RRS Discovery Replacement

Shipbuilder: Construcciones Navales P. Freire, S.A., Vigo, Spain

Designer: Skipsteknisk AS, Norway

Contract placed 29th March 2010

A new multi-role oceanographic vessel to be delivered 2013

18th November 2011

Subset of original presentation by Ed Cooper

Aim & Funding

The project aim is to provide a multi-role oceanographic research vessel comprising state of the art facilities and capable of operating worldwide (tropics to ice edge) in support of leading edge multi-disciplinary research. The vessel will be primarily for deep ocean research but is also capable of conducting continental margin studies.

The new vessel will complement the RRS James Cook which was brought into service in March 2007. Lessons have been learnt from the James Cook Project which are being taken forward in the development of the Discovery replacement.

RRS James Cook 5th July 2006

Funding for the project is being provided by NERC and a capital allocation of £48M from the Science Budget via the Large Facilities Capital Fund administered by the Department for Business, Innovation & Skills (BIS).

Project Funding

- **Estimated total disturbance cost - £75 million**
- **Funding:**
  - **£48 million from BIS (Large Capital Facilities Fund)**
  - **£27 million from NERC**

1960's

1970's & 1980's

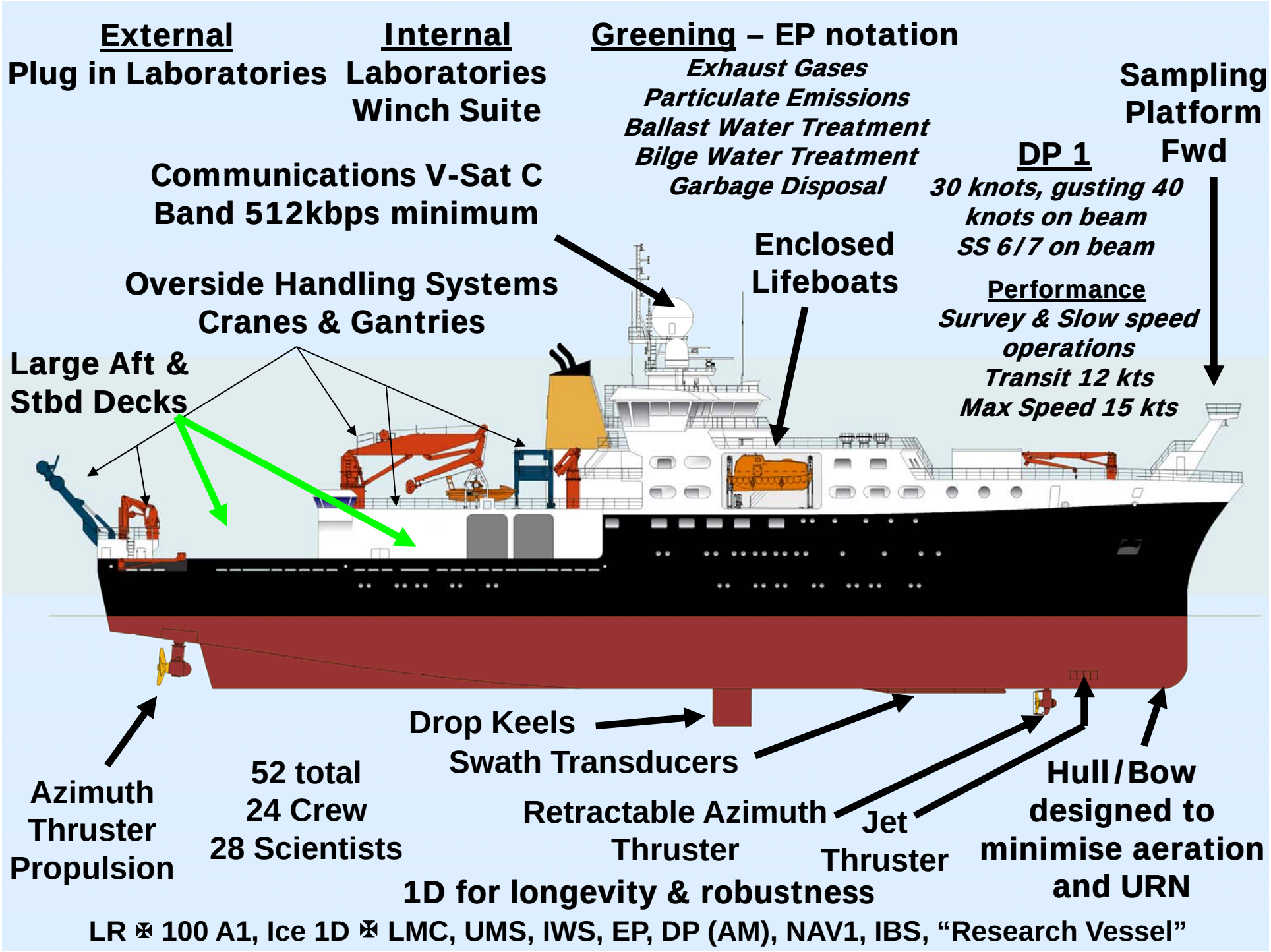
RRS DISCOVERY

1992 – 2013/4

2013 onward

RRS Discovery, 1963 – Hall Russell Aberdeen. Lloyd's 100 A1 UMS Dtp Class VII. Length 90.25m, Beam 14.02m, Draught 5.3m, 3008 tonnes. Passage 11 knots. Endurance 55 days max. 45 days operational. Scientists 28, Marine 22. Multi-role oceanography of all disciplines.

Owned by NERC operated by National Marine Facilities – Sea Systems based at NOCS


External
Plug in Laboratories
Internal
Laboratories
Winch Suite
Greening – EP notation
Exhaust Gases
Particulate Emissions
Ballast Water Treatment
Bilge Water Treatment
Garbage Disposal
Sampling Platform Fwd
DP 1
30 knots, gusting 40 knots on beam
SS 6/7 on beam
Performance
Survey & Slow speed operations
Transit 12 kts
Max Speed 15 kts
Communications V-Sat C Band 512kbps minimum
Enclosed Lifeboats
Overside Handling Systems Cranes & Gantries
Large Aft & Stbd Decks
Drop Keels
Swath Transducers
Azimuth Thruster Propulsion
52 total
24 Crew
28 Scientists
Retractable Azimuth Thruster
Jet Thruster
Hull/Bow designed to minimise aeration and URN
1D for longevity & robustness
LR ✠ 100 A1, Ice 1D ✠ LMC, UMS, IWS, EP, DP (AM), NAV1, IBS, "Research Vessel"

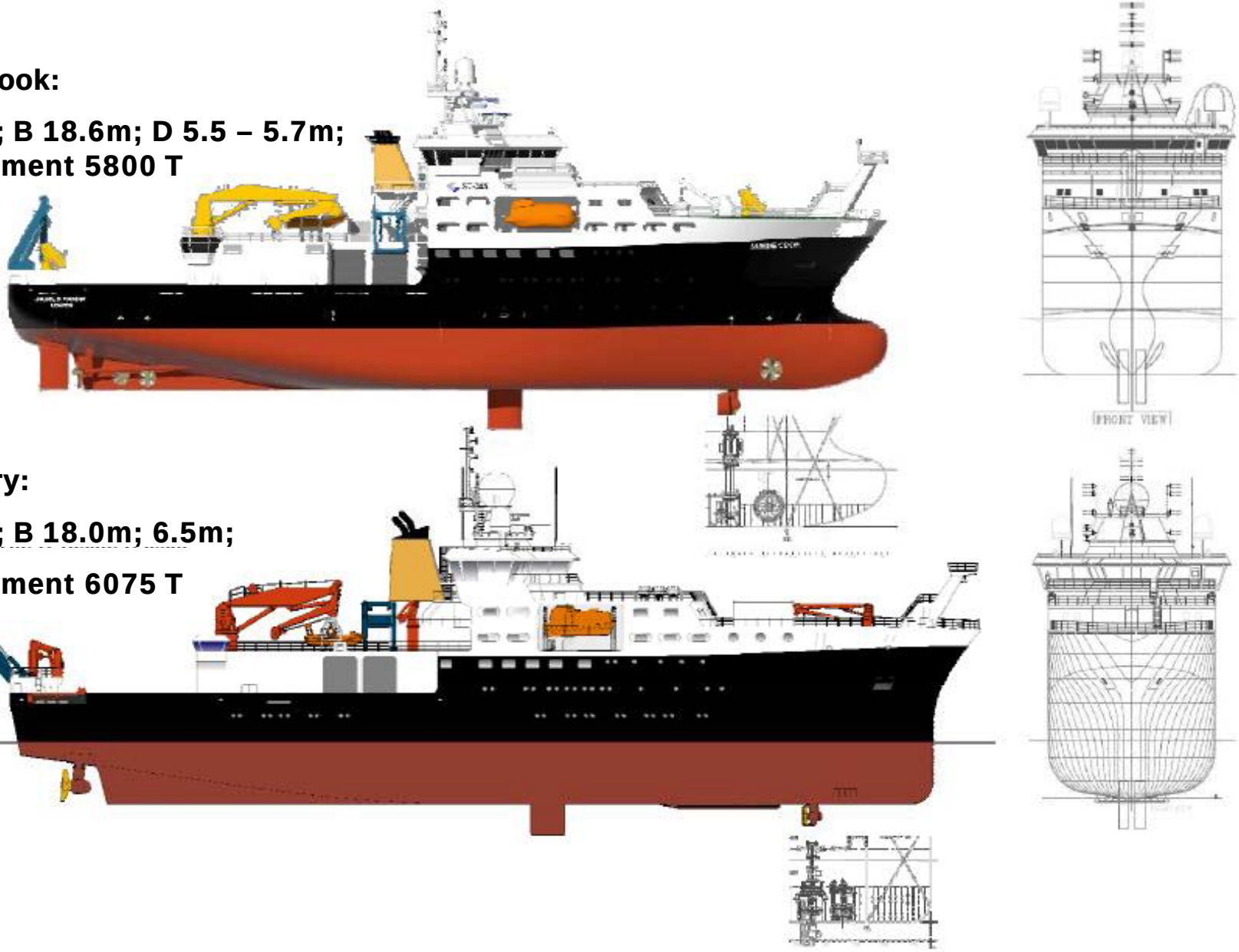
Expected Outcome

- **50 days endurance (L 99.7m, B 18m, D 6.5m)**
- **Scientific Transit Speed – 12 knots maximum**
- **24 Officers & Crew (includes 1 Training Berth)**
- **28 Scientists & Technicians**
- **DP Capable (DP1) SS6/7**
- **Multidisciplinary**
- **Seismic capability**
- **Multibeam(s) & Sub Bottom profiler**
- **Minimal Ice Class – for hull life (Lloyds 1D)**
- **Overside/overstern lifting – 20 tonnes (JC 30 tonnes)**
- **Drop Keels**
- **Low URN but not ICES209**
- **Propulsion – 2 x Azimuthing Units Aft Azimuthing Thruster Fwd, Manoeuvring Thruster Fwd**
- **Oceanographic Winch Suite including Metal Free CTD Winch**

RRS James Cook / Discovery Replacement Comparison

James Cook:

L 89.5m; B 18.6m; D 5.5 – 5.7m;
Displacement 5800 T



Discovery:

L 99.7m; B 18.0m; 6.5m;

Displacement 6075 T

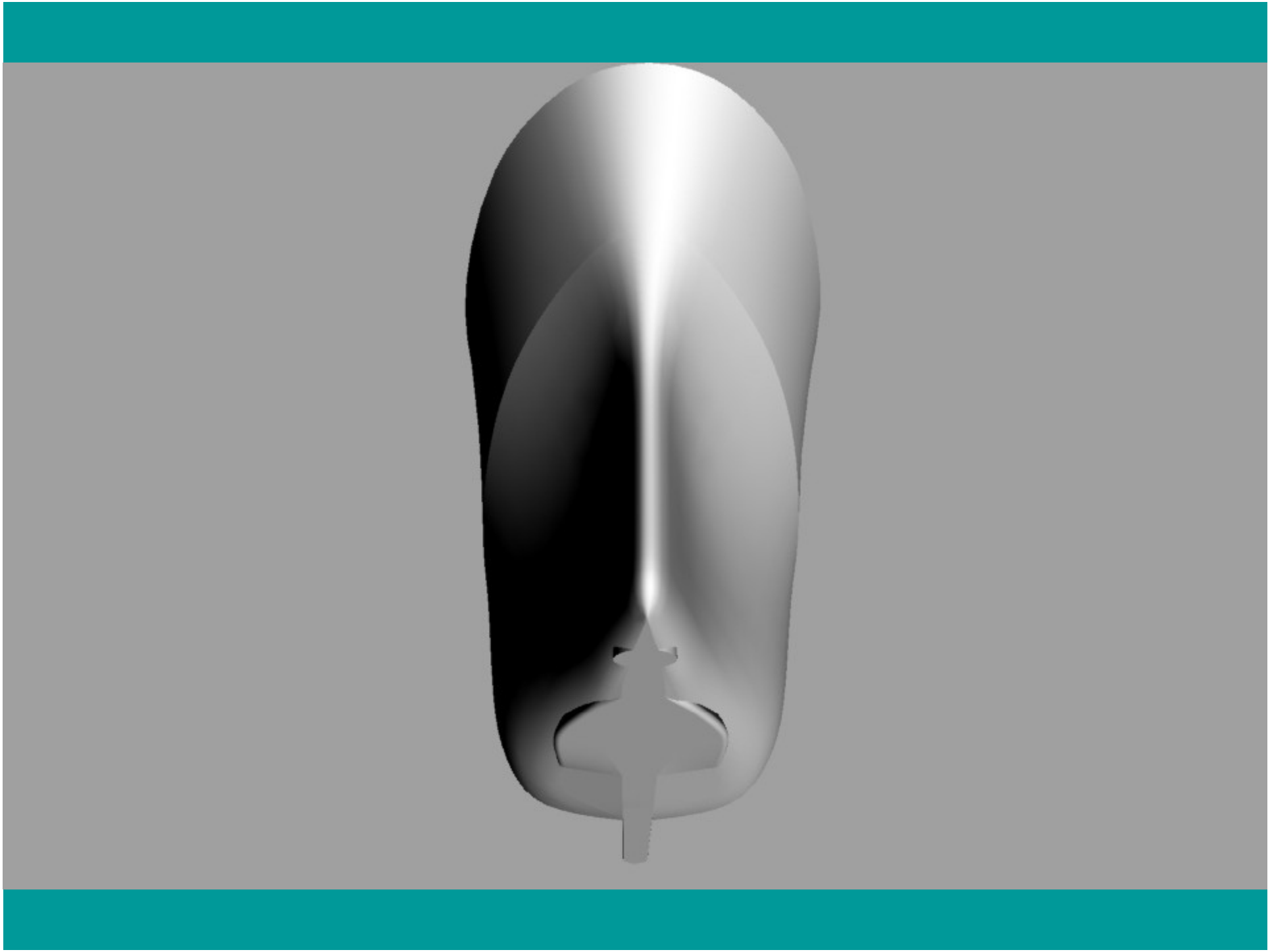
Model Tests

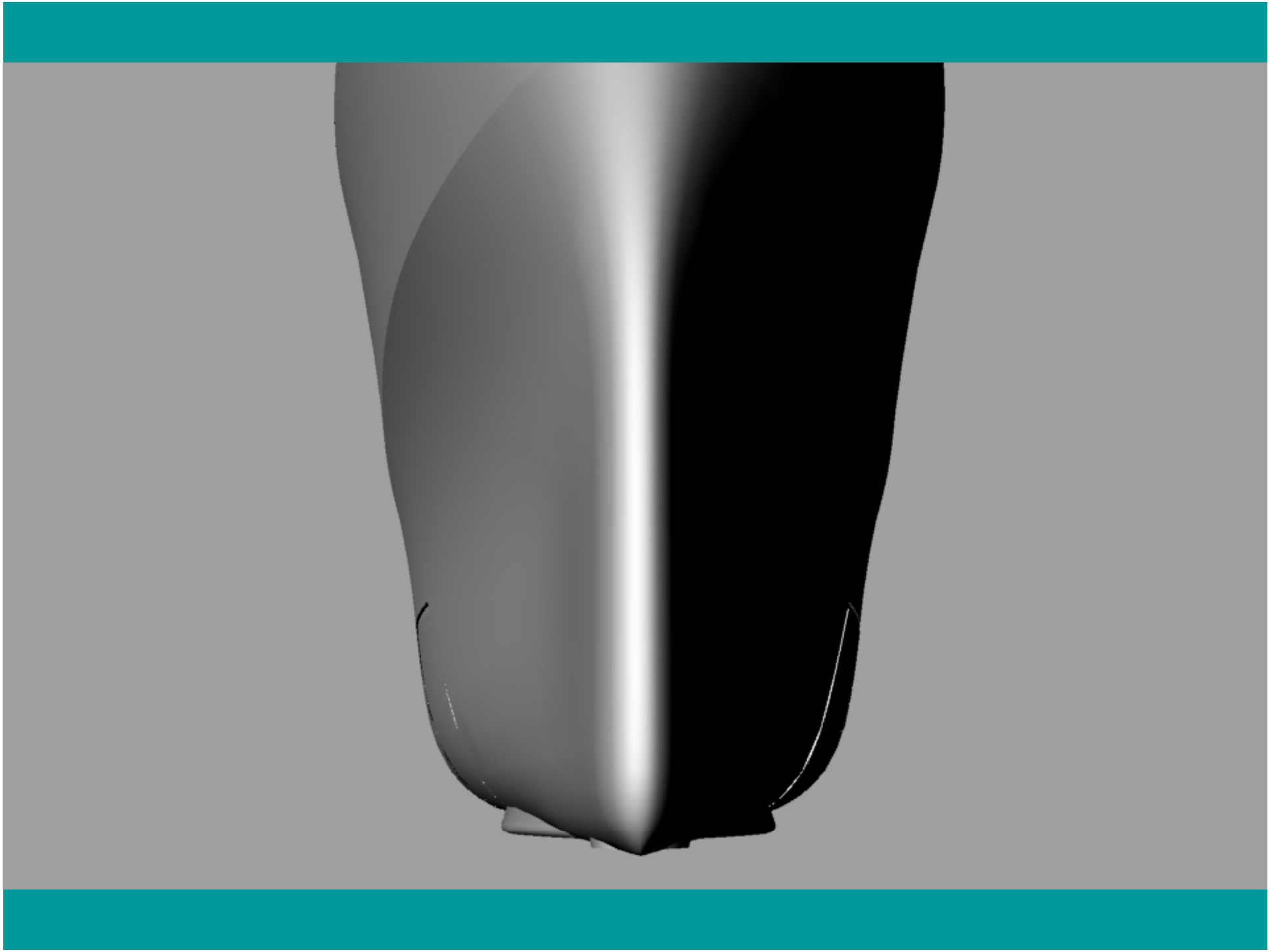
During the design phase of the project a number of model tests & complementary Computational Fluid Dynamics (CFD) simulations have bee conducted to inform and confirm design decisions.

Computational Fluid Dynamics
Resistance & Powering Tests
Seakeeping & Manoeuvering Tests
Propeller Cavitation Tests

A REMINDER OF THE JAMES COOK HULL FORM

DISCOVERY REPLACEMENT HULL FORM





D4RP / NB 704 HULL BUILD PROGRESS

Drawings received for review

Steel cut [PT97 & PL01 – Aluminium]

Under construction

Complete awaiting transfer to slipway

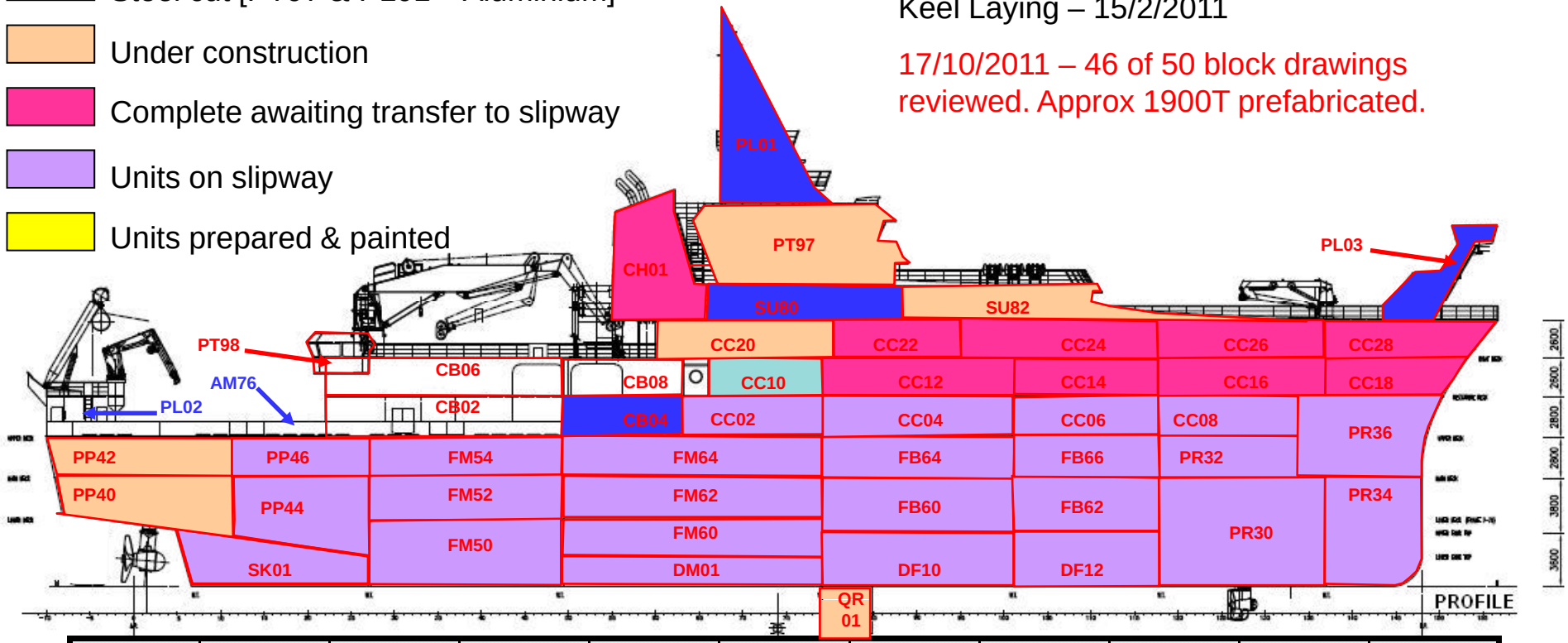
Units on slipway

Units prepared & painted

First steel cut – 11/11/2010

Keel Laying – 15/2/2011

17/10/2011 – 46 of 50 block drawings reviewed. Approx 1900T prefabricated.



1	2	3	4	5	6	7	8	9	10	11
DF10	DF12	DM01	FM50	FB60	FB62	PR30	PR34	FM60	FM62	FM52
12	13	14	15	16	17	18	19	20	21	22
SK01	PP44	PR36	PP40	PR32	FB66	FB64	CC08	CC06	CC04	CC18
23	24	25	26	27	28	29	30	31	32	33
CC16	CC14	CC28	CC26	FM64	FM54	PP46	PP42	CC02	AM76	CC12
34	34	36	37	38	39	40	41	42	43	44
CC10	CC24	CC22	CC20	SU82	SU80	CB04	CB02	CB08	CB06	CH01
45	46	47	48	49	50					
PT98	PT97	PL01	PL02	PL03	QR01					

BUILDING SEQUENCE – CNP FREIRE


11/11/2010 First Steel Cut

15/02/2011 Keel Laying Event – part of DF10

Hull Assembly 6/5/2011

PR34 4/5/2011

SK01 & FB66 6/5/2011

PR36 6/5/2011

Diesel Main Generator in Shanghai 6/9/2011


FREIRE
2/7/2011

04/10/2011 Blister with Transducer Openings


FREIRE

Block PP40 – 14/10/2011

Block PP42 14/10/2011

Planned Timescales

- **March 2010 - Contract Award.**
- **Build Period 2010 – 2013.**
  - **Milestone 5 – Deliver generators – November 2011.**
  - **Milestone 6 – Deliver propulsion – December 2011.**
  - **Milestone 7 – Ready for Launch – January 2012.**
  - **Milestone 8 – Deliver winch system – April 2012.**
  - **Milestone 9 – Start Generators – September 2012.**
  - **Milestone 10 – Start Sea Trials – January 2013.**
  - **Milestone 11 – Vessel Delivery – 3rd June 2013.**
- **Commissioning & Trials Q3/4 2013.**
- **Available for Science Programmes early 2014.**

NB. Existing RRS Discovery operational until end 2012.

Future Timescales

- **March 2012 Hull Launch**
- **2012 Outfitting**
- **2013 Equipment Run Up & Sea Trials**
- **June 2013 Delivery to NERC**
- **June – Dec 2013 Commissioning, Familiarisation and Deep Water Trials**
  Science Equipment
- **2014 Available for Science Programmes**

Model