

YACHTRECHT INTERNATIONAL

SYSTEM MONITORING AND MAINTENANCE OF SUPERYACHTS

Fourth generation AI makes it possible: a revolution in system monitoring and maintenance of superyachts through onboard real-time anomaly detection.

MEER & YACHTEN spoke with Prof. Dr. Christoph Ph. Schließmann, specialist lawyer for international commercial law in Frankfurt am Main, who has been assisting companies with of her international business development at the interface of economics, law & taxes, about the complexity of modern systems on superyachts.

MEER & YACHTEN: Mr Schließmann, modern systems on superyachts are becoming increasingly complex, what challenges do you see here? Prof.

Schließmann: Modern technical systems such as automobiles, airplanes, ships and military equipment are true wonders, controlled under the influence of human leadership and management via software, hardware and sensors. Every technical "organ"



Prof. Dr. Christoph Ph. Schließmann

continuously generates data and information about its operating status. It

It is standard to measure and monitor this direct operating state

and use important information for maintenance and repair.

The crucial thing is how those who operate and control a complex system such as a superyacht deal with this information and how

prepares them for easy and effective efficient decision-making.

With the increasing complexity in organizations and the rapid changes in environments and markets, the use and integration of intuition into daily processes and decisions is becoming increasingly important.

Intuition is a crucial input

estimation strategy that enables managers - such as a captain or yacht manager - to act quickly and effectively in uncertain and dynamic contexts.

One could define intuition as a kind of inner describe an autopilot who knows what to do depending on the situation by unconsciously applying experience and action knowledge. This type of

"Acting without thinking" draws on a deep reservoir of unthinking

knowledge gained from experience. An essential aspect of intuition is its ability to be based on few but relevant pieces of information and to

to process spontaneously. This is where heuristics come into play, simple, efficient rules of thumb that enable us to make complex decisions quickly by reducing the amount of information to the essentials.

Heuristics are mental shortcuts based on experience and knowledge that help us in situations of

Uncertainty and information overload

They can filter and prioritize information, which is crucial for intuition.

tion is.

Intuition and heuristics work Hand in hand. While intuition

acts as an "inner autopilot", Heuristics provide the structure that this autopilot uses to make decisions



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Heuristics support the

Intuition by simplifying the decision-making process and helping to quickly develop actionable assessments in complex situations. This combination of intuitive

Perception and heuristic shortcuts protect us from information overload and enable us to function despite the abundance of data and impressions.

to make informed and effective decisions.

Where do you see the limits of traditional surveillance methods?

Traditional monitoring methods are often based on simple statistical models or the monitoring of individual components without taking intuitive and heuristic decision-making into account.

However, these approaches have proven inadequate to cope with the growing complexity of modern technical systems.

Such a fragmented approach is particularly ineffective on large yachts and ships, where numerous systems are interconnected. Anomalies can arise from the interaction

different systems, which can only be achieved through holistic monitoring can be recognized.

Based on machine learning-

The methods used in many modern surveillance systems require large amounts of training data and constant relearning to remain effective. This poses

especially in rare anomalies

a problem because there are not enough examples available to adequately train the system. In addition, these methods are often slow and can fail in real-time scenarios where quick decisions are required.

How can decision-makers in the superyacht system be protected from this Background with pragmatic information and data analysis

that take intuitive and heuristic approaches into account? The solution lies in a proactive monitoring and control system. What is needed is an advanced monitoring technology that is able to measure and process this complexity in a "superyacht" system, identify potential threats within the interdependencies in

Real time detection. CPS Schließmann and ONTONIX have taken on this task as long-standing partners.

ONTONIX has developed an innovative solution:
The fourth generation of

artificial intelligence, known as
"Artificial Intuition" enables onboard real-time
anomaly detection without conventional machine

Learning is enough. I have been researching
more than 15 years on the topic of "Systemic
Complexity and Control" (see book: Schließmann,
Interdependenz, Springer Verlag, 2nd edition, 2014,
d.

My method, in conjunction with a special intuitive
technology from ONTONIX, has made complexity
measurable and controllable for the first time.

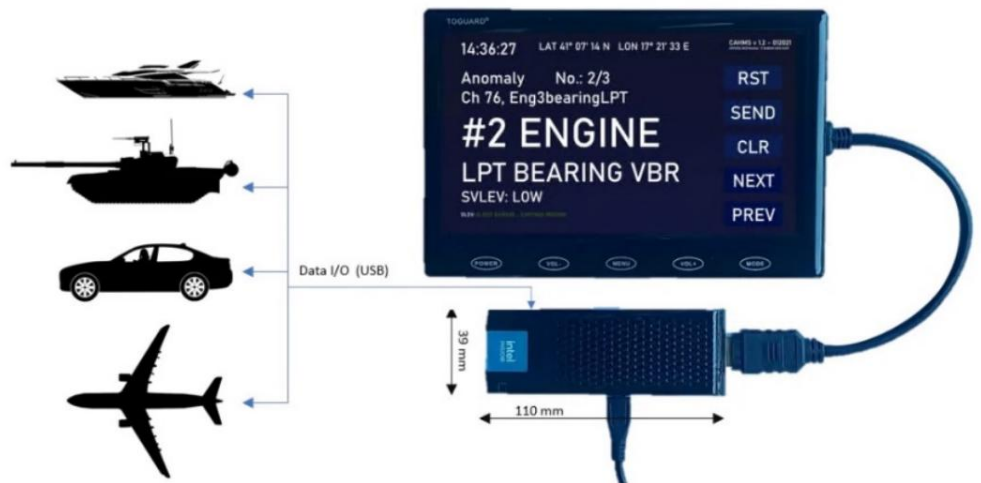
Both partners further developed this technology in
2024 and now offer it as a holistic anomaly detection
and early warning system for yacht systems: as
original equipment and for retrofitting. This
development marks the next step towards tech,
leadership and legal operations by linking the
technical "yacht system" with operational
management and environmental parameters.

**A new era of anomaly detection through
artificial intuition?** The Artificial Intuition developed
by ONTONIX

Intuition goes beyond the limitations of traditional
AI systems by enabling real-time monitoring that
does not require extensive training data sets. Similar
to human intuition, this technology makes it possible
to detect threats and vulnerabilities in highly complex
systems without the need for explicit instructions or
prior training.

All relevant system parameters, not just those of the
technical devices

and functions, but above all those that influence the
"superyacht" system from the inside and outside are
recorded.



To make the technology widely and securely available – in cars, airplanes, ships, medical devices, routers, transformers or military platforms – a new edge computing capability is offered. The approach is simple: the entire software system based on artificial intuition is delivered on a mini PC that connects to a USB port on the customer's platform.

The main focus is on measuring the
interdependencies, i.e. the nature of the qualitative
and quantitative relationships between the
parameters. This not only makes it possible to
identify which parameters are related to each other
and which have a highly sensitive impact on the
system, but the change in the relationships in the
"ideal state" can also be used to draw conclusions
about medium and long-term developments and
problems in the technical "organs".

This technology has proven itself in various high-
tech industries of high complexity. A key advantage
of Artificial Intuition is its

Speed and efficiency, making it ideal for edge
computing and on-board applications. Integrated
into mini-PCs that can be easily connected to the
systems, this solution offers a flexible and secure
way to continuously monitor highly complex systems
and to

to react promptly to potential anomalies.

**What does this mean in relation to a
Application to yacht systems con-
kret?** Large yachts and ships are

particularly demanding in their technical complexity.
The management of these systems requires not
only technical know-how, but also a deep
understanding of the operational and

legal framework. The technology offers a holistic
health measurement that allows the condition of the
entire yacht system to be assessed in real time.

Potential vulnerabilities can
are identified before they become critical, and early
warnings about impending anomalies enable rapid
and precise intervention. This proactive approach
not only minimizes downtime, but also reduces
maintenance costs and increases the reliability of
the entire system.

**What exactly are the advantages of Artificial
Intuition on
large yachts, and how can a technical
implementation be achieved?** The implementation
of Artificial Intuition is remarkably simple and does
not require any fundamental changes to the existing
IT infrastructure of the

Yacht systems. A mini PC that is connected to a
USB port,

takes over the entire data processing and analysis.

The system does not require the installation of additional software or hardware and operates autonomously without relying on the ship's network infrastructure.

This not only increases security but also the reliability of monitoring.

The artificial intuition-based monitoring system developed by ONTONIX not only provides early warning of anomalies but also provides useful information for condition-based maintenance (CBM), a maintenance strategy that involves monitoring the condition of an asset in real time to determine which maintenance actions need to be carried out.

Unlike preventive maintenance, which uses calendar- or statistics-based strategies to determine when maintenance needs to be scheduled, condition-based maintenance dictates that maintenance should only be performed when it is necessary - not too early and not too late.

The fourth generation of artificial intelligence is called 'Artificial Intuition' and has been developed over the last ten years by

ONTONIX. It enables computers to identify threats and vulnerabilities without having to be trained, just as human intuition enables us to make decisions without receiving specific instructions.

To make the technology widely and securely available – in cars, airplanes, ships, medical devices, routers, transformers or military platforms – a new edge computing capability is offered. The approach is simple: the entire software system based on artificial intuition is delivered on a mini PC that is connected to a USB port on the customer's platform.

The current implementation uses a NiPoGi Ntel Atom x5 z8350 Mini PC, 8 GB DDR3 RAM 128 GB eMMC, 4.2/4K HD/USB 3.0.

When the system is switched on, it starts working automatically. A data frame with N samples

for each of the M channels you want to monitor must be created on the client platform and placed in a specific

directory on the USB drive. This can happen once per second, once per minute, or at any frequency.

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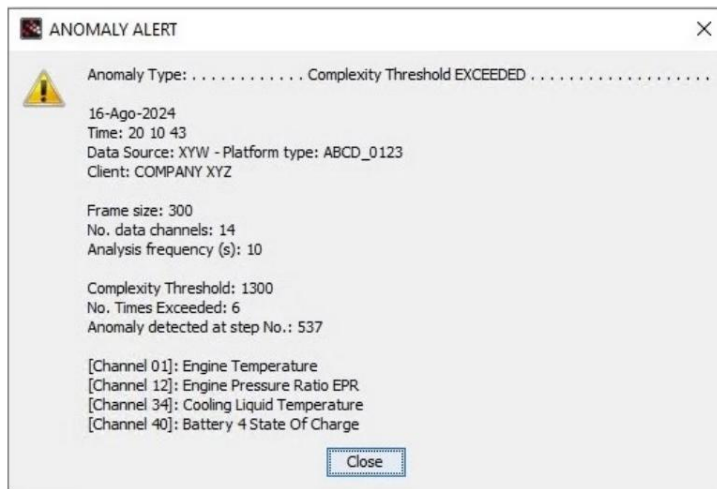


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ONTONIX accesses data from onboard computers, processes and analyses this information and delivers actionable insights. The solution is tailored to each yacht and each system. Photo: an example of the type of message issued by the system.

The system automatically analyses the data and provides a list of current

all potential vulnerabilities and anomaly early warnings, if any. This is done with the frequency stated above. Anomaly early warnings can be displayed on the customer's dashboard or on a separate display.

The information for the condition-oriented maintenance are stored on the drive and can be used later by the manufacturer or operator of a specific platform

become.

The key features of our technology: Holistic health measurement: Provides an overall assessment of the health of the entire yacht system. Identification of vulnerability hotspots: Locates potential weak points in the yacht's systems so that problems can be addressed before they become critical. Early warnings and sourcing: Provides early warnings of impending anomalies in real time and

identifies their causes, which enables quick and precise intervention.

Our approach considers all combinations between the measurements and

detects (often invisible) problems in the holistic internal and external environment of a ship before they become potentially difficult to handle.

He recognizes anomalies in their composition and latent anomalies proactively through complex connections, even if the measurement parameters of the individual technical devices still look good.

It is like in medicine. Your blood values may still be fine, but there is a pathological problem. When the blood values raise the alarm, it is usually already too late.

When an anomaly is about to occur, the system indicates the time, frame number, type of anomaly and

Key variables (channels) responsible for the anomaly in question.

The main advantages of this

Technology includes: Early detection of problems: Anomalies are detected before they develop into larger problems. Cost savings: Early intervention minimizes repair costs. Minimized downtime: The yacht systems remain operational and longer downtimes are avoided. Increased reliability: The overall performance and safety of the yacht systems are sustainably improved.

Is this what the future of system monitoring and maintenance on large yachts looks like?

The introduction of artificial intuition into real-time ano-

Malfunction detection marks a significant advance in the monitoring and maintenance of highly complex technical systems. This technology offers a clear competitive advantage, particularly in shipping, where downtime and maintenance costs can have a significant economic impact.

With their ability to monitor complex systems in real time and provide early

By reacting quickly to potential problems, Artificial Intuition sets new standards in system monitoring and lays the foundation for a more reliable and efficient future.

The future of system monitoring lies in the combination of technological progress and intuitive decision-making. With the development of Artificial Intuition, we have paved the way for this future and offer a solution that is not only innovative, but also practical and user-friendly.

is friendly. 

Interview: Matt. Müncheberg

Prof. Dr. Christoph Schließmann is happy to be the contact person for anyone who would like to integrate this new technology into their "superyacht" system. Info: der-yacht-anwalt.de, superyachtforum.eu

