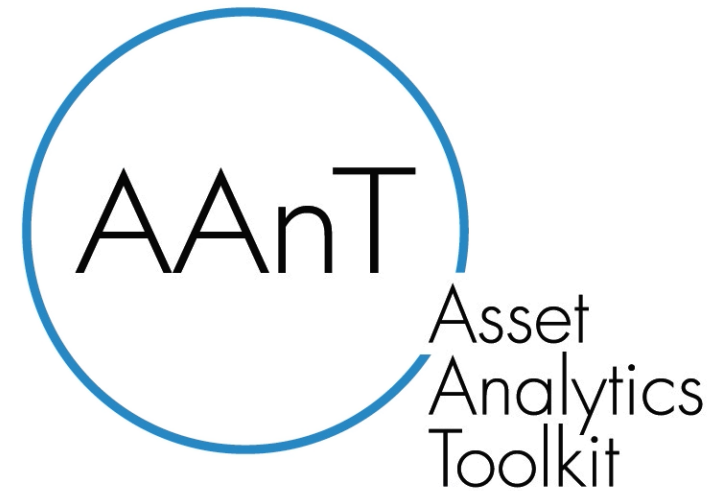




PRODUCT INTRODUCTION

Vibration Expert Systems | Consulting | System Design

Machine Condition Monitoring



What is AAnT?

AAnT (Asset Analytics Toolkit) is a software used to expand the capabilities of conventional diagnostic monitoring (CoDiS).

AAnT is using the data collected by CoDiS (or other monitoring systems) expanding the capabilities of machine analytics, data interpretation and data presentation.

- Configurable dashboards
- Long term history trends (from single point to years of data)
- Raw data analysis
- Histogram analysis
- Regression curve fitting
- Evaluation based on industry standards (ISO 20816-5, ISO 13373-7 and others)
- Data interpretation report repository

Monitoring and analytics

Product + Service



Monitoring

+



Asset analytics

ADD ON
(UPGRADE)



Prediction

(ML, AI...)

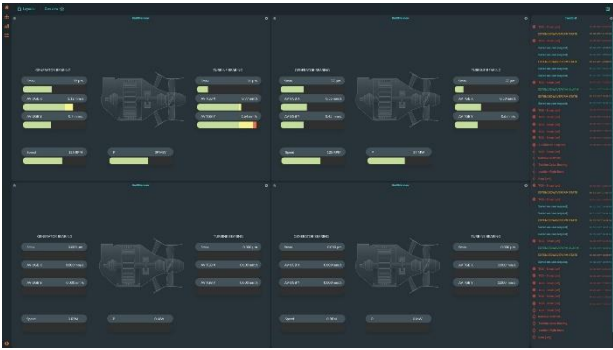
KEY FACTORS:

1. (THE RIGHT) DATA SET
2. SW TOOLS
3. DOMAIN EXPERTISE

From Monitoring to Efficiency improvements

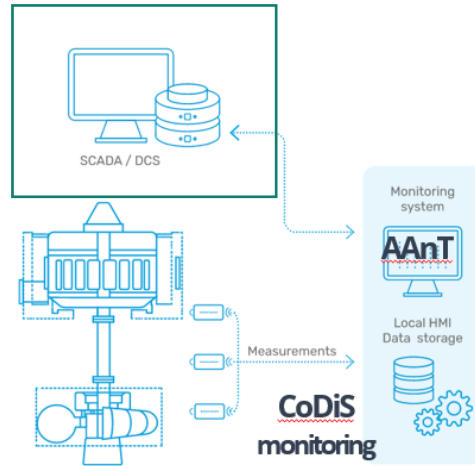


On-line Monitoring



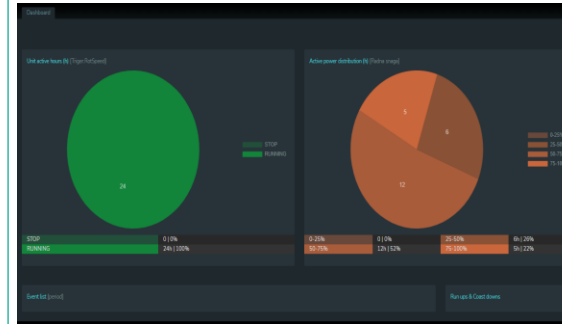
- Sensors
- On-line monitoring
- On-line data
- Monitoring and diagnostics tools

Integration with SCADA / DCS



- Integration of process values
- Data exchange
- Executive functions

Asset analytics and performance



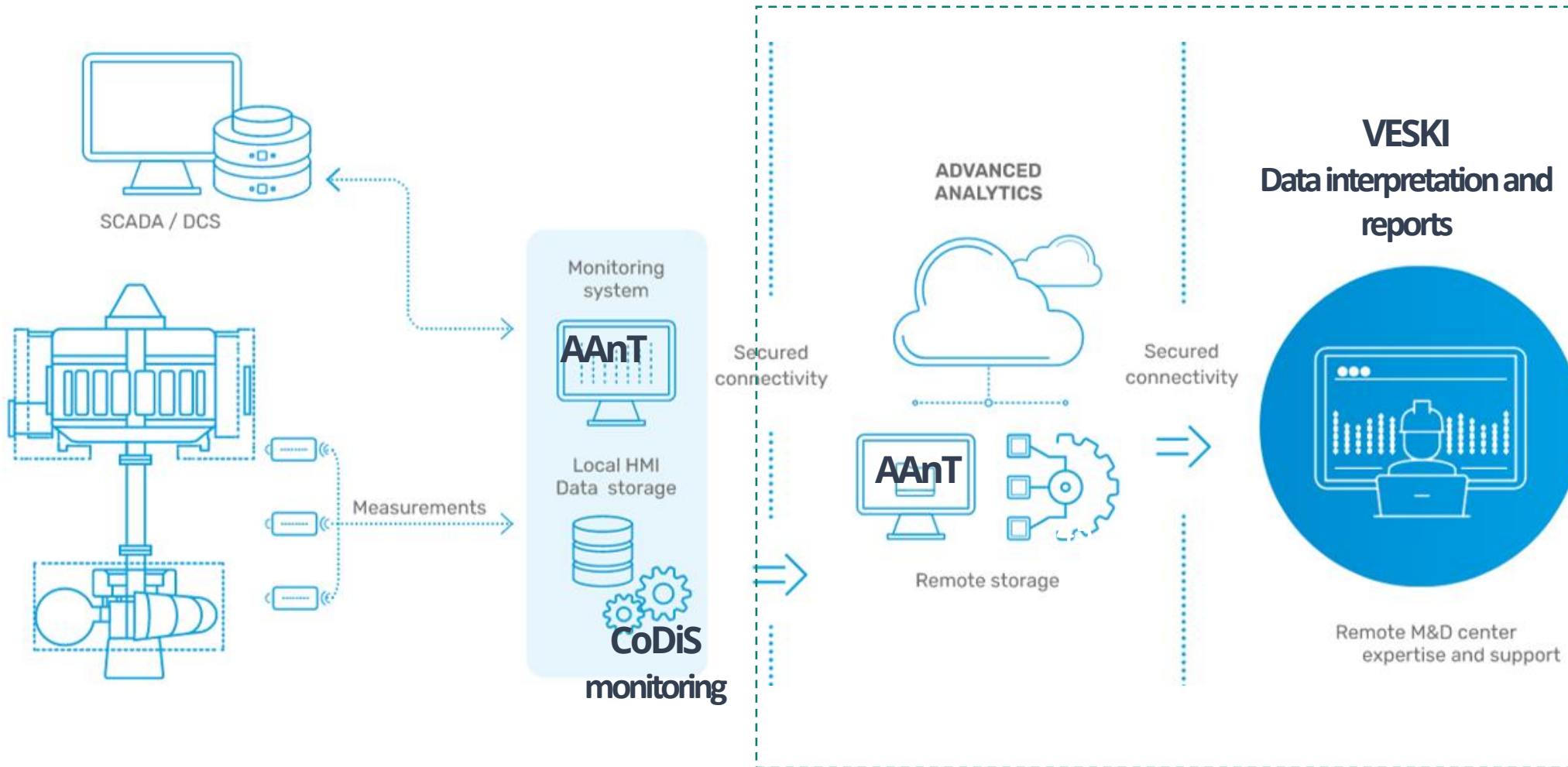
- KPIs on plant level
- Alarm analysis
- Plant Maintenance planning
- Plant Maintenance optimization

Process optimization



- KPIs on Fleet level
- Efficiency improvements
- Production optimisation
- Fleet Maintenance planning
- Fleet Maintenance optimization

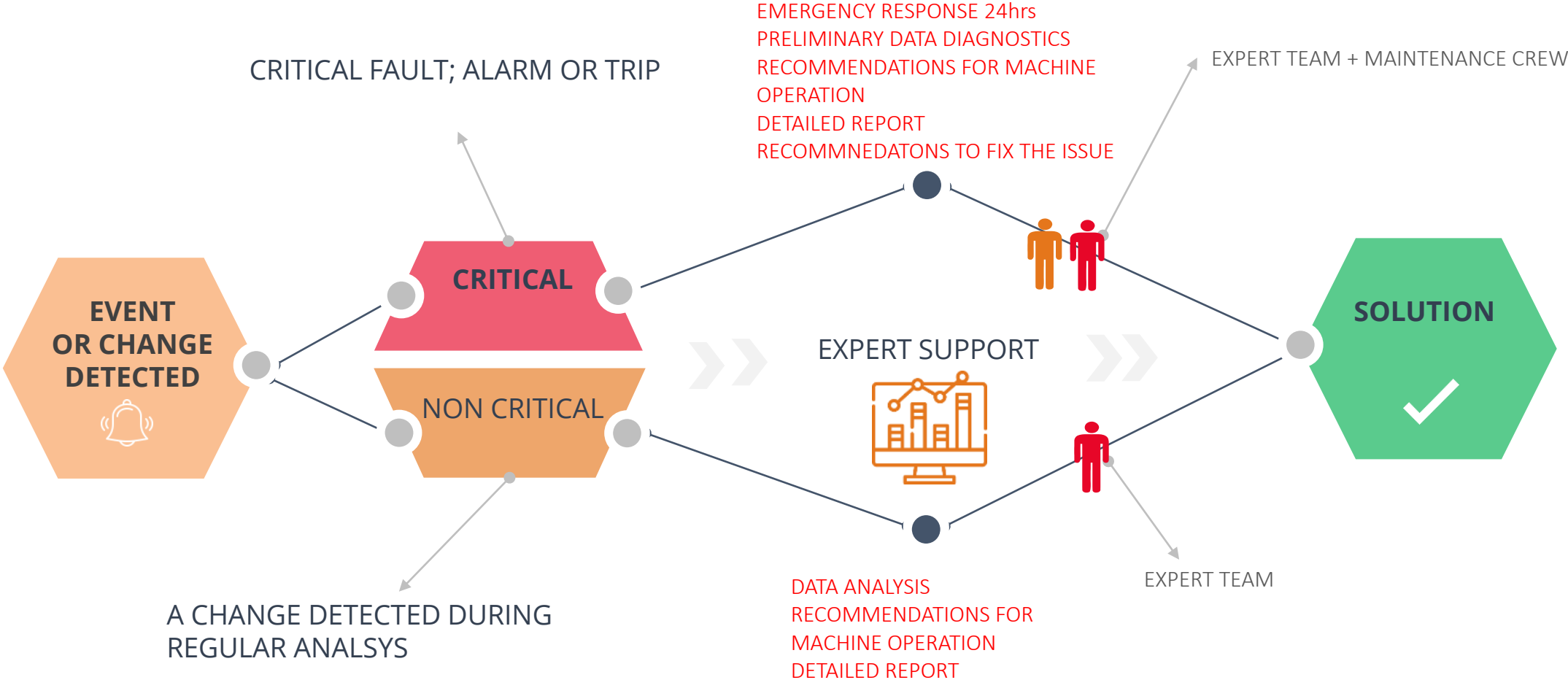
Cloud SaaS - AAnT



New business model / PRODUCT+SERVICE

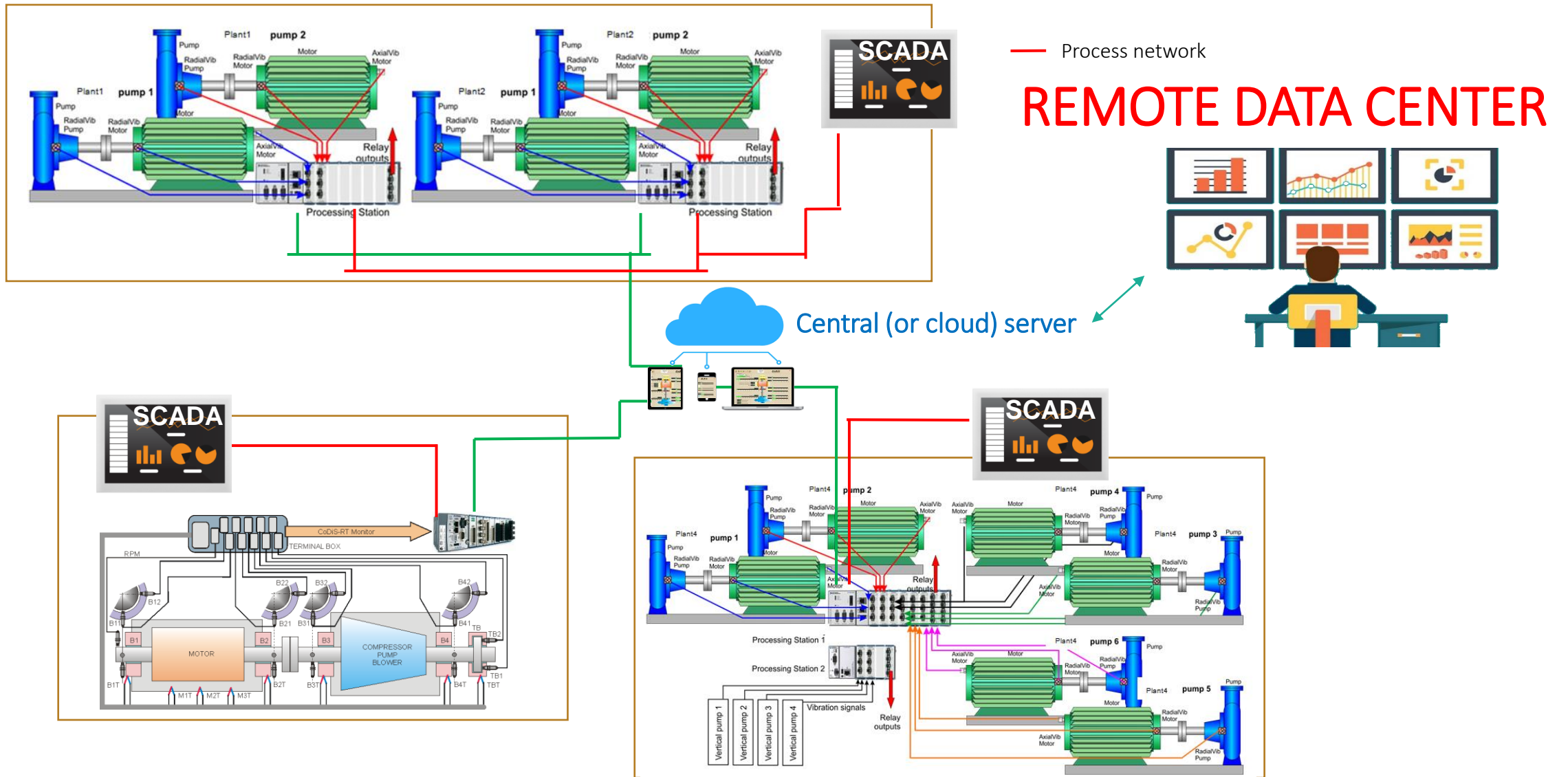
What kind of the Service is it?

ON LINE MONITORING



ASSET ANALYTICS TOOLKIT

On-line monitoring



AAnT On-line DASHBOARDS

AFTER

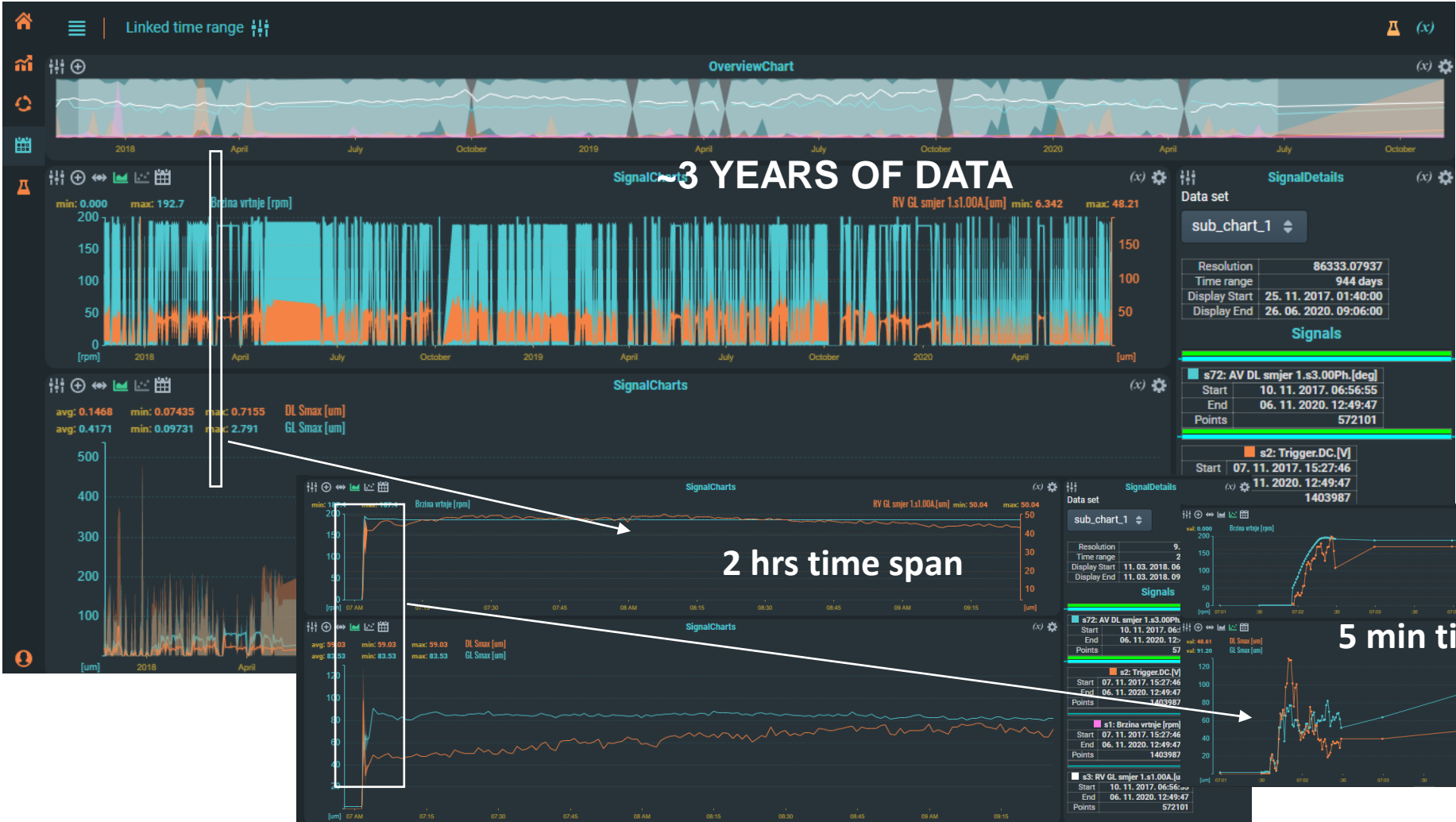
New enhanced web based overview



BEFORE

HISTORY TRENDS

Multi year trend plot



Capability to plot over 10 years data trends with resolution from 1 sec to 1 min.

DATA FILTERING

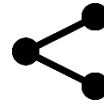


AAnT Online DATA ANALYSIS

Raw data analysis, Orbits, FFT, AIR GAP and FLUX and many more tools available



DATA SHARING



[192.168.0.198:4000/#/dash/d54e9000-c2af-11eb-bcb8-7e9ff63a94a1/{\"tr\":\[1606589088000,1606603944000\]}](http://192.168.0.198:4000/#/dash/d54e9000-c2af-11eb-bcb8-7e9ff63a94a1/{\)

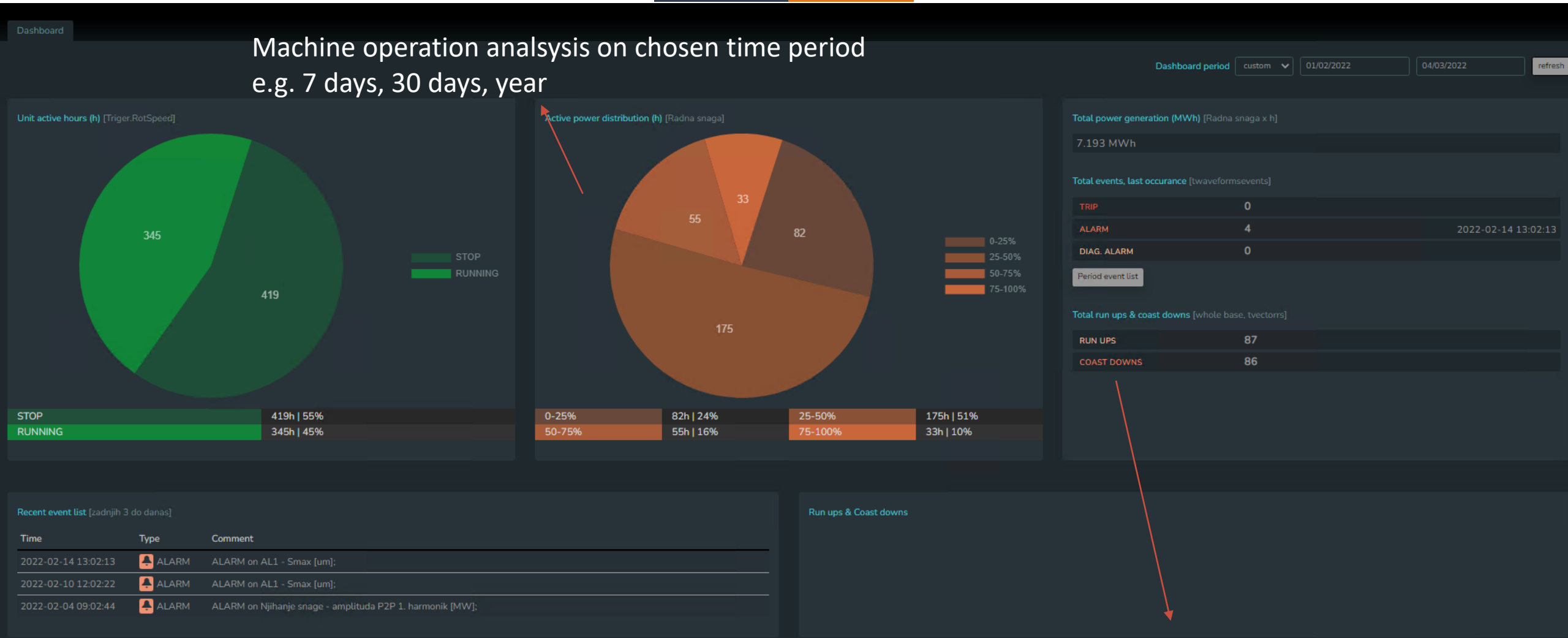
ENGINEER 1
Shares URL



ENGINEER 2
Opens URL

- Sharing the link to actual dashboard and data via email or mobile app
- Bookmarking the link to specific dataset
- Make custom analysis notes and link the dashboards

AAnT Cloud DASHBOARDS

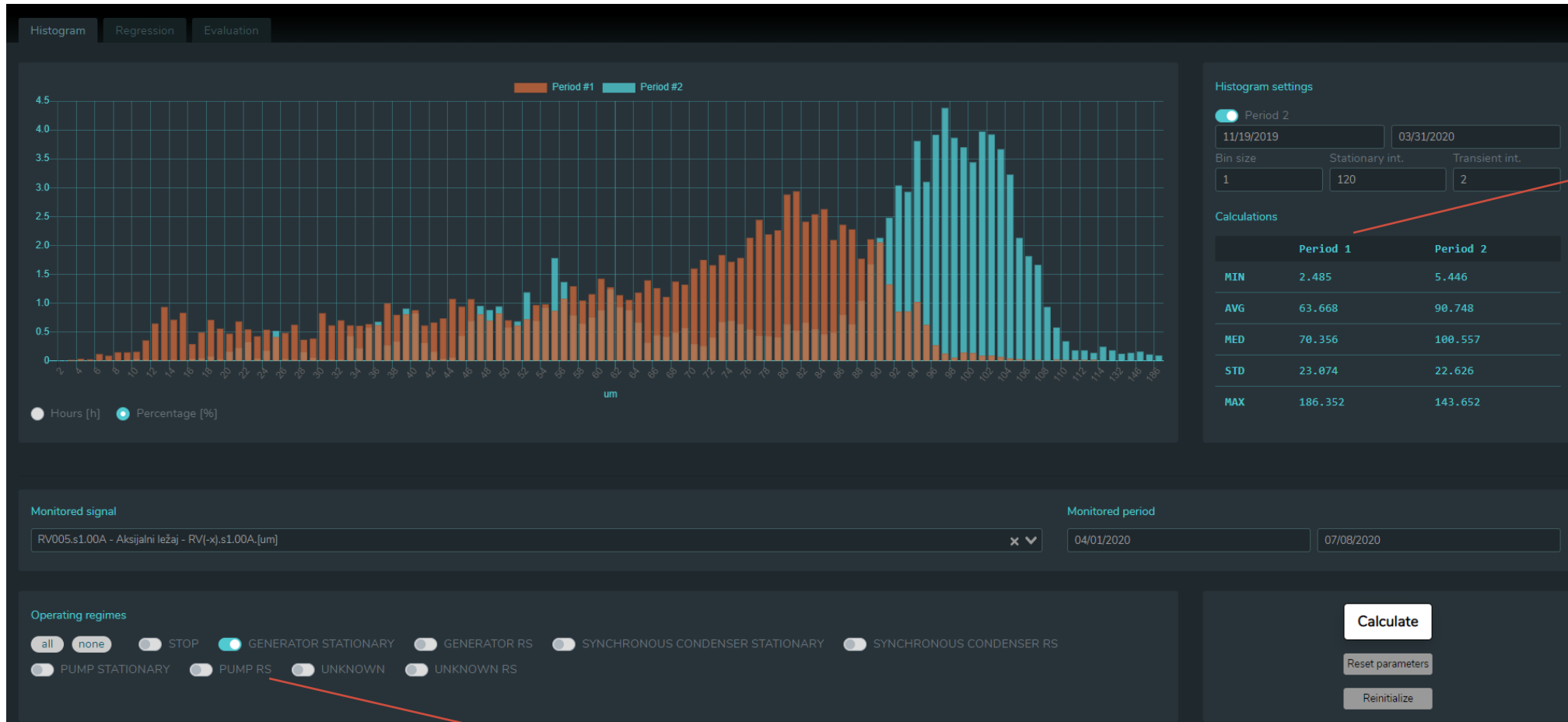


DASHBOARDS ARE CUSTOM TAILORED TO EVERY ASSET!

Alarm and transient count

HISTOGRAM ANALYSIS

Compare the histogram data over two different time periods in same operating conditions



Statistical data:
Min
Max
Median
Average

Operating condition filtering

REGRESSION CURVE ANALYSIS

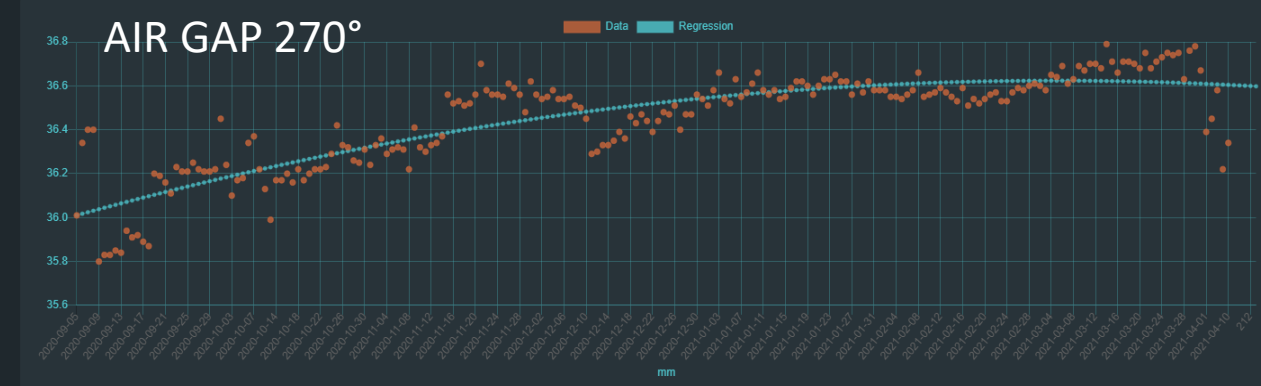
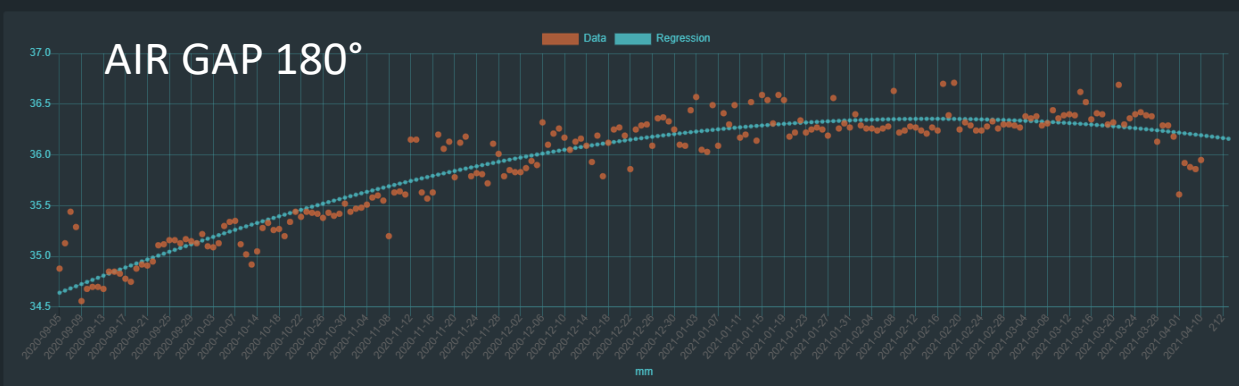
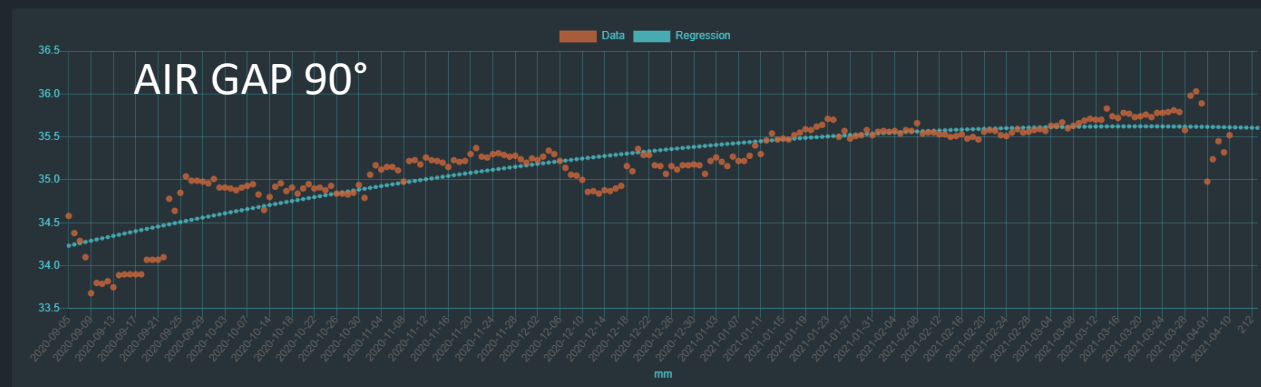
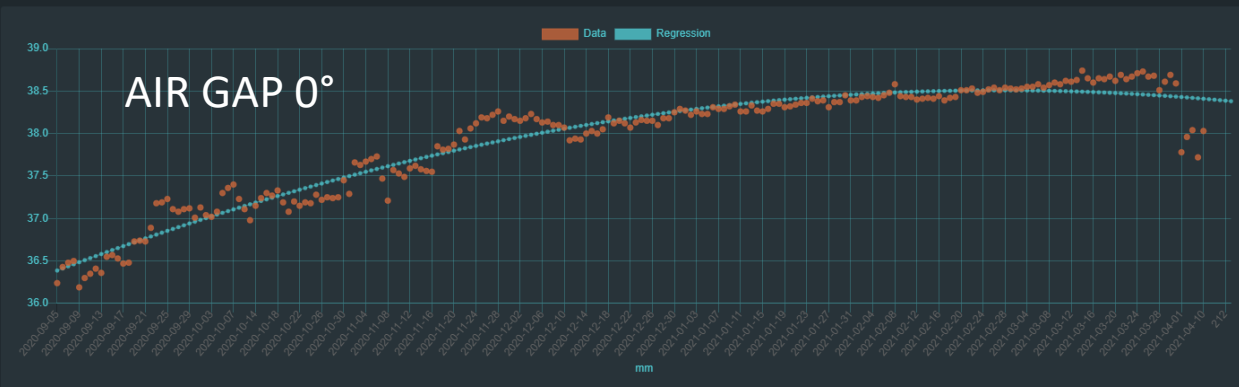
Estimate the possible outcome using regression curve fitting



Operating condition filtering

Additional filter criteria
(e.g. certain power span, temperature etc.)

Example



AG000.DCExtremaMin - AG Up 0°.DCExtremaMin.[mm] ✕

Sub criteria signal

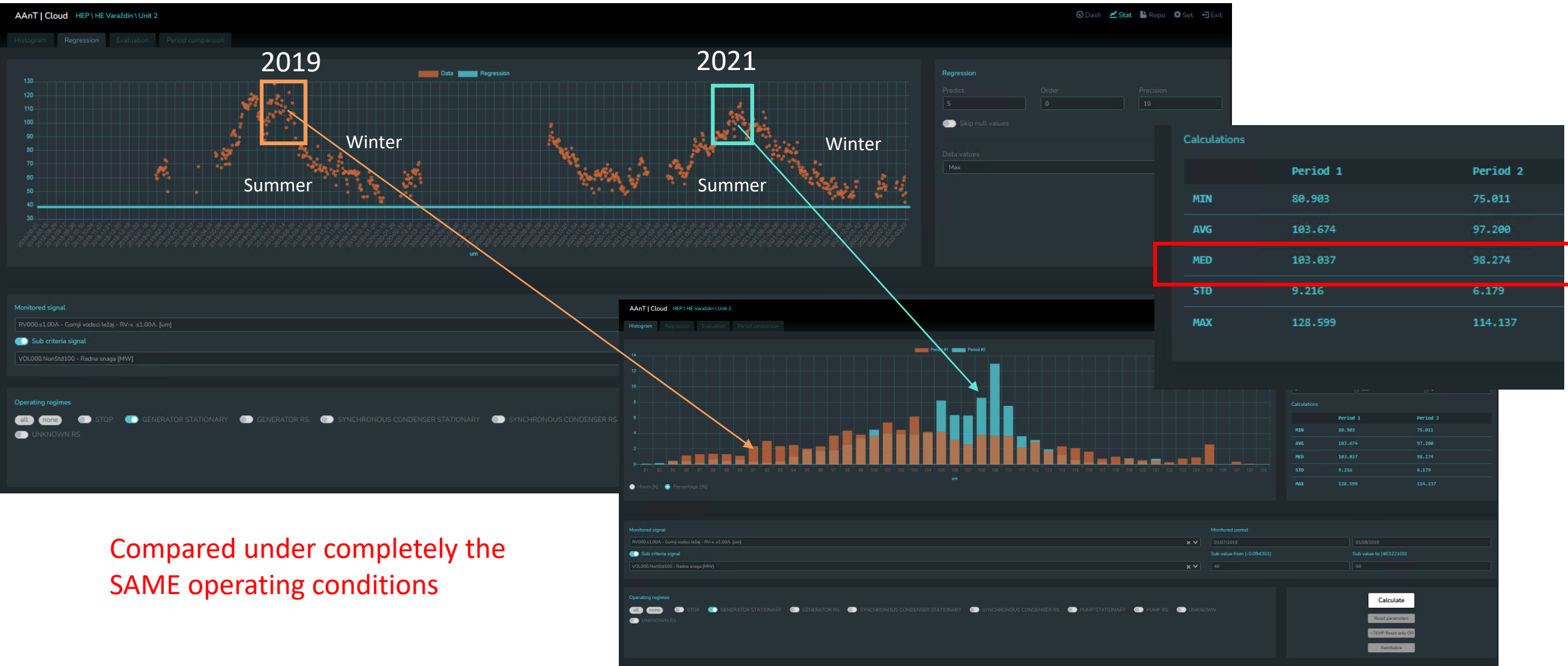
PROC000.DC - Radna Snaga [MW] **Active Power filter on!** ✕

Sub value from (-0.089211) Sub value to (110.741)

Operating regimes: all none STOP GENERATOR STATIONARY GENERATOR RS

Compared under completely the SAME operating conditions

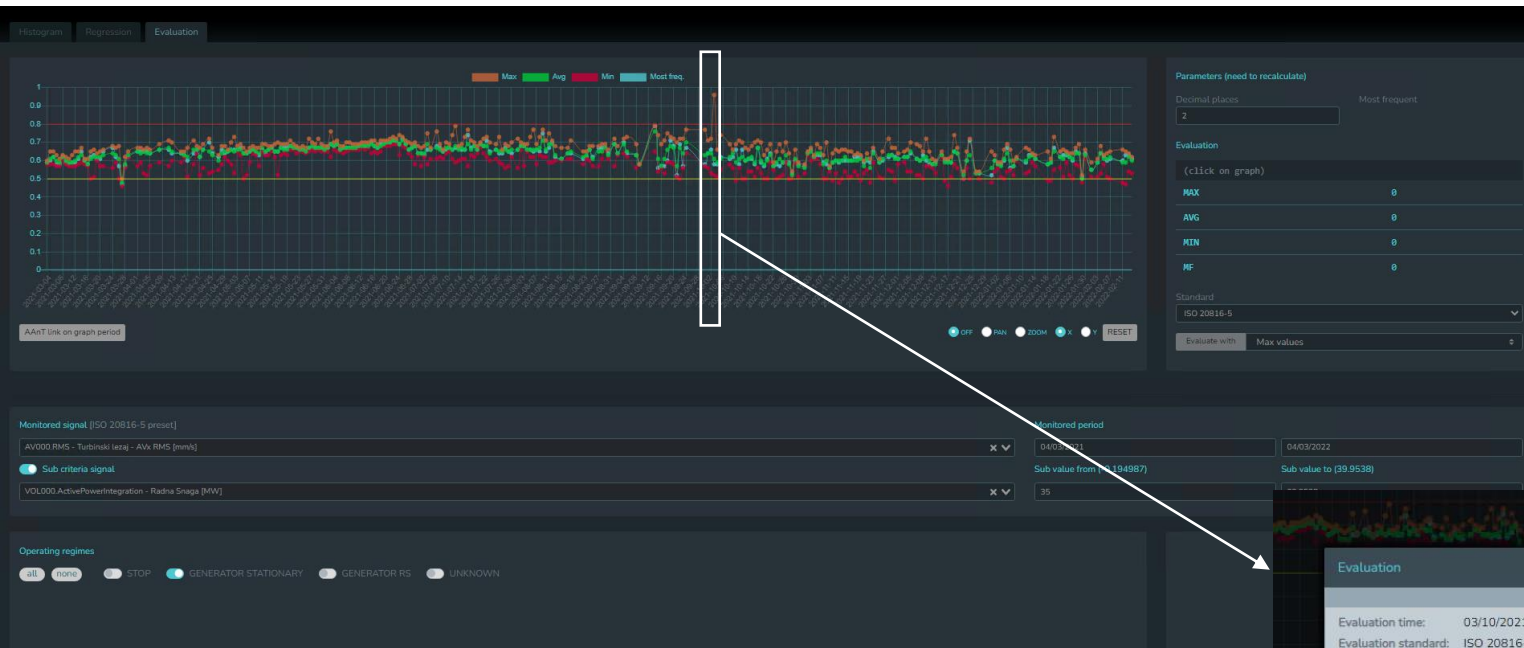
Example



Compared under completely the SAME operating conditions

EVALUATION vs STANDARDS

Check the history points and compare to industry standards.
The software filters the signals accordingly to pre arranged overviews:
ISO 20186-5 (or other applicable)
ISO 13373-7
Any other applicable or internal standard!



Sensor (unit)	Location	Value	Criteria Alarm	Criteria Trip	Evaluation per table	Evaluation per flow chart
RV001 (um)		32.76	220	340	✓ OK	/
RV002 (um)		26.43	220	340	✓ OK	/
RV003 (um)		106.17	220	340	✓ OK	/
RV004 (um)		96.55	220	340	✓ OK	/
RV005 (um)		108.35	220	340	✓ OK	/
RV006 (um)		89.78	220	340	✓ OK	/
RV007 (um)		73.40	220	340	✓ OK	/
RV008 (um)		63.12	220	340	✓ OK	/
AV000 (mm/s)		0.96	0.5	0.8	✗ Trip	/
AV001 (mm/s)		0.97	0.5	0.8	✗ Trip	/

Export to PDF

Close

REPORT REPOSITORY

Stat Repo Exit

Keep records of all machine diagnostic and work reports in one place. Conclusions highlighted

Repository

Available documents

31.03.2022

Periodička provjera stanja sustava

Provjera podataka snimljenih u vektor stanja (bazu podataka) sustava u razdoblju 01.04.2021.-01.03.2022. godine. Ocjena stanja agregata B prema analizi najvažnijih veličina koje sustav nadzire.

Tehnički izvještaj TR122_R00_22032022



Document details

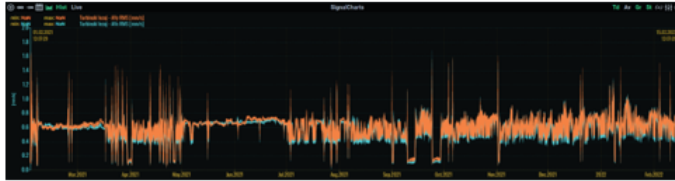
Zaključak:

Prema standardu ISO 20816-5:2018, po kriteriju relativnih pomaka vrabita, ležajevi GL i TL agregata B rade u zoni A-B.

Prema standardu ISO 20816-5:2018, po kriteriju apsolutnih vibracija kućišta ležajeva, ležaj TL agregata B radi u zoni A-B.

Agregat B na HE Dubrava može raditi dalje bez ikakvih ograničenja.

REPORT to data HYPERLINKS



sl. 5 RMS vrijednosti apsolutnih vibracija kućišta turbinskog ležaja u vremenskom intervalu 01.02.2021. - 15.02.2022. Plavom bojom prikazan X smjer na TL, narančastom Y smjer na TL

Kao i kod relativnih pomaka vratila, za ocjenu vibrodinamičkog stanja agregata odabran je zadnja vrtinja agregata prije ovogodišnjeg remonta, od 14.02.2022. oko 15 h do 15.02.2022. oko 8 h. Na sl. 6 očitane su vrijednosti od trenutka kad je agregat bio progrijan i radio na snazi od ~19 MW, 15.02.2022. oko 6:00 h.



sl. 6 RMS vrijednosti apsolutnih vibracija kućišta turbinskog ležaja u zadnjoj vrtinji agregata prije remonta. Plavom bojom prikazan X smjer na TL, narančastom Y smjer na TL

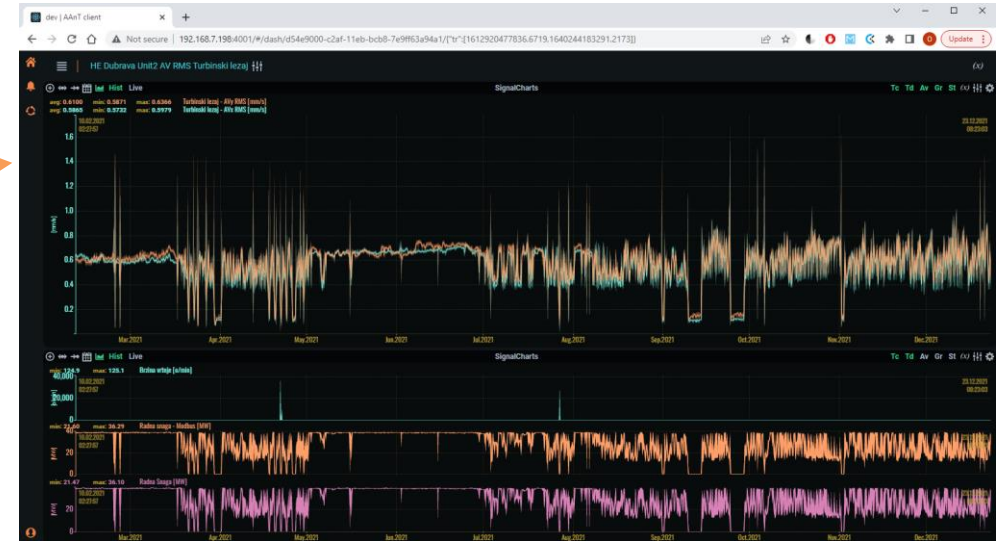
Najviše očitane vrijednosti su:

- TL X smjer = 0.60 mm/s
- TL Y smjer = 0.66 mm/s

Iz očitanih vrijednosti vidi se da po kriteriju apsolutnih vibracija kućišta ležajeva agregat B na HE Dubrava radi u zoni A-B.

2.3 Aksijalni pomak vratila

Na sl. 7 prikazan je signal davača aksijalnog pomaka vratila u cjelokupno promatranom vremenskom intervalu, od 01.02.2021. do 15.02.2022. godine.



Hyperlinking the report graphs to actual data helps in backtracking

Example



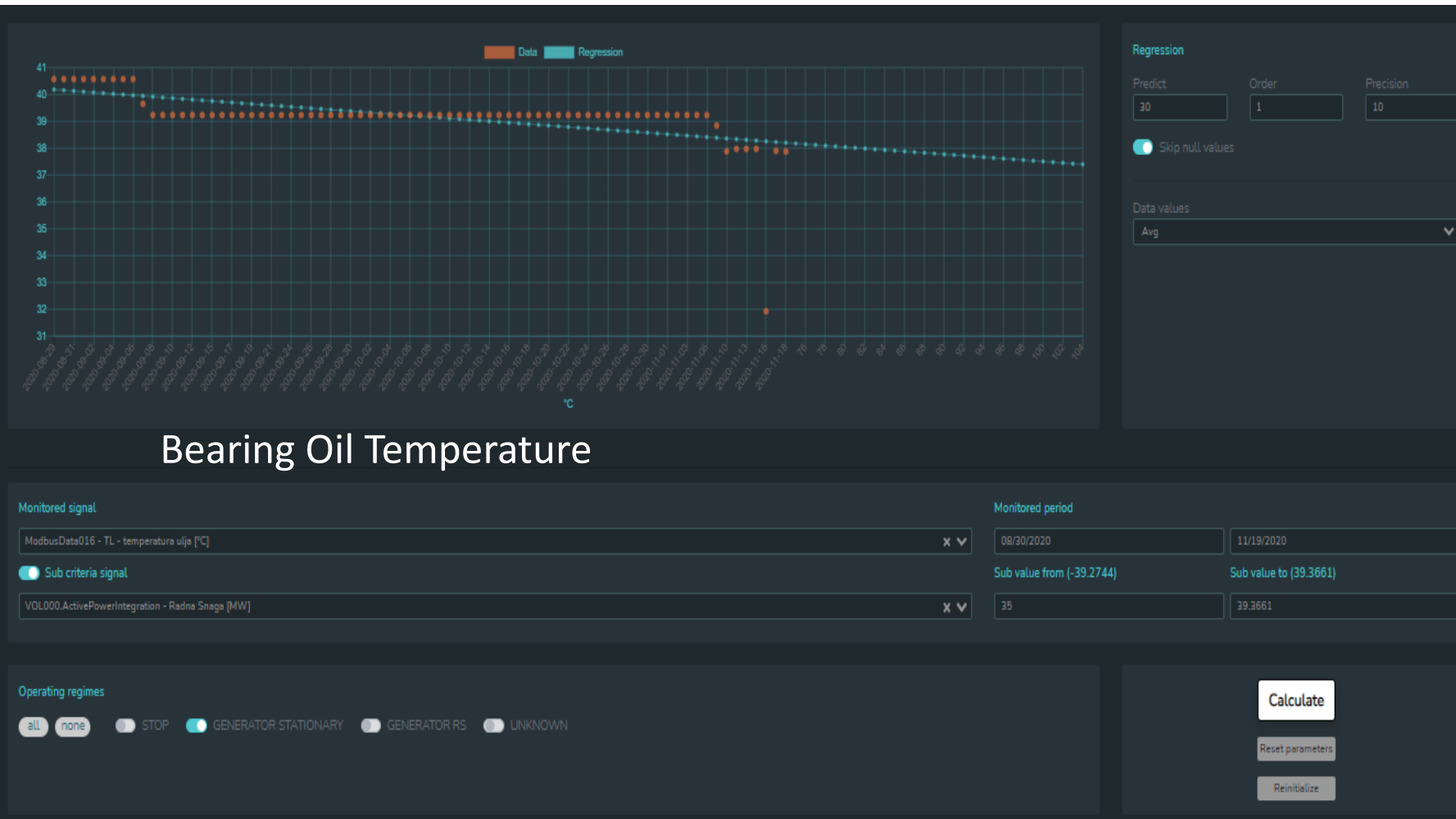
Shaft displacement Y –S1A Peak

FILTERS:
35-39MW
Steady state

**The value increased >35!
From 30um-45um Peak**

SHOULD WE BE WORRIED?

Example



FILTERS:
35-39MW
Steady state

**The value decreased >10%!
From 41°C to 38°C**

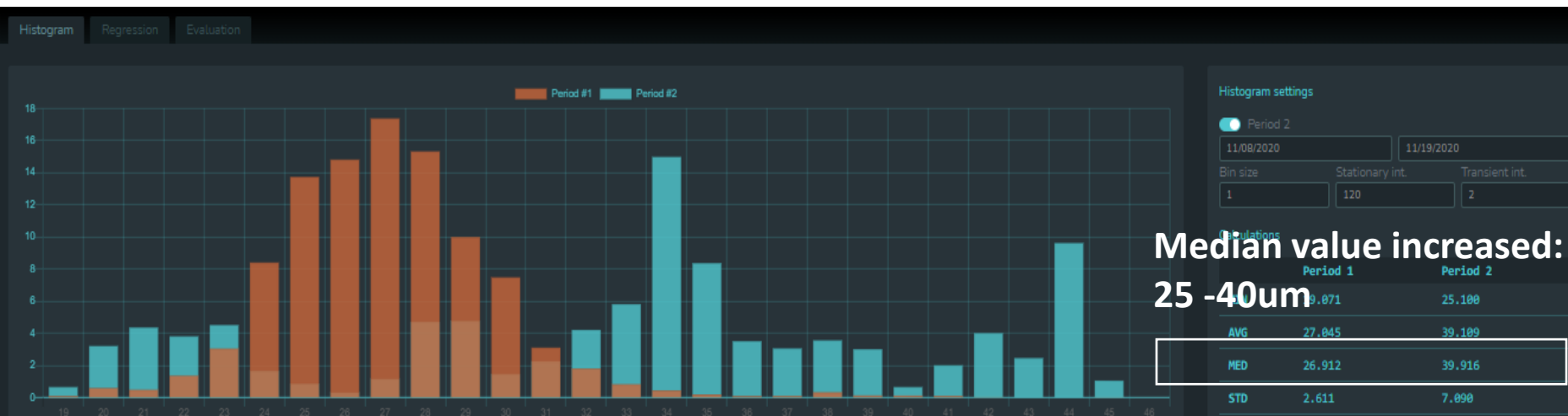
CORRELATION?

Example

FILTERS:
35-39MW
Steady state

NOT CRITICAL – FLAGED

TRACK THE PROGRESSION WITH TIME!



	Period 1	Period 2
AVG	27.845	39.109
MED	26.912	39.916
STD	2.611	7.090

Shaft displacement Y –S1A Peak

Monitored signal

RV002.EqPeak - Turbinski ležaj - RVy.EqPeak[um]

Sub criteria signal

VOL000.ActivePowerIntegration - Radna Snaga [MW]

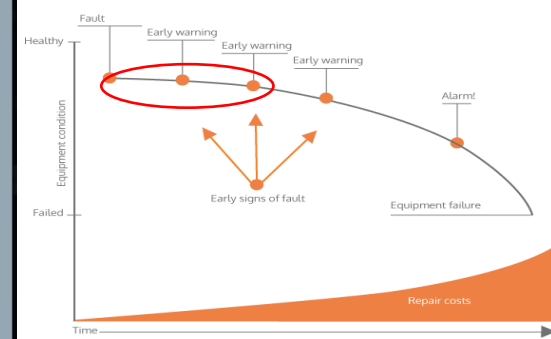
Operating regimes

all none STOP GENERATOR STATIONARY GENERATOR RS UNKNOWN

Evaluation time: 2020-05-11 Evaluation by: MAX values
 Evaluation standard: ISO 20816-5 Operating regimes: .GENERATOR STATIONARY.

Sensor (unit)	Location	Value	Criteria Alarm	Criteria Trip	Evaluation per table	Evaluation per flow chart
RV002 (um)		59.98	220	340	OK	/
RV003 (um)		190.84	220	340	OK	/
RV004 (um)		174.18	220	340	OK	/
RV005 (um)		195.78	220	340	OK	/
RV006 (um)		164.26	220	340	OK	/
RV007 (um)		134.38	220	340	OK	/
RV008 (um)		123.36	220	340	OK	/
AV000 (mm/s)		0.71	0.5	0.8	Alarm	/
AV001 (mm/s)		0.62	0.5	0.8	Alarm	/

ISO 20816-5



Why AAnT

AAnT is data analytics software designed by engineers for engineers, helping them turn the data into fact-based maintenance decisions.





THANK YOU FOR YOUR ATTENTION

www.veski.hr