



THIS SECTION

**Facilities**

# The RRS Discovery

**RRS Discovery is a multidisciplinary ship, specifically designed for the challenges of 21st century oceanography**

The NOC operates two world-class research ships with state-of-the-art capabilities. Our **SCROLL LEFT / RIGHT TO VIEW**

newest research ship and the fourth ship of its name, RRS *Discovery* is a multidisciplinary ship, specifically designed for the challenges of 21st century

oceanography.  
[Privacy and cookies](#)

RRS *Discovery* was designed by A.S. Skipsteknisk and was delivered to the National Oceanography Centre on the 8 July 2013. Fitted with the most up-to-date and high-tech instruments and equipment, it is ideal for oceanic exploration. **COOKIE SETTINGS**

With the ability to travel to remote and extreme oceanic environments, RRS *Discovery* is highly sophisticated and has the ability to operate in high sea states (up to sea-state 6). The ship comes with sub-bottom profiling and multi-beam equipment for mapping the seabed, while her dynamic positioning capability means that Remotely Operated Vehicles can be used. Her wide range of cranes and over-side **ACCEPT ALL**

gantries, with associated winches and wires, will allow many different types of equipment to be deployed from the ship. These facilities and the many more listed below help support the marine science community as it undertakes research of national and global importance.

## RRS Discovery Virtual Tour

Explore one of the world's most advanced research vessels from the bridge to the engine room.

### Specifications and capabilities

We use cookies to aid user experience. Accept, reject or revoke consent at any time in

“[Cookie settings](#)”.

[Privacy Integrated data logging](#)

- Single and multi-beam echosounder surveys
- Seismic surveys
- Clean seawater sampling
- Remotely operated vehicle operations
- CTD surveys
- Deep-water coring, trawling, dredging and instrument towing

COOKIE SETTINGS

REJECT ALL

ACCEPT ALL

# Scientific facilities

## Handling systems

The RRS *Discovery* is fitted with a range of handling systems including a comprehensive suite of winches, allowing operations to be conducted from both the starboard side of the ship and the stern. Provision of two separate systems on the starboard side enable both to be rigged with working cables simultaneously, which will facilitate swapping of differing operations between the two deployment points seamlessly. The permanently fitted winch suite is located in a purpose built winch room on the main deck of the ship where the wire is fed up to the gantries on deck. Winches on the research ship are used for a multitude of operations including:

- To lower sensor packages such as conductivity, temperature and depth (CTD) sensors through the water column;
- To lower coring systems to the seabed to obtain samples from the seabed and sub-seabed;
- Towing of platforms such as the Towed Ocean Bottom Instrument (TOBI) for seabed mapping;
- Towing of undulating sensor platform to measure water properties while underway;
- Towing of deep-sea trawling and net systems.

## Laboratories

The ship contains a range of laboratory spaces that can be flexibly configured to support multiple scientific activities on each expedition. A wide variety of scientific activities can be conducted concurrently on board RRS *Discovery*, as the research vessel is sub-divided into ultraclean, clean, normal, and temperature-controlled areas, with sufficient flexibility to be used for multiple needs. 'Dry' labs are used for housing electronic systems such as the user-interface to the hydroacoustic suite in the main laboratory. Some labs, for example, the deck lab, can be configured either as 'wet' or 'dry' depending on the nature of the science being undertaken. Specialist laboratory needs are often provided through the use of containerised laboratories. In total, the RRS *Discovery* has 390m<sup>2</sup> of laboratory space, as well as positions for up to seven 20-foot container laboratories on deck. The ship also contains a substantial scientific stores area, including areas for frozen and refrigerated samples.

REJECT ALL

## Working decks

RRS *Discovery's* working decks are designed with flexibility in mind, with deck areas uncluttered by fittings and as open as possible for fitting of a wide variety of equipment. RRS *Discovery* has working deck space

ACCEPT ALL

of 432m<sup>2</sup> and slots for 18× 20-foot containers.

## Permanently fitted sensors and instrumentation

The RRS *Discovery* is configured with a suite of state-of-the-art sensors, as well as a modern computerized data logging and distribution system.

### Hydroacoustic suite

The hydroacoustic suite is one of the most important components of the RRS *Discovery's* sensor outfit. These sensors are mounted in two main areas: the large bottom mapping multibeam echo-sounder transducer is fitted in a novel design bottom 'blister', while a range of other acoustic instruments are fitted within two drop keels.

## Bridge equipment and propulsion

### Bridge equipment

RRS *Discovery* is one of the most sophisticated research ships afloat and has been designed and commissioned with a full suite of modern navigation and communications systems, including a dynamic positioning system.

Task	System	RRS <i>Discovery</i>	RRS <i>James C</i>
<b>Communications</b>	Stabilised C Band V-Sat	Standard 256Kb/s	Standard 256K
	Sat B	Sailor 250 Broadband	NERA
<b>Navigation</b>	Sat C	Sailor	Sailor
	Global Maritime Distress and Safety System	Sailor 6222 plus other items	Sailor DT4646
	Portable	Iridium	Iridium
<b>Navigation</b>	Integrated bridge	Kongsberg K Bridge	Kongsberg BL
	Echo sounder 1	REJECT ALL Skipper GDS102 50kHz and 200kHz	Kongsberg EA
	Echo sounder 2	ACCEPT ALL Skipper GDS102 50kHz and 200kHz	Kongsberg EA

We use cookies to aid user experience. Accept, reject or revoke consent at any time in "Cookie settings".

[Privacy and cookies](#)

COOKIE SETTINGS

Task	System	RRS <i>Discovery</i>	RRS <i>James C</i>
	Radar	Kongsberg S-Band 30kW Kongsberg X-Band 25kW	Kongsberg
	GPS 1	MX512	Kongsberg MX
	GPS 2	MX512	Applanix POSI
	GPS 3	Applanix PosMV 320	Ashtech ADU5
	GPS 4	Seatex Seapath 300	DPS116
	GPS 5	Fugro Marinestar 9200	Seatex Seapat
	GPS 6	C-Nav 2050	–
	Gyro	3× Navigat X Mk 1	Sperry C.Plath Mk1
	Chart system	Kongsberg K-Planning	Kongsberg Sea
	Speed log 1	Skipper DL 850	Kongsberg Do
	Speed log 2	Skipper DL 850	Chernikeef Aq
	Voyage data recorder	Maritime Black Box MBB	Kongsberg MB
	Automatic Identification System	Kongsberg AIS200	Kongsberg AIS
	High resolution picture transmission	Dartcom	Dartcom
	USBL 1	Sonardyne	Sonardyne
	USBL 2	Sonardyne	Sonardyne
<b>Dynamic positioning</b>	–	Kongsberg K-POS DP-22	Kongsberg SD

## Propulsion

The ship is configured with a novel azimuth thruster propulsion system configuration compared to a conventional fixed shafts/propellers and rudders. The thrusters can be independently rotated through 360° which will make the vessel extremely manoeuvrable. This configuration has also been selected with fuel efficiency in mind while the ship is also some 10 metres longer (and slightly narrower) than the RRS James Cook, the additional length also contributes to fuel efficiency.

COOKIE SETTINGS

## On-board equipment

RRS *Discovery* comes with a range of in-built equipment that scientists will use on an expedition enabling samples to be collected and measurements to be taken.

ACCEPT ALL

## ADCP

Acoustic Doppler Current Profilers (ADCPs) are a type of sonar device measuring velocity (speed and direction) of the water by sending out a 'ping' sound wave, then measuring the return time and frequency. By combining several sonar transmitters and receivers with amplifiers and signal processing electronics or software, ADCPs are able to calculate the speed and direction that the water is moving using the Doppler effect. Speed and direction can be calculated over a range of depths, giving a two dimensional profile.

Both NOC ships are fitted with 75kHz and 150kHz ADCPs. The 75kHz ADCP can typically measure currents down to a depth of 560–700m, while the 150kHz will typically operate to a maximum range of 375–400m.

## Air and water sampling

Air and water samples are continuously taken during a research expedition. Information about surface temperature and sea conditions are collected for scientists to create models of the climate. Surfmet is the Surface Water and Meteorological monitoring system consisting of two parts: one takes seawater from a few metres below the surface and passes this water through a series of instruments that measure the different characteristics of the water at that near the surface; the other consists of meteorological instruments located high up the forward mast. (~10m above sea level)

Surface water measurements include: salinity, measured by a thermosalinograph; chlorophyll, measured by a fluorometer and particulate matter in the water column; using a transmissometer.

Air measurements include: temperature and humidity using a sensor, wind speed using an anemometer and the air pressure using a barometric pressure sensor. Light readings are also taken using light meters measuring both the total solar energy and the photosynthetically active radiation.

## Data logging

We use cookies to aid user experience. Accept, reject or revoke consent at any time in

Each research ship has a data logging system to record multiple pieces of data including GPS positions, meteorological measurements such as temperature, humidity and air pressure or sonars measuring water depth, simultaneously. The high cost of running a research ship means that these measurements must be recorded reliably so that the valuable data is not lost. The data logger records the data generated by each instrument. It also records the time that each data item was generated at. The data logger synchronises its time with GPS satellites, which gives a time accurate to a couple of milliseconds. Current data loggers are PCs running reliable industrial grade operating systems with RAID storage disks. The data loggers save the data in a format that is well documented so that scientists and the British Oceanographic Data Centre can read the data.

ACCEPT ALL

## Echo-sounders

Echo-sounders are types of sonar devices that use sound to measure distances underwater. They are used to find objects in the water column such as fish or bubbles from sea vents or to calculate the depth of the water. An echo-sounder works by transmitting a pulse of sound directly downwards from the ship. Once the pulse bounces off the seabed it travels back to the ship. Using the length of time it takes for the pulse to return, along with the known speed of sound in water, the depth can then be calculated. Multi-beam echo-sounders are used to map large areas of the sea bed from the ship using an array of transducers and signal processing electronics.

## Ultra Short Base Line

Ultra Short Base Line (USBL) is a technique using sound waves to measure the position of an object that is underwater relative to the ship. It is important when using remotely operated vehicles, towed vehicles and drills. The underwater vehicle is fitted with a USBL beacon, which is able to detect pulses from the transceiver on the ship's hull and can then return the pulse. Using both the bearing and the return time of the pulse the transceiver is able to calculate the position of the vehicle to a high level of accuracy.

## Satellite Internet and Phones

RRS *Discovery* is fitted with a C-band VSat antenna which is subscribed to a time-division-multiple-access (TDMA) internet connection service over satellite. This provides the ship with a guaranteed download speed of 1.5 Mbps (~183KB/s), a guaranteed upload speed of 1.5Mbps (~183KB/s) and four telephone lines when a stable link has been established. The TDMA allows bursts of up to 10 Mbps, depending on whether there are other ships using the same satellite. The ship is also fitted with a pair of Thrane&Thrane Cobham Sailor 500 antennae which provide up to 256Kps (~32KB/s) internet and a satellite phone. We use cookies to aid user experience. Accept, reject or revoke consent at any time in

[IT Provision on NMF-Operated Ships](#)  
[Cookie settings](#).

[Privacy and cookies](#)

## Winch systems

Scientific winches are used to: COOKIE SETTINGS

- Lower sensor packages such as Conductivity, Temperature and Depth (CTD) sensors through the water column; REJECT ALL
- Lower coring systems to the seabed to obtain samples from the seabed and sub-seabed; ACCEPT ALL
- Tow platforms such as the Towed Ocean Bottom Instrument (TOBI) for seabed mapping;

- Tow undulating sensor platform to measure water properties while underway;
- Tow deep-sea trawling and net systems.

The permanently fitted winches live in the bottom of the ship, where the wire is fed up to the gantries on deck. The table below shows the types and properties of the permanently fitted winches found on our ships.

Task	Wire construction	Wire length (m)	Wire diameter (mm)	Safe working load (T)	Mean breaking load (T)	Weight in water (kg·km <sup>-1</sup> )	Operation	P
<b>Coring</b>	Steel	7,000	16.5	11	18.56	780	Direct pull	1
<b>Trawling</b>	Tapered steel	8,300	14.5	11.5	13.00	638	Direct pull	≤
		4,350	16.5		18.10	780		(f
		2,350	18.00	12.5	20.90	1,133		le
<b>Deep tow</b>	Steel armoured electro / optical cable for high data transmission	10,000	0.68" (~17.3)	11	18.14	806	Shared traction winch with level winds for each storage drum	1
<b>Deep coring</b>	Plasma rope	8,000	0.875" (~22.0)	30	75.00	Buoyant Specific gravity = 0.98	20	2
<b>Standard CTD</b>	Steel armoured	8,000	0.45" (~11.43)	5	8.39	417	Traction winch with level wind	5

## Current Expeditions

Find out where our ships are now and what they are doing.  
 We use cookies to aid user experience. Accept, reject or revoke consent at any time in "Cookie settings".

## Marine Facilities Planning

This website allows Scientists to apply to use marine facilities from the Natural Environment Research Council (NERC), the Nederlands Instituut voor Onderzoek der Zee (NIOZ) or GEOMAR Helmholtz Centre for Ocean Research Kiel.

COOKIE SETTINGS

## Commercial Hire of Research Vessels

Our multidisciplinary oceanographic research vessels are available for charter by marine organisations operating within the UK and internationally.

ACCEPT ALL



## Accessing equipment

For information relating to accessing the ships please email

✉ [chartering@noc.ac.uk](mailto:chartering@noc.ac.uk)

We look forward to hearing from you.

We use cookies to aid user experience. Accept, reject or revoke consent at any time in “Cookie settings”.

[Privacy and cookies](#)

COOKIE SETTINGS

REJECT ALL

ACCEPT ALL

Registered address:

European Way, Southampton SO14 3ZH

Company no.: 11444362

Charity no.: 1185265 (England and Wales)

SC049896 (Scotland)

+44 (0)300 131 2321 Southampton  
+44 (0)151 795 4800 Liverpool

## Get in touch

[Contact us](#)

[Media Enquiries](#)

[Staff Directory](#)

## Ocean News

Bite-sized updates straight to your inbox

[Subscribe now](#)

We use cookies to aid user experience. Accept, reject or revoke consent at any time in

["Cookie settings"](#)  
**Help our ocean thrive**

[Privacy and cookies](#)  
Play a part in delivering scientific understanding and education

[Support us](#)

COOKIE SETTINGS

REJECT ALL

## Follow us



© 2025 The National Oceanography Centre (NOC) owns copyright of the material available at this site, unless otherwise stated. All rights reserved.

[Disclaimer](#) [Privacy and cookies](#) [Cookie settings](#) [Modern slavery](#) [Contact us](#) [Staff resources](#)

We use cookies to aid user experience. Accept, reject or revoke consent at any time in “Cookie settings”.

[Privacy and cookies](#)

COOKIE SETTINGS

REJECT ALL

ACCEPT ALL