Announcement of Opportunity
Invitation to Tender:
User Pilot Projects for EO Data Hub

1. INTRODUCTION

The National Centre for Earth Observation (NCEO) is pleased to announce an invitation to tender with the primary aim of engaging the user community in the development of the EO Data Hub. It seeks input from potentials users, communities and stakeholders to demonstrate EO services and data supply concepts which would be enabled by the EO Data Hub. The selected projects in this call will help to specify the functionality, software and desirable data streams in the Hub and obtain early access to the Hub as it is implemented.

The newly commissioned EO Data Hub (EODH) has the objective to deliver an innovative, pre-operational pathfinder data and analysis "single point of access" for UK EO data offerings from distributed public and commercial sources. It will implement a uniquely UK offering which will federate access to data and provide centralised software services to bring value across the breadth of UK EO sector users. The EODH:

- builds on current EO infrastructure provision whilst looking forward to new satellite missions and other data sources;
- provides adaptive and scalable software implemented in the cloud to access and transform data streams;
- supports new EO transformational tools (core and user-provided) to produce analysis-ready data systems and merged products via a modular container-based approach to software.
- improves EO data access and discovery, interoperability, transparency, and trustworthiness, including a dedicated Quality Assurance Service.
- Will enable unified but flexible UK access to EO data from across multiple (public and private) sources, through common and accessible interfaces for a broad set of data users by implementing a hub which can access a wide variety of public, scientific and commercial data, support for data-proximate computing minimising downloads and dedicated web application and portals to serve broad communities or dedicated services.

- Is a national UK asset which provides the first phase in dedicated national data infrastructure for Earth Observation.

The EODH has been funded by the National Environment Research Council (NERC), part of UKRI, through the Copernicus transition, national project funding provided by the Department for Science, Innovation and Technology (formerly BEIS)[1][2]. The consortium is led by NCEO (including CEDA@ STFC RAL Space and U. Leicester staff), the Satellite Applications Catapult (SAC), the Met Office, the National Physical Laboratory and the UK Space Agency.

1.1 EO Platforms and the EO Data Hub (EODH) Concept

Over the last decade the *Platform* concept has developed and matured in the EO sector as a means to bring together data and computational resources into a unified virtual work environment for users[3]. The EODH builds on this approach and will offer a software framework operating in a (public) cloud environment. This suite of software services will include - but not be limited to - identity and access management, a searchable catalogue for data and other resources, capability to assemble data pipelines to transform data into value-added and/or analysis-ready data products. This software system is the key to unlock the rich variety of data in a data stream layer, an extendable architecture in which any number of data sources can be integrated. An important feature of this UK EO hub system is that it will interface, by intent, to public service data (state-funded through space agencies), commercial datasets e.g. from constellations, and UK scientific data as described above through Application Programming Interfaces (APIs), allowing data discovery and data access using open standards-based interfaces. Critically, the datasets will be given a "trusted" approval status through a Quality Assurance Service running in the Hub software in parallel to the data search function.

A further crucial element is that the automated workflows of the hub will allow code containers (encapsulating algorithms or tools) that can transform the data to forms that the user can exploit more easily. These containers can be hub-provided functions, user-supplied code or open-source routines; our aim is to provide some key tools centrally through experts in our organisations, ranging from data formatting to atmospheric correction and cloud clearing.

Finally, the **Hub capabilities will support the development of web-based applications which build upon the data access and processing functionality provided by the Hub to implement thematic area-specific portals and analysis environments for users**. These applications are intended to give end-

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[1] https://www.gov.uk/government/publications/earth-observation-investment
[2] https://www.nceo.ac.uk/article/uk-government-commits-close-to-400-million-to-earth-observation-research-and-industry-projects/
[3] https://docs.ogc.org/bp/20-089r1.html

users ability to interrogate key products, customise data, request expert support, develop value-added products and support decision making all tailored to the specific application scenario or theme.

For this pathfinder project the EODH will support the development and operation of up to three web-based applications/portal as part of the national government-supported asset, one of which will be a climate data-driven offering and the other two of which will be directed at user-driven priority sectors. To these will be added more focused, user-commissioned web applications offering specific services to collaborative and customer bases.

2   USER PILOT CALL DESCRIPTION

The purpose of this call is to foster a technical and practical activity, demonstrating what could be provided for a broad base of users for a specific application sector through the exploitation of EO data. It should showcase specific services that could be implemented, and which can efficiently grow downstream service provision. There are three main objectives:
1. to demonstrate EO service and data supply concepts that would benefit from the EODH in both conceptual and practical forms using available data sources (including climate model data) which the proposer specifies;
2. to provide specifications for the functionality and software requirements of the hub and application developments.
3. to provide a user perspective on the development of the EODH, providing user-specifications, evaluation and test users for the first development steps of the project.

2.1   EXPECTED PROJECT CRITERIA

Appropriate projects for this call will be reasonably mature, i.e. have concepts that are actively being pursued in existing projects or service developments (typically Technology Readiness Levels of around 5). The project activities will exemplify use cases satisfying all or some of the following criteria:

- A service (including applications, web portals, analysis environments) or demonstration concept relevant to the EO Data Hub which illustrates the attributes needed for a particular sector and, ideally, also a more focused, sustained service bespoke to the particular proposers.
- A concept which is shareable within the consortium, can be used to identify hub software functionalities, can be shared with funders to exemplify usage.
- Should demonstrate how user and community engagement will grow the user base for the EO Data Hub.
- Should demonstrate and can be used to specify key aspects of the EO Data Hub system and software including some of the following:

- o Combined usage of EO data from multiple sources; including historical, real-time and forecast / predictive information to inform risk, resilience and impact focused user requirements
  - o Transformation of EO data to ARD forms including use of computation, models, assimilation into models or emulation, Artificial Intelligence tools, EO algorithms, DataCubes etc. Need and ingestion of in-situ, model or climate data
  - o Data quality attribution needs
- Involves use of public or science EO data together with commercial data.
- Demonstrates a clear service opportunity or science challenge.

Participants also agree to:

a) Claim finance by invoice under U. Leicester's contracting agreements
b) Maintain flexibility in working arrangements
c) Participate in other project user engagement activities

2.2   PROJECT BUDGET AND DELIVERABLES

Individual proposals may be submitted up to the value of £20,000 (excl. VAT) per project in phase 1, the end date of this part of the project being end August 2023. Subject to completion and review, there will be an opportunity for follow-up funding during a second phase for some projects, in order to further develop the concept.

The call is released on 22nd February 2023 **with a closing date of 13th March 2023 at 09.30**. Proposal selection will take place immediately, in anticipation of projects starting from 20th March 2023.

Proposals are expected to be *led by data users* but may include data providers or software platform designers. Proposals should also indicate wider networks of collaborators, customers or other end users and existing projects that the applicants can represent or engage with.

Alternative leadership arrangements are possible but, in these cases the proposal must state a) the commitment of a specific user to provide design, engagement and feedback; b) the way in which user-needs drive the study.

Deliverables:
- **D1:** A brief design report explaining user needs and the core functionality that will be required from a future hub (due by 31st March 2023)
- **D2:** A request table for sample data sets to be iterated with the consortium in terms of practicality of access to data, size etc. (due by 31st March 2023)
- **D3:** An activity which allows testing of the service idea in a way that shows the needs for a hub or web application delivery (proposed activity to be finalised at KO); (due by 15th June 2023).
- **D4:** Participation with the overall hub user engagement activities (in the form of interviews, workshops, etc.). This will be led by the Satellite Applications Catapult; (due by 31st May 2023).

- **D5:** Preliminary inputs to specification of hub and/or web application study; (due by 25th April 2023).
- **D6:** Final inputs to specification of hub and/or web application study; (due by 15th June 2023).

25% of the work will be initiated and completed by the end of March 2023 (See allocation of costs) with the remaining work completed by 30th June 2023. Kick-off meetings will be held by telecon/videoconference in the first instance.

4. GUIDELINES FOR PREPARING AN APPLICATION

Applicants are required to submit their bid by email to the EO Data Hub, including the application form in section 8 in a cover letter, by 09:30 on Monday March 13th 2023. Email to:

nceo-datahub@leicester.ac.uk

Proposals comprising academic/public or industrial/public partnerships are particularly welcomed to demonstrate the potential usefulness of the EO Data Hub components (hub, applications, transformational tools, multiple data streams) for usage, improvements to quality-of-service delivery by users, accessibility and integration for users.

The package should consist of:
- A cover letter.
- The completed application form in section 8.
- A main proposal of no more than 4 pages of A4 (12 point, Arial)
- A 1-page statement of financial costs, giving hourly rates for personnel (ideally named), total hours and any meeting or other costs.
- A 1-2 page Track Record for the project covering the lead and partner organisations involved.
- A CV (no more than 2 pages) for each of the main team members.

In the cover letter please include:
- A brief statement of the project outline.
- A committing offer to the University of Leicester, who will contractually administer the contract on behalf of the UK EO Data Hub consortium and on behalf of NCEO.

The main proposal should deliver:
- A project outline, its benefits and innovative aspects, including any images to assist the description, and the key milestones.
- A description of the usage context and any partner users, networks, or communities.
- A clear outline of the work that will be undertaken with the user and the types of feedback that will be given to the EO Data Hub software procurements and teams.

The financial proposal should:
- Be no more than 1 page.

- Include a table of personnel costs including hourly rates and total hours.

- Indicate company contributions where appropriate.

Define all other costs by item, e.g., cost of meetings (estimated number of people, estimated number of meetings).

Questions for clarification may be submitted by email to support@ceda.ac.uk with subject line, "EO Data Hub User Pilot AO". Questions posed along with their answers will be made publicly available. To preserve anonymity, the identity of the originator of the query will not be made public.

5. CONTRACTUAL INFORMATION

Award(s) will take the form of a contract between the University of Leicester, NCEO and the project's lead organisation. The lead organisation will be expected to place contracts, if required, to flow down to any collaborating partners.

The award will be made on a firm fixed price basis. The Intellectual Property generated during the project will belong to the originators but the EO Data Hub will be licensed to use the results of the project. The use of Open-Source software licensing in conjunction with the proposed work is actively encouraged.
All relevant costs must be included within the total amount of the contract.

Up to 25% of the payment will be made on KO and a further 25% payment will be made against the D1 and D2 deliverables due by 31st March 2023 as described in the project outline. The remainder of the payment will be made on delivery of the final reports and materials with a deadline of 31st July 2023.

6. ASSESSMENT OF PROPOSALS

The review panel will consist of EODH personnel. Proposals will be evaluated against the criteria in section 2.1.

7. PROJECT REPORTING

The final approved report of the work is due within two months of completion of the work: by 31st August 2023.

8. ELIGIBILITY

Bids are welcomed from a variety of organisations including academia, industry and government research institutes based in the UK.

9. APPLICATION FORM

The Application Form below should be completed and submitted with the Cover Letter.

Title of Project	
Lead organisation	
Lead contact name and email	
Other organisations involved	
Cost for lead	£
Cost for each partner organisation	£
Total cost of project	£
Address of lead organisation	
Thematic area/areas , e.g. agriculture, flooding, climate finance, disaster response	