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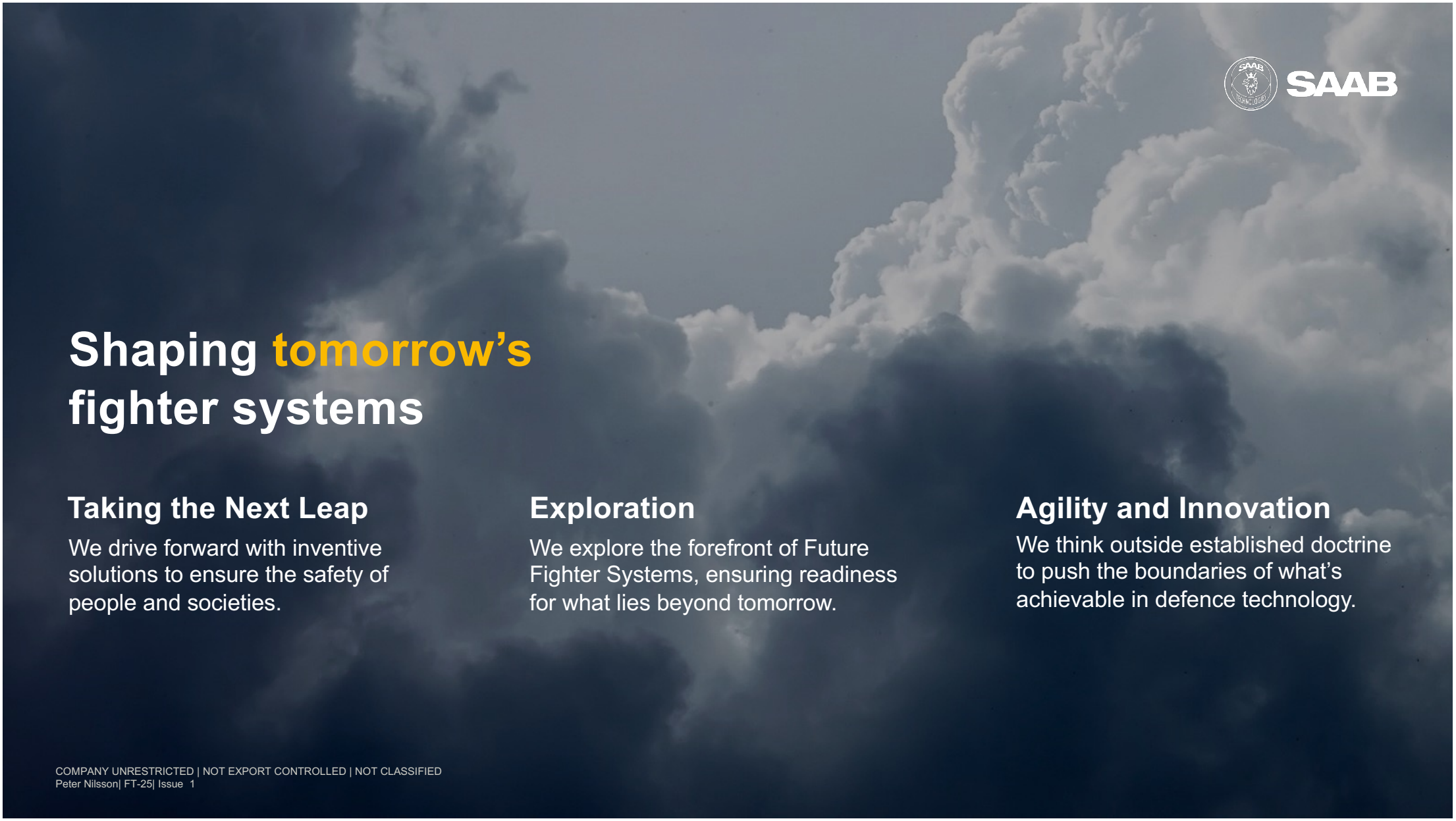
AI on wings
- the new era of Air Combat

Peter Nilsson, Head of Advanced Programs



Advanced Programs´ focus areas

Future Fighter System

Un-crewed Attritable/Survivable Collaborative Combat Aircraft

Un-crewed Disposable/Attritable Dual-Use platforms

Research and Development

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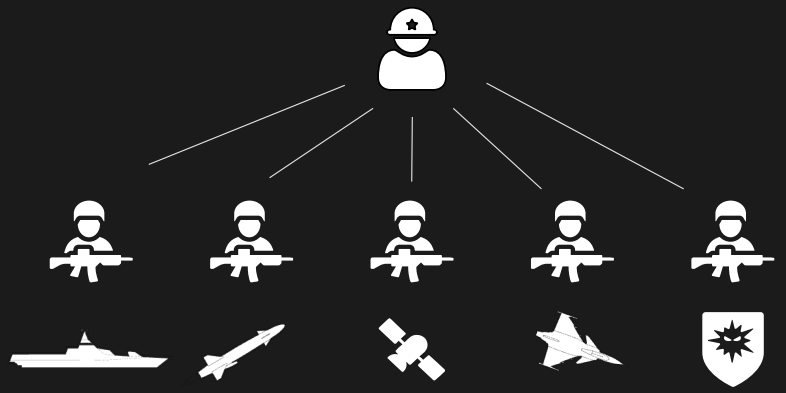
AI is changing the prerequisites for how warfare is conducted

The future of warfare is agentic and adaptive - shaped by autonomous, decision-capable systems operating at machine speed.

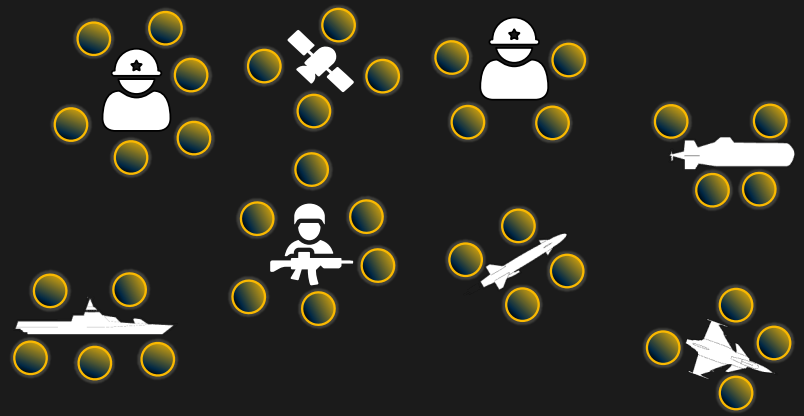
Current Warfare: Command-driven & Domain-centric



Current Warfare

- People with decades of single-domain knowledge
- Human connected workflows
- Decisions in days

Future Warfare: Agentic, Adaptive, Decentralized, Multidomain



Agentic Warfare

- AI models with thousands of years of all-domain knowledge
- AI agents automatically connect workflows with human in the loop on a higher abstraction level
- Decision in seconds and minutes

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Saab's four strategic pillars in AI, driving what value we deliver and how we operate

Strategic Pillar

AI in products for
Mission Advantage

AI in enterprise for
Smart Operations

AI in development for
Augmented Design & Engineering

Ethical AI for
Trusted adoption

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Developing ethical and trustworthy AI is as important to us as delivering trustworthy flight safety

Trusted-by-design

Sovereign data infrastructure

Trusted AI governance

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Project Beyond

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Project Beyond

Goals

Helsing

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It has been shown that AI can beat human in Air Combat using reinforcement learning

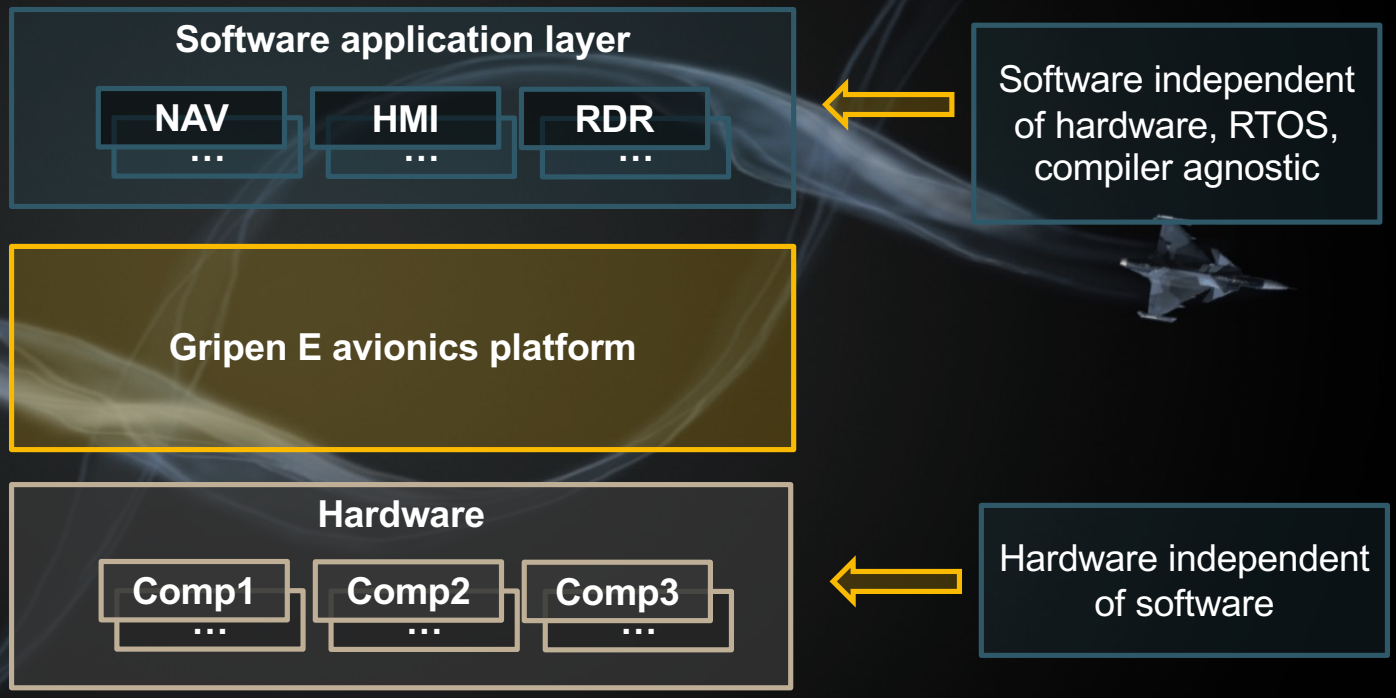
Helsing is one of the companies that can do this in simulation

Saab has a unique avionics system in Gripen E that allows for easy integration of third-party software along with the ecosystem of simulators needed for an reinforcement learning approach

Primary Goal: Can we, in a relative short period of time (<6 months), develop an AI agent, integrate it into the Gripen eco-system (simulators) and then directly in a speedy way, go and fly in a ordinary series aircraft. No special computers, straight into the avionics software, fully certified.

Secondary Goal: Can an AI-trained agent using reinforcement-learning beat a human in Beyond Visual Range (BVR)-combat for real?

Gripen E Avionics
Power through software



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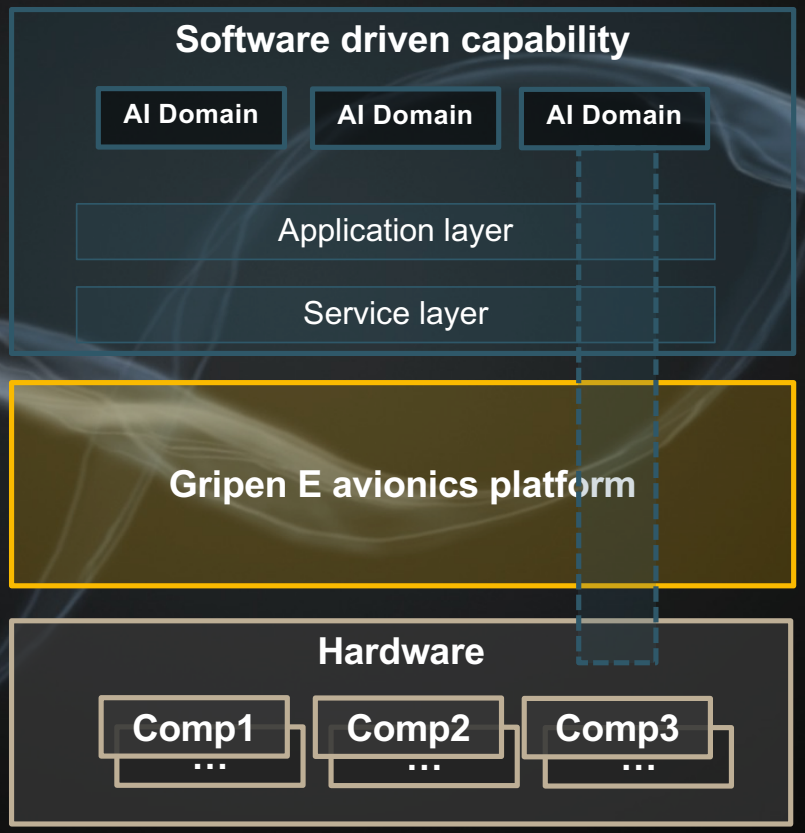


Project Beyond

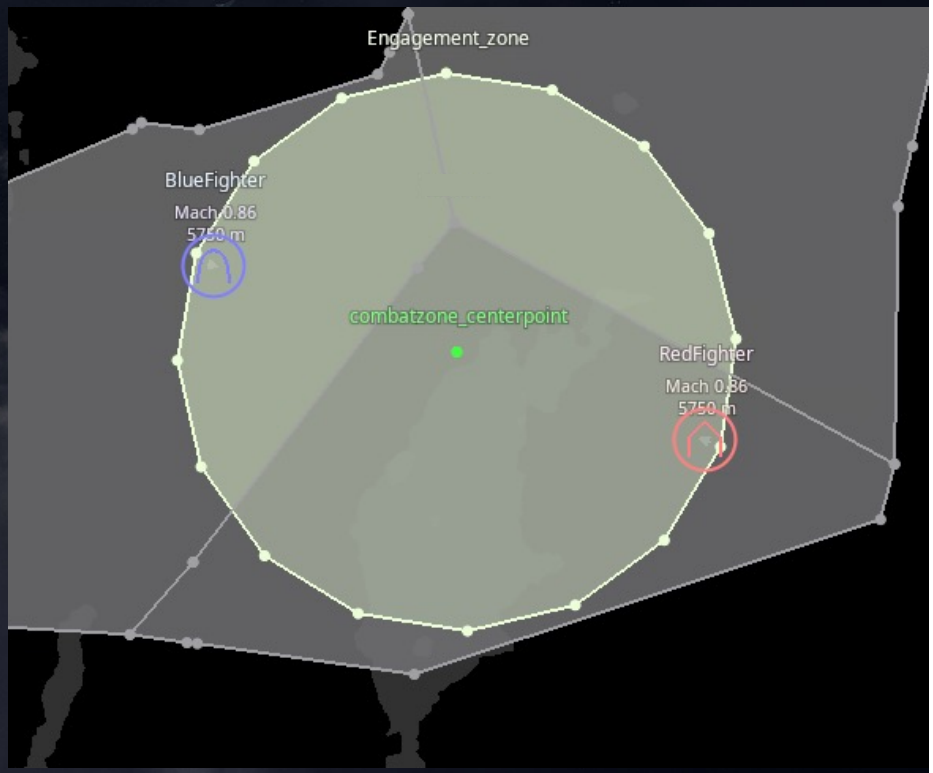
Main scenario

Beyond Visual Range (BVR) air combat between two aircraft

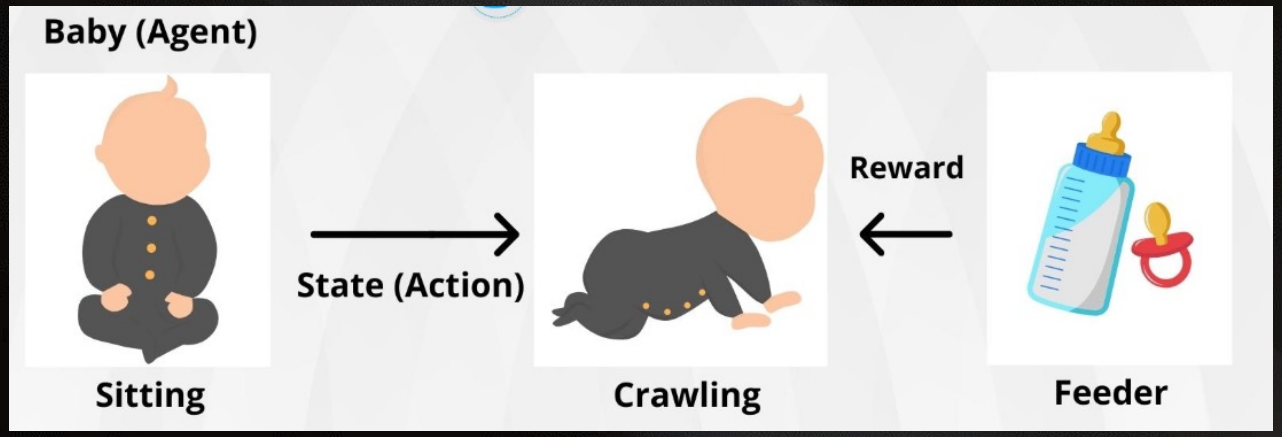
In more detail:

- Aircraft are equipped with missiles
- Aircraft need to fly within a predefined combat area
- Each aircraft is supported by one A&EW (outside of the combat area)

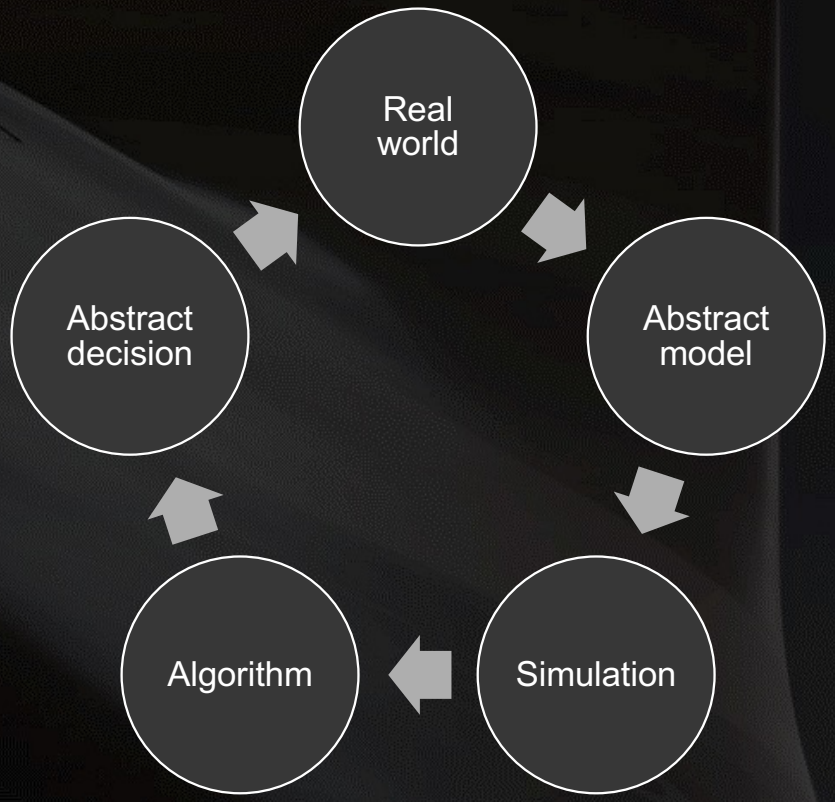
The objective for each aircraft is to (if possible) win the fight



Reinforcement Learning



Approaching an AI challenge



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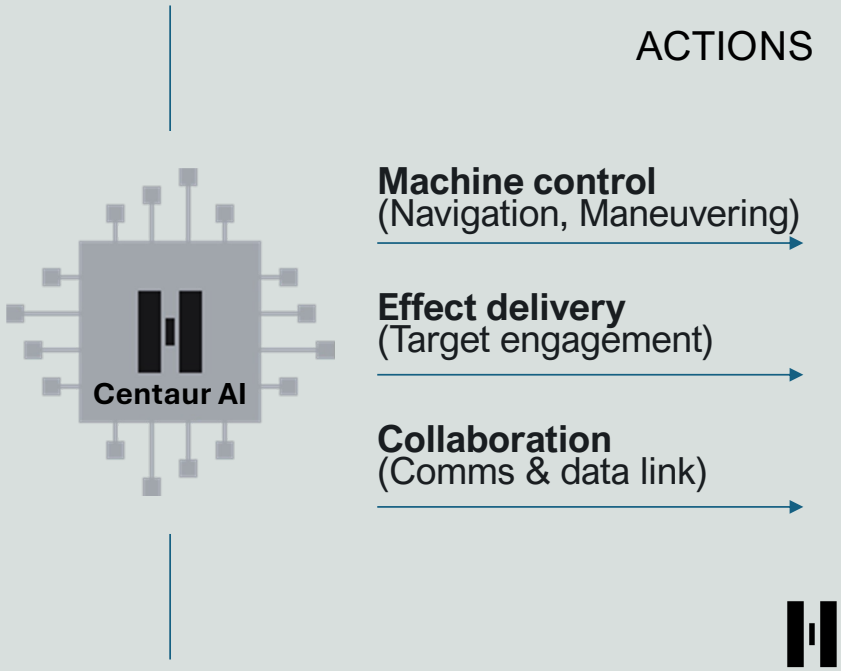
Helsing's Centaur

- State-of-the-art AI agent based on Reinforcement Learning
- Developed by Helsing since 2023 – Software, Infrastructure, Tooling
- Optimized for complex air combat missions for current and next generation of combat air platforms (crewed/uncrewed)

Helsing



Helsing

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Weekly iterations, learning in breakneck speeds

Helsing

Training/Improving "Centaur" in Helsing's RL Factory

1 agent per week, 3-4 days of training

- Gained Experience: ~30 years of virtual training time per agent across multiple instances
- All experience is cumulated to one new agent version for delivery to Saab

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Centaur integrated to test environment (e.g., Gripen simulator)

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Validating Centaur performance in test environment

Weekly iteration

Evaluation insights are shared with Helsing

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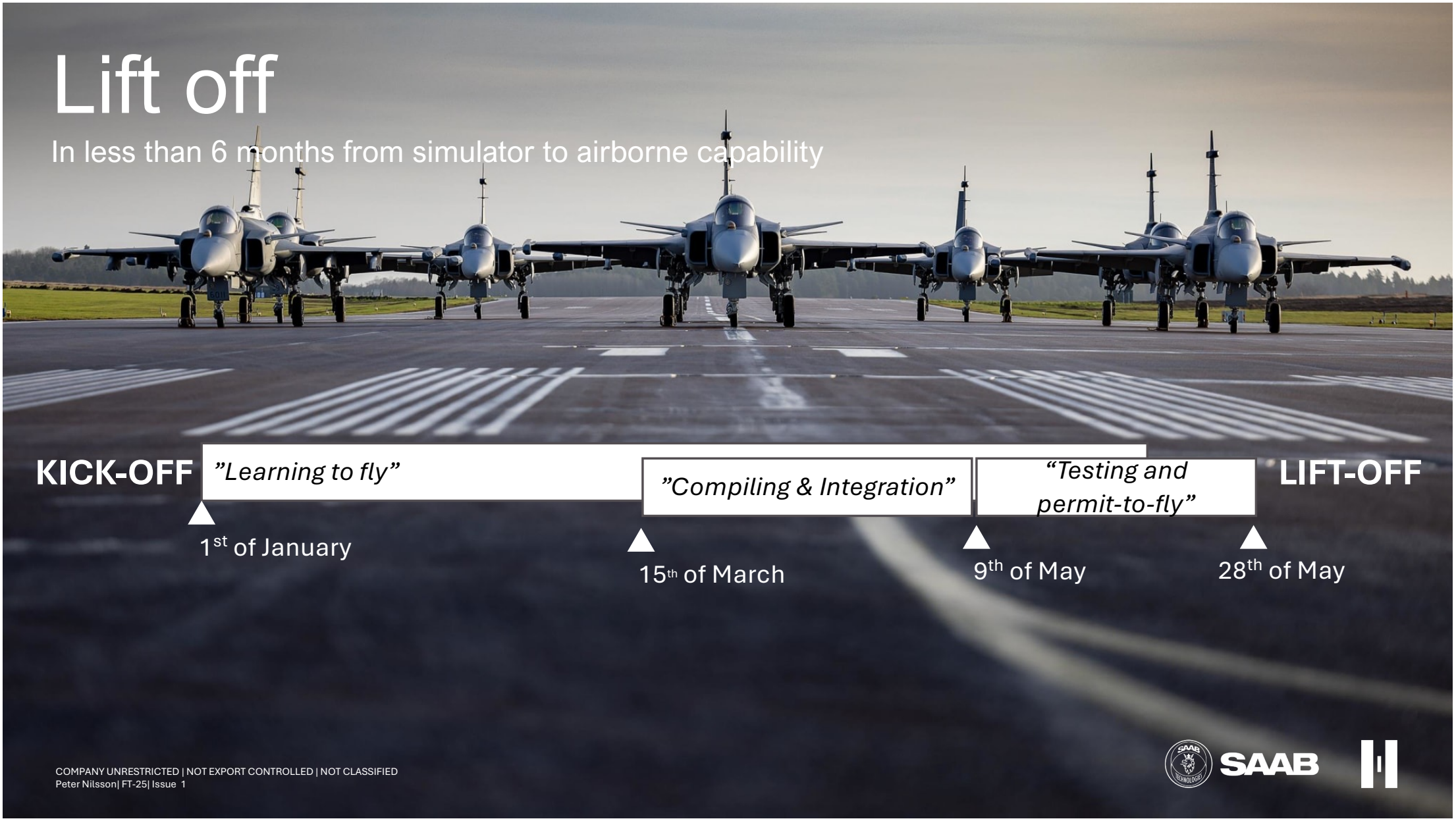
Lift off

In less than 6 months from simulator to airborne capability



28 of May - 2025

- the Worlds first AI in a fully certified series aircraft operating in a Controlled Airspace

Project Beyond

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Helsing

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An astronaut / test pilot smiling to the camera after being ”shot down” by an AI agent…or?

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Learnings & Thoughts

Who won?

- 50/50…in May
- Today…after “150 years of more training…??

What do you need?

- Computing Power
- Understanding the Problem
- Domain Knowledge

What needs to be discussed?

- “Dead” aircraft → “Live” aircraft
- Tactics?... Air Force or Industry?

Thank You!