Cooperation on Artificial Intelligence

CANUKUS AI Principles

WINS Presentation
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Laura Lynne Churchill
Canadian Nuclear Safety Commission

OUTLINE

- Background on Individual Agency AI Activities
- CANUKUS AI Trilateral Background
- AI Principles Paper Overview
- Path Forward

CNSC and DIET

- Disruptive, Innovative, Emerging Technologies (DIET)
  - CNSC's DIET Working Group and its Innovation Hub enables greater sharing of innovation, internally and externally
  - Acts as first point of contact for industry innovation
  - Topics include AI, fusion, digital twins, drones, robotics, additive manufacturing, etc. .. .

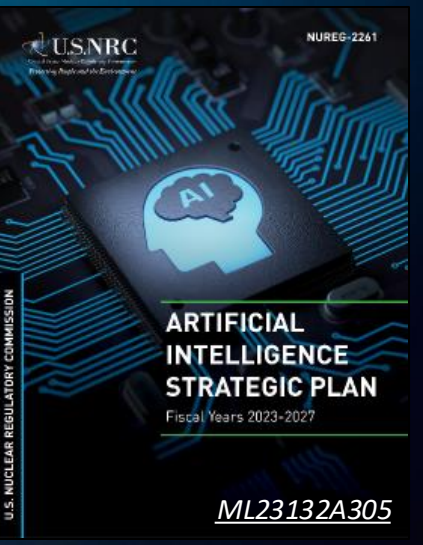
CNSC AI Activities

- Collaboration
  - Seminars from external presenters, internal communication, and DIET sub-groups
  - Engagement with other Canadian regulators, IAEA, NEA, CSA Group (Canadian Standards Association), Canadian labs and Canadian Nuclear Society (CNS DIET2024 Conference, Nov 27-29, 2024)
- Research on AI regulation
  - R760.1 A Study for the CNSC on AI Applications and Implications for the Nuclear Industry (April 2023)
- Future activities
  - Gathering intelligence, assessing DIET readiness, build innovative culture, ensure knowledge management, and continue external engagement (Industry engagement, IAEA, NEA, regulatory counterparts, etc.)

UK ONR AI Activities

- Research on regulation to manage AI risks
  - ONR-RRR-121 (June 2021) + new research (commencing October 2024)
- Collaboration
  - Other UK regulators, licensees, internal specialisms, academia
  - Chair IAEA AI Safety Working Group, Alan Turing AI Standards forum
- Sandboxing
  - Test realistic applications against ONR regulation, test ability of AI to be used in nuclear safety applications, and pilot use of regulatory sandbox
  - Outcomes of nuclear AI regulatory sandbox pilot (November 2023)
- Future activities
  - IAEA participation, sandboxing, guidance, and growing skilled inspectors

US NRC AI Activities



AI Research Priorities

- Regulatory framework applicability assessment
- Survey AI tools and methods for safety evaluation
- AI use cases for regulatory framework
- AI standards identification
- AI partnerships

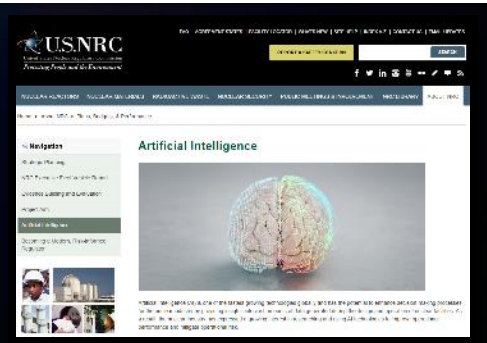
AI Regulatory Workshops*

- Scoping AI characteristics and regulatory considerations (2023.09.19)
- Regulatory gaps and considerations (2024.09.17)

AI Organizational Framework

- Internal NRC AI Steering Committee
- Internal NRC AI Community of Practice

NRC AI Webpage



*https://www.nrc.gov/public-involve/conference-symposia/data-science-ai-reg-workshops.html

CANUKUS Trilateral Background

- CNSC/UK ONR/US NRC established a trilateral relationship in March 2022 to share knowledge and discuss disruptive, innovative and emerging technology (DIET)
- Three regulators agreed to work together to produce and publish a trilateral AI principles paper
- Working group organized in November 2022
  - CNSC: Kevin Lee, Senior Regulatory Policy Officer
  - UK ONR: Andy White, Superintending Nuclear Inspector, Electrical and Control & Instrumentation
  - US NRC: Matt Dennis, Data Scientist

CANUKUS AI Principles Paper

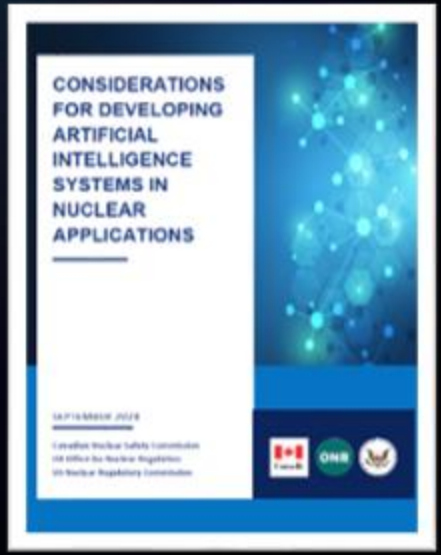
- Purpose: Collaborate on a joint AI principles paper to establish a common set of overarching principles for the use of AI technologies in nuclear activities
- Objective: The CANUKUS trilateral AI principles paper covers considerations for nuclear-related systems containing AI
- Outcome: The AI principles paper describes important topics that should be considered when deploying AI to ensure continued safe and secure operation of nuclear facilities

AI Principles Paper Outline

1. Introduction
2. Country-specific regulatory philosophies and perspectives
3. High level categories for AI use cases in nuclear applications
4. Considerations for developing systems containing AI
5. Conclusion
6. Further reading (links to useful documents, etc.)
7. Annex (relevant standards and guidance across regulatory areas)

Considerations for Developing AI Systems in Nuclear Applications

- Use of existing safety and security systems engineering principles
- Human and organisational factors
- AI architecture in nuclear applications
- AI lifecycle management
- Documenting AI safety and security



Trilateral AI Publication

- Trilateral social media announcement occurred on September 5, 2024
- Trilateral AI principles paper published on respective agency websites:
  - CNSC
  - ONR
  - NRC

Proposed Future CANUKUS AI Activities

- Following publication, considering initiating new trilateral AI paper:
  - Build on the CANUKUS AI principles paper and IAEA publications
  - Elaborate on how the three regulators are still aligned
  - Delve into some areas of AI paired with other topics such as:
    - Digital twins / virtual reality
    - Drones and robotics
    - Remote operation
    - Security considerations

Conclusion

- Observations from fruitful and productive trilateral engagement
  - Recognition that AI is similar to other previous innovations
  - We have faced innovative technologies in the past and integrated those into suitable engineered systems to manage risks
  - Recognition that we are grappling with areas of uncertainty
- Maintaining adequate safety and security is fundamental
- Global cooperation among entities is paramount to ensure efficient, safe, and secure adoption of this emerging technology

Staff Contact Information

- **Kevin Lee**
  Senior Regulatory Policy Officer, DIET Lead
  Innovation and Research Division
  Canadian Nuclear Safety Commission
  Kevin.Lee@cnsc-ccsn.gc.ca

- **Andrew White**
  Superintending Nuclear Inspector
  Head of Profession for the Electrical and Control & Instrumentation Engineering Specialism
  U.K. Office for Nuclear Regulation
  andrew.white@onr.gov.uk

- **Matt Dennis**
  Data Scientist
  Office of Nuclear Regulatory Research
  U.S. Nuclear Regulatory Commission
  matthew.dennis@nrc.gov