Davis NEWSLETTER

June 1994, Issue 04

CEPYC WAVE GENERATOR OPERATING SMOOTHLY

In April 1993, DAVIS commissioned the piston mode segmented wave generator for the Centro de Estudios de Puertos y Costas (CEPYC) Laboratory of the Spanish Department of Public Works in Madrid, Spain. This marked the completion of a $2.2 M contract (announced in Issue 03) to supply 72 segments (increased from the original 60 segments) in their Laboratory, which carries out a variety of coastal and river studies.

continued on page 3

Multidirectional Wave Tank at CEPYC

FOCUS

Interest in stealth technology continues to grow with defence strategists holding firm in the face of shrinking budgets in their insistence upon protection. DAVIS has long been a leader in stealth technology with our IRSS and ASG systems and we are continuing their development.

The first passive (non-fan assist) DRES Ball units were successfully trialed on the new Israeli SA'AR 5 Corvettes, which expands the proven options available for ship IRSS systems.

In another new initiative, we have been successful in the design of an IR suppressor for the CF Twin Huey helicopter. This will lead to a new stealth product line which will be in strong demand in many parts of the world.

The completion of the wave generator in Spain ends a burst of activity in this field, which included installations in France, U.S.A. and South Korea.

The adoption of the Active Shaft Grounding System by the Canadian, U.S. and Royal Navies indicates a solid future for that product. In order to realize that potential, we are pleased to announce that we have signed a License Agreement with Vickers Shipbuilding and Engineering Ltd. (VSEL) for the U.K. and the European Community.

Rolly Davis, P.Eng.
President

INS ELIAT

ISRAELI SA'AR 5 CLASS CORVETTE SEA TRIALS

In early 1990, DAVIS signed a contract with Ingalls Shipbuilding Limited of Pascagoula, Mississippi for the design and production of three shipsets of IRSS equipment for the Israeli Corvette, SA'AR 5.

The first of three SA'AR 5 Class Corvettes, the INS ELIAT, underwent the first builder's trials in December 1993. It underwent the second builder's trials in March 1994 and will join the Israeli fleet in the Fall of 1994.

A prime element in the design was the signature suppression. The picture shows the careful contouring of the hull and superstructure designed to minimize the radar signature. The ship is also designed to minimize the infrared signature by fitting DAVIS DRES Ball IRSS systems to both the gas turbine and diesel propulsion engines.

The remaining two ships of the class will be trialed and delivered by the end of 1994.

continued on page 5

ROYAL NAVY TO FIT ASG SYSTEMS

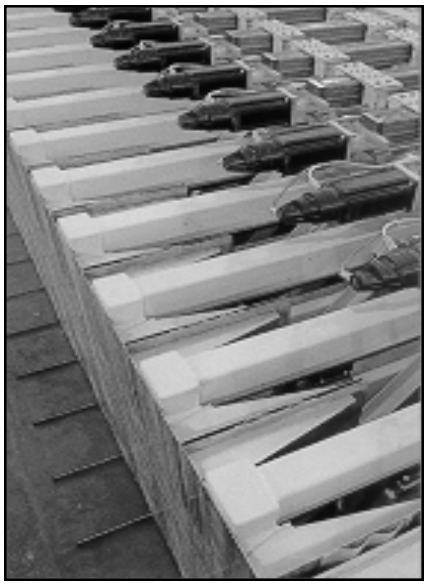
In August 1993, U.K. Ministry of Defence (MOD) contracted with Vickers Shipbuilding and Engineering Ltd. (VSEL) for ten Active Shaft Grounding (ASG) Systems to fit to seven Trafalgar Class and three Swiftsure Class boats. This contract with the result of a fairly lengthy competition between several major U.K. defence firms to supply the DAVIS system to the Royal Navy. The systems will be manufactured and supplied by DAVIS to VSEL for re-sale to the MOD.

The ASG systems are designed to virtually eliminate the Extra Low Frequency Electromagnetic (ELFE) underwater signal given off by ships and submarines and also to reduce corrosion problems caused by currents set up in the shaft and propeller of the vessel.

In 1990, the Royal Navy completed the Operational Evaluation for the ASG on two of their nuclear powered submarines using the ASG system (Issue 01), and since that time, have been arranging for this procurement.

ASG for Royal Navy Submarines

The Royal Navy will be fitting these ASG systems to the remainder of their nuclear powered submarine fleet, including the Vanguard Class. Acceptance by the Royal Navy of this new technology, and also by the U.S. Navy for the Seawolf submarine (Issue 03), are significant milestones in the successful application of the ASG system. With the increased emphasis on mine countermeasures, we expect that the ASG system will become a standard fit on most warships and submarines.



CEPYC Waveboards and Actuators

CEPYC Wave Generator

continued from page 1

The machine is quite similar to that supplied to the Laboratoire National d'Hydraulique (LNH) in that it comprises electric ball screw actuators, the new NRC/DAVIS direct digital control system and the GEDAP software package.

The installation and commissioning went very smoothly and the wave machine has been operating trouble free since that time.

The client, CEPYC, is very pleased with the entire system.

DAVIS was supported by the Hydraulics Laboratory of the National Research Council throughout the project, and in particular, during the commissioning and training phases.

This is the fifth major installation for DAVIS, and brings our total installed number of segments to over 400.

ASG SYSTEM FOR AEGIS DESTROYER

The U.S. Navy has specified the Active Shaft Grounding System for Flight IIA of the DDG51 Destroyer. This new class will comprise 19 ships to be built between 1994 and 1999. The production will be shared between Ingalls Shipbuilding of Pascagoula, Mississippi and Bath Iron Works of Bath, Maine.

In 1986, four military qualified units were produced for the U.S. Navy for use in an Operational Evaluation with two surface ships and three submarines.

This Operational Evaluation proved successful and in October 1988 a U.S. Navy report described the positive results (Issue 01).

In 1992, a 200 Amp ASG system was specified for the Seawolf (SSN-21), the U.S. Navy's newest attack submarine.

Delivery of the first unit to the Electric Boat Division of General Dynamics is now scheduled for late 1994 (Issue 03).

DAVIS is now working with the engineering staff at Bath Iron Works on the integration of the ASG system into the destroyer design. It is anticipated that procurement will start some time in late 1994.

USS Barry (DDG 52)

VSEL ASG LICENSE

We are pleased and proud to announce the licensing of our Active Shaft Grounding System to Vickers Shipbuilding and Engineering Ltd. (VSEL), located at Barrow-in-Furness (U.K.).

We believe that VSEL will provide the very strong technical and service support local to the Royal Navy and the European Community which the complex Active Shaft Grounding product requires. VSEL are already well into the "technical transfer phase" and are talking to a number of people in the European Community with regard to their needs for ASG systems. It is obvious from our point of view that VSEL are assigning a very strong team to the product which bodes well for our success in the European Community.

On our part, we are optimistic that this new working relationship with a major European Defence Contractor will lead to other opportunities for DAVIS in the future.

IRSS SYSTEM DELIVERED TO THE JAPANESE DEFENCE AGENCY (JDA)

In January 1994, DAVIS delivered one Infrared Signature Suppression (IRSS) DRES Ball System to Sumitomo Heavy Industries (SHI), Uraga Shipyard, Japan, where the new experimental platform, designated ASE04, is being built for JDA.

The ASE04 is being used for new technology evaluation; that is, this new platform will be fitted with many new technologies for evaluation before being adopted for the next DD Class Frigate. JDA considers the DRES Ball System to have high potential and therefore has decided to fit it to the ASE04 for evaluation.

The DRES Ball is similar to the system fit on the Canadian Patrol Frigate (CPF) Class which has proven to be so successful in signature reduction for those ships. Because of that proven success, we are optimistic that the evaluation by JDA will also be successful.

This is our first sale to JDA, and we hope that it will be the beginning of a long term relationship.

DAVIS has worked closely with SHI during the formulation and implementation of this project and Davis Engineering staff will be visiting Japan to supervise the installation in June 1994 and the commissioning in March 1995.

During our discussions, JDA have also expressed interest in the DAVIS ASG system, as well as the Canadian Underwater ELF Range Technology that has been developed at Defence Research Establishment Pacific (DREP).

SHI's Uraga Shipyard

Israeli SA'AR 5 Class Corvette Sea Trials

continued from page 2

Davis Engineering staff performed the Sea Trials under particularly adverse conditions; working quarters were extremely tight and the first builder's trials took place under very stormy conditions.

However, as has been our experience in other DRES Ball trials, the IRSS equipment worked extremely well and exceeded the contract requirements.

The SA'AR 5 units were the first DRES Balls to be designated to operate without assistance by a cooling fan. The results measured on the full scale unit during Sea Trials matched the predictions made from quarter scale model tests. A further design first was the close coupling of the IRSS system to the gas turbine collector box on the operation of the DRES Ball.

Again, the predictions from the model tests were validated by the excellent operation of the full scale units.

Davis

Canadian Forces Bell 212 Helicopter

HELICOPTER IR SUPPRESSOR DEVELOPMENT

In September 1993, DAVIS began a R&D contract with DASP 3-4 of the Director General Aerospace Engineering and Maintenance (DGAEM) of DND for the development of an IR Suppressor for the Bell 212/412 Twin Huey helicopter. The initiation of this contract followed a feasibility study which demonstrated the benefits which accrue from IR signature suppression due to the decrease in susceptibility to the IR threat.

The benefits due to IR signature suppression are very real; since the Vietnam war, 95% of aircraft lost in combat were due to IR seeking missiles. As the Canadian Forces increase their peace-keeping role in places like Somalia and Bosnia, they find themselves exposed to shoulder-fired IR seeking missiles, where reduced IR signatures become invaluable.

This was a particularly challenging design task in that the IR suppressor is to be retrofitted to the helicopter and has to be integrated with the existing air management system, which includes an eductor for particle separation. In addition, there were strict weight and power loss targets. DAVIS had two strengths which helped to meet this challenge; first, we were able to utilize the Hot Gas Test Facility and to mock up the actual intake and exhaust system by loaning the equipment from DND. Second, we have an abundance of eductor performance test data and design experience due to previous testing in this facility.

As a result, we have successfully completed the first phase of this project which comprises the replacement of the existing eductor with a high performance eductor, and the addition of a film cooled tailpipe. These changes have been made without altering the existing helicopter structure and have resulted in a significant reduction in the gas and metal temperature and the accompanying reduction in IR signature.

We are now involved in the second phase of the project which comprises the design of a suppressor which provides complete optical blockage to shield the engine exhaust from the IR seeker.

It is anticipated that a prototype will be ready for flight testing by the end of 1994, so that flight tests and IR signature evaluation can take place in the spring of 1995.

It is anticipated that these IR suppressors will be supplied in kit form so they can be fitted to helicopters whose mission will benefit from the increased protection. DAVIS is optimistic that this retrofit kit approach will prove successful in the export market as the world inventory of shoulder fired IR missiles increases.

For further information please contact:
W.R. Davis Engineering Limited, 1260 Old Innes Road, Ottawa, Ontario, K1B 3V3
Tel: (613) 748-5500, Fax: (613) 748-3972, E-mail Address: marketing@davis-eng.com