

Briefing Paper

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The AtlantOS Vision – A long-term observing system in the Atlantic Ocean

Message from the Editors

Sandra Ketelhake (German Marine Research Consortium)

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AtlantOS is a large-scale research and innovation project aiming to deliver an advanced framework for the development of an integrated Atlantic Ocean Observing System that goes beyond the state-of-the-art, and leaves a legacy of sustainability after the lifetime of the project. The general vision of AtlantOS is to improve Atlantic observing to obtain an international, more sustainable, more efficient, more integrated, and fit-for-purpose ocean observing system. Ultimately, this will improve the value for money, extent, completeness, quality and ease of access to ocean data with the aim of delivering comprehensive ocean information to assess current trends and predict future scenarios.

The project is largely funded by the EU Horizon 2020 programme, but is a truly pan-Atlantic initiative with partners from Brazil, Canada, South Africa and the USA. As such, AtlantOS contributes to the Trans-Atlantic Research Alliance (Galway Initiative), the Group on Earth Observations and to the implementation of SDG14 entitled 'Conserve and sustainably use the oceans, seas and marine resources for sustainable development'.

During the course of the project a number of Briefing Papers will be produced to summarize the key aims of and developments in AtlantOS. This first Briefing Paper highlights the AtlantOS vision. The authors include members of the AtlantOS Executive

Board, who each take a look at the AtlantOS vision from slightly different perspectives. Martin Visbeck elaborates on the broader contribution of AtlantOS to understanding, using and protecting the oceans. Albert Fischer looks at the vision for AtlantOS. Matt Mowlem focuses on the technological vision for AtlantOS and Brad de Young looks at the challenges of putting the vision into practice.

We hope you enjoy this first briefing paper. For questions to this paper or suggestions for future topics, please contact us at:

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Sustained ocean observing in support of the implementation of SDG14

Martin Visbeck (Helmholtz Centre for Ocean Research Kiel and Coordinator of AtlantOS)

The ocean regulates global climate, provides resources such as food, materials, substances and energy. It facilitates 90% of global trade and enables recreational and cultural activities. Human development, population and economic growth together with essentially free access to ocean resources cause increased pressure on marine systems. Overfishing, unsustainable and polluting resource extraction, alteration of coastal zones and land-based ocean pollution and climate change are the most pressing issues. International cooperation is needed to enable more effective governance to ensure more sustainable use of marine resources and protection of the marine environment to safeguard equitable prosperity for current and future generations globally.

Ocean sustainability was not explicitly addressed in the United Nations Millennium Development Goals. However, during negotiations of the 2030 development agenda a growing coalition led by the Small Island Development States articulated effectively the case for a standalone ocean goal. In 2015, the UN finally adopted Sustainable Development Goal 14, entitled 'Conserve and sustainably use the oceans, seas and marine resources for sustainable development'. As an initial step toward implementing this goal, the UN has agreed to hold a first global conference on the oceans in June 2017 in New York City. Ocean science as well as data and information are identified as key areas of focus concerning SDG14.

The EU Horizon 2020 project

AtlantOS, 'Optimising and Enhancing the Integrated Atlantic Ocean Observing System', is improving and innovating Atlantic observing with the ambition to arrive at a more international, more sustainable, more efficient, more integrated and fit-for-purpose system. Together with the Group of Earth Observations (GEO) Blue Planet initiative, and the Global Ocean Observing System (GOOS) they jointly support the implementation of SDG14. AtlantOS and global sustained ocean observing contributes to the implementation of SDG14 by providing the ocean information needed to establish both status and pressure indicators of 'ocean health and productivity' that are essential to evaluate the progress against SDG14.

The strategic vision of AtlantOS

Albert Fischer, Micheal Ott (UNESCO – IOC)

The AtlantOS project is a driver in the vision of an integrated Atlantic Ocean observing system that achieves a transition from a loosely-coordinated and fragmented set of existing activities, into a system that is sustained and sustainable, efficient, and fit-for-purpose.

This system will cover the value chain from observations

to use of information products by policy- and decision-makers, and includes data management, analysis and modelling, and dissemination of information and products, as well as continuous improvement of the system through technological advances and user feedback. The sustainability of the observing system is intimately linked to its fitness-for-purpose

– how closely it meets the requirements of society and of science for sustained ocean observations and information.

The AtlantOS project will use a systems approach, based on the Framework for Ocean Observing (2012), to: identify a common understanding of requirements across the stakeholders of Atlantic sustained ocean observing

systems; coordinate existing observation efforts and augment them, where necessary, to fill identified gaps; integrate data streams; and make data and information widely available for societal benefit across areas as diverse as climate, operational ocean services (e.g., for industry), and ocean health.

This is an ambitious vision, and relies on developing a voluntary collaborative system, where all countries around the Atlantic Rim and all stakeholders see the value

in mutual cooperation, using commonly-agreed standards and best practices, and coordinating all of the pieces into a more valuable integrated whole. While the AtlantOS project is driven by European funding, the vision broadly includes a much wider set of partners, and seeks to build a common effort.

An initial analysis of existing requirements and observing programs has been completed and will inform innovation activities within the project and with outside partners to: better define integrated

requirements; identify capacities and gaps; and understand trade-offs between the feasibility and impact of different observing networks in capturing Atlantic Ocean phenomena and delivering for scientific and operational applications. It will form a basis for further discussions about common priorities amongst AtlantOS project partners and all stakeholders, around the Atlantic basin, in a future AtlantOS integrated and sustained ocean observing system.

The vision for technology for the Atlantic

Matt Mowlem (National Oceanographic Centre)

The AtlantOS vision for technology in the Atlantic is to continue to target key capability gaps, and to maximise opportunities for improved efficiency and cost reduction for observing systems. Sensors and instrumentation are critical as they are currently a limiting factor in our capability to observe, particularly biogeochemical and biological parameters, at the required spatial and temporal scales using either new or existing ocean platforms and observing networks. To address this gap AtlantOS will roadmap optimal sensor development and integration into observing systems and also the development of future observing networks. A key gap which we address is the remote and autonomous sampling and processing of biological

samples for widespread biological and (meta)genomic observations. Complimentary to this activity is the continuous improvement in data standards and reliability being undertaken by existing centres of gravity. AtlantOS will work with these initiatives to collate and develop common metrology techniques and best practice (including standards) for measurement of priority Essential Ocean Variables (EOVs). These include all aspects of the ocean environment – physical, biological and biogeochemical.

To reduce cost and increase Integrated Atlantic Ocean Observing Systems efficiency one aspect of our vision is to promote and facilitate networks and nations sharing or combining resources and infrastructure in construction,

operation and maintenance of ocean observation systems. This is best enacted through international collaboration and dissemination of best practice. We are working with existing initiatives (e.g. POGO fellows) and structures in GEO (e.g. communities of practice), and GOOS (OCEATLAN, IOCARIBE, GOOS-Africa, US IOOS and EuroGOOS in particular). In the future, and through active engagement of all stakeholders, we will see ever greater synergy between the separate enterprises.

AtlantOS will draw these strands together to enable a capable, efficient and responsive technology ecosystem for Atlantic observing with impact on sustained Atlantic observing and the Atlantic blue economy.

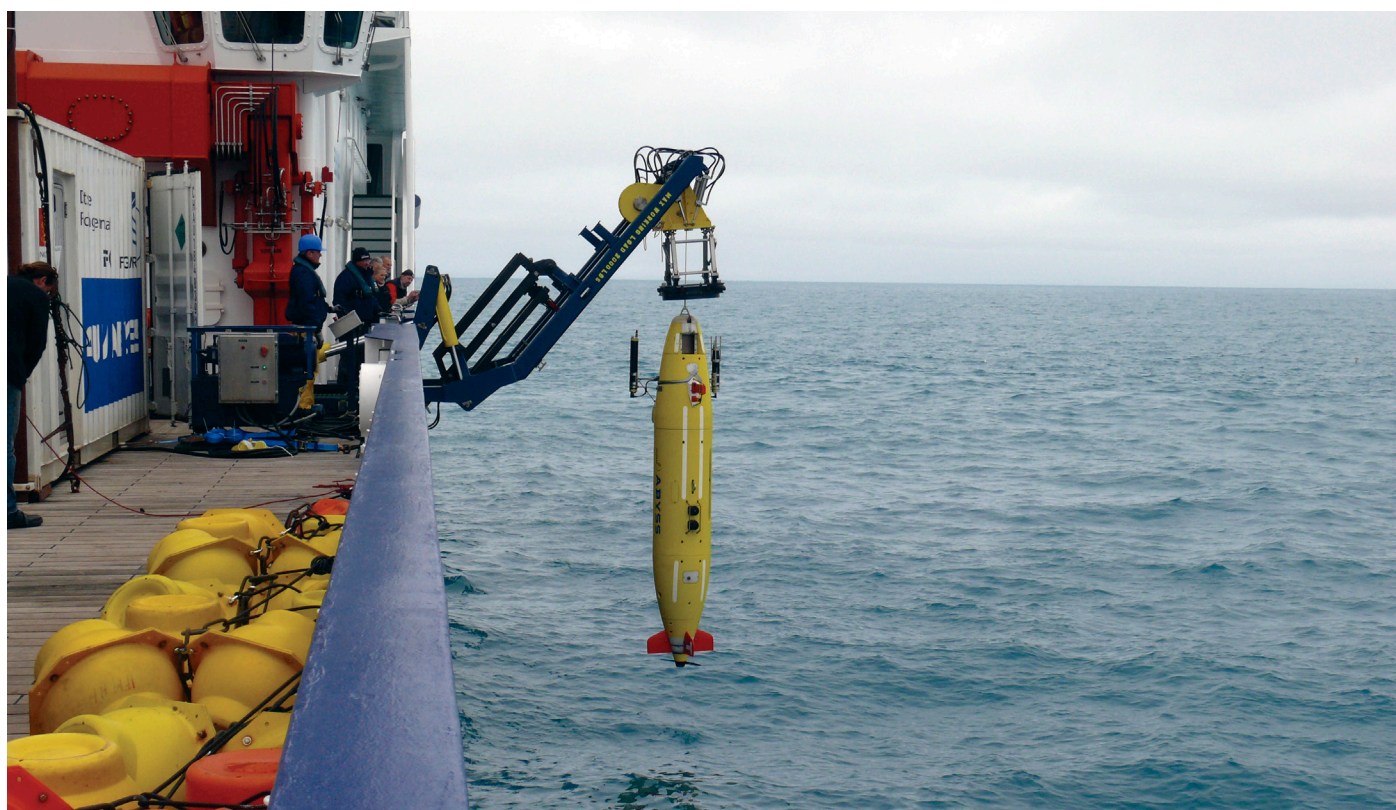
Blueprint for an Atlantic Ocean Observing System: The vision in practice

Brad de Young (Memorial University)

The oceans play a vital role in the global climate system and biosphere, providing crucial resources for humanity including water, food, energy and raw materials. There is therefore a compelling need to develop a sustainable, internationally-coordinated and comprehensive ocean observing system to enhance scientific understanding and to support the prediction of future scenarios to improve ocean management. AtlantOS will guide the development of an advanced, internationally elaborated, Blueprint for

an Integrated Atlantic Ocean Observing System. The Blueprint process will look beyond AtlantOS to the needs and priorities of the wider communities interested in developing ocean observing. The Ocean Observing System should develop new approaches and bring together existing ocean observing activities into an efficient, and fit-for-purpose program that leaves a legacy of sustainability. The Observing System should be integrative, ambitious, multi-national, multi-sectoral and purposeful

but not prescriptive. It must include capacity development and emphasize the role of resource mobilization for observation of the entire Atlantic Ocean. Each of the key characteristics of the Observing System is required for a successful and sustainable program. The System should support and encourage new partnerships between science, civil society, governments, and the private sector. AtlantOS is actively seeking interested members for this Blueprint committee now.



An Autonomous Underwater Vehicle (AUV) used to collect data about the state of the oceans. © GEOMAR

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