



# Coordination Center German Research Vessels

## Experiences with RV SONNE

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# Coordination Center German Research Vessels

## coordinates the worldwide activities of following research vessels:

RV METEOR

since 1986



RV MARIA S. MERIAN

since 2005



RV SONNE

since 2014





## RV SONNE

After a very long planning and tendering phase the built of the vessel went successfully according to plan in Meyer Werft, Papenburg.

### Milestones during construction and building

- **Political decision for building of the vessel: 2008**
- **Tendering phase with 4 offers from shipyard + shipping company**
- **Start of construction: Dez. 2012**
- **Christening: July 2014**
- **Handing over to science: Nov. 2014**



## Ships christening

Godmother Chancellor Dr. Angela Merkel christened the new vessel in Warnemünde on the 11th July 2014.

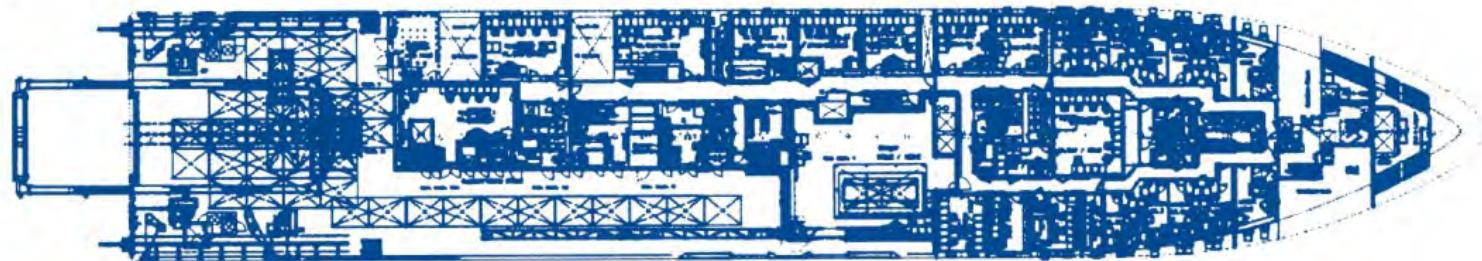
Several test cruises were run in the following three month, rendering the vessel and the equipment ready for operation.





## Dimensions and main data

Built:	2014
Shipyard:	Meyer Werft, Papenburg
Flag:	German Federal Service
Call sign:	DBBE
Class:	GL+100A5 E Nav OC, special purpose
Length o.a.:	118.42 m
Beam:	20.60 m
Draught:	6.60 m
Gross Tonnage:	8554 BRZ
Speed max.:	15 kn
Endurance :	52 days





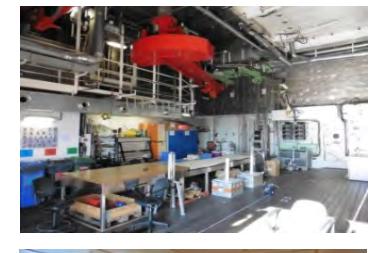
## Laboratories and scientific rooms

24 laboratories for multidisciplinary research in marine geology, geophysics, meteorology, oceanography, climatology, fishery, ecology, hydro-chemistry and deep-sea research.



## Accommodation

32 crew members and max. 40 scientists



## Main Engine

Main Engine: 4 x Main Engine, Wärtsila 9L20CR, each 1620 kW

Propulsion: 2 x electric engines, each 2350 kW



## Acoustic Equipment

Multibeam echosounder EM710 and EM122, echosounder for fishery research EK60, RDI Acoustic Doppler current Profiler, USBL / IXBLUE, double log SAM 4683, Atlas navigation-echosounder 4651



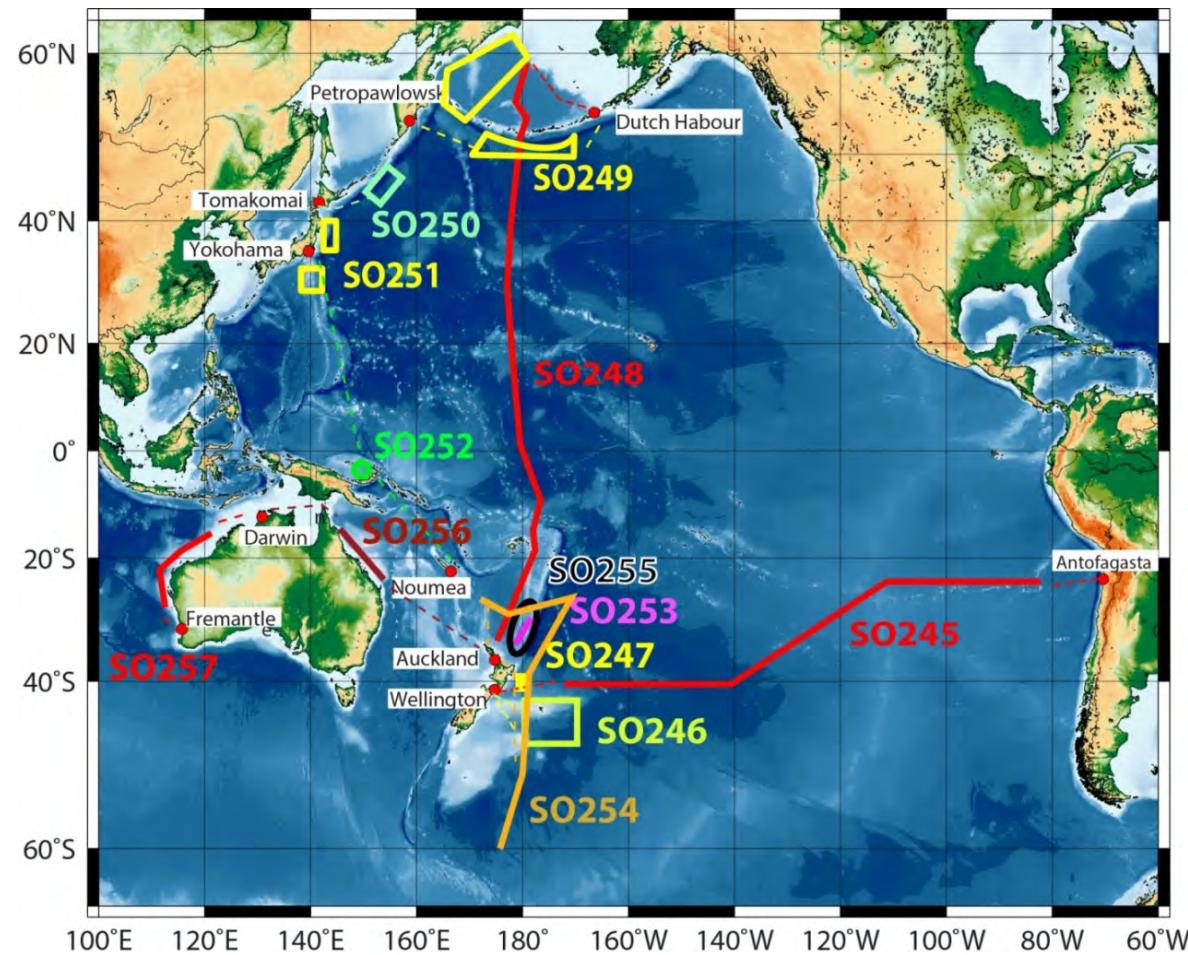
## Lifting Gear

A-frame, large sliding beam, small sliding beam, 4 cranes cover the working deck area, different lifting gears inside hangar, scientific store room and laboratories.





## Working areas from January 2016 to May 2017





R/V SONNE has spacious working decks of about 800 sqmtr allowing the storage of more than 30 containers, powerful cranes (12 t), two sliding bars (7 and 25 t) as well as a stern frame designed to move weights up to 30 t.

In the spacious hangar the large systems can be prepared for and maintained after the deployments, protected from wind and splashing sea water. The hangar can further be used as wet laboratory, where the water and sediment samples are taken from CTDs and coring devices.





R/V SONNE is designed to cover a wide range of marine research disciplines. The vessel offers various working spaces. All multi-purpose laboratories, including dry, wet, chemical, and climate control labs are equipped with modern technology and necessary interfaces that allow connecting the systems scientists bring along.

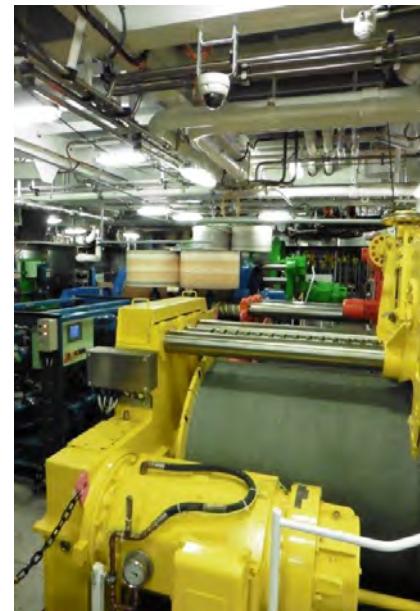




Two hydrographic moon pools allow protected deployments of instrumentation at the water line.

The electrical winches carry cables or wires of up to 12,500 m length, allowing the deployment of heavy equipment into the deep ocean trenches.

The winches themselves are located below the main deck, protected from the weather. They can be operated together with an efficient wave compensation unit.





## Positives:

- Good usage as multidisciplinary research vessel
- The first two years of operation proceeded successfully without any major malfunctions
- Excellent manoeuvering and sea handling qualities
- The room concept: hangar, labs, working decks, cranes and winches has proved to be successful
- Heath compensator works well (18mm LWL-cable & geol. wire)
- Vessel complies with ICES 209 and runs extremely silent
- Interior design and daily life procedures on board are well accepted



## Planned adaptions after two years experiences:

### ➤ Waste concept

Due to the travel areas of R/V SONNE there are problems with the waste disposal. This problem will be solved during the next shipyard period.

During the construction phase of the vessel it wasn't recognized that the occurring wet waste cannot be disposed in every port. Either ports located in the travel area of R/V SONNE do not allow the disposal of wet waste or the costs for wet waste disposal are extremely high.

During the first two years of operation malfunctions of some subsystems of the waste treatment came to light, e.g. tin press, paper press and glas crusher.

Solution approach : Realization of the newly developed waste treatment concept, that intends the incineration and storage of the wet waste in a way that no wet waste disposal in ports is necessary any longer.



## Planned adaptions after two years experiences:

### ➤ Insufficient storage space

In spite of the large vessel size storage space is too small. Especially in the machine rooms storage space is not sufficient.

Solution approach: Several cupboards and shavings were installed in machine rooms.

After the realization of the new waste concept, a new room behind the vessel's chimney is created. Half of the room can be used for storage purposes.

### ➤ Complex ship, time costly machine operation

Due to its high technical complexity and extremely complex automation level the handling in several machinery sectors is very complicated and time costly. For that reason the crew had to be increased by one additional electronics engineer.



## Planned adaptions after two years experiences:

### ➤ Internet Connection

With two VSAT Antennas (KU-Band) the globally operating research vessel isn't sufficiently equipped. It is planned to solve this problem by installing a C-Band Antenna (funding pending).

### ➤ Complicated port logistics

Due to the vessel's dimensions and the shipping routes the port logistics is complicated. Especially provisioning of the ship in cases can be difficult.

For the check of the safety equipment on board we have to plan 5 more days in port every year.



## **Planned adaptions after two years experiences:**

### **➤ Decks illumination**

The deck illumination is not sufficient for work during the night time. The systems and devices are not sufficiently illuminated. This problem will be solved during the next shipyard time in 2017.

### **➤ The first regular shipyard period for guaranty works and improvements is planned in Germany in 2017**

### **➤ In total there are 250 proposed improvements**



**The Coordination Center of German  
Research Vessels thanks for your  
kind attention.**

**We are happy to answer your  
questions.**



Universität Hamburg  
DER FORSCHUNG | DER LEHRE | DER BILDUNG



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## Nur zur Info:

The R/V SONNE is a multi-purpose research vessel constituting a state-of-the-art platform for German and international marine research. It is owned by the Federal Republic of Germany, represented by the Ministry of Education and Research (BMBF). The ministry financed 90% of the building costs of the vessel and provides all of its running expenses. The north German coastal states contributed 10% to the building costs.

The Leitstelle Deutsche Forschungsschiffe at the University of Hamburg has the general oversight and is responsible for the technical, logistic and financial planning and execution of the ships' operations.

Managing owner of the vessel is Briese Schiffahrts GmbH & Co. KG.

RV SONNE was built to fulfill the standards of the German "Blauer Engel" that puts heavy demand on fuel efficiency and environmental protection.



## A multi-disciplinary research vessel and floating city

RV SONNE is a modern multi-disciplinary research vessel serving activities in marine physics, geophysics, geology, chemistry, biogeochemistry and meteorology. The ship's crew of 35 allow the research to be carried out around the clock. The vessel is equipped with special very high-resolution multi-beam echosounding systems, that can map the sea floor with unprecedented accuracy.

The extensive deck-equipment, consisting of the 30-ton stern A-frame, several working cranes (12 t), sliding beams (7 t and 25 t), hydrographic moon pools as well as a set of winches carrying cables of up to 12,000 m length allow the deployment of the most modern and heavy equipment. The analysis and storage of scientific samples as well as the electronic data analysis is done in 17 temperature controlled laboratories, a large hangar and several freezing rooms.

Living quarters are up to the highest standard, as are the social rooms, library and conference rooms. These allow the ship's and the scientific crew excellent working and leisure time conditions, a prerequisite for the long cruises in the middle of the world oceans.

RV SONNE was built to fulfill the standards of the German "Blauer Engel", that puts heavy demand on fuel efficiency and environmental protection. The ship's hull was optimized for low noise operation, allowing the use of sensible acoustic systems.



R/V SONNE is the most modern German research vessel and was built to fulfil these requirements. The general philosophy is that it shall serve the different disciplines in marine research equally well: marine physics, geophysics, geology, chemistry, biogeochemistry and meteorology.

The vessel is equipped with a state of the art dynamical positioning systems comprising five propulsion components. The vessel is equipped with two high-resolution multi-beam echo sounding systems that can map the sea floor with unprecedented accuracy. It has a powerful sediment echo sounder and two acoustic Doppler Current Profilers.

Thanks to its streamlined hull design the vessel has an extremely low noise level, which enables collecting high quality acoustic data, covering a wide range of frequencies.