

# Adroit-based TMaSS NT

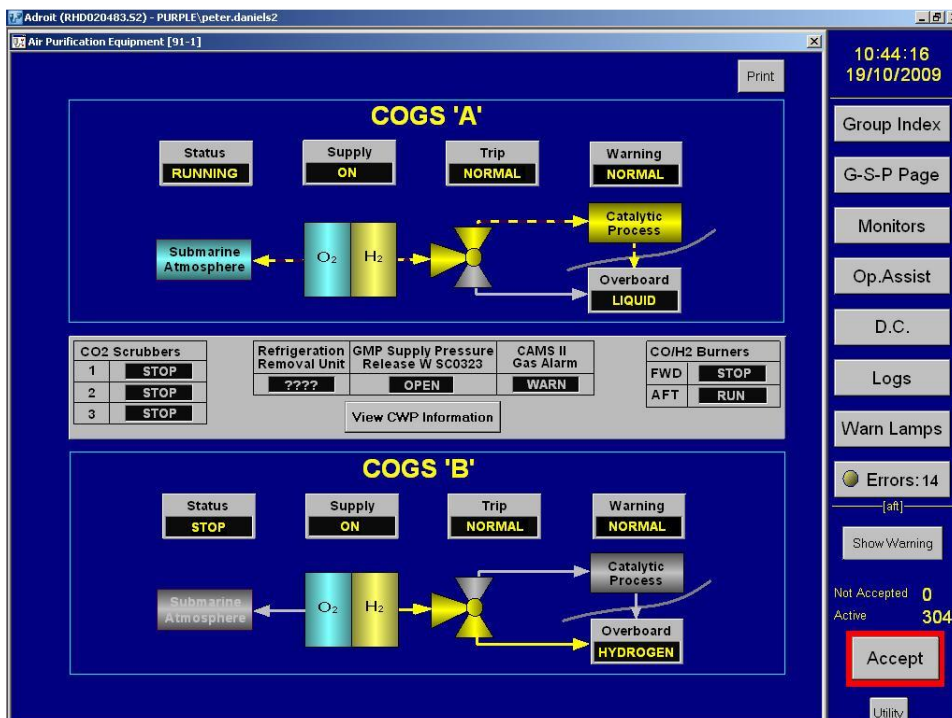
## (Trident Machinery Surveillance System – New Technology)

The term *Trident* refers to an operational system of four Vanguard-class submarines armed with Trident II D-5 ballistic missiles, able to deliver thermonuclear warheads from multiple independent re-entry vehicles. It is the most expensive and the most powerful capability of the British military forces. Operated by the Royal Navy and based at Clyde Naval Base on Scotland's west coast, at least one submarine is always on patrol to provide a continuous at-sea deterrent.

In 1998, UK defence company, BAE SYSTEMS selected Adroit Smart SCADA as a key component in a long-term project to upgrade the existing Coral Software based TMaSS machinery surveillance system which was considered obsolete and prohibitively expensive to develop and test. The upgraded system, comprising latest touch screen and graphics technology, is known as TMaSS NT



Interactive HMI graphic showing some key parameters



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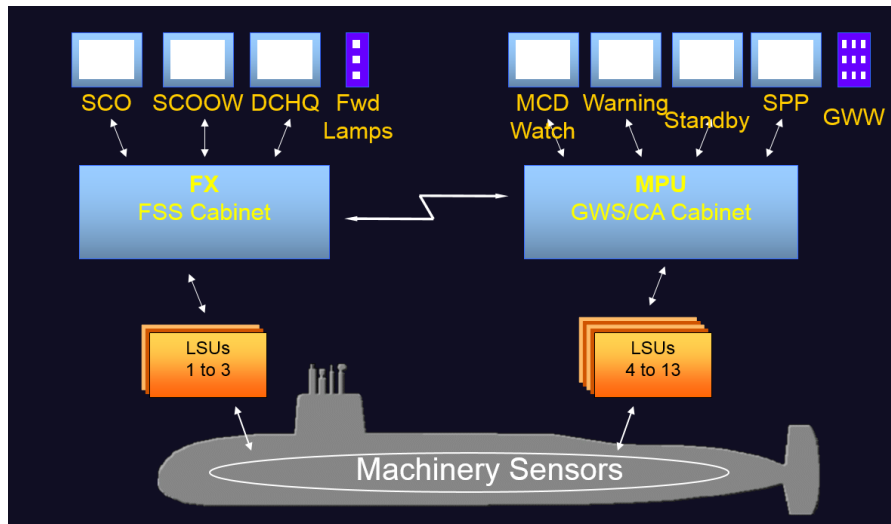


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As part of the upgrade all four Vanguard-class boats: HMS Vanguard, HMS Victorious, HMS Vengeance, and HMS Vigilant have been fitted with Adroit dual-redundant SCADA servers. On each boat, a total of 10 HMI workstations divided into fore and aft clusters connect into the server pair. In addition, the two training simulators at HMS Sultan and Faslane have been upgraded to Adroit-based TMaSS NT. The last upgraded boat is due to return into service mid/end of 2015.

### TMaSS NT System Layout



As the above schematic shows, TMaSS NT comprises central dual-redundant Adroit servers for highest possible availability, and a forward exchange. The servers are fed with data from the boat's machinery via 13 local scanner units (LSUs).

The system monitors machinery conditions and data...

- Approximately 2000 items
- Pressures, temperatures, valve positions, etc.
- e.g. Shaft speed, lubricant temperature
- Audible and visual warnings when things get too fast or too hot, etc.

The use of Adroit on the Trident programme is clearly a prestigious, if atypical application of our software. But as usual it has not disappointed in terms of reliability, robustness, performance, and flexibility. In fact naval personnel have commented very favourably on the upgraded Adroit-based system, notably its ease-of-use compared to the legacy TMaSS system. Within BAE SYSTEMS, the TMaSS NT project has picked up several awards for innovation, including one for dramatically reducing costs by virtue of the fact that Adroit SCADA servers, HMI workstations, and the LSUs were able to use the pre-existing cabling running around the boat as a network medium