

# MAIT

## Modular Analytics & Intelligence Toolkit



### Dashboard

Real-time monitoring  
at a glance



### Analytics

Trends and insights  
from your data



### Baselines

Statistical baselines  
and comparisons



### AI Reports

AI-powered analysis  
and recommendations



### System Console

Logs, diagnostics  
and system info

**MAIT** is a platform for monitoring, analyzing and diagnosing equipment. The system collects operational data from generators, engines and vessel systems, stores long-term historical telemetry, builds performance baselines, and provides AI-assisted engineering insights for condition monitoring and troubleshooting.

# The Problem

Modern vessels generate vast amounts of operational data from generators, engines, HVAC systems, and other critical equipment. While monitoring systems provide real-time telemetry and alarm notifications, engineers are often left to interpret trends, compare historical performance, and identify early signs of degradation manually.

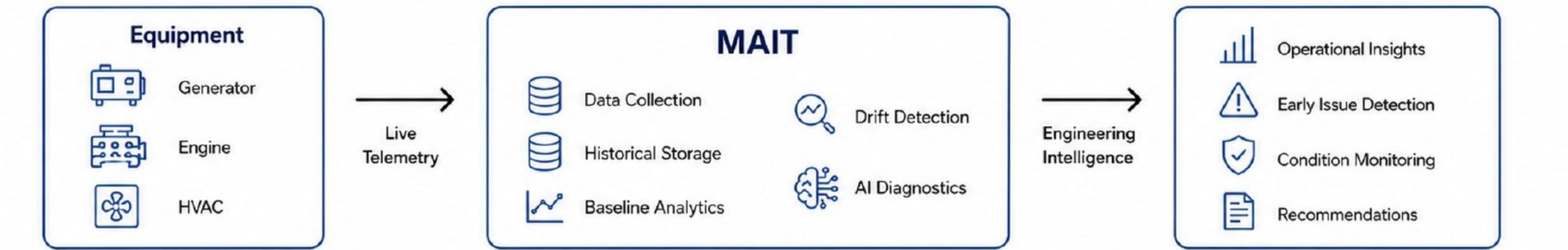
Most monitoring platforms focus on current operating conditions and alarm states, providing only a snapshot of equipment health. In many cases, alarms are triggered only after operating parameters have already exceeded acceptable limits, leaving little opportunity for early intervention.

As a result, valuable operational knowledge remains hidden within historical data, making it difficult to detect gradual performance drift, understand long-term equipment behavior, and move from reactive maintenance to condition-based decision making.

# The MAIT Approach

MAIT extends traditional monitoring by transforming operational data into actionable engineering intelligence. In addition to real-time monitoring and long-term telemetry storage, MAIT continuously analyzes equipment behavior against short-term and long-term historical baselines, identifies performance drift, and highlights developing issues before they escalate into alarms or failures.

By combining live telemetry, historical trends, baseline analytics, and AI-assisted diagnostics, MAIT helps engineers understand not only what is happening now, but also how equipment performance is evolving over time and where intervention may be required.



## Key Features

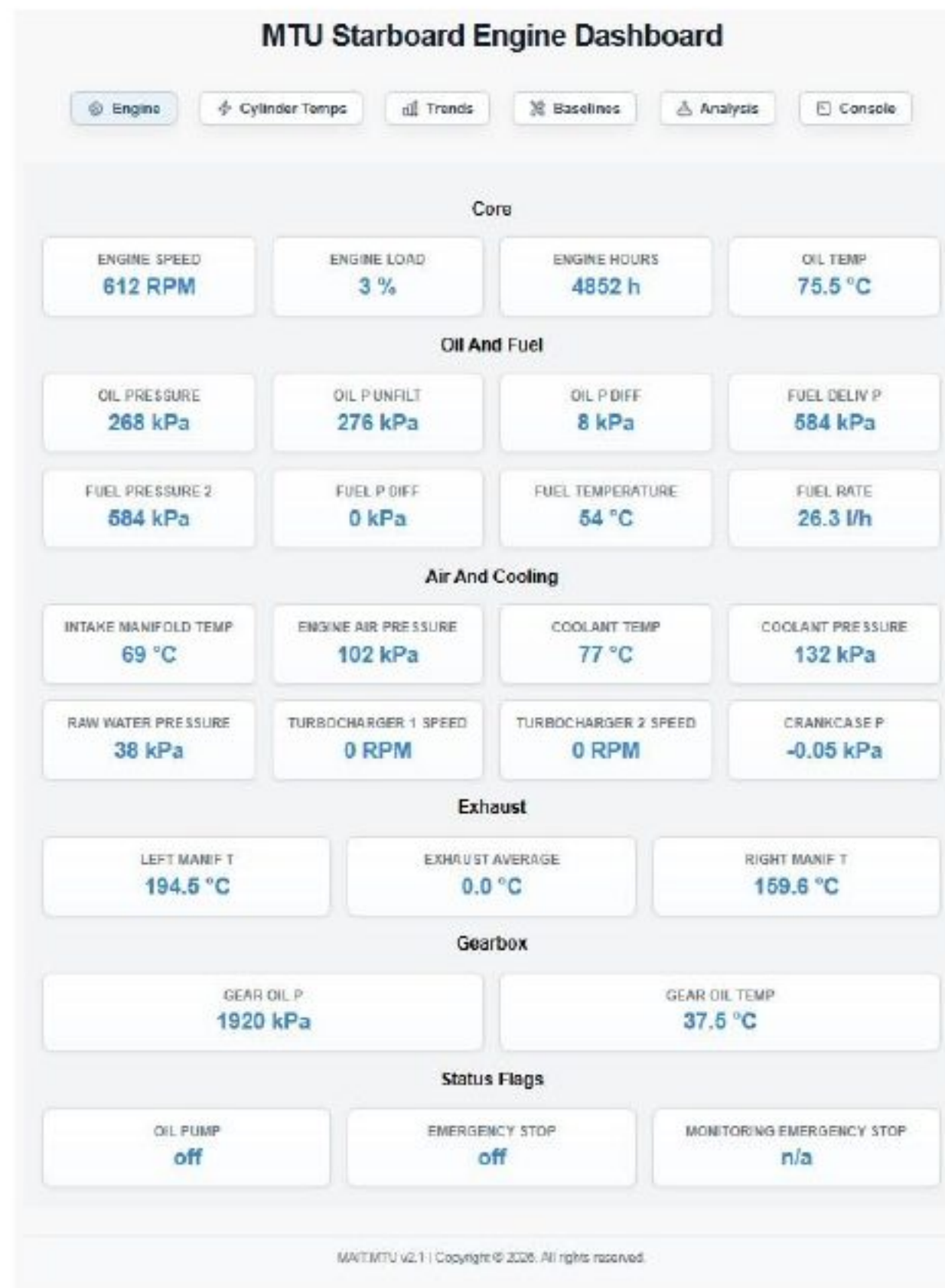
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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Equipment-Specific Analysis</b><br>Analytics tailored to the operational characteristics of main engines, generators, HVAC, and other marine systems. |  <b>Long-Term Telemetry Retention</b><br>Continuous collection and storage of operational data for historical analysis, troubleshooting, and performance tracking. |  <b>Baseline-Driven Analytics</b><br>Automatic generation of short-term and long-term performance baselines for every monitored parameter. |  <b>Performance Drift Detection</b><br>Identification of gradual changes in equipment behavior before operational limits or alarms are reached. |
|  <b>Live Telemetry vs Historical Performance</b><br>Real-time comparison of current operating conditions against established equipment baselines.         |  <b>AI-Assisted Diagnostics</b><br>Context-aware analysis grounded in live telemetry, historical trends, baseline deviations, and operational history.             |  <b>Secure Remote Monitoring</b><br>Encrypted remote access to vessel and equipment data for shore-based monitoring and support.           |  <b>Automated Cloud Backup</b><br>Secure backup of telemetry and operational history to preserve long-term equipment records.                   |

# Real-Time Monitoring & Historical Analytics

Continuous visibility into equipment performance, both in the moment and over time.

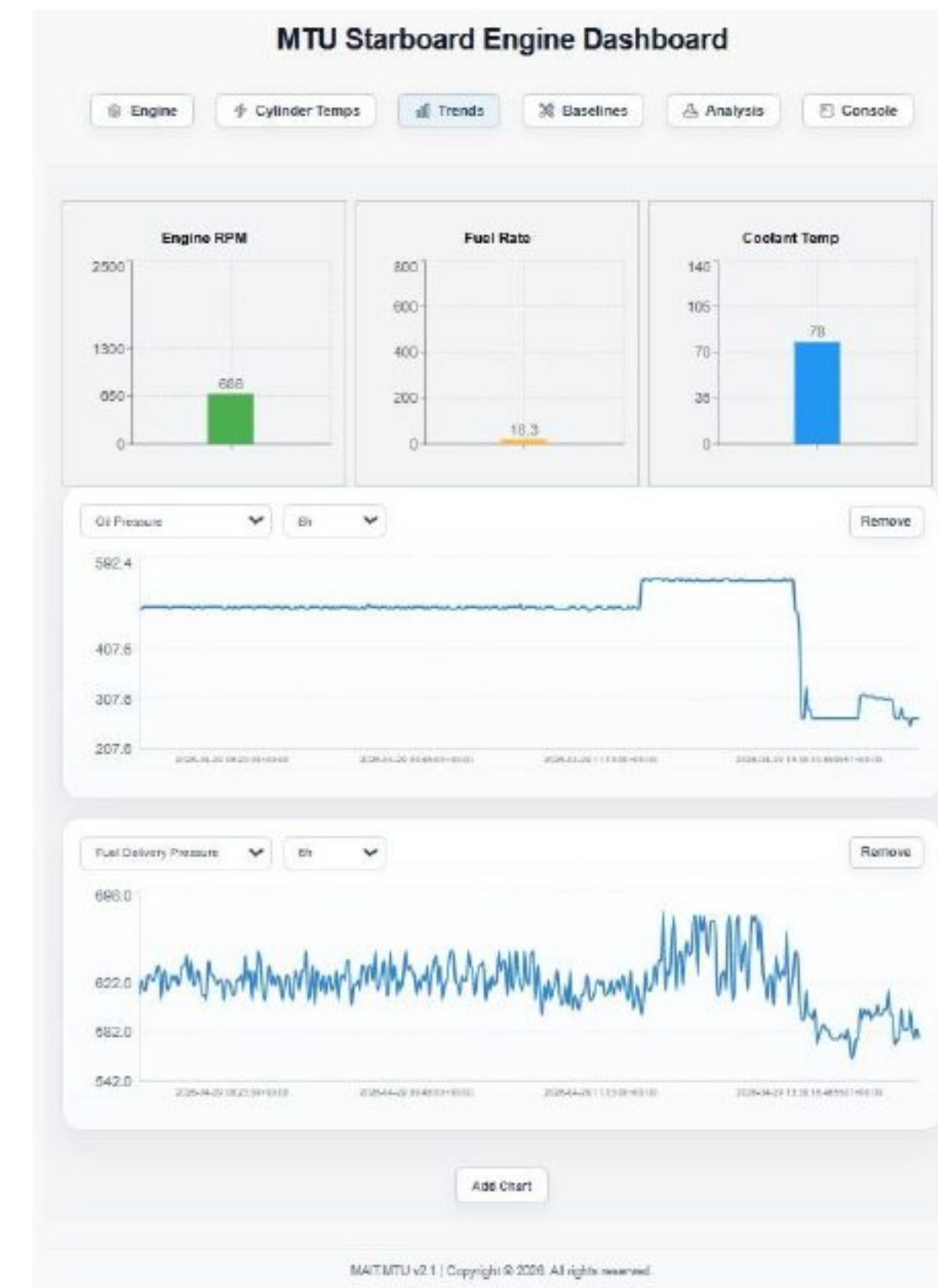
MAIT continuously collects telemetry from marine equipment and stores every data point in a long-term historical database. Engineers can monitor live operating conditions, review historical performance, analyze trends, and investigate events using months or years of operational history.

The platform combines real-time dashboards with flexible trend analysis tools, enabling users to move beyond instantaneous readings and understand how equipment behavior evolves over time.



## Live Operational Dashboard

Live operational overview of critical engine parameters, temperatures, pressures, alarms, and equipment status.



## Historical Trend Analysis

Historical trend analysis enables engineers to identify operational patterns, investigate events, and monitor long-term equipment performance.

## Key Capabilities



Real-Time  
Equipment Monitoring



Historical Telemetry  
Retention



Custom Trend  
Visualization



Long-Term  
Performance Tracking



Operational Event  
Investigation



Condition-Based  
Maintenance Support

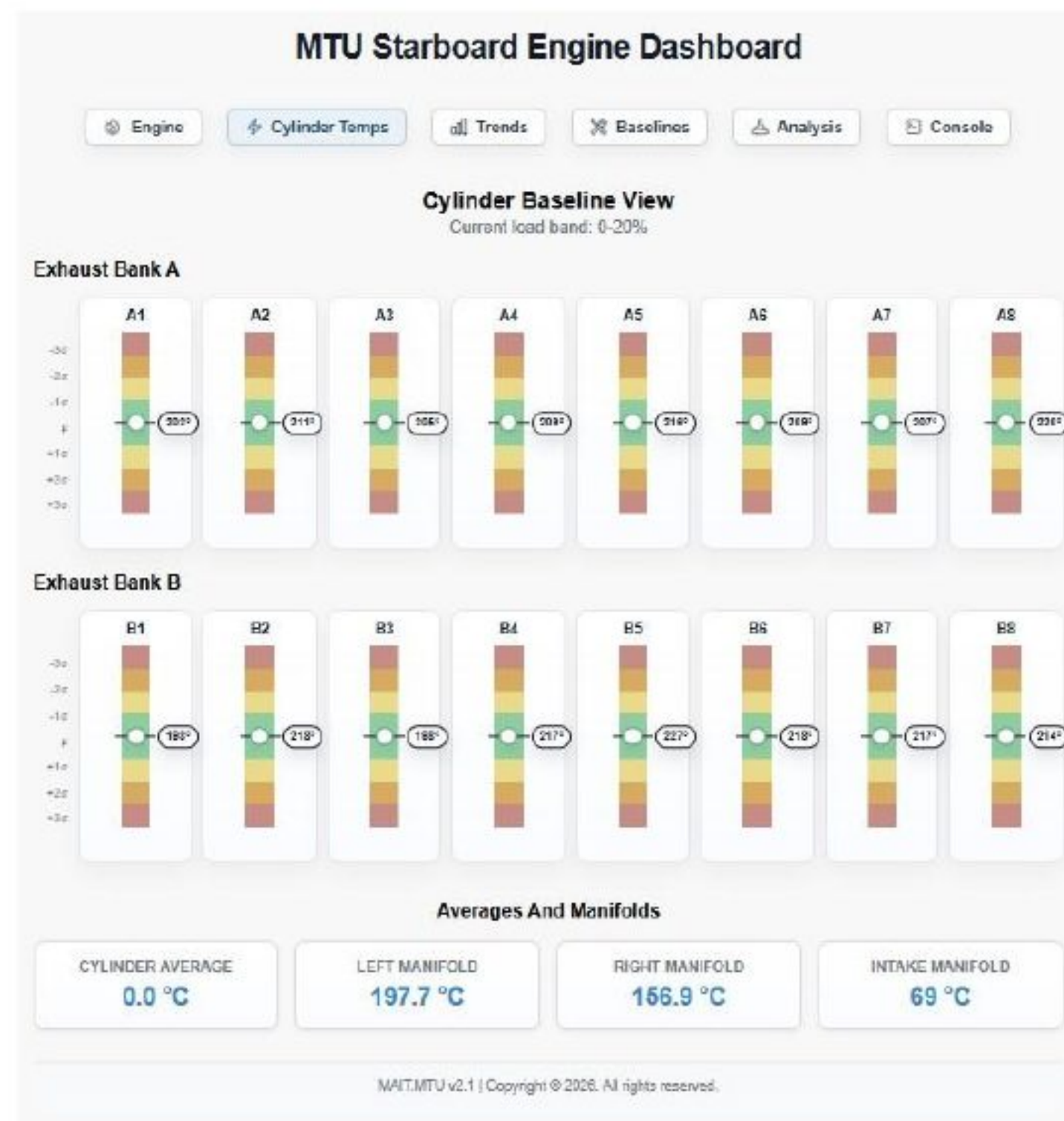
# Baseline Intelligence

## From Monitoring to Understanding

Traditional monitoring systems show current values and alarm conditions, leaving engineers to determine whether equipment is operating normally. MAIT continuously learns equipment behavior by building short-term and long-term statistical baselines for every monitored parameter.

Current telemetry is compared against these learned baselines to identify abnormal operating conditions, while changes in baseline behavior over time are tracked to detect gradual performance drift. By monitoring both instantaneous deviations and long-term baseline trends, MAIT can highlight developing issues before alarm thresholds are reached.

This approach transforms historical telemetry into a continuously evolving operational reference, helping engineers move from reactive troubleshooting to condition-based monitoring and early intervention.



MAIT continuously compares live telemetry against learned historical baselines while tracking how those baselines evolve over time. This allows engineers to identify abnormal conditions, gradual degradation, and emerging trends before traditional alarm systems are triggered.

### Key Capabilities



# AI-Assisted Diagnostics

## Turning Data into Actionable Insights

MAIT combines live telemetry, historical trends, baseline deviations, and operational context to generate actionable diagnostic insights and recommendations.

Rather than analyzing isolated measurements, MAIT evaluates equipment behavior in the context of historical performance, statistical baselines, and observed trends. This allows engineers to quickly identify emerging issues, understand their potential causes, and focus troubleshooting efforts where they matter most.

The AI analysis engine can be configured to run at user-defined intervals, providing continuously updated operational assessments and equipment health insights.

AI Analysis

Enabled

Show Less

Current Analysis

Recent Insights

AI Alerts

INFO: Fuel filter differential ~2 kPa, down from ~58 kPa baseline — probable filter change | Right manifold 11°C above baseline; trend +5.5°C/day — monitor for continued divergence | Raw water pressure 8 kPa above baseline; coolant temp normal — no action needed

Summary

Engine running at 42% load with stable thermal and lubrication parameters; fuel pressure differential has dropped dramatically from ~58 kPa to 2 kPa, most consistent with a recent fuel filter change, while all other systems remain within expected operating ranges for the current RPM/load point.

Trend Analysis

Fuel pressure differential collapsed from 57.6 kPa baseline to 2.0 kPa — sudden drop pattern consistent with filter replacement rather than filter bypass or failure, as both fuel pressures remain near nominal and fuel rate is normal  
Oil pressure at 544 kPa is slightly above the 534.7 kPa baseline, consistent with the higher current RPM (1159 vs 1120 baseline); the previously noted -10.8 kPa/day decline appears to have stabilized or was load-dependent  
Right manifold temperature trending +5.5°C/day per historical trend, currently 11.3°C above baseline at 421.3°C; left manifold only 5.2°C above baseline — asymmetry warrants monitoring  
No significant baseline drift available for long-term comparison; single baseline record limits confidence in slow degradation detection  
Raw water pressure at 128 kPa is ~8 kPa above the 120.1 kPa baseline, partially attributable to higher RPM but outside normal statistical variation; coolant temperature is normal, providing no corroboration of a supply issue

PATTERN

Left manifold consistently hotter than right (prior rest observations noted ~1.3°C delta; now 59.4°C delta at low load) — the proportional asymmetry increases at low load/RPM, suggesting turbocharger or exhaust runner thermal behavior rather than a combustion imbalance between banks

TREND

Oil pressure declining at -13.7 kPa/day and raw water pressure at -2.4 kPa/day per trend data; however both current values align with affinity-law predictions for 600 RPM, so these trends likely reflect operating-point variation rather than degradation — baseline support is limited to one period

OPERATIONAL

Engine at 600 RPM / 22% load is operating well below the 1086 RPM / 39% load baseline for this

Current Analysis

Provides a concise summary of current operating conditions, highlighting parameters that require attention and identifying immediate anomalies.

Trend Analysis

Evaluates how parameters change over time, identifying gradual degradation, improving conditions, or emerging performance drift.

Cross-System Analysis

[NORMAL] [RUNNING] Cooling: coolant at 77.0°C matches baseline exactly; coolant pressure 238 kPa within 1 SD of 236 kPa baseline -> no cooling system degradation (corroborated by normal raw water thermal performance)

[WATCH] [RUNNING] RawWater: pressure 128 kPa is ~8 kPa above 120.1 kPa baseline, exceeding statistical variation; coolant temp normal at 77°C provides no corroboration of restriction or supply issue -> likely RPM-related elevation, no thermal consequence

[WATCH] [RUNNING] FuelSystem: fuel pressure differential dropped from 57.6 kPa to 2.0 kPa with FP2 rising from 615 to 660 kPa -> probable fuel filter change; fuel rate and temperature normal corroborate no fuel delivery fault (baseline support limited to single record)

[NORMAL] [RUNNING] Lubrication: oil pressure 544 kPa slightly above 534.7 kPa baseline, consistent with higher RPM; oil temp 73.0°C matches baseline; oil differential 25.5 vs 25.9 kPa nominal -> no lubrication concern, prior decline trend appears stabilized

[NORMAL] [RUNNING] Combustion: exhaust average 461.9°C vs 459.2°C baseline, slight elevation consistent with higher RPM; B2 hottest at 506.4°C matching known pattern; cylinder spread widened modestly to 81°C from 76°C -> no injector or compression concern at this time

Recent Insights

Maintains awareness of developing patterns and recurring observations across multiple analysis cycles.

Cross-System Analysis

Correlates data across multiple subsystems to identify relationships that may not be visible when examining parameters individually.

AI Privacy & Deployment

Deployment & Data Handling

✓ AI analysis is performed through an optional cloud-hosted MAIT gateway

✓ Internet connectivity is required when AI-assisted diagnostics are enabled

✓ User-configurable analysis intervals

✓ Telemetry data is processed only for the requested analysis

✓ Analysis context is not retained between requests

## Deployment Options



### Onboard Installation

- Local telemetry collection
- Local storage
- Independent vessel operation



### Remote Monitoring

- Secure remote access
- Fleet-wide visibility
- Shore-side diagnostics



### Cloud Backup

- Historical data retention
- Long-term record preservation
- Secure offsite storage

## Who Benefits From MAIT



### Engineers & Crew

- Live equipment visibility
- Historical troubleshooting
- Early detection of performance drift
- AI-assisted diagnostics
- Reduced troubleshooting time



### Yacht Management & Fleet Managers

- Remote monitoring
- Fleet-wide visibility
- Maintenance planning
- Operational reporting
- Historical equipment records



### Service Providers

- Remote diagnostics
- Faster fault identification
- Historical trend analysis
- Improved first-time fix rate
- Reduced site visits



### Shipbuilders & OEMs

- Commissioning support
- Warranty data collection
- Temporary diagnostic deployments
- Equipment performance validation
- Historical operating records

## Target Applications



### Superyachts



### Commercial Vessels



### Shipyards & Refit Yards



### Yacht Management Companies



### Fleet Operators



### Service Organizations



### System Integrators

# MAIT Systems OÜ

## Equipment Intelligence Platform

MAIT (Modular Analytics & Intelligence Toolkit) is a marine equipment intelligence platform designed to transform operational telemetry into actionable engineering insight.



[www.mait.tech](http://www.mait.tech)



[ys@mait.tech](mailto:ys@mait.tech)

