Office for Nuclear Regulation

Environment Agency

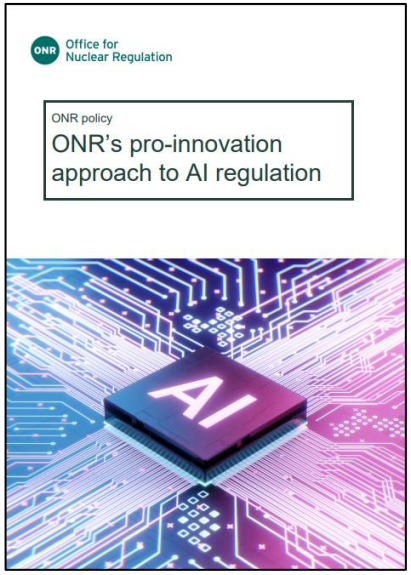
Progressing Regulation of AI in the Nuclear Sector

Andy White & Jake Surman

18 October 2024

ONR AI Regulation Strategy

- Understand what AI is and why it is different
- Determine how AI might be used
- Explore the potential benefits of AI
- Establish the challenges of the use of AI
- Recognise how we can use regulation to enable the nuclear industry to benefit from AI



Office for Nuclear Regulation

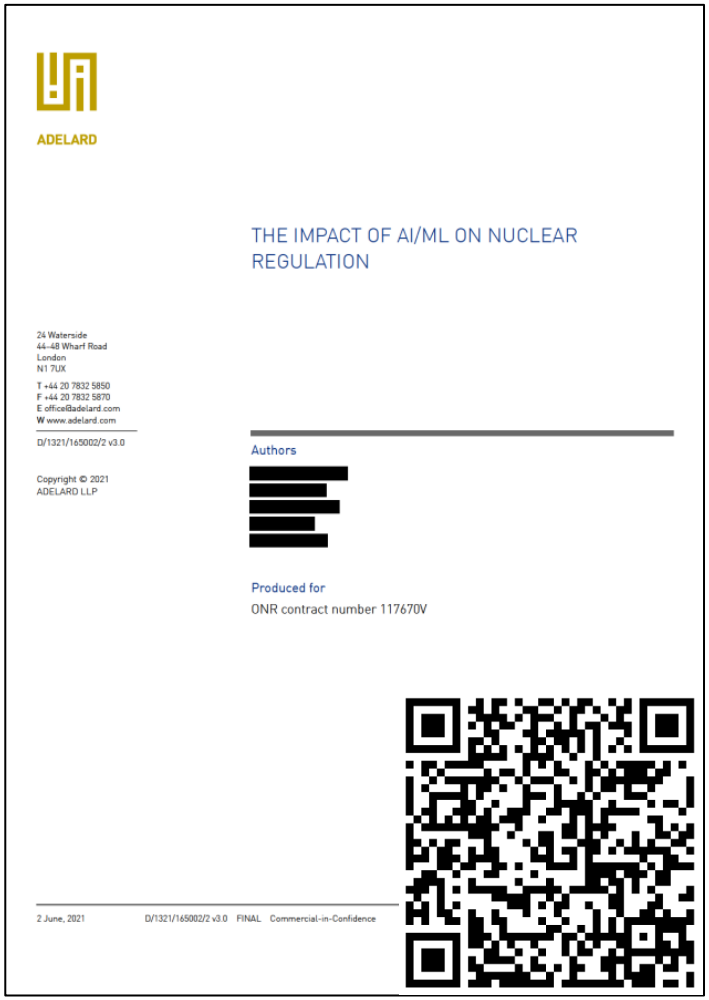
Environment Agency

ONR Research

Impact of AI / ML on nuclear regulation

Research considerations:

- Regulator capability and framework
- Evidence generation
- Data, architectural approaches, and cyber threats
- Standards development



ADELARD

THE IMPACT OF AI/ML ON NUCLEAR REGULATION

24 Waterside
44–48 Wharf Road
London
N1 7UX

T +44 20 7832 5850
F +44 20 7832 5870
E office@adelard.com
W www.adelard.com

D/1321/165002/2 v3.0

Authors

[redacted]

Produced for
ONR contract number 117670V

2 June, 2021 D/1321/165002/2 v3.0 FINAL Commercial-in-Confidence

We concluded our regulatory approach is fundamentally sound for regulating AI

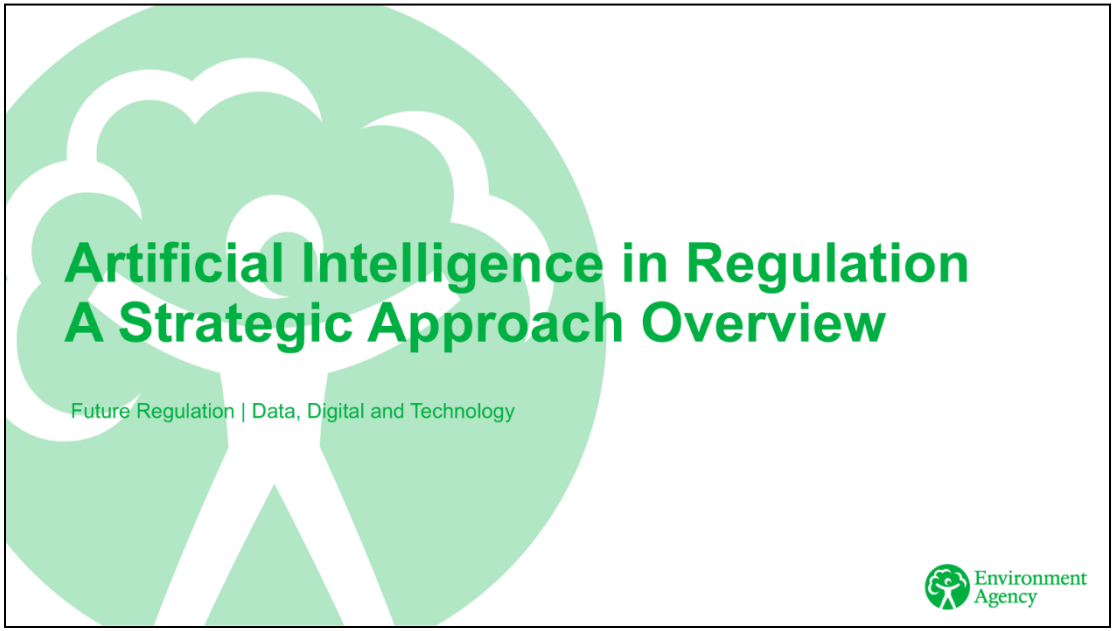
Office for Nuclear Regulation

www.onr.org.uk/documents/2021/onr-rrr-121.pdf

Environment Agency

Environment Agency AI Regulation Strategy

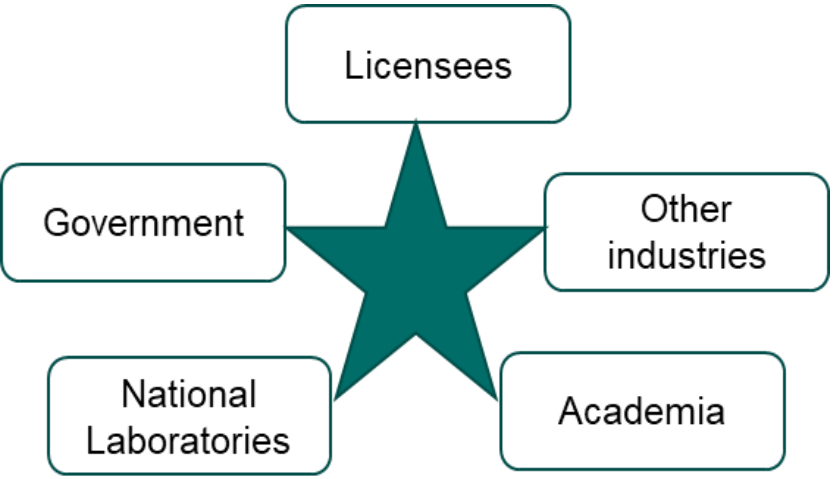
- In development



Expert Panels & Sandboxing

AI Regulatory Sandbox

AI Expert Panels



Office for Nuclear Regulation

Environment Agency

ONRs current regulatory position on AI

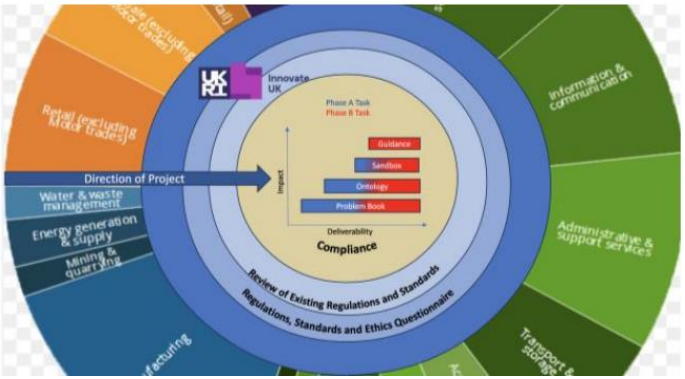
- AI cannot currently be relied on solely for safety, where there are significant consequences (also aligned with HSE).
- AI cannot be proved to be safe solely by testing
- If AI is not used, this will be a missed opportunity to reduce risks to people and the environment.
- AI can be used to improve safety and security, with appropriate controls, e.g.
  - Analysing maintenance data to gather insights
  - Surveying hazardous areas – Spot the dog
  - Sorting and segregating waste – increasing throughput, reducing dose to operators
  - Using robots to manipulate nuclear materials in gloveboxes, reducing risks to operators
  - Etc.

Working with the nuclear industry

- Individual operators / licensees
- AI for Nuclear
- RAICo: Applied AI Safety Summit
- NDA Robotics and AI Centre of Expertise
- Control and Instrumentation Nuclear Industry Forum (CINIF)
- …

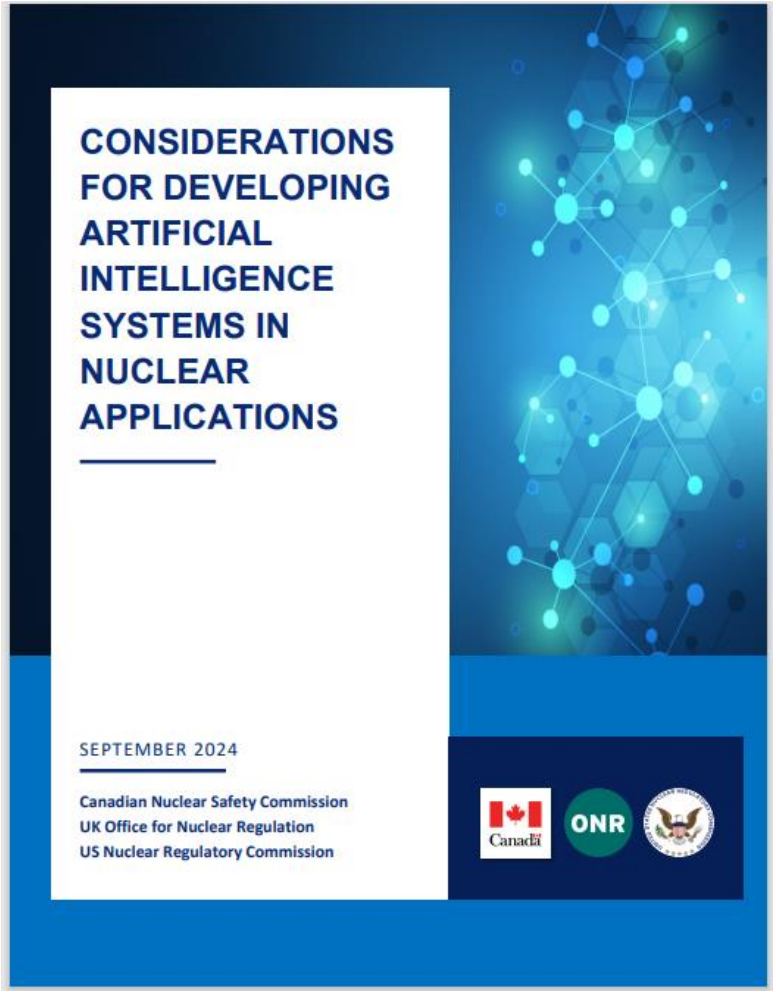
Cross-sector regulation working

- UK Health and Safety Regulator Network: Innovation Sub-group
- National RAS Standards, Regulation & Ethics Committee
- AI Standards (ATI)



International Collaboration

- CANUKUS Paper
- IAEA
- NEA
- ICRP

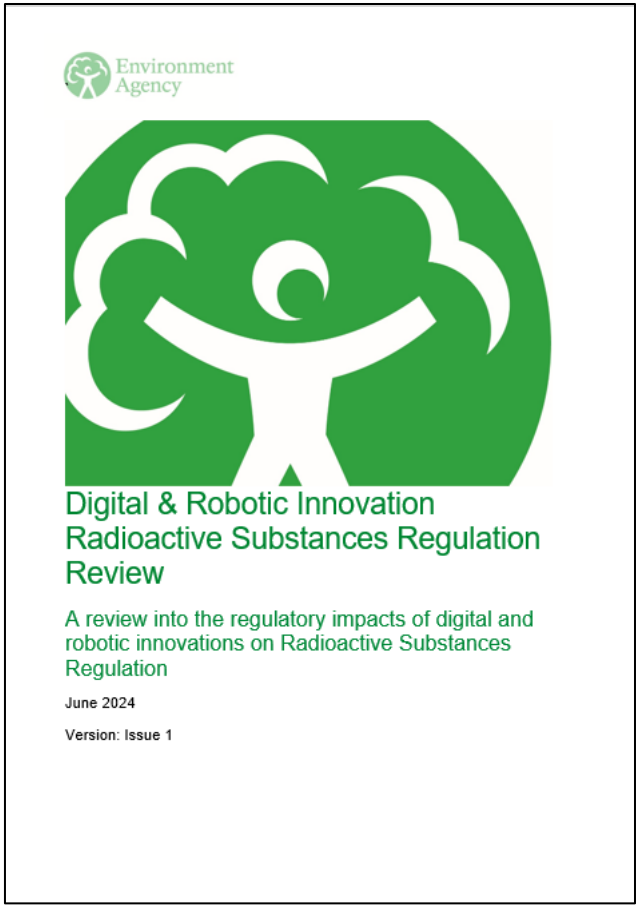


Environment Agency Research

Digital & Robotic Innovation: RSR Review

Research covered:

- Review of work to date
- Landscape review
- Review of guidance & permit conditions
- Review of regulatory capability needs



Further ONR Research

Phase 2 of research into AI

Output:

Public report which will be used to inform ONR policy

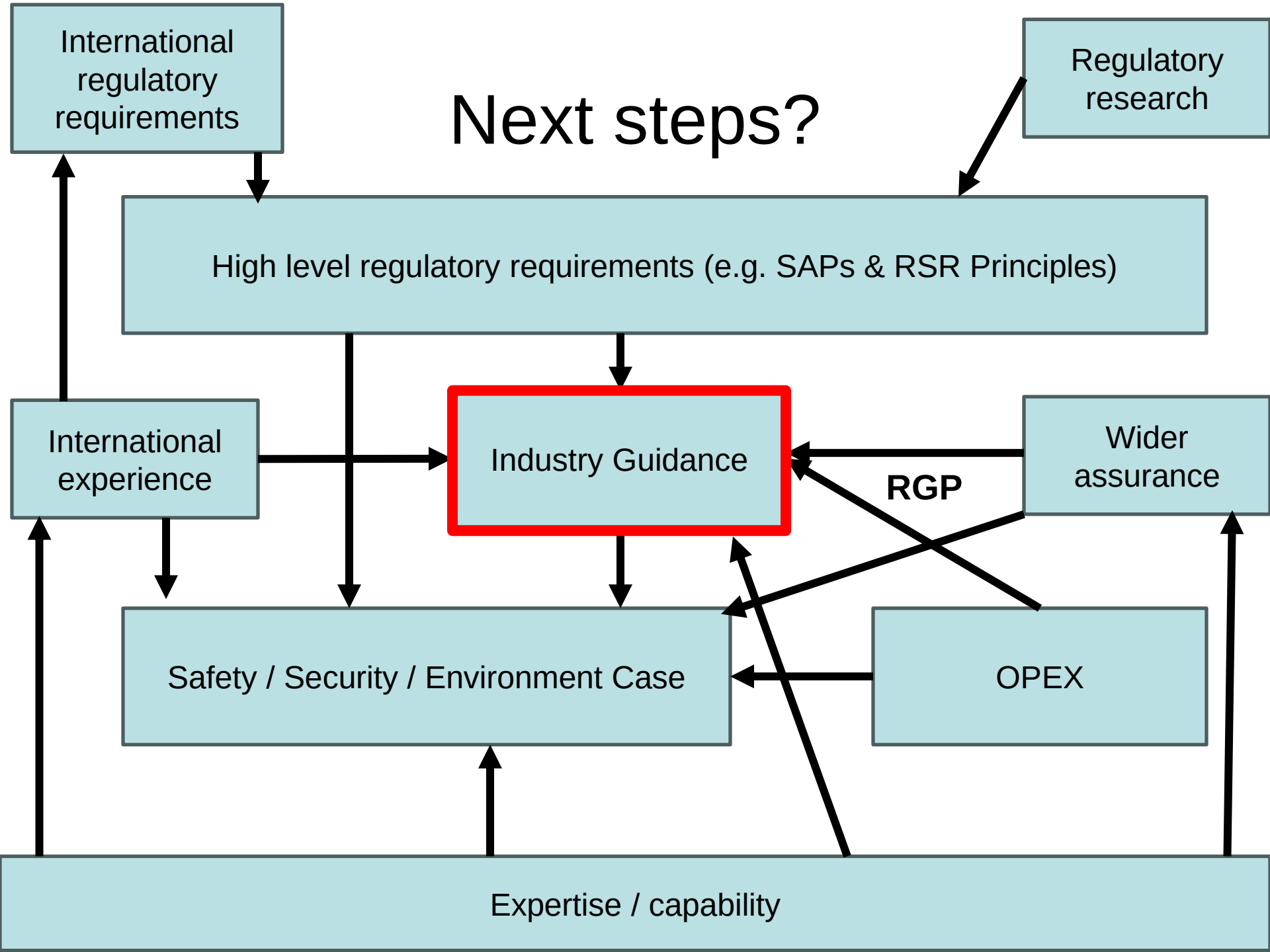
Covering:

- Characterise attributes of different applications

Technical and Human Factors

- Determine sensitivity to AI limitations and failures
- Develop a route map to enable use of AI whilst managing risks

Next steps?


International regulatory requirements
Regulatory research
High level regulatory requirements (e.g. SAPs & RSR Principles)
International experience
Industry Guidance
RGP
Wider assurance
Safety / Security / Environment Case
OPEX
Expertise / capability

Next steps?

‘Turning principles into practice for how UK nuclear organisations can get ready for the safe use of AI’

Or

‘Management and Leadership for Safety for the Deployment of AI on UK Nuclear Sites’

How UK nuclear organisations can get ready for the safe use of AI

Existing regulatory principles relevant to the deployment of AI include :

- Nuclear safety culture / environmental safety culture
- Personal accountability
- Staff competency and knowledge
- Effective supervision & oversight
- Intelligent customer expectations
- Transparency of decision making
- Defence in depth
- Human factors
- Appropriate standards
- Reliability
- Control & Instrumentation for protection measures
- Control of modifications

Benefits

- Shared vision
- Meaningful collaboration
- Manageable task
- Clear message that regulators are not unnecessary barriers or blockers…and challenge if you think they are!
- Help to galvanise support
- International leadership

Any questions?

Andy White:
andy.white@onr.gov.uk
Jake Surman:
jake.surman@environment-agency.gov.uk