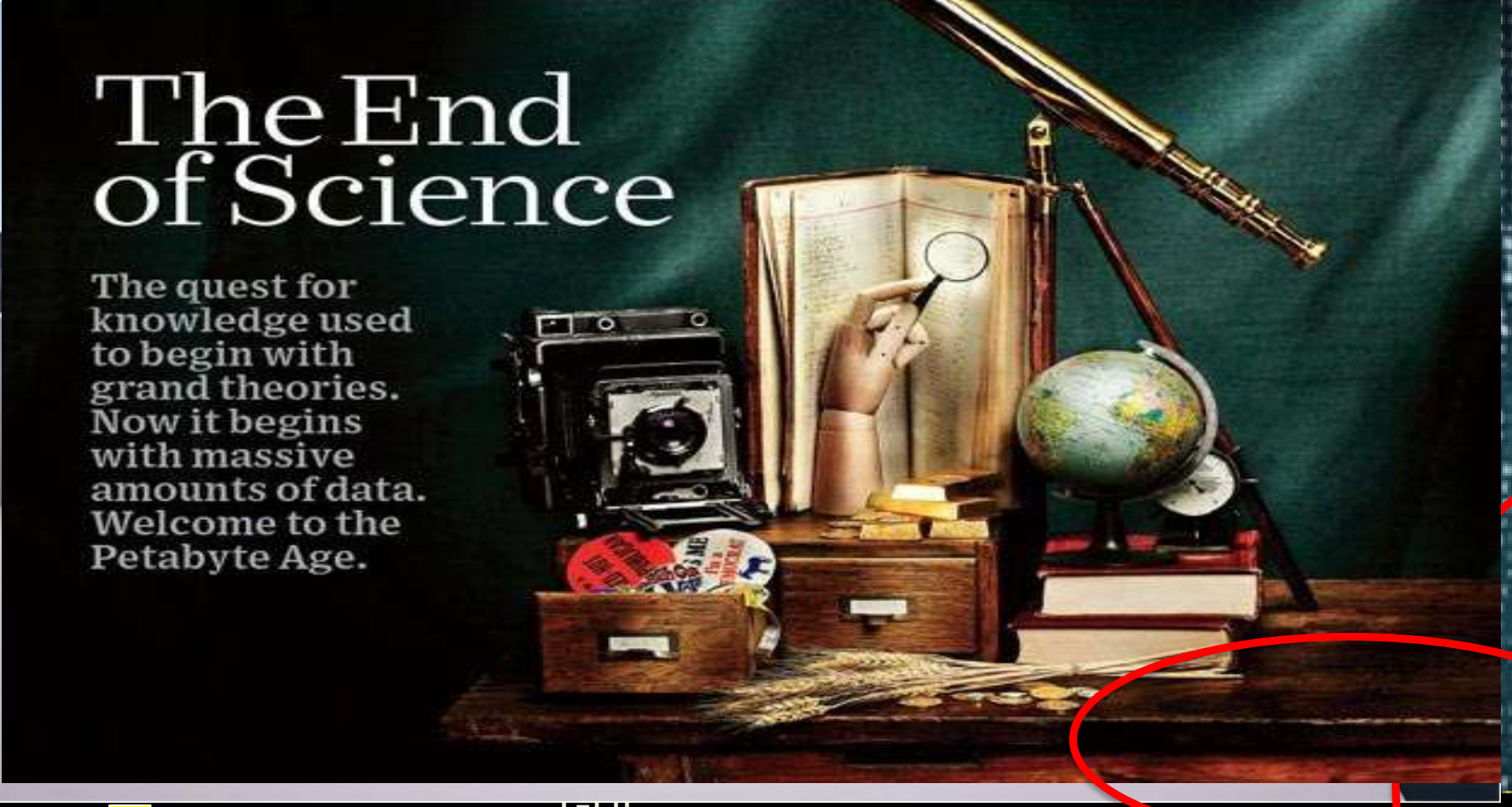
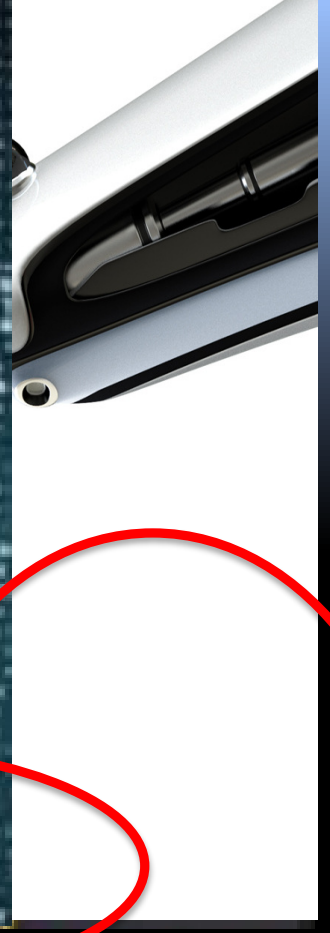
21st InfoCom World 2019

Exploiting the Potential Of Digitalization in Shipping

Dimitris Theodosiou

danaos®





True

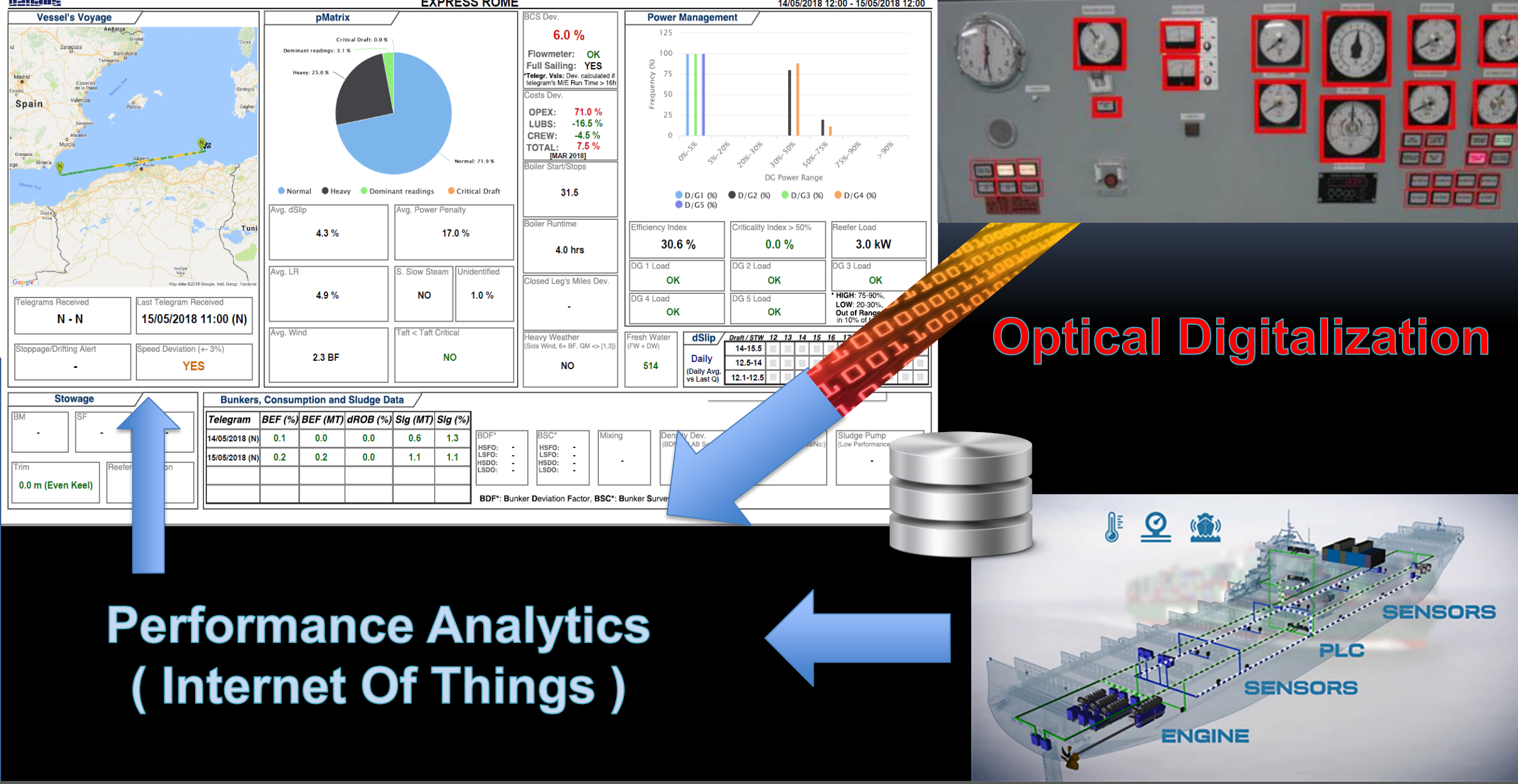
- GUI
- Internet ((Cloud)
- IOT
- Autonomous Vessels
- Cyber security
- Artificial Intelligence
- Block Chain

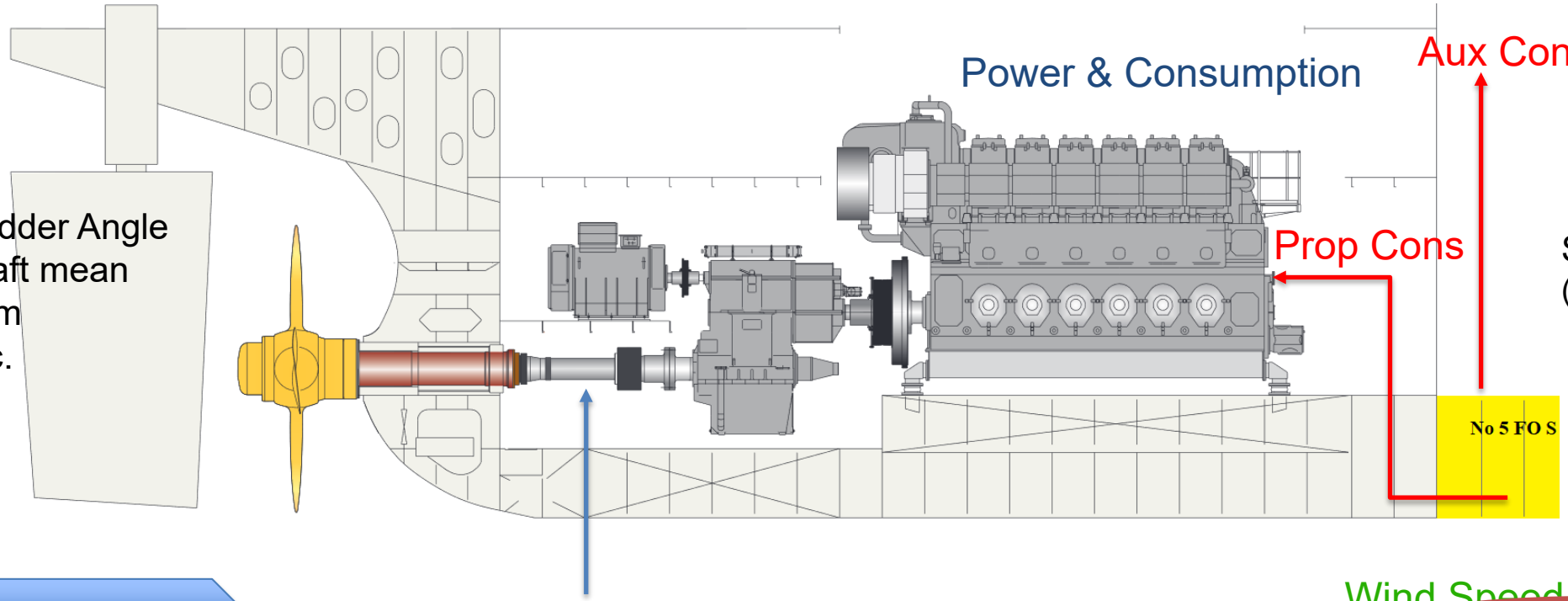
80's 90's 2000 2010 2020

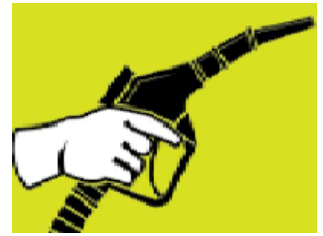
Hype

- E commerce
- Big Data

IT in shipping Roadmap


EXPRESS ROME
14/05/2018 12:00 - 15/05/2018 12:00
Vessel's Voyage
pMatrix
Critical Draft: 0.0 %
Dominant readings: 3.1 %
Heavy: 25.0 %
Normal: 71.9 %
Normal
Heavy
Dominant readings
Critical Draft
BCS Dev.
6.0 %
Flowmeter: OK
Full Sailing: YES
*Telegr. Vsls: Dev. calculated if telegram's M/E Run Time > 16h
Costs Dev.
OPEX: 71.0 %
LUBS: -16.5 %
CREW: -4.5 %
TOTAL: 7.5 %
[MAR 2018]
Power Management
Frequency (%)
DG Power Range
0%-5%
5%-20%
20%-30%
30%-50%
50%-75%
75%-90%
>90%
D/G1 (%)
D/G2 (%)
D/G3 (%)
D/G4 (%)
D/G5 (%)
Telegrams Received
N - N
Last Telegram Received
15/05/2018 11:00 (N)
Stoppage/Drifting Alert
-
Speed Deviation (+- 3%)
YES
Avg. dSlip
4.3 %
Avg. Power Penalty
17.0 %
Avg. LR
4.9 %
S. Slow Steam
NO
Unidentified
1.0 %
Avg. Wind
2.3 BF
Taft < Taft Critical
NO
Boiler Start/Stops
31.5
Boiler Runtime
4.0 hrs
Closed Leg's Miles Dev.
-
Heavy Weather
(Side Wind, 6+ BF, GM <> [1,3])
NO
Fresh Water
(FW + DW)
514
Efficiency Index
30.6 %
Criticality Index > 50%
0.0 %
Reefer Load
3.0 kW
DG 1 Load
OK
DG 2 Load
OK
DG 3 Load
OK
DG 4 Load
OK
DG 5 Load
OK
* HIGH: 75-90%,
LOW: 20-30%,
dSlip
Daily
(Daily Avg. vs Last Q)
Draft / STW
14-15.5
12.5-14
12.1-12.5
Stowage
BM
SF
Trim
0.0 m (Even Keel)
Bunkers, Consumption and Sludge Data
Telegram
BEF (%)
BEF (MT)
dROB (%)
Slg (MT)
Slg (%)
14/05/2018 (N)
0.1
0.0
0.0
0.6
1.3
15/05/2018 (N)
0.2
0.2
0.0
1.1
1.1
BDF*
HSFO: -
LSFO: -
HSDO: -
LSDO: -
BSC*
HSFO: -
LSFO: -
HSDO: -
LSDO: -
Mixing
-
Sludge Pump
(Low Performance
-
BDF*: Bunker Deviation Factor, BSC*: Bunker Surve
Optical Digitalization
Performance Analytics
(Internet Of Things)
SENSORS
PLC
SENSORS
ENGINE
Vessel digitalization / Performance Monitoring





Supplied Fuel Qty
(Viscosity, Calorific Value etc)

Fuel ROB by type

Rudder Angle
Draft mean
Trim
Etc.

RPM, Torque or Thrust

Speed Through Water
Speed over Ground
Lateral Speed
Compass bearing etc

Wind Speed & Direction
Sea & Swell State & Direction
Currents Etc.

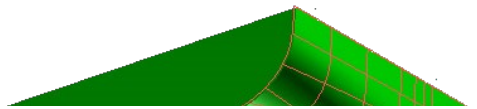
Vessel movements i.e.
Heeling, Pitching etc.

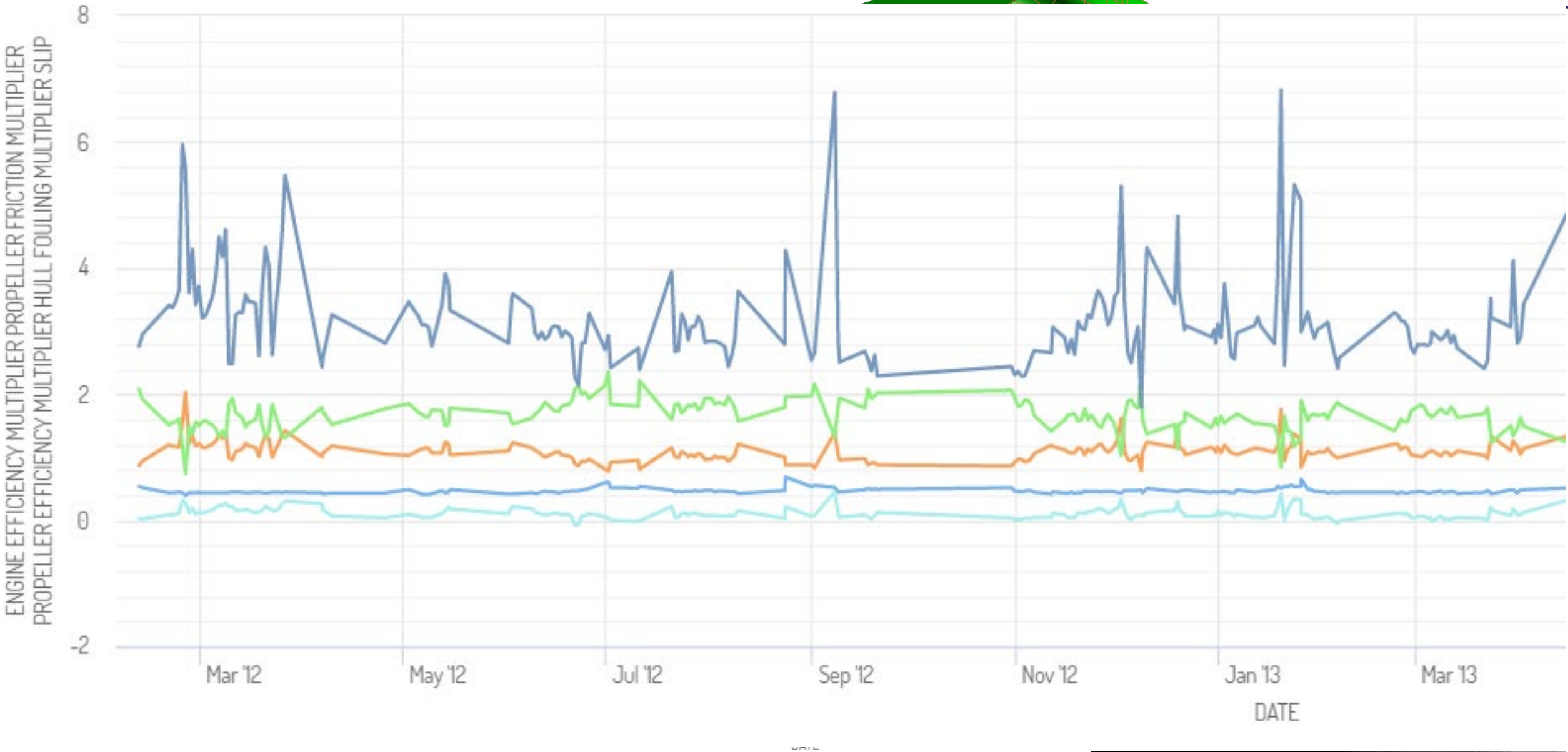
Various like
Temperatures, Pressures,
Generator powers, Boilers Starts
Stops, Sludge production etc

The majority of the above is averaged out and reported on the Noon Reports

Vessel digitalization : Readings & accuracy

Comparison with Theoretical Values



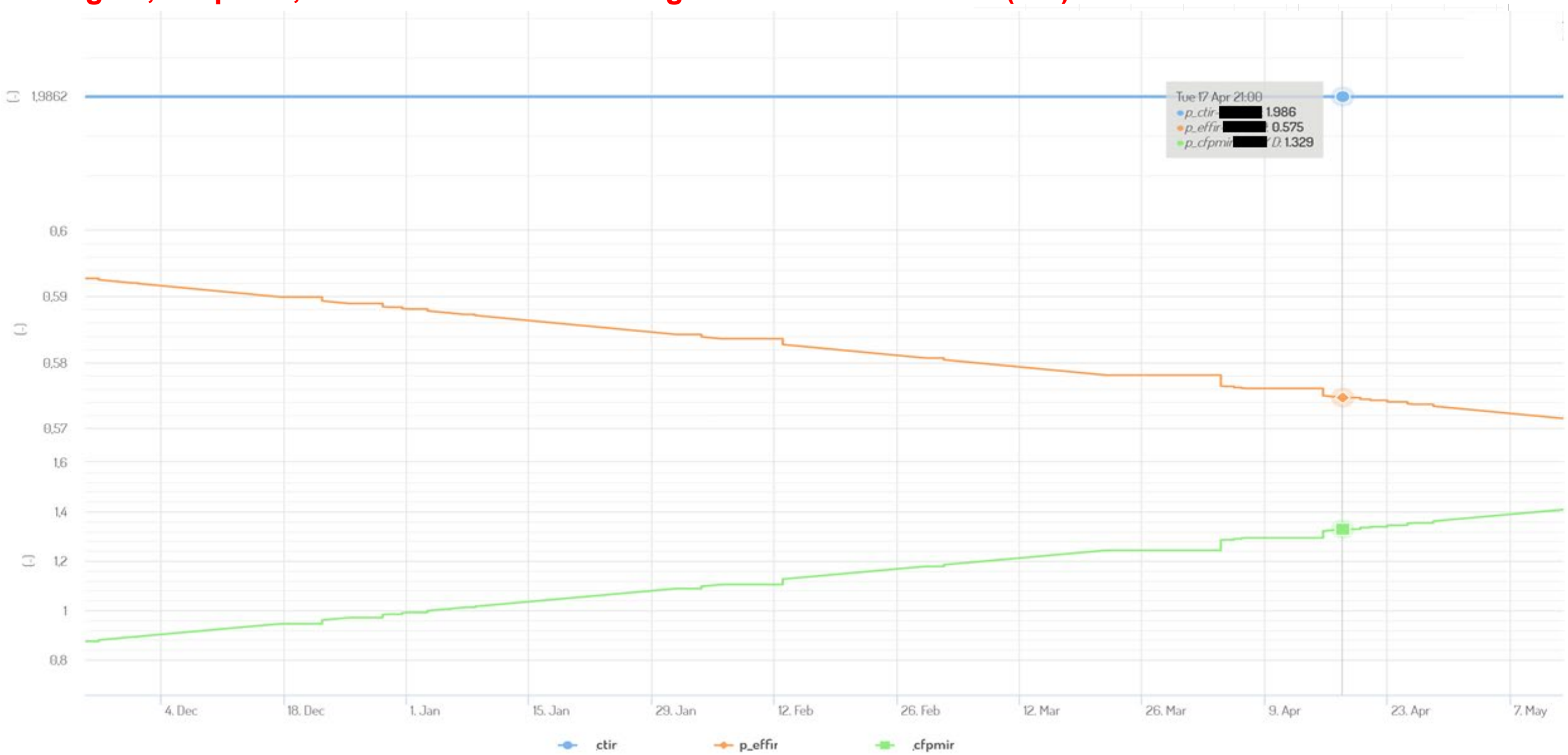


Performance Data Analytics

Comparison with Neural Predictions (AI)

Performance Data Analytics

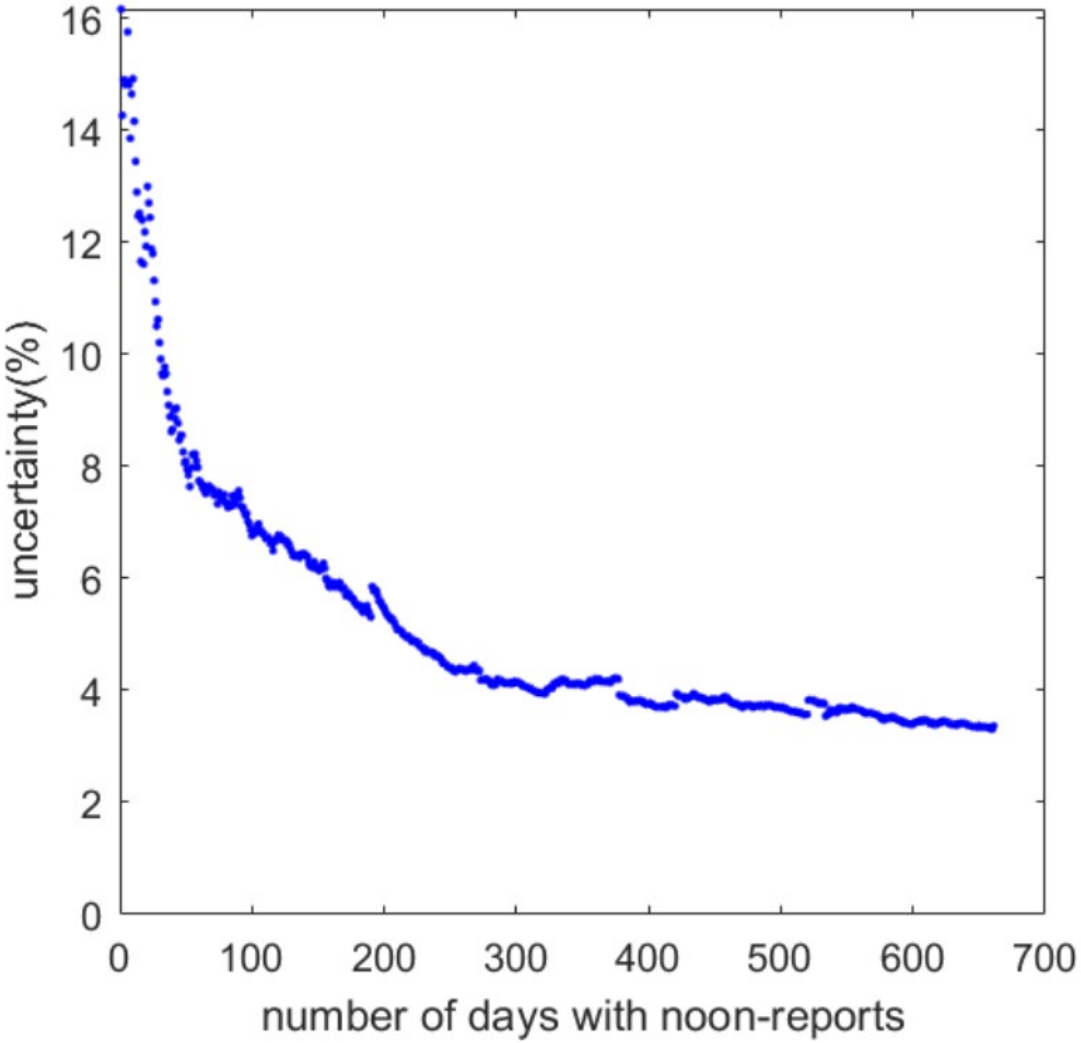
Engine, Propeller, Hull Resistance modelling & Neural Predictions (AI)



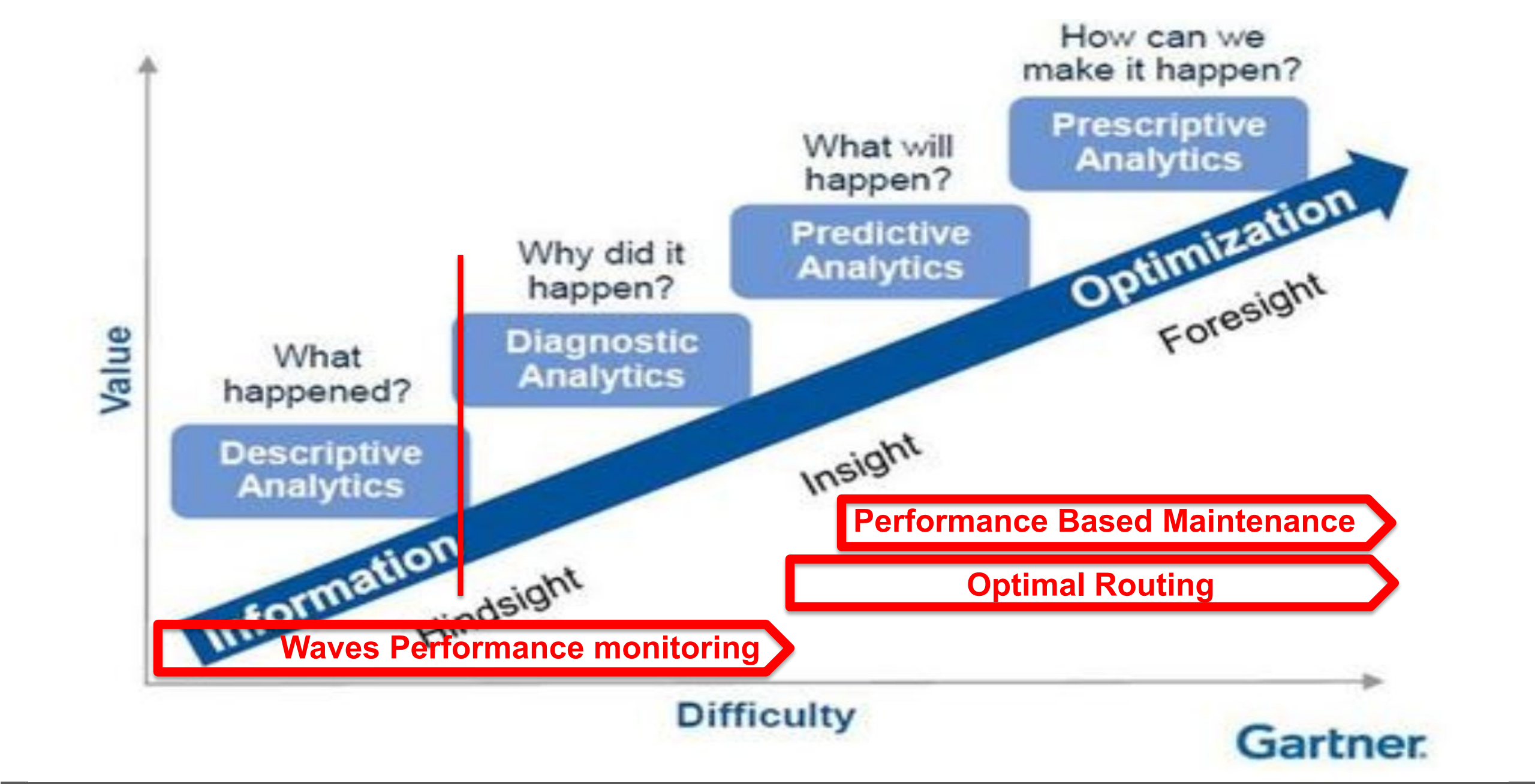
Performance Data Analytics

YES! By Increasing Prediction Accuracy

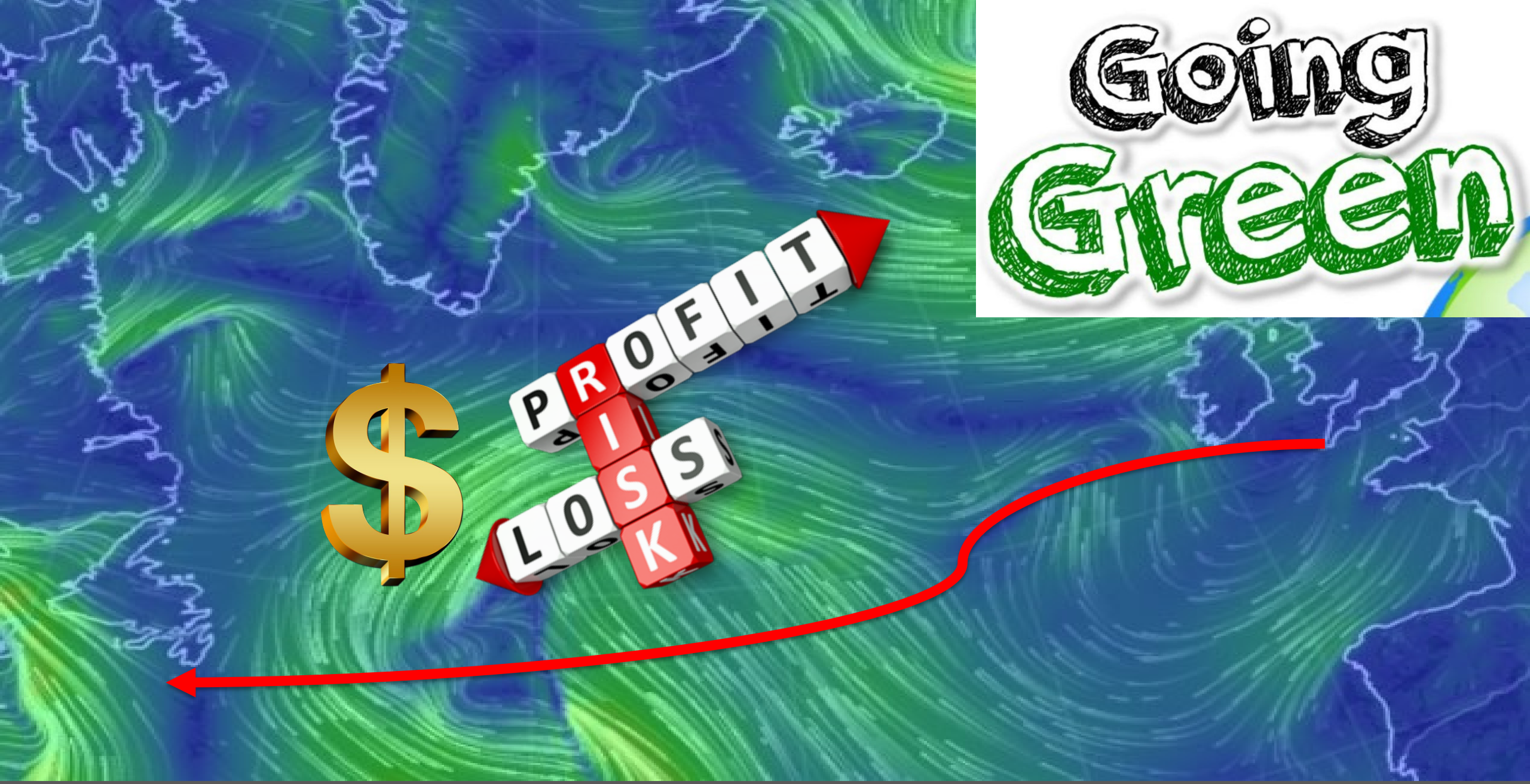
How much?



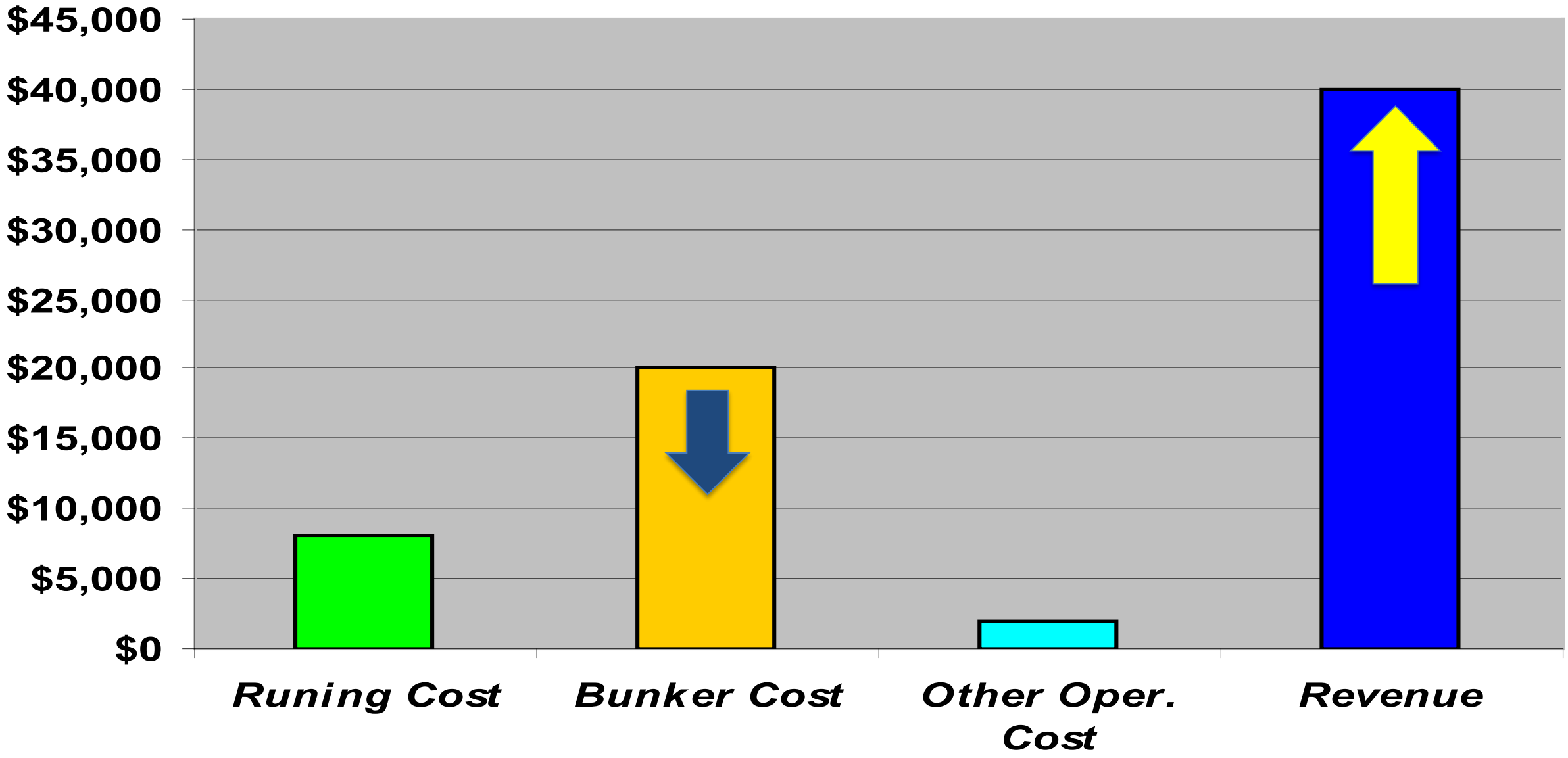
Can Sensor Data make Shipping more ECO?



The challenge "operational efficiency optimization"

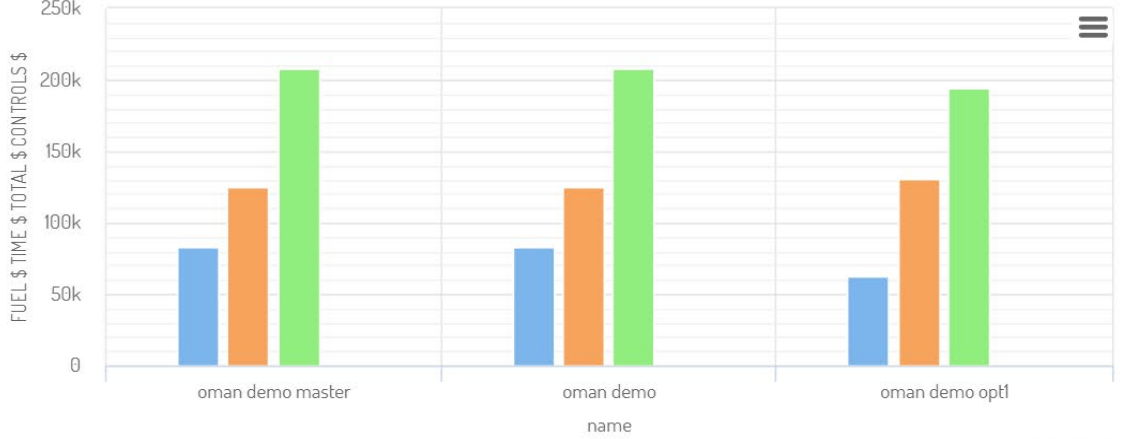


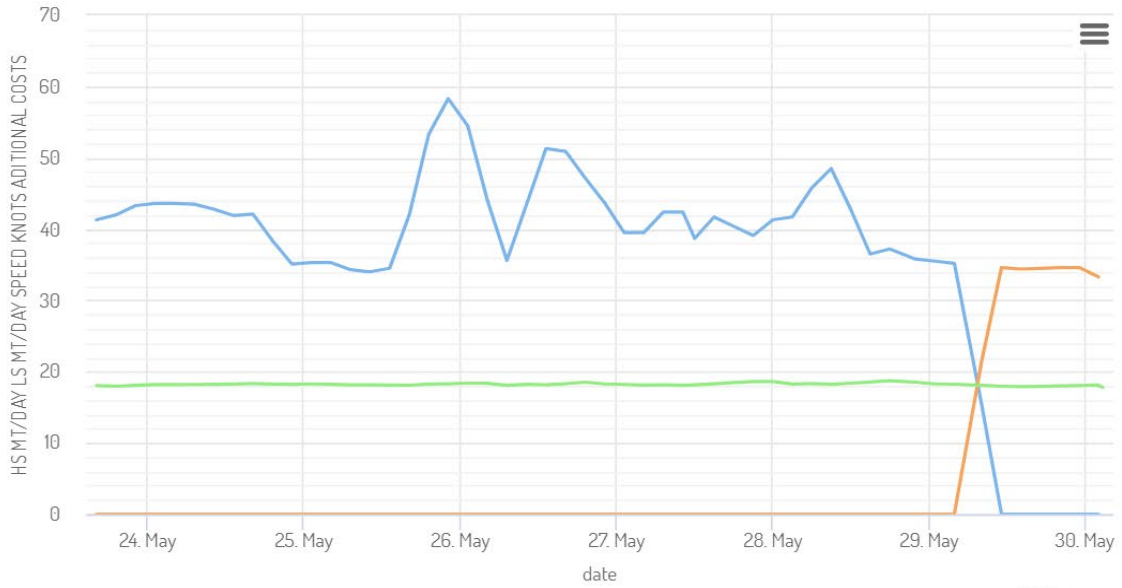
Optimal routing systems



The most effective control to improve profitability

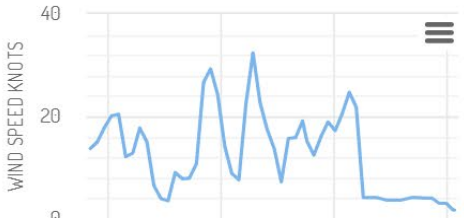
GMT (: - :)		From : 4.435 51.902 -74.007 40.698	From : 4.406 51.763 -74.007 40.698
	Actual	Passage Plan	Route advice
ETA		30 Wed May 18 00:52	30 Wed May 18 05:37
Destination		-74.007 40.698	-74.007 40.698
miles to go		2703	2841
hours to go		149	158
Speed SOG Kn		18.05	
consumption mt/day			
type of fuel			
Weather Wind BF / dir			
Sea BF / dir			
Swell BF / dir			
Current Kn / dir			
Engine RPM			
BHP			
Propeller Light/Heavy			
High sulfur FO mt		150	237
Low sulfur FO mt		105	30
RISK			
Control Cost $		0	0
Costs Fuel $		82751	62644
Time $		[illegible]	[illegible]
Total $		207873	193867

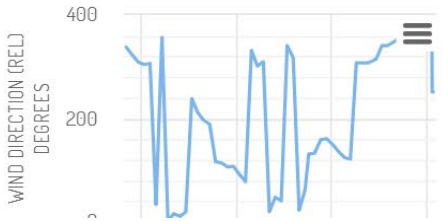


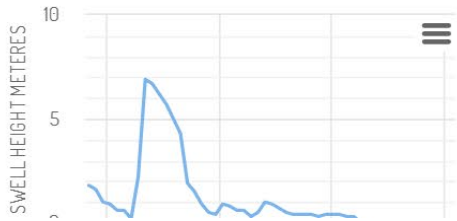


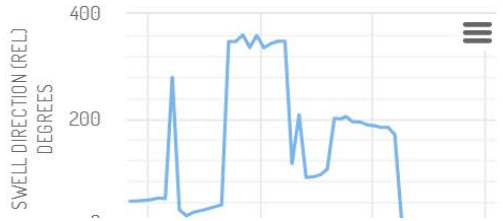
Passage Plan

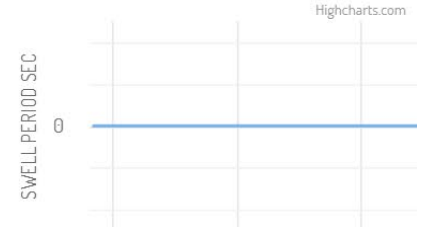
Optimal route advice



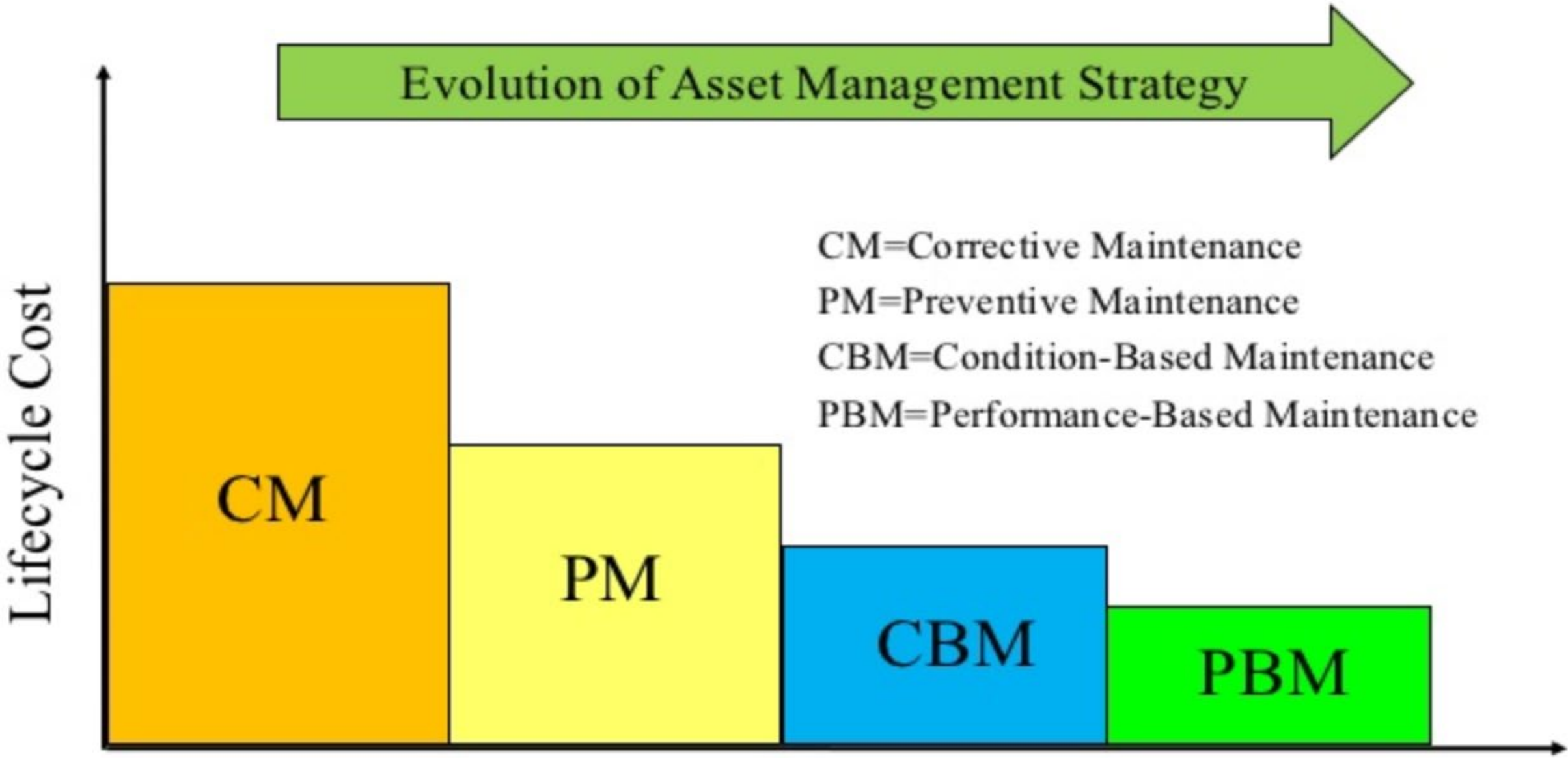




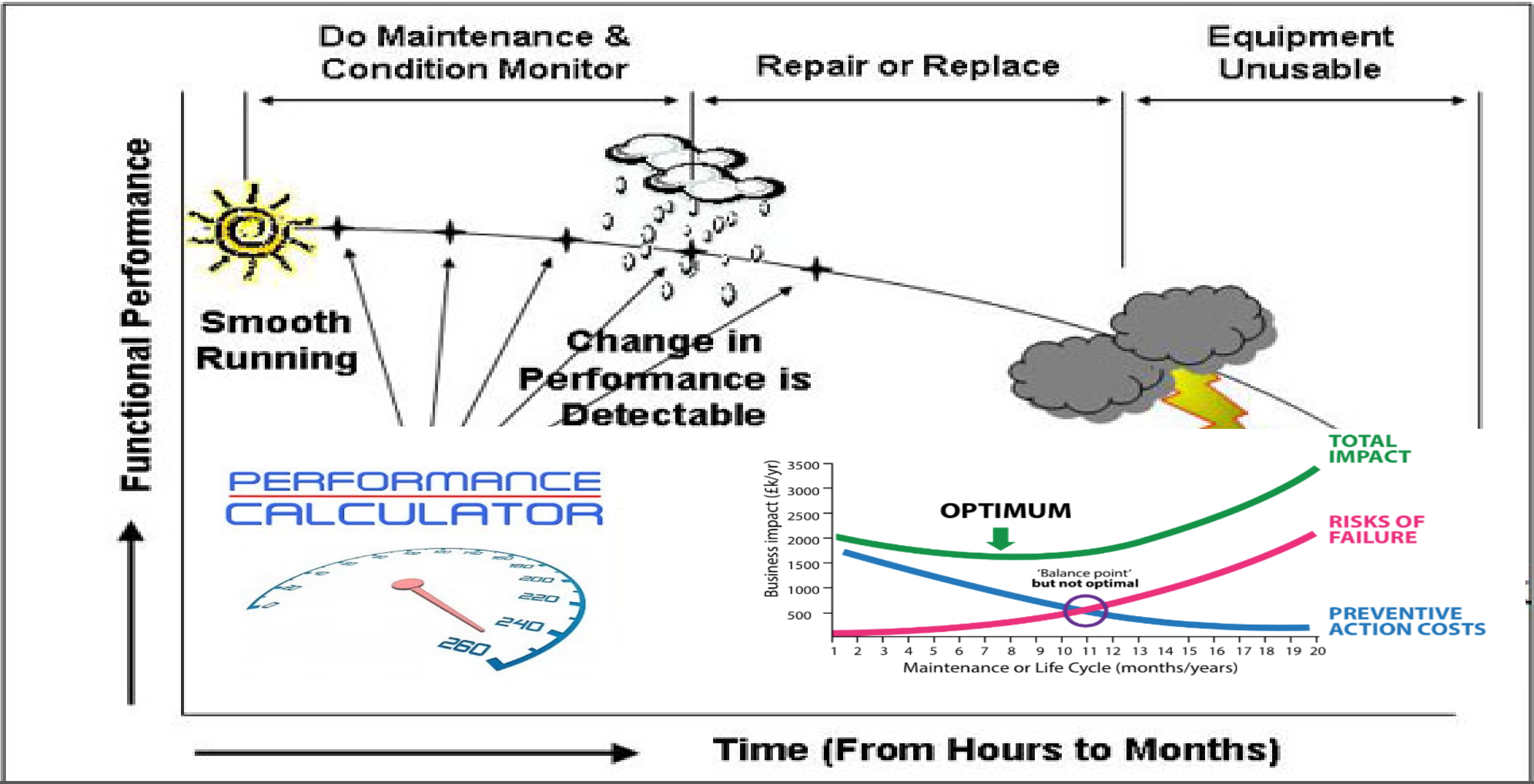




The most effective control to improve profitability



Maintenance a vital parameter!



Performance based maintenance

Thank you for your attention

Dimitris Theodosiou

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