

# DEFRA Challenge areas for project consideration during the CLASP Call 2022

## Overview:

- The focus of the environment theme is to explore how technology and data can 1. support our understanding of people's interaction with 'place' and the natural environment, 2. improve environmental monitoring and 3. understand the environment from an eco-centric perspective. Please see topics of interest to Defra group below.
- Please note that Defra Group will not be issuing letters of support to bidders. Given our overall support for the CLASP programme, we will engage with bidders on a non-exclusive basis and work with the successful projects as far as we are resourced to do so. Defra Group will not be making financial contributions to proposals.

## Topics:

- **'Smart catchments'** – How do we use emerging technologies (IoT, 5G, AI, VR/AR, Digital Twin) to be able to monitor catchments just like people are aiming to do with 'smart cities'? how do we enable more effective management through better data driving better policies and operational interventions?
- **Monitoring in very remote difficult places** – How do we apply emerging technologies to monitor hydrological parameters in natural 'slow the flow' flood defences (beaver dams)? How do we build on Internet of Things for terrestrial communications by exploring the potential use of satellite (specifically Low Earth Orbit satellite services) in order to physically reach remote places?
- **Remote monitoring of Tree 'Tilt'** – how do we overcome the challenge of identifying those trees that are at risk of felling (or losing branches) in windy weather which also pose a serious risk to people and property? How do we balance this challenge against not chopping tree/branches which don't pose a high risk of falling? How do we develop a mechanism for measuring oscillation of trees in very windy conditions at different scales and use the data to predict which ones are at risk of falling? What sensor capability is need given complexity of oscillation) and the number of trees that could be monitored?
- **People tracking at places of environmental interest e.g. Thames Basin Heaths** – How can we use emerging monitoring and data analytical technologies to effectively understand the people traffic to and within remote rural areas of environmental interest (e.g. heathlands, nature trails) in order to best manage those places with regards to environmental protection and assess how successful operational Defra group interventions actually are, plus better inform Defra policy making?

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- **Citizen Science** - How can citizen science be carried out using mobile phone technology taking account regulatory/privacy issues? How can future schemes be put in place, which are based on citizen science, for applications such as understanding visitor's perception of the environment or assessing the quality of the environment?

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- **Ecosystems as Data Centres** – With data requirements and energy costs raising, we need alternative storage and retrieval options. What if mature ecosystems, with their complexity and connectivity could be harnessed to hold data for digital applications across different spatial contexts? This could (a) provide sustainable and net zero storage solutions (b) potentially generate a new market for regenerative nature-based systems that is decoupled from a consumption-model.
- **Human Augmentation for nature** – Human Augmentation is positioned to enhance human performance and currently framed around benefits to the human subject. Studies suggest that our early gut biome could tolerate raw and unprocessed food much more effectively. Augmenting humans with auxiliary sensors (e.g., the ability to consciously process magnetic fields) could redefine our relationship with the more-than-human world. Taken together, Human Augmentation could be used to create new options for human adaption in alternative natural environments.
- **Eco-Centric Artificial Intelligence and interfaces**– AI is currently coded with human-centred language structure. From pheromones to whale song, earth vibrations to fungal messages, the non-human world communicates and senses their environment using different sensory and informational structures to humans and this divide is growing, with AI forming a further abstraction from our sensory knowledge of nature. Can we (a) train AI on more-than-human data, perhaps towards more-than-human goals and (b) use AI to help translate the full complexity of the non-human worlds without distorting through to anthropocentric information forms? How can interface technology then support human to non-human communication (e.g. interspecies communication at local levels), understandings and sensing within the context of local environments?

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