

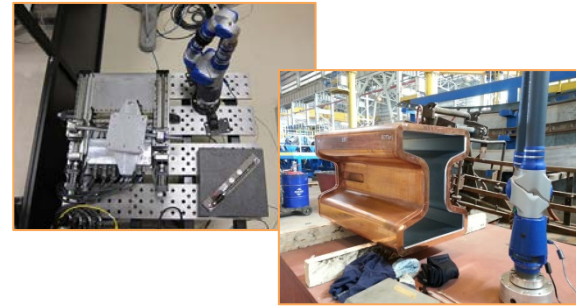
X	-0.0629
Y	0.0477
Z	0.0000
d	0.0790
A::Nominal CAD	

X	-1.4120
Y	1.0697
Z	-0.2014
align	:::6

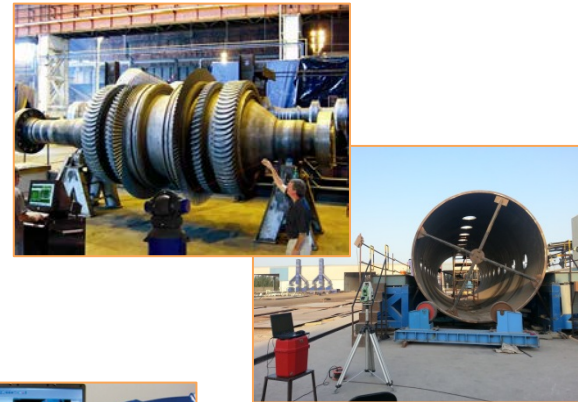
# Engineering – Metrology – Workshop - CNC

# Services

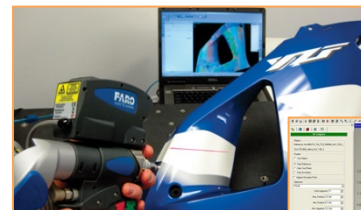
Small part mechanical measurements  
and reverse engineering



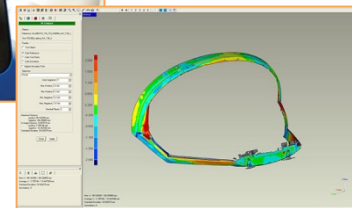
Large and very large measurements



Reverse engineering services



Tool designing



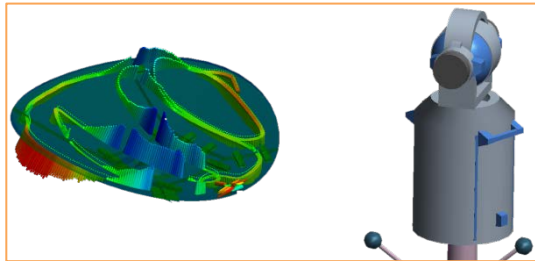
# Fields of application

- Aerospace
- Automotive
- Oil and gas
- Energy
- Shipbuilding
- Metallurgy
- Machined parts

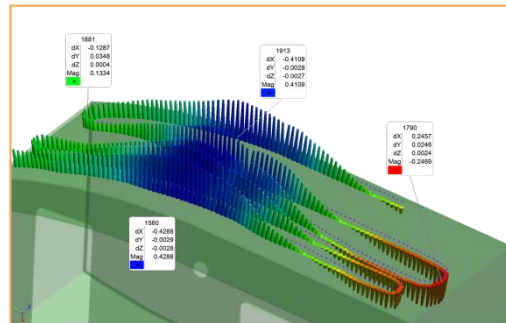
# Measurement process



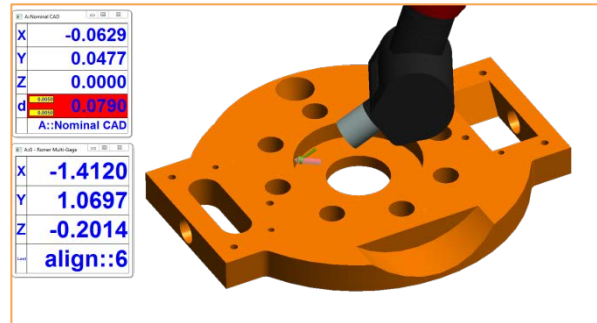
**Measurement of part**



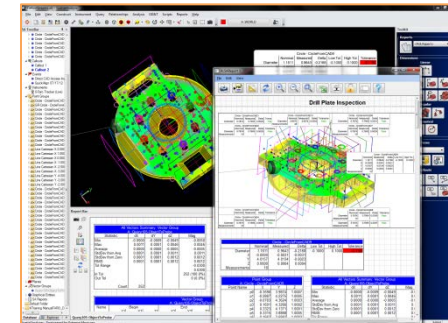
**Creation of geometry and reference system**



**Querying**

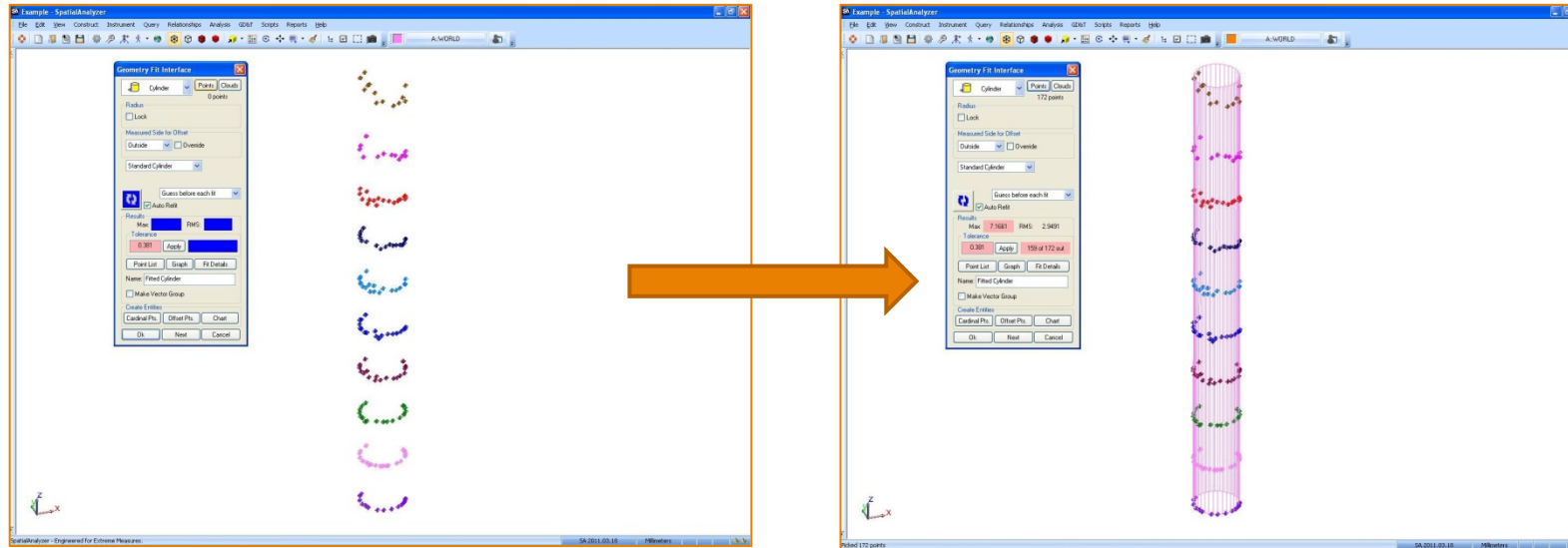


**Regulation and rechecking**



**Reporting**

# Geometry fitting



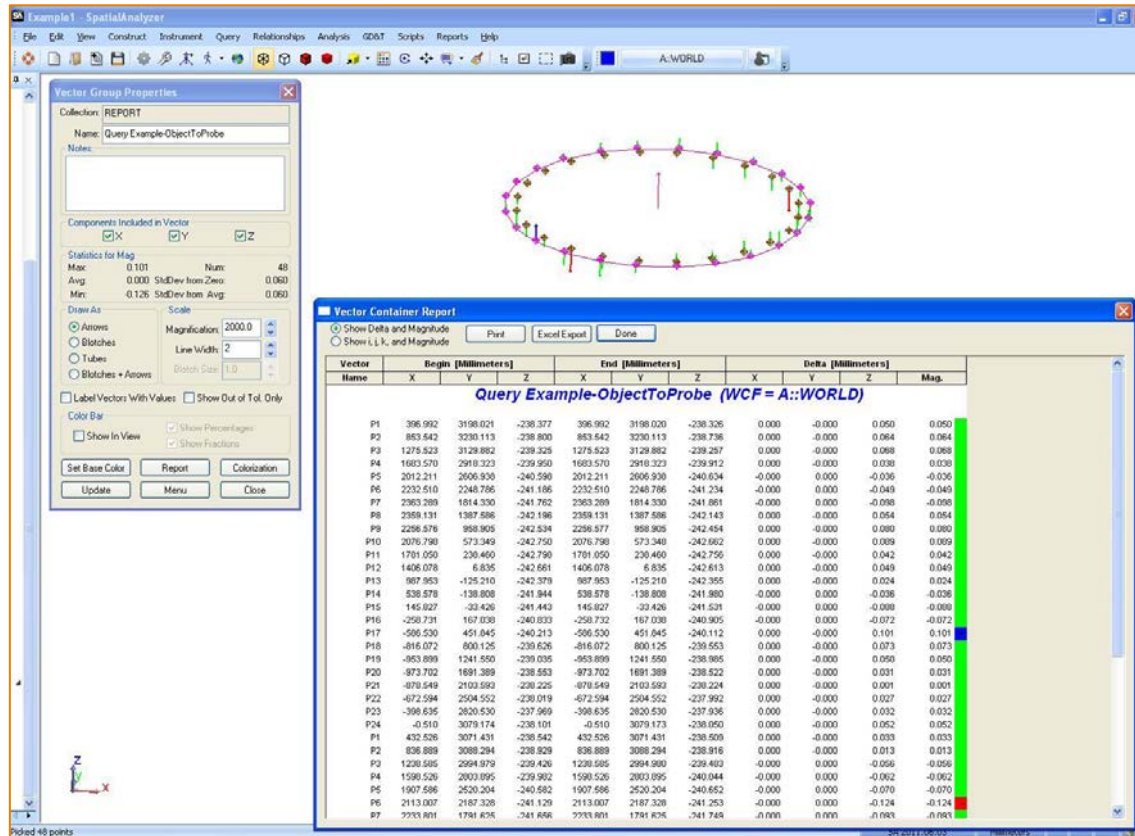
With our software we can create any basic geometry. The creation of geometry can be done immediately.

With Spatial Analyzer software we could create points like:

- Centers of circles, cylinders,
- Centroids of planes,
- Center of lines, etc.

And then compare them.

# Querying



With our software we can easily do any comparison between every geometry we created.

For best results we are applying environmental factors as temperature and air pressure.

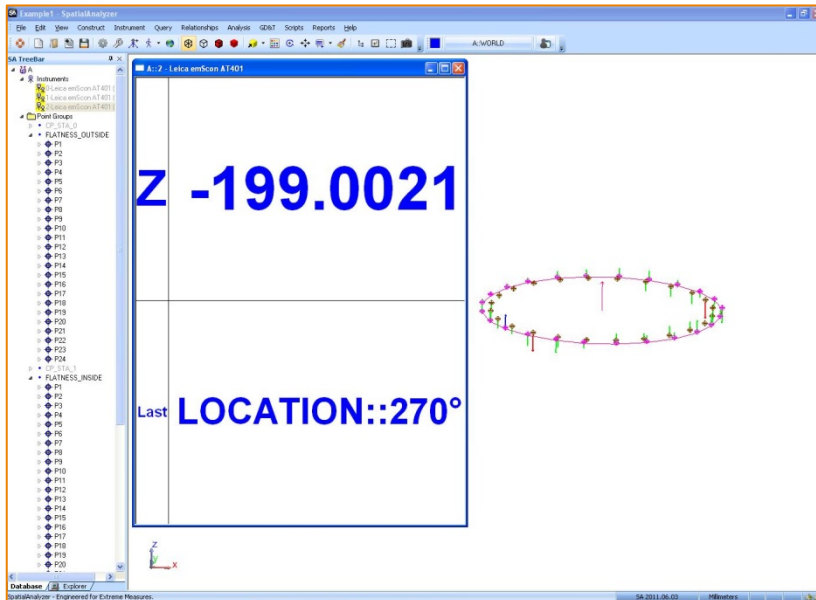
We could apply any material constants that could affect measurement, We own excessive database of materials, as well as, we could create new ones.

# On-site regulation

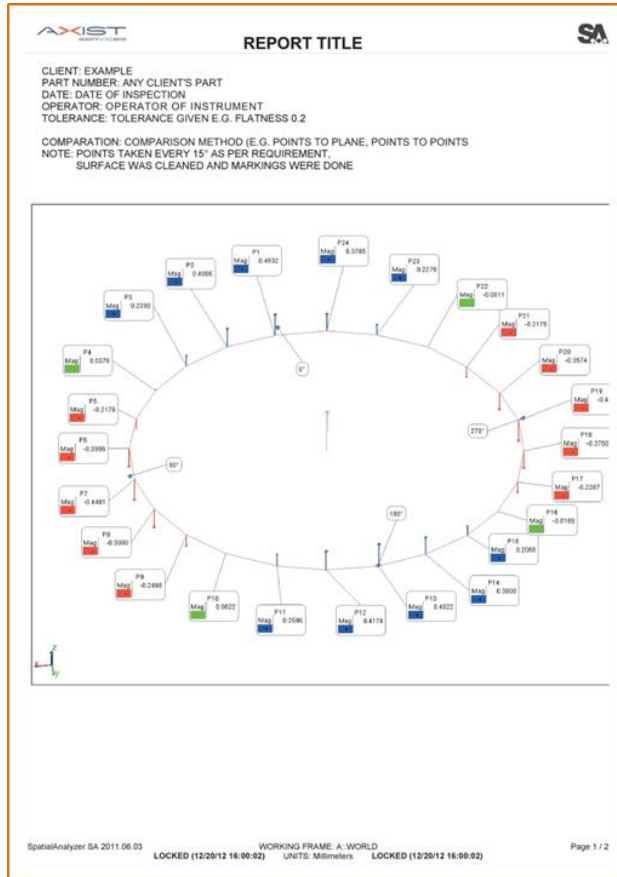
Thanks to Spatial Analyzer we could provide on-site real-time machines regulation.

Our instruments allow us to operate with constant stream of data so we do not need to analyze it after it measurement.

Thanks to this functions we could save huge amount of time.



# Reporting



We are providing clear reporting with any information that our Client require.

With our software we can clearly show which parts of measured item are wrong and which are in tolerance field. It is clearly stated through colour indication.



# Our equipment

## Laser Trackers:

- Leica Laser Trackers
- Faro Laser Tracker
- API Laser Tracker



## Poli-articulated arms:

- Faro Arms (Titanium and gold)
- Romer Arms

## Industrial Total Stations:

- Leica

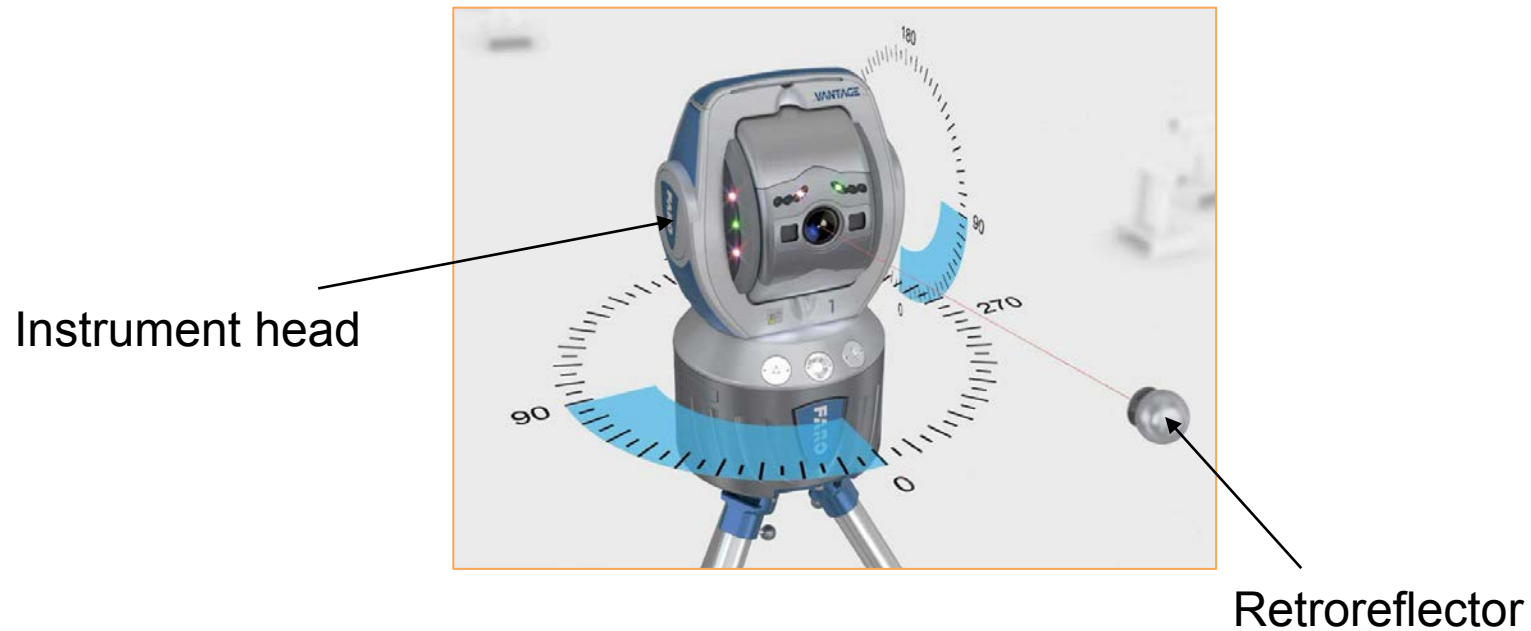


Photogrammetry

Laser radar



# How it works? Laser Tracker



All the theory end up with checking the distance (time of laser beam reflection) between the head and the retroreflector.

Head can operate in 360 deg. as showed.

# How it works?

## Industrial Total Station



Instrument head



Retroreflector



Reflective tape

Total Station works with IR (infrared) instead of laser for checking the distance between the head and the retroreflector.

Thanks to using the retroreflector instead of reflective tape we can acquire greater precision than most of the companies using only reflective tape.

With Total Station it is possible to check parts with good precision up to 500 m. Also the environment influence is, in case of Total Station, minimal compared to Laser Tracker.

Head can also operate in 360 deg., same as Laser Tracker

# Oil and gas industry

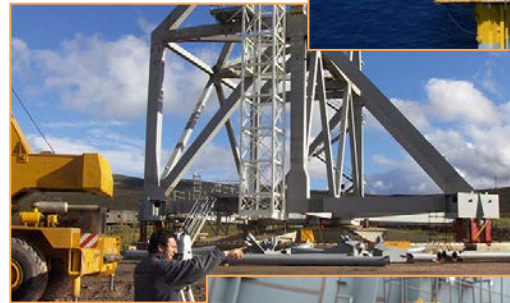
We are keeping in touch with biggest oil and gas companies.

Our services included:

- Measurement of very large structures (legs, water and oil tanks, oil platforms)
- Alignment of cranes, platforms and much much more

For accurate measurements we are using:

- Laser Trackers (1-160 meters)
- Total Stations (2-500 meters)



# Energy



We are providing dimensional services also in the energy industry.

We have outstanding experience in measuring such parts as: water turbines, various tanks and other big structures.



Some of many of our clients:

- DACTEK
- VOITH SIEMENS
- ALSTOM POWER
- ANSANDO ENERGIA

We are providing services with: laser trackers, total stations.

# Automotive

Due to our extensive cooperation with such companies as:

- FIAT Group
- Iveco
- Porsche
- Comau
- Kuka

we are able to offer highest quality of dimensional inspection within the automotive industry.

We are offering services in use of:

- CMMs
- Laser Trackers
- Poli-articulated Arms



# Aerospace

Our services include:

- Assembly rectification
- Dimensional checks
- Tools' creation and correction



We are using in this field:

- CMMs
- Laser Trackers
- Poli-articulated arms

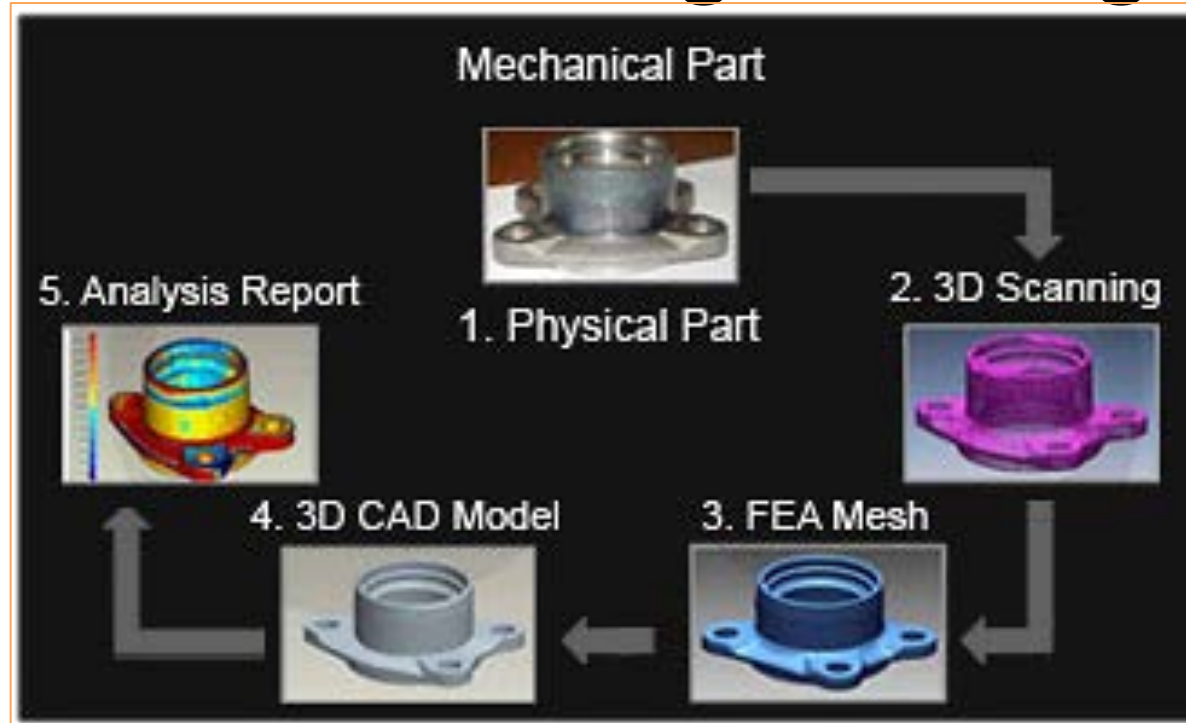


We are working with such companies as:

- Boeing
- Airbus
- AgustaWestland
- Alenia
- Tawazun Precision Industries
- STRATA



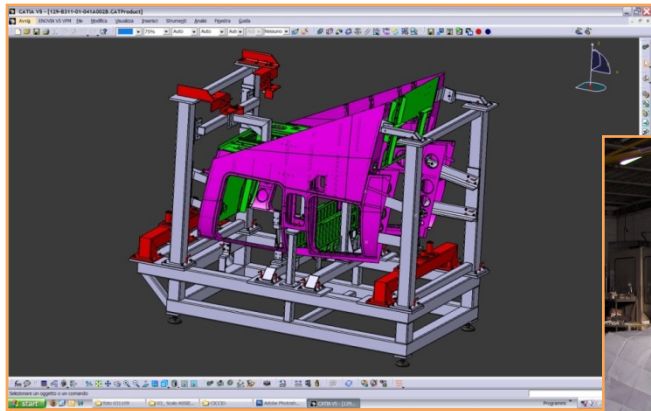
# Reverse engineering



We are providing full reverse engineering services, from scanning actual part, through creation of model, up to analysis.

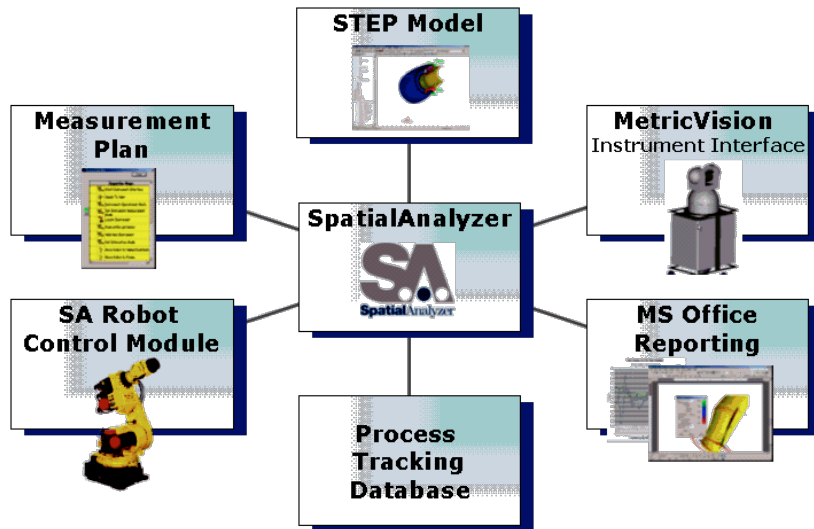


# Tool designing / manufacturing



We are in possession of well-equipped workshop, thanks to this and our experience we are able to offer wide variety of services in tool design and manufacturing.

# Software



We are in possession of licences of Spatial Analyzer and we are its authorized reseller.

For the designing and measurement purposes we have CATIA V5 licenses.



**ALTO** has been working with the main Aerospace Companies such as:

<b>ALENIA AERONAUTICA</b>	
<b>ALENIA AERMACCHI</b>	
<b>AGUSTA WESTLAND</b>	
<b>ALSTOM</b>	
<b>AIRBUS</b>	
<b>THE BOEING COMPANY</b>	
<b>ENEL</b>	
<b>FBM KNM FZCO</b>	

<p>FBM KNM FZCO</p>	
<p>LAMPRELL</p>	
<p>LOCKHEED MARTIN</p>	
<p>MAGELLAN</p>	
<p>OMA SUD</p>	
<p>SALVER</p>	
<p>THALES ALENIA</p>	
<p>TAWAZUN</p>	
<p>THE NORDAM GROUP</p>	
<p>VOITH</p>	