Integrated Vessel Performance & Remote Condition Monitoring System

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Vessel efficiency and Fuel Management is a very complex and multidimensional aspect.

For this reason and despite all the research and bibliography on this, there isn’t yet any standard approach and methodology to perform complete performance analysis.

This complex situation frequently creates tensions in the relationships between ship owners, ship managements, charters, classification society and authorities and even crew.
What is LAROS

LAROS system provides holistic approach for data collection through a system of wireless intelligent devices and knowledge management techniques for remote condition monitoring, and performance analysis of ships.
Delivers answers to your technical & operational needs

Data collection & Integration

Ship’s instruments
Sensors
Equipment
Engines etc

Analysis

Technical
Operational

Knowledge Management

Diagnosis
CBM
Fuel Reduction
Vessel Efficiency
Forecasting
Planning
Green Shipping
The System AT A GLANCE

Sources
- Main Engine
- Generators
- Torque Meter
- Power Meter
- Flow Meter
- Turbo Charger
- Boilers
- Inclinometer
- Ballast Room
- Speed Log, GPS
- Wind Indicator
- Cargo
- Exhaust Gas Economizer
- Alarms to VDR / Control
- Pumps, compressors, cranes
- Any Points of Interest

Analog Devices
- Control
- PLCs
- Instruments
- Other

Digital Devices
- Collectors
- Routers
- Gateway
- Ship’s Server
- Datacenter HQ
- Control Interfaces
- Programmable devices
- Sensors or Other sources

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System Fundamentals

- Theoretical Model
- Mathematical Model
- Actual Values

Embedded Data
- As Defined by the Manufacturers or Ship Trials / model testing etc
- Ideal Conditions that have been calculated by the system with statistical analysis, algorithms & other methods

Dynamic Data
- Data obtained by the System

Continuous Monitoring & Data Processing
- Deviation from Ideal or Predefined values

Delivery of results
- System Defines the Key Performance Indicators

LAROS SW SUITE (analytics)
And/or
OTHER 3rd PARTY SW

And/or If required
LAROS: a complete 3 step value proposition

**PERFORMANCE MONITORING**
- Monitoring (automatic)
- Any Points of interest
- Normalization
- Vessel performance baseline
- Vessel benchmarking tools

**PERFORMANCE MANAGEMENT**
- Energy & Audits
- Change Management
- Technical benchmarking
- KPI's
- Dashboards
- Voyage Efficiency (SEEMP)

**OPERATIONAL OPTIMIZATION**
- Fleet comparison (chartering tool)
- Fleet Utilization
- Operational fleet benchmarking
- Optimize Voyage Conditions
- Pool Optimization
- Green Shipping

**SAVINGS POTENTIAL & COMMERCIAL VALUES**
- LAROS innovative & Patented Collectors System for complete, reliable & automatic Data acquisition
- LAROS DAS – A powerful analytics SOFTWARE user friendly & user definable

**COMMITMENT**
- LAROS SW TOOLS – for Data utilization to support DECISION MAKING & also feed other 3rd PARTY SPECIALISED SOFTWARE
Reliable Data = Key factor to decision making

Reliable data is required in order to take the right decisions on maintenance policy, cost reduction, efficiency optimization and environmental protection.

“Reliable Data” means:
Accurate – Valid (No human intervention) - Uninterrupted - Formatted - Synchronized - Exploitable
Efficiency Estimations and Comparisons

Theoretical Model (orange)
Mathematical Model (blue)
Actual Values (red)

Deviation from the ideal
Asset Aging, Hull Fouling
Asset Condition and Operation
Complete Fleet status at a Glance

Instant View of The Vessels’ Status on the Fleet Map with new powerful features

- The color of each Vessel pushpin is arranged according to main KPIs.
- Easy access to vessels’ brief stats (minimum, maximum & average values) directly from the map with just a click on the vessel’s pushpin.
- Monitor last day’s route of each vessel
- Select vessel directly from map or from side buttons of each vessel for further analysis of monitored data using inner Data Analysis Platform.

Gain Innovative Revolutionary user experience navigating on map
Data Presentation
Power Fluctuation
High Level of Analysis

- **Novelty Detection***
  - Spike detection
  - State transitions detection

- **Time/Frequency Analysis**
  - Amplitude Response
  - Signal Energy
  - Periodicity Detection

- **Advanced Data Analysis tool**
  - Time-domain analysis
  - Two data tables or one (time series) as inputs
  - Processing of a time-series and cross-correlation or regression for two time-series
  - Period equalization between the two inputs
  - Signal processing and data analysis functions applied

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*Novelty detection* is the identification of new or unknown data that a machine learning system has not been trained with and was not previously aware of with the help of either statistical or machine learning based approaches.
An interesting graph
Conditions Analysis, Normalized comparison

- Vessels Performance Comparison in Similar Conditions
- The user defines the limits of the measured parameters that determine the similar voyage conditions
Condition Based Maintenance
Condition Based Maintenance
Advanced Features

- **Calculation of the Wind Resistance in Containerships**
  - LAROS includes a library providing functions for the calculation of the projection of the total front (or rear) and side surfaces of a containership on a plane perpendicular to the wind direction.
  - The library parses the stowage plan from the BAPLIE message in order to create a 3D model of the bays of the vessel.
Access Anywhere Anytime
Interoperability

- New reporting tools
  - PDF Reports in your e-mail in daily basis with an overview status of the fleet.
  - Automatic created XML, XLS and DOC files in any format with real time data and calculated equations.
- Interconnection with ERP and CMMS systems
- Interconnection with Ship’s Subsystems and Instruments
  - The options of LAROS for interconnection of different manufactures’ ships equipment are endless. Interconnections with AMS (Lyncso, Kongsberg, ACONIS, Samsung) and Cargo Control Systems (SAAB, Praxis Automation, Hanla) have been implemented.
The road map ahead – we never stop to innovate

Vessel Efficiency
Hardware & Software
Decision Support tools
Analytics

Condition Based Maintenance
Oil Analysis
Gas Analysis
Vibration Analysis
Modules
Asset Management
CBM platform

Towards the LAROS Ecosystem
A Maritime Big Data Center for developing e-services to all the sectors related to maritime.

We have participated in more than 25 collaborated research projects in the last 8 years and we keep invest in Research and Developing to increase the added value of our products and address new challenges.
Unique Characteristics …………Let’s sum-up

- Manufacturer independent
- Unified platform for ALL kinds of Vessels regardless Type, Age, Size etc.
- Deployment to monitor any Point of interest on the Vessel.
- Patented robust Collectors capable of receiving data from a number of sources
- Wireless transmission of collected Data to Ship's Server & Company’s HQ.
- Reliable data (No Human intervention)
- Capability to feed automatically the acquired data to other 3rd Party SW
- Powerful software, fully configurable with enhanced Analytics
Unique Characteristics ............Let’s sum-up

- End to end solution & support where Prisma Electronics is your counterpart for Hardware, Software and Service
- Customer has full access to the Collected RAW DATA
- Open System
- Expandable with full initial investment protection
- Low deployment cost & TCO with easy & short deployment & extremely short ROI.
The vendor: PRISMA ELECTRONICS S.A.

PRISMA has developed and manufacture innovative electronics and software systems for demanding applications for 25 years.

- Defense Projects
- Medical Devices
- Scientific Equipment
- Space

Industry Gold Award from the CERN (Centre European Research Nuclear Switzerland)
“Internet of Things in Maritime is now a reality”,

THANK YOU FOR YOUR ATTENTION