



Research Vessel ALKOR

GEOMAR Helmholtz-Zentrum für Ozeanforschung

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Abstract: The research vessel ALKOR, operated by GEOMAR Kiel, is a versatile facility for marine science. The knowledge gained from ocean expeditions contributes to a better understanding of the biological, physical, geological and chemical processes in the ocean.

1 Introduction

The R/V ALKOR was commissioned in 1990 and is owned by the federal state of Schleswig-Holstein. At present, the Briese shipping company in Leer manages the vessel. The main deployment region of this medium-sized research vessel is the Baltic Sea (including Kattegat and Skagerrak) as well as the North Sea and the Norwegian coast. R/V ALKOR has the “short sea transport” and “small-scale maritime fishing” sailing permits. Her maximum endurance is 21 days. The cruising range is 7.500 nm. The home port is Kiel. A general overhaul and modernisation of the vessel was completed in late 2010. Primary research fields of R/V ALKOR are oceanography, biology, fishery, geophysics, and geology. The research vessel offers accommodation for 12 scientists.

2 Technical Data

Owner: Federal state of Schleswig-Holstein, Home port: Kiel

Operator: GEOMAR Helmholtz Centre for Ocean Research Kiel

Year: 1990, Tonnage: 1322 GT, Draft: 4.16m

Dimensions: Length: 55.2 m Width: 12.5 m

Speed: 12.5 knots, Operating range: 7500 nautical miles

Crew: 11 people, Scientists: 12 people

Facilities for the scientific operation: 4 labs 15-52 sqm, 1 vertical shaft, 1 container slot, various cranes, winches and cables; thermosalinograph, several sounders (sediment echo sounder, fish sounder, mobile multibeam) data acquisition system DSHIP, ADCP





Figure 1: R/V ALKOR entering Kiel Bay.

The ship features diesel-electric propulsion, i.e. diesel engines drive generators producing electrical current. Three generators supply the power for the on-board network and the propulsion, a smaller harbour diesel generates electrical power during longer harbour stays. The continuously variable and reversible electrical propulsion motor drives the propeller directly. The vessel features a transverse thruster for lateral movements. The water is taken in midships underneath the vessel and expelled below the vessel through a lateral vent. The direction can be chosen freely. R/V ALKOR features a master crane, an auxiliary crane, and a provisions crane. There is also a lateral boom at midships starboard, and a stern boom (A-frame). There are 6 winches for scientific operation driven by a central hydraulic system. At starboard, there is a 4-drum winch on the midships forecastle, at the stern there is a single-conductor towing winch (W5), and on the main deck stern there are two trawl line winches (W6a and W6b). A lateral boom (A-frame) is located midships stern on the main deck.

3 Facilities for scientific operation

All of the laboratories are located on the main deck. Network sockets for access to the vessel's intranet and internet are available in all laboratories.

3.1 Scientific workstation

The major scientific workstations are located on the main deck in the dry laboratory. On-line data capturing occurs mainly in the dry laboratory. Here, the server for the network is located, the data for central data capturing (DataVis) is merged and distributed, the data for the mobile vessel ADCP, and in most cases, the CTD data as well is captured.

3.2 Dry laboratory

The temperature in the dry laboratory is regulated using the air conditioner. The laboratory features the following equipment:

- Sounder workstation for sediment echo sounder SES2000
- EK-60 fishery echo sounder repeater displays
- Repeater display of the electronic sea chart
- Workstation for ADCP
- All workstations equipped with IT network access and interfaces to scientific data capturing systems, internet PC
- Large wall monitor for visualisation/presentation of results and processed maps
- Scientific laboratory refrigerator, ice machine
- Workstation for CTD data capturing and processing

3.3 Wet laboratory

There is direct access from the wet laboratory to the working deck at a relatively sheltered position. The crane track can be extended from the laboratory through the bulkhead onto the working deck. A swan neck allows loose cables to be routed to the working deck and into other laboratories. The laboratory features the following equipment:

- Repeater display of the sediment echo sounder SES2000
- Repeater display of the scientific data collecting system DataVis
- Repeater display of the electronic sea chart
- 1 large laboratory basin (fish table) with storage
- Crane track for transporting heavy objects

3.4 Cold laboratory

In the cold laboratory, scientific samples can be examined at low temperatures, which can be regulated in the range of 1-20° C with an accuracy of +/- 1° C. The typical operating temperature in the laboratory is 4° C. The generous insulation of this laboratory ensures a highly stable temperature with very high thermal inertia. The laboratory features the following equipment:

- Generous rack system for storing cold samples
- Workstation for processing samples
- 3 laboratory deep freezers up to -40°C/shock freezing

3.5 Chemistry laboratory

The chemistry laboratory is mainly used to set up systems for marine chemistry work. It features a standard fume cupboard for all common acids except hydrogen fluoride. The temperature in the chemistry laboratory can be regulated. The flooring is chemical-proof. The laboratory features the following equipment:

- Sea water connection (aquarium pump); drain basin
- Pure seawater tap connection
- Repeater monitor for scientific data distribution system DataVis
- Fume cupboard
- Heating/cooling combination, 4°C, 170 l, -40°C, 80l and 0-80°C incubator useful volume
- Connection for osmosis water (500µS) via intermediate tank (60l) upon request

3.6 Scientific storage

The scientific storage and workroom is located in the hangar. This hangar allows work to be conducted outside while protecting against rain/spray. Larger scientific devices for outside use can be stored here safely and protected against weather. For this purpose, the hangar can be closed with a large roller shutter. For example, the onboard mobile CTD is prepared for operation here.

In addition, R/V ALKOR features a number of permanently installed hydro-acoustic systems as:



- Sediment echosounder (6-30 kHz)
- Navigation echosounder (50 kHz)
- Fishery echosounder system with 4 frequencies (38, 70, 120, 200 kHz)
- EM log (for surface velocity) and Dolog (for velocity over ground)
- GPS (global positioning system) and MRU (motion sensor for motion compensation)
- Underway data capturing system (for surface salinity, sound velocity and turbidity/chlorophyll contents)