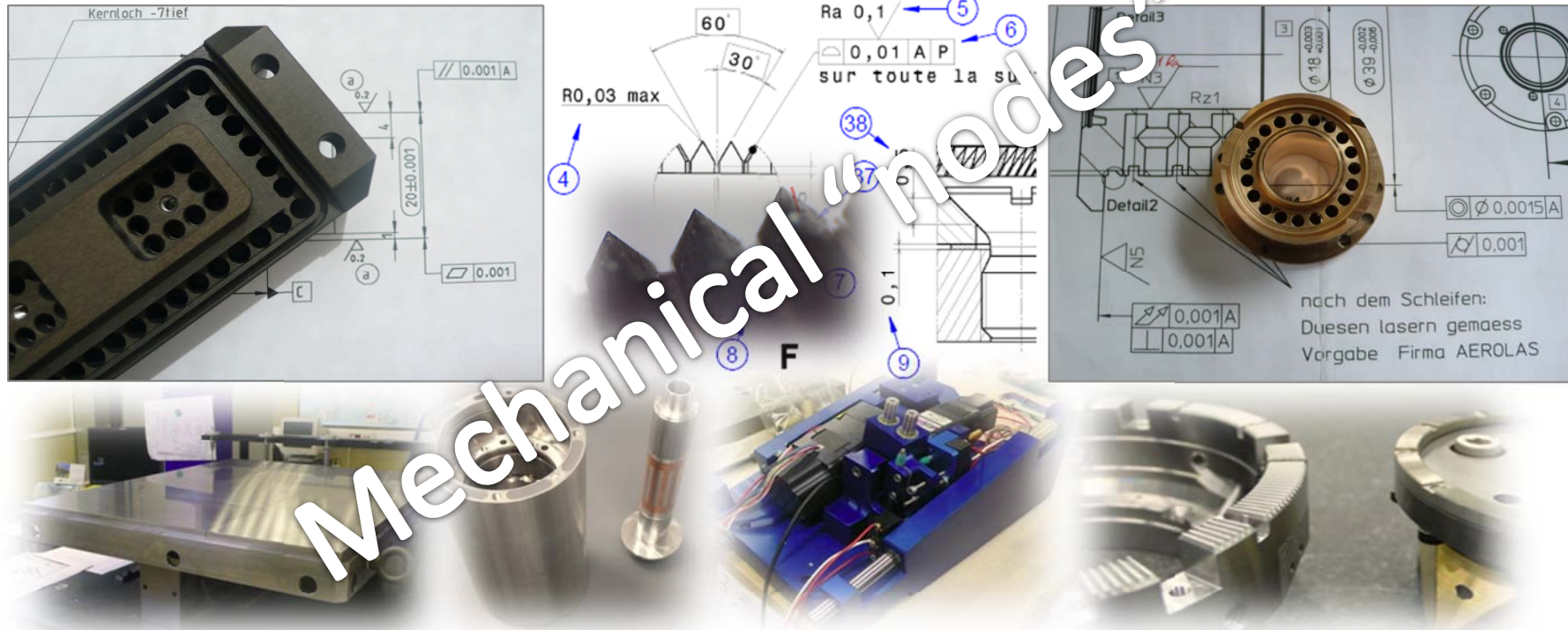
Systems that DMP can handle entirely



Positioning systems:

Based on their knowledge of kinematic components acquired through the aeronautical industry or air-bearing systems, for machines with speeds up to 480,000 rpm.

DMP can design the most advanced and performing systems with their ability to manufacture the most precise components, and to integrate them into robust designs.



Systems that DMP can handle entirely





AIR-BEARING

COMPONENTS & SYSTEMS



Examples of niche market components

DMP has a large range of solutions to provide their customers with full support and consultancy for their mechanical challenges

**maximising the value contribution
through mechanical expertise**



Some of our achievements and products



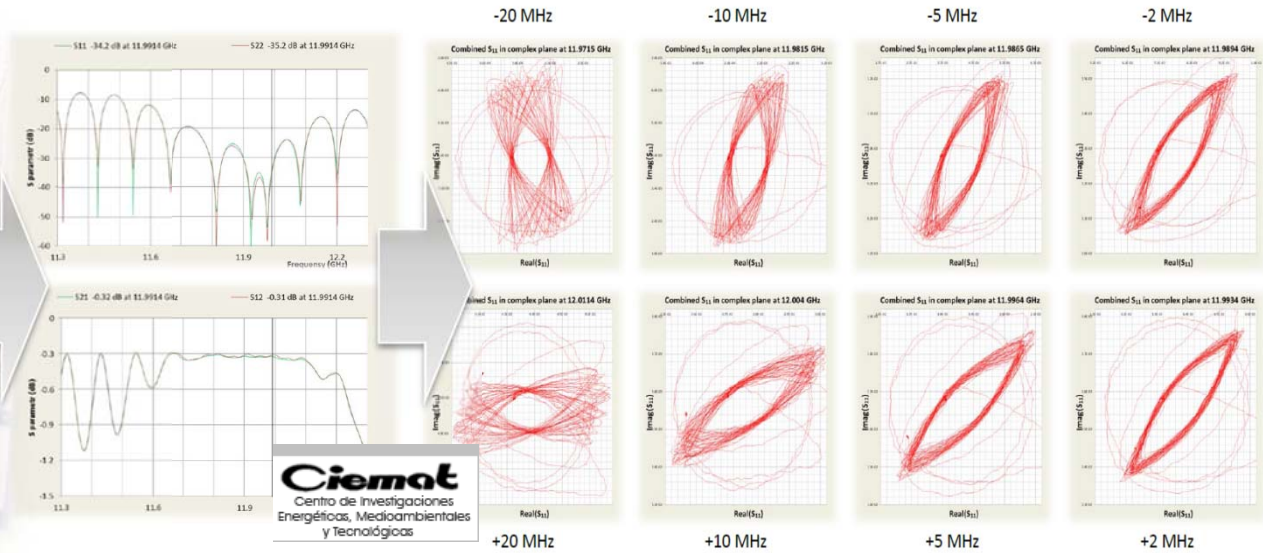
E-modulus press - CERN



Phase shifter - XFEL



PETS - CLIC



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**1 hour from Biarritz airport,
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