

## **SURVEY, WRECK SEARCH, AND RESEARCH VESSEL *ATAIR***

by the German Hydrographic Institute (\*)

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The new Survey, Wreck Search, and Research Vessel *Atair* (Fig. 1) was delivered to her owners, the Deutsches Hydrographisches Institut (DHI) (German Hydrographic Institute), Hamburg, on 3 August 1987, nine months after laying the keel. The new ship is especially equipped for different duties. One hundred and fifty days per year *Atair* will be used for survey and wreck search services and the other one hundred days at sea the ship will be used for various tasks, e.g. tests of nautical equipment, oceanographic research, etc.



FIG. 1. — The Survey, Wreck Search, and Research Vessel *Atair*.

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### Principal Characteristics

Length overall .....	51.50 metres
Moulded beam .....	11.40 metres
Moulded depth .....	5.23 metres
Maximum draught .....	3.18 metres
Gross tonnage .....	950 GRT
Propulsion .....	2 DEUTZ MWM — 4 stroke marine diesel engines type TBD 604 BL 6, 630 HP
Operating speed .....	11.5 knots
Fuel tank capacity .....	82 m <sup>3</sup>
Fresh water tank capacity .....	43 m <sup>3</sup>
Endurance .....	4500 nautical miles
Complement .....	10 officers, 6 crew, 7 scientists.

### Description of the Shipbuilding

The ship is designed to fulfil the following requirements:

- the best draught possible during survey operations in the Wadden Sea regions (tide lands);
- suitability to take the ground in the tide lands;
- optimally designed forward shape for the employment of sounding systems.

Owing to the last mentioned requirement, a bulbous bow was dispensed with in order to reduce aeration. For the installation of the numerous underwater oscillators and underwater pieces of equipment, it was necessary to create a sufficiently large, flat space in front of the Schottel pump jet. For that reason, a vertically, sharply defined, stem frame with a then rapidly broadening waterline was chosen. From the operational experience gained to date, excellent sounding results have been attained. Even in bad weather conditions, it is possible to take soundings continuously.

Owing to the need to take the ground, a flat bottom was designed. To improve the propulsion properties, a flow compensating jet has been installed. Furthermore, a broad square stern was designed in order to obtain a large working deck aft and to provide container parking spaces.

In the dimensioning of the tanks for fuel oil and fresh water, as well as for other stores, it was proceeded on the assumption that the ship should be able to remain fully operational for two weeks at sea. Furthermore, the storage of 20 tons of scientific dead-weight cargo and two containers on deck is possible.

The ship is equipped with reinforced bower anchor and stern anchor installations because, during surveying, wreck search, and research operations, she must be anchored for long periods in unprotected waters.

### **Engine Installation**

The machinery plant on board the *Atair* is laid out for an unmanned engine room in accordance with Class GL AUT. As has already been the case on board other ships with a similar range of tasks, a diesel-electric propulsion concept was selected.

### *Motive Power Unit*

The two three-phase generators for the common power supply systems for shipboard auxiliaries and propulsion motors are each driven by a water-cooled DEUTZ MWM four stroke ship's diesel engine, type TBD 604 BL6, with super-charging and super-charger intercooler, each with an output of 463 kW at 1 500 min<sup>-1</sup>.

### **Manœuvring Systems**

The various operations require an optimal manœuvring capability for the ship. It has a high performance fin rudder, designed so that the helm can be put from hard to hard (each time 45°) in 9 seconds. Furthermore, a pump jet is installed with 400 kW electric propulsion with infinitely variable drive. The thrust force, in all directions, is 345 kN. The pump jet consists of a spiral housing rotating through 360°, in which an impeller sucks up the water under the ship's bottom and then expels it as a thrust jet. The unit is installed in the ship's bottom and requires very little water; it is therefore particularly suitable for operations in shallow waters.

With the pump jet, and without the main propulsion, a speed of 8.0 knots is attained. During station operations, the ship frequently sails with the pump jet only. This avoids lines fouling the propeller and the rudder. From the experience gained to date, operation with the pump jet has no influence upon the soundings. Thus, soundings taken during station operations are not interrupted by the manœuvring systems, in spite of the fact that the water jet is directed over the region of the oscillator.

### *Stabilizer*

For roll damping, an Interling stabilizer is installed. This system was chosen because, independent of the speed, the same stabilizing moment is always available.

### **Working Boats and Davit System**

#### *Working Boats*

The *Atair* is equipped with two working boats (Fig. 2) with extensive special equipment for sea and coastal surveys, as well as for the support of diving operations.



FIG. 2. — Working boat in operation.

The following trial run results were achieved:

- Survey boat: weight 3.525 t (including half-stores and two-man crew).
  - a) Capacity 132 kW/3500 min<sup>-1</sup>: 22.8 kn.
  - b) Capacity reduced for working operations: 110 kW/3200 min<sup>-1</sup>: 19.1 kn.
- Diving boat: weight 3.825 t (including half-stores and two-man crew).
  - a) Capacity 132 kW/3500 min<sup>-1</sup>: 22.2 kn.
  - b) Capacity reduced for working operations: 110 kW/3200 min<sup>-1</sup>: 18.9 kn.

### *Davit System*

The hoisting and lowering of the boats is undertaken with an electro-hydraulic operated davit system. It is comprised of a gravity davit with the following special features:

- Separately operable boat hoists for the forward and stern falls which, during hoisting out in an emergency, coupled with the centrifugal clutch brake, work like a conventional boat hoist.
  - The haul and veering speed: 0 to 60 m/min.
  - The spilling line safeguard by means of tripping pulleys on the davit spreaders.
  - Swell compensator in the hauling direction; that means that slack rope caused by the heave of the sea is hauled in at the rate of 150 m/min.

### **Special Equipment**

The ship is fitted with the following lifting gear, winches, and other special



FIG. 3. — Internal view of the bridge.

pieces of equipment:

- a) Central crane, 4.8 tons carrying capacity;
- b) Heavy duty beam lifter;
- c) Slewing davits for wire winch;
- d) Towing davits — 3 tons towing capacity;
- e) Single wire and repeat winch;
- f) Wire rope winch;
- g) Trunk for radiation measurement sonde;
- h) Running-out equipment for the laying out of sondes or the sucking in of sea water;
- i) Divers' room with decompression chamber (Fig. 4);
- j) Two survey boats.

#### **Life-saving Appliances**

- a) Inflatable accident lifeboat without outboard motor;
- b) Two life-rafts — one to port and one to starboard;
- c) Survival suits with thermal protection.

#### **Navigational Facilities (Fig. 5)**

- a) Gyro compass system;
- b) Decca receiver RS 4000;
- c) Loran-C receiver with satellite navigator;
- d) Doppler log DO LOG 22 D;
- e) EM-Log NAVIKNOT II-NF;

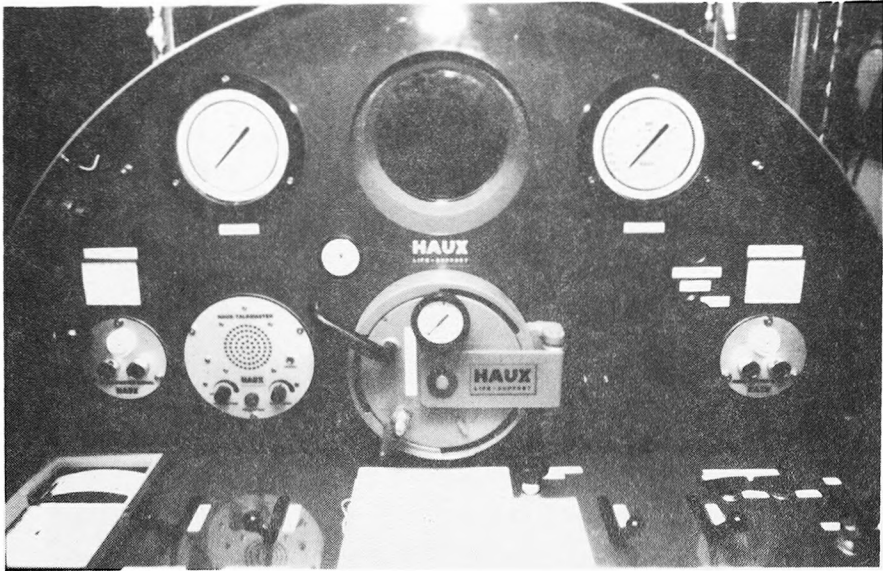


FIG. 4. — Decompression chamber.



FIG. 5. — Survey instrumentation.

- f)* Meteorological station;
- g)* Navigation sounder LA Z 51;
- h)* Hydrographic survey system;
- i)* Survey sounder;
- j)* Horizontal echo sounder (oblique sonar);
- k)* Side-scan sonar;
- l)* Two radar systems.

**Special Scientific Facilities**

A data distribution system (DVS) of type DATADIS-VI is installed for the use of both the scientists and the ship's bridge operations. This system permits the users to be able to read-off at a glance all the navigational data, from different rooms, on one display. Several already programmed formats are available.

**Radio Engineering Facilities**

The radio installation consists of:

- AC/DC short wave radiotelephone Scanti TRP 8750 with 750 W PEP and fully automatic antenna coupler.
- Radio teleprinter system FFS 1004 for the SITOR procedure.
- Multirange receiver RX 1002.
- Weather chart receiver/recorder Rayfax 1000.
- Two VHF maritime radio systems USE 199 D.
- AC/DC guard receiver, Navtex receiver, and lifeboat radio station.

**Laboratories and Special Rooms**

- a) Survey and work room;
- b) Wet work room;
- c) Dry laboratory;
- d) Divers' room;
- e) Container connection supply room (electricity, water, etc.);
- f) Electronic workshop.

**Specialized Duties of the Ship**

- a) Hydrographic survey and wreck search;
- b) Oceanographic investigations;
- c) Nautical-technical investigations (type tests and type approvals of nautical-technical instruments, pieces of equipment, and systems).