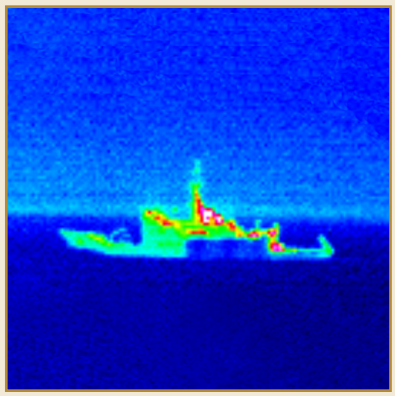

OSM
Main Control Unit
(MCU)
RS-422
Ethernet Switch
RS-422
IMCS
METEO
Onboard Signature Management (OSM) V0.0-x3
[S] System
[M] Mode
[V] View
[O] Options
[R] Reports
[A] About
[H] Help
Ship Information:
Weather Station:
GPS Data:
Thu Sep 28 15:02:48 2006
Overall System Status
[System Status]
[Connectivity]
Status of Selected System
Sensor View
Operator Set-Point
View Schematics
Manual: STOP
Hide Info
Events:
LOCAL
PEACETIME
OFF
Davis ENGINEERING
AHC
AHC06
AHC Zone
OSM Wa
Management Sy
Actuator Loading
Management
AHC06-WT01
NOZZLES
AHC06-V01
AHC06-WP01
Onboard Signature Manager/Active Hull Cooling
Davis

APPLICATIONS

The Onboard Signature Manager (OSM) provides the control function for the Active Hull Cooling and engine exhaust Sea Water Injection IR suppression systems. Real-time on board IR signature prediction can be achieved with a software upgrade (under development).

Active Hull Cooling (AHC)

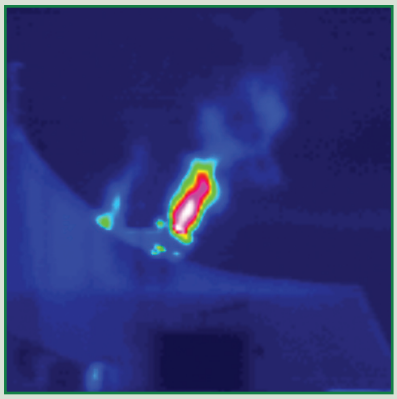
AHC actively controls the temperature of the ship skin in order to minimize contrast IR signature with the background. OSM monitors the environment to determine optimal skin temperatures, and controls the sea water flow to the AHC sprinkler array.

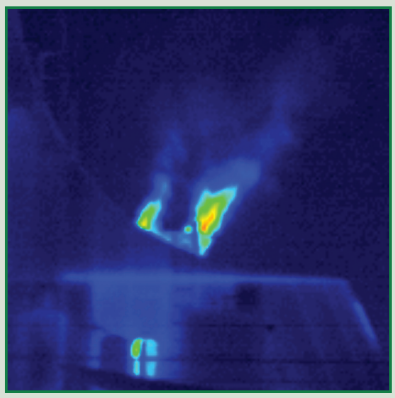


Left: Hull cooling on experimental ship; Right: MWIR measurement of ship with AHC on hull section (at 5.5 km).

Sea Water Injection (SWI)

The SWI system cools the engine exhaust by the injection of a fine water mist. When augmented with a passive Eductor/Diffuser, SWI can produce plume temperatures below 100°C. OSM controls the flow of injected water as a function of the current operating state of the engine.

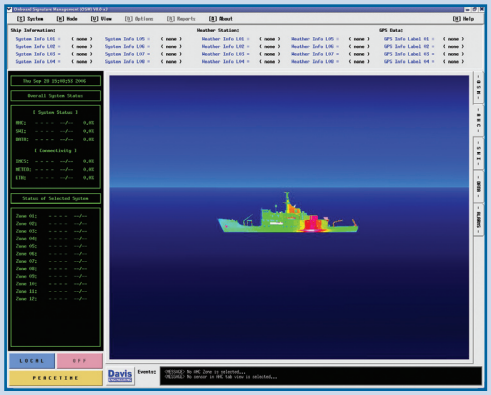




Unsuppressed and suppressed exhaust plume viewed in the mid-wave IR band.

Real-time Prediction

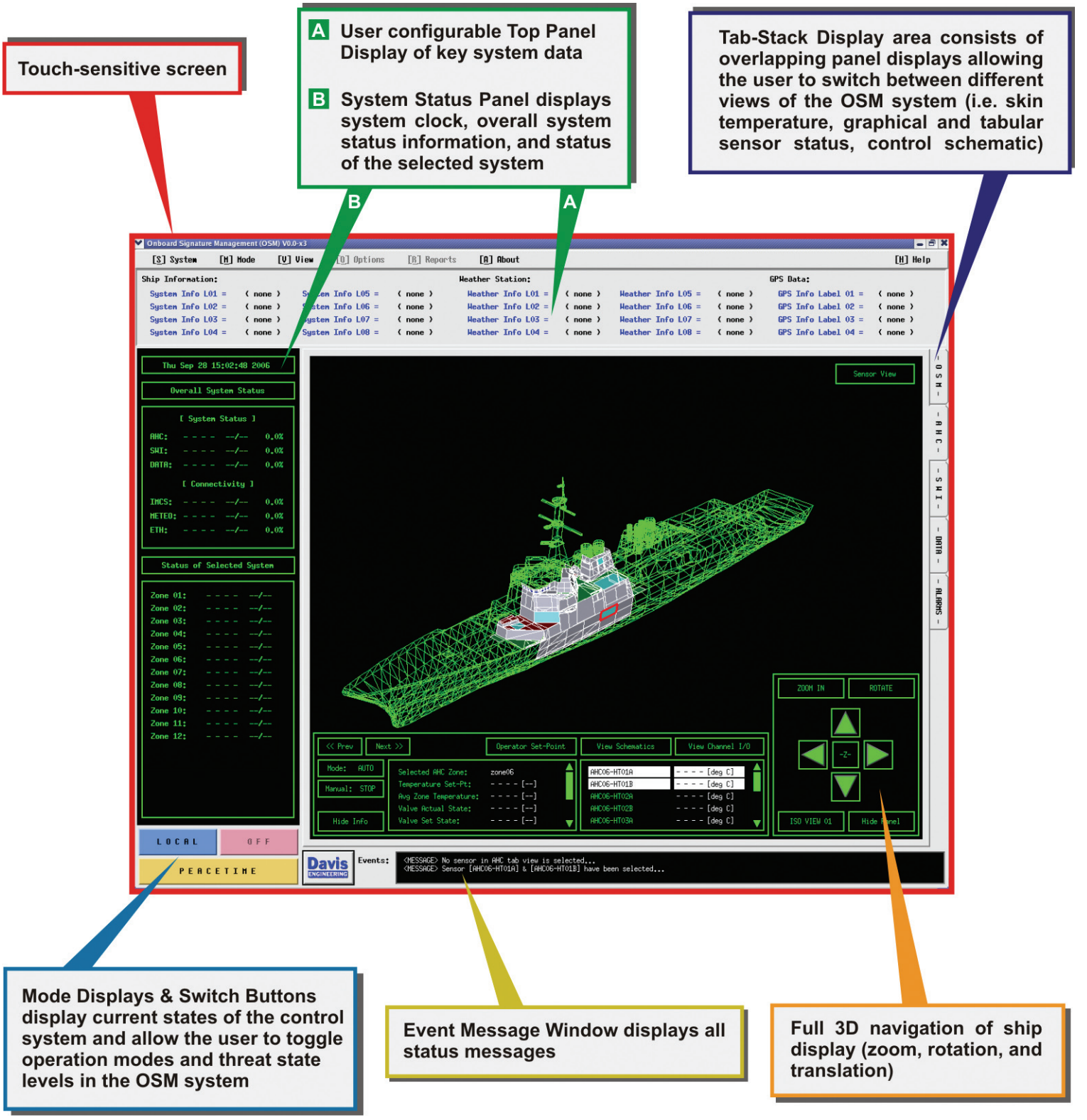
OSM builds upon the validated accuracy of the NATO standard code, ShipIR, to predict the IR signature of the ship in real-time. Real-time prediction allows the ship operator to understand its susceptibility to IR threats in the current operating environment - a key component of situational awareness. This capability will be available as a software upgrade.



Conceptual rendering of real-time prediction within OSM.

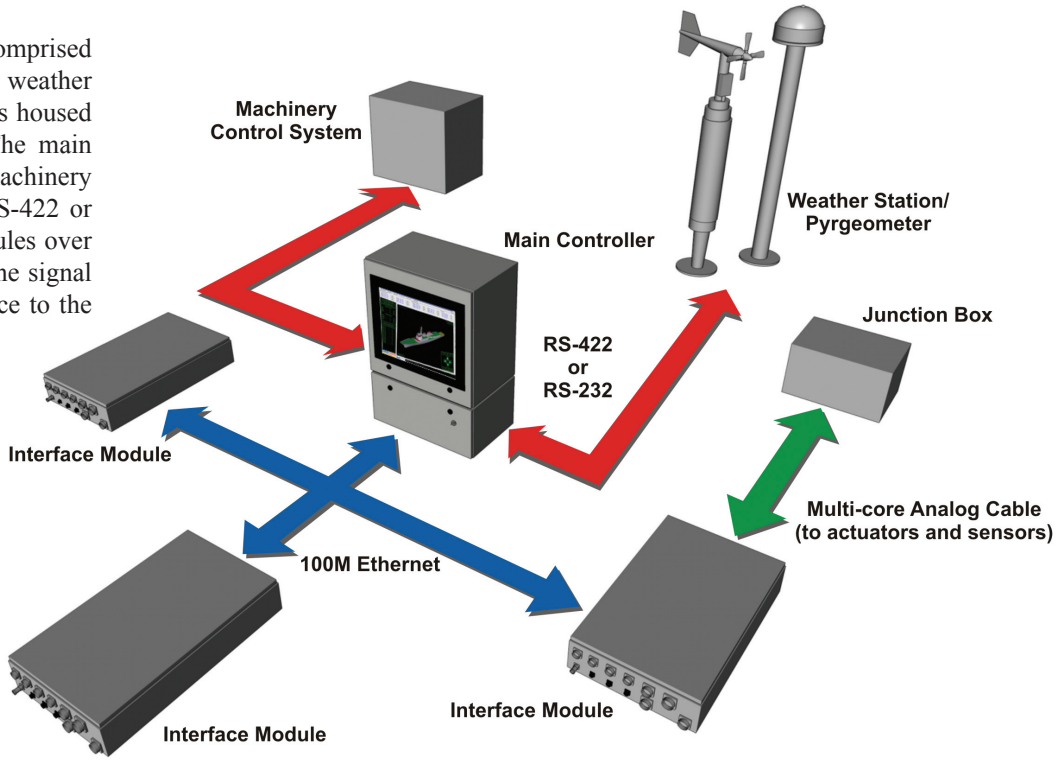
SOFTWARE

The OSM graphical user interface provides control and display of active IRSS systems either through the navigation of a three dimensional representation of the ship, or with the display of control schematics. The interface provides access to all control points and sensor data. The operator can either manually control the IRSS systems, or can select OSM to perform automatic control as a function of the selected threat state.

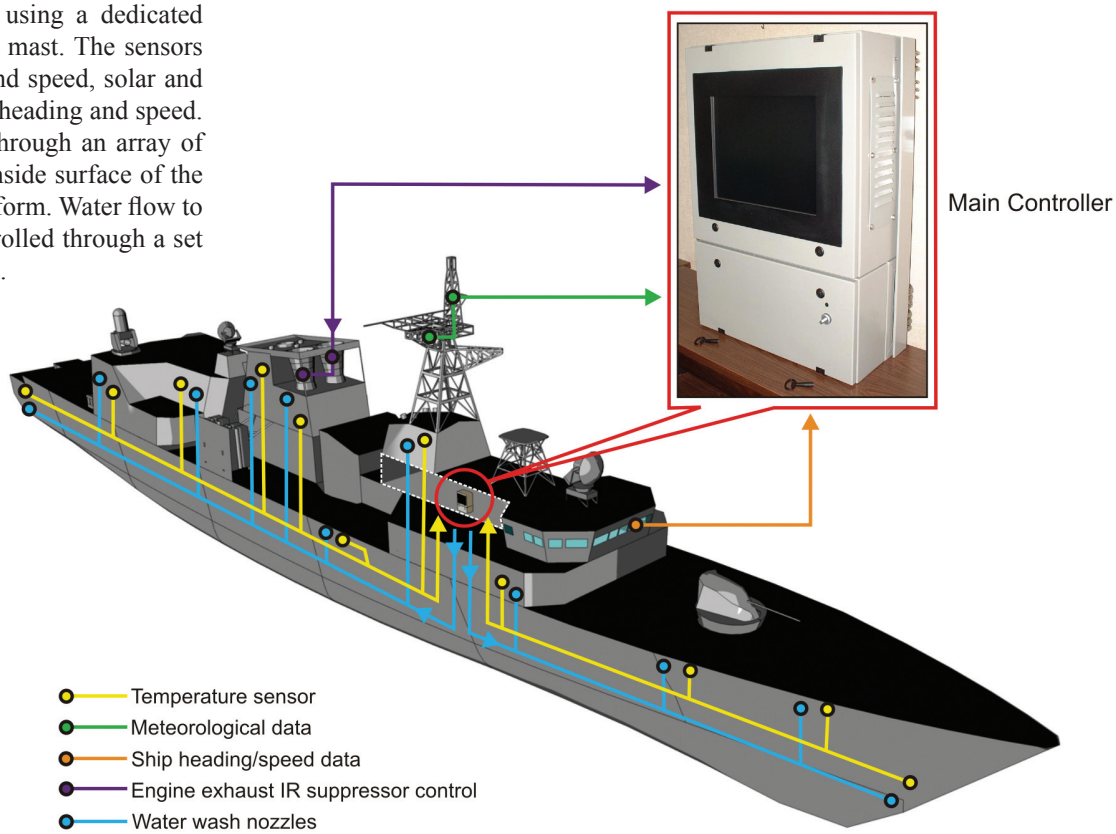


ARCHITECTURE

OSM is a distributed control system which is comprised of a main controller, interface modules, and a weather station. The OSM software and user interface is housed in a rugged wall mounted main controller. The main controller communicates directly with the machinery control system and weather station over an RS-422 or RS-232 serial link, and with the interface modules over Fast Ethernet. The interface modules provide the signal conditioning, A/D, and D/A conversion interface to the sensors and valve actuators.



OSM measures environmental data using a dedicated weather station mounted on the ship mast. The sensors record air temperature, humidity, wind speed, solar and background thermal irradiation, ship heading and speed. Ship skin temperature is measured through an array of temperature sensors located on the inside surface of the ship at various points around the platform. Water flow to the SWI and AHC sprinklers is controlled through a set of electrically actuated control valves.



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