

Technical and operational impacts for research ship operators supporting increasingly complex research ships

- The rate of technology change of scientific equipment for sampling, sensing and data gathering has been significant in the last 10–15 years and is likely to continue
- Technology change is moving the boundaries of marine science requiring more complex research platforms to support more demanding science projects
- Integrated multi discipline sampling and survey experiments involving different science teams on each individual voyage often require the operation and deployment of many different types of sampling and survey equipment on the same voyage



Supporting increasingly complex research ships

This overview is based on the operating model of the NERC centralised ship and equipment operation which manages the NERC programme centrally, along with a centralised portable equipment and technical support capability. Other operators may manage de-centralised capabilities which may encounter the same type of operational pressures, but apply different operational solutions.

- There is a continued trend for research ship builds to be more complex in design able to support multiple types of research activities on single cruises, with increased quantities of portable equipment and technicians.
- To maximise ship capability, research ship operators and equipment owners need to respond to this increased capability in the following areas;
 - portable sampling and survey equipment
 - experienced, skilled technical support and training overheads
 - shore infrastructure supporting maintenance, storage and movement of equipment
 - Programme / cruise planning & logistics

Some of the drivers for increased complexity of ship design

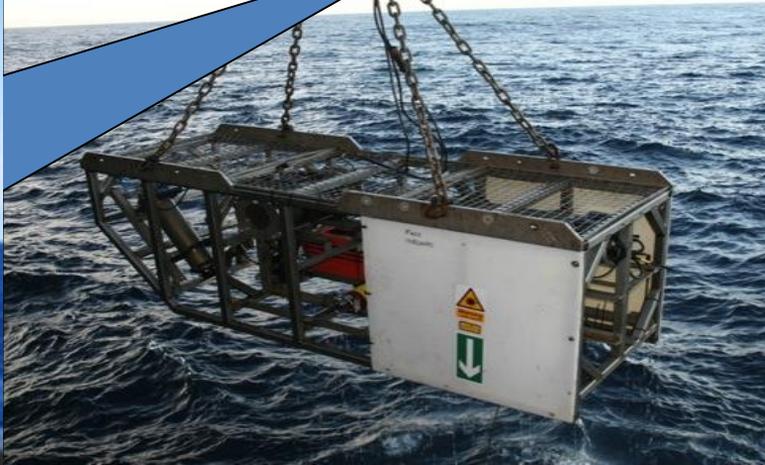
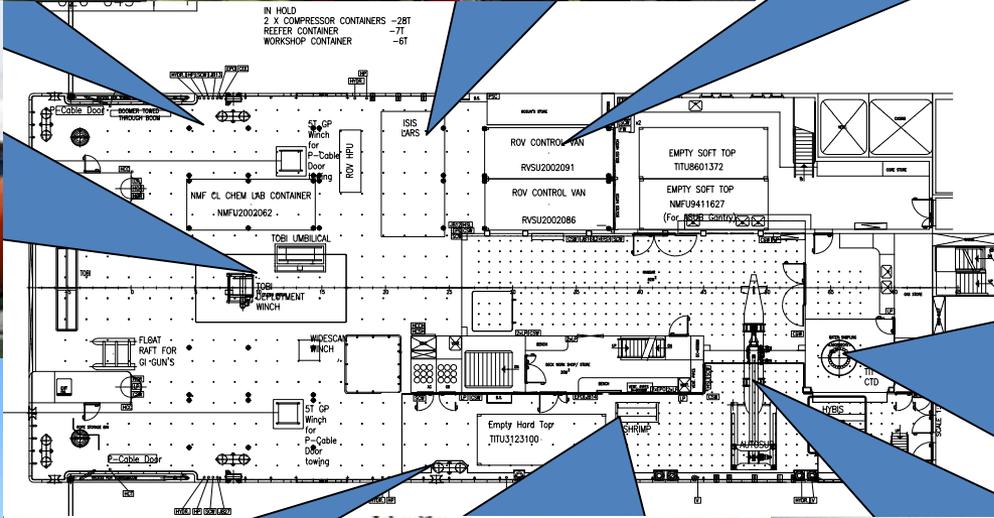
- Science requirements driving multi discipline sampling and survey projects;
 - multidiscipline science teams,
 - increased levels of sampling, survey and handling equipment,
 - increased numbers of embarked technicians and scientists.
- Changing technologies;
 - autonomous sampling and survey systems,
 - long term sea bed observatories,
 - deep sea minerals survey,
 - development of larger and more complex equipment,
 - developments in acoustic survey and positioning technology.
- Increases in ship capability;
 - improved station keeping,
 - developments in winch, handling, rope and cable technologies,
 - increased data band width.



These drivers present the following challenges

- In the early stage of new build projects the impact on fleet support resources and infrastructure can be under evaluated when building the case for a new ship, 'bigger and better' often looks like the best route to securing funding.
- A limiting factor to effective utilisation of large highly capable multi discipline research ships is the availability of portable sampling and survey equipment, and the experienced support technicians to manage the equipment both ashore and at sea.
- There can be a tendency to focus only on the impact of operating the new ship with insufficient focus on the impact on the overall support structure.
- Fleet changes should be considered in an integrated way across the organisation(s) in context of the equipment, technicians and shore based capabilities needed to support new builds, and the impact to the whole delivery capability.
- Study of the impact on overall delivery infrastructure should be a central part of the new build project to evaluate what changes the new build will require across the fleet support.





Conclusion

- Carrying out a study of the impact that a new build programme may have across the integrated operation would identify any requirement to realign or develop support infrastructure and funding to support any changed capabilities of the fleet.
- This impact assessment could support the case for parallel investment for support infrastructure (equipment/technicians/planning/logistics/storage), but only if carried out in the early stage of the ship build assessment; a retrospective study will only identify what could have been done better, and what may need to be done in the future!
 - ✧ *Evaluate operational & technical support requirements in parallel with the ship concept design, and cost both as integral part of build project.*
- Pre-build study of the integrated impact will help set the benefits realisation metrics ensuring they actually align with in service benefits realisation reports down the line
- Managing expectations....only assume that multi discipline science output will increase if the portable equipment and technical staff is available to support new build projects.