Experiences and bottlenecks of R&D logistics

Project: RAVE – Measurements and Data Management

GL Garrad Hassan – Wilhelm Heckmann

Funded on the base of an act of the German Parliament

Supervisor

Coordination
1. • GL Garrad Hassan in 30 Seconds...

2. • Framework conditions for R&D logistics

3. • Major bottlenecks and hurdles for R&D logistics

4. • Final Remarks
Germanischer Lloyd  GL Group
is a global service provider in the maritime and energy markets

**Maritime**
- Classification of 6800 ships in service
- Plan approval and new build supervision of 500 ships p.a.
- Maritime Systems & Components
- Maritime Solutions

**Oil & Gas (GL Noble Denton)**
- Technical Assurance
- Engineering Consulting
- Asset Performance & Maintenance
- Marine Operations & Consulting
- Project Execution
- Software Products

**Renewables (GL Garrad Hassan)**
- Certification
- Engineering Consulting
- Marine Operations
- Measurements
- Software Products
- Training

**7,000 Employees in 80 Countries, 200 Offices worldwide**

**Strong growth accelerated by acquisitions [EURm]**

<table>
<thead>
<tr>
<th>Year</th>
<th>Industrial</th>
<th>Maritime</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
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<td>2008</td>
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<tr>
<td>2009E</td>
<td>370</td>
<td>370</td>
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</tbody>
</table>
Five Leading Brands Combine...

- ... to make the world’s largest provider of technical advice and engineering consultancy services to the renewable energy market.
GL Garrad Hassan is currently active in 43 locations in 22 countries & employs > 800 people

<table>
<thead>
<tr>
<th>Staff Americas: ~ 170</th>
<th>Staff Europe: ~ 550</th>
<th>Staff Asia/AU/NZ: ~ 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vancouver</td>
<td>Glasgow</td>
<td>Beijing</td>
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<tr>
<td>Ottawa</td>
<td>Bristol</td>
<td>Tokyo</td>
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<td>Sydney</td>
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<tr>
<td>Porto Alegre</td>
<td>Madrid</td>
<td></td>
</tr>
</tbody>
</table>

Countries with GL Garrad Hassan presence

Countries with newly established GL Garrad Hassan presence
1. • GL Garrad Hassan in 30 Seconds...

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Framework conditions for R&D logistics

Contracting Party

- Which party in the offshore wind farm project is the contracting party for the R&D work?
  - Turbine manufacturer
  - Wind farm owner/ operator
  - Federal Ministry (governmental sponsored R&D project)

- Contractual configuration defines priority settings within the project course
Framework conditions for R&D logistics

Position in the Schedule – at what time to install R&D equipment [1/3]

Installation of R&D equipment for measurements in offshore wind farms can be split into two major phases:

<table>
<thead>
<tr>
<th>Phase 1: Installation Onshore</th>
<th>Phase 2: Installation Offshore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-installation of measurement equipment which are not sensitive to major offshore installation works, or which are positioned in non-accessible areas offshore on the main components.</td>
<td>Final installation of all necessary measurement equipment and commissioning of the measurement system.</td>
</tr>
</tbody>
</table>
Framework conditions for R&D logistics

Position in the Schedule – at what time to install R&D equipment [2/3]

Phase 2: Execution of offshore installation maintenance works

How to schedule the installation, commissioning & maintenance of the measurement equipment:

1. simultaneously to installation & commissioning works of WTG and auxiliaries
2. after completion of installation & commissioning works of WTG and auxiliaries
Framework conditions for R&D logistics

Position in the Schedule – at what time to install and maintain R&D equipment [3/3]

Phase 2: Execution of offshore installation & maintenance works

Different logistic approaches for the execution of the R&D installation works offshore:

1. Integration of the R&D transfers into the offshore wind farm logistic
2. Separate R&D logistic as single transfers or campaign
1. • GL Garrad Hassan in 30 Seconds...

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Major bottlenecks and hurdles for R&D logistics

R&D logistic ops alpha ventus – realisation rate

Scheduled installation & maintenance activities
and realisation rate [192]

- 2009: 30%
- 2010: 38%
- 2011: 32%

2009
- schlecht wetter: 45%
- offshore gearbeitet: 25%
- technik versagen: 10%
- unterordnung priorität: 12%

2010
- offshore gearbeitet: 60%
- technik versagen: 6%
- schlecht wetter: 23%
- unterordnung priorität: 5%

2011
- schlecht wetter: 32%
- offshore gearbeitet: 49%
- technik versagen: 0%
- unterordnung priorität: 19%
Major bottlenecks and hurdles for R&D logistics
R&D logistic ops alpha ventus – diving campaign

2011: Progress Report Summary [792 h]

- In Port Standby: 34%
- Transit: 10%
- Positioning / Anchor Operation: 2%
- Weather Downtime: 3%
- Waiting on Tide: 33%
- In Port Working: 6%
- Downtime: 4%
- Dive Job: 7%
- Additional Work: 0%
Major bottlenecks and hurdles for R&D logistics

Main issues

- Weather and port restrictions
- PAX capacity bottlenecks on vessels and helicopters
- Prioritisation of other offshore wind farm activities
- Unforeseen technical problems with the WTGs and logistic vehicles
- Staff limitation of wind farm operator or manufacturer to provide representatives for the operating control of the WTG
- Insufficient HSE instruction and training of the R&D staff
- Competition of different R&D projects about the labour for the specific project leading to later realisation (time consuming offshore work vs. limited R&D labour)
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Final Remarks

- Maximum pre-installation onshore/ more ‘plug’n’play’ configurations to reduce offshore effort
- Cost / Capacity balance for the transfer in order to realise a good logistic availability by reasonable costs (split work vs. campaigns)
- Finding a good balance between the level of wind turbine/ farm completion and start of R&D installation activities to avoid additional delays & extra work
- Good communication and arrangement with the operator of the offshore wind farm, to minimise extra effort in incorrect planning
Thank you!

Wilhelm Heckmann
Senior Offshore Wind Consultant

wilhelm.heckmann@gl-group.com
+49(0)40 36149 7547
+49(0)175 581 5214

www.gl-garradhassan.com