# AI FELIX, a Quest for Innovation in Artificial Intelligence in NATO

## Operations Research and Analysis Conference 2020

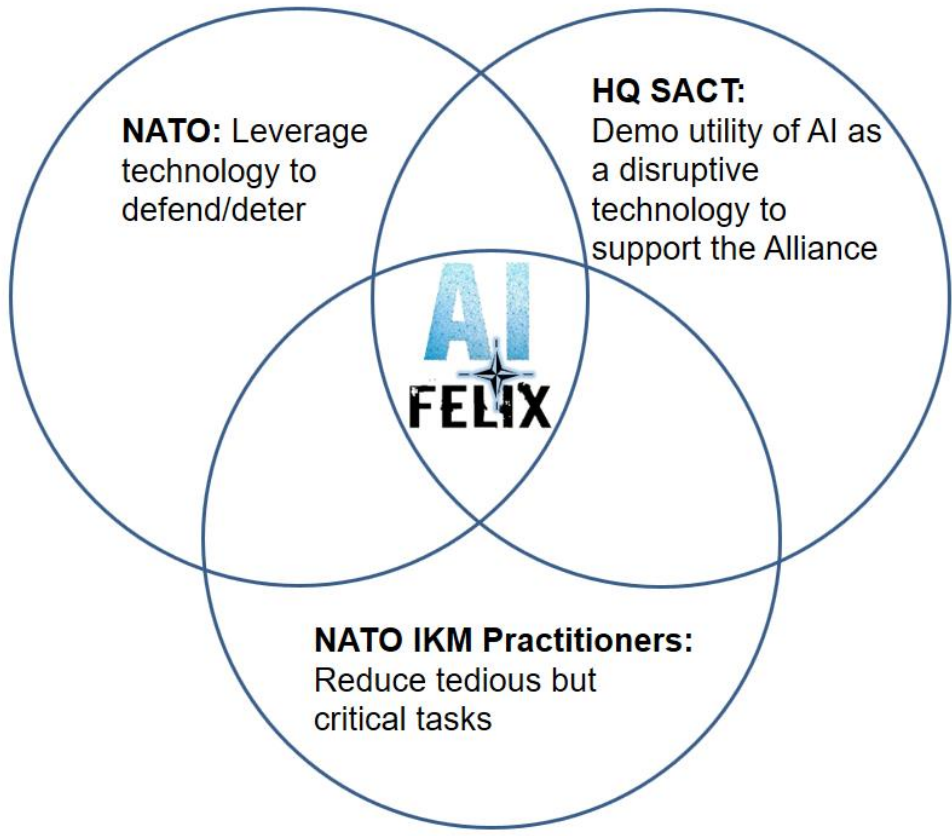Arnau Pons, Simon Purton, Michael Martin, and Sean Lewis

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# Outline

- Why AI FELIX?

- Trends of Artificial Intelligence

- AI FELIX

  ➢ Evolution of the project

  ➢ Lessons learned

- Innovating with AI in NATO

  ➢ DevSecOps

  ➢ Framework for innovation

- Conclusions

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# Why AI FELIX?



**NATO:** Leverage technology to defend/deter

**HQ SACT:** Demo utility of AI as a disruptive technology to support the Alliance

**AI FELIX**

**NATO IKM Practitioners:** Reduce tedious but critical tasks

- Age of information

- Artificial intelligence revolution

- Knowledge management needs

- Experimenting with new tech

- Minimum Viable Product (MVP)

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# Trends of Artificial Intelligence



Accuracy increases with training dataset size [2]
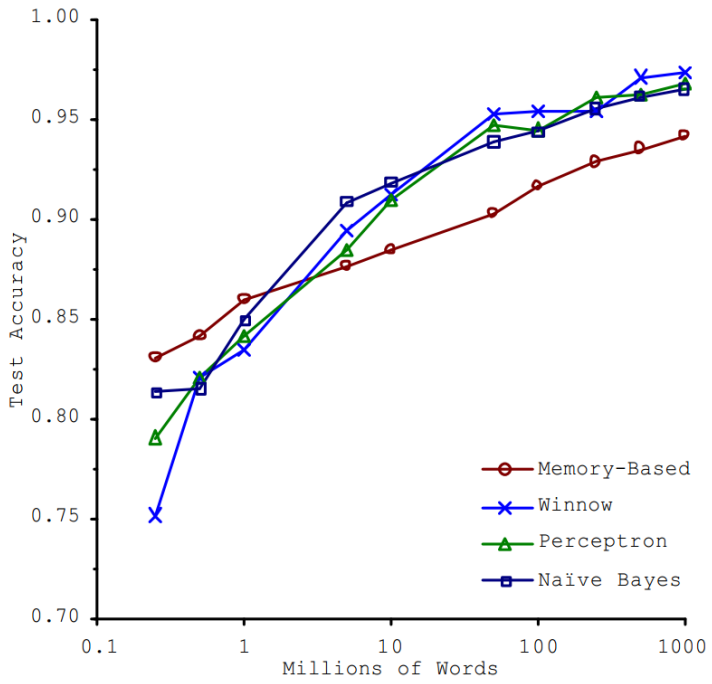
- AI software development growing 42% annually[1]
- Pace of technological disruption increasing over time
- Scale matters
- To leverage AI:
  - Advanced algorithms
  - Large amounts of data
  - High performance computing

*"It's not who has the best algorithm that wins. It's who has the most data".*

Andrew Ng

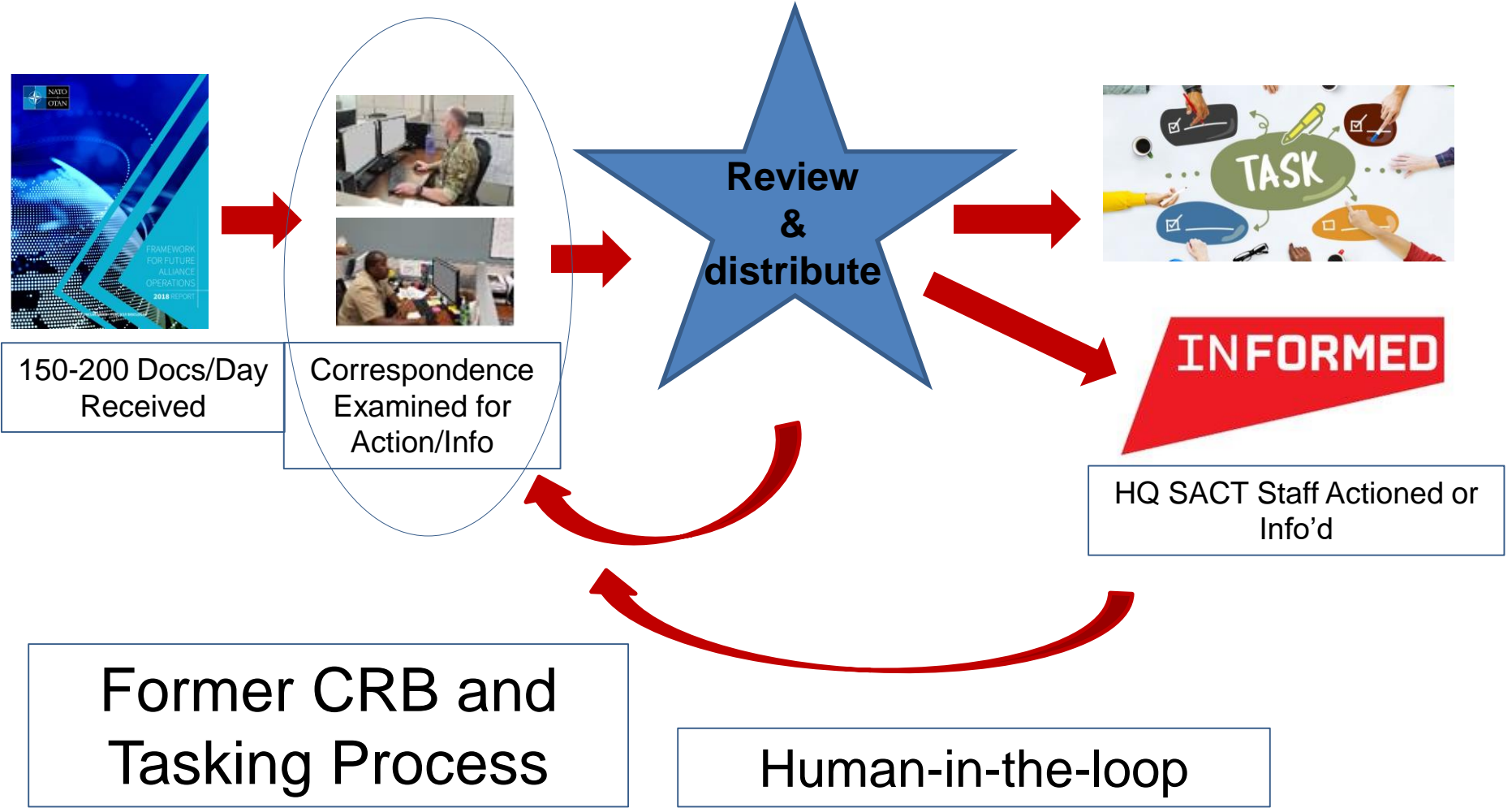[1] Morgan Stanley, https://www.morganstanley.com/ideas/fourth-industrial-revolution

[2] Banko, M., Brill, E., *Scaling to Very Very Large Corpora for Natural Language Disambiguation.* Proceedings of the 39th Annual Meeting on Association for Computational Linguistics, pp. 26-33, Toulouse, France, 26-11 July, 2001.

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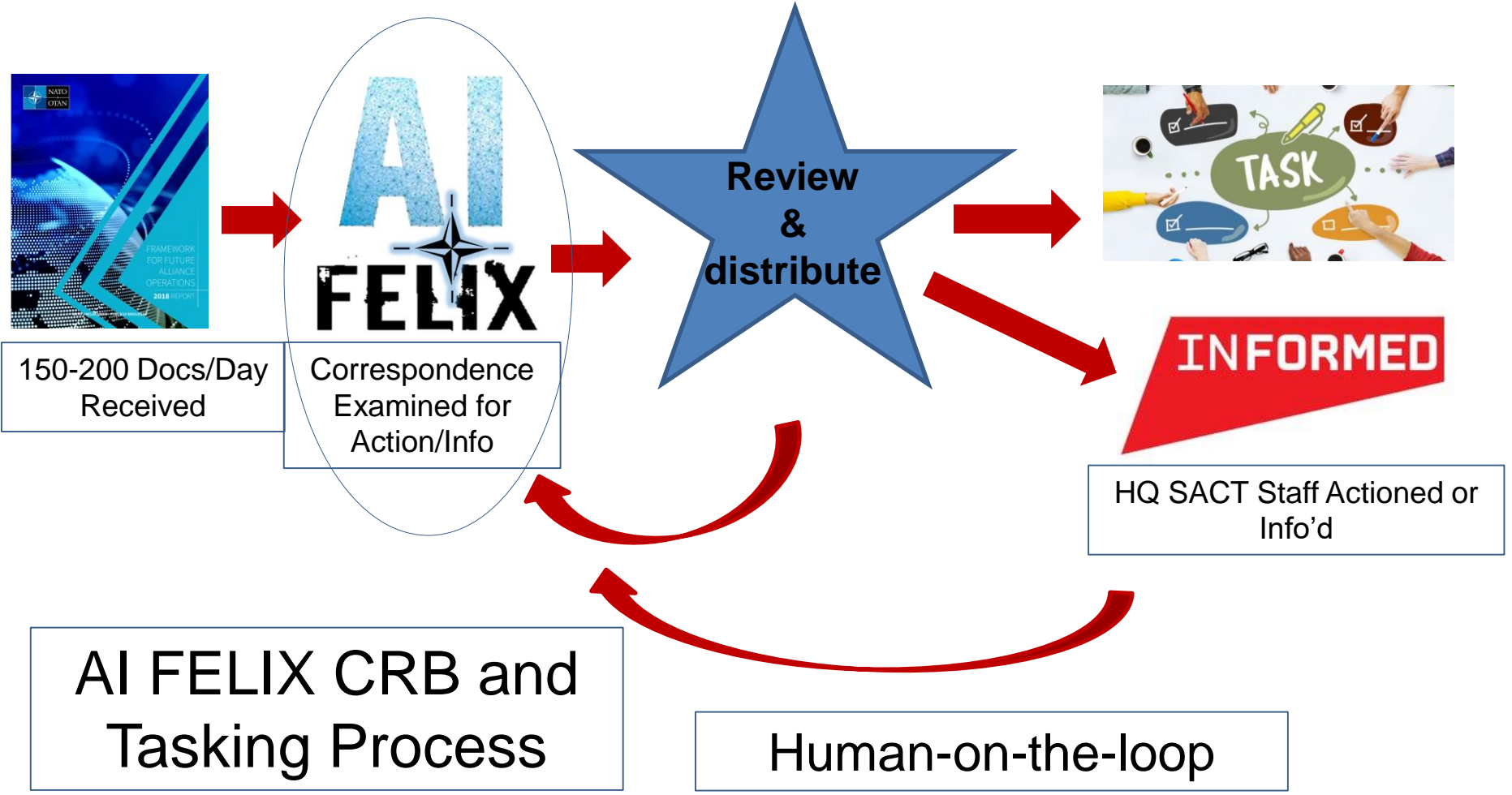
# What is AI FELIX?

- **AI FELIX:** Artificial Intelligence Front End Learning Information Execution

- Leveraging Artificial Intelligence to develop a Minimum Viable Product that uses machine learning to reduce the staff effort currently assigned to the HQ SACT Command Read Board (CRB) internal management process

- Cross Functional DCOS RM / DCOS CD / DCOS JFD Experiment

- Winning Innovation Challenge from I3 week (November 2018)

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# Overview of the Initiative



150-200 Docs/Day Received

Correspondence Examined for Action/Info

Review & distribute

TASK

INFORMED

HQ SACT Staff Actioned or Info'd

Former CRB and Tasking Process

Human-in-the-loop

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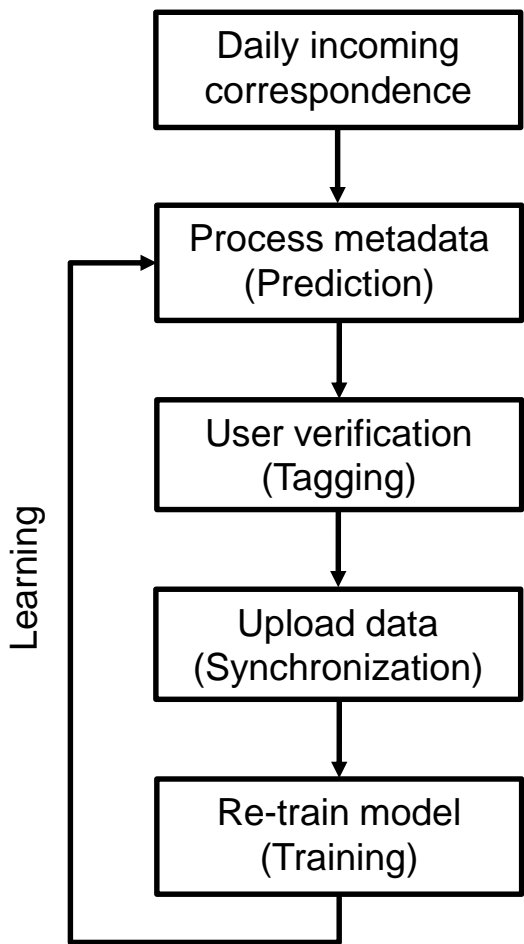
# CRB Machine Learning process



- Document metadata: dates, addressees, security classification, topics, keywords, etc.

- Average processing time: 27 seconds

- Accuracy levels on the order of 90-100% in several metadata fields

- Accuracy improves over time

- 80% processing time reduction → Users can focus on complex tasks

- Interoperable with EDMS[*] and TT+[*]

[*] NATO has a number of knowledge management tools, such as the Enterprise Document Management System (EDMS), Tasker Tracker Plus (TT+), and the NATO Information Portal (NIP).

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# Tasking Portfolio Management

- Tasking Portfolio Management is the second AI FELIX App
- This tool provides different views of taskers within a NATO command:
  - Top View: agile dashboard for assessing overall taskers status
  - Detailed View: timeline, performance metrics, and risk of a tasker
  - Lines of Effort: how does a tasker fit in the overall lines of effort
- Quantitative analysis and performance metrics
- Automatically predicts timeline of a tasker
- Near-real time analysis and tracking of taskers progress
- Automatically send alerts and reminders to personnel to mitigate risk of a tasker being late
- Change in TKM business processes paradigm: preventive not reactive
- Informing leadership with objective and accurate metrics of status of work

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# Knowledge Wingman

- Fuses multiple isolated data sources to enhance information flow and knowledge management

- Compares a document that the staff officer is working on with other documents from NATO enterprise document libraries, as well as presenting the user with similar relevant documents

- Generates a document tree that searches for the referenced documents along with their version history over time

- Auto-tagging capability for individual or multiple document upload that suggests machine learning predicted metadata for the user

- Based on the user interests, job position, and document library, Knowledge Wingman provides a reading list of documents that are of interest to the user as well as related training courses

- Daily digest email with three Command Read Board documents related to the interests of the user

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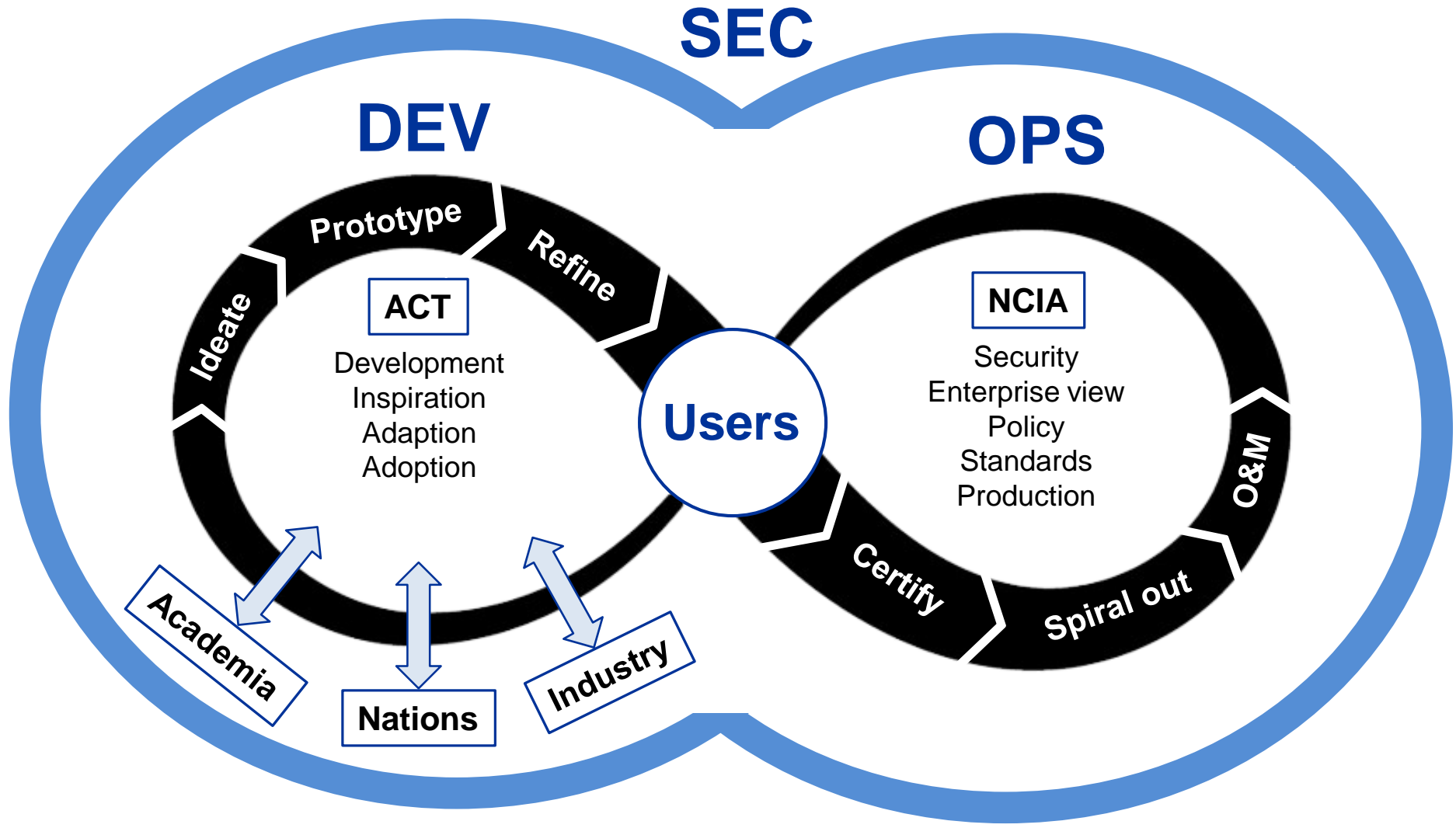
# Lessons learned

- Funding for AI-enabled ventures

- Start small, aim big

- Embracing fluid requirements

- User at the centre

- Consolidate and clean the data

- Failure as an option

- Integration of all stakeholders

- Need to share vs. need to know

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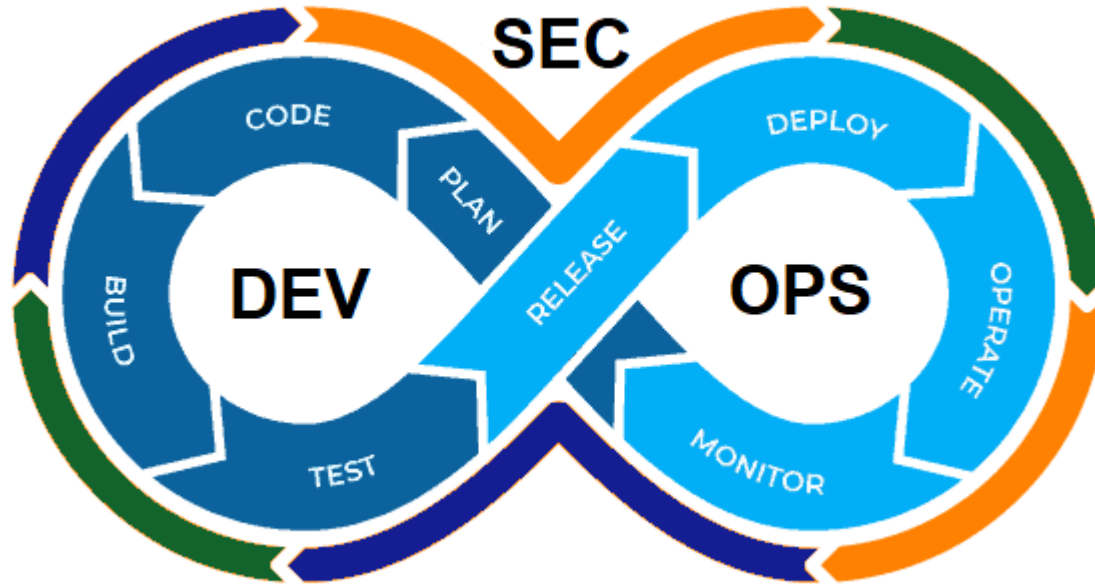
## DevSecOps



- Methodology to deliver software applications faster, better and secure
- DevSecOps involves people + process + tools
- Integrate security into software development from the start
- Continuous Iteration and Continuous Delivery (CI/CD)
- Agile Management

# Framework for innovation in AI in NATO

SEC

DEV

OPS

Prototype
Refine
Ideate

**ACT**

Development
Inspiration
Adaption
Adoption

**NCIA**

Security
Enterprise view
Policy
Standards
Production

**Users**

O&M

Certify

Spiral out

Academia

Nations

Industry

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# Conclusions

- In the "*disrupt, or be disrupted*" era, the only certainty is the continuous change of technology at an ever-increasing pace.

- Implementing Emerging Disruptive Technologies is more of an organizational culture problem than a technical challenge.

- Applying the traditional capability development processes to AI software development leads to deliver tomorrow's capability with yesterday's technology to unsatisfied users.

- To embrace AI, development processes need to be adapted, procurement and cybersecurity regulations streamlined.

- The AI FELIX project has demonstrated that NATO can successfully innovate in artificial intelligence.

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# Thank you for your attention



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