

## Lead Institution

GEOMAR Helmholtz Center for  
Ocean Research Kiel and Kiel  
University

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## Key Partners

- [National Oceanography Centre](#)
- [Mercator Ocean international](#)
- [FUGRO](#)
- [Integrated Marine Observing System](#)
- [National Oceans and Coastal Management System](#)

## Decade Challenges Addressed

**CHALLENGE 1:** Understand and beat marine pollution

**CHALLENGE 2:** Protect and restore ecosystems and biodiversity

**CHALLENGE 3:** Sustainably feed the global population

**CHALLENGE 4:** Develop a sustainable and equitable ocean economy

**CHALLENGE 5:** Unlock ocean-based solutions to climate change

**CHALLENGE 6:** Increase community resilience to ocean hazards

**CHALLENGE 7:** Expand the Global Ocean Observing System

**CHALLENGE 8:** Create a digital representation of the Ocean

**CHALLENGE 9:** Skills, knowledge and technology for all

**CHALLENGE 10:** Change humanity's relationship with the ocean

## Ocean Basins

North Atlantic	South Pacific
South Atlantic	Indian
North Pacific	Arctic

## Summary

DITTO will support the development of digital twins of the ocean as “a realistic digital representations of assets, processes or systems in the built or natural environment”. This will be accomplished by establishing and advancing a digital framework on which all marine data, satellite data and reanalyzes, modelling and simulation along with high-performance computing (HPC) capacities, artificial intelligence (AI) algorithms and specialized tools including relevant best practices will form a new globally shared capacity to access, manipulate, analyze, visualize and effectively use marine information. DITTO will enable users and partners to create their own digital twin of the ocean to answer “what if” questions in support of a wide range of use in the context of ocean development addressing issues such as development of a sustainable Blue Economy and effective Maritime Spatial Planning.

Duration: 01/07/2021 - 30/06/2030

## Priority Activities (first 2 years)

- Articulate a common understanding of digital twins of the oceans' purpose and provide benefit to all by enabling value and real insight into the ocean.
- Establishing procedures to build trust in Digital Twins through FAIR, open, and verifiable quality data.
- Articulate and advance a common understanding of Digital Twins of the Ocean architecture.
- Advance a number of “use case” prototype Digital Twin applications across the spectrum from science, engineering and operations.
- Support capacity building and training in regions of limited capacity and capabilities.
- Encourage the formulation of DITTO related Decade Projects.
- Hold annual DITTO Summits. The first Summit is supported by the G7 and is planned for May 2022 in London, UK.
- Build a community of practice at the intersection between other Decade Programmes.

*Digital Twins of the Ocean will bring together ocean data, models and digital information with those who are planning and regulating human ocean interactions. They will become an indispensable element of sustainable development of the ocean space*

Martin Visbeck, Oceanographer at GEOMAR



**DITTO**  
Digital Twins of the Ocean

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