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DIGITAL ASSET PORTAL

Asset Performance Monitoring & Asset Predictive Maintenance by an holistic approach

Dr. Maurizio Rovaglio
Head of Digital Enterprise Busieness
Process Industry & Drive – Italy

More than 10 B€ investment on SW in the last 10 years

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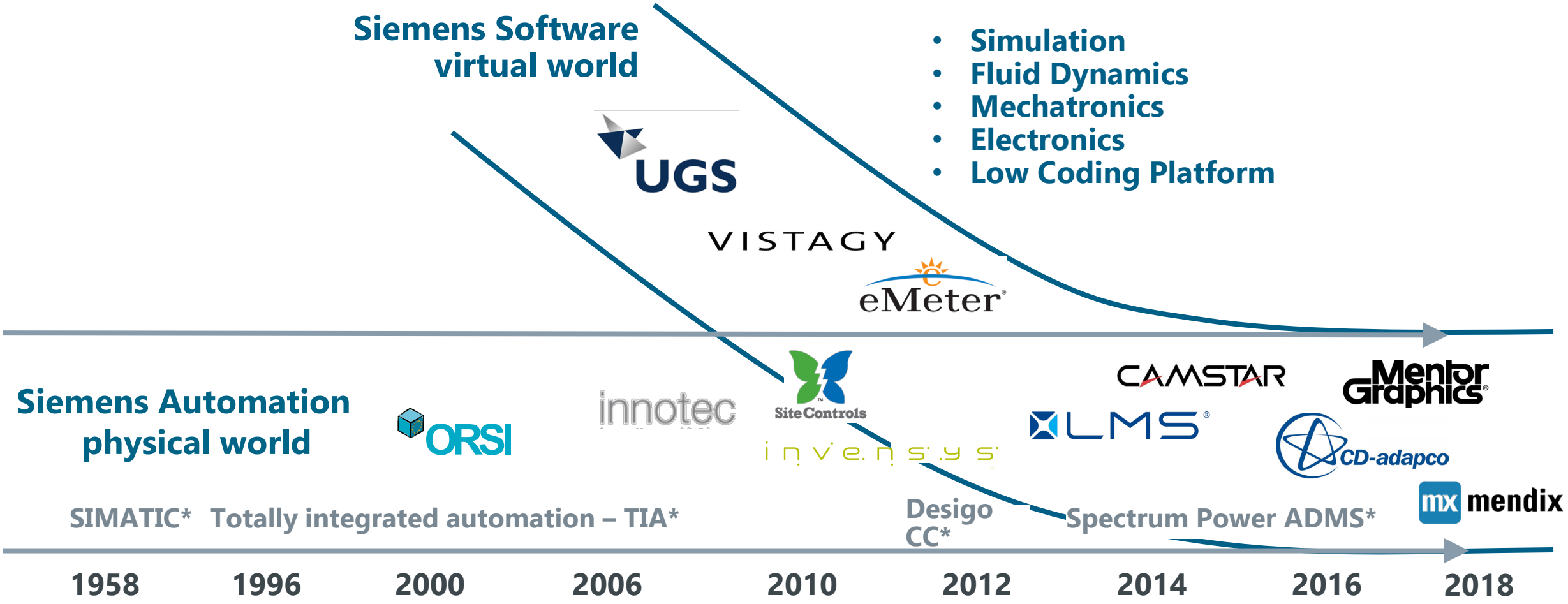

* In-house developments/digital upgrades

ASSET DIGITAL PORTAL Architecture

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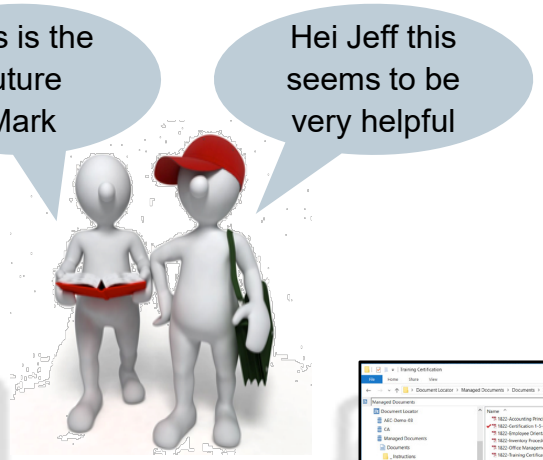
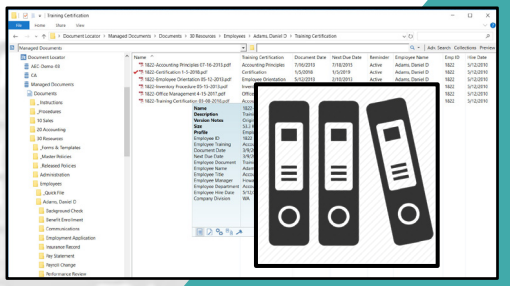


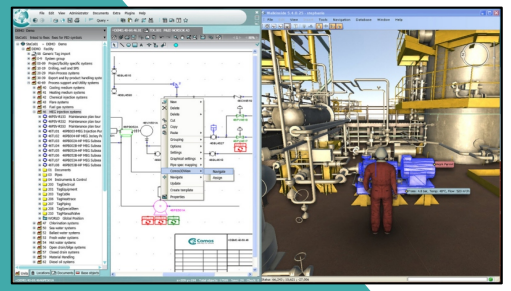
Enterprise Level Supervisory



Site Level Data Management

Documental Archive

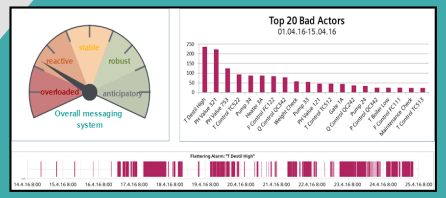
PLATFORM



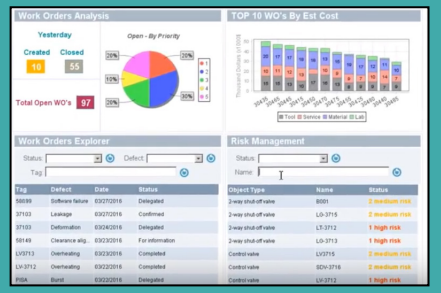
Virtual Plant Navigation

Site Level Operations

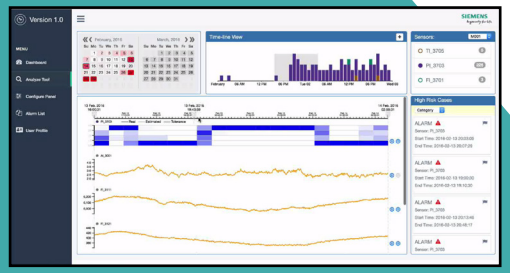
Plant Floor Connectivity



Process Event Analytics



CMMS tools



Asset Predictive Analytics

Plant Floor Analytics

ASSET PREDICTIVE ANALYTICS – Data Driven

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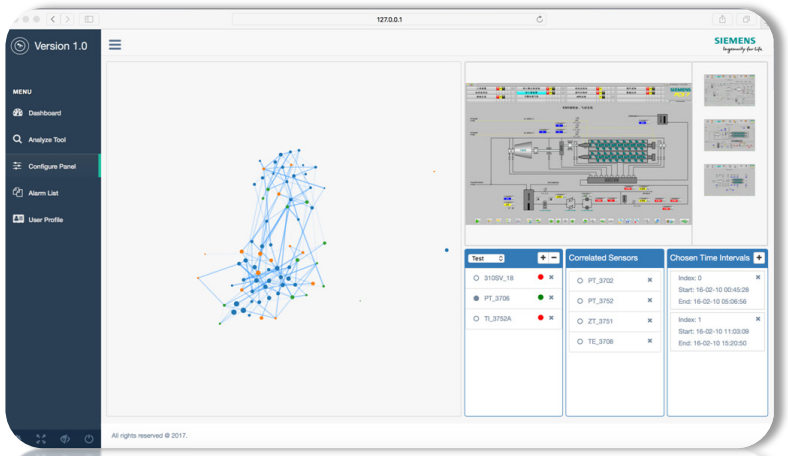
Connectivity: Unified view of equipment with low-cost, secure and reliable connection.

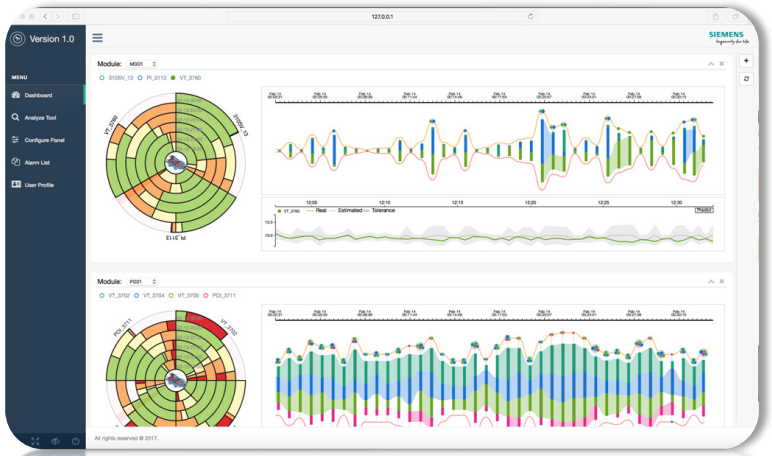
Interactive Configuration:

- **Understandable** modeling process
  - → Easy know-how integration
  - → Trustable/usable result
- **Intuitive** correlation analysis



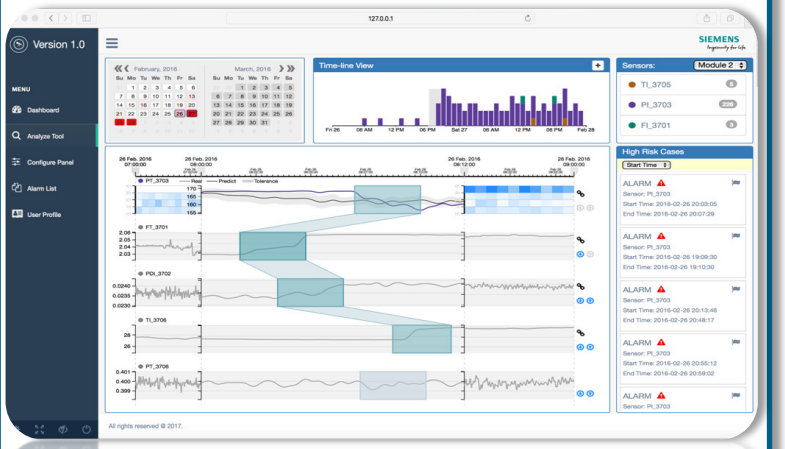
Intuitive Monitoring:

- **Configurable** dashboard
- **Aesthetic**/pleasing visualization
- **Efficient** process & **comprehensive** insight of streaming data



Flexible Inspection:

- Gain **data-rich** actionable insights
- Convenient model update
  - → **Robust/adaptive** system



Connectivity

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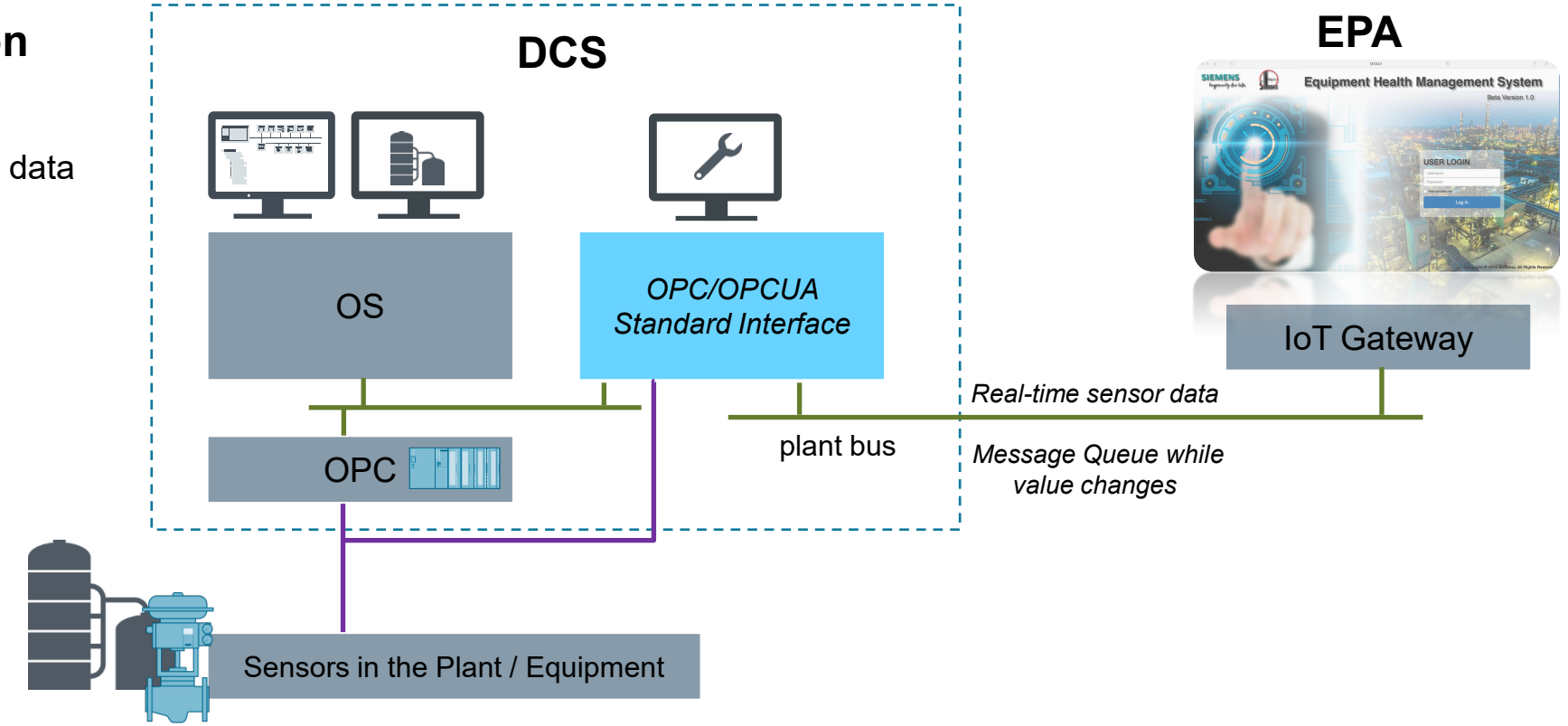
Data Integration

- Process control sensor data
- Equipment real-time monitoring data
- Engineering Data
- Maintenance Data
- Others



Supporting Predictive Maintenance by Motors & Drives data

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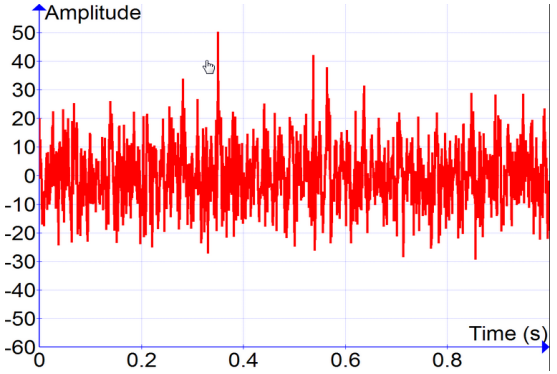
Digital snake camera to acquire analog indicators in the field and digitalizing the information.

Image acquired is stored into a time series and transmitted.



Highlighted Features

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Connectivity: Unified view of equipment with low-cost, secure and reliable connection.

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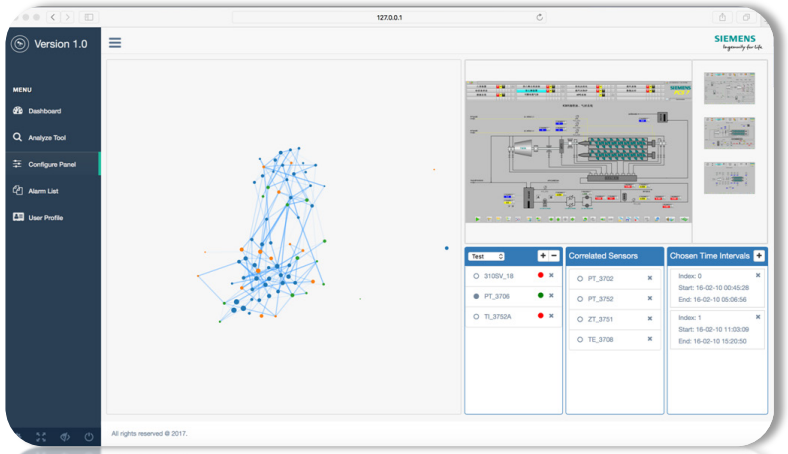

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Equipment Health Analysis System

Beta Version 1.0

USER LOGIN

Username

Password

Remember me

Log in

Highlighted Features

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Connectivity: Unified view of equipment with low-cost, secure and reliable connection.

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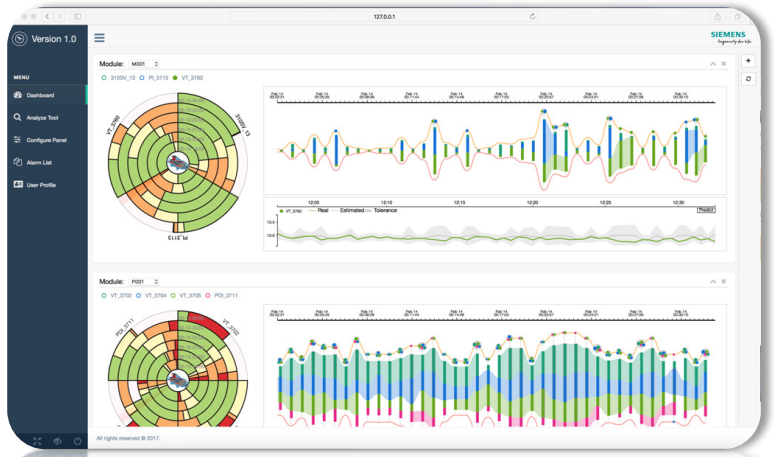

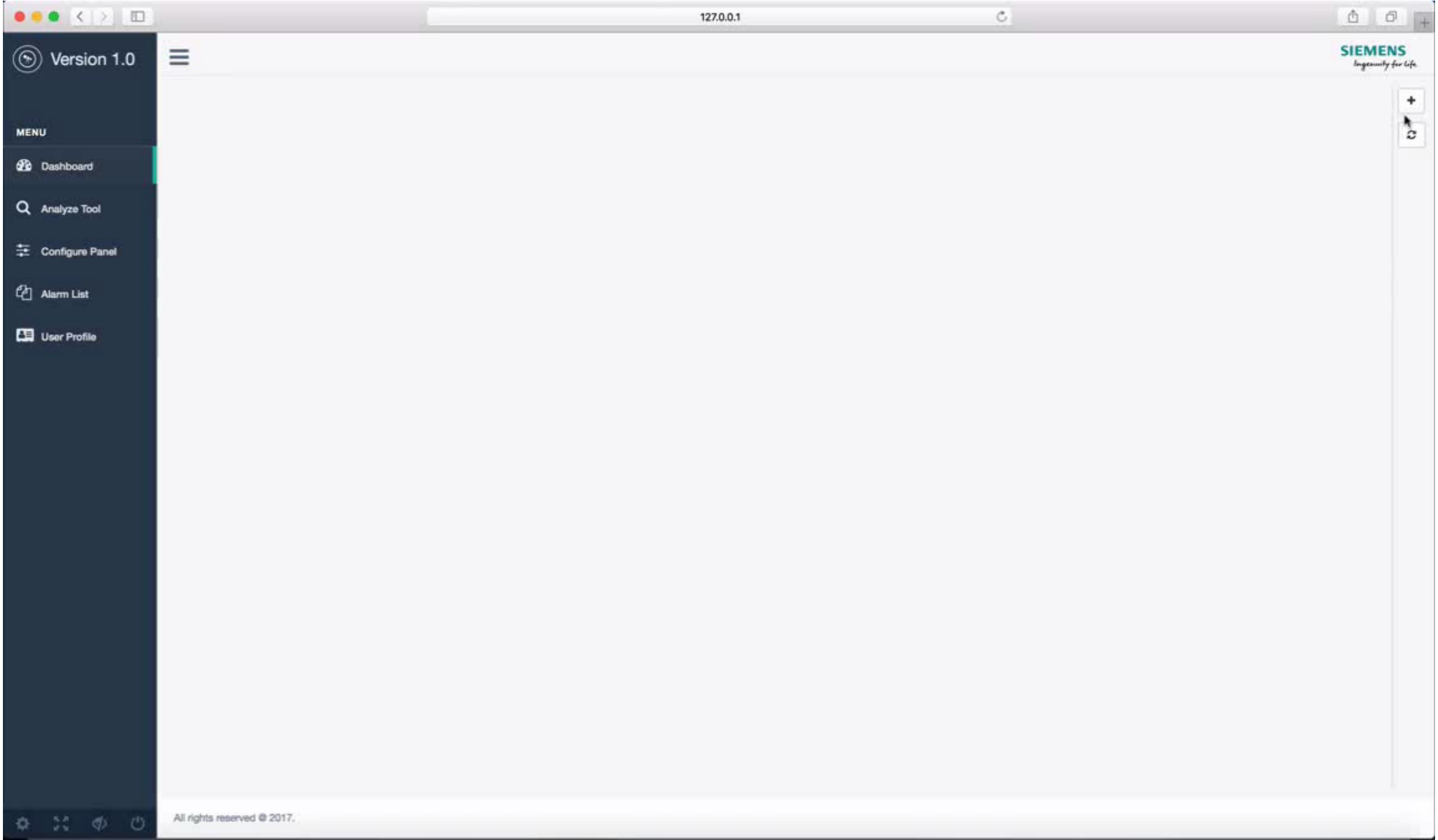
127.0.0.1
Version 1.0
MENU
Dashboard
Analyze Tool
Configure Panel
Alarm List
User Profile
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USE CASE Objectives

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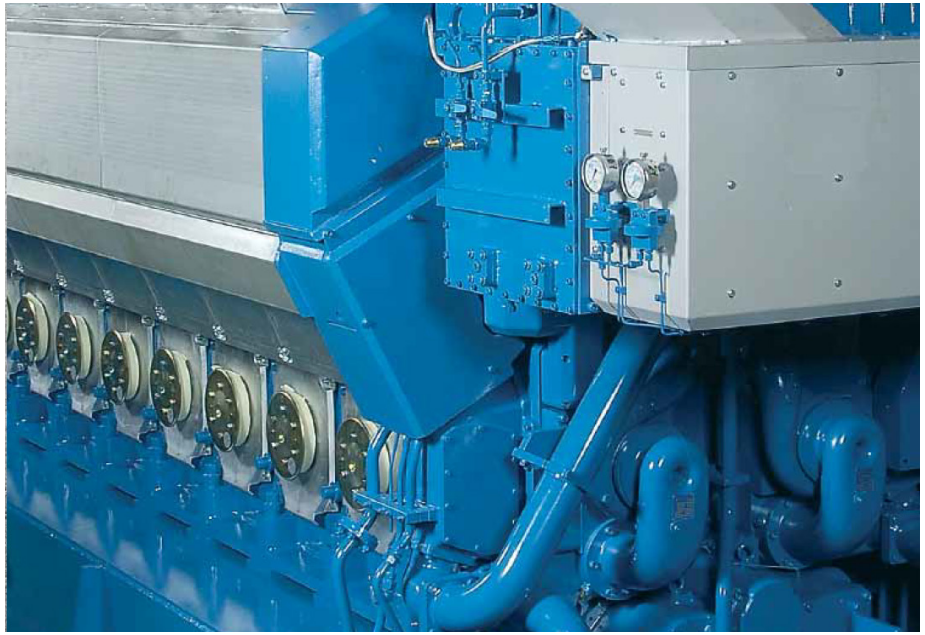
Data Set: eight power generators on drilling rig

- **Objective #1:**

  Detect anomalies/faults during recorded period

- **Objective #2:**

  Optimization of fuel consumption



Objective 1 – Generator 3: Drift on fuel consumption

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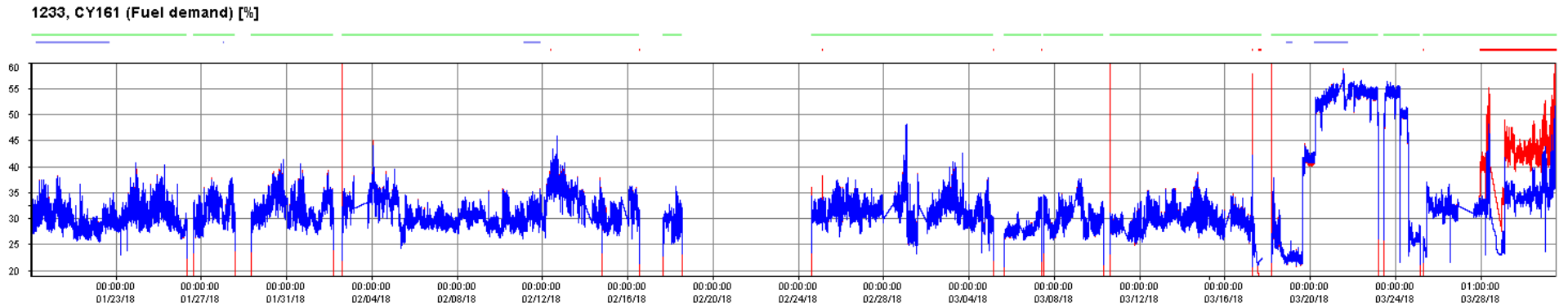
Anomaly detection algorithm identified sudden change from March, 28th onwards on multiple sensors



Malfunction detected by mismatch between AI model and real time data

Possible causes: - variation on the inlet air temperature
- check air compressor

Objective 1 – Generator 2: Drifts in Fuel Oil Pressure

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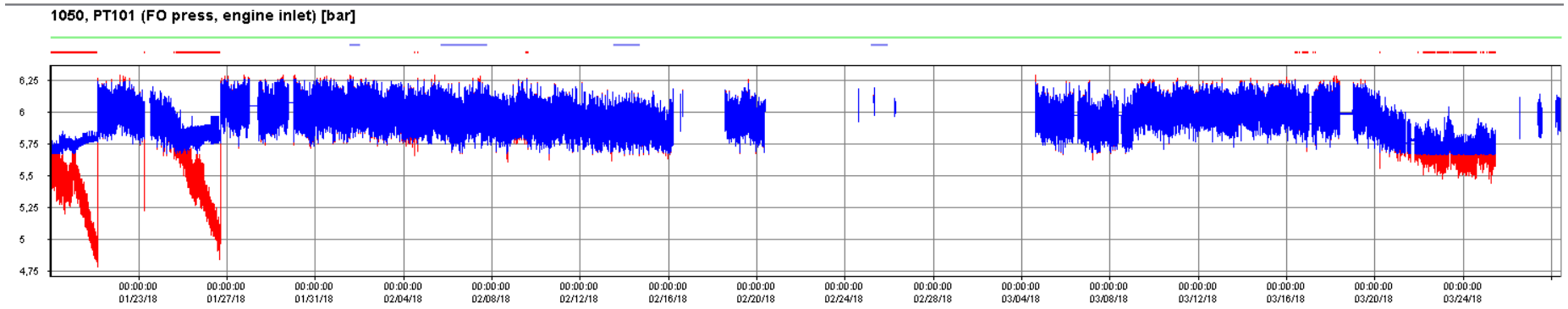
Average fuel oil pressure is usually constant but shows multiple drifts

Actual values
Values expected by algorithm



Malfunction detected by mismatch between AI model and real time data

Possible causes: - malfunction on pressure relief valve system
- malfunction on fuel injection pump

Objective 2 – Generator 5 and Generator 6: Running too Long in Low-load Mode

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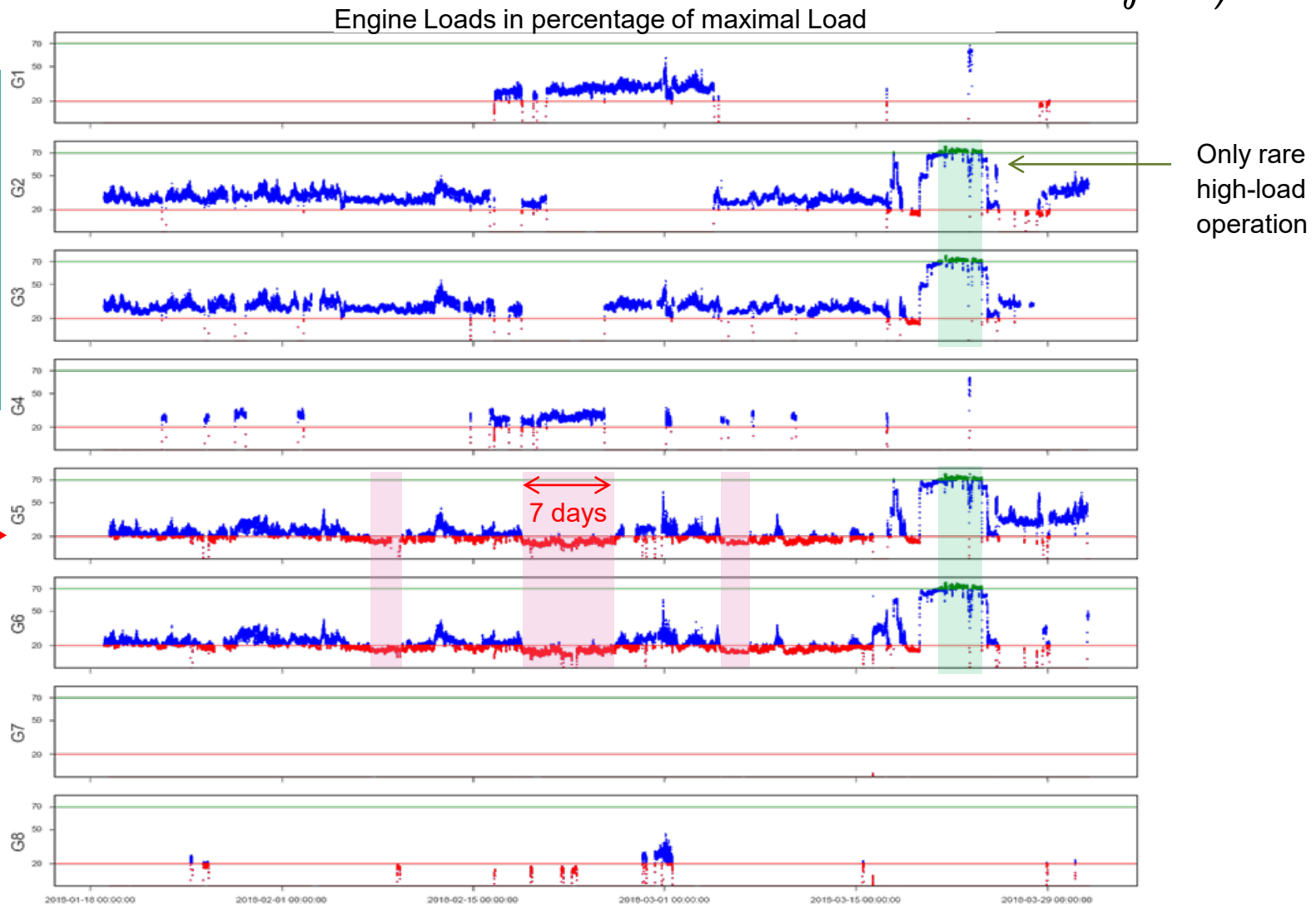
Low-load operation (10 – 20%) should be limited to maximum time 30 hours

After low-load operation, the engine has to run on high load for at least 60 minutes to clean up the engine

Paragraph 2.5 product guide

Very long periods of low-load running (< 20%) are observed in G5 and G6



Possible Issues:

- **internal glazing and carbon fouling**
- **poor piston ring sealing**

Objective 2 – Efficiency can be Increased by Running Engines at a Higher Load

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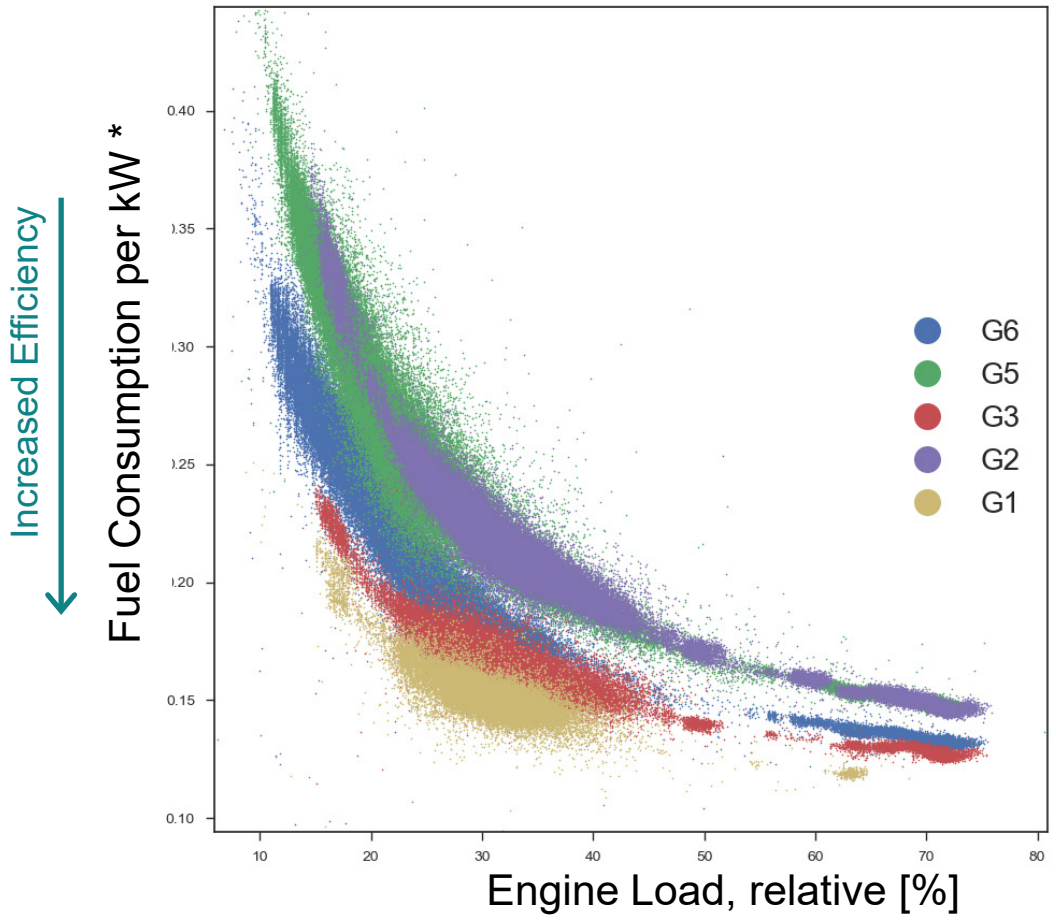
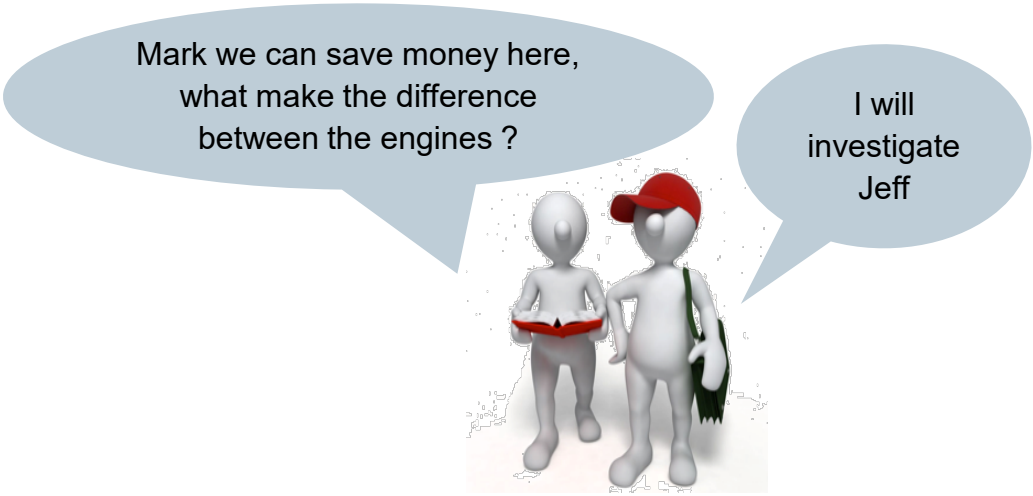


- It is more efficient to run the engines at a higher load (> 55% of maximal load)
- Engine G1 and G3 are most efficient

Extracting value from real time data



Holistic Approach for Predictive Analytics

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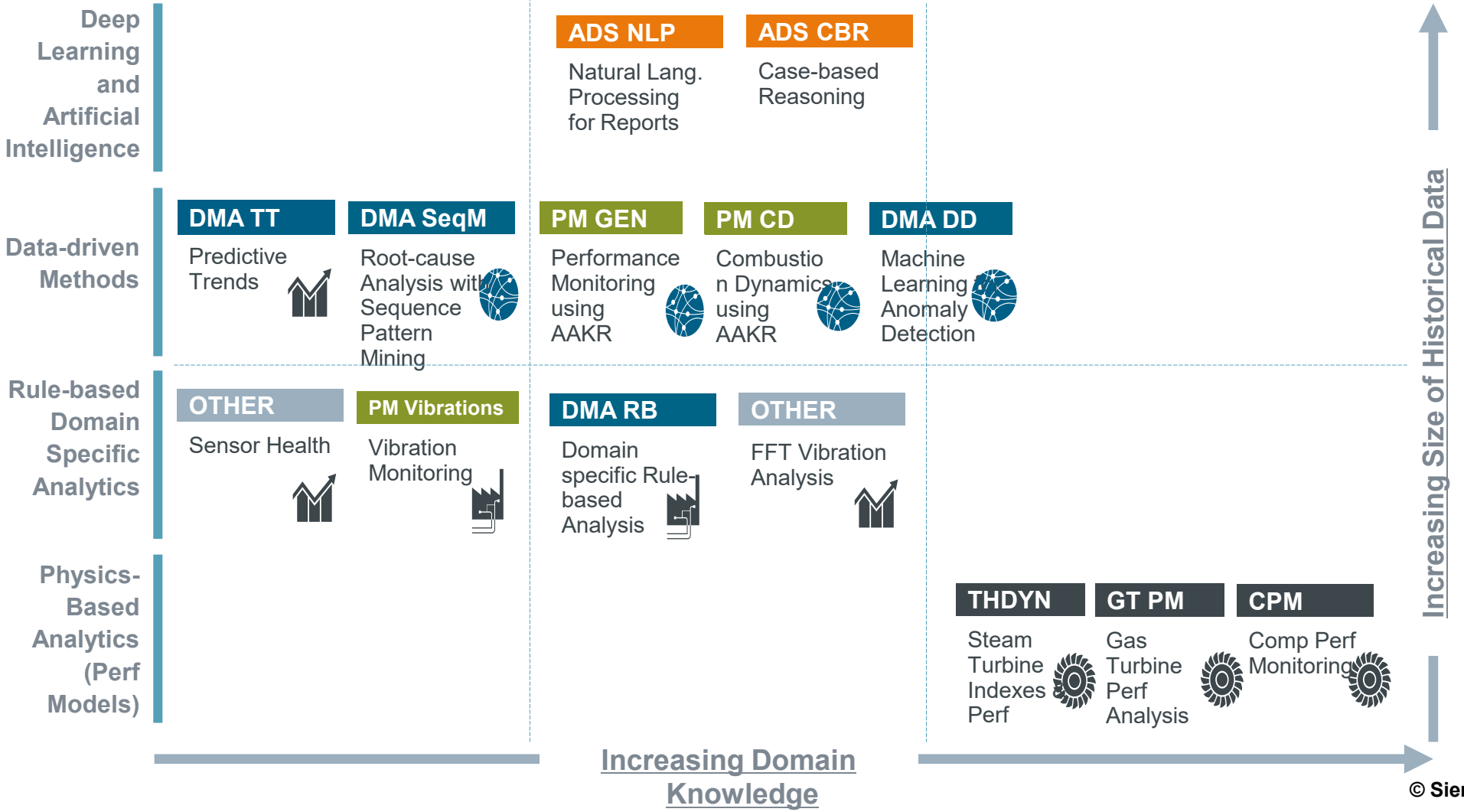

Thank You !

Maurizio Rovaglio
Head of Digital Enterprise Business
Process Industry & Drives
Siemens SPA
maurizio.rovaglio@siemens.com