replacement SONNE

status report

Klaus von Bröckel, ERVO, May 2012
Preliminary remark:

Tendering procedure started in 2009. For the first time the tender was for the construction as well as for the operation of the ship for 10 years. That is for a consortium consisting of a shipyard and a shipping company. Four consortiums submitted an offer. Than, the whole process of negotiating (with several offers and tenders) took nearly 1.5 years. Finally, in July 2011 the contract was signed for the construction of the ship as well as for operating the ship for 10 years.

Construction is taking place within the Meyer Shipyard company in Papenburg (famous for huge cruise liners) at the Neptun shipyard in Warnemünde. Ship operator will be the Reedereigemeinschaft Forschungsschiffahrt (RF) in Bremen (owner of the old SONNE).
short history:
1969 built as stern-trawler
1977 conversion to global multidisciplinary research vessel
1991 extension and modernisation
work area: mainly Pacific und Indic Ocean
field of work: mainly geophysics and multidisciplinary oceanography
owner: RF-GmbH, Bremen
### RV SONNE

#### General Data

<table>
<thead>
<tr>
<th></th>
<th><strong>New</strong></th>
<th><strong>Old</strong></th>
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<tbody>
<tr>
<td><strong>Length:</strong></td>
<td>112,4 m</td>
<td>87,00 m</td>
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<tr>
<td><strong>Width:</strong></td>
<td>20,6 m</td>
<td>14,20 m</td>
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<tr>
<td><strong>Draught:</strong></td>
<td>6,4 m</td>
<td>6,80 m</td>
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<tr>
<td><strong>Displacement:</strong></td>
<td>About 8,800 t</td>
<td>4,734 t</td>
</tr>
<tr>
<td><strong>Speed:</strong></td>
<td>15 kn</td>
<td>12,5 kn</td>
</tr>
<tr>
<td><strong>Crew:</strong></td>
<td>32 pers.</td>
<td>25 pers.</td>
</tr>
<tr>
<td><strong>Scientists:</strong></td>
<td>40 pers.</td>
<td>25 pers.</td>
</tr>
<tr>
<td><strong>Propulsion:</strong></td>
<td>Diesel-electric</td>
<td>Diesel-electric</td>
</tr>
<tr>
<td><strong>Endurance:</strong></td>
<td>50 days</td>
<td>50 days</td>
</tr>
<tr>
<td><strong>Cables + Wires:</strong></td>
<td>8,000 m</td>
<td>Max. 8,000 m</td>
</tr>
<tr>
<td><strong>Scientific Rooms:</strong></td>
<td>550 m²</td>
<td>450 m²</td>
</tr>
<tr>
<td><strong>Working Deck Area:</strong></td>
<td>700 m²</td>
<td>260 m²</td>
</tr>
<tr>
<td><strong>20'-Container:</strong></td>
<td>25 (4 inside)</td>
<td>7,5 (2 inside)</td>
</tr>
<tr>
<td><strong>Scientific Store Room:</strong></td>
<td>150 m²</td>
<td>50 m²</td>
</tr>
<tr>
<td><strong>ICES 209:</strong></td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

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RV SONNE

General arrangement

Third deck (working deck)

- Crane
- Air gun array + station
- Wet lab
- Climate lab
- Dry labs
- Hydroacoustic room
- Cabins
- A-frame
- Container storage
- Wet lab
- Piston core
- Sliding beams
- Hangar
- Electronic labs

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first deck

- redundant machinery
- winch room
- hydrographic wells
- seawater room

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multifunction cranes:
- offshore (SWL 6 t)
- harbour (SWL 10 t)
model of working deck (scale 1:50) with all lifting devices (cranes, frames, beams and winch room) allows to simulate all desired functions and helps to find weak points as well as necessary changes.
**echosounder challenge:**
- avoid bubble sweedown
- huge transducers for deep-sea multibeam echo-sounder
  \((0.5^\circ \times 1^\circ \text{ beam-opening})\)
  \((16 \text{ m} \times 8 \text{ m})\)

**first solution:**
first drawing
'dent' plus
integrated gondola

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- First tank tests resulted in max. speed of 15.3 kn (15 kn required)
- Shipyard put 'cowcatcher' underneath (they called it 'iron')

- Next tank tests revealed: 20 to 25 % more power needed to reach same speeds as without 'cowcatcher' !!
- a different bow-form and some small changes might have resulted in about 4% less loss due to 'cowcatcher'
- now: hull with integrated gondola, an optimized 'dent' and optimized, slightly different bow-form
- computer simulations as well as tank tests show bubble sweepdown behind last cross-beam of hydroacoustic devices
A new design for German research vessel should:
- show: these are German vessels
- show: these are special (research) vessels
- be: safe and maintenance friendly

Several suggestions from shipyard, controlling station and two design offices

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result: - dark grey hull with German banderole
- white superstructure
- red lifting gear and funnel
- "SCIENCE" label on both sides
thanks for your attention

ready for science: end of 2014

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