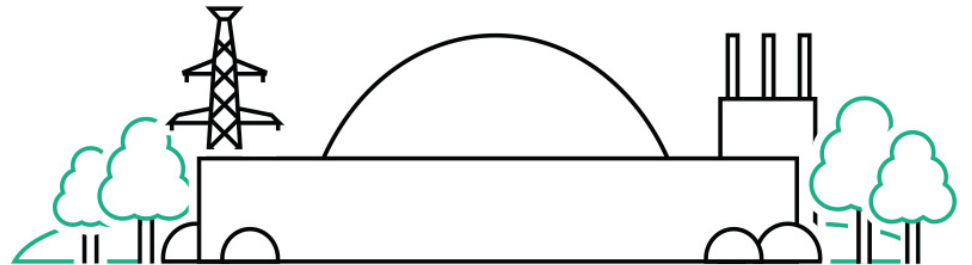USNRC Workshop Artificial Intelligence - Session #4
Characteristics for Regulatory Consideration

Regulatory Perspectives on AI

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# Objectives of this presentation

- Give a view on the uses of Artificial Intelligence in the nuclear industry

- What ONR has been doing on AI so far

- Can Artificial Intelligence be safe?

- Can Artificial Intelligence be regulated?

- A few conclusions so far

Artificial Intelligence – potential uses in the nuclear industry

- Artificial Intelligence (AI) has been proposed for everything from analysis of maintenance data to interpretation of hand gestures in a nuclear power plant control room!

- AI can provide insights that are currently not visible by existing means, enabling activities to reduce risks and better manage nuclear facilities (and save money).

- However AI is not tried and tested, and is likely to present new risks.

- ONR asked the questions:
  - Can AI be safely used in the UK nuclear industry?
  - Can AI be regulated?

Artificial Intelligence – What has ONR done so far?

- ONR commissioned a research report - see link, to ask whether the UK regulatory approach was suitable to regulate AI.

- Outcome – Yes, but a few enhancements would be beneficial in the areas of:

  - Human Factors

  - Guidance

- Engaging with other UK regulators in the diverse areas – Air Traffic Control, Maritime, Financial Services, etc.

- Participating in activities to encourage the development of standards and guidance.
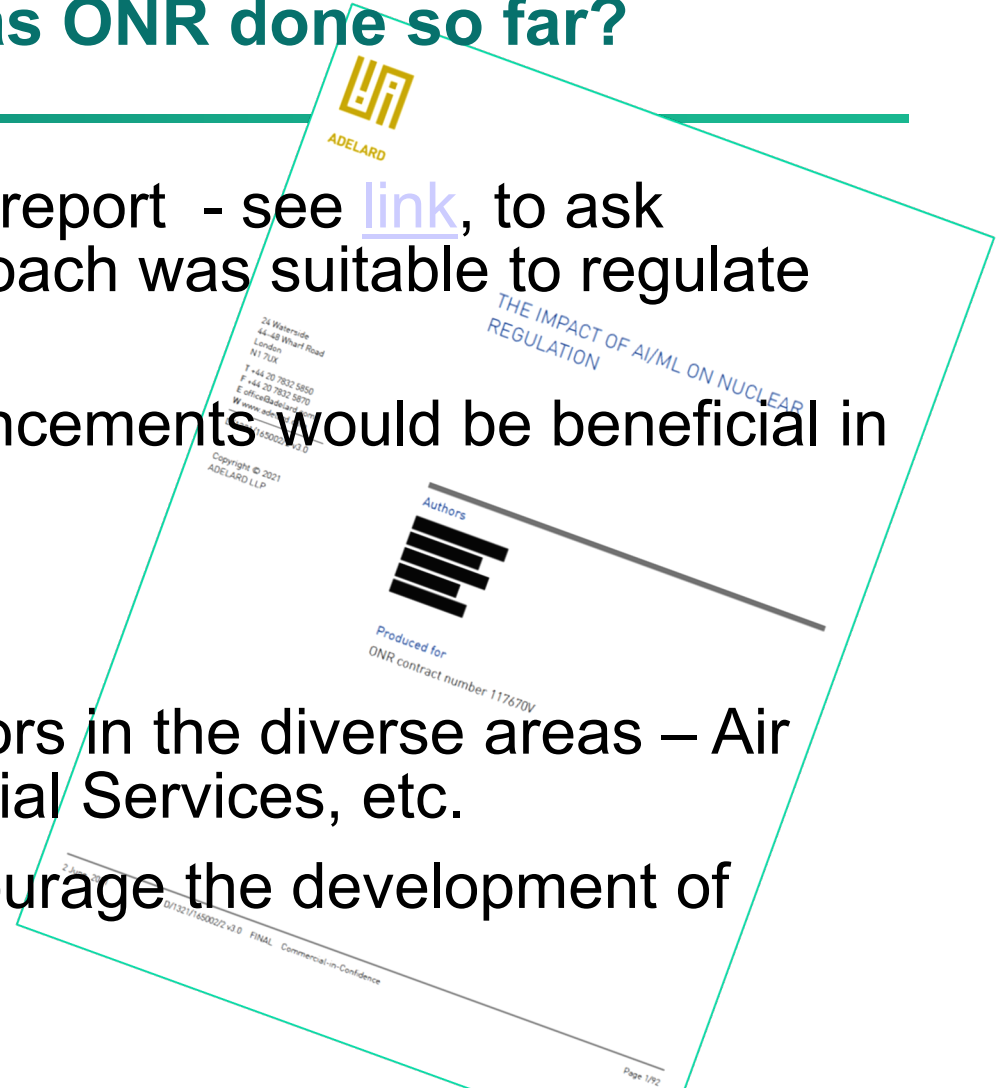
Artificial Intelligence – What has ONR done so far?

- ONR has undertaken a non regulatory review of a system containing AI.

- ONR has considered two applications of AI using the regulatory sandboxing approach:

  - Use of AI to detect flaws using non-destructive testing techniques.

  - Use of AI to control a robot within a glovebox.

- ONR is jointly developing a paper on the regulation of AI with the USNRC and CNSC.

- ONR will be chairing an IAEA workshop on the use of AI in safety applications in October.

Artificial Intelligence – Can AI be regulated?

- Yes, <u>in the right applications</u>, for example:
    - Where the risks to safety and security can be tolerated
    - Where the risks to safety and security can be managed

Why?

- Because there are many ways to do the above
- The UK nuclear regulatory approach has the flexibility to accommodate working without standards if the licensee can justify adequate safety and security has been achieved.

Artificial Intelligence – Can AI be safe?

- Where the risks are small, can get the benefits of AI whilst tolerating the risks.

- Where the risks are larger - could:

  - Make decisions offline

  - Use conventional systems to manage risks

  - Build in validation approaches that detect failure of AI

  - Use architectural approaches to contain failures

  - etc.

- But – very dependent on the application, and don't forget the effect on people.

Artificial Intelligence – Conclusions

- AI has the potential to bring many improvements to the nuclear industry that will directly and indirect enhance safety and security.

- The risks posed by AI need to be identified, understood and managed.

- Regulators need to lead from the front to enable the benefits of AI to be achieved, providing assurance that system developers need.

- It is important that safety and security is considered at the concept stage, and how this will be demonstrated.

- Reliance solely on testing to justify safety is very unlikely to be an acceptable approach in the UK.