National Oceanography Centre

ANNUAL REPORT & FINANCIAL STATEMENTS

FOR THE YEAR ENDED 30 SEPTEMBER 2022

REGISTERED NUMBER 11444362

CHARITY NUMBERS 1185265 & SC049896

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NATIONAL OCEANOGRAPHY CENTRE
A COMPANY LIMITED BY GUARANTEE

Annual Report and Financial Statements

Year Ended 30 September 2022

Registered Number 11444362

Charity Numbers 1185265 & SC049896

FOREWORD BY THE CHAIR OF TRUSTEES

I would like to thank John Hirst for his outstanding leadership, and I am looking forward to chairing a Board of such committed and knowledgeable leaders.

I am thrilled to be joining NOC at such a critical time for ocean research and technology. The work done by the dedicated scientists and innovators at NOC is crucial to protecting our ocean and our planet. The passion NOC's experts have for their work is inspiring to see and I look forward to helping them ensure that their important work has global impact and recognition.

With the turbulent political and economic environment, there will be challenging times ahead for all organisations. NOC is an established world leader with a strong reputation for excellence and a sound sustainability strategy and business plan. I look forward to us continuing our vital work in the coming year.

JEREMY DARROCH
CHAIR OF BOARD OF TRUSTEES
27 APRIL 2023

MESSAGE FROM THE FORMER CHAIR

The 2021 State of the UK Climate report was a reminder that temperatures continue to rise, and with that, we see considerable sea level rise. The important role of the ocean in climate was clear at COP26 last year, and growing from that, we are now part of a global Blue Ocean Pavilion at COP27, working with the world's leading ocean institutes to influence the climate agenda. We have been prominent on the national and international stage this year when it comes to advocating for the ocean and putting science and technology at the heart of understanding our seas.

Another key area where NOC is leading in this space is in the development of net zero oceanographic capability. We published a ground-breaking report on this, leading to the Natural Environment Research Council developing its own programme for across the whole community. As others set their own net-zero targets, NOC can work in partnership with industry to inform and advise on solutions and mitigation.

We continue to raise awareness of the ocean with public and policy makers, and we celebrated World Ocean's Day this year with a stakeholder event for Government colleagues and donors, and a huge Open Day for thousands of members of the public to learn about the importance of the ocean and the role NOC plays in educating and advocating for its future health.

This is our third annual report as an independent charity, and my last as Chair because I reach the end of my term this year. I will miss working with NOC, but I step down knowing it is in good hands, with a very strong Board and a dynamic new Chair in Jeremy Darroch. I would like to thank my fellow Board members and all the staff at NOC, who strive to make a difference to the world through our work with the ocean.

JOHN HIRST CBE
FORMER CHAIR OF BOARD OF TRUSTEES

REPORT OF THE CHIEF EXECUTIVE

We took the opportunity of our third year of independence to ensure we are staying true to our core purpose – balancing our science and technology aspirations with our determination to diversify our income by working in new areas. As a result, we reviewed and refreshed our Purpose as an organisation with our staff, and we know that we unite around our goals with a shared passion.

We continue to play a vital role in the United Nations Decade of Ocean Science, and have led and partnered on a number of projects endorsed this year. We have grown our activity influencing domestic and global agendas, with our experts advising the UK Government at G7 fora and international meetings, as well as providing the scientific evidence and expertise on key ocean issues with our own Parliamentarians at home, through Select Committees, events and Party Conferences. There is no doubt that NOC is ensuring conversations and decisions about the ocean are based on sound science and innovation leadership.

I was particularly proud of our work with the Government of Saint Lucia this year, through the Disaster Vulnerability Reduction Project. We installed three new tide gauges to help reduce the island's vulnerability to natural hazards and climate change. The network of tide gauges will continuously measure and report sea level and tidal variability, providing valuable information to local seafarers and port authorities, as well as being an important addition to the Caribbean Early Warning System for tsunamis and other coastal hazards.

This example clearly illustrates how observing the ocean remains fundamental to understanding its effect on human lives. This year, we led a review of the UK funded ocean observations, both in the context of our own science and as global contributors to the shared efforts in this area. We will publish the outcomes of this and make recommendations to the Natural Environment Research Council on what the UK priorities are in this area. Our world leading developments in observing were also recognised by industry, when Teledyne chose NOC to service all of its European gliders. This year, we celebrated the 25th anniversary of our first underwater autonomous vehicle mission, so it was a great time to reflect how far we have come in this technology.

Thank you to every person and every team at NOC. Our staff continue to be our greatest assets and we were proud to be awarded our Silver accreditation by Investors in People this year. We continue to house world leaders; nurture our own talent, and build teams that support our organisation to grow and thrive.

PROFESSOR ED HILL CBE
CHIEF EXECUTIVE
27 APRIL 2023

CHARITABLE PURPOSE & OBJECTS

NOC's charitable objects, which were developed to benefit the public and the world in which we live together, are as follows:

THE ADVANCEMENT OF SCIENCE, in particular enhancing the scientific knowledge and understanding of oceanographic sciences, and the ocean and its interaction with the earth system, and facilitating the use and application of that knowledge and understanding, particularly by:

a. Undertaking and causing to be undertaken research including through technology development, experimentation, analysis, long term ocean observation, monitoring, mapping, survey and modelling of a high international standard and disseminating the useful results of research.

b. Providing access to scientific research and technology development facilities and infrastructure including research ships and other measurement platforms and systems to the ocean science community.

c. Obtaining, managing, curating and providing access to digital data, samples and other specimens.

d. Being the UK national focus for ocean science, exercising leadership for and promoting co-operation with the wider UK science community, and providing national and international visibility and expert representation for oceanographic sciences.

e. Innovation or by encouraging and supporting innovation.

THE ADVANCEMENT OF EDUCATION IN OCEANOGRAPHIC SCIENCES, and the ocean and its interaction with the earth system and relationship with people, particularly by:

a. Contributing to the education (particularly post graduate higher education), training and development of the next generation of scientists, engineers, technologists including the supervision of postgraduate research students.

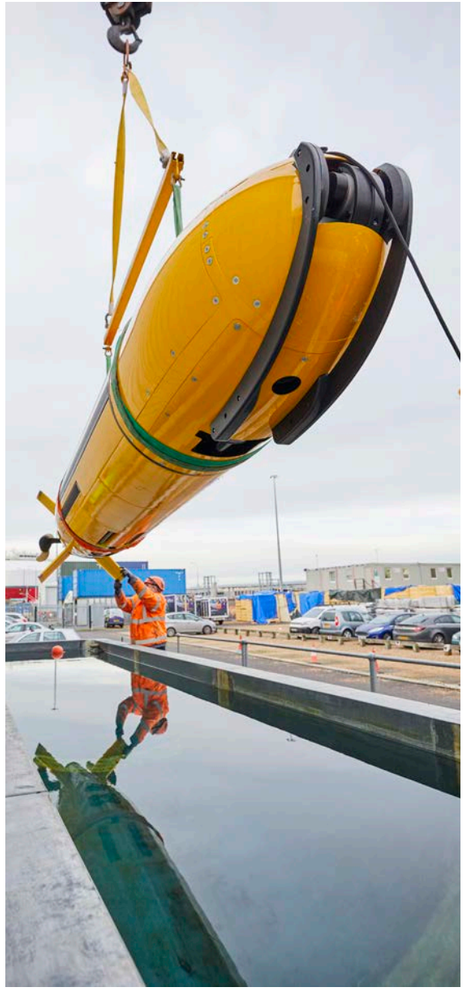
b. Supporting the building of marine research scientific and technical capacity in other countries around the world.

c. Communicating with and engaging with the public in relation to ocean science and technology through seminars, talks, leaflets, papers and other means.

OUR BENEFICIARIES

We exist to make a difference, so our beneficiaries are at the forefront of all we do. They include:

- **The public all over the world** - inspiring, informing and educating.
- **Marine life and ecosystems** - protecting our world so it works in harmony.
- **Scientists, engineers and researchers** - nationally, internationally and in developing countries.
- **Young people and students** - encouraging study, research and careers in oceanography.
- **Government** - informing decision making through robust evidence.
- **Offshore operators** - ensuring those who use the ocean do so in a safe and sustainable way.
- **NOC teams** - making sure our people have a career that inspires and motivates them.



OUR VISION, MISSION & VALUES

OUR VISION

Our vision for the NOC is by 2025 to be seen as the world's most innovative oceanographic institution.

OUR MISSION

Our main mission is to make sense of changing seas, upon which future human prosperity and well-being depends. The way in which we intend to achieve our mission is by:

- undertaking and enabling world-class science and technology development;
- providing large research facilities and access to data and samples for the benefit of UK science; and
- creating value and public benefit by supporting, with scientific evidence, the development of public policy, hazard assessment, ocean governance and regulation, and sustainable development.

Going forwards, we will better exploit the synergies across these different supporting pillars of our mission to drive novel and innovative approaches to our work, enabling us to do things that are distinctive and that few others could do.

OUR VALUES

EXCELLENCE

ENVIRONMENTAL RESPONSIBILITY

INNOVATIVE THINKING

INTEGRITY

EMPOWERMENT

WORKING IN PARTNERSHIP

PUBLIC BENEFIT STATEMENT

In setting the vision and mission for the NOC, the Trustees gave due consideration to the guidance on public benefit, as outlined by the Charity Commission of England and Wales and the Scottish Charity Regulator OSCR.

NOC's key driver for selecting topics for research is always what will take ocean science forward for the furtherance of our charitable purpose, our touch stone in all endeavours is increasing knowledge to deliver public benefit.

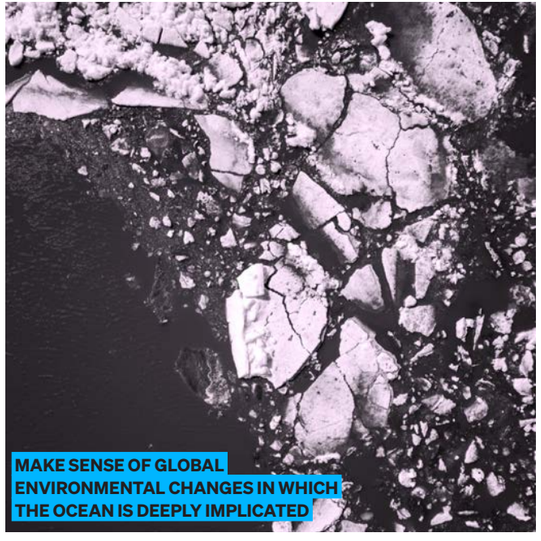
To enable the organisation and individuals to exercise independent discretion in this decision making we have established an Activity Decision Tree. Its general principles are applied when deciding whether activity is routed through the National Oceanography Centre (NOC) or the trading subsidiary: National Oceanography Centre Innovations Limited (NOC Innovations Ltd). This includes examination of ethical considerations, reputational risks, organisation and scientific independence of NOC, where the benefit is accrued and risk and mitigations thereof.

Where contract research is undertaken by NOC we do so in line with the Commission's guidance on Research by Higher Education Institutions, and ensure it is funded at full economic cost, often by matching funding across the portfolio. NOC retains scientific control of any IP licensed so that it can continue to advance science and technology for the benefit of the public.

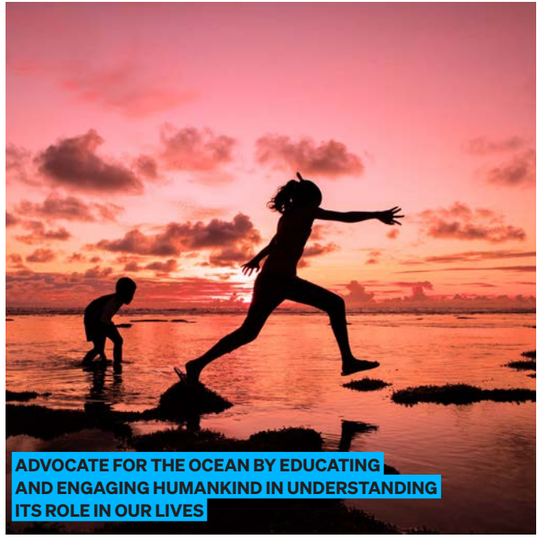
NOC and our trading subsidiary, NOC Innovations, bring benefits in a number of ways, including through scientific research, marine technology, education, information and advice. Through our work, we aim to do five things:

GROW MARINE-BASED ECONOMIES WHILST PROTECTING THE OCEAN'S FUTURE HEALTH

PROTECT PEOPLE AND ECONOMIC INFRASTRUCTURE FROM MARINE-RELATED DISASTERS



MAKE SENSE OF GLOBAL ENVIRONMENTAL CHANGES IN WHICH THE OCEAN IS DEEPLY IMPLICATED



ADVOCATE FOR THE OCEAN BY EDUCATING AND ENGAGING HUMANKIND IN UNDERSTANDING ITS ROLE IN OUR LIVES

ADDRESS ISSUES OF NATIONAL IMPORTANCE REQUIRING INTERDISCIPLINARY SCIENCE; A STRONG EMPHASIS IN GLOBAL INFLUENCE

OUR BOARD OF TRUSTEES

JEREMY DARROCH
INCOMING CHAIR OF THE BOARD

For 14 years, Jeremy has been instrumental in leading Sky into a new era of environmental awareness with a substantial commitment to environmental sustainability. He helped launch major initiatives designed to bring awareness to the challenges facing the environment.

DAVID GEE
AUDIT AND RISK COMMITTEE CHAIR

David is a strategically orientated senior business manager and finance professional with a focus on value creation with a proven track record of strategic definition and management.

SARAH KENNY OBE
REMUNERATION COMMITTEE CHAIR

Sarah is the Chief Executive Officer at the BMT Group, a leading international multi-disciplinary engineering, science and technology consultancy offering a broad range of services, particularly in the defence, energy, environment, shipping and ports and logistics sectors.

JOHN HIRST CBE
FORMER CHAIR OF THE BOARD

John is a highly experienced business leader in both the private and public sectors serving at board level for over 20 years. His previous roles include CEO of the Met Office, where he was also the UK Permanent Representative to the World Meteorological Organisation. He is also chairman of BSI and Anglian Water.

DR RUTH BOUMPHREY

Ruth is the Chief Executive Officer at Lloyd's Register Foundation, a global charity protecting life and property and supporting education, engineering-related research and public engagement.

PROFESSOR SIR IAN BOYD FRS

Ian is a marine and polar scientist who was Chief Scientific Adviser to the UK Government on Food and the Environment. He is currently a Professor at the University of St Andrews and the Chairman of the UK Research Integrity Office.

NOC EXECUTIVE ATTENDEES

Professor Ed Hill CBE
Julie Pringle-Stewart, Company Secretary
Professor Angela Hatton

OBSERVERS

NERC

Victoria McMyn (Up to June 2022)
Nigel Bird (July 2022 onwards)

NOC Association

David Thomas (Up to December 2021)
Mark Inall (January 2022 onwards)

DANIEL HOOK

Dan is a Naval Architect and Chartered Engineer with over 18 years' experience in the marine industry. Dan worked as a naval architect on the development, testing and trials of a wide range of specialist craft. He is now the Chief Technology Officer of Ocean Infinity and Director of several start-up marine tech companies.

DR SARAH MCMATH

Sarah is the Chief Executive Officer, of Market Operator Services Ltd (MOSL). MOSL allows 1.2 million businesses, public sector bodies, charity and not-for-profit organisations in England to choose who provides their water retail services.

OUR STAKEHOLDERS

During the year, NOC has continued developing its formal framework for engagement with stakeholders, led by the Executive Committee, with the Board being briefed on and involved with setting the strategy.

The Board reviewed its interaction with stakeholders, and that of NOC as a whole, as part of its annual Board Effectiveness review in September 2021 and is developing actions to embed and extend this further during the next financial year.

SCIENTISTS, ENGINEERS AND RESEARCHERS	Enabling scientists and researchers is one of our core goals, with activities including operating research ships; providing key data; as well as marine robotics facilities.	Goal 3 Innovate Goal 4 Enable
MARINE RESEARCH ORGANISATIONS AND PUBLIC AUTHORITIES	We are the hub of many marine networks, providing us with a position of authority and influence, including through the NOC Association of Marine National Capability Beneficiaries; the Marine Facilities Advisory Board; and the Cruise Programme Review Group, which provide formal feedback to us from beneficiaries around major areas of our activities. Our work allows collaborative relationships with national and international marine institutions, as well as government.	Goal 1 Advance
PUBLIC IN THE UK AND WORLDWIDE	Despite the challenges of the last year, which limited in-person opportunities, our public engagement has successfully continued, including virtual events such as World Oceans Day.	Goal 2 Share
YOUNG PEOPLE AND STUDENTS	We continue to work closely with universities, including the Universities of Southampton and Liverpool, and collaborate with schools within our local area.	
EMPLOYEES	We continue to be driven by our values, engaging with our people; Trade Unions; and developing our Equality, Diversity and Inclusion approach.	Goal 7 People and Culture
FUNDERS	We regularly engage with funders day to day through the delivery of projects, as well as through more formal interactions with Board Observers from UKRI-NERC and strategic meetings.	Goal 5 Grow & Diversify
SUPPLIERS	Our Procurement team engage with suppliers from tender stage to delivery, building good relationships and high standards.	Goal 6 Governance

OUR EXECUTIVE COMMITEE

PROFESSOR ED HILL CBE
CHIEF EXECUTIVE

PROFESSOR ANGELA HATTON
DIRECTOR OF DATA, SCIENCE AND TECHNOLOGY

JULIE PRINGLE-STEWART
CHIEF OPERATING OFFICER, CHIEF FINANCIAL OFFICER

CAIT ALLEN
ASSOCIATE DIRECTOR ENGAGEMENT

NATALIE CAMPBELL
ASSOCIATE DIRECTOR CORPORATE BUSINESS SUPPORT

PROFESSOR DOUG CONNELLY
ASSOCIATE DIRECTOR SCIENCE AND TECHNOLOGY

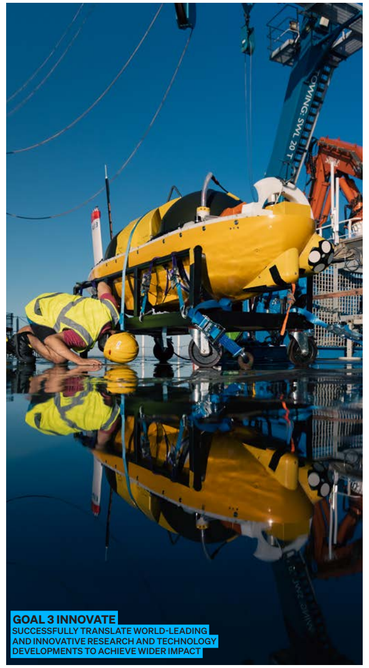
DR MAATEN FURLONG
ASSOCIATE DIRECTOR NATIONAL MARINE FACILITIES

HUW GULLICK
ASSOCIATE DIRECTOR NOC INNOVATIONS

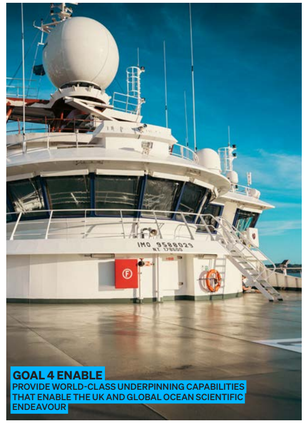
DR JOHN SIDDORN
ASSOCIATE DIRECTOR DIGITAL OCEAN

GOAL 1 ADVANCE
UNDERTAKE INTERNATIONALLY EXCELLENT RESEARCH AND TECHNOLOGY DEVELOPMENT TO ADVANCE THE FRONTIERS OF KNOWLEDGE ABOUT THE OCEAN

GOAL 2 SHARE
CREATE PUBLIC BENEFIT FROM ALL OF NOC'S CAPABILITIES



GOAL 3 INNOVATE
SUCCESSFULLY TRANSLATE WORLD-LEADING AND INNOVATIVE RESEARCH AND TECHNOLOGY DEVELOPMENTS TO ACHIEVE WIDER IMPACT



GOAL 4 ENABLE
PROVIDE WORLD-CLASS UNDERPINNING CAPABILITIES THAT ENABLE THE UK AND GLOBAL OCEAN SCIENTIFIC ENDEAVOUR

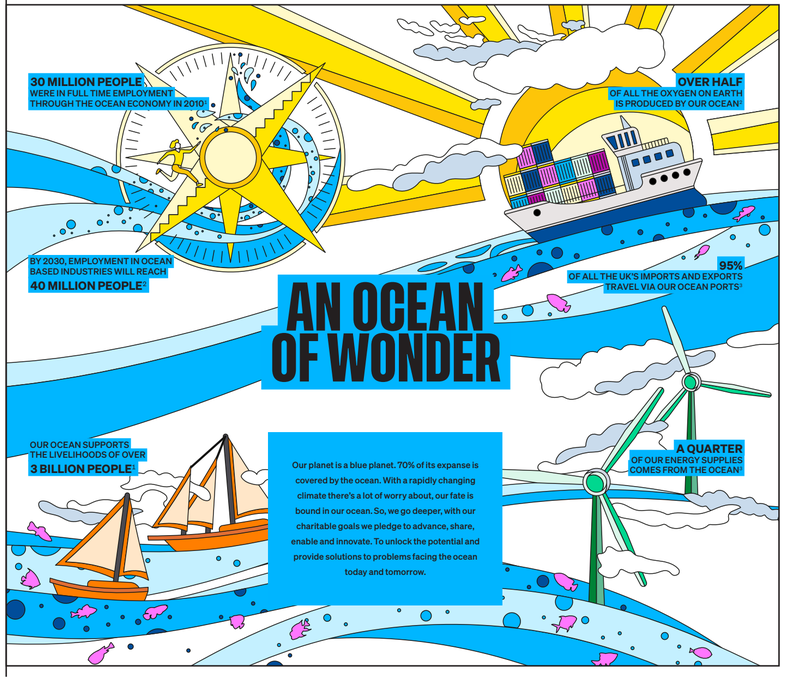
GOAL 5 GROW & DIVERSIFY
RESPONSIBLY GROW AND DIVERSIFY REVENUE TO SUSTAIN OUR MISSION WITH A CRITICAL MASS OF SCIENTIFIC AND TECHNICAL CAPABILITY

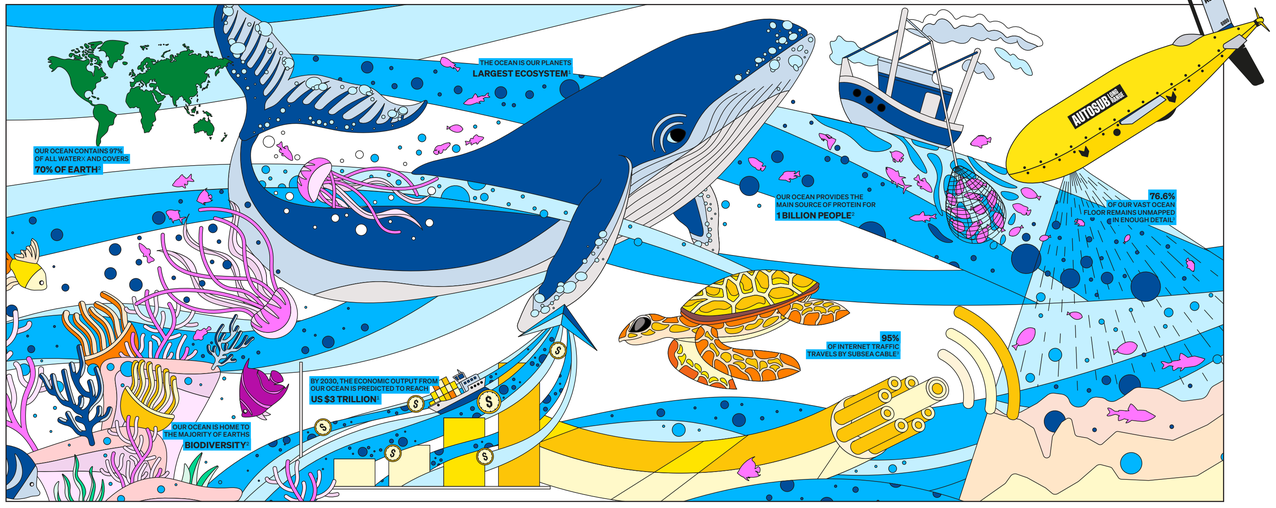
GOAL 6 GOVERNANCE
TRANSFORM THE WAY NOC IS GOVERNED AND OPERATED

GOAL 7 PEOPLE & CULTURE
INVEST AND REINVEST IN NOC AND ITS PEOPLE

DELIVERING OUR STRATEGIC GOALS

The delivery of our five-year strategy is structured around seven clear goals, each of which links directly to our Charitable Purpose and Objects. Together with the Board of Trustees, our Executive Committee are united in the delivery of these goals as well as living by our values every day.





[1]The Sustainable Development Goals Report 2022 (Unstats.un.org/sdgs/report/2022) & Sustainable Development Goal 14 (sdgs.un.org/goals/goal14)
[2]UN World Oceans Day 2022 (un.org/en/observances/oceans-day) [3]National Oceanography Centre (noc.ac.uk) British Oceanographic Data Centre (bodc.ac.uk)

1/4

OF GLOBAL ANNUAL CO_2 EMISSIONS ARE ABSORBED BY OUR OCEAN

93%

OF EXCESS HEAT FROM CLIMATE CHANGE IS ABSORBED BY OUR OCEAN

"The second report from the IPCC emphasises that climate change is a major threat to human wellbeing and the health of the planet. It has highlighted that climate change is continuing to cause substantial damage to open ocean marine ecosystems.

Ocean warming and acidification have adversely affected food production from fisheries in some oceanic regions, and forecast levels of climate change, plus habitat destruction, will lead to the loss of much of the world's coral reefs and low-lying coastal wetlands.

The next 20-50 years will see a change in the Earth's climate, and how that will affect nature and humans will depend on how plants, animals and people adapt.

There is a rapidly closing window of opportunity to both reduce greenhouse gas emissions and develop climate resilient adaptation measures. By conserving, protecting and restoring ocean ecosystems, we can reduce the vulnerability of biodiversity to climate change."

PROFESSOR STEPHANIE HENSON
PRINCIPAL SCIENTIST, NATIONAL OCEANOGRAPHY CENTRE

DISCUSSING THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC) SIXTH ASSESSMENT REPORT

"Tide gauge records provide robust observational evidence that sea level around the UK continue to rise due to increased rate of ice loss from the Greenland and Antarctic ice sheets, as well as continued glacier mass loss and warming of the ocean.

Our long term records show that over the past few decades the rate of sea level rise in the UK is increasing. As sea levels rise there can be greater impacts from storm surges. Last year storm surges of over 1.5m were seen during Storm Arwen, but extreme sea levels were avoided as this occurred during low water and a neap tide.

DR SVETLANA JEVREJEVA
PRINCIPAL SCIENTIST, NATIONAL OCEANOGRAPHY CENTRE

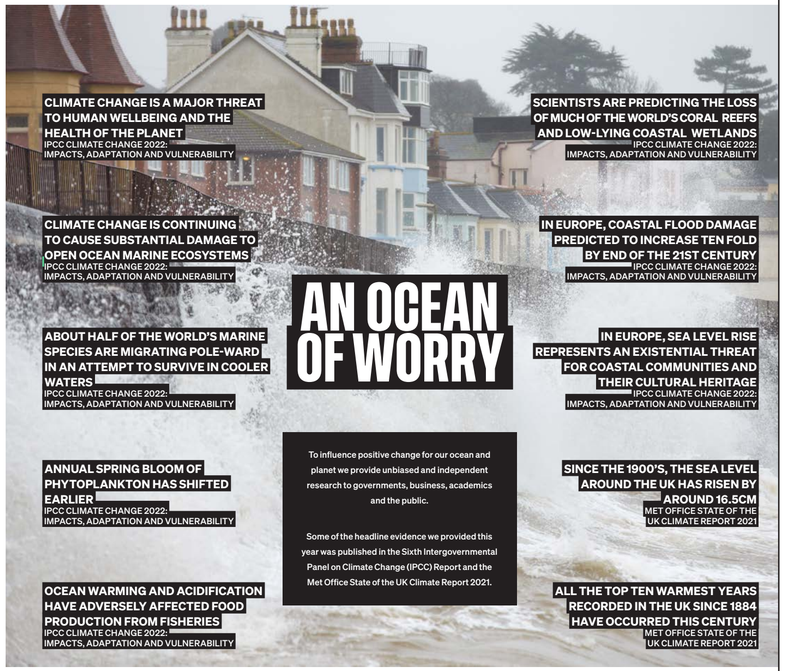
DISCUSSING THE MET OFFICE STATE OF UK CLIMATE 2021 REPORT

50%

LOWER ATMOSPHERIC CO_2 LEVEL IS ONLY POSSIBLE DUE TO THE CONTRIBUTIONS OF THE 'BIOLOGICAL CARBON PUMP'[2]

2/3

OF BRITISH PEOPLE SURVEYED SUPPORT INVESTMENT INTO SEA LEVEL MONITORING SYSTEMS TO TACKLE COASTAL FLOODING



GOAL 1
ADVANCE

Undertake internationally excellent research and technology development to advance the frontiers of knowledge about the ocean

To solve the huge problems facing our world and climate today, we need to go deeper. We need to go further in our thinking than ever before. That's why with the intellect and dedication of world leading scientists we've pursued deeper understanding and have collaborated on the most influential, agenda setting research and reports this year, both at home and internationally. Whilst our facts highlight threats to human wellbeing our long-term goal to advance solution-focused work continues stronger than ever. We are committed to not only understand the issues better but to mitigate the impacts on our coasts and deep ocean.

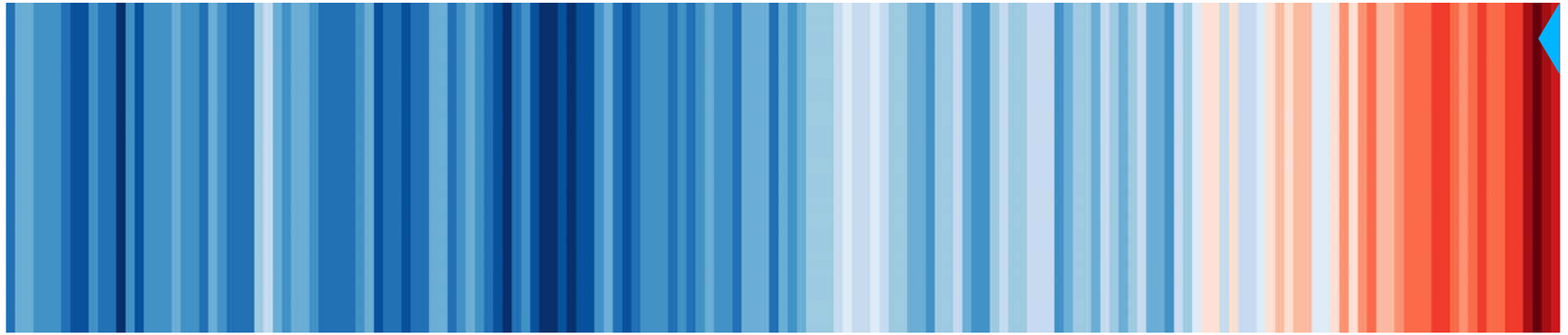
197
RESEARCH PAPERS PRODUCED

154
GOLD OPEN ACCESS RESEARCH PAPERS

9
GREEN OPEN ACCESS RESEARCH PAPERS

34
NON-COMPLIANT RESEARCH PAPERS

83%
OF ALL RESEARCH PAPERS ARE OPEN ACCESS



Hawkins, Ed, 2018. "Warming stripes for 1850-2018" Climate Lab Book. 4 December 2018. Creative Commons Attribution-ShareAlike 4.0 International License.

PREDICTING CHANGE

From real life ocean observations, we can inform digital climate models to forecast how the world will respond to climate change caused by increasing carbon dioxide in the atmosphere.

UN Ocean Decade endorsed initiative FLAME will act as the international focal point and coordinator for understanding the impacts of future climate change in the global coastal ocean.

Within the project we'll generate innovative, high-resolution, projections of future coastal ocean climates and the impacts on coastal ecosystems, hazards, services and resources. We will do this at the local-regional scales necessary for informed decision making across a range of polar, temperate, subtropical and tropical regions.

OCEAN EYES

At the 2021 United Nations Climate Change Conference, more commonly referred to as COP26, we called for investment in the global ocean observation system, after all, how can we manage what we cannot measure. We're nothing without quality data so this action is imperative to fulfil our collective stewardship responsibility and understand the effects of climate change on human life, economic, and environmental wellbeing.

To fully realise this service, we must expand our view of the value of ocean observing and move towards a sustained observing system to deliver crucial information to stakeholders and policymakers. UN Ocean Decade endorsed initiative AtlantOS, supports Atlantic basin scale implementation by identifying and fostering collaborative partnerships among user communities and ocean observing and data networks. AtlantOS is actively building formal relationships with international bodies and AtlantOS-connect will facilitate engagement with national and regional entities, connecting observing networks and providing visibility to the common challenges, needs and opportunities of Atlantic communities.

STRENGTH IN NUMBERS

We joined with other leading UK climate science organisations to develop a new national alliance focused on climate solutions for society. Together, with six Natural Environment Research Council (NERC) supported centres and the Met Office, we will work together as the new UK National Climate Science Partnership (UKNCSP) to respond to threats posed by a rapidly changing climate by putting climate science at the forefront of the solutions agenda.

Recognising the urgency of accelerating action towards the goals of the Paris Agreement and UN Framework Convention on Climate Change, the UKNCSP will play a leading role in the development of an end-to-end climate strategy.

The solutions-focused approach is supporting the UK Government in developing and evaluating solutions to the challenges of mitigating and adapting to climate change. The partnership will also work with the public and private sectors to ensure decision makers and businesses have access to the climate information they need, in order to build resilience and adapt to the pressing challenges of the coming decades.

"The UK has world-leading capabilities for monitoring, modelling and predicting UK and global climate change and its impacts. We need to continue to develop these capabilities to address new challenges, provide early warning of potential high impact changes that may emerge and evaluate specific policy options to mitigate and adapt to climate change. The UKNCSP provides the foundations to enable the UK to continue to lead in these areas."

PROFESSOR ANGELA HATTON
DIRECTOR OF SCIENCE AND TECHNOLOGY, NATIONAL OCEANOGRAPHY CENTRE

BLUE MEADOWS

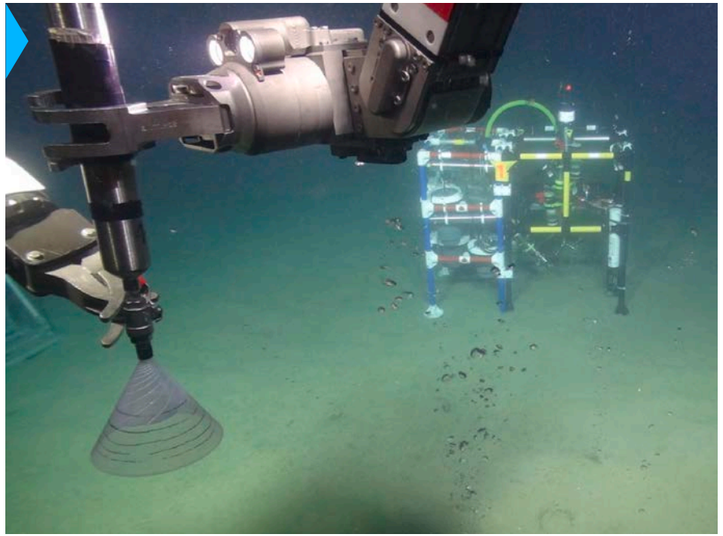
A study underway on the Isle of Man is investigating, for the first time, the Island's marine and coastal role in storing carbon to help mitigate climate change.

Blue carbon habitats like seagrass meadows, which are found around the Isle of Man, capture significant amounts of carbon, and they can also protect coastal communities against storms and flooding, improve ocean health and provide habitats for a multitude of species and commercially important fisheries. Understanding the management and restoration of these environments supports the Manx government's ambition to achieve carbon neutrality on the Isle of Man by 2050.

CARBON VAULT

In a world-first, our research off the coast of Scotland suggested that storing carbon dioxide (CO_2) under the sea is both viable and safe.

The process known as carbon capture and storage (CCS) is regarded as one of the more effective tools in the fight against climate change. The process involves separating the CO_2 generated during industrial processes and injecting it directly into rock formations or depleted oil and gas reservoirs deep underground. Evidence from our pilot study will now help inform the direction of technology development for the long-term monitoring of offshore CO_2 storage reservoirs. It is a huge step forward in assuring regulators that this process is safe by being able to monitor any potential leaks as well as assess any potential damage to marine life.

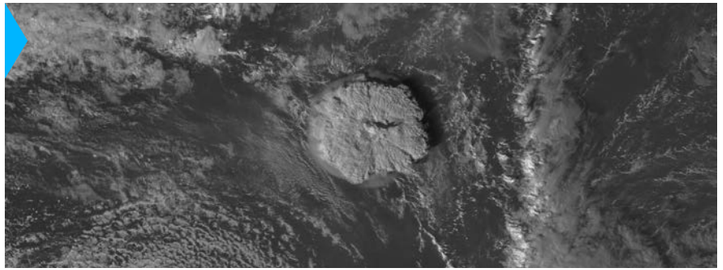


RAPID RESPONSE

The eruption of the Tongan Volcano Hunga Tonga – Hunga Ha'apai, which culminated in the most explosive eruption in more than a hundred years, took the world by surprise and highlighted a global vulnerability to large magnitude volcanic events. The most explosive phase of the eruption broke the only seafloor telecommunication cables that connected the Kingdom of Tonga to international telecommunications; effectively cutting an entire nation off from the rest of the world for more than 5 weeks, at a critical time for disaster response.

Commitment to our Values and Sustainability and Social Responsibility Strategy (see Goal 7) saw us rally into action and form an international collaboration. Working with the National Institute of Water and Research (NIWA), New Zealand, the Japan Agency for Marine-Earth Science and Technology (JAMSTEC), collaborators across the Kingdom of Tonga and subsea cable companies we coordinated ambitious research to understand the processes that drove the eruption and the resultant cascades of hazards.

We led a NERC Urgency Grant, which enabled seafloor surveys to be performed within 2 months of the event - revealing powerful seafloor flows were triggered by the eruption, travelling at fast speeds over tens of kilometres, explaining the widespread damage to seafloor telecommunications cables. These findings were immediately transferred to local stakeholders and subsea cable companies to select optimal locations for the repaired cables and design new cable routes that are required to improve resilience in the region.
The power of the Hunga Tunga – Hunga Ha'apai eruption was unexpected, but there are many similar volcanoes along the Tongan Volcanic Arc. A new NERC Global Seedcorn project aims to improve our knowledge of these kinds of hazards, identifying other volcanoes that pose a similar risk. This research builds on our strong background in assessing threats to critical infrastructure and volcanic hazard research across the Pacific including a similarly rapid response to the 2019 eruptions of Tongan Volcano F and Late'iki.



SAFTEY FIRST

Working on behalf of the Government of Saint Lucia through the Disaster Vulnerability Reduction Project we installed three new tide gauges to help reduce the island's vulnerability to natural hazards and climate change. The network of tide gauges will continuously measure and report sea level and tidal variability, providing valuable information to local seafarers and port authorities, as well as being an important addition to the Caribbean Early Warning System for tsunamis and other coastal hazards.

Alongside an existing tide gauge installed by NOC under the Commonwealth Marine Economies Programme in 2016, the data from these gauges will be transmitted in near real-time to the Sea Level Station Monitoring Facility, enabling the data to be publicly accessible globally.

With the frequency of coastal inundation due to storm surges projected to increase and global mean sea level likely to rise by up to 0.23m by 2050*, the installations will help local planning authorities to decide how high to build coastal defences to protect coastal populations from the dangers of flooding. In addition, the gauges will enable the Saint Lucia Meteorological Service to produce tide tables that show times and heights of sea level to aid safe navigation and port operations.

GOAL 2

SHARE

Create public benefit from all of NOC's capabilities

Our science must go deeper than just gaining academic understanding. Understanding needs to translate into awareness, action and positive change. That's why we're inspiring and empowering the next generation of ocean scientists and technologists through community events, school projects, education resources and online engagement. We're helping young people have a deeper connection and a deeper understanding of the ocean. We passionately believe positive change for the planet starts with ocean literacy.

SMALL BUT MIGHTY

Our scientists, engineers and mariners worked with students from King Edward VI School in Southampton to send a miniature research sailboat on a 46-day expedition of discovery.

Named 'KES Kraken' by the students, the mini-boat was built over several weeks as part of a hands-on afterschool project. The students equipped it with a sail and a satellite tracker, as well as a unique suite of scientific sensors, that enabled them to track in real time the air and water temperature and compare it to NOC research.

During the build, to support our commitments to ocean literacy, NOC scientists dropped in to provide support and educational talks on ocean and environmental issues including microplastics and climate change.

Once complete KES Kraken was launched into the Atlantic Ocean by our crew on board RRS Discovery on the 19th February. After 46 days at sea KES Kraken was successfully recovered on the shores of Brazil having travelled 40,000km and provided the captivated students a unique and unforgettable experience.

The King Edward VI School project is a collaboration between NOC, Educational Passages non-profit and EU Interreg iFADO project, with additional support from the EU-funded GOCART project and the NERC-funded DIAPOD projects.

"I hope all students involved in the project were inspired by the NOC experts who visited the school, and have dedicated their careers to science. It was also wonderful to see Sixth Form assisting younger students with the project."

DR MAYOR
TEACHER,
KING EDWARDS VI SCHOOL

"We really enjoyed working with this group of young students to engage them in oceanography in such a unique way. It's so important to inspire people from a young age, especially on crucial environmental issues like climate change and microplastics that they might not otherwise be exposed to in school."

DR B.B. CAEL
RESEARCHER, NATIONAL OCEANOGRAPHY CENTRE

1207
ONLINE DELEGATES

2759
VIEWS ON DEMAND

175K
SOCIAL MEDIA REACH

WORLD OCEAN DAY

In London our Board of Trustees and Executive team welcomed friends, supporters and Ocean Alliance partners from across government and business who, like us, recognise the need to act to protect our ocean and our planet.

Our position as the UK's leading marine charity, having left the public sector in 2019, allows us to unite and explore new innovative opportunities. Keynote speaker The Right Honourable Lord Goldsmith, Minister of State for the Pacific and the International Environment, acknowledged our work has been key to understanding the urgency with which we need to act to protect our ocean.

Internationally, as part of the United Nations Ocean Conference, we partnered with aligned research organisations, UN agencies and industry partners in delivering many side events. We participated on a number of exciting panels to raise awareness and champion ocean sustainability, women leadership and empowerment, and inclusive governance. All causes supported by our vision, vision and values.

Digitally, our education focused hybrid event on site in Southampton, UK allowed us to broadcast live into classrooms and homes internationally. Our experts shared knowledge on the challenges we face, as well as the solutions we're helping to advance.

4140 TOTAL "OCEAN SCIENCE IN ACTION" MOOC LEARNERS

2271 TOTAL ACTIVE MOOC PARTICIPANTS

721 FULLY COMPLETED MOOC COURSES

145 COUNTRIES WITH MOOC PARTICIPANTS

4199 INTERACTIVE COMMENTS

3 MARINE TECHNOLOGIES

4 CASE STUDIES IN THE INDIAN OCEAN

MOOC

The highly successful Massive Open Online Course (MOOC) ran for its fifth year with 2021-22 seeing new lectures launched on Somalia upwelling and fisheries.

The free course introduces learners to innovative marine technologies and their applications used to tackle the challenges of the sustainable management of marine ecosystems. Digitally, our education focused hybrid event on site in Southampton, UK allowed us to broadcast live into classrooms and homes internationally. Our experts shared knowledge on the challenges we face, as well as the solutions we're helping to advance.

889

PODCAST LISTENS SINCE LAUNCH ON WORLD OCEANS DAY 2022

957

VIDEO VIEWS SINCE LAUNCH ON WORLD OCEANS DAY 2022

CASTING FURTHER

Into the Blue is our latest free and online resource designed to share our understanding of the ocean environment and enable everyone to dive deeper.

In each episode we unravel the complexity of issues facing today's ocean and the variety of ways a healthy ocean supports human wellbeing and prosperity. These conversations complement the already popular 'Under the Surface' pages on our website, giving even more accessibility to ocean literacy. The podcast introduces the wealth of talented scientists and engineers working at NOC and gives them a platform to educate and inform about their passion projects and world leading work.

OCEAN NEWS

We pride ourselves on being the spokespeople for the ocean, we're a trusted source of facts and our people are passionate. We share stories of our research and experiences in lots of different ways to turn ocean worriers into action advocates. You've likely seen some of our work on the news, or in a magazine, you may have read our newsletters or visited our website. If so, we're delighted you've joined us as part of our growing ocean news community.

5763 OCEAN NEWS EMAIL SUBSCRIBERS

64K TOTAL SOCIAL MEDIA AUDIENCE

1846 TOTAL PODCAST VIEWS AND LISTENS

626 PIECES OF MEDIA COVERAGE

191.1M TOTAL MAINSTREAM MEDIA REACH

788K TOTAL TRADE MEDIA REACH

596K UNIQUE PAGE VIEWS ACROSS NOC WEBSITE

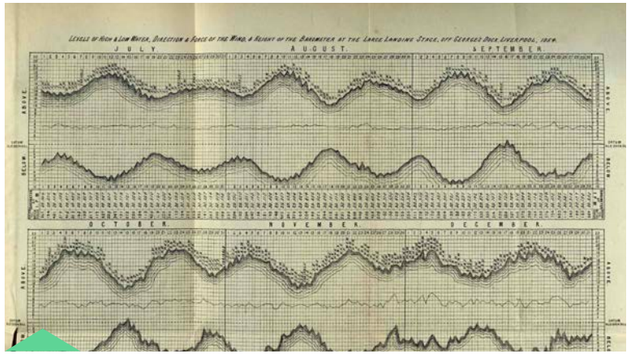
77K UNIQUE PAGE VIEWS ON NOC NEWS STORIES

103 NOC NEWS STORIES PUBLISHED ON WEBSITE

TRUST TRAINING

Microplastics are of emerging global concern, due to their potential to cause harm across eco systems, but more data is needed about their spread in the ocean, and their interaction with plankton – a food source for many aquatic organisms.

In order to fill this data gap, we're training citizen scientists at The Wildlife Trusts to generate a microplastic and plankton time-series using Stanford University's PlanktoScope. The PlanktoScope, a low-cost flow imaging microscope, is composed of a Rapsberry Pi computer and a camera, two lenses for magnification and a flow system. The flow system affords efficient imaging of microscopic particles in a water sample as they move past the camera.



TIDE OF SUPPORT

Over 3,800 volunteers from The Zooniverse, an online citizen science platform, helped to digitise historical data of tides and sea level near Liverpool.

We launched the UK Tides Citizen Science Project in January 2021 and asked you to help transcribe hand-written tide data from two gauges in Hilbre Island and George's Pier between 1853–1903. The new data gathered will help the science community understand how tides and extreme sea levels have changed over the past two centuries and allow them to better quantify the risks we face from flooding in the future.

"Wildlife Trusts all over the country, at coastal locations and inland on our waterways are preparing to construct PlanktoScope to take a closer look at the animals and plants that lie hidden from the naked eye in our waters.

We are excited about the opportunities that having these specialised microscopes will bring. We hope to raise awareness of these tiny life forms and use the PlanktoScope to give us the ability to monitor long term and help us address conservation questions about the health of our waters, both fresh and salty. The adventure awaits!"

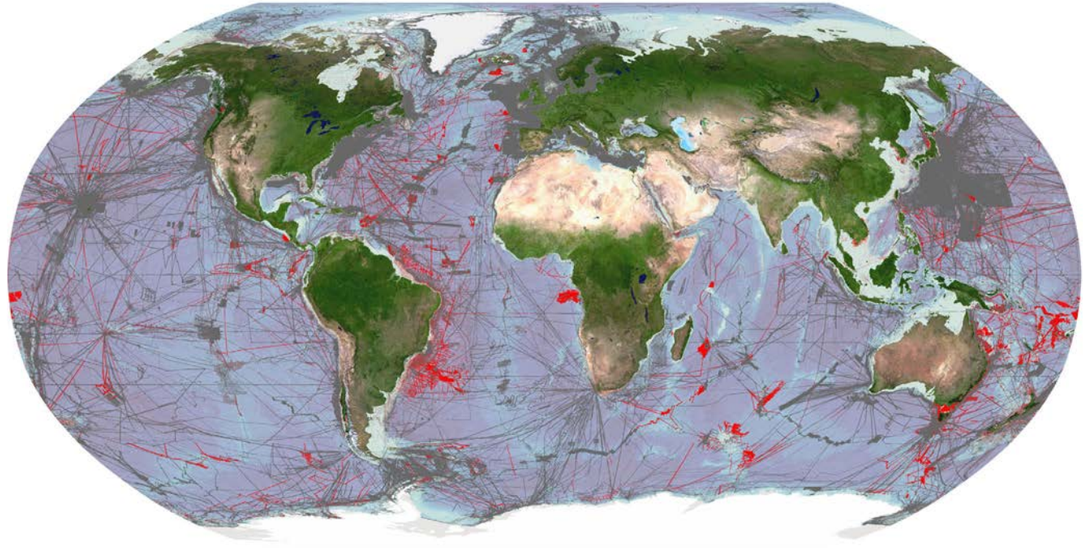
DR LISSA BATEY
HEAD OF MARINE CONSERVATION, THE WILDLIFE TRUSTSS

GOAL 3

INNOVATE

Successfully translate world-leading and innovative research and technology developments to achieve wider impact

The brilliant minds at the helm of ocean discovery need equally brilliant technology to push the boundaries of innovation. That's why the latest, cutting-edge technology plays a major underpinning role in our work. This technology doesn't just take us to the depths of the ocean, it gives us a deeper understanding of everything past, present and future, from the coast to deep ocean. From deep diving data, to pioneering measurement technology, we're living our value of innovation.



The Nippon Foundation-GEBCO Seabed 2030 Global Center (GDACC) on behalf of Seabed 2030

MAPPING UNKNOWN

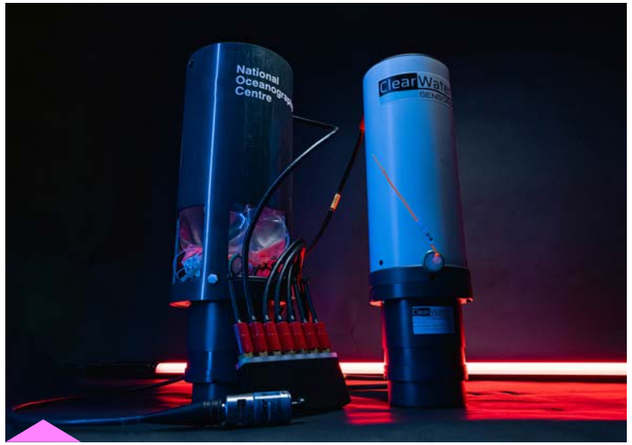
It covers 70% of our blue planet yet the ocean is still a greater mystery than our moon.

But Seabed 2030 is out to change that, endorsed by the UN Ocean Decade it's an international effort to chart the world's entire ocean floor. This year the total amount of sea floor mapped now stands at 23.4%, reflecting an increase of 10.1 million square kilometres of new bathymetric data. This increase is equivalent to an area around the size of Europe; and slightly larger than the Sahara - Earth's largest hot desert. As the global centre for Seabed 2030, NOC's British Oceanographic Data Centre brought together the regional compilations into a single, global, harmonised, data set. This will help identify underwater hazards and inform sustainable marine resource management and infrastructure development, ultimately saving lives.

76.6%

OF THE SEA FLOOR IS UNMAPPED IN ENOUGH BATHYMETRIC DETAIL

THE GEBCO SEABED 2030 PROJECT AIMS TO MAP THE WHOLE OCEAN TO THE ORDER OF TENS OF METRES IN SCALE BY 2030



INDUSTRY ALLIANCE

The launch of the BORA Blue Ocean Research Alliance™ has helped us bridge the gap between industry and science to support sustainable research and development. Together the Alliance is providing researchers access to hard-to-reach areas and sharing open access scientific data and knowledge at every step of the way.

The Alliance successfully developed a prototype essential ocean variable sensor box and deployed it for trials in the North Sea with Subsea7. The first complete box is now being commissioned in Brazil with Subsea7 on one of their client sites and will be in service for 18 months to supply key data on the health of the ocean in that region. There are also projects in development to research acoustic monitoring in deep-sea canyons and management of endangered species.

"With innovation at its heart, BORA Blue Ocean Research Alliance™ will help push the limits of scientific knowledge, setting the standard for collaboration between the industrial and scientific communities and delivering meaningful research on a global scale that will provide benefits for all communities."

HUW GULLICK
ASSOCIATE DIRECTOR,
NOC INNOVATIONS

DOUBLE ACT

Digital Twins, a virtual representation of an object or system, have the potential to be a massive step-change in the way we understand our evolving environment.

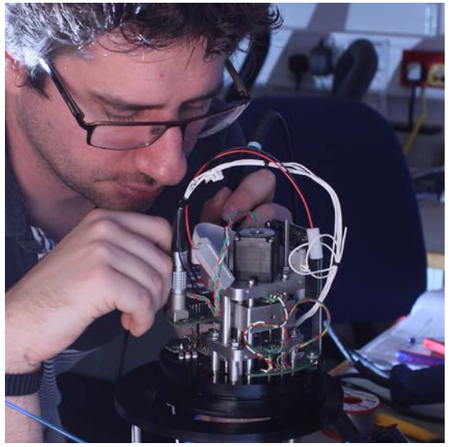
These intelligent systems, using simulations or data-based methods such as machine learning, are already revolutionising how some sectors work. Our experts are championing progress towards digital twins of the ocean and environment as they could be a solution towards net-zero targets and a paradigm shift in protecting and managing our ocean.

In pursuit of this vision our experts lead a community report, which has outlined the building blocks necessary for unlocking the true potential of environmental digital twins. The recommendations cover everything from a conceptual framework, management and governance, common language to pilot studies and computational architecture. This first report, 'An Information Management Framework for Environmental Digital Twins (IMFe)' is just the first collaboration into this exciting digital frontier.

CELEBRATING 10 YEARS OF LAB-ON-CHIP INNOVATION

Our ocean technology and engineering experts are at the forefront designing, creating and using novel sensors and instruments to collect these vital data, and continue to push research boundaries.

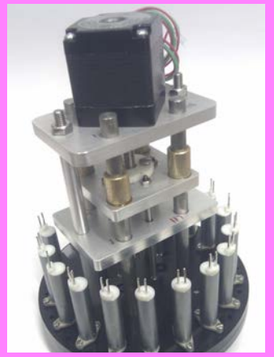
Lab-on-Chip (LOC) sensors are at the cutting-edge of today's ocean sensing technology. With reduced power consumption, cost and size compared to more traditional systems, longer deployments on a vast range of oceanographic platforms are now possible, enabling the advancement of scientific research undertaken in the most extreme marine environments. This year we celebrated 10 years since our first paper proving the LOC sensor worked, here are the top ten milestones from the decade that followed.



FIRST SUCCESSFUL FIELD DEPLOYMENT OF A LOC NUTRIENT SENSOR

After many years of research and experimentation, the first successful deployments of the LOC nutrient sensor platform took place in Southampton Water in 2011 and 2012.

The nitrate and nitrite sensors used microfluidics combined with sensitive chemical analysis techniques to make high quality in situ measurements of nutrient concentrations in the estuary over several weeks. Over the next ten years the LOC sensor platform would continue to develop to measure a wide range of chemical parameters, expanding capabilities for more cost effective, and carbon efficient ocean science.



PROVING LOW TEMPERATURE PERFORMANCE

The robustness and low temperature performance of the LOC sensors was put to the test in 2013 and 2015 when they were deployed to measure nitrate in glacial meltwater draining from the Greenland Ice Sheet.

In collaboration with the University of Bristol, sensors were deployed in proglacial melt-water streams close to Kangerlussuaq and Narsarsuaq in Greenland. The liquid reagents were modified with antifreeze so that they remained liquid at low temperatures.

LOC ON THE WORLD STAGE

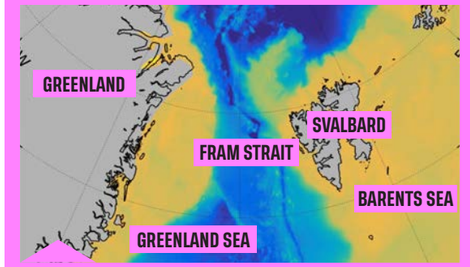
In 2014, NOC scientists and engineers took part in the high-profile international competition to develop pH sensors to measure changes in the acidity of the ocean.

We were proud to be one of only two organisations representing the UK in the Wendy Schmidt Ocean Health XPRIZE, which attracted all the major players from the global scientific community. The pH sensor we entered was very small in size, and based on a microfluidic design which requires very small volumes of seawater to generate a reading. It was also designed as an autonomous system able to operate on a number of oceanographic platforms and down to depths of several thousand metres.

GOING DEEPER WITH SEAGLIDER

In 2014, the LOC chemical sensor platform reached new depths when we re-designed it to facilitate deployment in the deep sea and on autonomous vehicles.

In 2015 we proved conception and saw the first successful deployment of a LOC sensor on an underwater glider. The sensor was integrated into a Kongsberg Seaglider, and was used to collect nitrate profiles in the Celtic Sea as part of the Shelf Seas Biogeochemisty programme. This was also the first deployment below 1000 m on CTD (conductivity, temperature, depth) instrument. CTD measurements are fundamental in understanding the physical structure of the ocean but also provide valuable contextual information for other co-located biogeochemical measurements. These deployments subsequently took place with phosphate & pH sensors.



A YEAR-LONG ARCTIC ADVENTURE

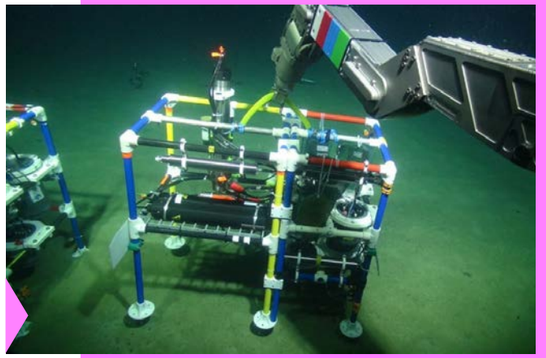
In 2015, the first year-long Arctic deployment of a LOC sensor took place, an event which saw two more firsts; the highest latitude and furthest north deployment of a LOC sensor.

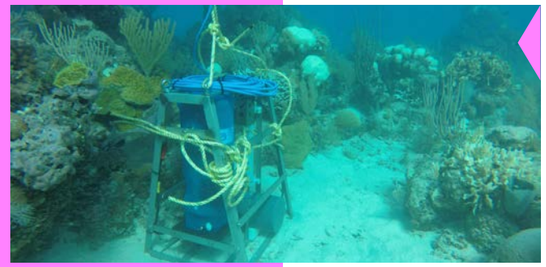
The ability to have long term unattended deployments in remote locations was one of the key goals when developing the LOC sensor platform. This was realised in 2015 when LOC nitrate sensors were successfully deployed for one year on moorings in Fram Strait. This was followed in 2018-2020 with a deployment just over a year-long of LOC sensors on a mooring in the south Pacific.

LARGEST EVER LOC DEPLOYMENT

The number of LOC sensors on a deployment scaled up significantly in 2019 when for the first time we operated 25 simultaneously as part of the STEMM-CCS project.

Before the project, a typical deployment involved two to four LOC sensors; making the jump to deploying 25 in one experiment a huge change in scale. The STEMM-CCS project created novel technology, including many new LOC sensors, to monitor the integrity of offshore CO_2 storage facilities. The main field campaign of the project saw the 25 LOC sensors operating simultaneously in the North Sea, measuring 5 different parameters. We deployed them on a variety of platforms including several landers, an ROV, and a ship's underway.





BUILDING CAPACITY FOR DEVELOPING STATES

In 2019, we provided an innovative pH LOC sensor to the Commonwealth Marine Economies (CME) Programme, which helped to build ocean sensing capacity in small island developing states.

The project first assisted the Belize Coastal Zone Management Authority and Institute through the installation of the sensor, which can measure in real-time (every two hours) the acidity, temperature, salinity and oxygen of sea water. LOC technology has enabled Belize to collect essential consistent data needed for important marine environment policy decisions. This success has now been shared with deployments of the pH LOC sensors in the Seychelles, Fiji and Dominica.

FIRST COMMERCIAL LOC SENSORS DELIVERED

Select types of LOC chemical sensor technology and their underpinning intellectual property was successfully licensed for commercial supply from NOC and the University of Southampton in 2019.

This led to the formation of a start-up company now known as ClearWater Sensors Ltd and together, as part of the Horizon Europe project "GEORGE", we will develop a new generation of high-performance sensors for the ocean carbonate system.

ICEBERG INVESTIGATIONS

In 2021, an expedition on the RV Polarstern saw many firsts for LOC technology.

The instruments provided the first nutrient and carbonate data from water behind a freshly created iceberg, which had just broken off the continental shelf. This was also the furthest south deployment to date of the technology (down to 77°S), and was also the first time the instruments were used to measure benthic fluxes by their integration onto a benthic chamber system.


READ MORE IN GOAL 4

BIGGEST BOATY LOC DEPLOYMENT

In March 2022, nine types of LOC systems were simultaneously deployed from RRS *Discovery*.

The sensors measured a wide range of nutrients (nitrate, nitrite, phosphate, silicate, iron) and components of the carbonate system (pH, total alkalinity, dissolved inorganic carbon), which is crucial for advancing our knowledge of the oceans changing environment and how marine ecosystems are responding. The trials proved the powerful new capability for simultaneous and autonomous biogeochemical sensing in the ocean.

GOAL 4

ENABLE

Provide world-class underpinning capabilities that enable the UK and global ocean scientific endeavour

To reach beyond surface-level knowledge, we need a range of excellent facilities and specialist teams. That's why we have research ships, ocean observatories and moorings. Along with state-of-the art laboratories, and an extensive oceanographic library and specimen collection. And, because deeper knowledge will only ever come from sharing what we have – we operate these services on behalf of the entire UK marine research community. So, together, we can go deeper than ever before into our united ocean.

ANNUAL HEALTH CHECK

The Porcupine Abyssal Plain Sustained Observatory (PAP-SO) is the longest running abyssal time-series study site in the world, with observations dating back to 1985. This expedition saw 18 researchers and engineers make the same pilgrimage to take ocean health checks, including annual sampling and servicing of infrastructure that cannot be achieved autonomously.

It may sound like every year is the same but new technology and methods, such as our new Marine Snow Catchers (pictured below), are fundamental to these expeditions. They continue the legacy of carbon and climate recording and also allow us to study new threats such as microplastics in the Twilight zone and beyond.

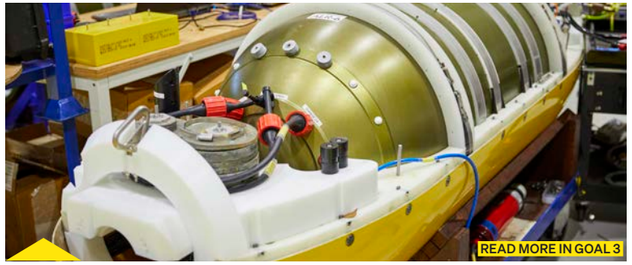
Recently endorsed as a UN Ocean Decade initiative is JETZON, looking at the study of the Twilight Zone, the dimly lit region extending from a few hundred metres depth to 1,000m. It is poorly understood from almost any perspective. However, it contains possibly the world's largest and least exploited fish stock and recycles ~80% of the organic material that sinks out of the productive surface waters. Expeditions like this continue our understanding of these valuable ocean zones.

7 EARLY CAREER RESEARCHERS, SUPPORTED TO JOIN THIS EXPEDITION BY POSTDOCTORAL FELLOWSHIPS FROM NOC'S CLASS PROJECT

UNDER PRESSURES

Alongside scientists from the Scottish Association for Marine Science (SAMS) we embarked on an expedition to the North Atlantic Subpolar Gyre to measure ocean changes and how they affect the UK's weather systems.

The team made observations of ocean variables such as temperature, salinity, carbon and oxygen, as well as deploying a new recorder to measure water pressure at the seafloor. The pressure recorder will remain in the water for ten years and the data it gathers will be harvested remotely without a need to recover the device. The pressure at the bottom of the sea is three hundred times greater than air pressure on land, and how it changes over time tells scientists about the ocean currents. The new pressure recorder will pave the way for net zero carbon methods to measure the huge ocean currents that flow through the North Atlantic.



READ MORE IN GOAL 3

OCEAN SENSORS

Three novel marine sensor suites, integrated by our engineers into Autosub Long Range (ALR), were successfully validated as part of an expedition with our pioneering Oceanids project team.

Two of them, AutoNutS nutrient sensors and CarCASS carbonate chemistry sensors, are both based on the Lab-on-Chip technologies developed inhouse at NOC. All three sensors can now be used for autonomous monitoring of the oceans without the need for an on-site presence by a research ship, a significant step on the road to the future Net Zero Oceanographic Capability large research infrastructure.

FLOAT AND SINK

Using RRS *Discovery* we deployed the first of the UK's new fleet of Biogeochemical (BGC) Argo profiling floats.

The fleet of 15 robotic floats makes up 50% of the UK's contribution to BGC Argo and is a vital source of ocean data, transforming the understanding of oceanic processes at depths up to 2,000m. The deployment formed part of our RAPID project's expedition to the Atlantic, where we serviced a collection of moorings that help measure ocean currents and examine the effects on short-term weather and long-term climate. The floats – which saw an investment from the Natural Environment Research Council (NERC) and NOC of £3.7million – have successfully performed several 24-hour cycles from the surface to depths of 2,000m, marking a huge step towards the UK's enhanced ocean observations capability.

> "Argo floats have been taking the temperature of the top 2km of the ocean for the past 20 years, forming the beating heart of our system of ocean observations and revolutionising the information we have to guide climate solutions for society. This new generation of BGC-Argo floats with their additional sensors will provide a step change in our understanding of how the ocean's changing biology, chemistry and physics interact to drive the ocean carbon cycle, including the exchange of carbon between the atmosphere and the ocean."
>
> **NATHAN BRIGGS**
> OCEAN BIOCHEMIST, NATIONAL OCEANOGRAPHY CENTRE

WORLD-CLASS RESEARCH SHIPS

The ability to explore remote and challenging areas at sea is critical to understand the complex nature of our oceans in order to predict future change. Thus, we operate two world class royal research ships on behalf of the marine community;

RRS *DISCOVERY*

260 DAYS IN SUPPORT OF SCIENCE

14 DAYS IN REFIT

75 DAYS ALONGSIDE

15 DAYS ON PASSAGE TO DESTINATION

RRS *JAMES COOK*

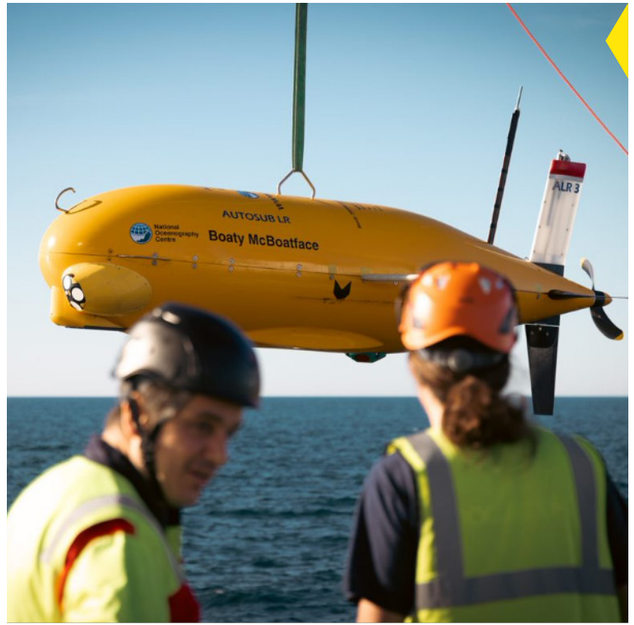
200 DAYS IN SUPPORT OF SCIENCE

118 DAYS IN REFIT*

33 DAYS ALONGSIDE

14 DAYS ON PASSAGE TO DESTINATION

*RRS *James Cook* undertook a longer refit period due to starboard motor repair.



BOATY PASSES THE TEST

The most anticipated expedition of the year saw us complete the final deep-sea tests of our newest ocean robots, sensors and control software. A culmination of several years of shore-based trials, this expedition deployed several autonomous underwater vehicles (AUV) out into Haig Fras, a Marine Protected Area of Celtic Sea lying about 95 km northwest of the Isles of Scilly, and the deep waters of the Whittard Canyon complex 300km to the south west.

In the first week Autosub 5, our new work-class AUV, carried out its first ever science survey by taking part in a sidescan sonar mission that helped generate habitat maps. It also took part in its first ever overnight mission on multibeam and camera surveys. In its second week Autosub 5 had achieved its deepest ever dive, reaching an incredible depth of 4197.48m. It spent 14 hours in the water undertaking 50km of multibeam and sidescan sonar mapping south of the Whittard Canyon. On a separate deployment it also collected 25,000 images of the seafloor and marine life, including Starfish, Eels and Lobsters. These successful milestones marked its official commissioning into active service.

Autosub Long Range 3, better known as Boaty McBoatface, successfully spent several unaccompanied days completing surveys and capturing seabed imagery all using the University of Southampton's unique and low power 3D visual mapping system BioCAM.

Making a hattrick of success for the expedition, the Deepglider, built to withstand the 600 atmospheres of pressure found in the deepest parts of the ocean profiled south of Whittard Canyon down to targeted depths of 4000m.

ADDRESSING KNOWEDGE GAPS

We set off on the latest CLASS expedition to advance knowledge of some of the richest and most complex deep-sea ecosystems on Earth.

The Whittard Canyon system is home to a variety of species, including cold-water coral reefs, clams, deep-sea oysters. It is a key area for understanding the interaction between coastal, shelf waters and the open ocean, however, there are currently gaps in knowledge in how the system responds to human impacts such as climate change and bottom trawling. To address these knowledge gaps we collected sustained ocean observational data of the canyon using our own recently trialled new Autonomous Underwater Vehicles (AUV) equipped with the latest sensors.

106	ANALYSIS REQUESTS
1652M	SEDIMENT CORE ANALYSED
16	UNIQUE USERS
13	INSTITUTES
1434	HOURS OF ANALYSIS
21	SAMPLE REQUESTS
3807	SUBSAMPLES COLLECTED FROM THE CORE COLLECTION
3000	SEDIMENT CORES APPROXIMATELY, WHICH IS 12.77KM OF DEEP SEA CORE

BOSCORF

The British Ocean Sediment Core Research Facility (BOSCORF) is the UK's largest deep-sea sediment repository and state-of-the-art research facility.

Our core collection holds unique geological samples used by scientists worldwide to investigate topics such as geo-hazards, climate change and marine ecosystems.

1274	NEW USERS
89%	OF DATASETS AVAILABLE WITHIN 2 CLICKS OF MEDIN PORTAL
100%	OF CRUISE DATA ARCHIVED WITHIN 1 MONTH OF RECEIPT
76%	OF NRT PROFILES AVAILABLE IN DELAYED MODE
78K	BATHYMETRY SETS DOWNLOADED
201	DATA DEPOSITS RECEIVED
479K	NON-BATHYMETRY SETS DOWNLOADED
1.31M	DOWNLOADS OF THE NERC VOCABULARY SERVICE (NVS)
34K	NEW NERC VOCABULARY SERVICE (NVS) USERS
3629	DELAYED MODE ARGO SETS PROVIDED
77K	TOTAL NERC VOCABULARY SERVICE (NVS) USERS
8022	ARGO DATASETS SENT TO MET OFFICE

BODC

The British Oceanographic Data Centre (BODC) provides instant access to over 130,000 unique data sets with 1640 new data sets processed this year alone.

Our data helps provide answers to both local questions such as the likelihood of coastal flooding, or global issues such as the impact of climate change. This year our data are being used in projects to:

- Research of the feasibility of a tidal power lagoon in Swansea Bay.
- Research on the change in dissolved oxygen concentration in seawater, as a consequence of climate change.
- Impact of bottom trawling fishing gear on the benthic habitats in the UK EEZ.
- Research on the effects of salinity on tidal turbine blades.
- Planning the nuclear decommissioning of Dounreay.

25 YEARS OF AUTOSUB

THE FIRST MISSION
SOUTHAMPTON EMPRESS DOCK AND PORTLAND HARBOUR

In June, Autosub-1 ventured out of the lab for the first time and into Empress Dock at the Southampton Oceanography Centre (the precursor to the National Oceanography Centre) to undergo an exhaustive series of tests which included testing all technological systems and on-surface manoeuvres.

Following this, it set sail in Portland Harbour where it completed a 3.6km mission, supported by the catamaran Top Cat, which included surfacing positions and GPS fixes.

THE CALANUS DIVE
FIRTH OF LORNE, ARDMUCKNISH BAY

The first demonstration of Autosub-1's extended survey type missions, leaving Dunstaffnage Bay and navigating autonomously through the channel that was just 130 metres wide at the narrowest point between the mainland and Eilean Mor.

The mission was supported by the ship Calanus, despite Autosub-1 being too long to fit onto her deck.

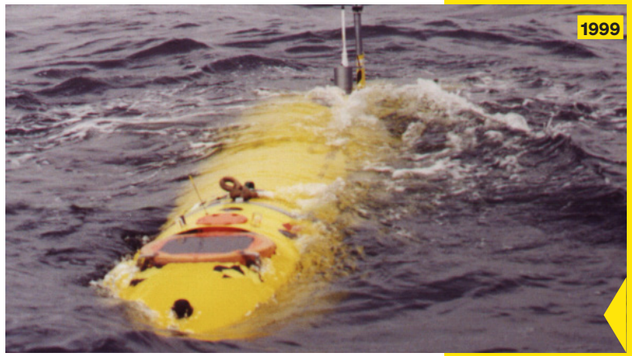
AMERICAN ADVENTURE
FORT LAUDERDALE, FLORIDA

Dr Stanley Dunn and his group at Florida Atlantic University, Boca Raton obtained funding from the US Office of Naval Research to take Autosub to Florida for a series of missions between the Florida Current and the Florida coast.

This unintentionally became the first unaccompanied mission as Autosub-1 was able to make faster progress at the depth below the currents of the Florida Current than the support boat, the Lady-Go Driver. The team decided to head straight to the mission end waypoint and wait for the Autosub to surface. It was a nervous wait but thankfully Autosub arrived unharmed.

THE AUTONOMOUS VEHICLE VALIDATION EXPERIMENT
BERMUDA

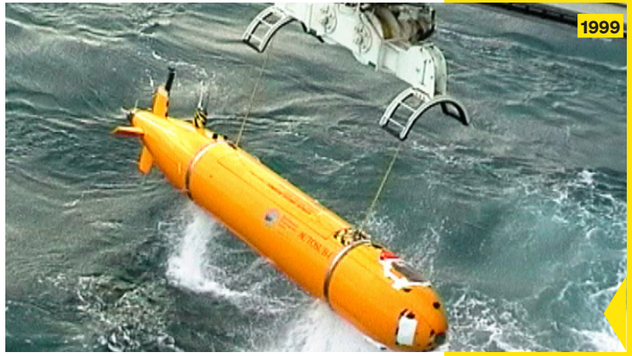
Named AVVEX (Autonomous Vehicle Validation Experiment), this expedition took place aboard the RV Weatherbird II in the vicinity of the Bermuda Atlantic Time Series mooring (BATS). Autosub-1 was fitted with two forward sensors, Chelsea Instruments and SeaBird CTDs, as well as a state-of-the-art turbulence probe that attached onto the nose of the vehicle, provided by the Florida Atlantic University.



LARS DEBUT
OBAN SCOTLAND

These trials were the first to include Launch And Recovery System (LARS), which meant Calanus, the support vessel, needed to be loaded with extra ballast in order to ensure stability.

A purpose built gantry was used to help ensure safe and effective deployment and recovery from a range of ships. Under hydraulic power the upper beam telescopes out over the stern, a hydraulic motor on the headpiece then rotates the vehicle parallel to the stern and two motors lower the vehicle via lines to the water. Lines attached to plugs are tugged from the ship, releasing the vehicle from its deployment/ lifting lines.



UNDER SEA ICE AND PELAGIC SURVEYS
NORTH SEA

As part of NERC's Autosub Science Missions thematic programme, Autosub-2 was deployed on the Fisheries Research Vessel, Scotia. Uniquely, deployment and recovery was through an opening in the side of the vessel to a space known as the 'hanger', through which the gantry could still be used.

The images captured from this mission went on to be widely used by various AUV groups to show recovery in typical North Sea conditions. At the time these groups were only working in benign coastal waters and the Autosub images were some of the first examples of large AUV operations in real oceanic conditions.

BIOLOGY, PHYSICS, AND CHEMISTRY
CELTIC AND IRISH SEAS

Aboard the support vessel MV Terschelling, Autosub-2 became the first AUV to carry a Flow Cytometer - an optical instrument to characterise single phytoplankton cells and particles using light scatter and fluorescence. The experimental Cytosub was produced by Cytobuoy NV of the Netherlands.

On another expedition, Autosub-2 was fitted with multiple acoustic instruments in support of the "Sonar and turbulence studies of the upper ocean" project. Subsequently, a manganese sensor was fitted in support of the "Dissolved and particulate manganese and oxygen in the water column of the upper basins of two hypoxic sea lochs" project.

STUCK IN SICILY
STRAIT OF SICILY

During Mission 240, while deployed on the Italian research vessel Urania, the vehicle became stuck under an overhang while terrain following close to the bottom up a steep cliff.

The Leviathan Facility arranged for a passing offshore support vessel with ROVs - the Polar Prince - to attend the site of the stranding, locate the Autosub via its acoustic pinger and use an ROV to pull the Autosub free.

SCIENCE MUSEUM EXHIBITION
LONDON, UK

A year after the new Wellcome Wing at the Science Museum, London, had opened the Autosub programme was part of a major exhibition surrounding robot submarines.

On display was a model of Autosub-2 suspended from the ceiling, an ARGO profiling float, interactive Autosub displays on computer screens and images from the recent Oban mission.

BRAVING THE ELEMENTS
ANTARCTICA

The Autosub team undertook their first Polar mission, accompanied by scientists from the British Antarctic Survey, the Open University and the Marine Lab in Aberdeen. Due to the lack of support container on the ship, the team had to service the Autosub on the snow covered deck. Some incredible locations were visited including the ice edge in the Weddell Sea, Drake Passage and the Falkland Islands.

At the very end of the 60km Mission 252 in February, Autosub-2 collided with an iceberg, resulting in a bent nose.

OCEANOLOGY INTERNATIONAL
EXCEL CENTRE, LONDON

The Southampton Oceanography Centre had entered a commercialisation licensing agreement with Halliburton SubSea7, where it would build and operate variants of Autosub, named Geosub for its own purposes. The stand at the Oceanology International Exhibition was co-curated by the Autosub team and featured a Geosub as well as a working model of the Autosub gantry used in multiple previous missions.

AUTOSUB UNDER ICE
BRANSFIELD STRAIT, ANTARCTICA

The Autosub team again braved snow and ice onboard RRS *James Clark Ross*. Due to heavy ice, the cruise was unable to reach its intended working area, the Pine Island Glacier, and instead Autosub was used on multiple under ice missions.

A number of open water tests were carried out in benign conditions of the Bransfield Strait, with the team treated to an appearance from a group of Cetaceans. At one point a team was landed onto the sea ice with a manual ice drill to make ice thickness measurements and compare with those inferred from Autosub sonar draft measurements.

Overall the cruise was successful but on one mission impact with the side of the ship on recovery in choppy conditions damaged the nose and sensors of Autosub-2.

MUDDY NOSE
SOUTH WEST APPROACHES

Autosub-2 underwent a major rebuild to address design weaknesses in the commercial underwater connectors. These weaknesses had been identified during the 2003 Autosub Under Ice cruise.

A continental shelf depth mission was organised to trial the modified vehicle, but unfortunately it didn't go to plan. Four hours into the mission acoustic tracking showed Autosub to have stopped and stuck on the seafloor. An altimeter fault meant it had been ploughing a furrow into the soft sediment, accumulating material in its nose, sufficient so it ground to a halt and was too heavy to surface even after dropping its weight.

TO THE ARCTIC
COURTAULD GLACIER, ARCTIC

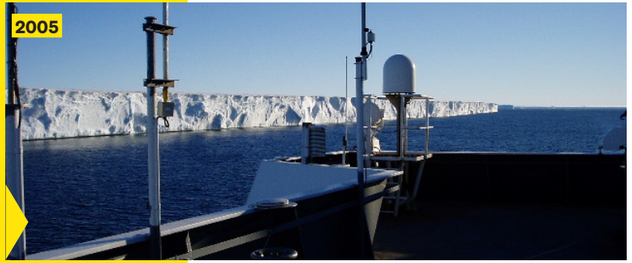
Autosub undertook two cruises aboard RRS *James Clark Ross* in the Arctic. Slender wings were added to the rear half of the centre section of the vehicle. Also added was an Aqualab water sampler, a 200ml motorised syringe taking in water and saving into one of twenty-five 50ml bags. Conditions were more often mist and fog, with sunny days being the exception.

Autosub successfully executed several under sea ice missions. The vehicle was fitted with two semi-transparent acoustic 'windows' which covered the upward looking Kongsberg EM2000 swath bathymetry transducers.

MISSING IN ACTION
FIMBULISEN ICE SHELF, ANTARCTICA

The major milestone of this mission was Autosub's first successful under ice shelf mission. This campaign was part of the NERC Autosub Under Ice thematic programme, led by Dr Keith Nicholls from the British Antarctic Survey.

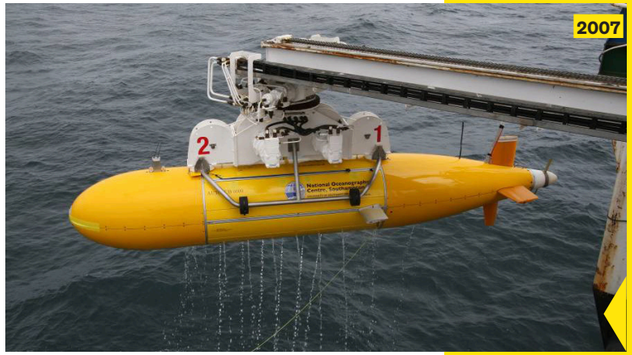
Following a successful first mission, things took a turn when, during mission 383, Autosub-2 became trapped under the ice shelf. The team had no idea what happened, they had no choice but to abandon the vehicle. It's possible that the ice shelf will fracture and form an iceberg, which will melt and reveal Autosub-2 once again.



DYNAMICS OF SHELF SEAS FRONTS
THE IRISH SEA

Autosub operations were conducted from MV Terschelling in the Irish Sea off the North Wales coast, with the mission totalling 751km. For this mission, Autosub-3 was fitted with a turbulence probe on it's nose, which was angled up by 0.7° with reference to the inertial navigation system so that it was near horizontal when in flight.

As you can see by the image, not all recoveries have the desirable equal lengths on the recovery lines, resulting in some interesting recoveries.



AUTOSUB6000 TRIALS
SOUTH WEST APPROACHES

In September, Autosub6000 took part in its first deepwater trial aboard RRS *Discovery* as part of cruise D323.

Led by Steve McPhail, the vehicle went 4500 metres below sea level and stayed there for 90 minutes. It was fitted with short stubby wings at the rear of the mid section to aid diving.

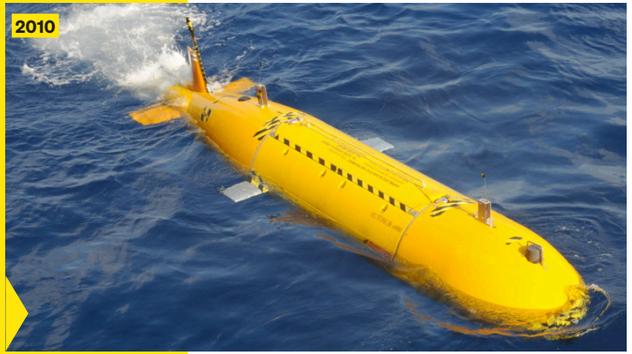
DEEPWATER TRIALS MAP SEAMOUNT
CASABLANCA SEAMOUNT

Autosub6000 continued to take part in further deepwater trials in preparation for future missions. The vehicle was fitted with Edgetech Seaking collision avoidance sonar with resilient rubber 'bumpers' underneath to minimise damage should the vehicle strike the seabed.

Autosub6000 was specifically designed with low altitude seabed photographic missions in mind. In these trials, Autosub6000 descended 2500m to the top of the Casablanca Seamount twice, with the second dive being within 10m of the seabed.

DISCOVERING HYDRO-THERMAL VENTS
CAYMAN TROUGH

As part of an International Interridge Programme, Autosub6000 provided fine-scale maps of the seafloor bathymetry to pinpoint new vent sites. The vehicle detected magnetic anomalies when flying close to the seabed to help indicate vent sites. This was possible due to most of Autosub6000 being constructed of non-magnetic metals, plastics and syntactic foam, meaning it could carry a sensitive magnetometer. The mapping was made possible by the use of a special sensor provided by Dr Koichi Nakamura, National Institute of Advanced Industrial Science and Technology, Japan.



EXPLORING UNDER ICE
PINE ISLAND GLACIER, ANTARCTICA

Autosub-3 undertook 6 missions under the glacier, with 167 hours covering a whopping 510km in total for the NERC Under Ice thematic programme. The cruise was aboard the RV Nathaniel B. Palmer, a twin-screw vessel with a cut-away counter, which meant that Autosub could easily be drawn under the hull. To combat this, launch and recovery operations used a support boat to keep the vehicle away from the stern.

On mission 431, when following the underside of the ice, the vehicle rose into a crevasse and hit the ice side-wall, sustaining damage to its nose but thankfully managing to make its way back to the ship.

PHOTOGRAPHY MISSION
DARWIN MOUNDS, SCOTLAND

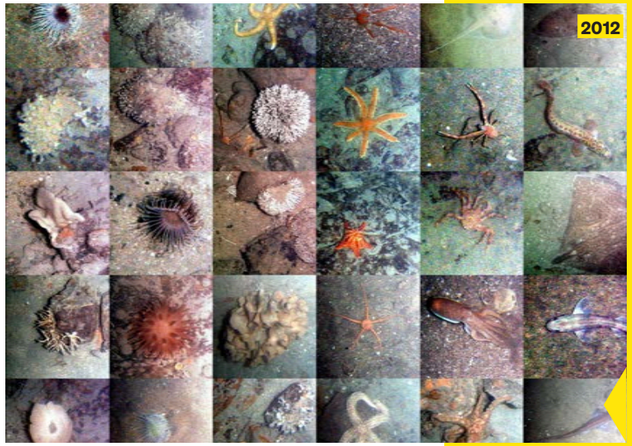
In operation on the RRS *James Cook*, Autosub6000 took part in an expedition to study benthic habitats and human impact in the Rockall Trough, Rockall Bank and Hatton Basin. Unfortunately, for the most part, the weather was atrocious.

Autosub6000 was a key tool in the expedition providing high-resolution seabed morphology, multibeam bathymetry and photographic images which were thankfully unaffected by surface conditions. In total, the vehicle surveyed 685km of track, 96km² in a total of 7 days in the water.

AUTOSUB LONG RANGE
ATLANTIC OCEAN

Autosub Long Range AUV (ALR) was a new type of AUV with a depth rating of 6000m. Although a third the weight of Autosub3 and Autosub6000, it is able to travel greater than ten times the distance and can be deployed for over a hundred times the duration.

NERC Core Strategic "Autosub and Sensors" technology programme was treated as the first deepwater trials of ALR. The vehicle was launched over the side of the RRS *Discovery* by crane as it did not have a dedicated gantry.



SEA CREATURE ENCOUNTER
EASTERN NORTH ATLANTIC

Autosub6000 took part in this Ecological Sampling and Surveying cruise during the early days of its seabed photography capabilities. It was fitted with an oblique forward-looking camera with flash and a vertical camera with vertical flash.

Autosub encountered a diverse variety of wildlife during its numerous dives, photographing a selection of benthic invertebrates and demersal fish during mission 58, dive 3. It also captured litter such as plastic bags and bottles and metal cans discarded on the seabed.

SURVEYING SUCCESS
NORWAY

Autosub6000 MKII took part in a long surveying mission, fitted with a brand new launch and recovery system on its afterdeck to help manouvre the vehicle. 708km of track lines were surveyed over a period of 141 hours with various tools and features including a sidescan sonar, 5M pixel colour camera and a light backscatter sensors.

The red tape shows where there was top panel damage from a ship collision on a previous recovery.

SHORE COMMAND
GRAN CANARIA

A series of AUV trials were carried out from a base at the Spanish oceanographic research facility PLOCAN. The trials were a success, with much learnt about the characteristics of the vehicle. Perhaps the greatest achievement was the demonstration that such trials could be accomplished from a shore base, with the AUV deployed from a trailer on a ramp, from where a small rib towed it a short distance offshore. A signal was then sent to the AUV via a WiFi link, and the AUV started its journey East.

FIRST UK VISIT TO THE CLARION CLIPPERTON ZONE
NORTHERN EQUATORIAL PACIFIC

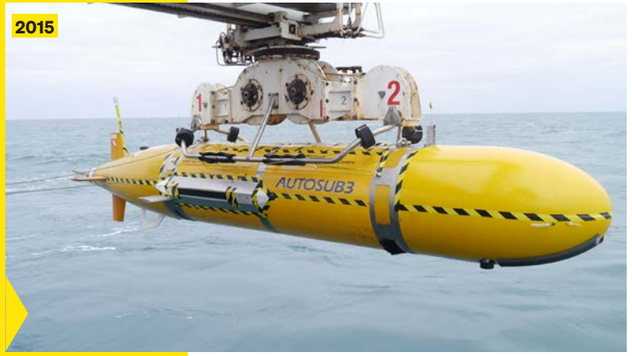
The first UK science cruise to the Clarion Clipperton Zone (CCZ) in the northern equatorial Pacific, an area likely to be targeted for deep-sea mining. In particular, the cruise visited the north easternmost Area of Particular Environmental Importance (APEI).

Autosub6000 carried out wide-area acoustic surveys, collected seabed photographs and made physical measurements of the water column of the APEI.

LOSS AND RETURN OF AUTOSUB3
CELTIC SEA

It was not possible to complete the first of two Benthic Shelf Seas Biogeochemistry (SSB) NERC cruises due to the loss of Autosub3. An immediate post mission search began and an estimated position of the AUV from its emergency beacon was found. With time running short, the Autosub was left on the seabed to be recovered a few weeks later by the Trinity House ship, Endeavour.

It turned out that less than 3m off the seabed, the Autosub3 had become entangled in a discarded fishing net. Autosub3 was recovered, repaired within 2 months and subsequently took part in the second cruise back again in the Celtic sea.



COMMENCEMENT OF OCEANIDS
SOUTHAMPTON, UK

The Oceanids Programme, a £16M Marine Autonomous Systems (MAS) development programme funded by UK Government as part of the Industrial Strategy Challenge Fund (ISCF), is launched.

The programme aims to see two new autonomous underwater vehicle (AUV) classes delivered: three 1500m depth-rated Autosub Long Range vehicles that will have longer endurance and greater payload capacity compared with the current vehicles; and a 2000m depth-rated Autosub capable of carrying high-power sensors and operating under ice.

BOATY'S FIRST MISSION
SCOTIA SEA, ANTARCTIC

RRS *James Clark Ross* arrived in Southampton, returning Autosub Long Range (ALR), known as 'Boaty McBoatface', home after its first scientific deployment in the Antarctic.

Supported by NOC engineers, the team, which involved scientists from the University of Southampton and British Antarctic Survey, collected data on temperature, speed of water flow and underwater turbulence rates of the Orkney Passage, a region of the Southern Ocean that is around 4000m deep and roughly 500 miles from the Antarctic Peninsula.

EPIC ANTARCTIC ADVENTURES
WEDDELL SEA, ANTARCTIC

From January to February, the Autosub Long-Range, 'Boaty McBoatface' was deployed during RV Polarstern cruise PS111 as part of the Filchner Ice Shelf System (FISS) Project – a collaboration involving leading UK research institutions.

'Boaty' spent a total of 51 hours under the Antarctic ice, travelling 108km over the duration of the deployment. The vehicle reached water depths of 944m, and spent 20 hours exploring beneath a section of the ice shelf that was 550m thick.

CORAL MOUNDS CHECKUP
DARWIN MOUNDS MARINE PROTECTED AREA

RRS *Discovery* and Autosub6000 travelled to an area of small cold-water coral mounds in the Northern Rockall Trough which was discovered by NOC scientists in 1998. This area is protected from bottom contact fisheries, in order to identify and quantify any long-term changes to this deep-sea habitat. Autosub6000's job was to survey the mounds using a sidescan sonar and was supported by the HyBIS video platform and a series of targeted boxcores.

Despite some time lost due to weather and unfortunate equipment malfunctioning the expedition was a success with the required surveys completed.

ALR1500 HARBOUR ACCEPTANCE TRIALS
PORTLAND HARBOUR, DORSET UK

The Autosub Long Range (ALR) vehicle, developed under the NERC Oceanids programme, successfully completed its first live trials.

ALR1500 – named for the 1500m depth it can achieve – passed its first major test with flying colours, successfully demonstrating its integration with the unified web-based Command and Control (C2) software platform that had been developed in parallel by the NOC in partnership with the Scottish Association for Marine Science.

SUCCESS AT LOCH NESS
LOCH NESS, SCOTLAND

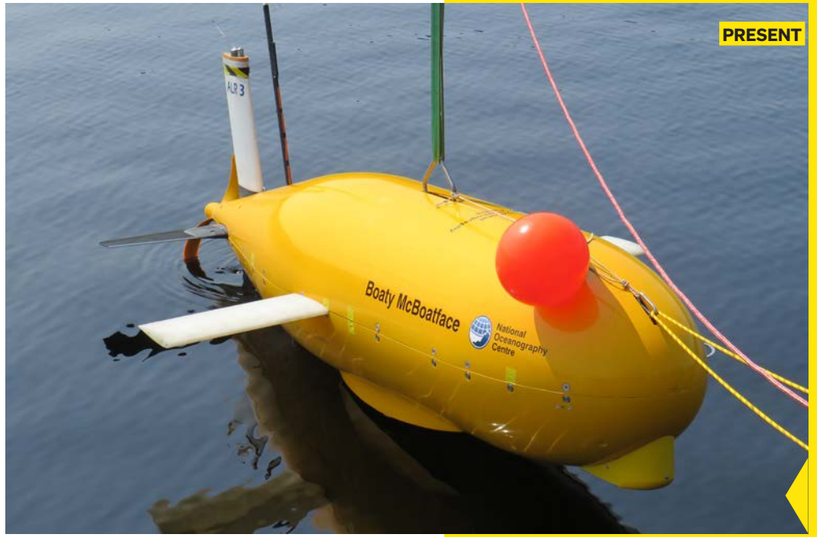
Following the Portland trials, two of the three new ALR1500's went through their first round of commissioning trials. The vehicles carried out a range of test missions of increasing complexity across three weeks to test the vehicles' enhanced functionality, including Terrain Aided Navigation and environmental profiling capabilities.

The NOC returned later in the year to conduct trials of the next generation of marine sensors and autonomous underwater vehicles.

BIOCAM ON TRIAL
LOCH NESS, SCOTLAND

The Oceanids Autosub 2000 Under-Ice platform begun the next phase of trials; in-water Harbour Acceptance Testing.

An important milestone in developing a reliable platform for delivering high-power missions in deep-water and under-ice environments.



HARBOUR ACCEPTANCE TESTING
LOCH NESS, SCOTLAND

The Oceanids team began testing the integration of the BioCam sensor system with Autosub Long Range. Led by Professor Blair Thornton at the University of Southampton, the BioCam project develop innovative hardware and software for autonomous measurements of benthic biology.

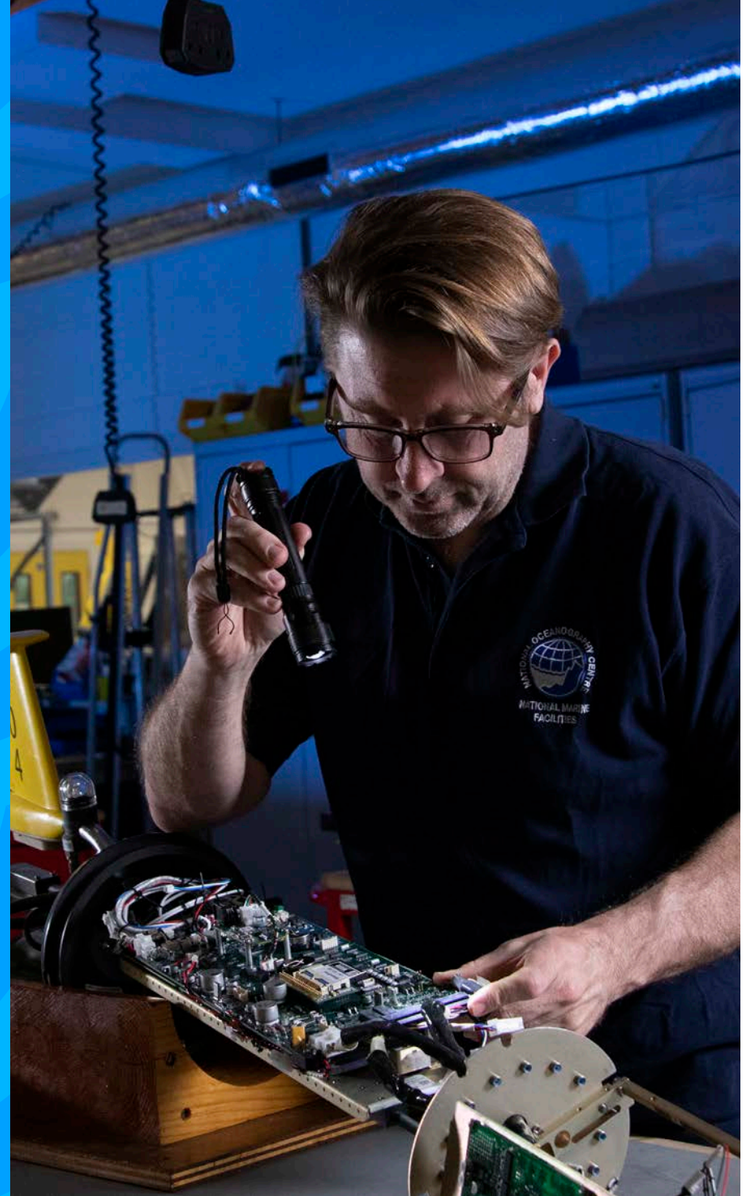
The Oceanids team also tested new vehicle navigation software ready for the next scientific deployment at the Thwaites Glacier, Antarctica.

GOAL 5

GROW & DIVERSIFY

Responsibly grow and diversify revenue to sustain our mission with a critical mass of scientific and technical capability

As the UK's leading marine charity, we've worked hard and smart to get the best results for our ocean from careful use of time, resource and funding. With newly defined donation streams we've carved out exciting new ocean literacy and education offerings for the next generation of science and engineering students. We've built on our reputation as the spokesperson of the ocean, maintaining our authority on the world stage as an impartial expert. New business-sector relationships, aligned to our purpose and five-year plan, have already seen creation of several exciting partnerships and missions.



ACTION IN ALLIANCE

We launched a new fundraising call to enable individuals and businesses to protect the future of the ocean by joining our Ocean Alliance. The funding programme will be an essential resource for global ocean research and vital technological development, empowering society to become more involved in the global science needed to support a sustainable ocean.

The Ocean Alliance is a group of partners that promote knowledge, innovation and sustainable use of the ocean and fund the research and technology development needed to make a positive impact and drive change. As the largest, most connected and vital ecosystem on earth, the ocean sustains all life. Yet today, ocean conservation receives less than 1% of global charitable giving. With the United Nations Decade of Ocean Science highlighting the importance of including the ocean in climate conversations, NOC is encouraging those interested in protecting the oceans and the planet to join the Ocean Alliance and have the chance to directly impact the global scientific findings, innovations and education needed to tackle climate change.

The alliance comprises four funds:

"When we can understand the ocean and its ecosystems, we are in a better position to know how to not only preserve it, but also to manage it to ensure that it is protected for the future.

At NOC we have the existing scale, experience and infrastructure to deliver the science needed to drive forward global action, but require the financial support to continue driving discovery and pursue bold new lines of ocean research in ways other funding types cannot.

We want our supporters to come with us on this journey and learn about the impact they are having."

SOFIE BENNETT
HEAD OF PHILANTHROPY, NATIONAL OCEANOGRAPHY CENTRE

THE ADVANCE FUND

BRINGING SCIENTIFIC SOLUTIONS TO THE WORLD'S MOST COMPLEX PROBLEM

THE INNOVATE FUND

USING SCIENCE AND TECHNOLOGY TO FUEL INNOVATIVE SOLUTIONS TO CREATE A THRIVING OCEAN ECONOMY FOR ALL

THE EMPOWER FUND

INFORMING GOVERNMENT POLICIES, GOOD CORPORATE PRACTICES, AND A STEP CHANGE IN PUBLIC AWARENESS OF THE ROLE THE OCEAN PLAYS

THE EDUCATE FUND

A DIVERSE WORLD OF FUTURE SCIENTISTS TO ENSURE THE OCEAN REGAINS AND MAINTAINS ITS HEALTH

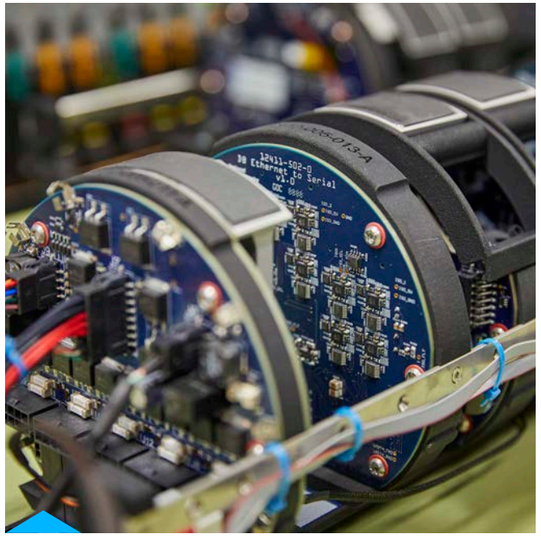
BURSARY ON BOARD

Together with the West of England P&I Club (West P&I) we were proud to announce Adeola Dahunsi and Selasi Yao Avornyo as the two students selected for the second year of our collaborative international bursary programme.

They joined their first sea-going research expedition in July to get hands-on experience of working and living on an oceanographic research ship. As part of the science team on board the RRS *James Cook* (JC238) they travelled to the North Atlantic Subpolar Gyre to measure ocean changes and how they affect the UK's weather systems.

> "It's so exciting to be able to provide this sea-going experience thanks to the bursary programme with West P&I. Adeola and Selasi Yao were selected for it because of their research interests, which fit with the expedition objectives, plus the commitment and talent they demonstrated during the bursary programme's first year which had to be run completely online."
>
> **DR SAMIA BURRIDGE**
> HEAD OF PHILANTHROPY, NATIONAL OCEANOGRAPHY CENTRE

The West P&I Seagoing Science Bursary provides financial support to enable students and early career researchers in the field of marine science or oceanography, or those from developing countries who are keen to become involved in the field of marine science or oceanography, to gain practical experience of ship borne science.

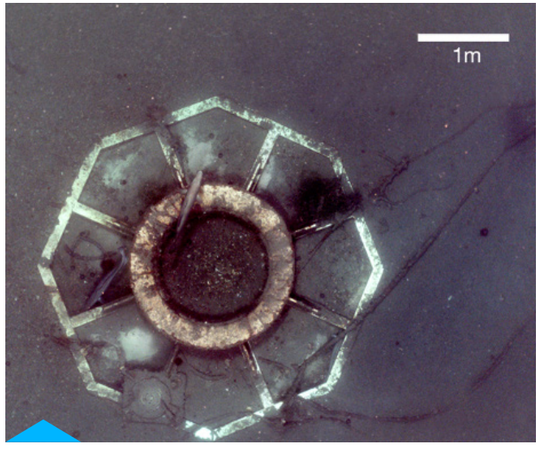


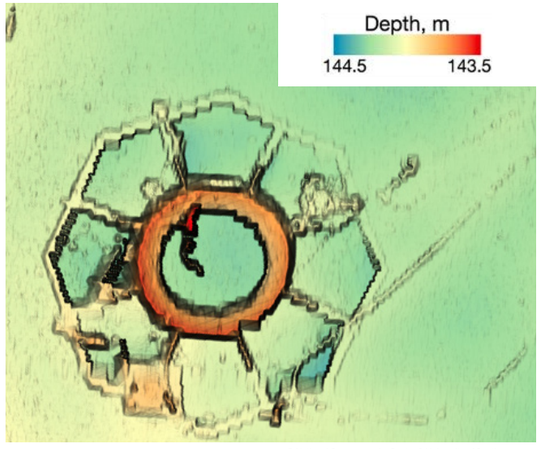
EUROPEAN CENTRE OPENS

Working in partnership with Teledyne Marine, NOC took the stage at Oceanology International 2022 to announce a new European Glider Service Centre.

Based in our Southampton dockside location, the Service Centre will offer an official service, support and repair facility for Teledyne Slocum Gliders.

> "Our new NOC Glider Service Centre builds on years of expertise from servicing our own underwater glider fleet – part of the largest autonomous vehicle fleet in Europe – to offer a commercial service incorporating our own in-house Calibration Laboratory and Pressure Testing Facility."
>
> **HUW GULLICK**
> ASSOCIATE DIRECTOR NOC INNOVATIONS,
> NATIONAL OCEANOGRAPHY CENTRE





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NET ZERO DECOMMISSIONING SURVEY

We proved it's possible to launch an autonomous underwater vehicle (AUV) from shore to undertake a long-distance, high-tech, low-impact marine monitoring survey.

This huge step forward in technology may eventually replace the current approach for environmental monitoring at decommissioned oil and gas sites, which need dedicated ships and teams of people offshore.

> "Our goal is to improve the environmental protection of the North Sea at a reduced cost and impact to the environment. We aim to demonstrate how this leading robotic technology could be used worldwide to support this crucial ocean monitoring."
>
> **DR DANIEL JONES**
> ASSOCIATE HEAD OF OCEAN BIOGEOSCIENCES
> NATIONAL OCEANOGRAPHY CENTRE

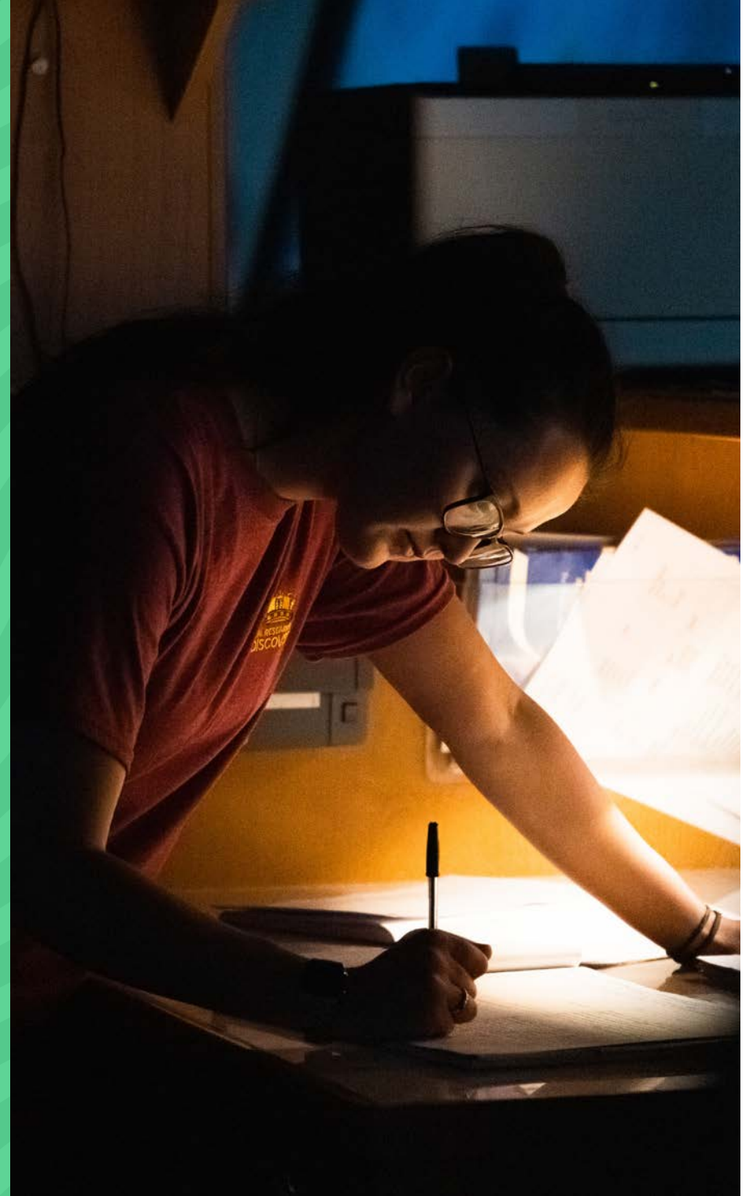
Our technical mission ended up being a great success and provides a huge step forward in operations offshore and the journey to net zero.

GOAL 6

GOVERNANCE

Transform the way the National Oceanography Centre is governed and operated

Our approach is not just about ensuring we are operating in line with company and charity law but encouraging responsibility and accountability that will ultimately improve performance and ensure we operate in a sustainable manner. We use two routes to achieve good governance; a sound governance framework for operation and an adherence to Charity Governance Code that aligns with our values and culture. This year we have pressed on with our continuous improvement journey.



GOVERNANCE FRAMEWORK

We have worked to improve our governance framework, we have reviewed our audit approach and developed a more practical and sustainable route, that is linked to the identified risk areas and meets the requirements of the charity governance code.

CYBER SECURITY AND DATA PROTECTION

Cyber security activity has seen significant investment during this year, we have recruited a new Head of Information Technology and a Cyber Security Manager that have increased our skills and improved our approaches.

We have delayed our Cyber Essentials Accreditation submission, to dedicate resources to completing a ship cyber review for the two NERC research vessels we operate. Installation of our new Active Directory setup and completing a third-party vulnerability assessment have improved our current position, and our ability to adapt to future threats. We will continue with Cyber Essentials Accreditation and aim to complete this in spring 2023.

This year we began work to analyse the current status of Data Protection policies and procedures, and other information available to staff in relation to current data protection legislation. This has included reviewing and updating Data Privacy Impact assessments; and reviewing and updating all Privacy Notices on the NOC website. This activity will continue next Financial year, where aim to improve our training approach for the organisation.

Recruitment of a new Information Governance & Publications Officer during Q3 provides the further resource needed to support this activity.

There were no reportable data protection breaches during the financial year.

RISK MANAGEMENT

The Trustees continue to have oversight of the risk management of the organisation. Staff training and workshopping have continued through 2022, this has helped to embed risk understanding, and improve monitoring and reporting across the organisation.

As our maturity increases, we will continue to develop improved approaches to support our staff who on day to day basis manage our operational risks in specialist areas.

ETHICS, SAFEGUARDING AND CONFLICTS OF INTEREST

We have reviewed our Research Integrity Policy, and have identified the need to deliver specific training in this area.

The training programme is in development and we will look to roll this out during the next financial year. A full review of NOC's Safeguarding Policy, Safeguarding Guidance and Reporting Procedure has been conducted by the Legal & Governance team, considering current Charity Commission guidance; UKRI guidance and requirements for projects that its funds; and current legislation and practice. The update provides the inclusion of comprehensive descriptions for specific scenarios to help considerations and support to our staff.

There were no externally reportable conflicts of interest and no significant governance or control issues during the financial year.

RECRUITMENT

We have continued to develop our skills with the recruitment of new leaders across Corporate Business Support that are contributing to significantly improving our operations and governance.

DUE DILIGENCE

Carrying out effective due diligence allows NOC to make good decisions; to understand and mitigate risks; and to ensure that in working we comply with our governance, and terms and conditions flowed down by our funders, customers, regulators including the Charity Commission and Scottish Charity Regulator (OSCR) and other third parties.

NOC has reviewed and updated it approach to due diligence of our partners that we work with. The new approach sits alongside the NOC Ethics Policy, and sets out (a) the requirements in relation to due diligence to be undertaken prior to NOC and/or National Oceanography Centre Innovations Limited (NOC Innovations) entering into an agreement with a third party.

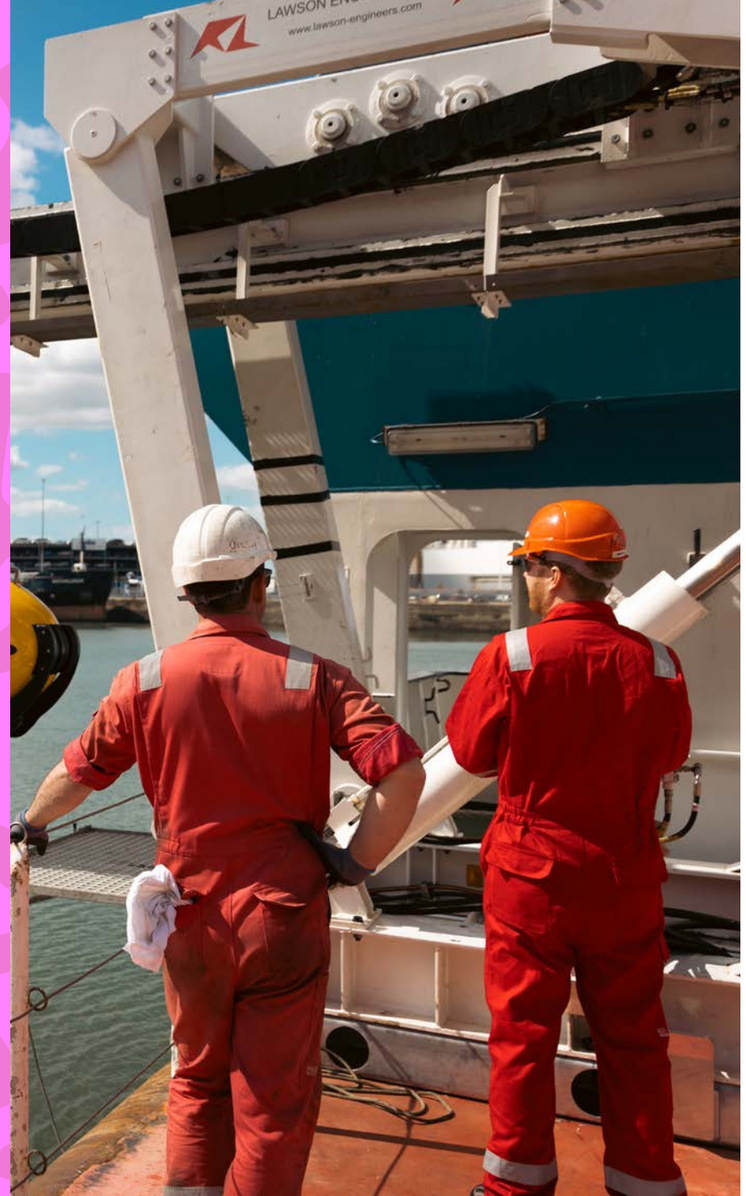
It also outlines a route for monitoring projects with other parties where a specific risk in relation to the other party is identified.

GOAL 7

PEOPLE & CULTURE

Invest and reinvest in the National Oceanography Centre and its people

We value individual differences and the rich diversity that this brings. Through a dedicated and inclusive culture, strong human empathy, alongside the strength of our policies, procedures, expectations and ways of working, we continue to create a positive and supportive environment for everyone, allowing them to reach their full potential and to bring out their very best self. This ethos is underpinned not only by our vision and values but by the positive pillars of our Sustainability and Social Responsibility Strategy.



34% OF OUR WORKFORCE ARE FEMALE

40% OF OUR 151 PEOPLE MANAGERS ARE FEMALE

56% OF OUR WORKFORCE ARE ON NOC CLG T&C's

9 EMPLOYEES ARE TRAINED AS MENTAL HEALTH FIRST AIDERS

115 VACANCIES FILLED

15% OUR STAFF HAVE FORMAL FLEXIBLE WORKING PATTERNS

397 STAFF MEMBERS ATTENDED ACTIVE BYSTANDER TRAINING

131 TOOK PART IN OUR PEOPLE MANAGER DEVELOPMENT PROGRAM

IIP THE INVESTORS IN PEOPLE ASSESSOR DESCRIBED OUR WELLBEING STRATEGY AS BEING OUTSTANDING

SUCCESS IS SILVER

We were awarded the Investors in People (IIP) silver accreditation – an accolade awarded to just 15% of organisations assessed. This is the first time NOC has achieved Silver, and reflects the positive progress made since our last assessment in 2018, especially during the last two years as we transitioned into a charity and navigated the pandemic.

Results from a recent staff survey showed 80% of staff agreed or strongly agreed that NOC was a great place to work. Our people also believe that we have supported them exceptionally well during the COVID-19 pandemic. Our initiatives are providing a measured and integrated approach to supporting the current and future wellbeing of our people.

> "To be given this award, by the organisation that sets the benchmark when it comes to people management, is testament of our shared commitment to a positive, values-focused internal culture. I'm delighted to know that staff feel supported and that they believe as I do, that their work has purpose and are proud to associate with the NOC's world class reputation."
>
> **PROFESSOR ED HILL CBE**
> CHIEF EXECUTIVE, NATIONAL OCEANOGRAPHY CENTRE

We are all incredibly proud of this achievement, and we are committed not only to maintaining the silver standard, but to exceeding it in the future. The same week we won the award we published our Sustainability and Social Responsibility Strategy, which sets People as one of our five pillars of culture, alongside community, environment, operations and research ethics.

PEOPLE CULTURE

COLLABORATION AWARD

It was an incredible proud day for everyone at NOC when SeaDataCloud, a collaborative project involving our British Oceanographic Data Centre, was awarded a "les Etoiles de l'Europe" trophy.

The award was presented by the French minister of Research and Innovation in Paris, as part of the 2021 Horizon Europe summit. This innovative project is the latest in a series of EU projects to develop a pan-European infrastructure called SeaDataNet, set up to enable the management and sharing of marine data and information across Europe and beyond. The SeaDataCloud project, managed by the team at the BODC and its European partners, has considerably advanced the technological infrastructure of SeaDataNet, with the adoption of cloud and high-performance computing capabilities.

> "We are delighted that SeaDataCloud has been presented with this prestigious French award that recognises excellence in project coordination and European-wide collaboration. We have a long association with SeaDataNet - as data providers and technical experts – and we are immensely proud of our contribution to this latest project. It represents a huge step forward for the international exchange of marine data and information."
>
> **MARK HEBDEN**
> SENIOR MARINE DATA MANAGER, NATIONAL OCEANOGRAPHY CENTRE
> PROJECT LEAD FOR SEADATACLOUD

PEOPLE CULTURE

COLLEAGUE RECOGNITION

Staff were rewarded for all their hard work and contributions over the year at our annual Summer Celebration and Values Awards event.

Held in person at our sites and ships we saw 14 awards, all reflecting our corporate values, presented to peer-nominated colleagues. As a fantastic celebration of all we've achieved together this event is always the highlight of the social calendar and especially so this year as it marked our first in person staff event since the pandemic.

PEOPLE CULTURE

ENVIRONMENT AWARDS

Our Environmental Management System was recertified with ISO14001, with its effectiveness demonstrated through operational processes, internal audit programme, monitoring, measurement, leadership and processes.

Our dedicated team ensured that we met objectives and demonstrated regulatory and legal compliance.

We were re-accredited with 0 non conformities and only four minor observations.

ENVIRONMENT CULTURE

DECARBONISATION PLAN

We set ourselves new challenging science-based targets, driven by Paris Agreement, to reduce our Scope 1 emissions by 27.5%, Scope 2 emissions by 46%, and Scope 3 by 46% with an ultimate goal of becoming a zero emissions based organisation by 2040.

Scope 1 emissions relate to the direct burning of fossil fuel on site (gas consumption) and Scope 2 emissions relate to the indirect generation of electricity for use on site (electricity consumption). This year we have generated 233,579.90 kWh of our own energy through our solar PV array.

We made good progress already this year, with annual gas consumption reduced by 26% from the 2019 baseline. The reduction in electricity consumption has been less significant (only 5% compared to 2019), but associated carbon emissions have decreased substantially due to the decarbonisation of grid electricity. The grid is expected to decarbonise further by 2030, which would allow us to meet the 2030 Scope 2 target (for building energy use) without the need for further reduction in energy consumption. We are engaged with our partner consultants to ensure a decarbonisation roadmap is fit for future and meets the required need to achieve our targets at 2030 and 2040.

As an international research centre, travel is an inevitable part of our scope 3 emissions. As part of our new decarbonisation plan, we have committed to reducing our business travel by 23% over the next 4 years. We have launched our Sustainable Travel and Commuting Guidance to support and guide staff to choose lower carbon modes of travel.

ENVIRONMENT CULTURE

CARBON CHANGES

Science expeditions have been an integral part of learning about our oceans for a very long time. We currently operate two world-class scientific research vessels, RRS *James Cook* and RRS *Discovery*, which have travelled around the world completing important missions and exploring every aspect of the ocean.

But our social media campaign #pastpresentfuture explored the exciting and innovative ways we're upholding our commitment to the environment and moving towards the 2040 future of net-zero oceanographic capability.

ENVIRONMENT CULTURE

FIT FOR FUTURE

To continue to see us thrive in all that we undertake, we have embarked on an ambitious journey of internal transformation. Our Fit for Future programme, spanning our long-term strategy, will create a collaborative, welcoming and inclusive environment that accommodates post pandemic working styles and is synonymous with creativity and unity. It will actively encourage cross functional working and facilitate rich and unique conversations that lead to scientific, technological, and collaborative innovations. The look and feel of this environment will be 'more than the sum of its parts', creating not only an exceptional and collaborative workplace but also somewhere to showcase NOC to the external environment.

This creative environment will be supported by highly efficient, digitally connected, corporate business support teams who are able to generate strong and sustainable value. These teams will embrace the culture of consistent innovation and continual improvement with the aim of delivering accurate, timely, and best in class services, ultimately creating more time for world class engineering and science. Executed well, this transformation will become enabling and energising, delivering an exemplary environment where our teams are able to work to their full potential, collaboratively and seamlessly from any location.

PEOPLE CULTURE ENVIRONMENT CULTURE OPERATIONS CULTURE

OCEAN EDUCATION

If there was ever a day in the year for us to shout that extra bit louder about our passion and hopes for the ocean it's the United Nations International World Oceans Day, this year framed around the theme of revitalisation.

Supported by the UN Decade of Ocean Science and the UN Ocean Conference we proudly participated in events locally, virtually and internationally. Schools, homes and offices tuned in to our dedicated day of education, through our hybrid talks and online classroom sessions, all delivered by our skilled ocean literacy ambassadors.

COMMUNITY CULTURE

1207
ONLINE DELEGATES

4
'OCEAN LITERACY' SESSIONS WITH LIVE Q&A

175K
TOTAL SOCIAL MEDIA REACH

4235
VIEWS ON DEMAND

4
HYBRID 'HOT TOPIC' PANEL DISCUSSIONS

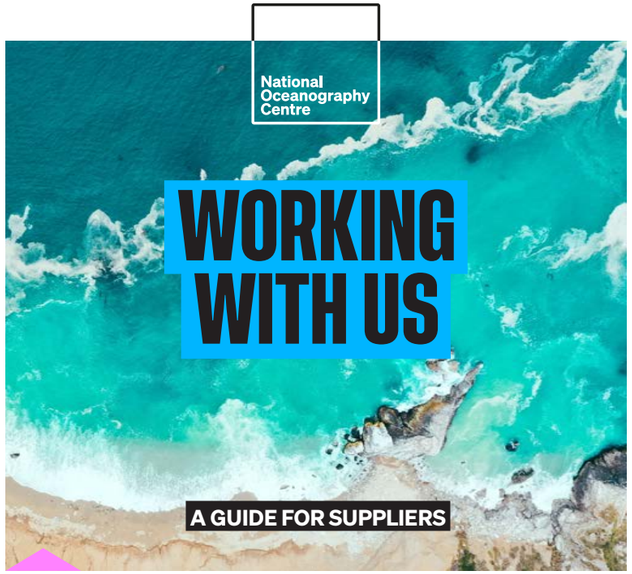
6.2%
AVERAGE SOCIAL MEDIA ENAGAGEMENT

BUSINESS SMART

We've gotten smarter at project management by further integrating our bespoke business systems.

The resource planning and financial outputs are now directly linked, enabling staff to more effectively plan out time and directly see the financial impact from their planning. There is now the possibility to assess the performance of projects on a real time basis where information is kept up to date. Regular proactive reporting to senior leaders, much earlier in the plan, means our people and business benefits from quicker and more informed decision making.

OPERATIONS CULTURE



CODE OF CONDUCT

We take a comprehensive view of our entire supply chain and work closely with our suppliers to ensure social responsibility is at the heart of what we do. Last year we reported that a Supplier handbook had been drafted and was ready to be launched this year. We're excited to update that the implementation was very successful and has helped consolidate vendor relationships and further improve our due diligence processes.

Through adoption of this guide we know all our suppliers agree to a code of conduct, clearly outlining our expectations and ways of working. All new suppliers that follow the full due diligence process are now categorised as TRUSTed. This commits to treating all people and communities with respect across the entire supply chain; recognise and work to minimise environmental impacts; understand our ways of working, our processes and needs; support our science and engineering through continual improvement and innovation; and be technically competent and compliant.

OPERATIONS CULTURE

RESPECT AT SEA

Creating an even more inclusive workplace culture is an ongoing priority for marine science institutions worldwide. Given the unique working environment of research ships and the potential to be at sea for weeks or even months, it is essential to promote positive values that instil respect for their colleagues.

To galvanise inclusive culture onboard research ships, NERC (Natural Environment Research Council) launched a thought-provoking training video designed to empower ocean researchers and remind them of their responsibility to respect colleagues and promote inclusion. The video is the latest element of NERC's ED&I (Equality, Diversity and Inclusion) commitments and features some NOC oceanographers and marine engineers who share their joy of going to sea and calls for colleagues to treat each other with respect. The film is being shown on board both NERC ships, operated by NOC, as part of the onboarding training for those setting sail.

> "Working globally and leading the broad science and technology around our vast ocean is one of the great challenges of our age. This needs the talents of many people from different backgrounds to make it possible, and to engage with diverse communities about the importance of the sea in all our lives. We strive for excellence in this area, whether that is through delivering education and awareness or driving change to our cultural practices."
>
> **CAIT ALLEN**
> ASSOCIATE DIRECTOR FOR ENGAGEMENT, NATIONAL OCEANOGRAPHY CENTRE

RESEARCH CULTURE

STRUCTURE, GOVERNANCE & MANAGEMENT

OVERVIEW

NOC was incorporated on 2 July 2018 as a charitable company limited by guarantee and commenced trading on 1 November 2019. It is registered as a charity with the Charity Commission in England & Wales and the Scottish Charity Regulator and is governed by articles of association in accordance with the Companies Act 2006.

ORGANISATIONAL STRUCTURE AND DECISION-MAKING POLICIES

BOARD OF TRUSTEES

NOC's Board of Trustees, who are also Non-Executive Directors for the purposes of company law, have overall responsibility for ensuring that NOC is carrying out its purpose for the public benefit; the continued financial viability of the organisation; and for ensuring that we meet all of our legal and compliance requirements.
The Trustees oversee the day-to-day delivery of NOC's strategy which is led by the Executive Committee. Trustee Directors are appointed by the existing Trustee Directors for a term of three years and are eligible for re-appointment for a further three years.

The Board of Trustees during the financial year was as follows:

CHAIR

Jeremy Darroch

DIRECTORS

Dr Ruth Boumphrey

Professor Sir Ian Boyd

David Gee

Daniel Hook

Sarah Kenny OBE

Dr Sarah McMath

The previous Chair of Trustees, John Hirst, retired 30th September 2022. The newly appointed Chair, Jeremy Darroch officially started his term 1st October 2022.

The first three-year term of four Trustee Directors (Dr Ruth Boumphrey, Professor Sir Ian Boyd, Daniel Hook, and Dr Sarah McMath) expired during 2022, following which all four were reappointed for a further three-year term.

DELEGATION OF DECISION MAKING - EXECUTIVE COMMITTEE

The Board delegates the day-to-day leadership and operations of NOC to its Executive Committee, which is made up of the Chief Executive Officer; the Chief Operating Officer/ Chief Financial Officer; the Director, Data, Science and Technology; and six Associate Directors.
The Executive Committee meets monthly, reviewing progress against NOC's goals; the KPIs set by the Board; and both current and longer-term priorities for the organisation. The Board has approved a formal Statement of Delegations for the Executive Committee to allow them to conduct the business of the organisation effectively.
During the financial year, the Board approved an updated Executive Roles and Responsibilities framework, setting out accountabilities for each member of the Executive Committee.

BOARD MEETINGS

The NOC Board meets formally at least quarterly. Standing items covered in Board meetings include strategy, performance, risk and compliance. The Executive reports quarterly to the Board on progress against KPIs set at the start of the financial year, which cover each of NOC's goals. Their activities included providing oversight and guidance in the development the Marketing Strategy and the Public Affairs Strategy, and the setting of a first Digital Strategy for NOC.

DELEGATION OF DECISION MAKING - COMMITTEES

The Board of Trustees has established four formal committees: the Audit & Risk Committee; the Nominations Committee; the Remuneration Committee; and the Scientific and Technology Advisory Committee.

Their role is to undertake detailed scrutiny of specific subject matters and to make recommendations on those topics. The committees are Chaired by a Trustee Director appointed by the Board and report directly to the Board. The constitution of the committees and their respective Terms of Reference are reviewed at least annually.

AUDIT AND RISK COMMITTEE

The Audit and Risk Committee is chaired by David Gee and meets quarterly. On behalf of the Board, it has overall responsibility for financial reporting and controls; risk management; audit; and whistle-blowing. The committee acts independently from the NOC Executive, to ensure that the interests of the charity are properly protected in terms of monitoring the integrity of the company financial statements. This year the committee established a new route to assure that the risk framework is embedding within the organisation, and provided advice and guidance on the development of our due diligence approach and update to safeguarding.

REMUNERATION COMMITTEE

The Remuneration Committee is chaired by Sarah Kenny OBE, and meets quarterly. It provides a forum for developing policy on trustee and executive remuneration; to recommend levels of remuneration for Directors; and to review the remuneration policy and reward package for all employees. It oversees any major changes in the employee benefits structure throughout the organisation. During 2022, the committee reviewed and approved the Executive pay and performance, and also advised on the succession planning for the Executive.

NOMINATION COMMITTEE

The Nomination Committee has the role of leading the process for Board appointments and making recommendations to the Board and meets at least twice a year. It is chaired by Jeremey Darroch and is responsible for long-term succession planning for future trustees, seeking to ensure there is a formal, rigorous and transparent procedure for the appointment of new directors to the

Board and reviewing and evaluating the balance of skills, knowledge, experience and diversity on the board. The Board analyses the capabilities of the existing Trustee Directors using a skills matrix, which is reviewed annually. The committee had oversight of the recruitment and appointment of the new Chair of Trustees.

SCIENCE AND TECHNOLOGY ADVISORY COMMITTEE

The Science and Technology Advisory Committee is chaired by Professor Sir Ian Boyd. Its remit is to provide independent advice to support the Board of Trustees and the Director Science & Technology in their responsibilities for development and delivery of the research strategy for NOC and on sustaining the quality and impact of NOC's research performance, its research environment and the health of its intellectual capital base. The committee is chaired by a member of the NOC Board and has a membership of no more than 10 people with expertise covering the breadth of NOC's main areas of scientific research and technology development. Members are drawn from outside NOC, taking due consideration of diversity, and bringing stakeholder and international perspectives commensurate with NOC's role as one of a relatively small number of large-scale oceanographic institutions in the world.

TRUSTEES' INDEMNITIES

Under NOC's governing documents, directors and former directors are entitled to an indemnity against liability incurred by them to a third party in the proper performance of their duties as a director or officer of NOC. The governing document also gives NOC powers to provide indemnity insurance for the Trustees in respect of liability arising from breach of trust or duty, negligence, subject to the conditions of s.189 of the Charities Act 2011 (which excludes from such insurance any criminal and regulatory fines and penalties). NOC maintains such insurance for the Trustees, with an annual cap on liability.

PAY POLICY FOR SENIOR STAFF

During the year one Trustee received remuneration as disclosed under note 7 to the financial statements. Details of Trustees' expenses incurred in the course of their duties and reimbursed are disclosed under note 7.

The Remuneration Committee has responsibility for developing, implementing and reviewing the remuneration, considering market value; performance; capabilities, values and leadership behaviours, and using up to date and relevant comparative salary information. The Chair of the Remuneration Committee recommends the remuneration package of the Chief Executive Officer to the Chair of the Board, who in turn reports to the Board.

INDUCTION AND TRAINING OF TRUSTEES

As part of our on-boarding process, new Trustees receive an induction to introduce them to our work, which includes introduction to each member of the Executive team, presentations, tours and meeting various colleagues to learn about the different functions of NOC. NOC also provides a trustee handbook with guidance on both NOC itself, and on charity governance requirements. Trustees are encouraged to attend relevant training events, and to identify any specific training requirements throughout the year.

REVIEW OF BOARD PERFORMANCE

The annual review of the effectiveness of the Board was completed externally by the Chartered Governance Institute between June and August 2022. The review methodology included consideration of various governance documents, trustee and executive director interviews, a board observation and a review of the board's competencies against the Institute's Charity Trustee Competence Matrix. The report stated that, NOC is a well-governed charity led by high-calibre, professional and experienced trustees who are committed to the work of the charity. NOC performed well against the criteria in the matrix. Importantly the review identified some recommendations for consideration, these areas will be put into an action plan that will provide continuous improvement over the next financial year. The Board Code of Conduct was also reviewed and reapproved during this year.

SUBSIDIARY GOVERNANCE AND RELATED PARTIES

NOC's wholly owned subsidiary, National Oceanography Centre Innovations Limited ('NOC Innovations'), was established in 2019 as a private limited company. Its role is to undertake more applied and commercial work, to facilitate knowledge exchange and encourage innovation. It has covenanted to donate to NOC all profits earned which it may legally donate and to re-claim gift aid on its profits to NOC. The NOC Innovations Board is chaired by David Gee, and its other directors are members of the Executive Committee. The NOC Innovations Board meets quarterly. Its Associate Director, Huw Gullick, provides regular updates to the NOC Board of Trustees on the activities and financial reporting of NOC Innovations.

NOC is eligible to bid for funding from UKRI, including the Natural Environment Research Council (NERC). NOC manages the National Capability funding on behalf of NERC working in partnership with marine centres throughout the UK.

MEMBERS OF THE NOC AND LIABILITY

The Members of the Charity are the Trustee Directors. They guarantee to contribute an amount not exceeding £1 to the assets of the Charity in the event of winding up.

DISCLOSURE OF INFORMATION TO AUDITOR

Each of the persons who are Trustees at the time when this Trustees' Report is approved has confirmed that:

- so far as that Trustee is aware, there is no relevant audit information of which the charitable company's auditor is unaware; and
- that Trustee has taken all the steps that ought to have been taken as a Trustee in order to be aware of any relevant audit information and to establish that the charitable company's auditor is aware of that info.

REFERENCE & ADMINISTRATIVE DETAILS

COMPANY REGISTERED NUMBER
11444362

CHARITY REGISTERED NUMBERS
1185265 and SC049896

REGISTERED OFFICE
National Oceanography Centre
European Way, Southampton, SO14 3ZH

INDEPENDENT AUDITOR
BDO LLP
Arcadia House, Maritime Walk, Ocean Village,
Southampton, SO14 3TL

LEGAL ADVISORS
Eversheds Sutherland
Bridgewater Place, Water Lane, Leeds, LS11 5DR

BANK
NatWest
3 Hampshire Corporate Park, PO Box 462, Templars Way,
Chandlers Ford, SO53 3RY

FINANCIAL / TAX ADVICE
Deloitte LLP
3 Rivergate, Temple Quay, Bristol, BS1 6GD

CHAIR
Jeremy Darroch

DIRECTORS AND TRUSTEES
Professor Sir Ian L Boyd

Dr Ruth Boumphrey

Sarah Kenny OBE

Dr Sarah McMath

David Gee

Daniel Hook

SENIOR MANAGEMENT TEAM

Professor Ed Hill CBE
Chief Executive

Julie Pringle-Stewart
Chief Operating Officer, Chief Financial Officer, Company Secretary

Professor Angela Hatton
Director of Data, Science and Technology, Chief Scientist

Dr Maaten Furlong
Associate Director for National Marine Facilities

Dr John Siddorn
Associate Director for Digital Ocean

Natalie Campbell
Associate Director for Corporate Business Support

Professor Doug Connelly
Associate Director for Science & Technology

Cait Allen
Associate Director for Engagement

Huw Gullick
Associate Director for National Oceanography Centre: Innovations Ltd

Danielle Rossiter
Head of Finance

Matt Eades
Head of People and Skills

SECTION 172 STATEMENT

The NOC Board of Trustees have acted in the way they consider to be in good faith, would be most likely to promote the success of the company for the benefit of its members as a whole, and in doing so have regard to the matters set out in s172(1)(a-f) of the Companies Act 2006, in the decisions taken during the year.

The Board of Trustees are briefed on their legal duties as part of their induction and are able to seek further advice from the Company Secretary, Head of Legal & Governance or access external independent advice if required.

STRATEGY AND CONSIDERATION OF THE CONSEQUENCE OF LONG-TERM DECISIONS

NOC's main mission is making sense of changing seas, on which future human prosperity and well-being depend. Our vision for NOC is by 2025 to be seen as the world's most innovative oceanographic institution. We have now finished the second year of delivery of our five-year strategy "Defining our Future" which aims to preserve the very best of what we do and grow our work – exploring new depths; creating the most innovative technologies; being the most exciting place to learn and work.

Throughout the year, decisions and considerations at Board meetings are consistently linked to how NOC meet their strategic objectives and how NOC can build and develop further to the environment around and in turn, contribute further to achieving public benefit. Decisions are underpinned by a detailed business plan, with budgets built from funded projects and forecasts across the following 5 years, based on experience of research funding; pipeline research areas; and market research on future areas of growth. The Board also considers the longer-term prospects and funding landscape for NOC, taking into account expected changes in technology and skills required and types of research and data analysis to be undertaken in the next 10-15 years, and conscious of NOC's aim to diversify income over the longer term.

OUR PEOPLE

The Board considers that developing and maintaining good employee engagement and cementing NOC's reputation as an employer of choice, are fundamental to the delivery of the NOC Strategy. Further detail on the comprehensive initiatives undertaken by NOC during the year and overseen by the Board is in Goal 7: People and Culture. After feeding into the development of the ED&I (Equality, Diversity and Inclusion) approaches at NOC, the Board approved and signed off the strategy this year. We launched Active Bystander training which has been well received by our employees. Achieving a silver Investors in People award was a particular highlight. We have maintained proactive engagement with the Trade Unions in setting pay for the year, and reviewing our approach to allowances. We continue to engage employees through our Staff Focus Group and Open Staff Meetings, that continue to evolve based on the feedback we encourage. The Board has welcomed the roll out of our World Class Manager programme, to support the leaders across the organisation.

SUSTAINABILITY AND SOCIAL RESPONSIBILITY

As a registered charity with public benefit at the heart of the organisation, NOC's aim is to make a positive contribution to society by advancing ocean science and education, supported by continuing substantial public research investment.

As the national centre and a world leader in marine science, NOC's aim is to lead by example. During 2021-2022 a Sustainability and Social Responsibility Committee has met regularly within the organisation, agreeing the content of NOC's SSR Statement to review the plans for and implementation of its three-year delivery plan, centred around the pillars of People; Operations; Community; Environment; and Research. In its delivery of this plan, NOC is aiming to work to the principles of ISO 26000 Social Responsibility. The Board reviews SSR as part of its regular programme.

HIGH STANDARDS AND BUSINESS CONDUCT

NOC's values of Excellence, Innovative Thinking, Empowerment, Environmental Responsibility; Integrity; and Working in Partnership, underpin the way in which the Trustee Directors take decisions and set standards for the way in which the organisation operates.

Through the delivery of our strategy, NOC's intention is to promote our reputation, reflecting responsible behaviour and maintaining high standards of business conduct. The Board reviews the NOC's Ethics & Research integrity frameworks annually. During the financial year, the Board has had oversight of the operation of the NOC's Ethics Committee, the remit of which is to review new business proposals against NOC's charitable purposes and objectives and has also approved an Ethical Positioning statement for NOC, providing further guidance for the organisation. NOC continues to be committed to following the Seven Principles of Public Life, which outline the ethical standards to which those working in the public sector are expected to adhere and which complement NOC's own values.

MEMBERS

The Trustee Directors are also the Members of NOC. The Directors, in consultation with the Executives, take decisions jointly, in accordance with company law, and regularly review any conflicts of interest they may have in their other capacities or wider activities.

STREAMLINED ENERGY & CARBON REPORTING (SECR)

Environmental Responsibility is one of the NOC's six core Values, and 'Excellent environmental awareness and best practice' is built into our Sustainability and Social Responsibility strategy. To ensure our energy and carbon impact aligned with our beliefs and ambition we undertook the following initiatives to bring down our Greenhouse Gas emissions, waste production and transport (mileage) throughout 2021-22. The total CO_2e, was 15,218.22 tonnes, at an intensity ratio of 0.28 (tCO_2e/m^2) and 281.64 ($kgCO_2e/m^2$) (Table 1).

NOC's annual quantity of emissions in tonnes of carbon dioxide equivalent from activities for which the company is responsible involving the combustion of gas was 988.14 tonnes CO_2e and for the consumption of fuel for ship transport was 13,087.19 tonnes CO_2e. In addition, the annual quantity of emissions in tCO_2e from the purchase of electricity by the company for its own use was 1,114.80 tonnes CO_2e.

The annual quantity of energy consumed from activities for which the company is responsible, for the combustion of gas was 5,394.96 kWh and for the consumption of fuel for the purposes of transport in vehicle fuel was 14,637.00 litres diesel (fleet vehicles), 1.30 tonnes LPG, and ship fuel used was 2,762.40 m^3 for RRS *Discovery* and 1,657.00 tonnes for RRS *James Cook*.

The annual quantity of energy consumed resulting from the purchase of electricity by the company for its own use was 5,250.31 kWh.

The following methodologies were used to calculate the information disclosed for both emissions and energy data:

Energy data was collected from the sites' main meters and converted into CO_2e using UK Government GHG Conversion Factors for company reporting. Ship fuel data is reported by ship Captains and converted to CO_2e using Carbon conversion factors for Marine Gas Oil. Transport data for fleet vehicles was compiled from our Stores' turnover records and converted to CO_2e using Carbon conversion factors for LPG and Diesel (100% mineral oil). CO_2e for transport of hire vehicles was collected from our hire company. Rail and air transport CO_2e data was collected from our transport provider. Transport of employee-owned vehicles used for business travel was calculated using staff expenses from our Finance system and converted to CO_2e using the following assumptions: medium sized car, unknown fuel type, Fuel cost 160/l, 0.0595 l/1km, and the UK Government GHG Conversion Factors for company reporting.

GREENHOUSE GAS EMISSIONS

Emissions have increased across the board compared with last year, with a few exceptions. This is owing to the increased occupancy following COVID-19 and staff returning to site and ship working.

We are on a 100% green tariff, reducing the Carbon impact of our purchased electricity.

Our vessels use Low Sulphur Fuel with a maximum sulphur content of 0.1% at all times.

WASTE

Waste production increased slightly, owing to gradual return to pre-COVID-19 levels as staff return to both sites. The Liverpool site sent zero waste to landfill in 2021-22.

TRANSPORT

NOC owned fleet vehicles and hire vehicles both decreased. Travel between the two sites and to external conferences and meetings is therefore significantly reduced compared to the previous year. 252.69 litres of fuel (unknown type) were used for business travel using personal vehicles, equating to 0.74 tonnes CO_2e emissions. Mileage data was unavailable for this report. As such, reasonable assumptions were made for mileage data based on BEIS fuel cost data.

Air and rail transport all increased substantially due to lifting of some internal travel restrictions. Rail and air transport emissions increased by 379% from 43.55 tonnes CO_2e in 2020-21 to 208.71 tonnes CO_2e in 2021-22. Air travel within the UK accounted for 48% of all emissions from flights in 2021-22.

TABLE 1

SCOPE / EMISSION / ENERGY USE	REPORTING YEAR 2020-21 SOUTHAMPTON	LIVERPOOL	TOTAL	REPORTING YEAR 2021-22 SOUTHAMPTON	LIVERPOOL	TOTAL
Energy Consumption used to calculate emissions (MWh)	4,759.43	343.37	**5,102.80**	4,931.72	318.59	**5,250.31**
Emissions from purchased electricity (Scope 2, location-based) (tCO_2e)	1,010.57	72.91	**1,083.48**	1,047.15	67.65	**1,114.80**
Gas Consumption used to calculate emissions (MWh)	5,812.86	-	**5,812.86**	5,394.96	-	**5,394.96**
Emissions from combustion of gas (scope 1) (tCO_2e)	1,064.68	-	**1,064.68**	988.14	-	**988.14**
Heat purchased for own use (CHP/District heating) (MWh)	-	149.47	**149.47**	-	103.12	**103.12**
Emissions from heat purchased for own use (Scope 2) (CHP/District heating) (tCO_2e)	-	25.52	**25.52**	-	18.82	**18.82**
Fuel used for scientific research deployment - RSS *Discovery* (m^3)	-	-	**2,136.50**	-	-	**2,762.40**
Fuel used for scientific research deployment - RSS *James Cook* (tonnes)	-	-	**1,166.20**			**1,657.00**
Emissions from fuel used for transport purposes- Ships (scope 1) (tCO_2e)	-	-	**9,719.76**	-	-	**13,051.97**
Fuel used for transport purposes- Fleet vehicles (L)	-	-	**19,340.00**	-	-	**11,637.01**
Gas used for transport purposes- Fleet vehicles (tonnes)	-	-	**0.90**	-	-	**1.30**
Emissions from fuel for used transport purposes- Fleet Vehicles (scope 1) (tCO_2e)	-	-	**51.23**	-	-	**35.22**
Fuel used for business transport- Rental Cars (L)	-	-	**6,782.48**	-	-	**-**
Emissions from fuel used for business transport- Rental cars (Scope 3) tCO_2e	-	-	**20.03**	-	-	**8.52**
Fuel used for business transport- Employee owned vehicles (L)	-	-	**1,318.34**	-	-	**252.69**
Emissions from fuel used for business transport- Employee owned vehicles (Scope 3) (tCO_2e)	-	-	**3.89**	-	-	**0.74**
Total CO_2e based on above figures (tonnes)	**-**	**-**	**11,968.59**	**-**	**-**	**15,218.21**
Floor space (m^2)	51234.80	2800.00	**54034.80**	51234.80	2800.00	**54034.80**
Intensity ratio (tCO_2e/m2)	-	-	**0.22**	-	-	**0.28**
Intensity ratio ($kgCO_2e$/m2)	-	-	**221.50**	-	-	**281.64**

TABLE 2

ADDITIONAL REPORTING- WASTE	REPORTING YEAR 2020-21 SOUTHAMPTON	LIVERPOOL	TOTAL	REPORTING YEAR 2021-22 SOUTHAMPTON	LIVERPOOL	TOTAL
Incinerated waste (tonnes)	23.48	0.47	**23.95**	39.36	0.37	**39.73**
Incinerated waste emissions (tCO_2e)	0.50	0.01	**0.51**	0.84	0.01	**0.85**
Landfill (tonnes)	10.20	-	**10.20**	2.28	-	**2.28**
Landfill waste emissions (tCO_2e)	4.76	-	**4.76**	1.06	-	**1.06**
Food Waste (tonnes)	0.93	-	**0.93**	3.24	-	**3.24**
Anaerobic digestion emissions (tCO_2e)	0.01	-	**0.01**	0.03	-	**0.03**
Recycled (tonnes)	43.05	1.20	**44.25**	35.47	1.15	**36.62**
Recycled waste emissions (tCO_2e)	0.92	0.03	**0.95**	0.76	0.02	**0.78**
Total Emissions from disposal of waste generated in operations for which the company does not own or control (Scope 3) / tCO_2e	**6.19**	**0.04**	**6.23**	**2.69**	**0.03**	**2.72**

TABLE 3

ADDITIONAL REPORTING- AIR AND RAIL EMISSIONS	REPORTING YEAR 2020-21 TOTAL	REPORTING YEAR 2021-22 TOTAL
Domestic Air emissions (tCO_2e)	**9.60**	**10.29**
Short-Haul air emissions (tCO_2e)	**12.18**	**51.63**
Long-Haul air emissions (tCO_2e)	**15.90**	**90.39**
International air emissions (tCO_2e)	**4.29**	**41.35**
Domestic rail emissions (tCO_2e)	**1.58**	**14.97**
International rail emissions (tCO_2e)	**0.01**	**0.09**
Total CO_2e based on above figures	**43.56**	**208.72**

RISK MANAGEMENT STATEMENT

Pursuit of our objectives and strategy requires NOC to take risks within an acceptable appetite. A thorough understanding of the risks arising from the activities of the organisation is therefore fundamental to the ongoing effective management of NOC.

Our Risk Management Framework continues to embed and improve to provide management with the ability to anticipate the evolution of risks and the mitigations necessary to remain within appetite; to increase or resilience to change, and to reduce the threats and uncertainty faced by the organisation. It also supports management in the maximisation of opportunities by better facilitating informed decision making whilst also providing assurance that the company is operating within its risk appetite.

The Executive play a critical role in identifying and managing risk throughout the organisation, acting as the escalation route for risks to the Executive, the Risk and Audit Committee and the Board of Trustees. The Board and management are aided by a Risk Management function providing oversight, advice, challenge and guidance for the management of risk; support for risk reporting and the development of policies, procedures, regulatory compliance and training.

PRINCIPAL RISKS AND UNCERTAINTIES

In setting and monitoring the risk appetite of the organisation, the Board of Trustees and the Risk and Audit Committee provide essential and valued external challenge and advice through the robust assessment of the company's emerging and principal risks. Notably, our Board committees have provided challenge and support to management on the key risks impacting the company over the past 12 months. Principal amongst these risks have been:

- Management of the challenges arising as the global economy enters a period of inflation that is considerably higher rate than NOC or its funders have experienced for a number of years especially in respect of the cost of fuel for our ships and energy for our built environment;
- Supply chain shortages and delays resulting from the ongoing impact of COVID-19 and as an outcome of new import / export requirements resulting from Brexit for the goods and services NOC relies upon for the delivery of its objectives;
- A challenging environment for the retention and recruitment of staff to ensure we remain competitive as UK unemployment continues to fall and as a result of barriers to continued reliance on talent based in the EU;
- Management of the continuously evolving threat of cyber-attack through the implementation of available safeguards and recommended best practice whilst also maintaining access to the scientific data we manage and support the communities who access our IT estate; and
- NOC's goal to increase the diversity of its sources of funding against an uncertain landscape for funding from our traditional and largest sources.

NOC continues to evolve its Risk Management Framework in support of improvements in risk insights, accountability, and the future evolution of the organisation.

FINANCIAL REVIEW

RESULTS FOR THE YEAR

The net income and total increase to reserves for the year ended 30 September 2022 amounted to £4,613k (2021 (as restated): decrease £326k).

INCOME

Total income for the year amounted to £78,717k (£67,141k). The income was principally derived principally from UKRI-NERC funding for research, the operation of research infrastructure, data management and services and facilities of £57.6m (2021: £50.5m). This included income of £7,563k towards investment in tangible assets, which is the increase on prior year. A further £15.5m (2021: £12.5m) of other grant income was derived from other grants such as EU and GCRF funding.

EXPENDITURE

Expenditure for the year amounted to £74,093k (2021 (as restated): £67,025k). Staff costs accounted for £35,055k (48%) (2021: £32,701k, 49%) of expenditure in the year. The increase in staff costs compared to the prior year relates to the annual pay award.

PRIOR PERIOD ADJUSTMENT

The prior year period financial statements to 30 September 2021 have been adjusted to incorporate two adjustments. Firstly, to reclassify accrued income totalling £3,717k which had previously been netted off with deferred income on the Statement of Financial Position. There was no net impact on the total funds as a result of this adjustment. The second adjustment was to correct for a VAT liability which was identified after the 30 September 2021 results had been approved. The total liability of £1,274k to 30 September 2021 has been accrued for in the prior year adjustment, reducing the total funds by this amount. The liability relates to a VAT underpayment of £566k in the year to 30 September 2020 and an underpayment of £707k in the year to 30 September 2021.

RESERVES POSITION AND POLICY

NOC recorded a net increase in unrestricted reserves of £6,506k (2021 (as restated): £4,295k) while there was a £812k decrease (2021: £1,526k increase) recorded in restricted reserves. This is due to the phasing of projects with income being earned on restricted projects and released as unrestricted funds to cover central overhead on projects. The restricted fixed asset reserves decreased by £1,081k (2021: £6,147k decrease) being the net of capital additions and depreciation charged during the year. There were no capital additions in the prior year so only depreciation was charged to the fixed asset restricted reserve.

It is the policy of the Trustees to ensure that an amount is held in the unrestricted reserves to mitigate against operational risk likely to materialise over any 12-month period.

On commencing its activities, NOC's reserve policy was that a £2,000k unrestricted sustainability reserve is held for working capital to be grown by £6m over the next 5 years to cover the operational risk. In FY22 the financial and operational risk of the charity changed with some indemnities and guarantees from UKRI-NERC falling away. In addition, rising inflation saw the operational costs of the charity increase against a fixed committed income. The reserves policy was revised to increase the amount of unrestricted reserves to £7.5m needed as free cash for operational risk cover.

As at 30 September 2021 unrestricted reserves were £10,389k. During the current year the Trustees approved £7.5m to remain as available cash with the remaining £2.9m surplus was approved for investment as set out in the Investment Policy below.

INVESTMENT POLICY

The investment policy ensures that unrestricted reserves earmarked for investment opportunities are agreed, prioritised and approved in line with the NOC Strategy and Business Plan. As well as ensuring the delivery of the associated benefits and enhanced capability, whether this is financial or qualitative or both.

NOC will use the TRAC (Transparent Approach to Costing) FEC (Full Economic Cost) as the framework for pricing all contracts and projects and so ensuring it monitors its sustainability. Under TRAC there is the Margin for Sustainability and Investment (MSI) that is built into the FEC recovery that will contribute to the unrestricted reserves annually and then become the overall investment pot and provide ongoing risk cover. It is in the interests of the charity and the beneficiaries of NOC to continue to invest in new capability and further the aims of the charity in terms of its advance of science. TRAC requires that NOC does not hold too much in the sustainability reserve and encourages continual investment using the amount over the sustainability margin. It is in the interests of the charity and the beneficiaries of NOC to continue to invest in new capability and further the aims of the charity in terms of its advance of science object.

The Board approved an investment of £750k out of unrestricted reserves in October 2021 and a further is committed to investing at least £750k each year to upgrade and replenish assets and infrastructure transferred to NOC when its activities commenced. The £7.5m of reserves held as per the Reserve Policy is to be placed on deposit to help mitigate inflationary rises to costs.

NOC is inviting business cases from staff for investment in furthering its charitable objectives. The Finance and Investment Committee consider the each case for the purposes of making a return as well as investing in the strategic aims of NOC. Investments will be kept under regular review.

TRADING SUBSIDIARY

NOC's trading subsidiary, National Oceanography Centre Innovations Limited, was incorporated on 9 October 2019 and is a wholly-owned subsidiary of NOC. In the year to 30 September 2022 the subsidiary reported a loss for the financial year of £37k (2021: £65k). NOCI has a strong opportunity pipeline and a high-level certainty that this will be converted to revenue and be profit making in FY23.

There is an Operating Agreement in place between the charity and the trading subsidiary to ensure there is a structured and governed relationship. This includes detailed clauses which ensure the protection of licensed IP for the charity.

The trading subsidiary undertakes four significant areas of activity; product sales (marine data products), Events (Commercial activity only), Intellectual Property licensing (agreements) and Marine Robotic Innovation Centre – membership and renewal.

The Chair of NOC Innovations reports to the NOC Board of Trustees. The Board of Trustees review the progress of the subsidiary, ensuring that the strategic objectives of the subsidiary are not in conflict with its own and that the financial return is satisfactory. One member of the NOC Board of Trustees is a member of the trading subsidiary board.

FUNDRAISING POLICY

NOC seeks to ensure all fundraising activity is conducted with due regard to the guidance of the Charity's Commission and the Fundraising Regulator. NOC has undertaken limited fundraising activity during the year to 30 September 2022. Going forward, NOC's approach to fundraising will be to seek support from charitable foundations, trusts and corporations through their foundations. In addition, there will be the opportunity for the public to donate via regular or one-off giving or supporting fundraising events.

PLANS FOR FUTURE PERIODS

Our Five-Year Strategy, and its seven interdisciplinary strategic goals, will enable us to maintain commitment and delivery of our Charitable Objectives. Detailed in the Trustees' Report (incorporating the Strategic Report) are the activities we'll be focusing on between 2020-25, as part of our Five-Year Strategy, and our funding framework will diversify to support this.

GOING CONCERN

NOC has put together a Five-Year Business Plan which brings together the National Capability funding from NERC-UKRI with signed research projects and those in the pipeline. For the year 2022/23 a bottom up budgeting process was carried out reviewing the full current cost base of NOC which has been trimmed back to achieve some savings assisting with the rising inflation. As such the cost base is covered by funded projects with some resource available to deliver new projects that are in the pipeline or in early stages of bid development at present; some recruitment is likely to be needed in the coming year when current fixed term appointments end. NOC is deploying detailed resource planning to inform recruitment. As the forecast goes out to 2023/24 and beyond there is more capacity to take on new funded projects, at this time the plan starts to forecast increased income from fundraising and NOC Innovations activity. Once this takes more shape, recruitment will be planned around the skills needed to deliver new areas of activity. Taking into consideration, signed Awards for National Capability infrastructure and science facilities and services spanning the next three-five years, current indications of recommissioning for National Capability Science, previous success rates in research grant rounds with sustained bid submission and forecast of future income based on marketing analysis the indications are that NOC can continue to cover its cost base over the coming five-year period.

In conclusion there are no material uncertainties to cast doubt on NOC's ability to continue as a going concern.

AUDITOR

The auditor, BDO LLP, has indicated their willingness to continue in office. The designated Trustees will propose a motion reappointing the auditor at a meeting of the Trustees.

Approved by order of the members of the board of Trustees and signed on their behalf by

JEREMY DARROCH
CHAIR OF BOARD OF TRUSTEES
27 APRIL 2023

STATEMENT OF TRUSTEES' RESPONSIBILITIES

The Trustees (who are also the directors of the Charity for the purposes of company law) are responsible for preparing the Trustees' Report including the Strategic Report and the financial statements in accordance with applicable law and United Kingdom Accounting Standards (United Kingdom Generally Accepted Accounting Practice).

Company law requires the Trustees to prepare financial statements for each financial period. Under company law the Trustees must not approve the financial statements unless they are satisfied that they give a true and fair view of the state of affairs of the Group and the Charity and of the incoming resources and application of resources, including the income and expenditure of the Group for that period. In preparing these financial statements, the Trustees are required to:

- select suitable accounting policies and then apply them consistently;
- observe the methods and principles in the Charities SORP (FRS102);
- make judgements and accounting estimates that are reasonable and prudent;
- state whether applicable UK Accounting Standards have been followed, subject to any material departures disclosed and explained in the financial statements; and
- prepare the financial statements on the going concern basis unless it is inappropriate to presume that the Group will continue in business.

The Trustees are responsible for keeping adequate accounting records that are sufficient to show and explain the Charity's transactions and disclose with reasonable accuracy at any time the financial position of the Charity and enable them to ensure that the financial statements comply with the Companies Act 2006. They are also responsible for safeguarding the assets of the Group and the Charity and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

Financial statements are published on the Charity's website in accordance with legislation in the United Kingdom governing preparation and dissemination of financial statements, which may vary from legislation in other jurisdictions. The maintenance and integrity of the Charity's website is the responsibility of the trustees. The Trustees' responsibility also extends to the ongoing integrity of the financial statements contained therein.

Approved by order of the members of the board of Trustees and signed on their behalf by:

JEREMY DARROCH
CHAIR OF BOARD OF TRUSTEES
27 APRIL 2023

INDEPENDENT AUDITOR'S REPORT

OPINION

In our opinion, the financial statements:

- give a true and fair view of the state of the Group's and of the Parent Charitable Company's affairs as at 30 September 2022 and of the Group's incoming resources and application of resources for the year then ended;
- have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice; and
- have been prepared in accordance with the requirements of the Company's Act 2006, Charities and Trustee Investment (Scotland) Act 2005 and regulations 6 and 8 of the Charities Accounts (Scotland) Regulations 2006, as amended in 2010.

We have audited the financial statements of National Oceanography Centre ("the Parent Charitable Company") and its subsidiary ("the Group") for the year ended 30 September 2022, which comprise the consolidated statement of financial activities, the consolidated and charity balance sheets, the consolidated cash flow statement, and notes to the financial statements, including a summary of significant accounting policies. The financial reporting framework that has been applied in their preparation is applicable law and United Kingdom Accounting Standards, including Financial Reporting Standard 102 The Financial Reporting Standard applicable in the UK and Republic of Ireland (United Kingdom Generally Accepted Accounting Practice).

BASIS FOR OPINION

We conducted our audit in accordance with International Standards on Auditing (UK) (ISAs (UK)) and applicable law. Our responsibilities under those standards are further described in the Auditor's responsibilities for the audit of the financial statements section of our report. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

INDEPENDENCE

We remain independent of the Group and the Parent Charitable Company in accordance with the ethical requirements relevant to our audit of the financial statements in the UK, including the FRC's Ethical Standard, and we have fulfilled our other ethical responsibilities in accordance with these requirements.

CONCLUSIONS RELATED TO GOING CONCERN

In auditing the financial statements, we have concluded that the Trustees' use of the going concern basis of accounting in the preparation of the financial statements is appropriate.

Based on the work we have performed, we have not identified any material uncertainties relating to events or conditions that, individually or collectively, may cast significant doubt on the Group and the Parent Charitable Company's ability to continue as a going concern for a period of at least twelve months from when the financial statements are authorised for issue.

Our responsibilities and the responsibilities of the Trustees with respect to going concern are described in the relevant sections of this report.

OTHER INFORMATION

The Trustees are responsible for the other information. The other information comprises the information included in the Annual Report and financial statements, other than the financial statements and our auditor's report thereon. Our opinion on the financial statements does not cover the other information and, except to the extent otherwise explicitly stated in our report, we do not express any form of assurance conclusion thereon. Our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements, or our knowledge obtained in the audit or otherwise appears to be materially misstated. If we identify such material inconsistencies or apparent material misstatements, we are required to determine whether there is a material misstatement in the financial statements themselves. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact.

We have nothing to report in this regard.

OTHER COMPANIES ACT 2006 REPORTING

In our opinion, based on the work undertaken in the course of the audit:

- the information given in the Trustees' Report, which includes the Directors' Report and the Strategic Report prepared for the purposes of Company Law, for the financial year for which the financial statements are prepared is consistent with the financial statements; and
- the Strategic Report and Directors' Report, which are included in the Trustees' Report, have been prepared in accordance with applicable legal requirements.

In the light of the knowledge and understanding of the Group and the Parent Charitable Company and its environment obtained in the course of the audit, we have not identified material misstatements in the Strategic report or the Trustees' report.

We have nothing to report in respect of the following matters in relation to which the Companies Act 2006 and the Charities and Trustee Investment (Scotland) Act 2005 requires us to report to you if, in our opinion;

- adequate accounting records have not been kept by the Parent Charitable Company, or returns adequate for our audit have not been received from branches not visited by us; or
- the Parent Charitable Company financial statements are not in agreement with the accounting records and returns; or
- certain disclosures of Directors' remuneration specified by law are not made; or
- we have not received all the information and explanations we require for our audit.

RESPONSIBILITIES OF TRUSTEES

As explained more fully in the Trustees' responsibilities statement, the Trustees (who are also the directors of the Charitable Company for the purposes of company law) are responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view, and for such internal control as the Trustees determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Trustees are responsible for assessing the Group and the Parent Charitable Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the Trustees either intend to liquidate the Group or the Parent Charitable Company or to cease operations, or have no realistic alternative but to do so.

AUDITOR'S RESPONSIBILITIES FOR THE AUDIT OF THE FINANCIAL STATEMENTS

We have been appointed as auditor under section 44(1)(c) of the Charities and Trustee Investment (Scotland) Act 2005 and report in accordance with the Acts and relevant regulations made or having effect thereunder.

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs (UK) will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

EXTENT TO WHICH THE AUDIT WAS CAPABLE OF DETECTING IRREGULARITIES, INCLUDING FRAUD

Irregularities, including fraud, are instances of non-compliance with laws and regulations. We design procedures in line with our responsibilities, outlined above, to detect material misstatements in respect of irregularities, including fraud. The extent to which our procedures are capable of detecting irregularities, including fraud is detailed below.

We considered those laws and regulations that have a direct impact on the financial statements, such as the Companies Act 2006, Charities and Trustee Investment (Scotland) Act 2005, Charities Act 2011 and tax legislation. We evaluated management's incentives and opportunities for fraudulent manipulation of the financial statements (including the risk of override of controls), and determined that the principal risks were related to inappropriate journal entries to manipulate financial results.

Procedures performed by the audit team included:

- Discussions with management and those charged with governance regarding consideration of known or suspected instances of non-compliance with laws and regulations and fraud;
- Obtaining an understanding of controls designed to prevent and detect irregularities, including specific consideration of controls and accounting policies relating to significant accounting estimates;
- Reviewing minutes from resource and finance committee meetings for evidence of any fraud or non-compliance with laws and regulations;
- Communicating relevant laws and regulations and potential fraud risks to all engagement team members and remaining alert to any indications of fraud or non-compliance with laws and regulations throughout the audit; and
- Assessing journal entries as part of our planned audit approach, with a particular focus on journals entries to key financial statement areas.

Our audit procedures were designed to respond to risks of material misstatement in the financial statements, recognising that the risk of not detecting a material misstatement due to fraud is higher than the risk of not detecting one resulting from error, as fraud may involve deliberate concealment by, for example, forgery, misrepresentations or through collusion. There are inherent limitations in the audit procedures performed and the further removed non-compliance with laws and regulations is from the events and transactions reflected in the financial statements, the less likely we are to become aware of it.

A further description of our responsibilities for the audit of the financial statements is located at the Financial Reporting Council's ("FRC's") website at: https://www.frc.org.uk/auditorsresponsibilities. This description forms part of our auditor's report.

USE OF OUR REPORT

This report is made solely to the Charitable Company's members, as a body, in accordance with Chapter 3 of Part 16 of the Companies Act 2006, and to the Charitable Company's trustee, as a body, in accordance with the Charities and Trustee Investment (Scotland) Act 2005. Our audit work has been undertaken so that we might state to the Charitable Company's members and Trustees those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the Charitable Company and the Charitable Company's members as a body and the Charitable Company's trustees as a body, for our audit work, for this report, or for the opinions we have formed.

DocuSigned by:
David I'Anson
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DAVID I'ANSON
FOR AND ON BEHALF OF BDO LLP, SENIOR STATUTORY AUDITOR
SOUTHAMPTON, UK
04 MAY 2023

BDO LLP is a limited liability partnership registered in England and Wales (with registered number OC305127).

CONSOLIDATED STATEMENT OF FINANCIAL ACTIVITIES

FOR THE YEAR ENDED 30 SEPTEMBER 2022 INCORPORATING AN INCOME & EXPENDITURE ACCOUNT

	NOTE	UNRESTRICTED FUNDS £'000	RESTRICTED FUNDS £'000	RESTRICTED FIXED ASSET FUNDS £'000	TOTAL 2022 £'000
INCOME FROM:					
Donations, grants and legacies	1	36,495	29,100	7,563	73,158
Income from trading subsidiary	10	1,122	-	-	1,122
Other trading activities	2	4,215	92	-	4,307
Investments	3	18	-	-	18
Other income		110	2	-	112
Total incoming resources		**41,960**	**29,194**	**7,563**	**78,717**
EXPENDITURE ON:					
Raising funds:					
Expenditure from trading subsidiary	10	1,158	-	-	1,158
Charitable activities	4	40,198	27,471	5,266	72,935
Total expenditure		**41,356**	**27,471**	**5,266**	**74,093**
Net income/ (expenditure)		604	1,723	2,297	4,624
Transfers between funds	15	5,902	(2,535)	(3,378)	(11)
Net movement in funds	15	**6,506**	**(812)**	**(1,081)**	**4,613**
RECONCILIATION OF FUNDS:					
Fund balances at beginning of year (as restated)	15	9,116	1,951	11,394	22,461
Net movement in funds		6,506	(812)	(1,081)	4,613
Total fund balances at 30 September 2022	15	**15,622**	**1,139**	**10,313**	**27,074**

FOR COMPARATIVE PURPOSES – FINANCIAL PERFORMANCE FOR THE PRIOR FINANCIAL YEAR

	NOTE	UNRESTRICTED FUNDS AS RESTATED £'000	RESTRICTED FUNDS £'000	RESTRICTED FIXED ASSET FUNDS £'000	TOTAL 2021 AS RESTATED £'000
INCOME FROM:					
Donations, grants and legacies	1	39,910	23,100	-	63,010
Grant of assets from UKRI	1	-	-	-	-
Income from trading subsidiary	10	376	-	-	376
				-	
Other trading activities	2	3,019	305	-	3,324
Investments	3	3	-	-	3
Other income		428	-	-	428
Total incoming resources		**43,736**	**23,405**	**-**	**67,141**
EXPENDITURE ON:					
Raising funds:					
Expenditure from trading subsidiary	10	442	-	-	442
Charitable activities	4	38,501	22,384	6,140	67,025
Total expenditure		**38,943**	**22,384**	**6,140**	**67,467**
Net income/ (expenditure)		4,793	1,021	(6,140)	(326)
Transfers between funds	15	(498)	505	(7)	-
Net movement in funds	15	**4,295**	**1,526**	**(6,147)**	**(326)**
RECONCILIATION OF FUNDS:					
Fund balances at beginning of year (as restated)	15	4,821	425	17,541	22,787
Net movement in funds		4,295	1,526	(6,147)	(326)
Total fund balances at 30 September 2021	15	**9,116**	**1,951**	**11,394**	**22,461**

All amounts are derived from continuing activities during the above two periods. The consolidated statement of financial activities includes all gains and losses recognised in the year

The notes on pages 96 - 106 form part of these financial statements.

CONSOLIDATED BALANCE SHEET

AT 30 SEPTEMBER 2022

COMPANY NUMBER:	NOTE	2022	2022	2021 AS RESTATED	2021 AS RESTATED
11444362		**£'000**	**£'000**	**£'000**	**£'000**
FIXED ASSETS					
Intangible assets	8		45		574
Tangible assets	9		15,645		15,967
			15,690		**16,541**
CURRENT ASSETS					
Stocks	11	583		488	
Debtors	12	16,639		30,655	
Cash at bank and in hand	17	43,243		42,860	
		60,465		**74,003**	
Creditors: amounts falling due within one year	13	(49,081)		(68,083)	
Net current assets			11,441		5,920
Net assets	16		**27,074**		**22,461**
FUNDS					
Unrestricted	15		15,622		9,116
Restricted	15		1,139		1,951
Restricted fixed asset	15		10,313		11,394
Total funds	15, 21		**27,074**		**22,461**

The financial statements were approved and authorised for issue by the Trustees on and signed on their behalf by:

JEREMY DARROCH
CHAIR OF BOARD OF TRUSTEES
27 APRIL 2023

The notes on pages 96 - 106 form part of these financial statements.

CHARITY BALANCE SHEET

AT 30 SEPTEMBER 2022

COMPANY NUMBER:	NOTE	2022	2022	2021 AS RESTATED	2021 AS RESTATED
11444362		**£'000**	**£'000**	**£'000**	**£'000**
FIXED ASSETS					
Intangible assets	8	45			574
Tangible assets	9	15,598			15,967
Investments	10	-			-
			15,643		**16,541**
CURRENT ASSETS					
Stocks	11	583		488	
Debtors	12	17,773		31,161	
Cash at bank and in hand	17	41,853		42,417	
		60,209		**74,066**	
Creditors: amounts falling due within one year	13	(48,645)		(68,052)	
Net current assets			11,564		6,014
Net assets	16		**27,207**		**22,555**
FUNDS					
Unrestricted	15		15,755		9,210
Restricted	15		1,139		1,951
Restricted fixed asset	15		10,313		11,394
Total funds	15		**27,207**		**22,555**

As permitted by S408 of the Companies Act 2009, the Charity has not presented its own income and expenditure account and related notes. The Charity's surplus for the year was £4,662k (2021 (as restated): deficit £259k).

The financial statements were approved and authorised for issue by the Trustees on and signed on their behalf by:

JEREMY DARROCH
CHAIR OF BOARD OF TRUSTEES
27 APRIL 2023

The notes on pages 96 - 106 form part of these financial statements.

CONSOLIDATED STATEMENT OF CASH FLOWS

	NOTE	2022	2021 AS RESTATED
		£'000	£'000
CASH FLOWS FROM OPERATING ACTIVITIES			
Surplus for the year		4,624	(326)
Depreciation	9	4,737	5,599
Amortisation	8	529	540
Loss on disposal of equipment		109	-
Investment income	3	(18)	(3)
Increase in stocks	11	(95)	(450)
Decrease/ (increase) in debtors	12	14,016	(26,248)
(Decrease)/ increase in creditors	13	(19,002)	42,212
Net cash provided by operating activities		**4,900**	**21,324**
CASH FLOWS FROM INVESTING ACTIVITIES			
Investment income	3	18	3
Purchase of tangible assets	9	(4,535)	(5,118)
Net cash (used in)/ provided by investing activities		**(4,517)**	**(5,115)**
Increase in cash and cash equivalents in the year		**383**	**16,209**
Cash and cash equivalents at the beginning of the year	17	**42,860**	**26,651**
Cash and cash equivalents at the end of the year	17	**43,243**	**42,860**

The notes on pages 96 - 106 form part of these financial statements.

NOTES TO THE FINANCIAL STATEMENTS

BASIS OF PREPARATION OF FINANCIAL STATEMENTS

The financial statements have been prepared on a going concern basis under the historical cost convention. The financial statements have been prepared in accordance with the Charities SORP, 2nd Edition (FRS 102) Accounting and Reporting by Charities: Statement of Recommended Practice applicable to charities preparing their accounts in accordance with the Financial Reporting Standard applicable in the UK and Republic of Ireland (FRS 102) (effective 1 January 2019), the Financial Reporting Standard applicable in the UK and Republic of Ireland (FRS 102) and the Companies Act 2006.

National Oceanography Centre meets the definition of a public benefit entity under FRS 102. Assets and liabilities are initially recognised at historical cost or transaction value unless otherwise stated in the relevant accounting policy.

The financial statements are prepared in Sterling, which is the functional currency of the Group. Monetary amounts in these financial statements are rounded to the nearest thousand pounds.

The preparation of financial statements in compliance with FRS 102 requires the use of certain critical accounting estimates. It also requires management to exercise judgement in applying the Group's accounting policies.

The following principal accounting policies have been applied consistently:

BASIS OF CONSOLIDATION

The Consolidated Statement of Financial Activities (SOFA) and Consolidated Balance Sheet consolidate the financial statements of the Company and its subsidiary undertaking. The results of the subsidiary are consolidated on a line-by-line basis.

The Parent Charitable Company has taken advantage of the exemption allowed under section 408 of the Companies Act 2006 and has not presented its own Statement of Financial Activities in these financial statements.

EXEMPTIONS FOR QUALIFYING ENTITIES UNDER FRS 102

The Parent Charitable Company has taken advantage of the following disclosure exemptions available in FRS 102:

- from preparing a statement of cash flows;
- from financial instruments disclosures; and
- from the aggregate remuneration of the key management personnel as their remuneration is included in the totals for the group as a whole.

GOING CONCERN

The Trustees have reviewed whether it is appropriate for the financial statements to be prepared on a going concern basis.

The key assumption in assessing going concern is that NOC's key funders (UKRI and EU) have continued to pay as per their schedules, and the costs of delivery can continue to be met against rising inflation.

NOC has put together a Five-Year Business Plan which brings together the National Capability funding from NERC-UKRI with signed research projects and those in the pipeline. For the year 2022/23 a bottom up budgeting process was carried out reviewing the full current cost base of NOC which has been trimmed back to achieve some savings assisting with the rising inflation. As such the cost base is covered by funded projects with some resource available to deliver new projects that are in the pipeline or in early stages of bid development at present; some recruitment is likely to be needed in the coming year when current fixed term appointments end. NOC is deploying detailed resource planning to inform recruitment.

As the forecast goes out to 2023/24 and beyond there is more capacity to take on new funded projects, at this time the plan starts to forecast increased income from fundraising and NOC Innovations activity. Once this takes more shape the recruitment will be planned around the skills needed to deliver new areas of activity. Taking into consideration, signed Awards for National Capability infrastructure and science facilities and services spanning the next 3-5 years, current indications of recommissioning for National Capability Science, previous success rates in research grant rounds with sustained bid submission and forecast of future income based on marketing analysis the indications are that NOC can continue to cover its cost base over the coming five-year period.

In conclusion there are no material uncertainties to cast doubt on NOC's ability to continue as a going concern.

INCOME

All income is recognised once the Group has entitlement to the income, it is probable that the income will be received, and the amount of income receivable can be measured reliably.

Grants are included in the Consolidated Statement of Financial Activities on a receivable basis. The balance of income received for specific purposes but not expended during the year is shown in the relevant funds on the Balance Sheet. Where income is received in advance of entitlement of receipt, its recognition is deferred and included in creditors as deferred income. Where entitlement occurs before income is received, the income is accrued. Donations and grants for particular purposes are included in income as restricted funds.

Where grants relate to donated fixed assets, they are measured at fair value, unless it is impractical to measure this reliably, in which case the cost of the item to the donor is used. The gain is recognised as income from donations and a corresponding amount is included in the appropriate fixed asset class and depreciated over the useful economic life, in accordance with the Group's accounting policies.

Investment income relates to interest on funds held on deposit and is included when receivable and the amount can be measured reliably by the Group; this is normally upon notification of the interest paid or payable by the institution with whom the funds are deposited.

Incoming resources from charitable trading activity are accounted for when earned.

Where a contract for services is performed gradually over time the revenue is recognised as the activity progresses. The amount of revenue reflects the costs incurred up to the balance sheet date.

All other income is recognised on an accruals basis once the Group is legally entitled to receipt.

EXPENDITURE

Expenditure is recognised once there is a legal or constructive obligation to transfer economic benefit to a third party, it is probable that a transfer of economic benefits will be required in settlement and the amount of the obligation can be measured reliably.

Expenditure is classified by activity. The costs of each activity are made up of the total of direct costs and shared costs, including support costs involved in undertaking each activity.

Direct costs attributable to a single activity are allocated directly to that activity. Shared costs which contribute to more than one activity and support costs which are not attributable to a single activity are apportioned between those activities on a basis consistent with the use of resources. Central staff costs are allocated on the basis of time spent, and depreciation charges allocated on the portion of the asset's use.

Expenditure on raising funds includes all expenditure incurred by the Group to raise funds for its charitable purposes and includes costs of all fundraising activities events and non-charitable trading.

Expenditure on charitable activities is incurred on directly undertaking the activities which further the Group's objectives, as well as any associated support costs.

Governance costs include those incurred in the governance of the Charity and its assets and are primarily associated with constitutional and statutory requirements.

All expenditure is inclusive of irrecoverable VAT.

FOREIGN CURRENCIES

Monetary assets and liabilities denominated in foreign currencies are translated into sterling at rates of exchange ruling at the reporting date.

Transactions in foreign currencies are translated into sterling at the rate ruling on the date of the transaction.

Exchange gains and losses are recognised in the Consolidated Statement of Financial Activities.

INTANGIBLE ASSETS AND AMORTISATION

Intangible assets are capitalised and recognised when future economic benefits are probable, and the cost or value of the asset can be measured reliably.

Intangible assets are initially recognised at cost. After recognition, under the cost model, intangible assets are measured at cost less any accumulated amortisation and any accumulated impairment losses.

At each reporting date the Charity assesses whether there is any indication of impairment. If such indication exists, the recoverable amount of the asset is determined to be the higher of its fair value less costs to sell and its value in use. An impairment loss is recognised where the carrying amount exceeds the recoverable amount.

Amortisation is provided on intangible assets at rates calculated to write off the cost of each asset on a straight-line basis over its expected useful life.

The estimated useful lives are as follows:

Computer software	- 5 years straight line

TANGIBLE FIXED ASSETS AND DEPRECIATION

Tangible fixed assets are capitalised and recognised when future economic benefits are probable, and the cost or value of the asset can be measured reliably.

Tangible fixed assets are initially recognised at cost. After recognition, under the cost model, tangible fixed assets are measured at cost less accumulated depreciation and any accumulated impairment losses. All costs incurred to bring a tangible fixed asset into its intended working condition should be included in the measurement of cost.

Assets in the course of construction are included at costs incurred to date. Depreciation on these assets is not charged until they are brought into use.

At each reporting date the Charity assesses whether there is any indication of impairment. If such indication exists, the recoverable amount of the asset is determined to be the higher of its fair value less costs to sell and its value in use. An impairment loss is recognised where the carrying amount exceeds the recoverable amount.

Depreciation is charged on a straight-line basis over their estimated useful lives.

Depreciation is provided on the following bases:

Scientific equipment	- 5 years
Marine pool	- 5 years
Fixtures and fittings	- 5 years
Computer equipment	- 5 years
Plant and machinery	- 5 years

The assets' residual values, useful lives and depreciation methods are reviewed, and adjusted prospectively if appropriate, or if there is an indication of a significant change since the last reporting date.

Gains and losses on disposals are determined by comparing the proceeds with the carrying amount and are recognised in the Consolidated Statement of Financial Activities.

INVESTMENTS

Investments in subsidiaries are valued at cost less provision for impairment.

STOCKS

Stocks comprise of fuel held in storage for vessels and ship bond stock. Fuel stock is recorded at cost. Ship bond stock is valued at the lower of cost and net realisable value after making due allowance for obsolete and slow-moving stocks.

DEBTORS

Trade and other debtors are recognised at the settlement amount after any trade discount offered. Prepayments are valued at the amount prepaid net of any trade discounts due.

Work in progress reflects the costs incurred to balance sheet date on a contract for services.

CASH AND CASH EQUIVALENTS

Cash at bank and in hand includes cash and short term highly liquid investments with a short maturity of three months or less from the date of acquisition or opening of the deposit or similar account.

LIABILITIES AND PROVISIONS

Liabilities are recognised when there is an obligation at the Balance Sheet date as a result of a past event, it is probable that a transfer of economic benefit will be required in settlement, and the amount of the settlement can be estimated reliably.

Liabilities are recognised at the amount that the Group anticipates it will pay to settle the debt or the amount it has received as advanced payments for the goods or services it must provide.

FINANCIAL INSTRUMENTS

The Group only has financial assets and financial liabilities of a kind that qualify as basic financial instruments. Basic financial instruments are initially recognised at transaction value and subsequently measured at their settlement value with the exception of bank loans which are subsequently measured at amortised cost using the effective interest method.

OPERATING LEASES

Rentals paid under operating leases are charged to the Consolidated Statement of Financial Activities on a straight-line basis over the lease term.

PENSIONS

The Group operates a defined contribution pension scheme, and the pension charge represents the amounts payable by the Group to the fund in respect of the year.

The Group is also participating in a multi-employer plan with The National Environmental Research Council which is a defined benefit scheme funded from annual grant in aid on a pay as you go basis. It is not possible for the Group to obtain sufficient information to enable it to account for the plan as a defined benefit plan, it therefore accounts for the plan as a defined contribution plan.

FUND ACCOUNTING

General funds are unrestricted funds which are available for use at the discretion of the Trustees in furtherance of the general objectives of the Group and which have not been designated for other purposes.

Designated funds comprise unrestricted funds that have been set aside by the Trustees for particular purposes. The aim and use of each designated fund is set out in the notes to the financial statements.

Restricted funds are funds which are to be used in accordance with specific restrictions imposed by donors or which have been raised by the Group for particular purposes. The costs of raising and administering such funds are charged against the specific fund. The aim and use of each restricted fund is set out in the notes to the financial statements.

Restricted fixed asset funds represent the moveable assets of the National Oceanography Centre, being the plant, equipment (including IT equipment), libraries, stocks, inventory and consumables of the operation. Without them the National Oceanography Centre could not operate. They are shown separately to other unrestricted funds due to the size and importance of these assets to the National Oceanography Centre.

Investment income, gains and losses are allocated to the appropriate fund.

GIFT AID DONATIONS MADE TO THE CHARITY

Donations made by the subsidiary to the Parent Charity are recognised as income in the charity either when paid or at the date when the subsidiary has a legal liability to make the donation payment if earlier.

RESEARCH VESSELS

NOC operates and manages two research vessels owned by UKRI under a bareboat charter at peppercorn rates. The terms of the bareboat charter do not meet the definition of a lease and, due to the unique nature of the vessels, it is not possible to reasonably quantify the value ascribed to the ownership and operation of them.

CRITICAL ACCOUNTING ESTIMATES & AREAS OF JUDGEMENT

Estimates and judgements are continually evaluated and are based on historical experience and other factors, including expectations of future events that are believed to be reasonable under the circumstances.

CRITICAL ACCOUNTING ESTIMATES AND ASSUMPTIONS

The Group makes estimates and assumptions concerning the future. The resulting accounting estimates and assumptions will, by definition, seldom equal the related actual results. The estimates and assumptions that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are discussed below.

CRITICAL AREAS OF JUDGEMENT

Depreciation is a key estimate in the accounts which requires management judgement over the useful life of the assets and the residual values. The policy has been set out in the notes above.

1 INCOME FROM DONATIONS, GRANTS AND LEGACIES

	UNRESTRICTED FUNDS 2022	RESTRICTED FUNDS 2022	RESTRICTED FIXED ASSET FUNDS 2022	TOTAL FUNDS 2022	TOTAL FUNDS 2021
	£'000	£'000	£'000	£'000	£'000
DONATIONS					
Other donations	-	19	-	19	28
	-	**19**	**-**	**19**	**28**
INCOME FROM GRANTS					
UKRI NERC grant	21,731	28,342	7,563	57,636	50,505
UKRI other grants	6,072	278	-	6,350	3,118
Other grants	8,692	461	-	9,153	9,359
	36,495	**29,081**	**7,563**	**73,139**	**62,982**
	36,495	**29,100**	**7,563**	**73,158**	**63,010**

2 INCOME FROM OTHER TRADING ACTIVITIES

	UNRESTRICTED FUNDS 2022	RESTRICTED FUNDS 2022	TOTAL FUNDS 2022	TOTAL FUNDS 2021
	£'000	£'000	£'000	£'000
Rental	1,767	-	1,767	696
Disbursements	1,025	-	1,025	1,539
Maintenance and repairs income	1,407	16	1,423	1,008
Bond sales	-	51	51	56
Ship charter income	-	-	-	-
Other trading income	16	25	41	25
	4,215	**92**	**4,307**	**3,324**

3 INVESTMENT INCOME

	UNRESTRICTED FUNDS 2022	TOTAL FUNDS 2022	TOTAL FUNDS 2021
	£'000	£'000	£'000
Bank interest	**18**	**18**	**3**

4 EXPENDITURE ON CHARITABLE ACTIVITIES

	STAFF COSTS 2022	VESSEL COSTS 2022	RESEARCH COSTS 2022	ESTATE COSTS 2022	DEPRE-CIATION 2022	OTHER COSTS 2022	TOTAL 2022	TOTAL 2021 AS RESTATED
	£'000	£'000	£'000	£'000	£'000	£'000	£'000	£'000
ACTIVITIES UNDERTAKEN DIRECTLY								
Scientific research	24,874	9,561	2,542	3,105	4,037	7,424	51,543	48,019
Support costs:								
- Operations & finance staff	10,181	-	-	-	-	-	10,181	9,405
- Management, operations & facilities costs	-	-	-	3,507	-	6,222	9,729	7,984
- Depreciation	-	-	-	-	1,229	-	1,229	1,446
- Governance costs	-	-	-	-	-	253	253	171
	35,055	**9,561**	**2,542**	**6,612**	**5,266**	**13,899**	**72,935**	**67,025**

	TOTAL FUNDS 2022	TOTAL FUNDS 2021
	£'000	£'000
ANALYSIS OF GOVERNANCE COSTS		
Audit fees:		
- Audit of financial statements	98	83
- Other fees paid to auditors	28	29
Trustee remuneration and expenses	9	6
Legal and professional fees	102	41
Finance costs	16	12
	253	**171**

Total expenditure on charitable activities for the year was £72,935 (2021 (as restated): £67,025k). Of that expenditure £40,198k (2021(as restated): £38,501k) was unrestricted, £27,471k (2021: £22,384k) was restricted and £5,266k (2021: £6,140k) was restricted fixed asset funds.

5 NET INCOME

	2022	2021
	£'000	£'000
NET INCOME IS STATED AFTER CHARGING:		
Depreciation of tangible fixed assets	4,737	5,599
Amortisation of intangible fixed assets	529	540
Loss on disposal of equipment	109	-
Auditors' remuneration:		
- Audit fees	98	83
- Non-audit fees	28	29
(Gain) / Loss on foreign exchange	(173)	166

6 STAFF COSTS

	2022	2021
GROUP AND CHARITY	£'000	£'000
Wages and salaries	27,556	25,139
National insurance contributions	2,871	2,559
Pension costs	4,628	5,003
	35,055	**32,701**

During the year there were redundancy costs of £378k (2021: £247k) which were paid to 23 (2021: 25) members of staff. Of these 9 (2021: 17) were statutory redundancy pay and 14 (2021: 9) were severance pay.

The number of employees for the year was as follows:

	2022	2021
GROUP AND CHARITY	£'000	£'000
Science and research staff	237	241
Fundraising staff	4	3
Operations and finance staff	201	198
Engineers and technicians	119	108
Mariners	86	88
	647	**638**

6 STAFF COSTS (CONTINUED)

The number of employees whose employee benefits (excluding employer pension costs) exceeded £60,000 was:

	2022	2021
	NUMBER	NUMBER
£60,001 - £70,000	28	22
£70,001 - £80,000	10	6
£80,001 - £90,000	5	4
£90,001 - £100,000	1	-
£100,001 - £110,000	-	1
£110,001 - £120,000	2	2
£120,001 - £130,000	-	-
£130,001 - £140,000	-	-
£140,001 - £150,000	1	-

	2022	2021
	£'000	£'000
Key management personnel salaries (inc. pensions)		
(Key management personnel are the Senior Management Team, listed as the Executive Committee on page 11 of this report)	438	414

7 TRUSTEES' REMUNERATION AND EXPENSES

During the year, one Trustee (David John Gee) received £9 k (2021: £5.5k) in relation to remuneration or other benefits.

The remuneration was agreed and provided under a provision in the governing document of the Charity. Remuneration was provided due to the Trustees' role as the Chair of the Audit and Risk Committee, which requires a range of specialist knowledge and experience and has a wide remit in terms of the role that the Trustee is required to provide. No other benefits were provided.

During the year ended 30 September 2022, one Trustee was reimbursed £0.5k (2021: £nil k) for expenses in relation to travel and subsistence.

During the year indemnity insurance of £47 k (2021: £66k) was purchased in respect of all the Trustees and Officers of the Charity.

8 INTANGIBLE ASSETS

GROUP AND CHARITY	COMPUTER SOFTWARE AND TOTAL
	£'000
At 1 October 2021	1,609
Additions	-
At 30 September 2022	**1,609**
AMORTISATION	
At 1 October 2021	1,035
Charge for the year	529
At 30 September 2022	**1,564**
NET BOOK VALUE	
At 30 September 2022	**45**
At 30 September 2021	**574**

9 TANGIBLE FIXED ASSETS

GROUP	SCIENTIFIC EQUIPMENT	MARINE POOL	FIXTURES & FITTINGS	COMPUTER EQUIPMENT	PLANT & MACHINERY	TOTAL
	£'000	£'000	£'000	£'000	£'000	£'000
COST OR VALUATION						
At 1 October 2021	16,826	7,759	122	1,524	1,945	28,176
Additions	1,932	1,693	47	565	345	4,582
Disposals	(273)	(11)	(122)	(7)	(4)	(417)
At 30 September 2022	**18,485**	**9,441**	**47**	**2,082**	**2,286**	**32,341**
DEPRECIATION						
At 1 October 2021	7,359	2,958	49	845	998	12,209
Charge for the year	2,901	1,137	26	292	381	4,737
On disposals	(100)	(75)	(75)	-	-	(250)
At 30 September 2022	**10,160**	**4,020**	**-**	**1,137**	**1,379**	**16,696**
NET BOOK VALUE						
At 30 September 2022	**8,325**	**5,421**	**47**	**945**	**907**	**15,645**
At 30 September 2021	**9,467**	**4,801**	**73**	**679**	**947**	**15,967**

9 TANGIBLE FIXED ASSETS (CONTINUED)

CHARITY	SCIENTIFIC EQUIPMENT	MARINE POOL	FIXTURES & FITTINGS	COMPUTER EQUIPMENT	PLANT & MACHINERY	TOTAL
	£'000	£'000	£'000	£'000	£'000	£'000
COST OR VALUATION						
At 1 October 2021	16,826	7,759	122	1,524	1,945	28,176
Additions	1,932	1,693	-	565	345	4,672
Disposals	(273)	(11)	(122)	(7)	(4)	(417)
At 30 September 2022	**18,485**	**9,441**	**-**	**2,082**	**2,286**	**32,294**
DEPRECIATION						
At 1 October 2021	7,359	2,958	49	845	998	12,209
Charge for the year	2,901	1,137	26	292	381	4,737
On disposals	(100)	(75)	(75)	-	-	(250)
At 30 September 2022	**10,160**	**4,020**	**-**	**1,137**	**1,379**	**16,696**
NET BOOK VALUE						
At 30 September 2022	**8,325**	**5,421**	**-**	**945**	**907**	**15,598**
At 30 September 2021	**9,467**	**4,801**	**73**	**679**	**947**	**15,967**

10 FIXED ASSET INVESTMENTS

The addition in the year related to 100% of the share capital on incorporation of National Oceanography Centre Innovations Limited on the 9th October 2019 at the cost of £1.

PRINCIPAL SUBSIDIARIES

The following was a subsidiary undertaking of the Charity:

NAME	COMPANY NUMBER	REGISTERED OFFICE OR PRINCIPAL PLACE OF BUSINESS	PRINCIPAL ACTIVITY	CLASS OF SHARES	HOLDING
National Oceanography Centre Innovations Limited	12250763	National Oceanography Centre, European Way, Southampton, United Kingdom, SO14 3ZH	Development of products and services based on the output of ocean science research and engineering	Ordinary	100%

	2022	2021
	£'000	£'000
Income	1,122	376
Expenditure	(1,158)	(442)
Net liabilities	(36)	(66)

11 STOCKS

	2022	2021
	£'000	£'000
Marine fuel	546	432
Ship bond	37	56
	583	**488**

The difference between purchase price or production cost of stocks and their replacement cost is not material.

During the year there was no impairment to the value of stock (2021 - £Nil).

12 DEBTORS

	GROUP 2022	GROUP 2021 AS RESTATED	CHARITY 2022	CHARITY 2021 AS RESTATED
	£'000	£'000	£'000	£'000
Trade debtors	10,705	23,598	10,577	23,424
Group debtors	-	-	1,360	680
Prepayments	1,505	1,555	1,505	1,555
Accrued income	4,337	5,433	4,239	5,433
Other debtors	92	69	92	69
	16,639	**30,655**	**17,773**	**31,161**

During the year there was no impairment to the value of debtors in relation to bad debt provisions (2021 - £Nil).

13 CREDITORS: AMOUNTS FALLING DUE WITHIN ONE YEAR

	GROUP 2022	GROUP 2021 AS RESTATED	CHARITY 2022	CHARITY 2021 AS RESTATED
	£'000	£'000	£'000	£'000
Trade creditors	1,861	1,427	1,861	1,427
Due to Marine and EU partners	3,347	2,366	3,347	2,366
Pension accrual	268	207	268	207
Social security and other taxes	2,062	1,335	1,851	1,335
Accruals	4,017	3,076	4,007	3,061
Deferred income (see note 14)	37,526	59,672	37,311	59,655
	49,081	**68,083**	**48,645**	**68,051**

14 DEFERRED INCOME

	GROUP 2022	GROUP 2021 AS RESTATED	CHARITY 2022	CHARITY 2021 AS RESTATED
	£'000	£'000	£'000	£'000
At 1 October	59,672	14.413	59,655	14,333
Released to income	(72,043)	(55,938)	(72,027)	(60,401)
Amounts deferred in year	49,897	101,197	49,683	105,723
Carried forward	**37,526**	**59,672**	**37,311**	**59,655**

Deferred income relates to grant income, including research grants, which are received in advance of specific conditions being met. The income is shown as deferred until those conditions are fully satisfied.

15 FUNDS

GROUP	BALANCE AT 30 SEPTEMBER 2021 AS RESTATED	INCOME	EXPENDITURE	TRANSFERS	BALANCE AT 30 SEPTEMBER 2022
	£'000	£'000	£'000	£'000	£'000
UNRESTRICTED FUNDS					
General unrestricted:					
Unrestricted funds	9,116	41,960	(41,356)	5,902	15,622
Total unrestricted funds	**9,116**	**41,960**	**(41,356)**	**5,902**	**15,622**
RESTRICTED FUNDS					
Restricted funds	1,951	29,194	(27,471)	(2,535)	1,139
Restricted fixed asset funds	11,394	7,563	(5,266)	(3,378)	10,313
Total restricted funds	**13,345**	**36,757**	**(32,737)**	**(5,913)**	**11,452**
Total funds	**22,461**	**78,717**	**(74,093)**	**(11)**	**27,074**

15 FUNDS (CONTINUED)

CHARITY	BALANCE AT 30 SEPTEMBER 2021 AS RESTATED	INCOME	EXPENDITURE	TRANSFERS	BALANCE AT 30 SEPTEMBER 2022
	£'000	£'000	£'000	£'000	£'000
UNRESTRICTED FUNDS					
General unrestricted:					
Unrestricted funds	9,210	40,838	(40,198)	5,905	15,755
Total unrestricted funds	**9,210**	**40,838**	**(40,198)**	**5,905**	**15,755**
RESTRICTED FUNDS					
Restricted funds	1,951	29,194	(27,471)	(2,535)	1,139
Restricted fixed asset funds	11,394	7,563	(5,266)	(3,378)	10,313
Total restricted funds	**13,345**	**36,757**	**(32,737)**	**(5,913)**	**11,452**
Total funds	**22,555**	**77,595**	**(72,935)**	**(8)**	**27,207**

GROUP	BALANCE AT 30 SEPTEMBER 2020 AS RESTATED	INCOME	EXPENDITURE	TRANSFERS	BALANCE AT 30 SEPTEMBER 2021 AS RESTATED
	£'000	£'000	£'000	£'000	£'000
UNRESTRICTED FUNDS					
Designated:					
Long Term Maintenance	(1,042)	-	-	1,042	-
General unrestricted:					
Unrestricted funds	5,863	43,736	(38,943)	(1,540)	9,116
Total unrestricted funds	**4,821**	**43,736**	**(38,943)**	**(498)**	**9,116**
RESTRICTED FUNDS					
Restricted funds	425	23,405	(22,384)	505	1,951
Restricted fixed asset funds	17,541	-	(6,140)	(7)	11,394
Total restricted funds	**17,966**	**23,405**	**(28,524)**	**498**	**13,345**
Total funds	**22,787**	**67,141**	**(67,467)**	**-**	**22,461**

15 FUNDS (CONTINUED)

CHARITY	BALANCE AT 30 SEPTEMBER 2020 AS RESTATED	INCOME	EXPENDITURE	TRANSFERS	BALANCE AT 30 SEPTEMBER 2021 AS RESTATED
	£'000	£'000	£'000	£'000	£'000
UNRESTRICTED FUNDS					
Designated:					
Long Term Maintenance	(1,042)	-	-	1,042	-
General unrestricted:					
Unrestricted funds	5,891	43,360	(38,501)	(1,540)	9,210
Total unrestricted funds	**4,849**	**43,360**	**(38,501)**	**(498)**	**9,210**
RESTRICTED FUNDS					
Restricted funds	425	23,405	(22,384)	505	1,951
Restricted fixed asset funds	17,541	-	(6,140)	(7)	11,394
Total restricted funds	**17,966**	**23,405**	**(28,524)**	**498**	**13,345**
Total funds	**22,815**	**66,765**	**(67,025)**	**-**	**23,121**

General funds are unrestricted funds which are available for use at the discretion of the Trustees in furtherance of the general objectives of the Group and which have not been designated for other purposes.

Designated funds comprise unrestricted funds that have been set aside by the Trustees for particular purposes.

The aim and use of each designated fund are set out in the notes to the financial statements.

Restricted funds are funds which are to be used in accordance with specific restrictions imposed by donors or which have been raised by the Group for particular purposes. The costs of raising and administering such funds are charged against the specific fund.

Restricted funds comprise of NMF ship operating income, charter income balance and NMEP capital replacement.

Restricted fixed asset funds are funds for the sole use of acquiring the moveable assets of NOC on the 1 November 2019 and the expenditure is the subsequent depreciation of these assets.

16 NET ASSETS

GROUP	FIXED ASSETS 2022	CURRENT ASSETS 2022	CURRENT LIABILITIES 2022	TOTAL 2022
	£'000	£'000	£'000	£'000
General unrestricted	47	51,435	(35,860)	15,622
Restricted	5,330	9,030	(13,221)	1,139
Restricted fixed asset	10,313	-		10,313
	15,690	**60,465**	**(49,081)**	**27,074**

16 NET ASSETS (CONTINUED)

GROUP	FIXED ASSETS 2021 AS RESTATED	CURRENT ASSETS 2021 AS RESTATED	CURRENT LIABILITIES 2021 AS RESTATED	TOTAL 2021 AS RESTATED
	£'000	£'000	£'000	£'000
General unrestricted	-	21,368	(12,252)	9,116
Restricted	5,147	52,635	(55,831)	1,951
Restricted fixed asset	11,394	-	-	11,394
	16,541	**74,003**	**(68,083)**	**22,461**

CHARITY	FIXED ASSETS 2022	CURRENT ASSETS 2022	CURRENT LIABILITIES 2022	TOTAL 2022
	£'000	£'000	£'000	£'000
General unrestricted	-	51,179	(35,424)	15,755
Restricted	5,330	9,030	(13,221)	1,139
Restricted fixed asset	10,313	-	-	10,313
	15,643	**60,209**	**(48,645)**	**27,207**

CHARITY	FIXED ASSETS 2021 AS RESTATED	CURRENT ASSETS 2021 AS RESTATED	CURRENT LIABILITIES 2021 AS RESTATED	TOTAL 2021 AS RESTATED
	£'000	£'000	£'000	£'000
General unrestricted	-	21,431	(12,221)	9,210
Restricted	5,147	52,635	(55,831)	1,951
Restricted fixed asset	11,394	-	-	11,394
	16,541	**74,066**	**(68,052)**	**22,555**

17 CASH AND CASH EQUIVALENTS

	GROUP 2022	GROUP 2021	CHARITY 2022	CHARITY 2021
	£'000	£'000	£'000	£'000
Cash at bank	43,243	42,860	41,853	42,417

18 ANALYSIS OF NET FUNDS

	AT 1 OCTOBER 2021	CASH FLOWS	AT 30 SEPTEMBER 2022
GROUP			
Bank and cash balances	42,860	383	43,243
CHARITY			
Bank and cash balances	42,417	(564)	41,853

	AT 1 OCTOBER 2020	CASH FLOWS	AT 30 SEPTEMBER 2021
GROUP			
Bank and cash balances	26,651	16,209	42,860
CHARITY			
Bank and cash balances	26,467	15,950	42,417

19 PENSION COMMITMENTS

UKRI-NERC employees are entitled to be members of the Research Council's Pension Scheme which is a defined benefit scheme funded from annual grant-in-aid and pay-as-you-go basis. The pension scheme is contributory and is administered by the Research Council's Joint Superannuation Service.

The scheme is a multi-employer scheme, for which a separate Research Council's Pension Scheme account is published. NERC are unable to identify their share of the underlying assets and liabilities and those relating to NOC.

Employees who joined after 1 November 2019 are entitled to be members of the National Oceanography Centre Group Pension Scheme. This is a defined contribution pension scheme administered by Legal and General. Contributions for the year were employer's 10% and employees a minimum of 5%.

The pension costs charge for the year represents contributions payable to the schemes and amounted to £4,628 k (2021: £5,003k).

20 RELATED PARTY TRANSACTIONS

The Charity recharged employment costs of £514k (2021: £307k) to National Oceanography Centre Innovations Limited, its subsidiary and also incurred costs of £616k (2021: £134k) on behalf of its subsidiary.

At the year end the Charity was owed £1,360k (2021: £680k) by National Oceanography Centre Innovations Limited.

Transactions with Trustees are detailed in note 15.

21 PRIOR PERIOD ADJUSTMENT

The comparative figures for the year ended 30 September 2021 have been restated to correct two errors.

Firstly, debtors and creditors due within one year in the Consolidated and Charity Balance Sheets have been restated to recognise accrued income totalling £5,433k which had previously been netted off with deferred income. There is no impact on net current assets, total funds or net income as a result of this adjustment. Although there is no cash impact, the reconciliation of the deficit/(surplus) for the year to the net cash provided by operating activities for the year ended 30 September 2021 in the Consolidated Statement of Cash Flows has been restated for the amended movements in debtors and creditors.

The second correction is to recognise a VAT liability identified after the 30 September 2021 financial statements had been approved. Accounting for VAT is complex given the Charity's mixture of taxable, exempt, and non-business income and a review commissioned by the Trustees identified historic discrepancies that have been corrected in these financial statements. Creditors as at 30 September 2021 in the Consolidated and Charity Balance Sheets have been increased by £1,273k from the amounts previously stated, with total funds reduced by the same amount. Unrestricted expenditure on charitable activities for the year ended 30 September 2021 in the Consolidated Statement of Financial Activities has been increased by £707k from the amount previously stated, with net income/(expenditure) and net movement in funds restated accordingly. Because some of the VAT liability relates to before 1 October 2020, the unrestricted fund balance at the beginning of the comparative year has been reduced by £566k. Consequently, fund balances at 30 September 2021 have been reduced by £1,273k. Again, there is no impact on cash flows, but the reconciliation of the deficit/(surplus) for the year to the net cash provided by operating activities for the year ended 30 September 2021 in the Consolidated Statement of Cash Flows has been restated for the revised net expenditure for the year and amended movement in creditors.

	£'000
ADJUSTMENT 1 - RECLASSIFICATION OF ACCRUED INCOME	
Increase in Debtors - Accrued Income	5,433
Increase in Creditors - Deferred Income	(5,433)
ADJUSTMENT 2 - RECOGNITION OF VAT LIABILITY	
Increase in Creditors - Social Security and Other Taxes	(1,273)
Total Reduction in Fund Balance at 30 September 2021	**(1,273)**

STAY IN TOUCH

The National Oceanography Centre is one of the world's top oceanographic institutions. We provide the UK's National Capability needed to be a top global player, to lead and participate in international co-operations.

We undertake world leading research in large scale oceanography and ocean measurement technology innovation; working with government and business to turn great science and technology into advice and applications. We support scientists in universities and research institutes with facilities, research infrastructure and irreplaceable data assets – enabling the UK to harness the full power and diversity of its ocean science talent.

To get bite-sized updates on our Science and Technology, Latest News, Public Events, Career Opportunities and Educational Resources, subscribe to Ocean News via our website or follow us on social media:

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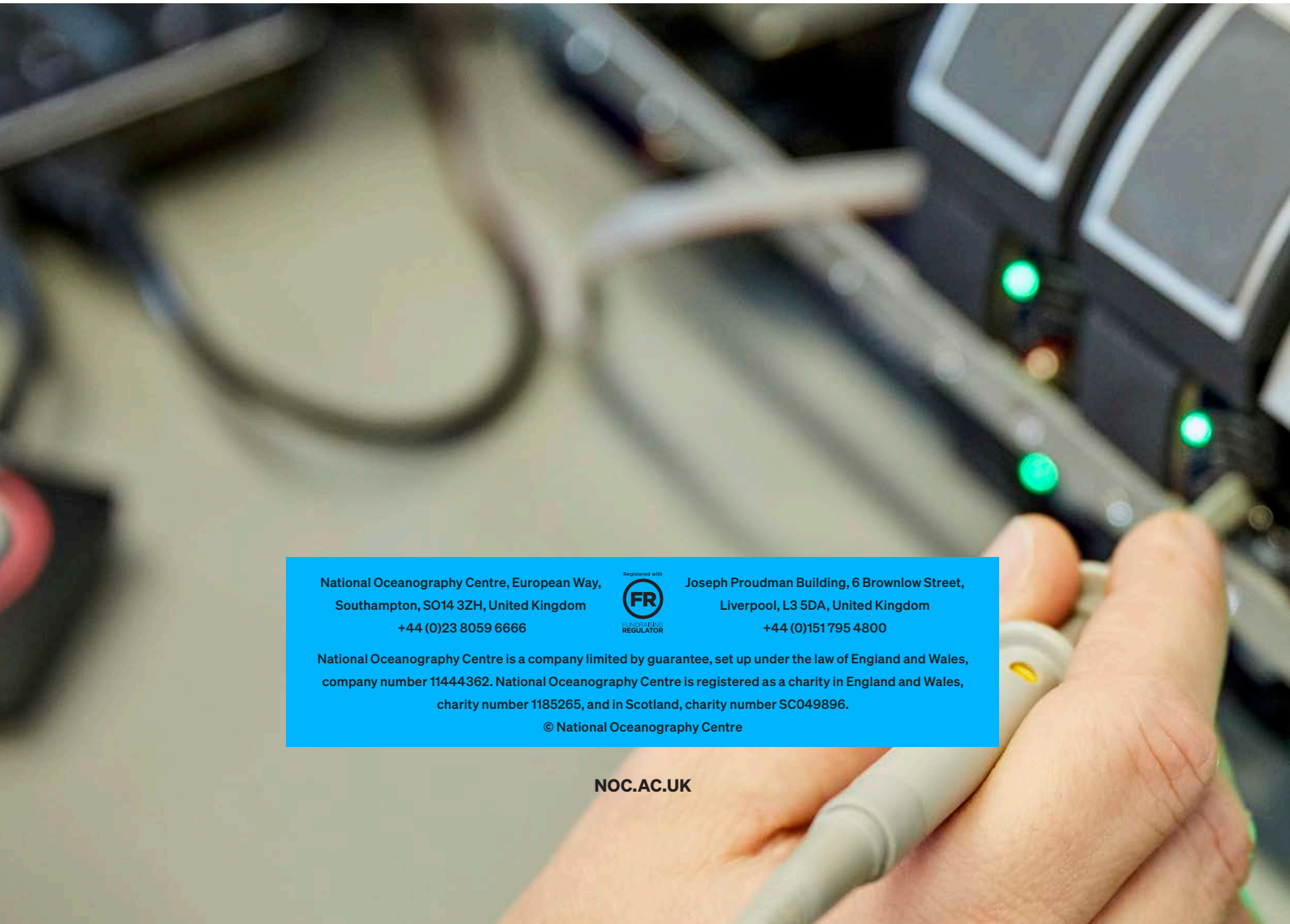

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