



AUSTRALIAN GEOSPATIAL- INTELLIGENCE ORGANISATION (AGO) ANALYTICS LAB PROGRAM

PROPOSAL BRIEFING DOCUMENT –
HIDDEN WAVES & DEPTHS OF THE DEEP BLUE SEA

Questions and further information can be provided by:

Roshni Sharma, Project Manager
rsharma@frontiersi.com.au

Kate Williams, Chief Delivery Officer
kwilliams@frontiersi.com.au

Objective

The AGO's Analytics Labs Program (AGO Labs), coordinated through FrontierSI, was created to help AGO better access innovative technology and trial new ways of working with industry. Specifically, AGO is keen to attract a wider pool of companies and technologies to draw on for automated geospatial intelligence. The Program aims to address AGO challenges and build new industry capability through short-term projects with Australian and New Zealand-based companies. AGO Labs Challenge Topics focus on machine learning and analytics challenges for producing automated imagery analysis.

Successful demonstrator projects may have the opportunity to progress to an additional limited operational testing phase.

What is AGO Labs?

AGO Labs is a way for AGO to rapidly assess new technology capability through a challenge-based innovation program. From this process, learnings can be gathered about the barriers and opportunities for AGO to work with an increased breadth of companies. In turn, this could lead to a long-term mechanism for AGO to access, and provide, a pipeline of activities to industry for testing new innovations and thinking in analytics.

Initial successful projects will be funded up to \$100,000 for Proof-of-Concept projects for projects up to four months in length. An additional \$50,000 and 3 months may be provided to some projects to undertake limited operational testing, though this process will be considered as a stage gate at the end of the Proof of Concept, and the focus on the Call for Proposals should focus on the Proof-of-Concept stage, rather than the operational testing stage.

The Challenge Topic is briefly described below. It is recommended that organisations read the full description of the challenge topic to understand background, use cases and evaluation criteria for each of the challenge topics. Further information is given in Appendix A of this document.

Challenge Topics:

The following two challenge topics are available for consideration in this challenge call. A full outline of each question is available in Appendix I of this document.

Hidden Waves

This challenge aims to find the location of internal waves in the ocean – where they occur over time and in near-real time. The aim is to create a process that automatically identifies internal waves.

Depths of the Deep Blue Sea

This challenge aims to modernise the process and enrich the data used to understand the water column.

Timeline

Interested parties may submit an AGO Labs project proposal by completing a short proposal, using the template downloaded from the [AGO Labs page](#), and emailing to the FrontierSI AGO Labs Project Manager, Roshni Sharma, at agolabs@frontiersi.com.au by **10:00 pm (AEST), Monday 8 July 2024**.

No extensions of time will be granted.

Projects will be shortlisted by a panel with representatives from both AGO and FrontierSI. Applicants may be contacted to provide further details on their proposals. Successful Projects will be notified by Friday 26 July.

Contracting will follow, and kick-off meetings are expected to be completed ahead of Friday 9 August. Project closure (including submission of final report and presentation) is expected to be completed by Friday 29 November, 2024.

Additional Resources

A public information session webinar will occur on **Wednesday 26 June 2024 at 10:00 am (AEST)** – registration for this is available at <https://frontiersi.com.au/news-events/ago-analytics-labs-challenge-2024/>. This webinar will include a presentation of the aims of the AGO Labs program, as well as interactive Q&A with AGO and FrontierSI representatives. A registration link for the webinar will be provided on the [AGO Labs page](#). Additional questions can be directed to FrontierSI at agolabs@frontiersi.com.au

Project Data

A number of open data options are available to assist the preparation of submissions. Examples of these open datasets are provided in Appendix I.

Project deliverables

Successful projects will be required to, at the end of their round, provide a presentation and final report to FrontierSI and AGO outlining:

- the approach they have taken
- a description of the project outcomes within the context of the selected challenge question
- a demonstration of the outcomes showcasing achievements
- an overview of lessons learnt
- suggested options for AGO to engage and work more effectively with AGO Labs

Delivery of outputs for AGO to access and test iteratively throughout the project, as well as delivery of derivative datasets and related source code created during the project is also required. Training material related to this is desirable.

Budget

Proof-of-Concept projects will be funded with a budget of up to \$100,000. There is no requirement that additional funding will be provided to the project by applicants.

As this activity will help companies pilot technology with AGO for potential future deployment, it is expected that applicants will not operate with full commercial rates, but instead will budget the project at-cost plus 30% overheads.

For projects that are considered particularly successful and make it through a stage gate assessment between AGO and FrontierSI at the end of their Proof-of-Concept phase an additional \$50,000 and three months will be provided to undertake limited operational testing.

The proposal response should focus on the \$100,000 Proof-of-Concept only, operational testing will be discussed later in each successful project.

Evaluation Criteria

Projects that meet the following criteria will be considered, for further information please refer to the AGO Labs Proposal Response Template found on the AGO Labs website <https://frontiersi.com.au/news-events/ago-analytics-labs-challenge-2024/>

Required

- Project approach and outputs that address the challenge topic
- Ability of AGO to access and test outputs iteratively during the project
- Outcomes that can be operationalised beyond the Proof-of-concept project
- Intended approach is appropriate in scope, proposed methods and measurement of success
- Presence of project management and communication strategies to support the project approach
- Project offers value for money
- Potential for collaboration following the Challenge project stage

Desirable

- Commitment to Diversity and Inclusion (with regards to people and culture as well as data, methodology, approach, etc.)
- In-kind contributions from project partners (e.g., staff time, equipment, IP).

Intellectual Property

Project Intellectual Property (Project IP) in the capability demonstrators produced during the Project will be owned by the participating partner, in agreement with the lead partner. The AGO is granted a perpetual licence to use any Project IP created for Defence Purposes generally (other than Commercialisation) including internal research, development, education and training. In relation to the use of software, source code and project code provided by a project partner, the licence will end at the conclusion of the relevant Project, and the AGO will be required to uninstall and decommission the relevant material promptly following the end of the licence term.

Ownership of Background IP of participating partners for the capability demonstrators will be retained by the participating partners.

AGO will own the project IP in the report required to be produced by participating partners in each demonstrator project.

Constraints and Requirements

- The Australian Government contribution will be limited to \$100,000 per project for the Proof-of-Concept
- Projects should be completed in a period of four months
- A final project report and presentation is required at the end of the AGO Labs project
- The lead organisation must be a company from Australia or New Zealand

Appendix I: Challenge Question

Challenge Question 1: Hidden Waves

Locating internal waves in the ocean

Overview:

This challenge aims to find the location of internal waves in the ocean – where they occur over time and in near-real time. The aim is to create a process that automatically identifies internal waves.

Problem Statement

Internal waves occur deep in the water column, and pose hazard areas for subsurface navigation. Developing more data on this phenomena will allow for validating modelling on how and where these waves occur, and being able to find them rapidly in the future. AGO is looking for innovative solutions that:

- Identify potential data sources and techniques to identify internal waves. This could include the use of artificial intelligence and machine learning (or other) techniques applied to earth observation data to automate detection of internal waves.

Desired Outcomes

Desired outputs will include:

- Dataset of identified internal waves with temporal and spatial metadata. Example of a suitable type of dataset is [2006-2012 Internal Waves Density and Seabed Impact Maps of UK continental shelf - MEDIN Discovery Metadata Portal](#)
- Commercial data models/algorithms/rulesets/tools/processes that can be deployed to automate detection of internal ocean waves using artificial intelligence, machine learning, deep learning or other methods.

Data

Data for this challenge is Open Source to allow for maximum scoping to answer the question. One data source is the Sentinel satellite constellation available from the ESA and various commercial cloud providers through their "Open Data" initiatives:

- [Copernicus Data Space Ecosystem | Europe's eyes on Earth](#)
- [Sentinel-1 - Registry of Open Data on AWS](#)
- [Sentinel-2 - Registry of Open Data on AWS](#)
- [Sentinel Collections in Earth Engine | Earth Engine Data Catalog | Google for Developers](#)
- [Sentinel-1 Synthetic Aperture Radar \(SAR\) | Planetary Computer \(microsoft.com\)](#)
- [Sentinel-2 Level-2A | Planetary Computer \(microsoft.com\)](#)

Use Cases

The following stories are provided as guidance to challenge responses but should not be considered definitive - AGO is willing to entertain modifications to the following list or additional use case/s:

- As an analyst, I want to identify internal waves in near real time to advise my customers of their location and impact.
- As an analyst, I want a historical database for remote sensed internal waves for post mission analysis.

Challenge Question 2: Depths of the Deep Blue Sea

Modernise how we understand the water column

Overview:

This challenge aims to modernise the process and enrich observational data used to understand the water column.

Problem Statement

AGO is interested in ways to automate currently manual processes, and bring in new methods and/or new datasets to support better understanding of the water column. AGO is looking for innovative solutions that:

- Automate quality control of ocean profiles (such as from eXpendable Bathy Thermography or ARGO Profiles) in real time, leveraging existing manual processes and training datasets, to facilitate near-real time observations to be used within ocean modelling.

Desired Outcomes

Desired outputs will include:

- Quality Control (QC) methodology that can be applied to ocean profile datasets in near-real time.
- Algorithms/rulesets/tools/processes that can be deployed to automate QC methodology in near-real time, combining real time and delayed mode QC.

Data

Data for this challenge will primarily be Open Source and is available from the Australian Ocean Data Portal or NCEP:

- [Australian Ocean Data Portal: Open Access to Ocean Data \(aodn.org.au\)](https://aodn.org.au)
- [NCEP-GTS Marine Observations in BUFR format \(noaa.gov\)](https://noaa.gov)

Data formats are NetCDF (delayed more and real time) and BUFR (real time).

- [BUFR Codes | World Meteorological Organization \(wmo.int\)](https://wmo.int)

Details on current QC methodology can be found at this links:

- [The Argo Online School — Argo Online School \(euroargodev.github.io\)](https://euroargodev.github.io)
- [Australian XBT Quality Control Cookbook Version 2.1](#)
- [IQuOD Community Practices References \(oceanbestpractices.org\)](https://oceanbestpractices.org)
- [ARGO: an international programme using autonomous floats ... \(oceanbestpractices.org\)](https://oceanbestpractices.org)

A selection of non-QC'd data can be made available towards the end of the challenge to showcase the utility of the solution.

Use Cases

The following stories are provided as guidance to challenge responses but should not be considered definitive - AGO is willing to entertain modifications to the following list or additional use case/s:

- As an analyst I want to ocean profiles that are quality control and available in near real time.
- As a data manager, I want a solution that speeds up manual QC to enable a more effective use of resources.