

SAILADV

Analyze  
Determine  
Validate

# Products and Services

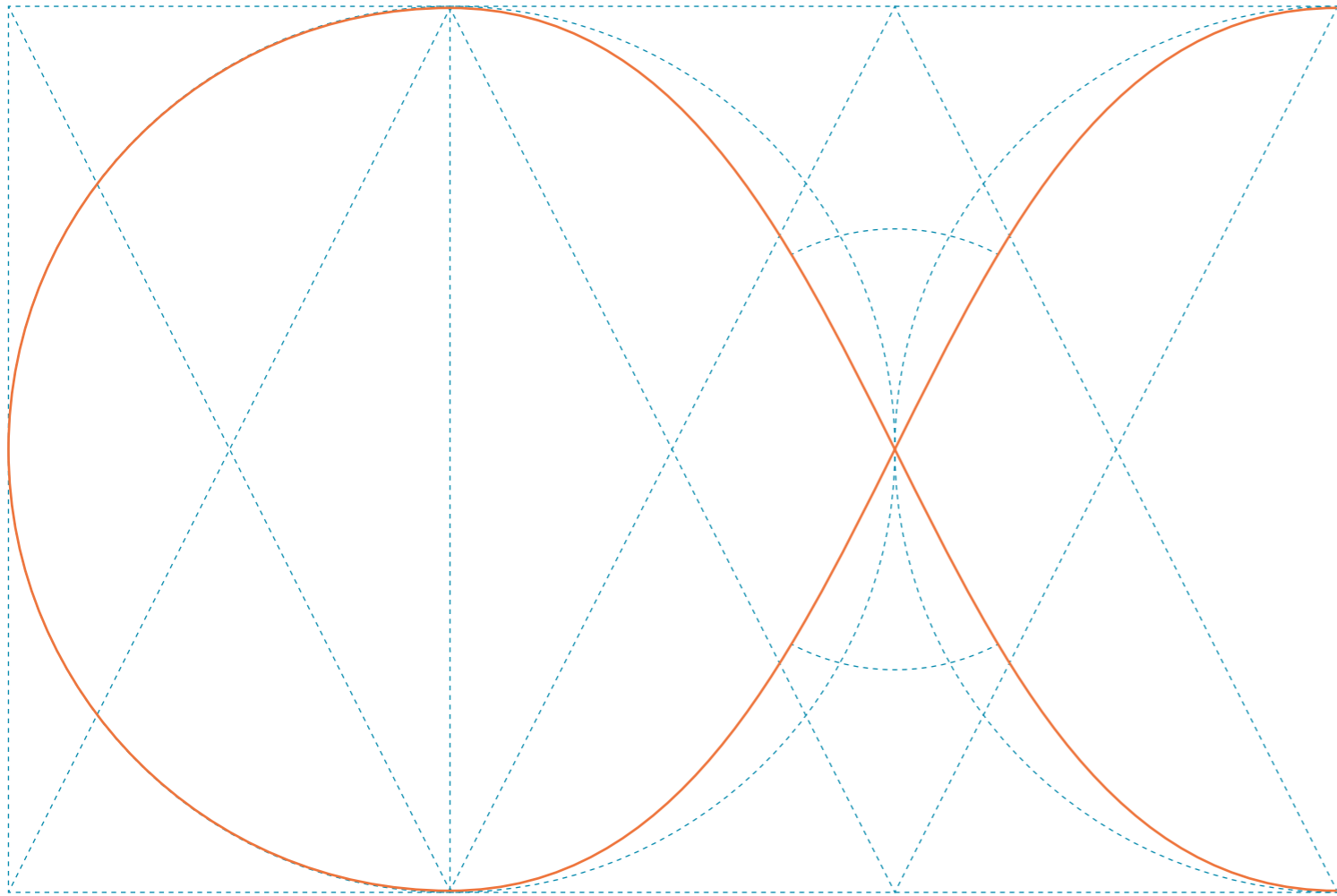
Performance Analysis  
Failure and Material Analysis  
Predictive Maintenance  
Oil, Fuel & Coolant Analysis  
3D Scan

# SAILADV

## CERTIFIED ANALYSIS, TESTS AND ENGINEERING FOR YOUR YACHT

There is only one way to unveil the potential of a yacht: measuring and monitoring its conditions.

We are your point of reference when it comes to tests and trials, analysis, surveys and technical measurements. We find the perfect tool to make the yacht match with your expectations.



# SAILADV

SailADV was founded in 2015 from the strong experience gained in the naval sector by the founder and independent surveyor Giovanni Palamà to answer a specific need of the marine industry, namely how to **measure performances and marine seaworthiness of yachts with a scientific, objective and repeatable approach.**

Today, SailADV works as a supplier of high technology services for the **most important European shipyards, fleet manager companies and ship owners.**

SailADV operates in the **Giga and Megayacht segments**, providing technical services to certify the compliance of yachts with the project specifications and the required quality standards. The expertise of its team guarantees the trustworthiness of the consultancy services, while the developed technology ensures the achievement of an extremely efficient real-time monitoring.



ANALYZE

DETERMINE

VALIDATE

SAILADV



1



3

- 1 CRN Odyssey 74m
- 2 CRN Latona 50m
- 3 Custom Line NAVETTA 28m
- 4 Custom Line NAVETTA 33m
- 5 Custom Line Navetta 42m



2

4



5

# Performance Analysis

H-Box / H-Log

Sea trial data acquisition:  
a new approach

H-Spectrum / H-Vibe

Vibration analysis system

H-Torque

Power torque and torsional  
vibration analysis service

H-Spark

Electrical systems analysis

## SAILADV



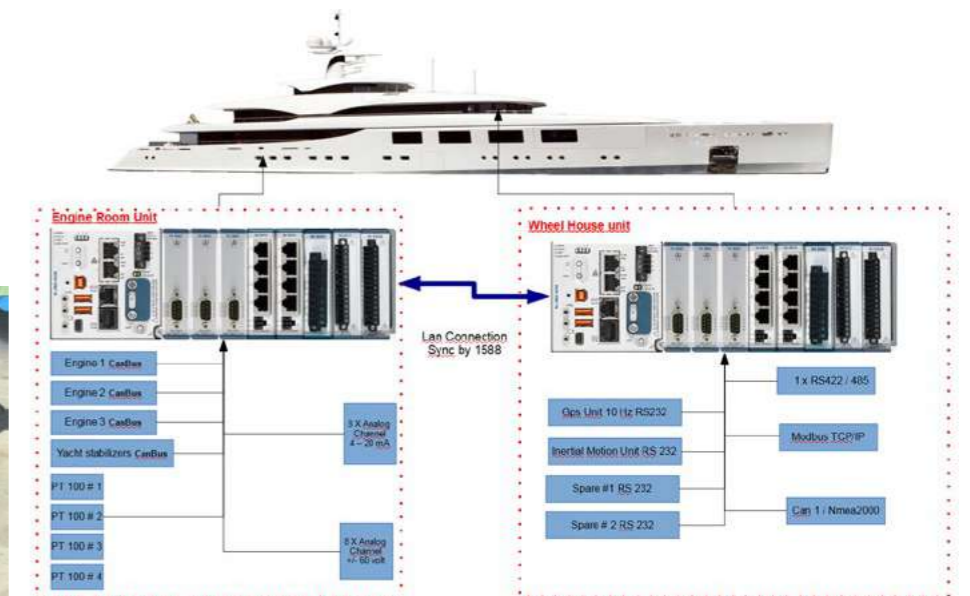
# H-Box H-Log

## Sea trial data acquisition: a new approach

H-BOX is an innovative data acquisition system for the analysis of the performances and the characteristics of yachts and ships (motor or sailing).

Designed to be an extremely precise and analytic instrument based on a Linux real time architecture, the system has an expandable modular functionality with our architecture that allows the maximum configurability and versatility being able to dialogue in a synchronous mode with the main ship systems.

## H-BOX ARCHITECTURE



## SYNCHRONOUS CONTINUOUS DATA ACQUISITION

### Supported Protocols:

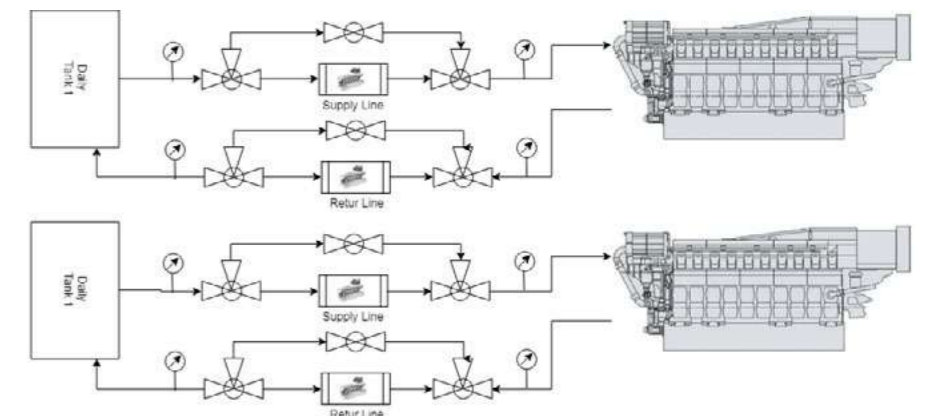
Nmea 0183/2000  
J1939  
MCS-5  
Mod Bus TCP/IP  
Mod bus RTU

### 16 bit Analog signal converter:

0-20 mA  
 $\pm 10 \text{ V} \pm 60 \text{ V}$   
Pt100

## FUEL CONSUMPTION MEASUREMENT

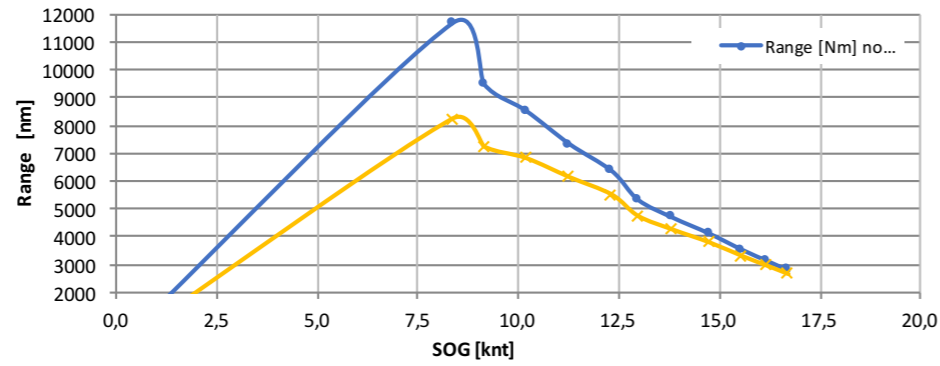
Due to the increasing awareness of the impact of exhaust emissions of the environment, combined with the continued increases in fuel costs, there is great need for reduction in fuel use. This consideration has led to a high demand for accurate measurement systems to monitor the fuel consumption per engine. Real-time measurement and trend analysis of fuel utilization provide helpful information for ship owners, ship managers and crew about the influences of their actions on the consumed fuel. We offer various kinds of services for the most accurate measurement and analysis of fuel consumption.



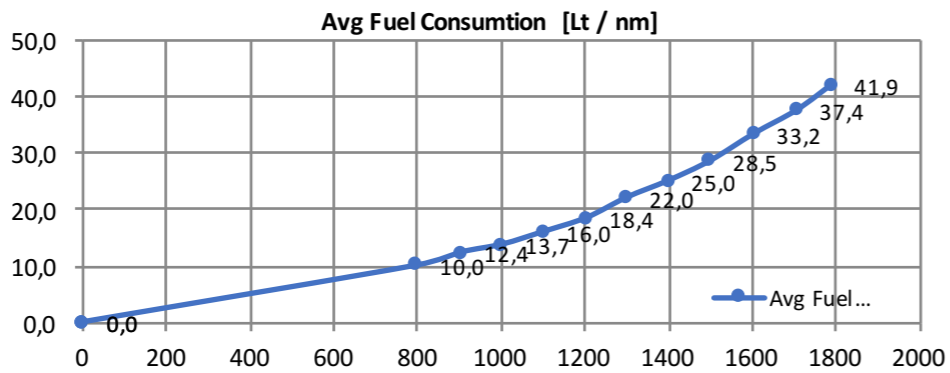
## ANALYZE

The synchronous data acquisition processes, from the flowmeter and from all the other on-board systems, allows a real time evaluation of the range and other important quantities derived.

## DETERMINE



Real-time measurement permits important Fuel Consumption and Emissions reduction

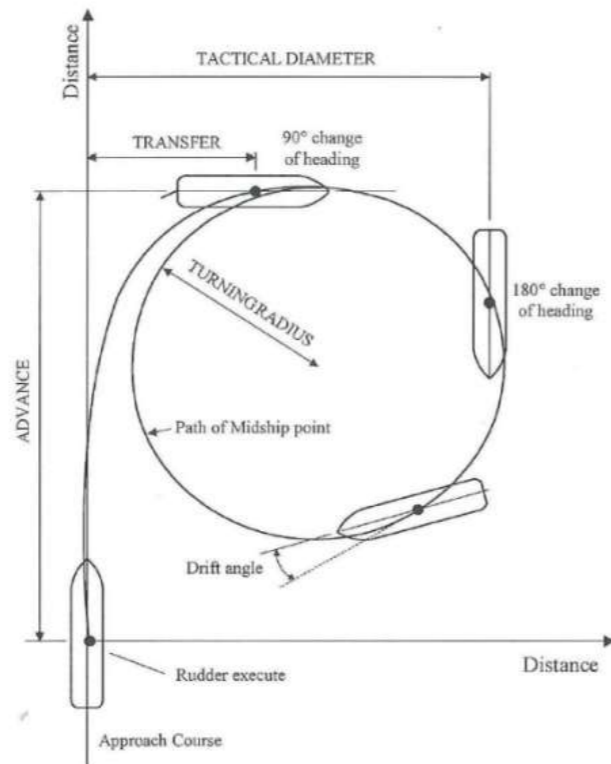


## MANEUVERING TESTS

The essential information that will be obtained from this maneuver consists in:

- tactical diameter
- advance
- transfer
- final ship speed
- yaw rate in the “steady state” of the turning circle.

The maneuverability performance of the yacht is obtained through the use of 2 differential GPS and a newly developed inertial platform.



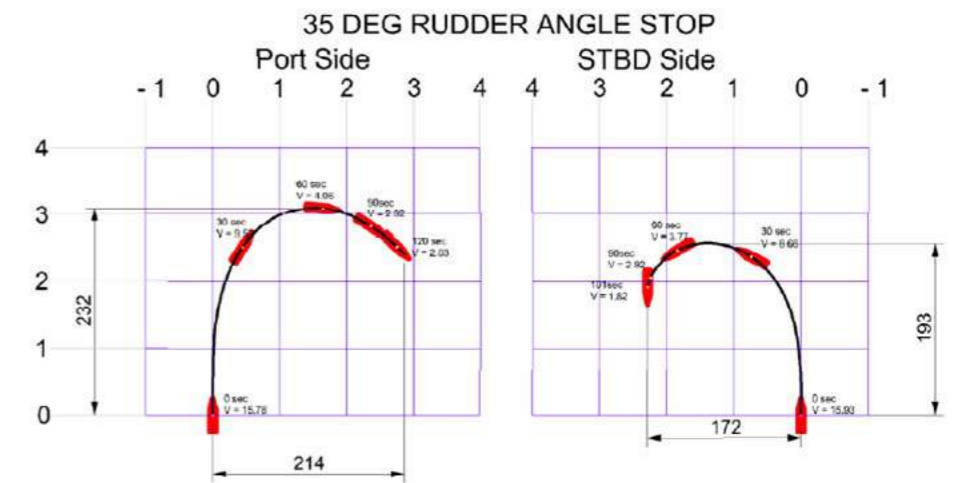
## SAILADV

The experience gained over the years has allowed us to develop many special analysis algorithms that permit a real time evaluation of:

- Instant turning radius
- Advancement
- Transfer.

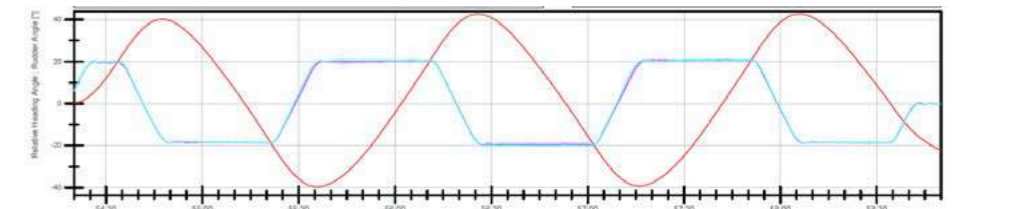
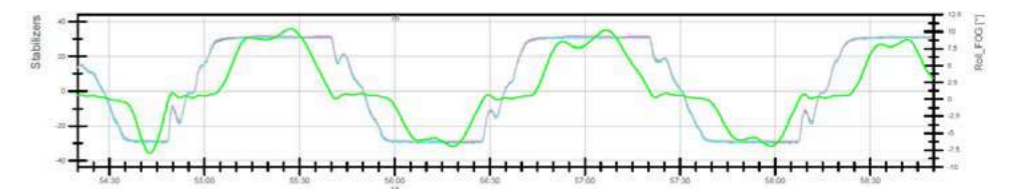
All parameters can also be contextualized with respect to, for example, the status of the stabilizers or the inertial platform.

## H-BOX / H-LOG



## “Z” MANEUVER

The “Z” Maneuver here below indicated, also known as Zig-Zag Maneuver or the Kempf Maneuver tests, is part of the standard IMO tests required for the assessment of the characteristics of maneuverability of yachts.



Thanks to the synchronous data acquisition of H-BOX it is possible to obtain the following information:

- Initial speed of response of the system
- Execution time of the second approach
- Time to stabilize the route
- Angle and width of the overshoot angle
- Responsiveness of stabilizers
- Maximum roll angle reached.

## LLOYD'S CERTIFICATION

SailADV H-BOX system:  
it's the one and only certified system with a statement of compliance given by the Lloyd's Register which considers it as appropriate to support sea trials by measurements and reporting.



Statement No. PRJ11091959-1  
12 November 2018

### FACTUAL STATEMENT SAILADV S.r.l – H-BOX Project

Lloyd's Register EMEA carried out the review of the **SAILADV Consulting** Documentation covering the **H-BOX**,

against the *IMO Resolution MSC.137(76) (adopted on 4 December 2002), STANDARDS FOR SHIP MANOEUVRABILITY* and the *BS EN ISO 19019:2015 Sea-going vessels and marine technology — Instructions for planning, carrying out and reporting sea trials*.

The H-BOX is considered as appropriate to support sea trials by measurements and reporting in compliance with the above mentioned IMO Resolution and ISO Instructions.



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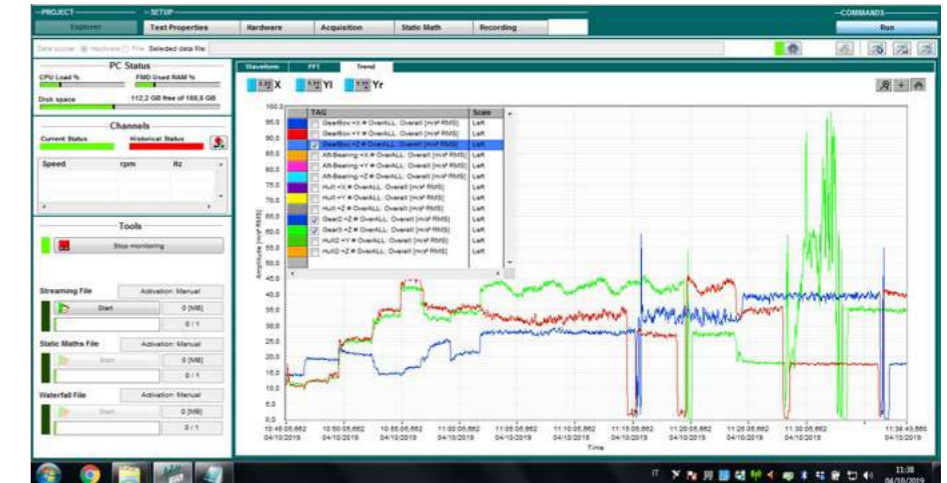
# H-Spectrum H-Vibe

## Vibration Analysis System

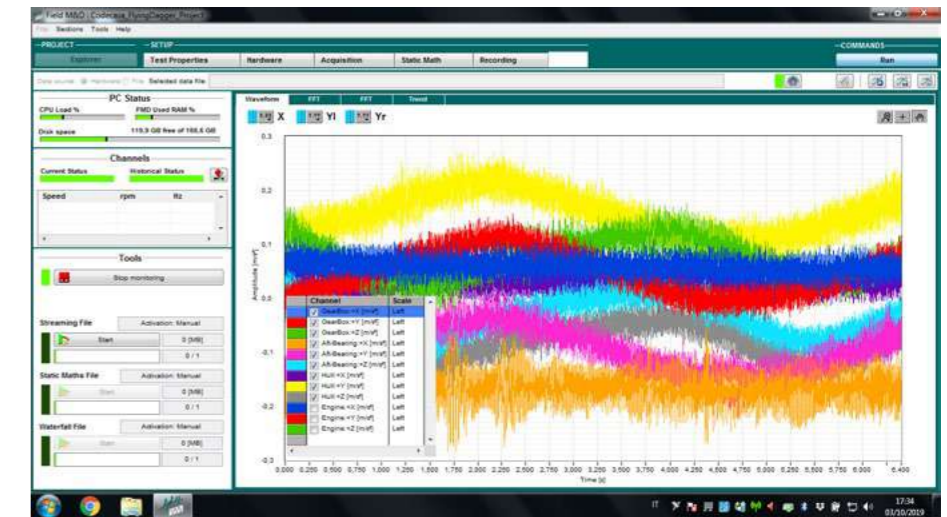
H-SPECTRUM is our innovative high frequency multi channel high frequency and spectrum analyzer developed over the years complying with the International Standards: **ISO 2631 - ISO Standard 10816**

This acquisition system, based on our proprietary synchronization technology, is the only system on the market that allows the synchronous acquisition of data from accelerometers, torque meters, strain gauge, analog high speed channels and at the same time is able to acquire all the operating parameters of the yacht/ship systems.

Accelerometers  
synchronous reading



Waveform analysis



FFT Analysis of up to 24  
accelerometers  
synchronous channel



# H-Torque

Shaft power and Torque meter are an essential measurement service to reduce running costs and maximize efficiency

when it is necessary to measure the real power supplied by the propulsion and the torsional components of the propulsion systems, SailADV is able to support its Clients thanks to the H-TORQUE measurement service.



WHY USING  
OUR TORQUE  
MEASUREMENT  
SERVICE?

- To evaluate overloads or underperformance
- To isolate the true cause of expensive failures
- To determine load distribution
- To verify performance specifications
- To anticipate the effects of increasing machine speed

HOW DO  
WE WORK?

Our technician will travel to your site, install the strain gauge sensor and torque telemetry instrumentation then record live torque data while you run the machinery. We'll provide a firm, realistic quotation in advance. And when we leave your site all the data in your hand.



# H-Spark

To meet the increasing complexity of the yacht Power Management System comes H-Spark.

H-Spark is a high frequency data sampling that allows to analyze the problems on the electric power system and electric devices on board.

Generator power transient analysis



Heavy/intermittent load, i.e. electric thruster

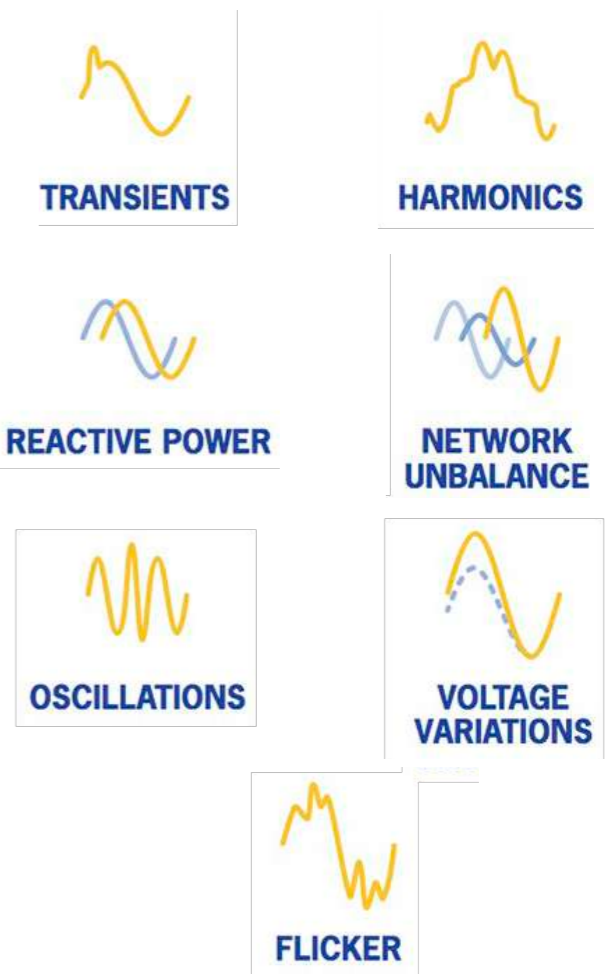
## WHY USING H-SPARK INTEGRATED MEASUREMENT SYSTEM?

- Frequency stability analysis with heavy/intermittent loads (galley, stabilizers, thruster)
- Generator power stability analysis (load sharing, load transfer)
- Power supply interferences (voltage spikes and drops, unbalanced and harmonic currents)
- Electric system failure analysis
- Generator shut-down and black-out analysis

## HOW DOES IT WORK?

- The data measured on the main yacht/ship devices (generators, frequency converters, thrusters, stabilizers):
- Are acquired and processed by H-Spark
  - Can integrate H-Box data for a complete ship performance analysis

Typical issues of power quality



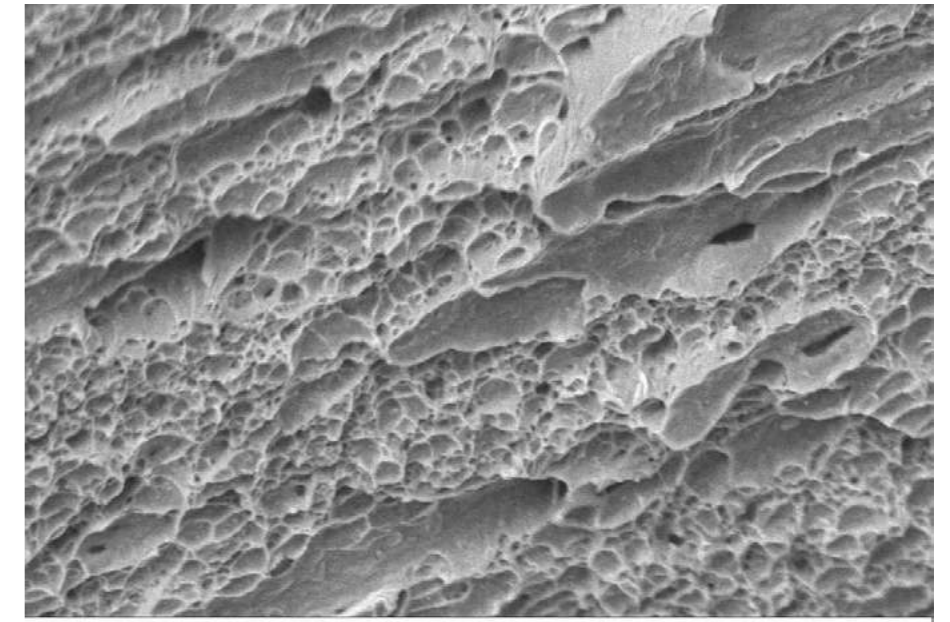
# Failure and Material Analysis

Determine to innovate

Our Laboratories are able to perform the most modern analytical techniques for materials analysis of composite, metal, polymeric. The presence of specific expertise allows us to study metals, plastics, textiles, paints, fuels, solvents.

## SCANNING ELECTRON MICROSCOPE (SEM)

Morphological analysis of fractures, treatments and surface coatings, analysis of components, are executable by Scanning Electron Microscope Zeiss Evo MA15 with high resolution LaB6 source. The X-ray Microanalysis allows to perform quantitative spot analysis.



10 µm EHT = 20.00 kV Signal A = SE1 Date :13 Jul 2017  
WD = 22.0 mm Photo No. = 1936 Mag = 2.83 K X Time :11:13:41 PONTILAB

## METALLOGRAPHY

We are able to perform micrographs, macrographs, micro hardness, analysis of inclusions, grain size, structure verification of any metallic material, according to the applicable reference standards.

We are able to perform breakdowns and failures analysis, in order to provide input to the activities of Problem Solving.

## TOMOGRAPHY

This new technology allows to have an accurate 3D reconstruction of the geometry of the analyzed object (internal and external) and of its functional characteristics thus, making the immediate identification of any possible failure.



## LABORATORY



## ENVIRONMENTAL TEST BENCHES

1. Thermal shock
2. Climatic chambers
3. Corrosion tests in artificial atmosphere
4. Ageing (sunlight, ozone)

## FUNCTIONAL AND MECHANICAL TESTING

1. Functional testing
2. Static testing
3. Fatigue testing (HCF-LCF)
4. Vibration testing
5. Impact testing
6. Custom testing

## TESTING RELIABILITY

In collaboration with our laboratories network we are able to perform mechanical and functional tests in order to verify the mechanical characteristic of components.

## MECHANICAL TEST BENCHES

1. Static load up to 250 KN
2. Fatigue test up to 250 KN and 40 Hz
3. Pressure pulsation
4. Impact
5. Vibrations

## NON DESTRUCTIVE TESTS "NDT"

### Researching Defects

We are able to examine castings, forged and machined parts in different materials (steel, aluminum and magnesium alloys, brass and bronze, titanium, plastics and composites) in order to detect signs of possible defects that might affect the use of the product.

## DYE LIQUID PENETRANT

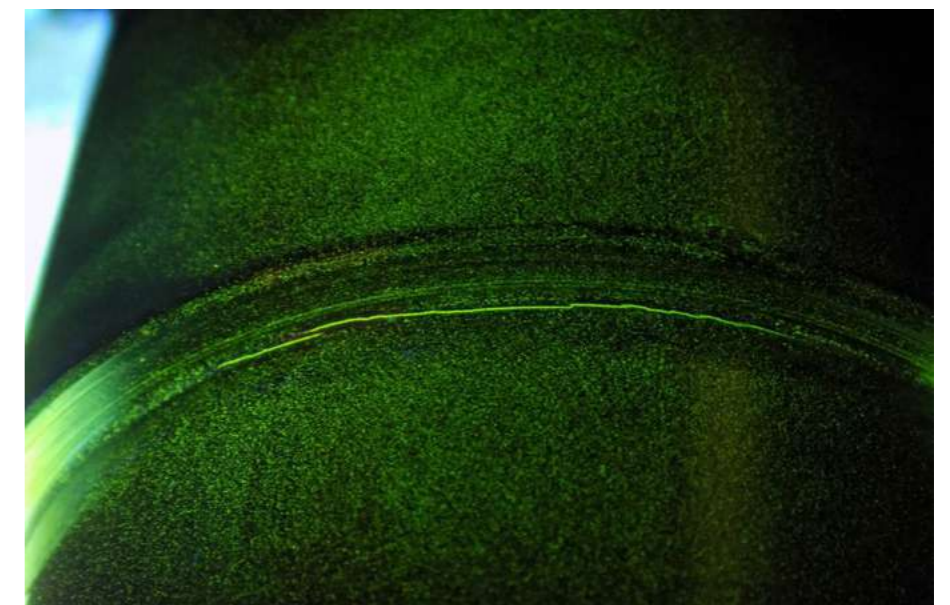
The dye liquid penetrant inspection is a control system suitable for non-ferromagnetic materials. The inspection allows to make evident with high sensitivity and accuracy each discontinuity surface, although very small, such as cracks, porosity, laps. In the method with contrast penetrant, a visible liquid (usually red) is made to penetrate the discontinuity surface of the workpiece. After removal of excess fluid and the application of a detector (usually a silica based amorphous liquid absorbent) is highlighted each discontinuity due to the color contrast of liquid detector.

## FLUORESCENT LIQUID PENETRANT

This method uses a fluorescent liquid penetrant (with different sensitivities depending on the type of detail and material examined), visible after the application of the detector after illumination with black light (Wood lamp). Pontlab, our Partner world leader in this field, is equipped with an inspection facility with the ability to run checks with post-emulsifiable fluorescent penetrants according to the main mechanical and aerospace standards (EN 571, ASTM E 1417, AMS 2644, MIL , ASME, DIN, UNI, BS, AFNOR).

## MAGNETIC PARTICLES

Magnetoscopic inspection (MT) exploits ferromagnetism of some metals to highlight the anomalies of the flow lines of the magnetic field of a near surface defects. The flow lines, which represent the strength of the local magnetic field near a discontinuity, as for example a micro-cracks, a cavity or an inclusion, are gathering or dispersing, turning locally and creating an anomaly in the magnetic field the edges of the defect. Just spray the surfaces or wet them with suitable suspensions of ferromagnetic powders, colored or fluorescent, for aligning the particles along the flow lines of the magnetic field. The different colors of powder or fluorescent light emitted in the visible spectrum when they are irradiated with ultraviolet light (Wood's light), will highlight each of their concentration and consequently, the outcrop or subcortical defects. The Magnetoscopy allows to highlight surface and subcortical defects not detectable with liquid penetrant, provided that the disturbance of the magnetic field in their vicinity can come to the surface to be examined.



in collaboration with:

ANALYZE

DETERMINE

VALIDATE

# Predictive Maintenance

Predictive maintenance (PdM) helps determine the condition of in-service equipment in order to estimate when maintenance should be performed.

SAILADV

PREDICTIVE MAINTENANCE

## SAILADV APPROACH

The SailADV approach allows cost savings over routine or time-based preventive maintenance, because tasks are performed only when needed. Thus, it is regarded as condition-based maintenance carried out as suggested by estimations of the degradation state of an item. The main goal of predictive maintenance is to allow convenient scheduling of corrective maintenance to prevent unexpected systems failures. The key is “the right information in the right time”.

SailADV, the Italian Company leader in its segment offers a professional PdM approach for all type of Yachts and Ships by:

- [Collecting data](#) by sensors and actuators
- [Predicting](#)
- [Reacting](#) (it's easy for SailADV to notify potential breakdowns and optimize the spare part inventory)

Benetti yachts  
MY Spectre 69m



# Motion Amplification

SailADV provides testing and measurements services to the marine sector for troubleshooting, periodic performance evaluation, certification according to specific standards.

The latest addition to SailADV testing capabilities is Motion Amplification in cooperation with MoMoTe.

Motion Amplification is a technology based on **fast cameras and video processing techniques**, that allows to detect small displacement, not visible with the naked eyes, and convert them to visible movements.

To this scope, every acquired pixel becomes a virtual sensor, allowing **simultaneous vibration measurements**, in many systems, points with a high level of accuracy. The acquired data can be processed, filtered, enhanced into a video to see the system's problem.

If a picture is worth a thousand words, a video is worth a thousand pictures, **Motion Amplification video allows to explain very fast and very easily also very complex problems.**

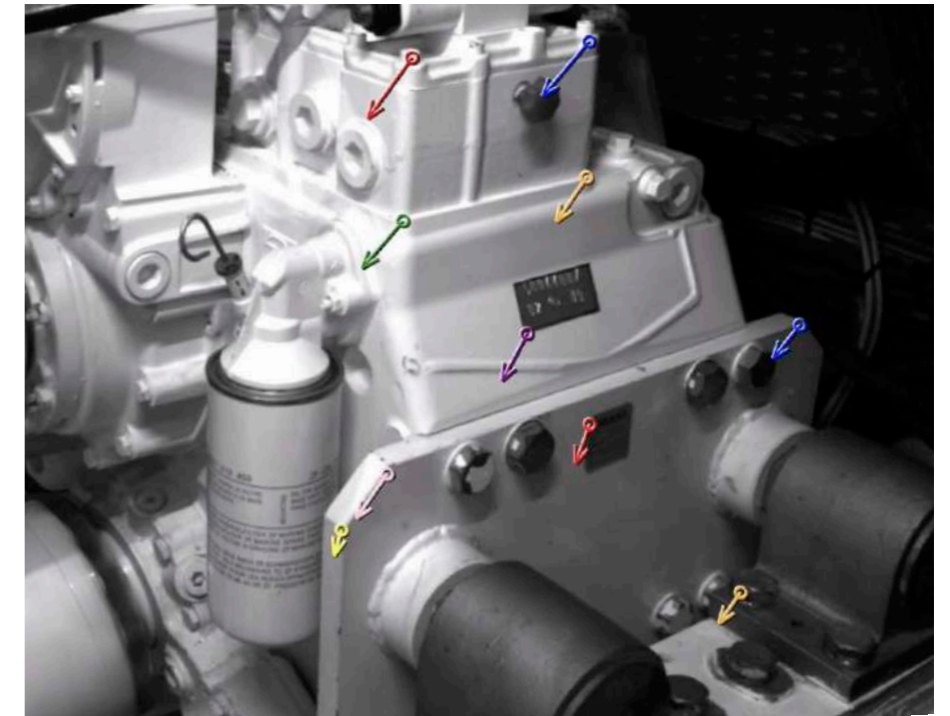
The videos can be shared easily within the organization and the final clients, reducing the time lag between the problem occurrence and the solution design.

SailADV in cooperation with MoMoTe provides Motion Amplification services for the marine sector for all cases in which standard vibration acquisition systems could be used, but with a much faster setup time and more **powerful and understandable results display**.

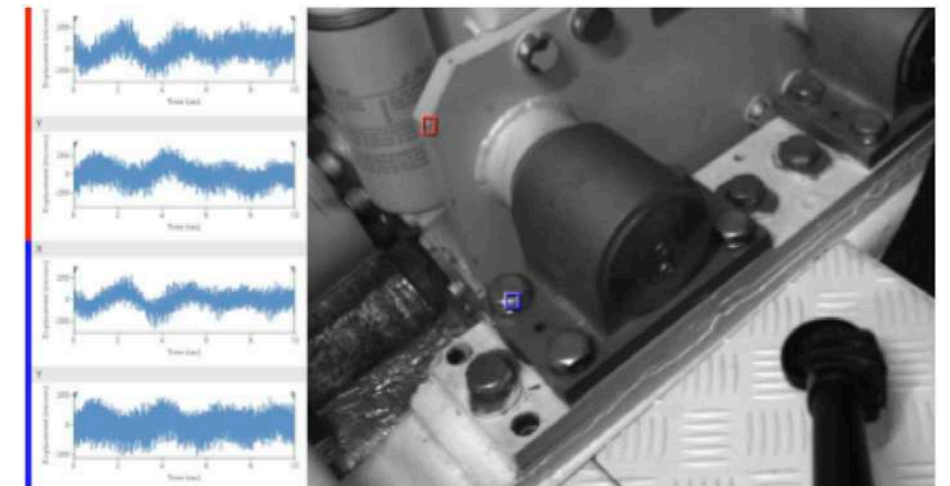
From global component behavior (i.e., a generator on resilient mounts) to detailed parts analysis (i.e., a cordon shaft alignment), all can be visualized with Motion Amplification. Ship motion can be compensated and eliminated to focus the attention to the **dynamic behavior of the components of interest**.

SailADV brings Motion Amplification technology to the marine sector, certain of the impact and the potentials.

All pixel become virtual sensors, to measure displacement and velocity.  
No limits in the number of measured points.

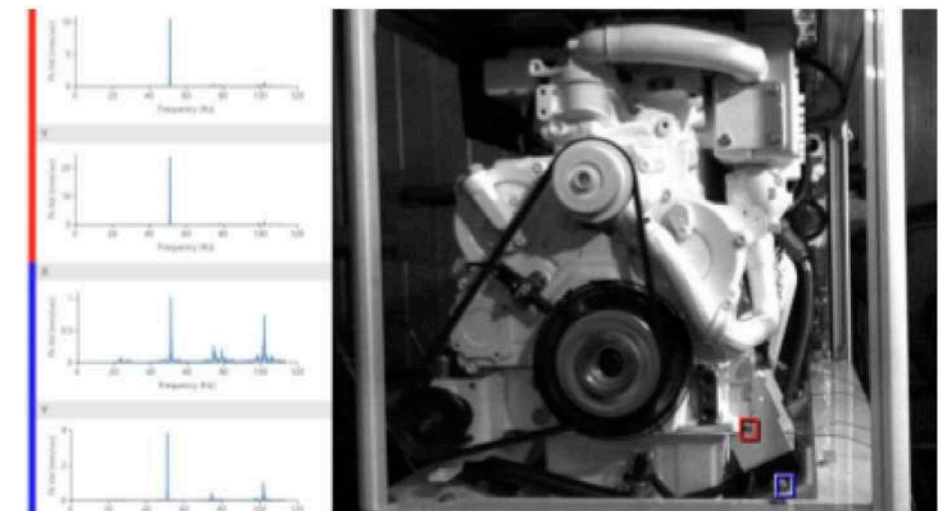


Time traces, spectrum and orbit plots, transient paths can be easily computed from each point of the video capture.



With the camera-point of interest distance the displacements can be derived with sub-millimetric precision.

Different lenses can be used to define the appropriate field of view





# Oil, Fuel & Coolant Analysis

The analysis of an oil sample, coming from a machinery in operation, is an efficient diagnostic tool to understand the health status of the systems. The “weak signals” contained in the used oil allow to identify any contaminant or chemical / physical degradation of the lubricant. The analysis reports provide useful information to take strategic decisions before a potential failure or in order to preserve the best functional integrity of the yacht systems. Knowing the “health status” of a system allows to evaluate in a few seconds the presence of contaminants and a potential damage to a mechanical component of the system or the presence of contaminants.

## PREDICTIVE APPROACH

The oil analysis are used to understand the “conditions” of the machinery. We fix certain targets to reduce or even eliminate the causes of the faults. This approach must pass through the Proactive phase.

- Greater savings thanks to fewer stops
- Programmed maintenance avoid urgent service
- Greater operational security
- Longer life cycle of the systems
- Better perceived quality of the yacht systems



## MARINE PROPULSION

The Marine Propulsion is one of the most critical system where Predictive maintenance approach may give the best results in terms of R.O.I. SailADV analysis can provide precious answers based on conditions monitoring for example: a minimal amount of sodium may lead to salt water contamination, trough corrosion of heat exchangers and intercooling systems. Quality and residual lubrication properties evaluation of the oil are vital to the efficiency of the systems.

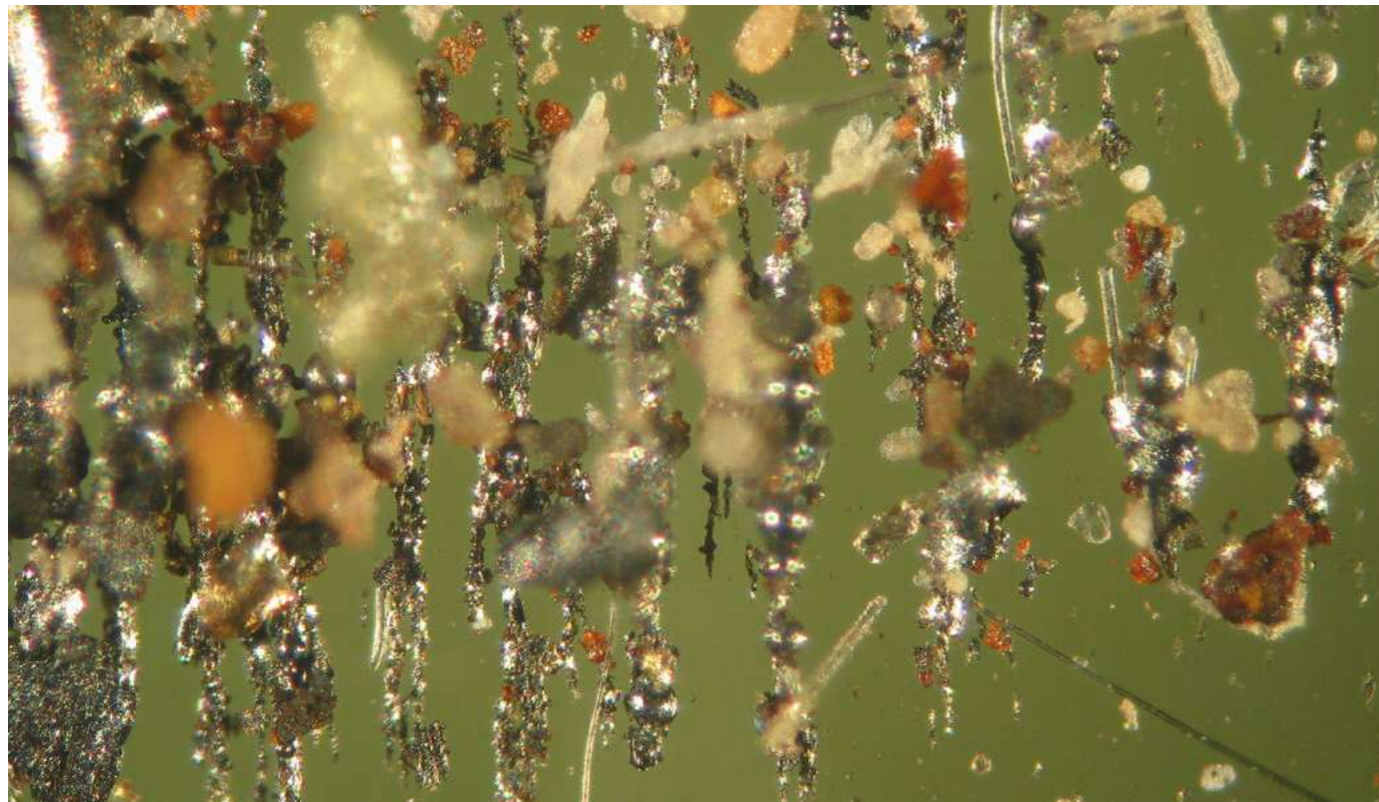
## GEAR BOX

Modern gearboxes have been completely re-designed, in order to obtain smaller dimensions, higher transmission ratios and lower lubricant amount. But as consequence of that, it has become much more stressed than ever before, with high specific loads and operating temperatures. The lubricant working-life has generally got shorter, but this does not preserve the gearbox from damage.

Only an oil analysis program that keeps wear metals trend under strict control (by RDE spectrometry), with a special attention to ISO 4406 contamination code and to proper lubricant viscosity, can protect the gearbox from unexpected breakdowns and allow to optimize lubricant management.

## HYDRAULIC SYSTEM

Most of the hydraulic systems failures can be attributed to contamination problems, usually due to the environmental dust, moisture and other exogenous substances. The analysis is therefore mainly focused on contaminants evaluation, using very sensitive analytical methods such as water determination with Karl Fischer method or particle counting, sizing and characterization using Lasernetet Fines, a revolutionary particle imaging technology, which automatically classifies particles in metallic and nonmetallic, based on their shape and appearance. Furthermore optical microscopy ensures a detailed evaluation of wear particles and varnish precursors, that can cause serious damages in the most sensitive components (valves, actuators and pumps).



## SAMPLING

Sampling procedure

Oil Analysis Kit

In order to trend the health status of the system, SailADV takes an oil sample regularly while the system is operating, at the working temperature.

[With the SailADV Oil Analysis Kit we provide everything you need to make a sampling wherever you are.](#)



Sending Samples

Check your results

SailADV takes care of collecting the samples wherever the client is and delivering them to the laboratory.

Through a web-based application designed for this purpose, SailADV manages and delivers analysis reports used oil analysis reports.

in collaboration with:



# 3D Scan

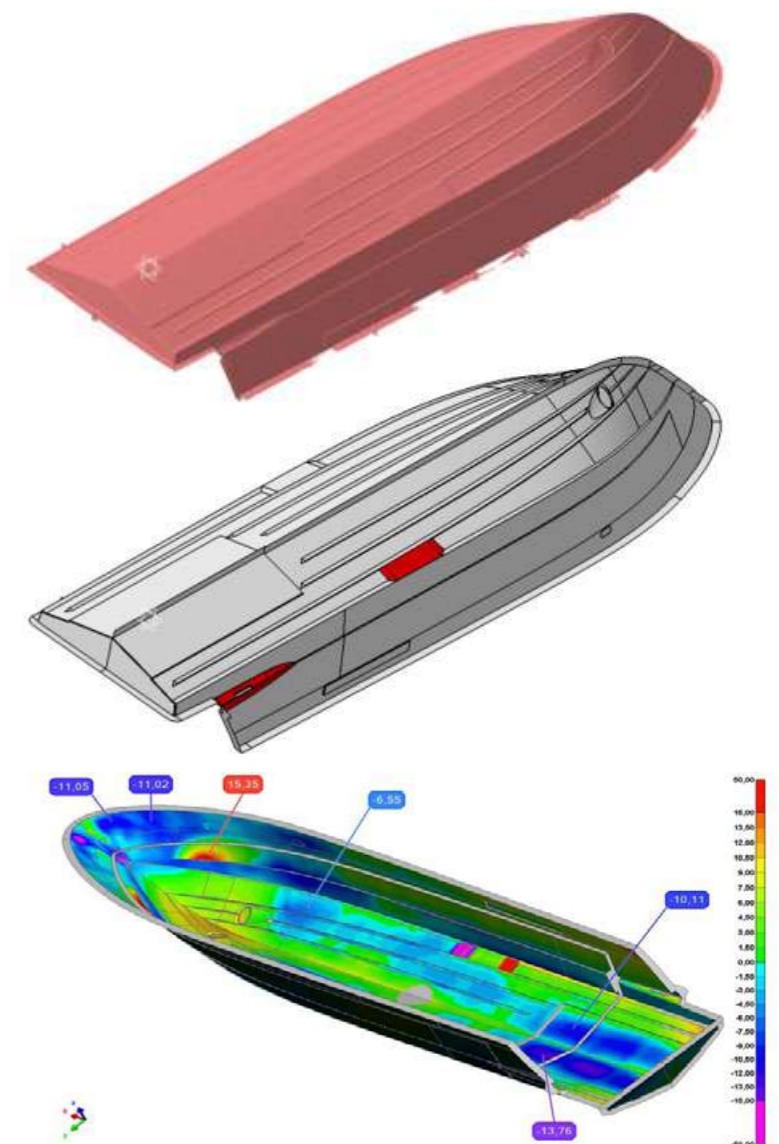
## Dimensional surveys

The latest generation of 3D Contactless Measurement systems with optical or laser technology, allows to capture the most complex geometry. The speed and the accuracy of these new systems can transform 100% of a surface into a high definition 3D point clouds. Thanks to the wide range of systems at our disposal we can scan objects from very small dimensions up to very large dimensions, always using the most appropriate device to ensure the highest level of accuracy. The measurement of the entire surface identifies the deviation of the real geometry from the designed geometry. That is an exceptional advantage for the development phase of the product: making the understanding of the potential defects possible (e.g. alignment problems, material distribution, geometry deviation...)

## REVERSE ENGINEERING

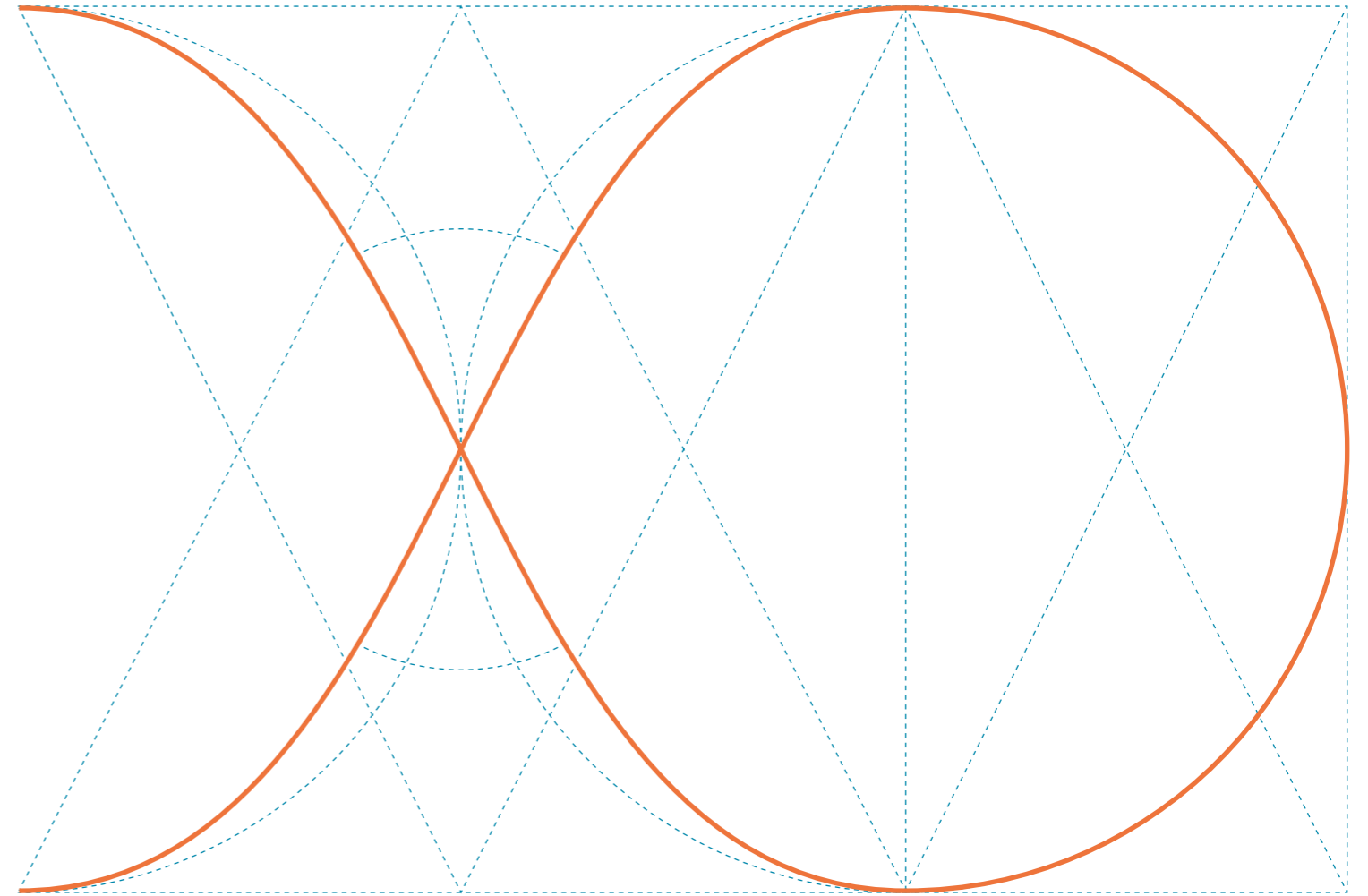
Reverse Engineering allows to create a mathematical model of an object starting from the digitalization of the object itself.

1. The first step is the scan of the object in order to create the mathematical model, this process is very efficient thanks to the 3D contactless digitalization system with optical technology. Starting from the scan with 3D digitizing systems and using software.
2. The second step is the processing of the acquired data being able to obtain a polygonal STL file using flat and curvature-based hole filling, boundary reconstruction, sharp edge and corner reconstruction.
3. The third step is the reconstruction of surfaces using Cad modeling software. Our software allows to create the output at different steps of the process until the IGES of Nurbs surfaces.



It is possible to have an immediate evaluation of the part conformity through colour maps, where the deviations between nominal and measured data are shown on a colour based scale; numerical values are always immediately available in any point. This service should be done also at the Customer's site, everywhere in the World, if the parts to be measured and analyzed, are not easy to be moved.





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