AVEVA PI WORLD

Rotating Equipment Monitoring

Spirit Energy and ITI Operations

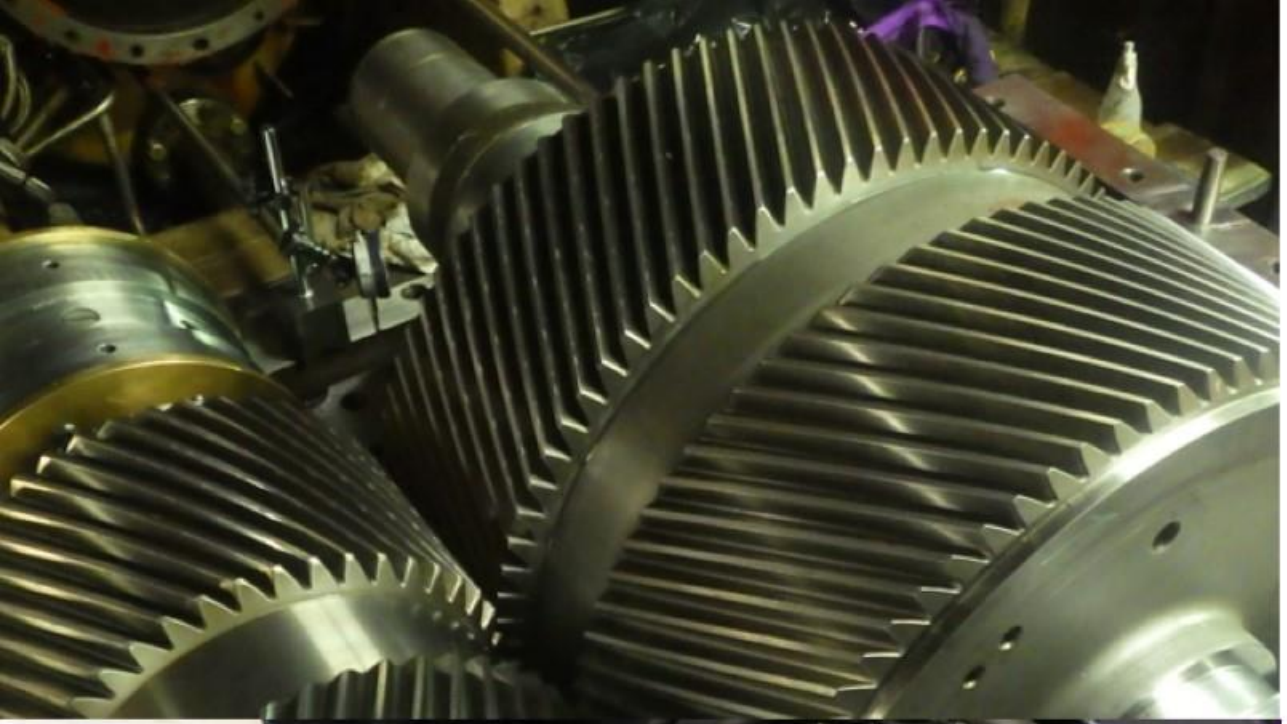
Presented By: Ross Yule and Richard J Wallace

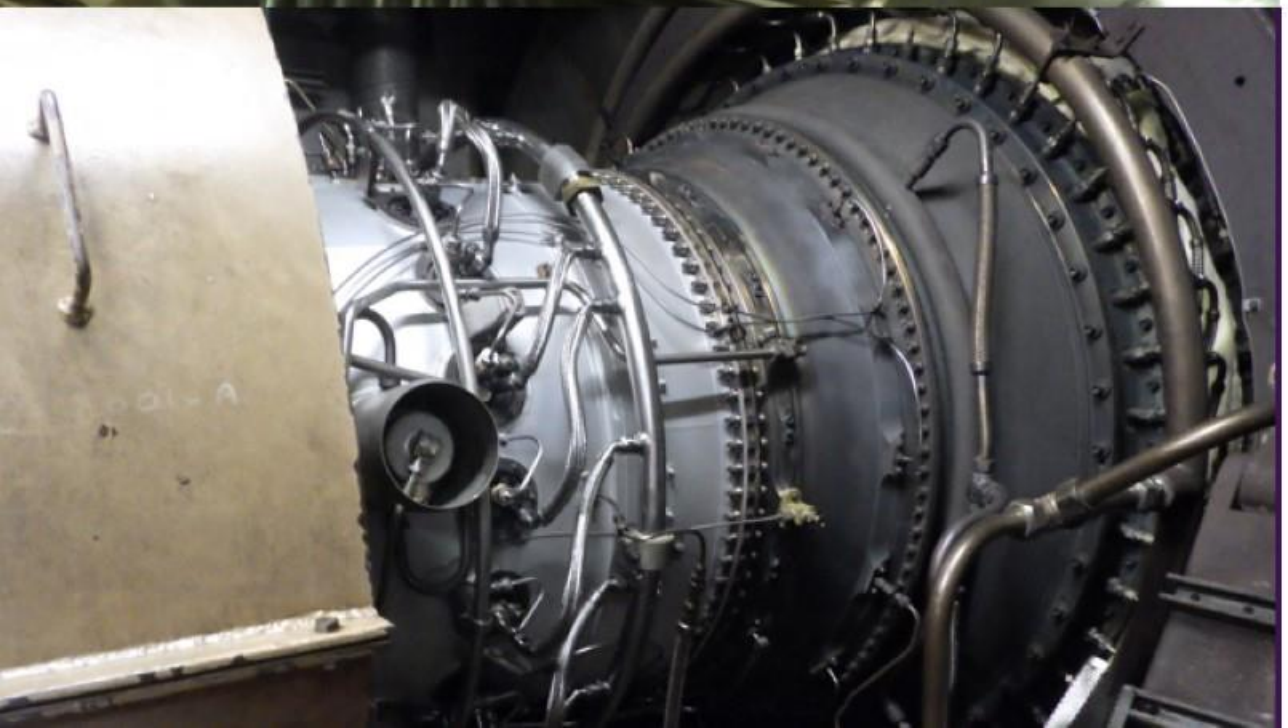
Spirit Energy

At a glance

- Oil and Gas Exploration and Production company
- Based in North West Europe
- Assets in UK, Netherlands and Norway
- Largest operated facility is the Morecambe Hub:
  - 2 Onshore Gas Processing Facilities
  - 8 Offshore Platforms
- Further information can be found on our website:

https://www.spirit-energy.com/





Rotating Equipment

- Operation and maintenance of Turbines, Compressors, Pumps, etc.
- Critical equipment in plant process
- Robust remote monitoring can allow:
  - Early failure mode identification and mitigation
  - Rapid fault finding investigation and reinstatement

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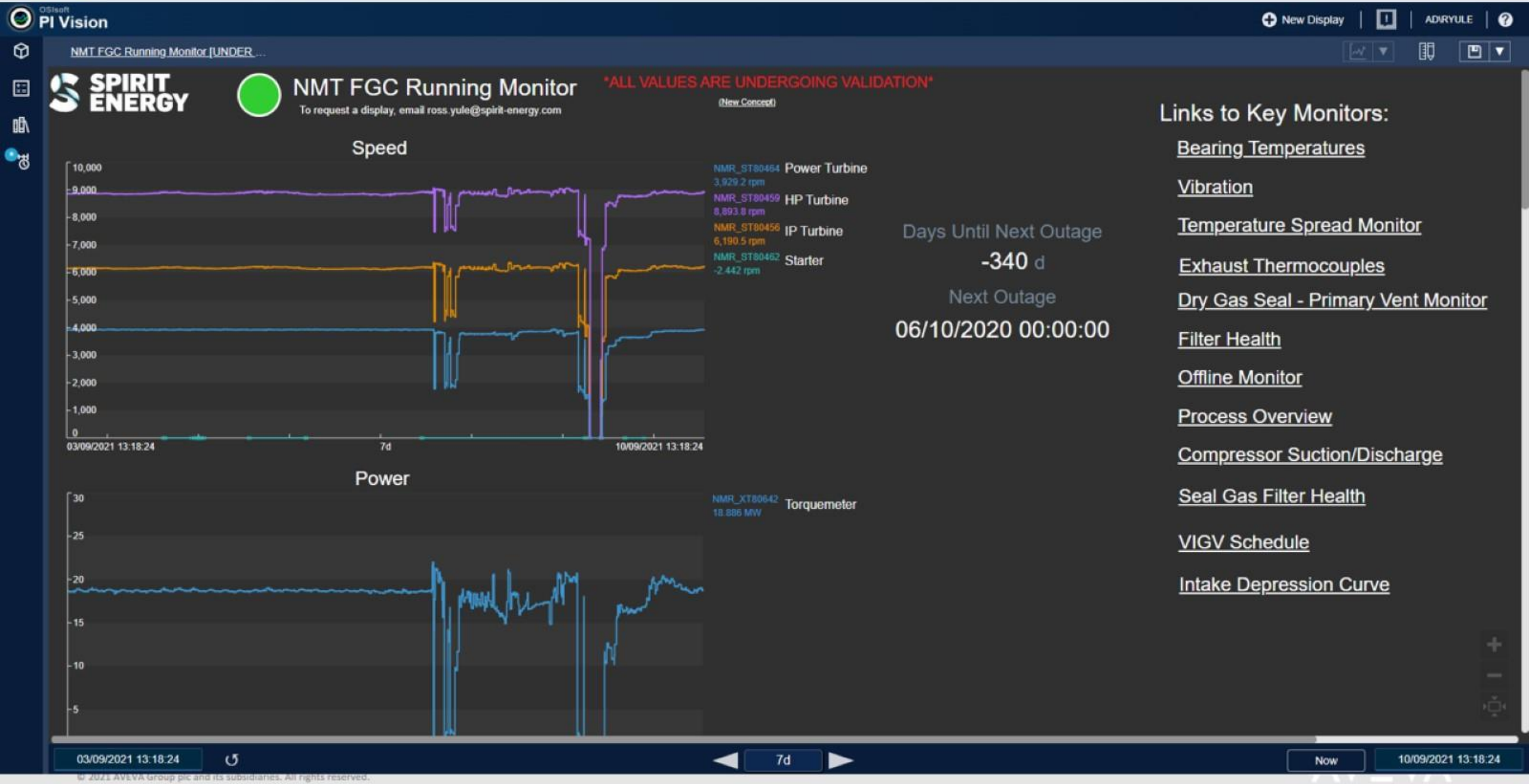
Original System

Original monitoring system installed early 2000s

Rev1


PI Vision
New Display
ADRYULE
NMT FGC Running Monitor [UNDER ...
SPIRIT ENERGY
NMT FGC Running Monitor
To request a display, email ross.yule@spirit-energy.com
ALL VALUES ARE UNDERGOING VALIDATION
(New Concept)
Speed
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
03/09/2021 13:18:24
7d
10/09/2021 13:18:24
NMR_ST80464 Power Turbine
3,929.2 rpm
NMR_ST80459 HP Turbine
8,893.8 rpm
NMR_ST80456 IP Turbine
6,190.5 rpm
NMR_ST80462 Starter
-2.442 rpm
Power
30
25
20
15
10
5
NMR_XT80642 Torquemeter
18.886 MW
Days Until Next Outage
-340 d
Next Outage
06/10/2020 00:00:00
Links to Key Monitors:
Bearing Temperatures
Vibration
Temperature Spread Monitor
Exhaust Thermocouples
Dry Gas Seal - Primary Vent Monitor
Filter Health
Offline Monitor
Process Overview
Compressor Suction/Discharge
Seal Gas Filter Health
VIGV Schedule
Intake Depression Curve
03/09/2021 13:18:24
7d
Now
10/09/2021 13:18:24
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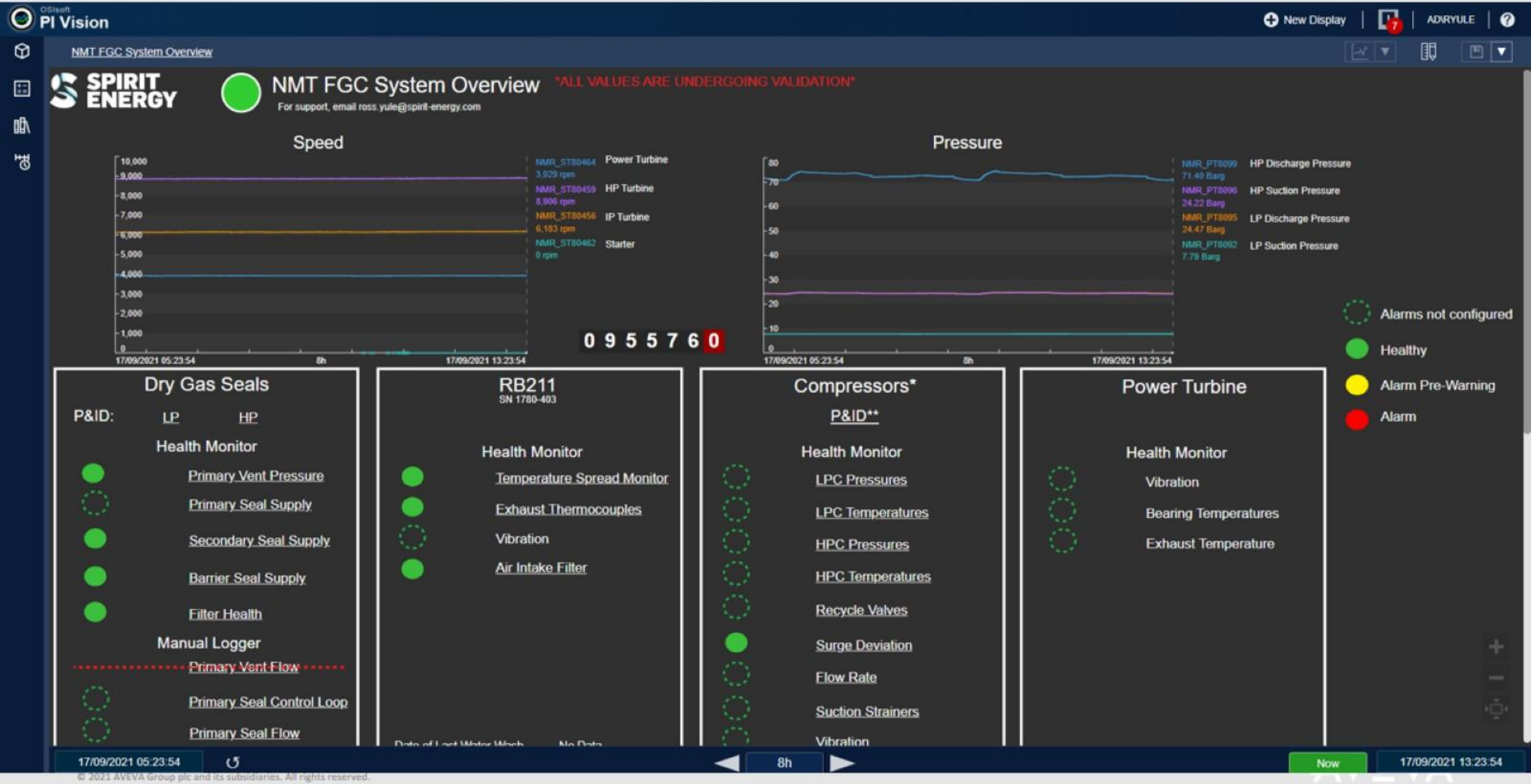
Rev2



Rev3

iti

OSIsoft. Premier Partner

At a glance

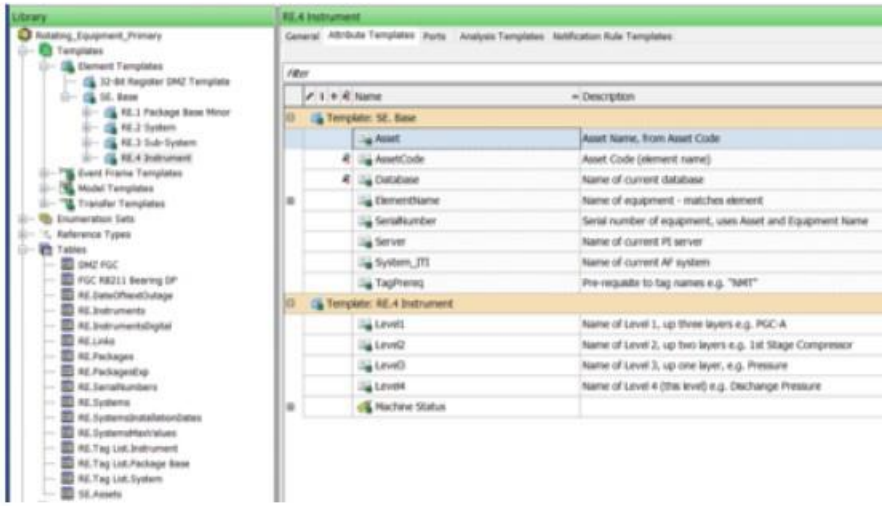
- Established in 1972 we are the UK's first OSIsoft Premier Partner.
- Developing the PI system for more than 20 years.
- More than 50% of UK accredited OSIsoft PI Engineers are ITI Staff.
- Focus on highly regulated industries, deemed to be Critical National Infrastructure.
- 150 staff working out of 5 regional UK offices.
- Dedicated 24/7/365 support, service and maintenance structure.
- Further information can be found on our website:

https://www.itigroup.co.uk/

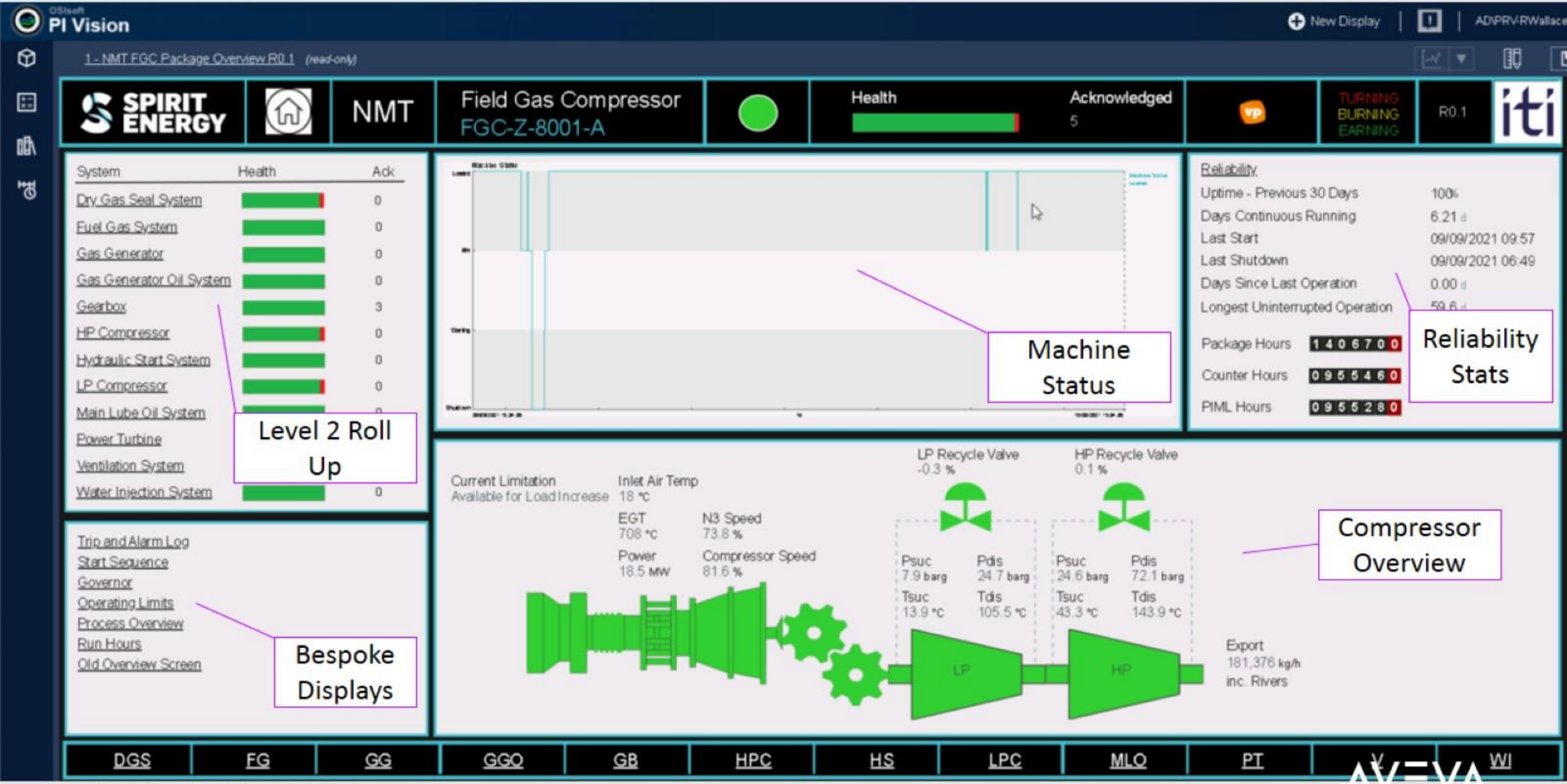
How did ITI help bring an Operational Model into a Deployable Product?

Robust, deployable, flexible, Agile built, remote monitoring

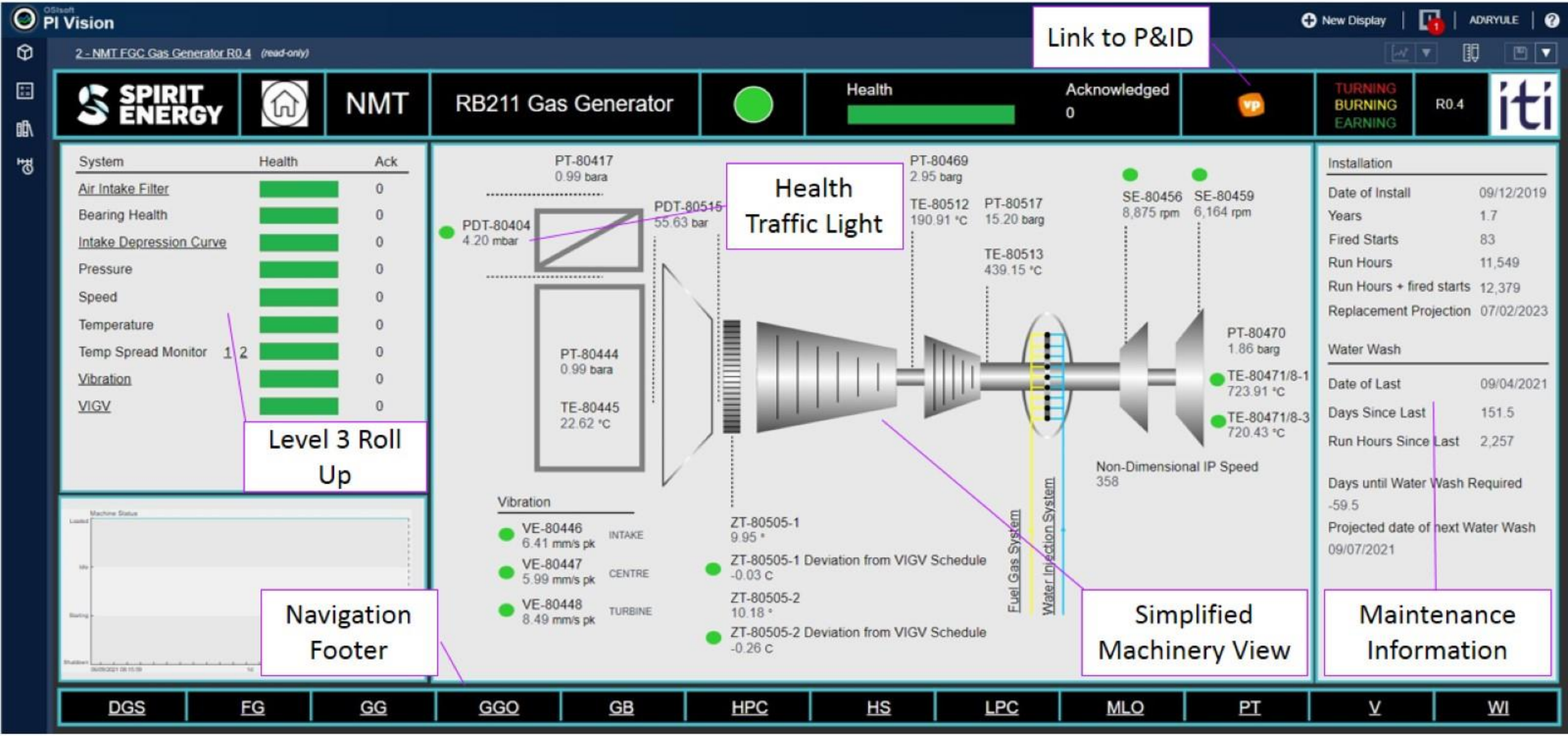
- Take the MVP and build a scalable and deployable solution
  - Agile method, using Sprints, with daily stand-ups
  - This enables continual feedback, and engineers to quickly see updates
- MVP had: (1) limited data, (2) draft analytics, (3) lack of consistency in visuals
- ITI :
  - Assisted with the PI infrastructure, PI Asset Framework and Vision
  - Data volume was hugely increased following install of PI Connector OPC UA
  - Improved the efficiency of analytics by applying general best practice
  - Provided expert UI / UX advice, style guides, and enhanced screens
- Way forward with ITI?
  - Expand rotating equipment application to use Power BI
  - Utilise PI data platform in other sectors in business, expose it's benefit, and solve other Business Problems (currently working with e.g. HCA, Process Engineers)



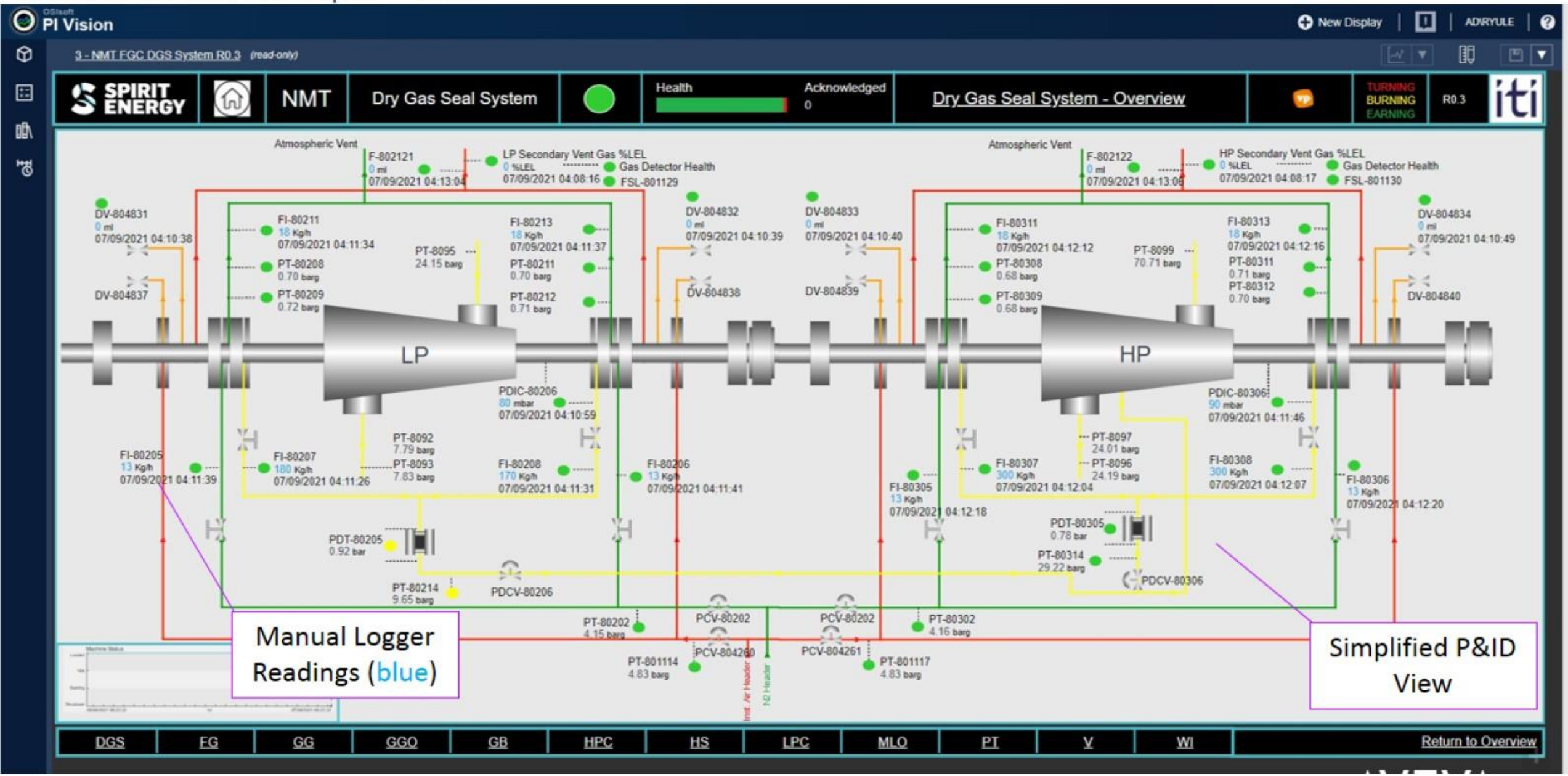
Level 1 Overview Screen



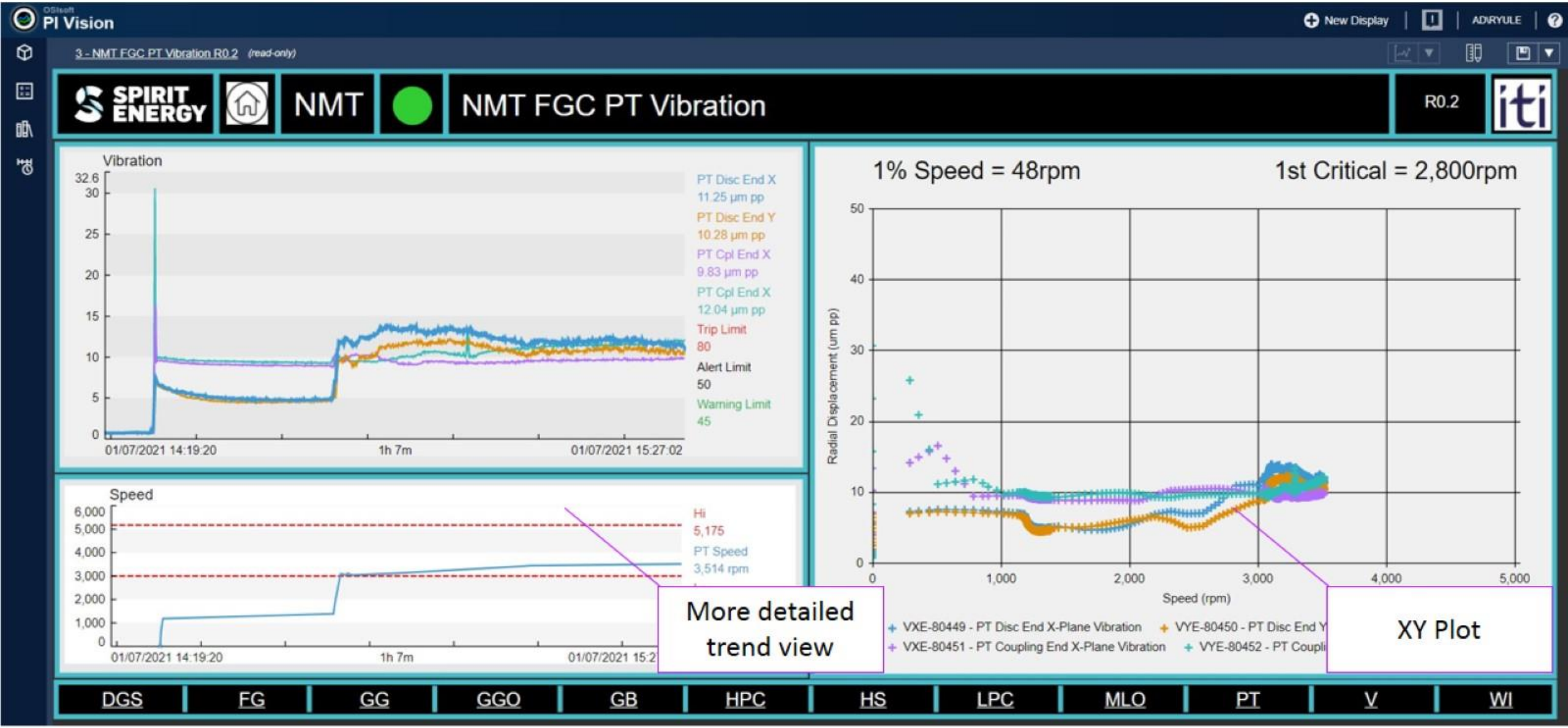
Level 2 Screen example – Gas Generator



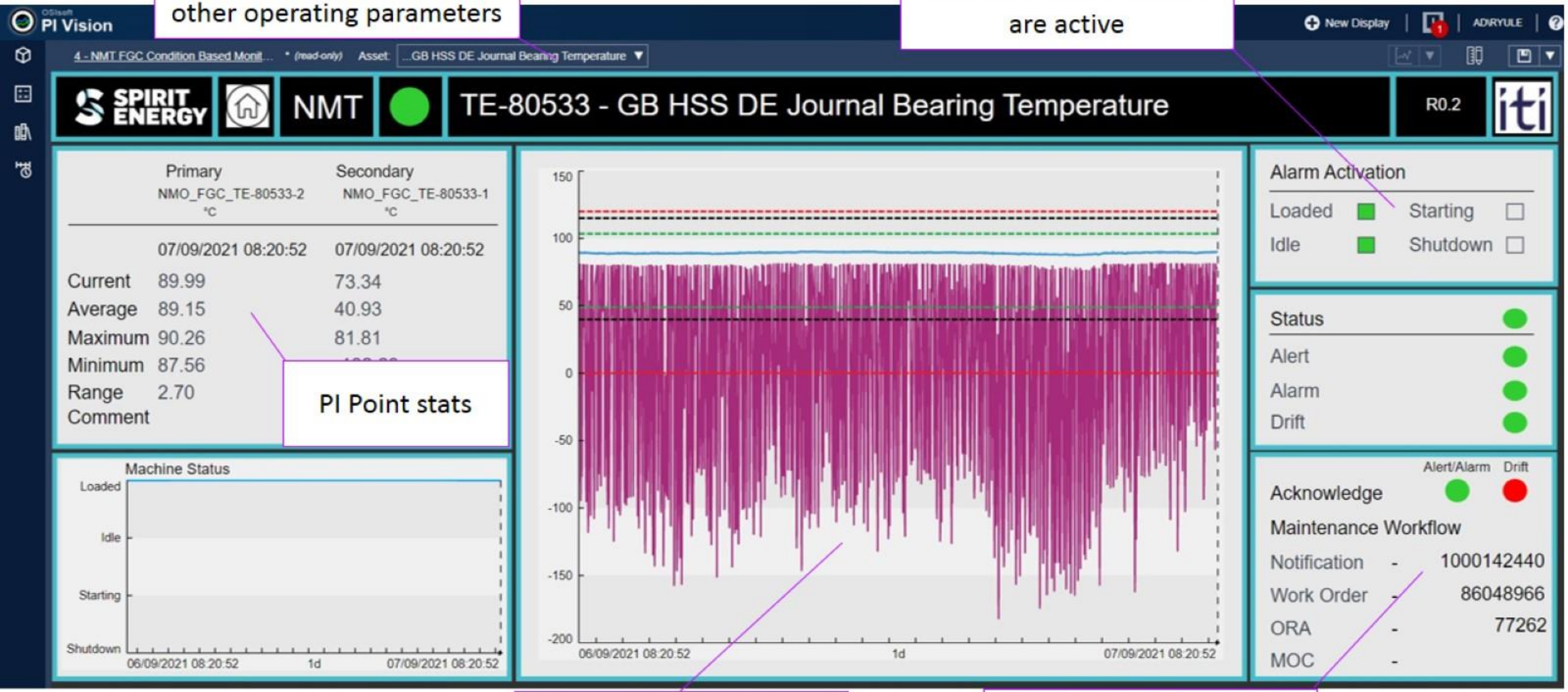
Level 2 Screen example – DGS



Level 3 Screen example – Power Turbine Vibration

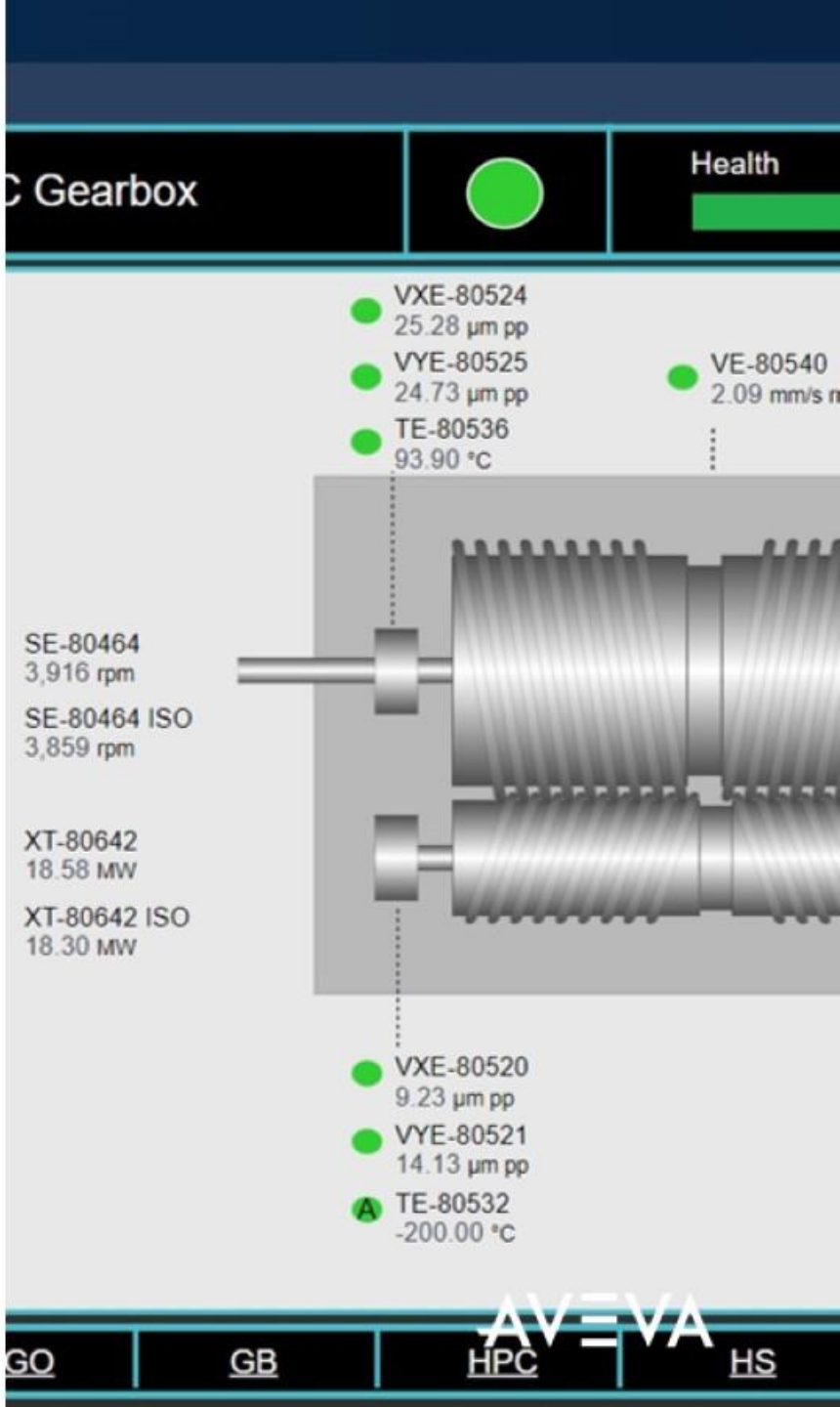


Level 4 Screen example – Bearing Temperature



What's Next?

- Automate "Trip Log" Event Frames to generate reliability statistics in PowerBI.
- Roll-out system to other critical plant equipment.
- Provide data input on PI Vision for acknowledgements, date of maintenance, etc.
- Application of advanced analytics to help early identification of failure modes.
- Work with equipment OEM's to develop models to improve condition monitoring.
- Bring CMMS (SAP) data into the PI System (e.g. maintenance metrics and spares availability)
- Take lessons learned from rotating equipment and use across other parts of business (e.g. hydrocarbon accounting, process)



OIL & GAS

Delivering critical equipment reliability

Challenge

Provide detailed monitoring of critical plant rotating equipment to deliver high uptime availability, including pumps, compressors and gas turbines.

Solution

Deployed the latest AVEVA PI System technology including

- PI AF
- PI Manual Logger
- PI Connector
- PI Vision

for Equipment Monitoring and Condition Based Maintenance.

Benefits

Increased production and operational efficiency, mobile inspections, exception-based surveillance, facilitating rapid fault investigation and resolution.

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