

IMACS 2020

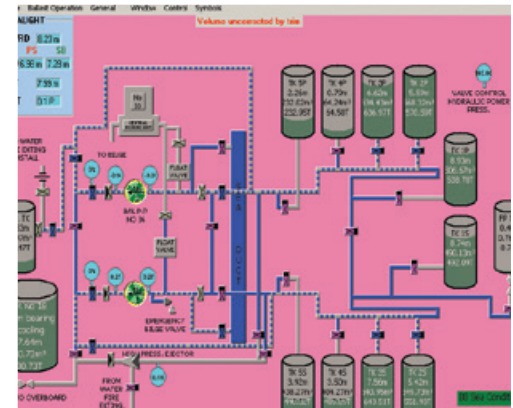
Much more than ENGINE MONITORING

**Totem
IMACS**

DSS: ENGINEER DECISION SUPPORT SYSTEM

- Immediate Decision Support: IMACS immediately shows the support stipulated by the Engine Maker.
- On Screen Manual: Relevant page in the manual is opened directly from the alarm form.
- MSA: Multi Sensor Alarm. Physical Events are defined by status of several sensors.

Faster ENGINEER RESPONSE Minimizes Failure Escalation!



9 Points of Difference:

- ▶ Siemens PLC: Full Redundancy, affordable Off the shelf spares.
- ▶ MSA: Multi Sensor Alarm makes the IMACS an event based system.
- ▶ CBM: Condition Based Maintenance & Monitoring - Big Data Analysis.
- ▶ On Line Stability – Automatic GM Measurement before sailing, during voyage.
- ▶ LAN ready for ship's computers.
- ▶ Zooming of mimics.
- ▶ Fuel Efficiency - handling of flow meters, shaft torque, thrust, ship performance etc.
- ▶ Remote access – Remote access during commissioning and maintenance.
- ▶ Office version for sup't use, as part of the system.

IMACS 2020 Hardware Advantages:



- ▶ Use of available COTS (Commercial Off The Shelf hardware).
- ▶ COTS eliminates the dependence on dedicated, more expensive and less accessible “marine” spare parts .
- ▶ Full redundancy of CPU (option)and BUS – Automatic take over if one PLC fails.
- ▶ Each work station can take over the entire system regardless of other stations failure (work station redundancy).
- ▶ LAN ready: Other computers on ship’s LAN can log into the system at will (for monitoring only).

DSS: Engineer Decision Support System

Increase of Engineer situation awareness & response time. To name some of those features:

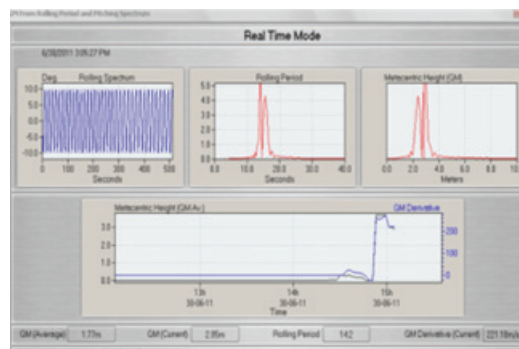
- ▶ **Immediate Decision Support:** for each alarm, IMACS can issue the advice stipulated by the engine maker or management. Examples: Decrease engine power, Cut off injection, Increase lubrication, etc.
- ▶ **On Screen Technical Reference:** On each alarm, user can open the relevant page in the relevant manual directly from the alarm form.
- ▶ **MSA: Multi Sensor Alarm:** Physical Events are defined, based on status of several sensors, and alarms are issued on events and not on single sensor set-points. Events can be taken from manuals or defined by superintendent or chief engineer. Examples: Fire in Cylinder X, Defective pressure control valve, etc.

On Line Stability

Container ships and Car Carriers can be at risk of losing stability due to wrong cargo values.

IMACS 2020 allows measurement of GM onboard to keep vessel safe at all times:

- ▶ GM from Pre Sail inclining experiment
- ▶ Automatic GM monitoring during voyage



STATUS: OFF
HEEL ANGLE: 0.00

INCLINING TEST SETUP

By Mean Draught of 4 sensors	Result	Dist
<input checked="" type="checkbox"/>	0.1%	11,543.80
<input checked="" type="checkbox"/>	By Mean Draught of fore and aft sensors	0.1%
		11,435.74

Manually entered values

TANK 4: Auto Trim Manually Entered Trim

TANK 5: Auto Trim Manually Entered Trim

PUMP 1: Auto Trim Manually Entered Trim

PUMP 2: Auto Trim Manually Entered Trim

INCLINING TEST VALUES

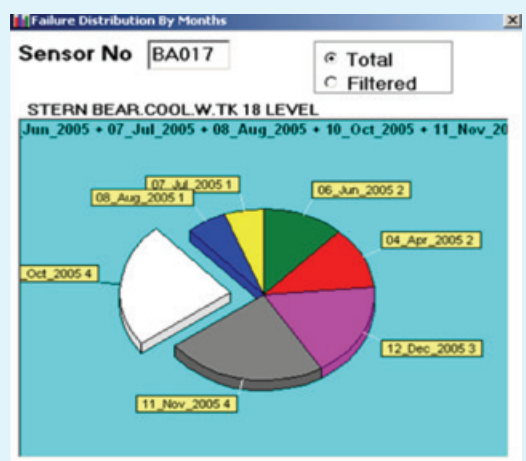
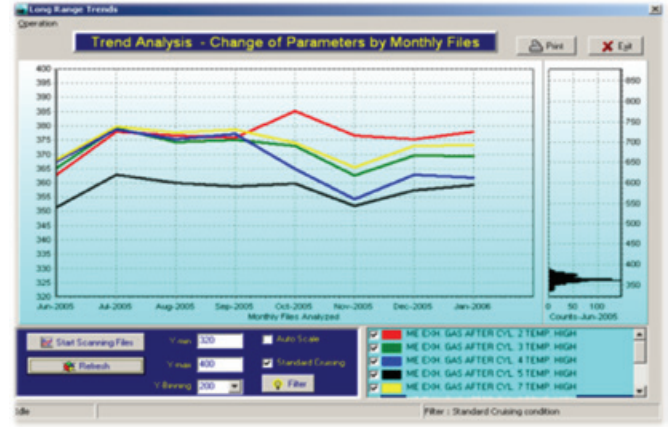
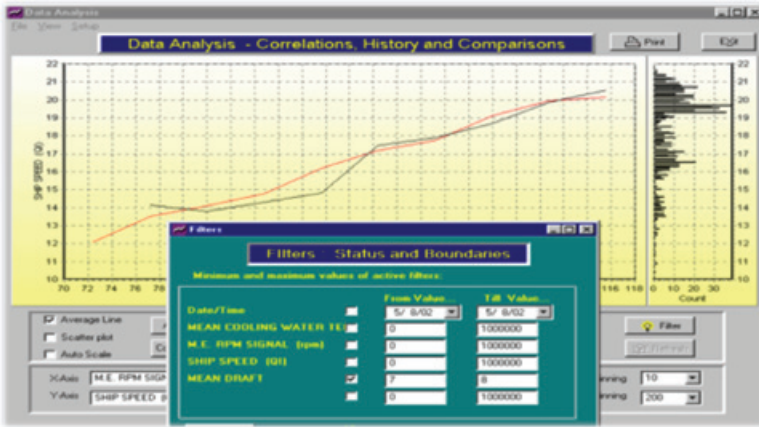
START	PORT	STBD	END	Units
4P	195.06 T	187.56 T	200.55 T	192.24 T
4S	294.89 T	303.26 T	289.03 T	291.53 T
5P	220.38 T	289.60 T	182.11 T	228.48 T
5S	216.27 T	179.00 T	250.40 T	206.22 T
ANGLE	0.00	1.39	1.85	0.00
GM	2.55 m	2.29 m	2.04 m	

Buttons: START, STOP, Eject

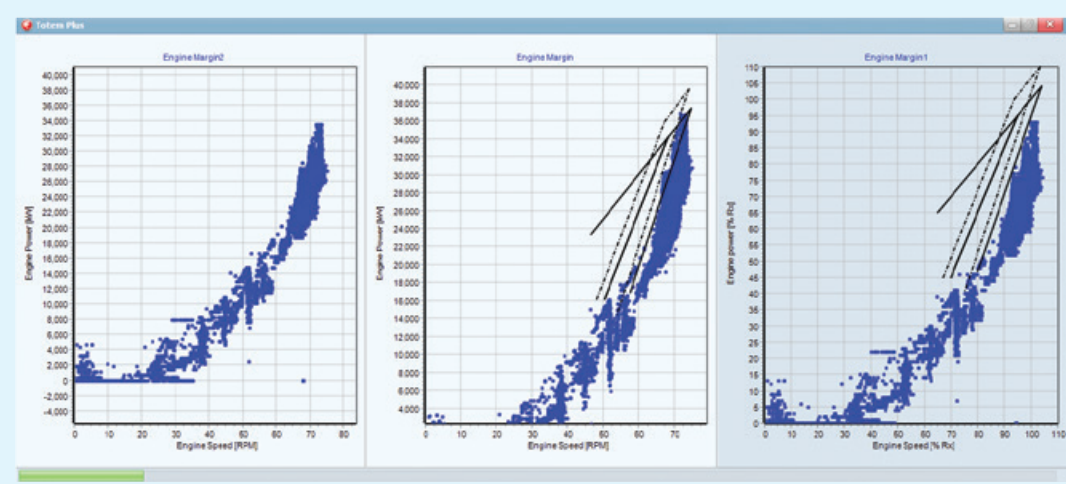
Remarks: GM - Distance of Metacenter from VCG: 2.464 VCG - Distance of Center of Gravity from Keel: 10.260

Big Data Analysis

Engine data can be analyzed in real time or off line. Trends of important sensors can be found and projected to show future values, correlations of sensors under varying conditions (RPM, draft etc.) can be analyzed, and more.



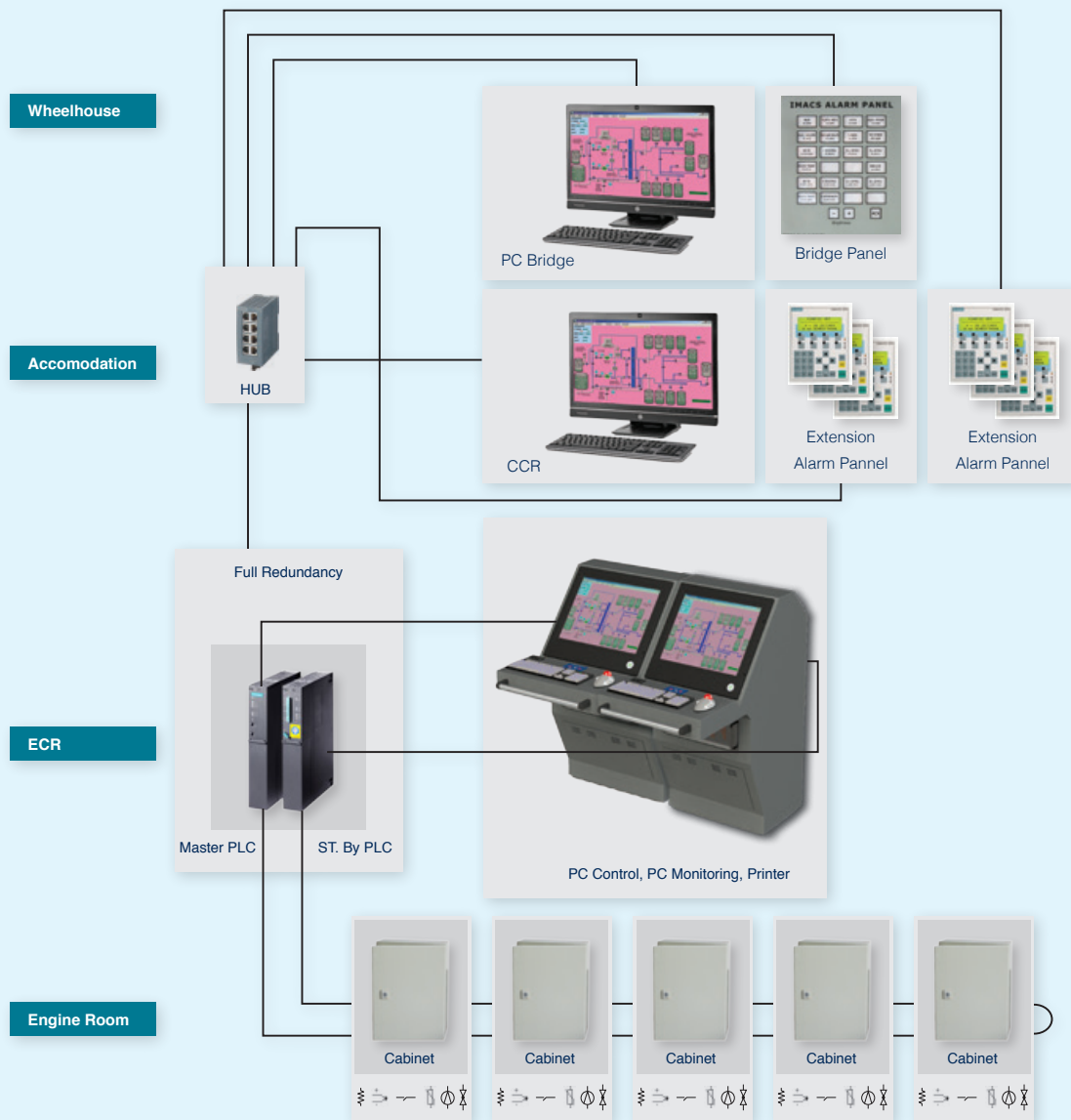
- ▶ Make sensors data into physical information.
- ▶ Plot dependencies of co-related parameters.
- ▶ Establish common domain for correlations.
- ▶ Achieve better understanding of engine performance.
- ▶ Gain significant improvement in Preventive Maintenance.



Totem IMACS 2020

System Layout - Example only

Totem IMACS 2020 can integrate TLG, VRC, PMS, Anti Heeling, Stability and more into one comprehensive system.



About Totem Plus

Totem Plus is an international company that manufactures and supplies High-Tech systems for vessels since 1994.

Totem Plus product line includes automation and navigation systems including: ECDIS, BAMS, BNWAS, Conning, VDR and more.



TotemPlus
Where Shipping Meets High-Tech