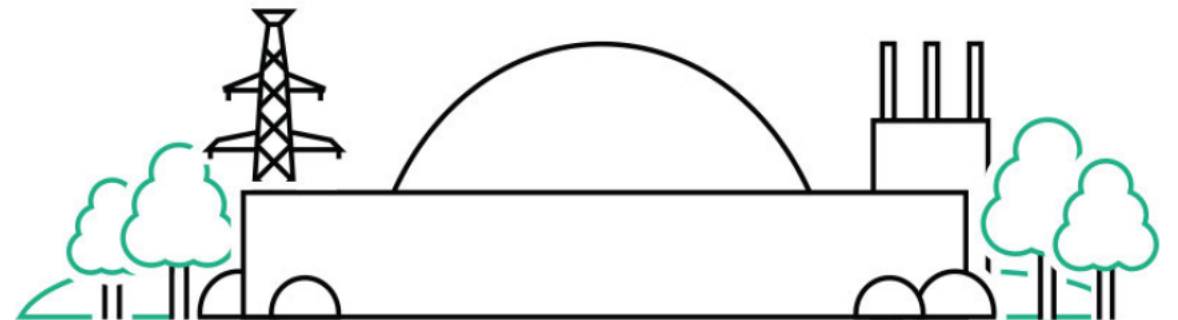




“Accelerating the safe deployment of artificial intelligence in nuclear installations”

Launch meeting

Date: 7 October 2025



Welcome

- ❑ Thank you for reaching out and expressing interest in this project
 - [ONR awarded quarter of a million pounds to develop AI capability in nuclear regulation | Office for Nuclear Regulation](#)
- ❑ AI capability fund from Regulatory Innovation Office / Department of Science, Innovation and Technology provides an exciting opportunity to support a responsible acceleration of AI deployment in nuclear
 - Keen to make sure we add value
- ❑ Launch meeting as the first step, to formally commence this programme of work
 - Window of opportunity between now and March 2025 (final publication of the report)

Rules of engagement at this meeting

☐ Many attendees

- Licensees / dutyholders
- Regulators (Environment Agency / Defence Nuclear Safety Regulator / Health&Safety Executive)
- Regulatory Innovation Office / Dep. for Science Innovation & Technology
- Others (experts / small and medium enterprises / academia / research centres)

☐ Questions at the end

- We will monitor the chat during the presentation and where possible will try to respond
- Please be respectful when using the chat
- Please mute when not talking, thanks

Outline

- How we regulate innovation in the nuclear sector?
- What is this project about?
- What is a regulatory sandboxing?
- What is the programme of work?
- How to engage on this project?
- Q&A

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Introduction to ONR – back in 3 minutes!



ONR strategic themes

Our mission

is to protect society by
securing safe nuclear
operations

Our vision

is to be a modern, transparent
regulator delivering trusted
outcomes and value

Our values



Accountable



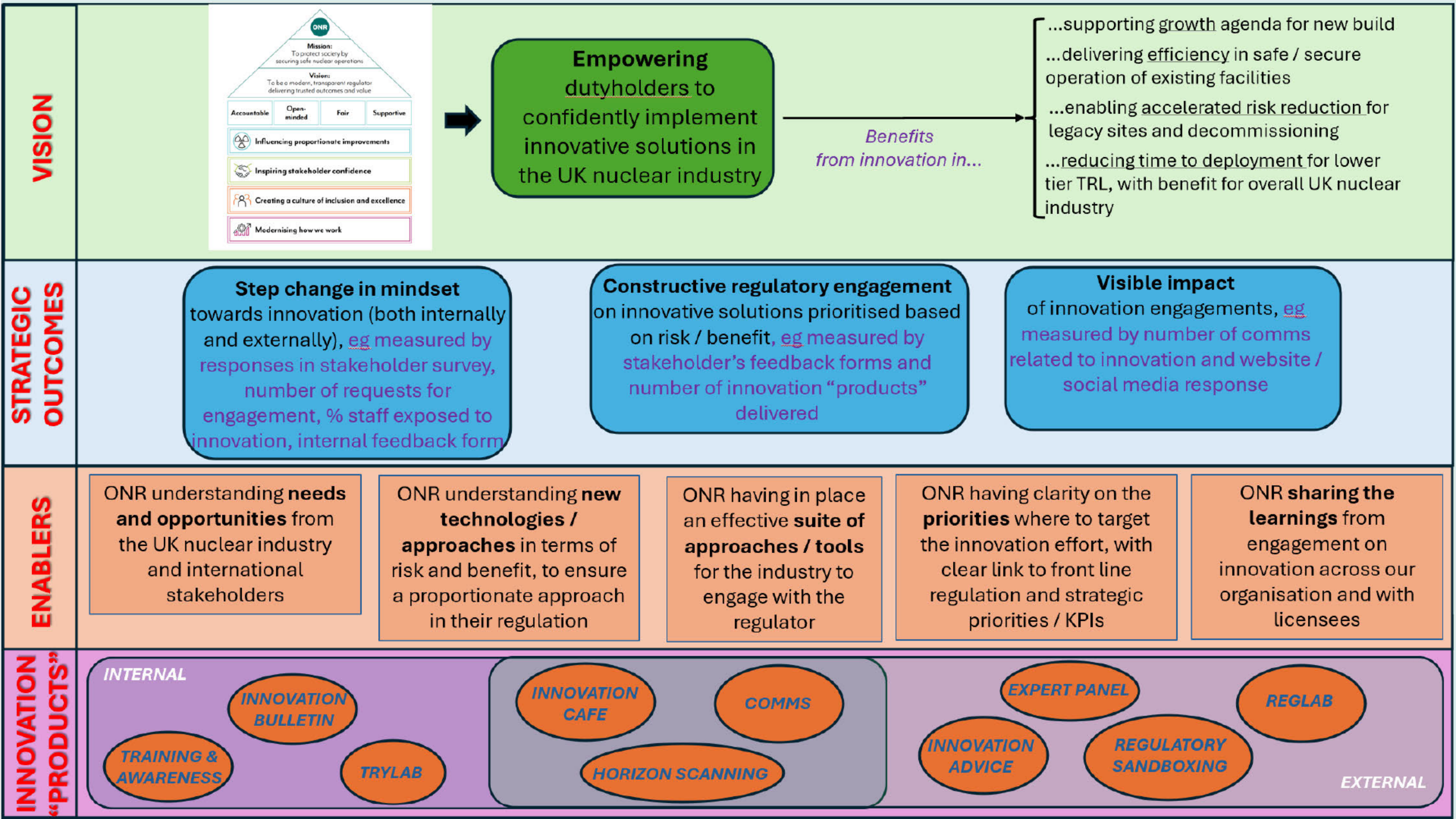
Open-minded



Fair



Supportive



Innovation engagement...

- ...provides an opportunity to:
 - Gain access to regulatory expertise,
 - Identify risk reduction mechanisms & approaches,
 - Reduce the cost & time of entry for innovation,
 - Allow regulators to test their arrangements,
 - Test technology & process innovation in a controlled environment, and
 - Inform future challenges / opportunities & develop capability within the sector.
- ...is not:
 - A short cut for existing regulatory processes.
 - A means of changing regulation, but may provide an opportunity to challenge & potentially improve existing practices.
 - An endorsement from regulators for a specific technology or process.

ONR / EA open to innovation

- Various opportunities to support innovation in the UK nuclear industry
 - e.g. horizon scanning on innovation
 - e.g. engagement on an innovative solution through one of the innovation "products"
- This RIO / DSIT project is one of the opportunities amongst others
- Focus on adding value through innovation
 - Responding to a need from industry (growth / efficiency)
 - Adding value from safety / security

For these reasons ONR / EA engage primarily through dutyholders on innovation

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Aim of the project

❑ Project's objectives

- To **accelerate the safe and secure deployment** of AI in nuclear installations, through engagement between nuclear regulators, licensees and AI experts on examples of high-impact applications to support the UK Government's nuclear industry ambitions; and
- To support a **responsible and gradual shift** of focus from applications with low autonomy and safety significance to beneficial applications of higher autonomy and safety / environment significance of failure

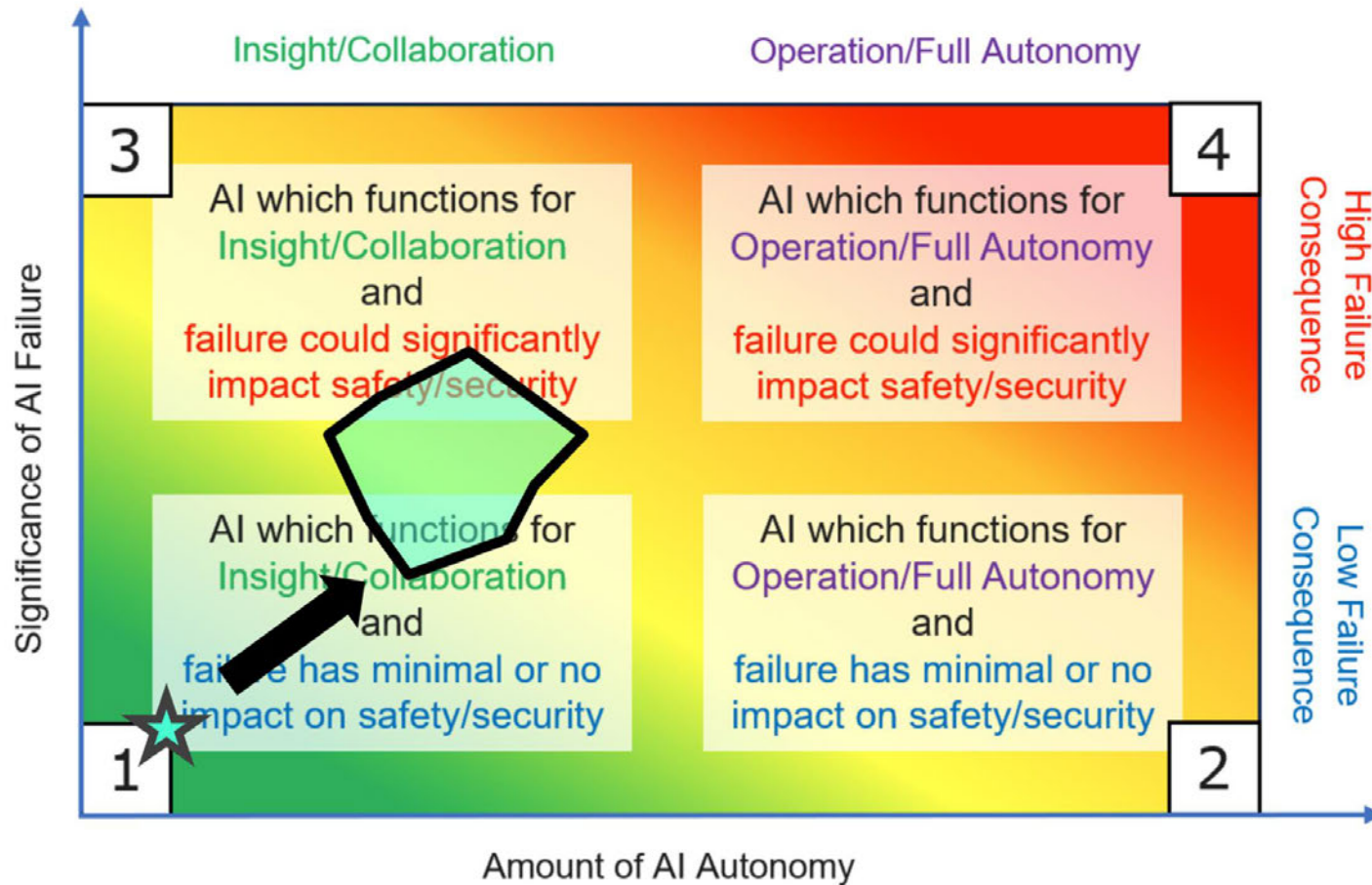
❑ Focus on two applications (relevance / benefit across directorates)

1. AI in non-destructive testing / radiography
2. AI in radioactive waste characterisation and management

❑ Longer term benefit

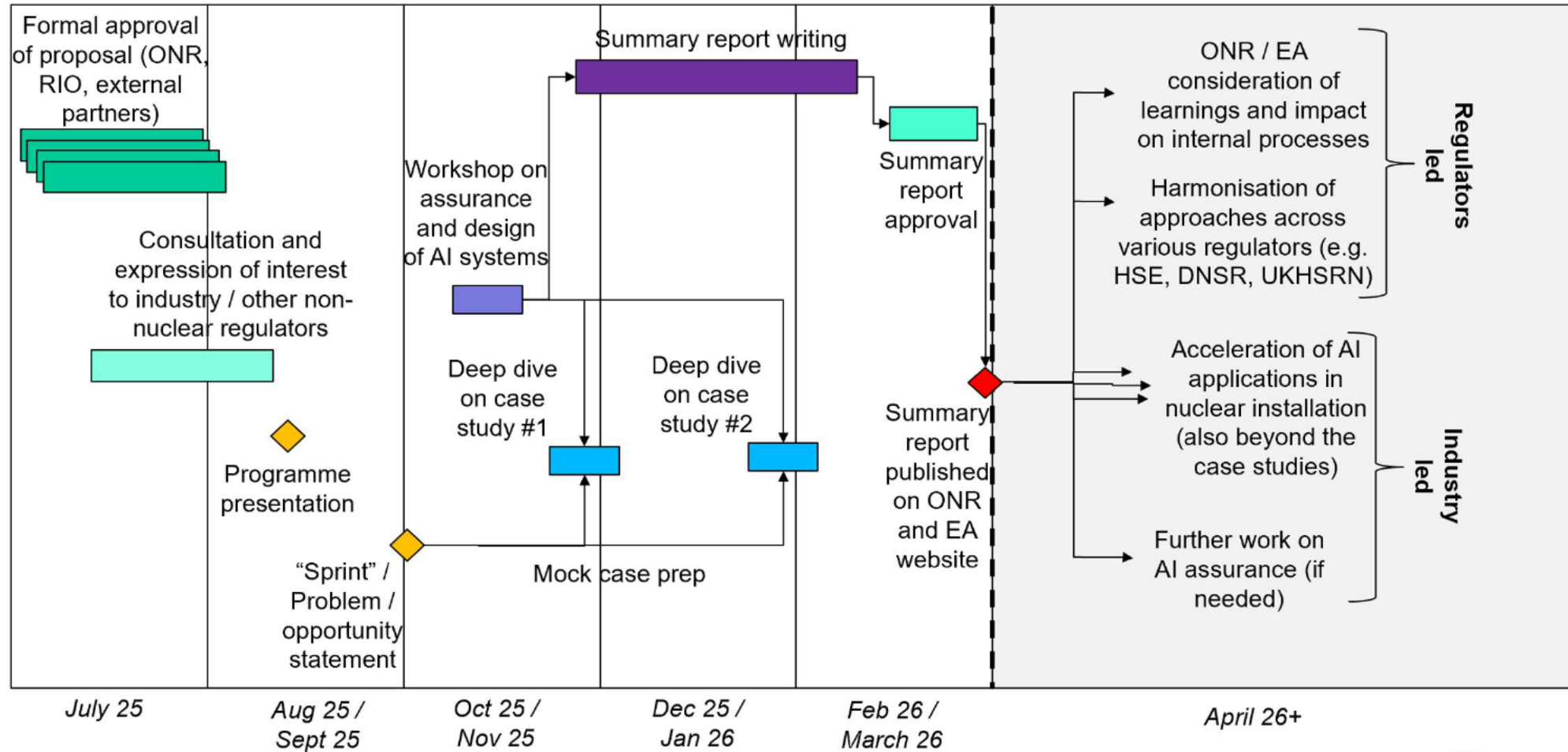
- ❖ Increase capability to support future AI applications
- ❖ Discuss enabling framework to support other applications

New opportunity: RIO / DSIT funding



- Support a responsible and gradual shift
- Safety, security and environmental protection remaining top of the priority
- Opportunities to support growth and efficiency

New opportunity: RIO / DSIT funding



How project aligns with RIO funding opportunity

- ❑ “Support or explore initiatives to develop the regulation of Artificial Intelligence in the UK.”
 - To develop, inform and enable nuclear regulators’ capability to regulate AI applications proportionately and effectively, by working with recognised experts in the sectors and other regulators on practical test cases in a safe environment (regulatory sandboxing).

- ❑ “Support or explore novel approaches to regulation through using Artificial Intelligence to improve outcomes i.e. for public safety, for economic growth.”
 - Through the test cases, to explore opportunities for nuclear regulators to reduce project risk in determining the regulatory readiness of new AI solutions in specific applications. This will encourage wider adoption of AI within the sector, which can help to improve regulatory services and compliance for the nuclear industry.

- ❑ “Support the initiatives set out in the AI Opportunities Action Plan.”
 - To support a number of actions from the above action plan, including action 25 (“regulators to scale up their AI capabilities”), action 27 (“regulators to accelerate AI in priority sectors and implement pro-innovation initiatives like regulatory sandboxes”) and 29 (“AI assurance ecosystem to increase trust and adoption by: Investing significantly in the development of new assurance tools”).

How project delivers sustainable benefits to nuclear industry

- ❑ Internal consideration in ONR and EA of the project learnings and opportunities to sustain safe and secure development of wider AI applications within the nuclear industry;
- ❑ Enhanced collaboration to share project learnings between different UK regulators to upskill the broader ecosystem and avoid fragmentation within and across sectors;
- ❑ Acceleration of other AI applications in nuclear installation (e.g., leveraging on the enablers identified as part of the regulatory sandbox or wider framework); and
- ❑ Consideration of further industry-led work on assurance of AI for nuclear applications.
- ❑ The final report, to be published on the ONR website, will contain the results of the deep dive and key learnings, which will provide benefit for the wider industry and regulators, and sustain a change in mindset for other AI applications in the nuclear industry. On completion of the project, the learnings from this activity will be shared internally with the wider inspector community and with senior management as appropriate, also considering any implications for ONR/EA internal processes and best practices. After closure, opportunities to present the learnings at future events will be considered to help sustain a change in the mindset on innovation in nuclear.

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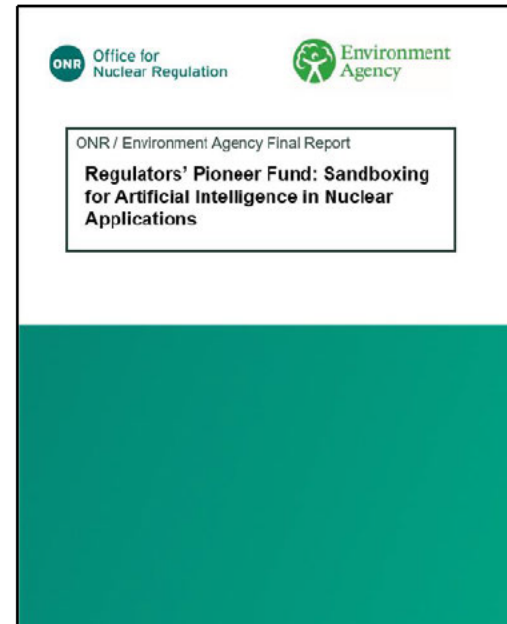
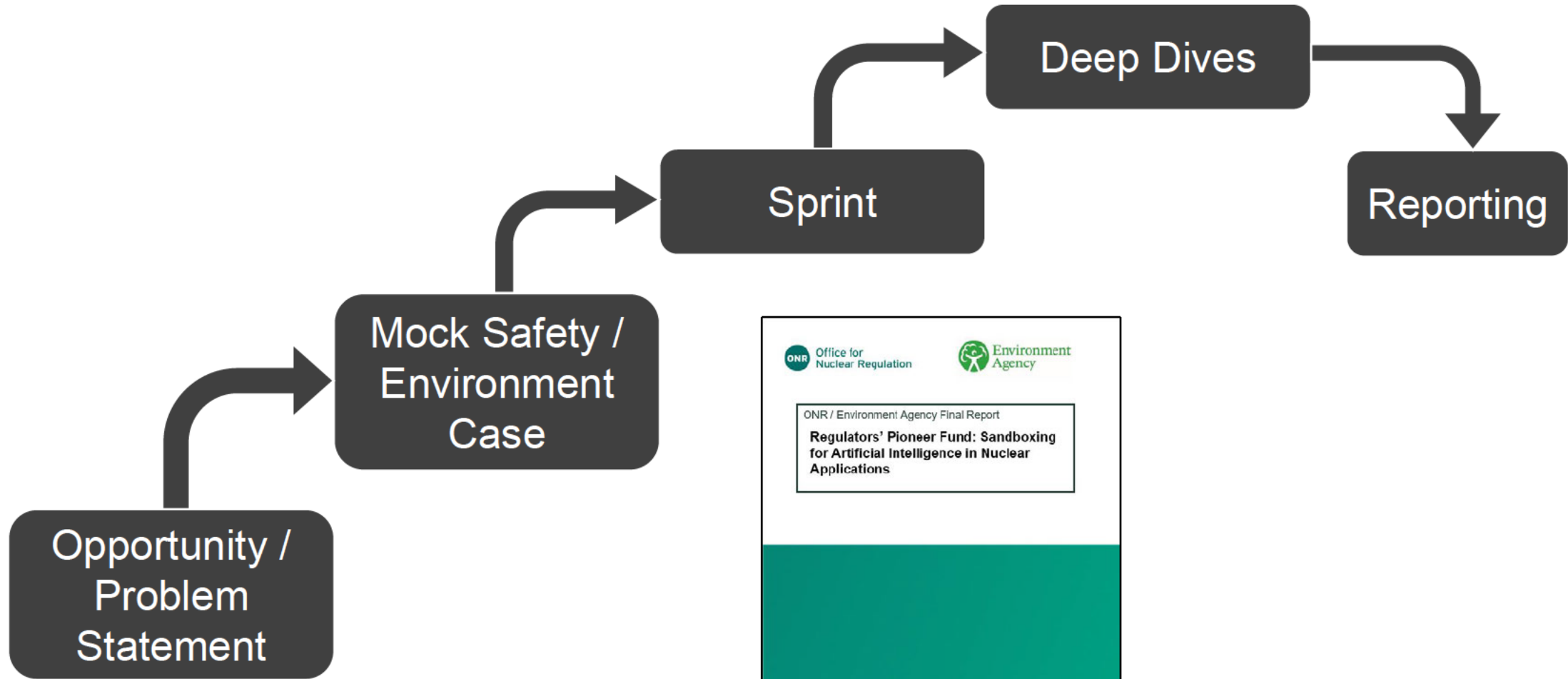


Innovation product: regulatory sandboxing

- What it is: practically explore perceived barrier to the implementation of a novel solution (typically for higher level TRL), considering the contextual information of an application
- How: a controlled real-life or realistic environment (digital, physical or table-top exercise) whereby regulators and industry collaborate to safely test and experiment with innovations. The intent of a regulatory sandbox is to explore how the sandboxed innovation can be regulated and safely deployed.
- Expected output: summary report on ONR website
- Examples:
 - ONR / EA regulatory sandboxing pilot [Outcomes of nuclear AI regulatory sandbox pilot published | Office for Nuclear Regulation](#)
 - International pilot on human decision making supported by AI <https://www.epri.com/research/products/000000003002031833>

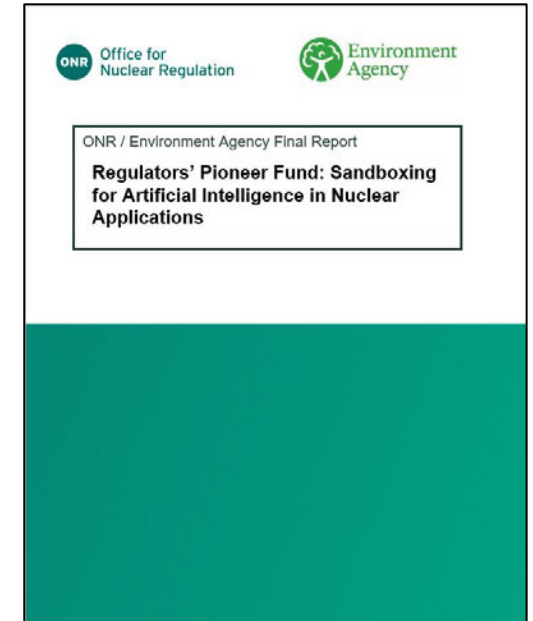


Innovation product: regulatory sandboxing



Key learning from ONR / EA regulatory sandboxing pilot

- ❑ Safe, collaborative space – developing a collective understanding
- ❑ Practical aspects, crux of issues – part of whole systems approach
- ❑ Identification of existing good practices and where further work needed
- ❑ Industry access to regulatory view
- ❑ Regulators gaining an understanding of an area of innovation



Key learning from ONR / EA regulatory sandboxing pilot

- ❑ Benefits of AI should be clearly articulated and compared with alternative (traditional) technologies
- ❑ Risks associated with AI need to be understood and managed through robust arrangements e.g.
 - The level of authority associated with the AI system
 - The level of safety, security and environmental significance
 - The level of continuous learning
- ❑ Deployment of AI systems should be phased in order to build confidence and experience
- ❑ Different considerations for different AI applications



Key learning from ONR / EA regulatory sandboxing pilot

- ❑ Substantiating AI difficult, instead consider & manage consequences of failure
- ❑ Performance of AI could still be monitored through understanding the systems functional requirements
- ❑ Transferring to a new operation or phase, it should be assumed the existing training data is no longer adequate
- ❑ Benchmarking the AI system should be considered, to indicate performance and operational envelope
- ❑ Hazard analysis needed for each potential deployment mode
- ❑ Important to understand the complexity of the human/system interaction



ONR / Environment Agency Final Report
**Regulators' Pioneer Fund: Sandboxing
for Artificial Intelligence in Nuclear
Applications**



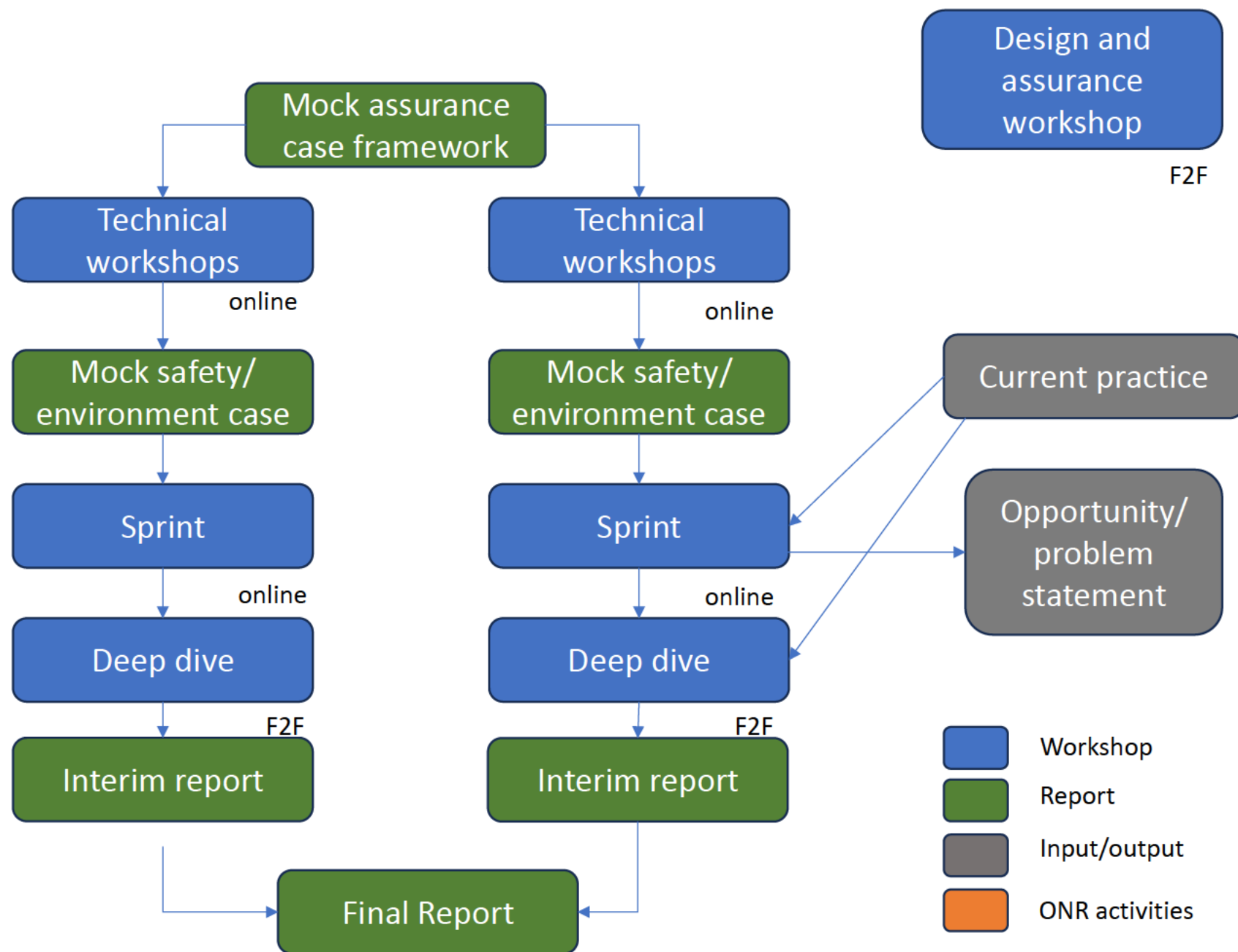
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ONR handbook for future regulatory sandboxing

Wider framework to enable other applications



Technical workshops

Objective

Understand

- Application area, current practice and current challenges
- Key requirements and available evidence
- Technical details of possible AI-based solution
- Safety, security and environmental impacts

Sprints

Objective

- Agreeing opportunity/problem statement
- Identify main opportunities and challenges
- Identify deep dive topics

Deep dives

Objective

- Develop strong fragments of the case in key areas
- Identify any 'show-stoppers' and discuss possible options to address them
- Identify what evidence is needed to support claim for this part of the mock assurance case
- Identify areas of focus for the regulator to further develop their approach to supporting AI justification
- Compare AI with non-AI solution in the context of BAT/ALARP
- Draw conclusions / observations on the safe and secure deployment of AI in the selected set of applications

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How to get involved: key principles

❑ Short duration of this opportunity

- Need to proceed at speed to realise the benefit **by March 2026**
- Prioritise projects where more credible, where support is available

❑ RIO / DSIT funding targeted to support regulators

- Nuclear regulators (ONR / EA)
- Non-nuclear regulators (HSE / DNSR)
- Contract support (AI expertise and project support)

❑ Fairness in selection of participants

- ONR reached out for expression of interest
- Responses from expression of interest shared with industry leads in each test case (waste characterisation and NDT)
- Selection of participants driven by with industry leads in each test case

❑ Sharing the learning at the end of the project

- Close out meeting
- Summary report on ONR's website

Key industrial partners

Radioactive waste characterisation

Sellafield Limited

- ai@sellafieldsites.com

Nuclear Restoration Services /
Nuclear Decommissioning Authority

- [Nuclear Restoration Services - GOV.UK](https://www.gov.uk/nuclear-restoration-services)
- innovation@nda.gov.uk

Non-destructive testing

Rolls Royce

- [Contacts | Rolls-Royce](#)

New build

- E.g. EDF Energy / SZC and HPC
(srw@edf-energy.com [REDACTED]
[REDACTED])

**Subject: “ONR / EA funding from
RIO / DSIT on acceleration of AI”**

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Questions & answers

- ☐ We will do our best to respond to your questions / suggestions
 - Encourage asking one question each to start with, to give space to different organisations
 - Also consider using the chat
 - In some cases, we may need to take away your point
- ☐ We will share the learning from this project
 - Summary report by end of March 2026
 - Close out project meeting expected in April 2026
- ☐ We are open to other opportunities to explore on innovation beyond this project

*(slides to be circulated at
the end of the meeting)*



Office for
Nuclear Regulation



Thank you!

Contact:

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