

MARS:News

Military Afloat Reach and Sustainability

MARS Project Newsletter | Issue #2 | Mar 2013



Making waves...

To assess the seakeeping and dynamic stability of the MARS Tanker, a tanker model was constructed and tested in QinetiQ's Ocean Basin facility.

At 122m long, 61m wide and 5.5m deep, QinetiQ's hydrodynamic testing tank at Haslar is the biggest covered water space in Europe. The facility is equipped with a state-of-the-art motion capture system for recording constrained and free manoeuvring surface ship and submarine model tests in calm water or waves.

Using a combination of physical model tests and numerical modelling, the seakeeping performance across a range of sea states and the manoeuvring characteristics were investigated.

The 1:44 scale free manoeuvring seakeeping MARS Tanker model was fully appended with stock fixed pitch propellers, bilge keels, twin skegs and steerable twin

skeg hung rudders in order to be tested at two conditions, representative of a light and deep seagoing condition, from head seas to following seas in sea states 5 and 6. A full set of manoeuvres was also carried out for both loading conditions, providing data on the tanker's behaviour from a manoeuvring and seakeeping perspective, including:

- Turning circle performance;
- Zig-Zag performance;
- Directional stability (pull-out) performance;
- Stopping distance performance;
- Time to react to rudder performance;
- Time to react to RPM change performance;
- Vertical and lateral velocities and accelerations;
- RMS motions in a range of sea states;

- Motion Induced Interruptions (MII's) and Motion Sickness Incidence (MSI's);
- Green seas and slamming events

The results concluded that the MARS tanker design meets customer requirements in terms of manoeuvrability and seakeeping, enabling the current tanker design to be progressed with only minor changes.

To assess the manoeuvring characteristics of MARS Tanker when operating the Queen Elizabeth Class Aircraft Carrier, a further set of manoeuvring trials have been undertaken. The trial has investigated the Tanker's ability to manoeuvre into the RAS position and break away from the carrier in conditions up to sea state 5, as well as the ability to manoeuvre to change heading whilst in the RAS position.

A history in Tide Class

The new MARS Tankers will be named RFA TIDESPRING, RFA TIDERACE, RFA TIDESURGE and RFA TIDEFORCE.

The original TIDE class Fleet Tankers served in the Royal Fleet Auxiliary (RFA) from 1955 until 1991, operating worldwide in support of numerous Operations and Exercises from Suez to the Falklands. Developed using the lessons of the Pacific Campaign in World War Two, these versatile ships were the first purpose-designed replenishment tankers for the RFA. Carrying bulk fuels, oil and fresh water they replenished Aircraft Carriers and Warships, British and Allied, enabling Task Groups to remain at sea for extended periods.

TIDESRING - The original TIDESPRING was awarded the Falklands Island Battle Honour in 1982, operating in support of the re-capture of South Georgia and then sustaining the fleet off the Falklands. She left service in 1992.

TIDERACE - After service in the Suez Crisis, the TIDERACE was renamed the TIDEFLOW to avoid confusion with another ship name. She left service in 1975.

TIDESURGE - She was built as TIDE-RANGE in 1954, but was renamed in 1958 and Served until 1976.

TIDEFORCE - A new name in RFA service.

In Brief

Want to contribute?

Contributions and feedback to:

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Key Long Lead Item - SELEX ES communications system

SELEX ES, a Finmeccanica company, provides secure military and civil networking solutions with benchmark capabilities in secure communications, systems integration, cryptography and radio frequency engineering.

The MARS communications system has been designed to make optimal use of commercial and military systems already proven on other defence programmes. The IFF solution is based on that being supplied to the Queen Elizabeth Class aircraft carriers, whilst the messaging system uses the company's MPS2000 system deployed on most Royal Navy vessels.

The MARS communications system is easy to use and optimised to support UK maritime operations. Key benefits include:

- Fast, flexible assignment of communications circuits and control of equipment characteristics;
- High levels of automation to reduce operator workload;
- Multi-level domain separation for voice, data and management traffic; designed to enable low risk security accreditation;
- Maximum use of standards-based solutions to aid scalability, capability insertion and obsolescence management;

- Extensive use of commercial products to take advantage of commercial innovation and upgrade cycles.

Status Update

The sub-system design is proceeding as planned. It was presented at a Preliminary Design Review in November last year. The intention is for several working groups to be set up to facilitate cooperation on the MARS design and development between SELEX ES, MOD, DSME and BMT Defence Services leading to a Critical Design Review in May 2013.



Designing for the environment

Designing a tanker which will transport fuel oils around the world whilst burning its own fuel makes the concept of Designing for the Environment (DfE) seem unrealistic. However, designing the new Tide Class to improve the Eco Credentials over those of previous ships is a target that the team intend to achieve.

The design could have been based on legislative requirements, however the project has grasped the DfE concept and the design seeks to improve energy efficiency, reduce the impact on the environment and, as far as possible, future proof the design for legislation changes.

The ship will eventually be given an 'efficiency rating' (similar to the efficiency scale found on the side of a new fridge). To help this, BMT have developed an energy efficient hull design and are seeking to improve the efficiency of engines and other machinery so that the best option for through life costs, maintenance, availability and ease of disposal is achieved.

Even before the ships are built we must think about disposal. By considering the basic building blocks, including the materials, it is possible to construct a ship that can be easily dismantled and the materials or individual items of equipment recovered for re-use or recycling i.e. building it out of Lego and being able to use the blocks again (which, incidentally, BMT have demonstrated).



This is simply a snap shot of a whole raft of good work that BMT Defence Services designers are undertaking to ensure that the environment is considered. Their colleagues in BMT Isis are ensuring the Environmental Management principles are close to the top of the agenda and will be producing an Environmental Case documenting all of the design influences to demonstrate that MARS Tanker is environmentally sound.



Okpo Visit

November 2012 saw Director Ships, Tony Graham, visit DSME's Okpo shipyard where four MARS Tankers are to be built.

He was briefed on the status of the MARS project by Project Manager, Hong-Sup Kim, and was then given a tour of the impressive shipbuilding facilities of the Okpo shipyard, which included viewing the biggest dry dock in the world with a 900 ton

some of the larger tanker blocks into place. Director Ships was very impressed by the professionalism, energy and customer focus. He also toured the area to see the local living arrangements for MOD staff posted to this beautiful part of Korea.

Director Ships also paid respects at the shrine of Admiral Yi Sun-Sin, an iconic naval officer whose professional life and death mirrored that of Admiral Horatio Nelson.