

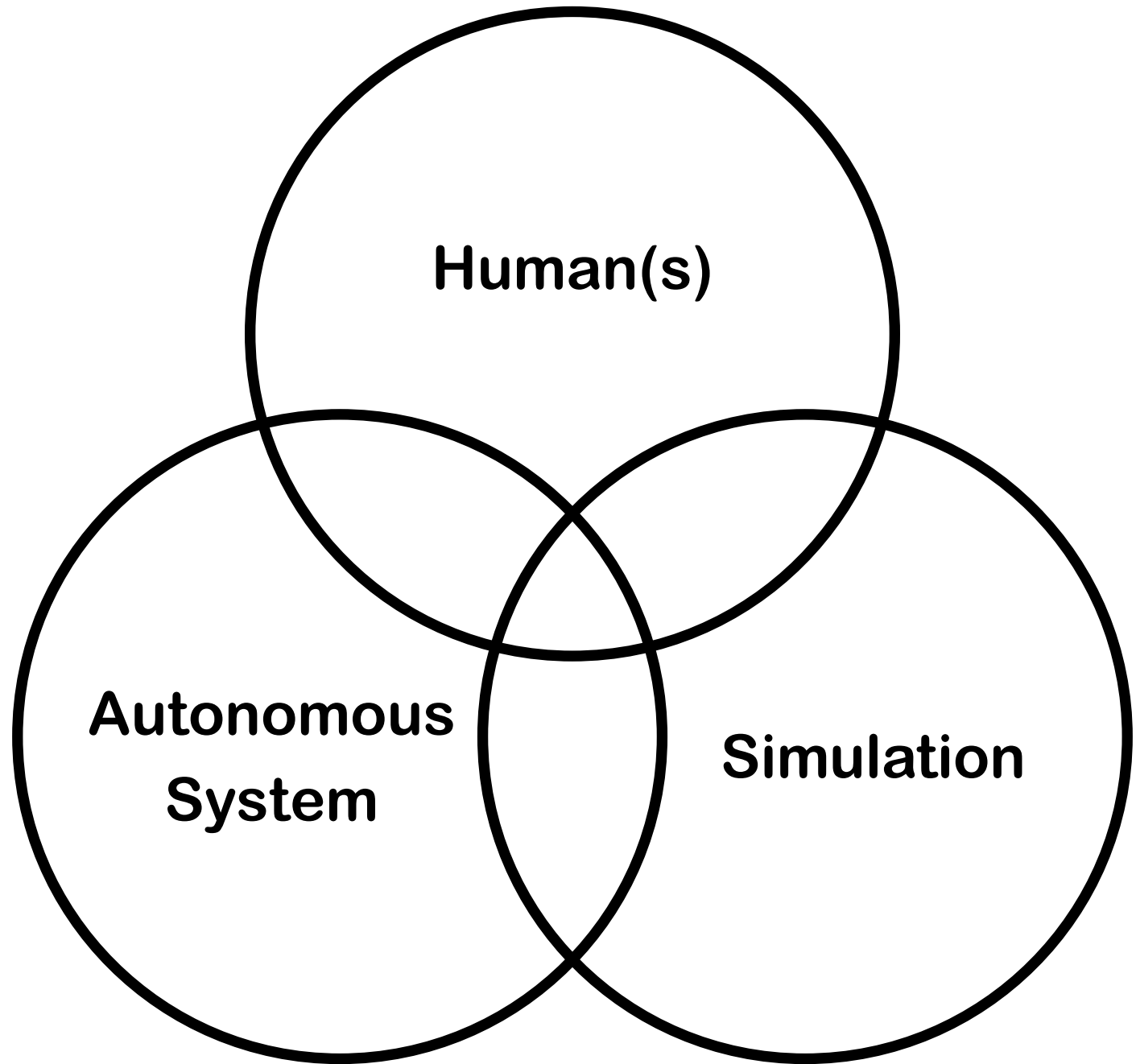
 **3rd Annual SMi
Military Robotics and
Autonomous Systems
2/3 September 2020**

Digital Soldier

**Andy Fawkes
FIMechE**



Synergies...



Outline

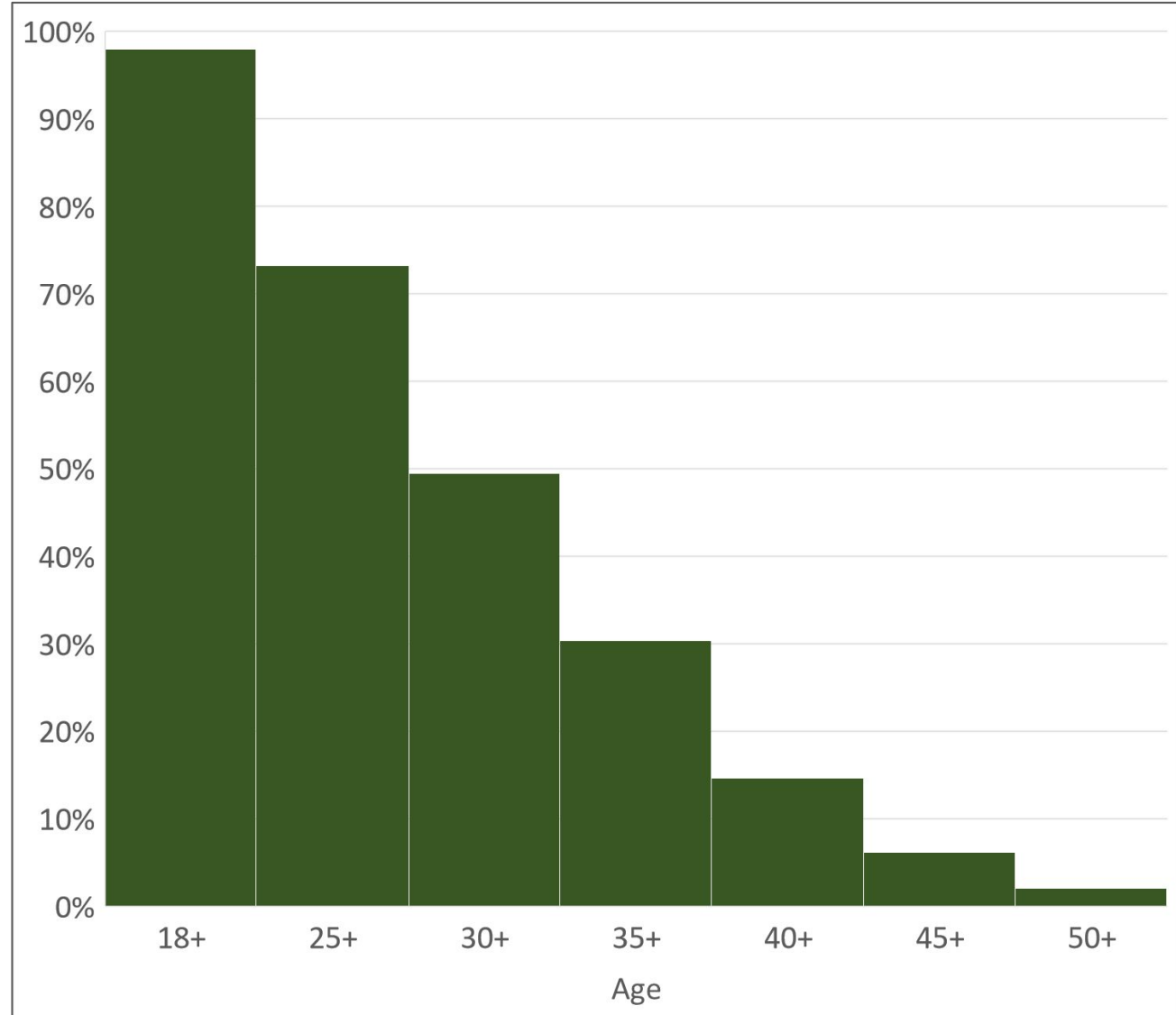
- **The Soldier**
- **Simulation and Gaming**
- **Human-Machine Interfaces**
- **Cautionary Tales**

The Soldier

1/4

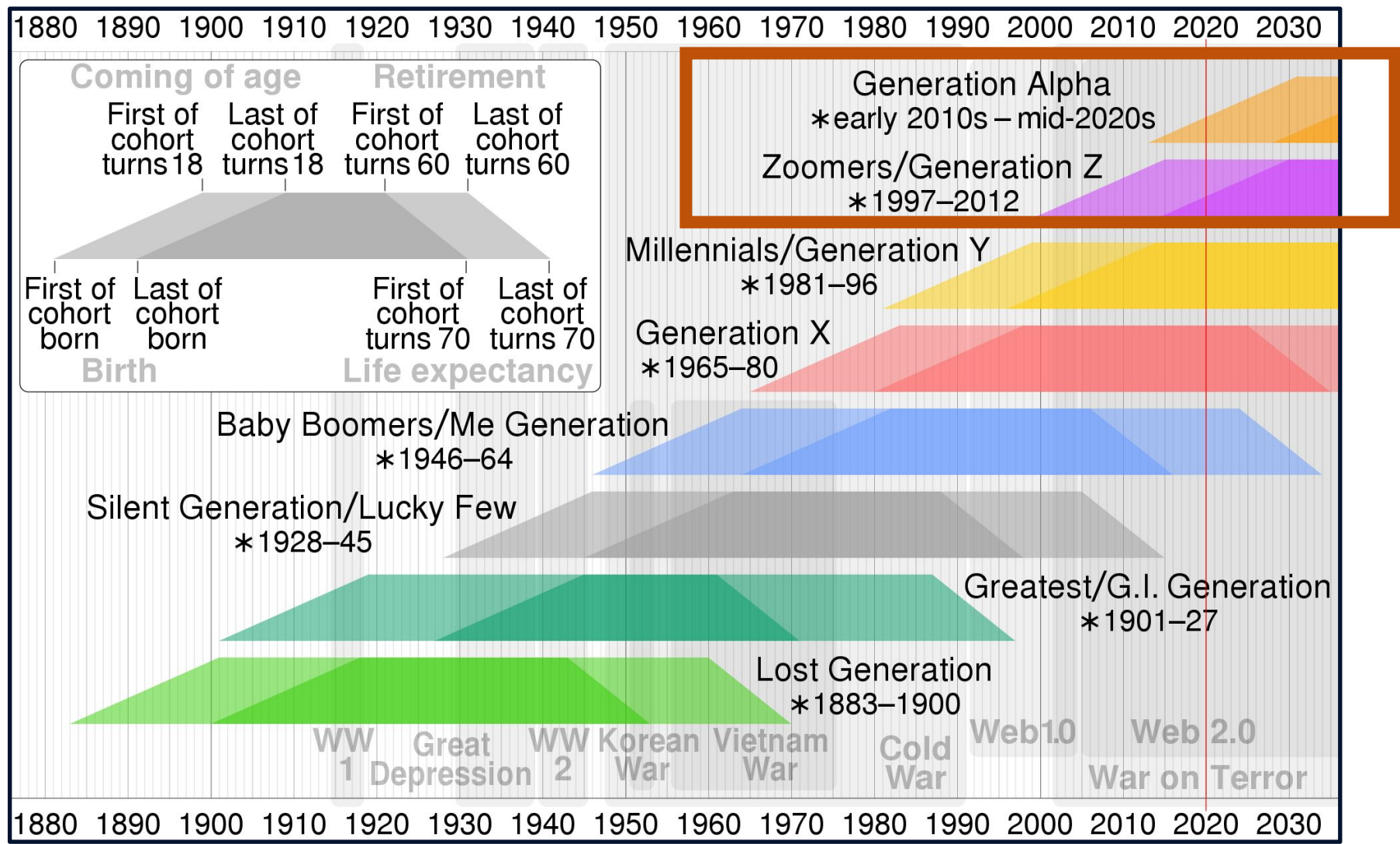


British Army Age Distribution



UK Defence Personnel Statistics - CBP7930, 12 June 2018

The Next Workforce

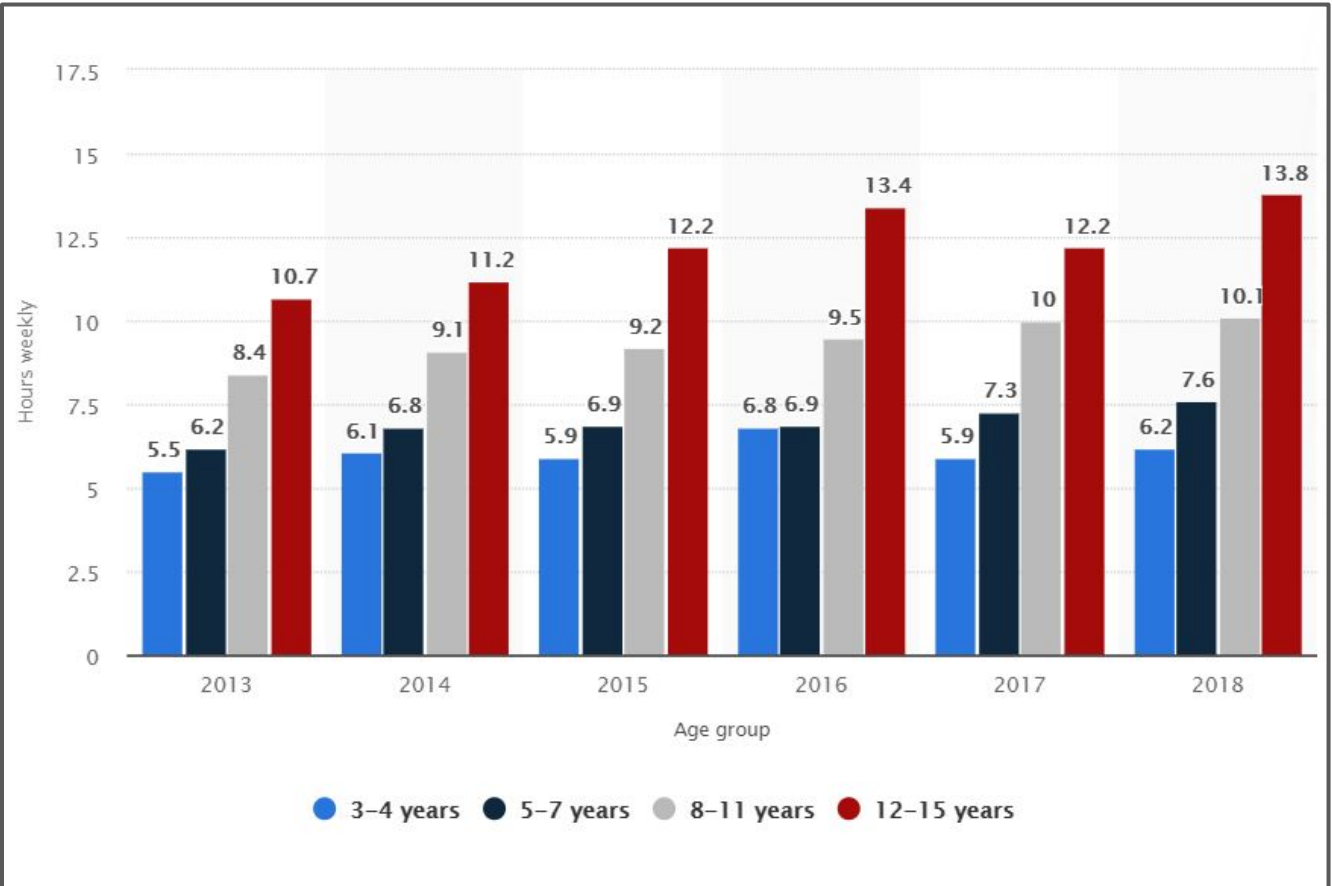


Z
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93% of Children Play Video Games

Children's Commissioner for England (2019)



Tip of the Spear Innovation



Combat Recce
@CombatRecce



WngO 2 for our Virtual Distributed Training event. Detail via our DC page and H Hr is 1900 on Wed 27 May 20 [#online](#) [#training](#) [#skills](#) [#distancelearning](#)



12:45 PM · May 26, 2020 from Tullibody, Scotland

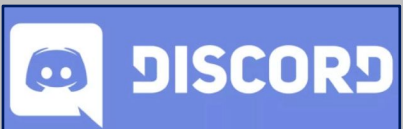


45



See Combat Recce's other Tweets

THE SCOTTISH AND NORTH IRISH YEOMANRY

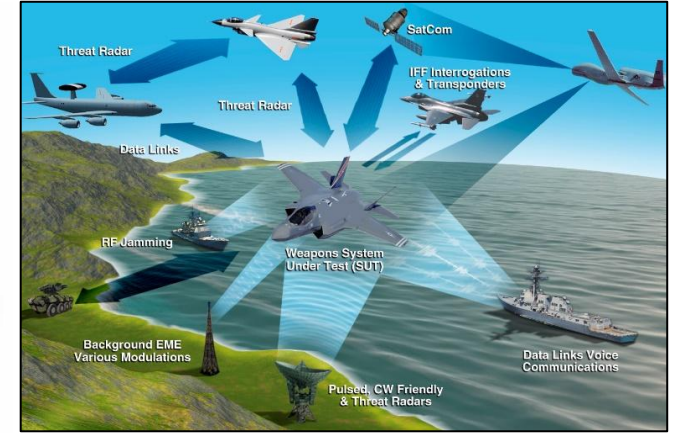


Simulation and Gaming

2/4



Why Use Simulation in Training?



Simulation Now - Land, Sea, Air, Anywhere





UNREAL ENGINE 5
FIRST LOOK

Simulation Trends

Unreal 5 (2021)



youtu.be/qC5KtatMcUw

Gaming Innovation

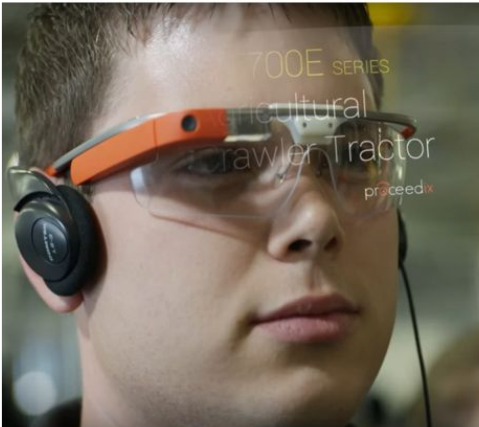
Apex Legends (Team-Based Battle Royale)

- Released 2019 - 50 Million Players Joined in One Month
- A novel ping system allows teammates to mark supplies, locations, and enemies



XR

eXtended Reality (XR)

Reality	Augmented Reality	Mixed Reality	Virtual Reality
The real world	Information layered over vision	Blend of real & digital information to enhance reality	Fully virtual world
			

Virtual Reality in Land Training (VRLT) Pilot 2019

- The aim was to identify how Virtual Reality technology might support future Army Team/Collective Training
- 30+ Trainees in VR
- Direct military involvement in the Pilot



VRLT Main Training Audience

Warrior
1

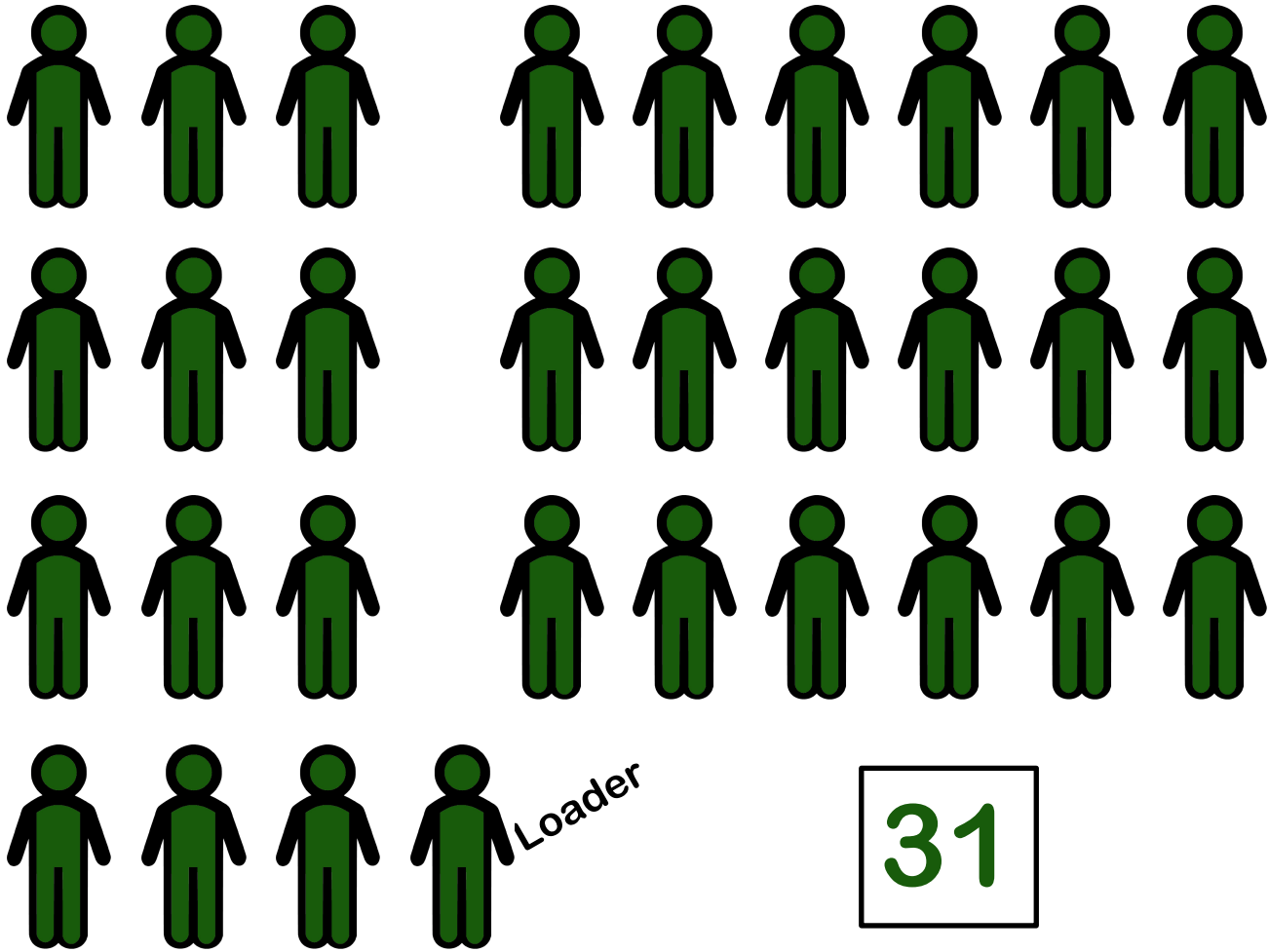
Warrior
2

Warrior
3

Challenger 2
Tank

Commander
Driver
Gunner

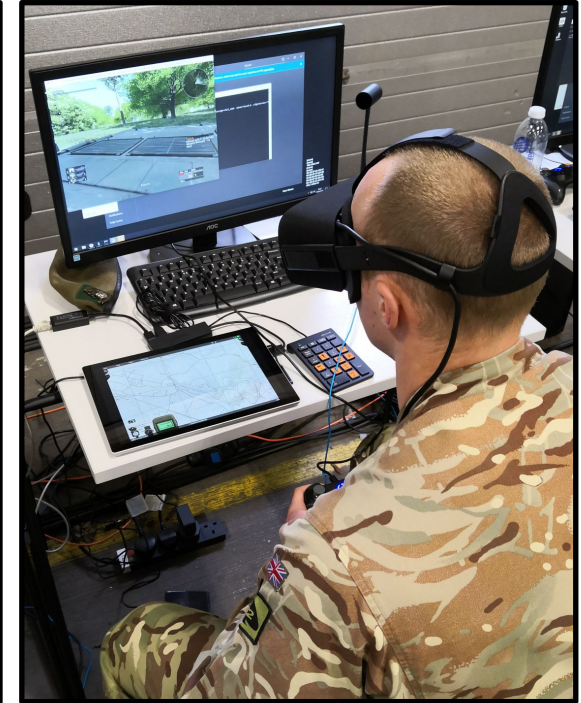
Dismounts



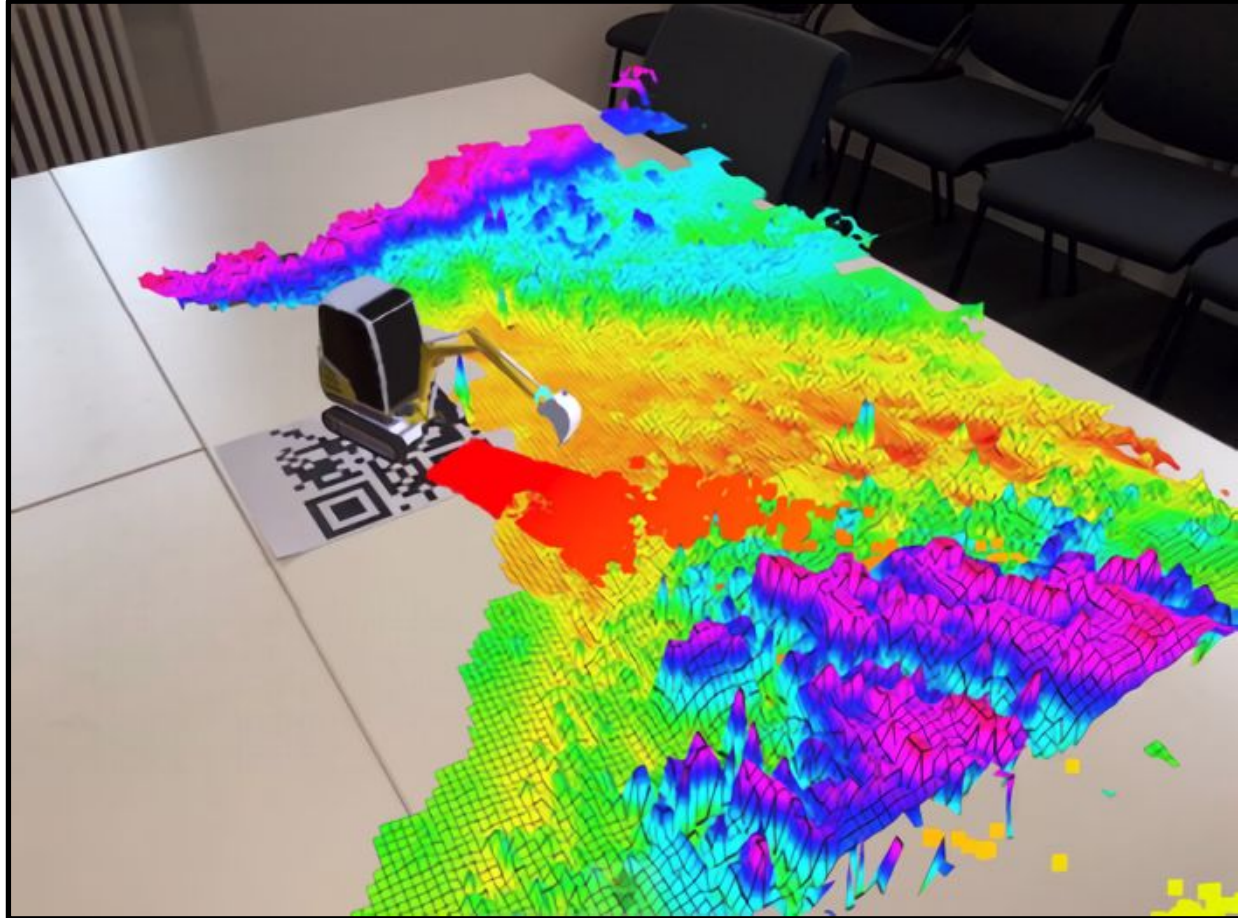
31



“In Virtual Simulation
you look at the
Virtual World,
in VR you are in it”



See What the Machine Sees Through AR (Augmented Reality)



Simulation
(VBS3)

Experimentation

Autonomous
Systems



Decision
Support

UK MoD
“Single
Synthetic
Environment”



Gen Sir Richard Barrons
Former Commander
UK Joint Forces Command



Human Machine Interfaces

3/4



Voice Controlled Autonomous Systems

UK

www.cervusdefence.com/case-studies/exploring-voice-controlled-autonomous-systems



Voice Control is Fast, Intuitive, Powerful



Dramatically speeds up interfaces and cycle times

Adapts to language in the context of the situation

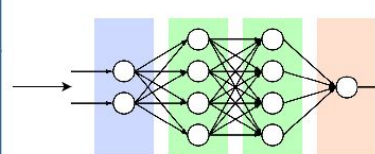
Control of both micro-movements and macro-tactics



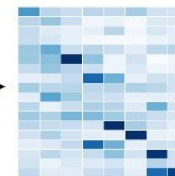
Operator / Mic



Voice processing
neural network



Encoded action / SQF



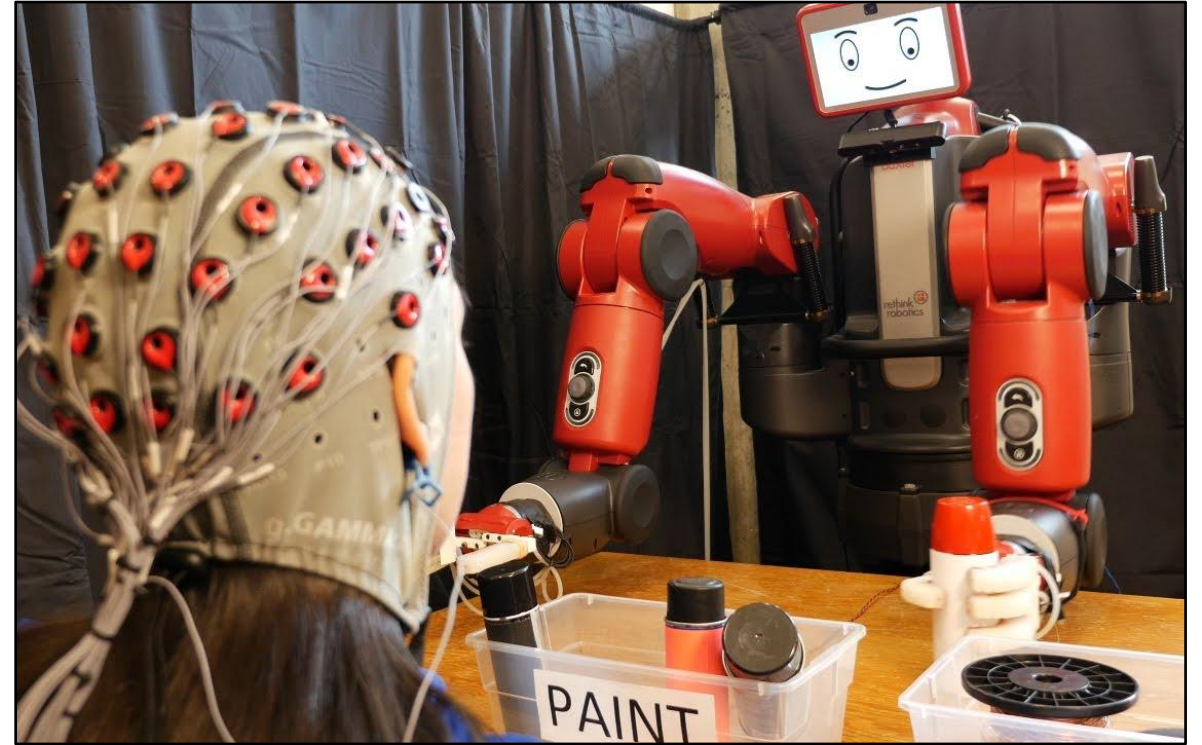
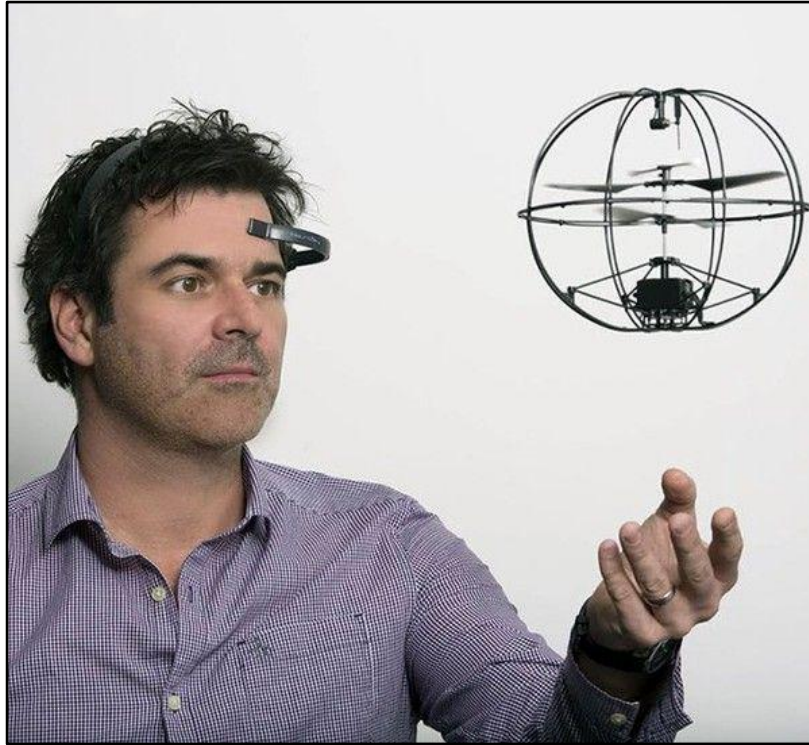
VBS3



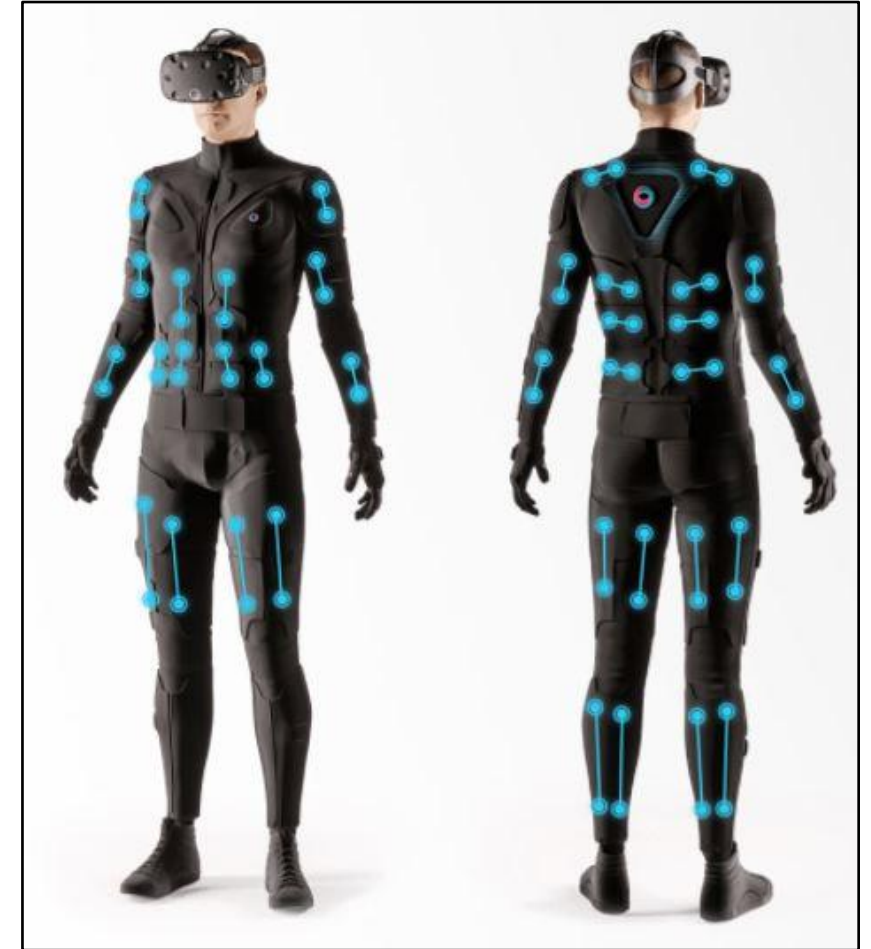
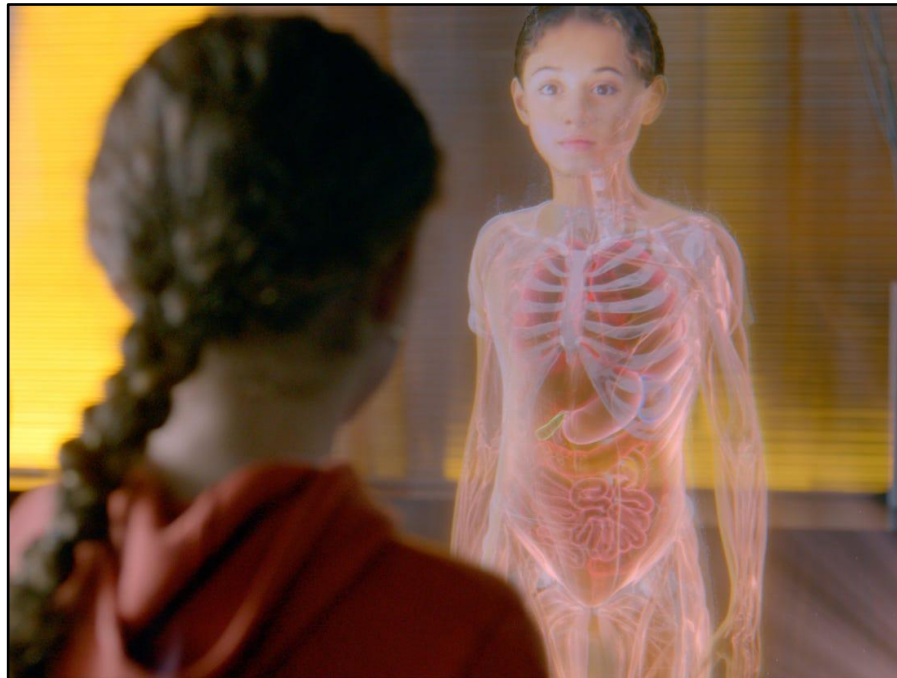
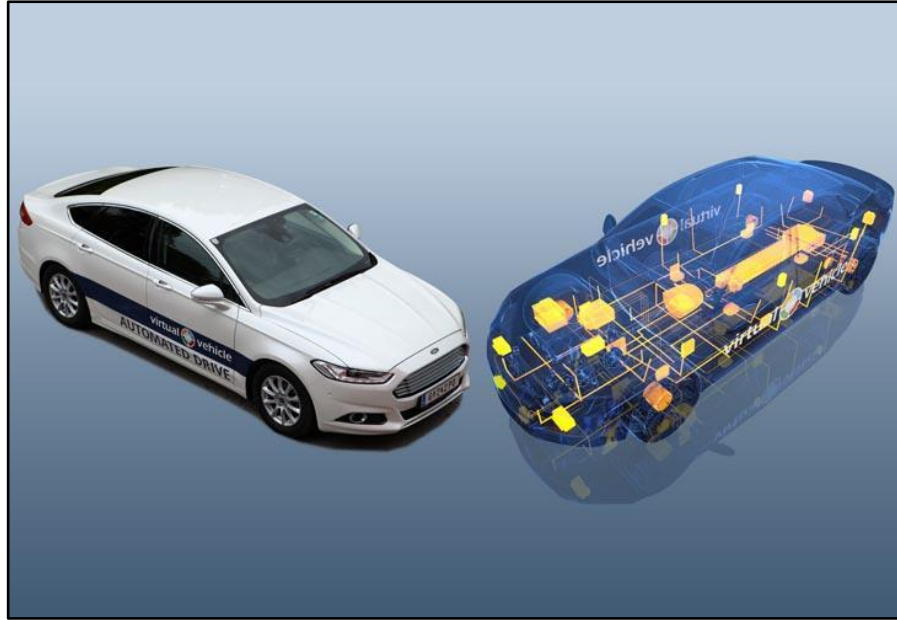
UGV



Brain Interface



Digital Twins



Teslasuit

Tracking/Gaming/AI (@sonsandanceman3)



**Netherlands
Army
Navigation
Belt
2020**

**Elitac
Wearables**

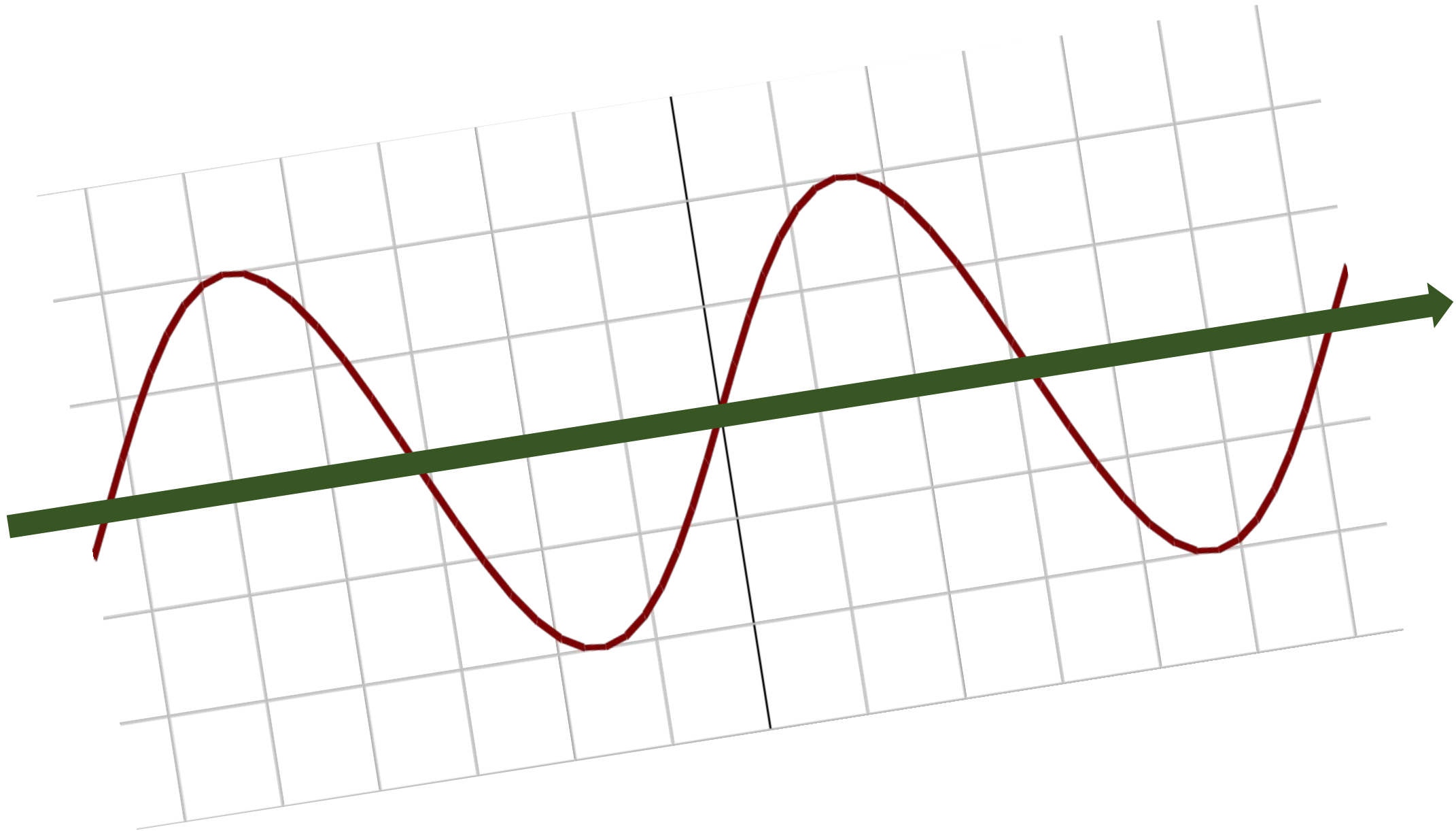


Cautionary Tales

4/4



My Feelings on Unmanned/Automation



Google DeepMind 2019

THE VERGE

TECH

REVIEWS

SCIENCE

CREATORS

ENTERTAINMENT

VIDEO

MORE

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GAMING

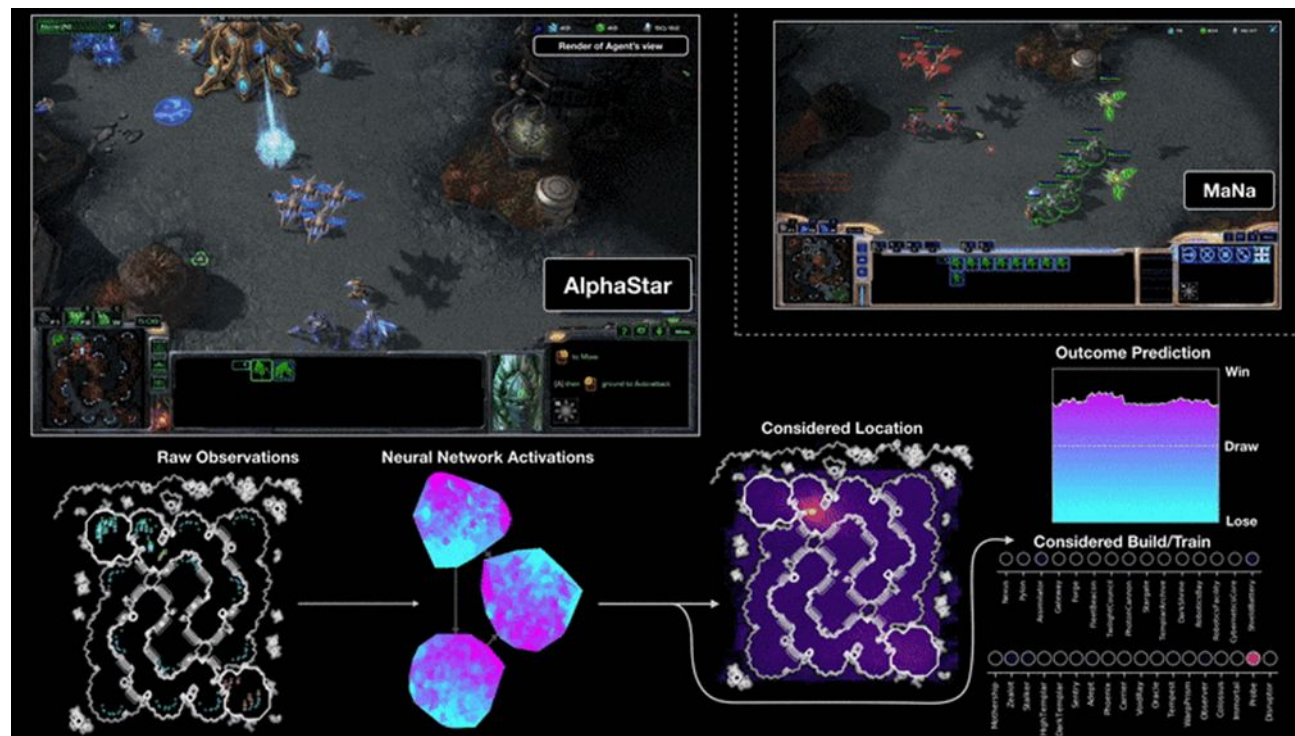
TECH

ARTIFICIAL INTELLIGENCE

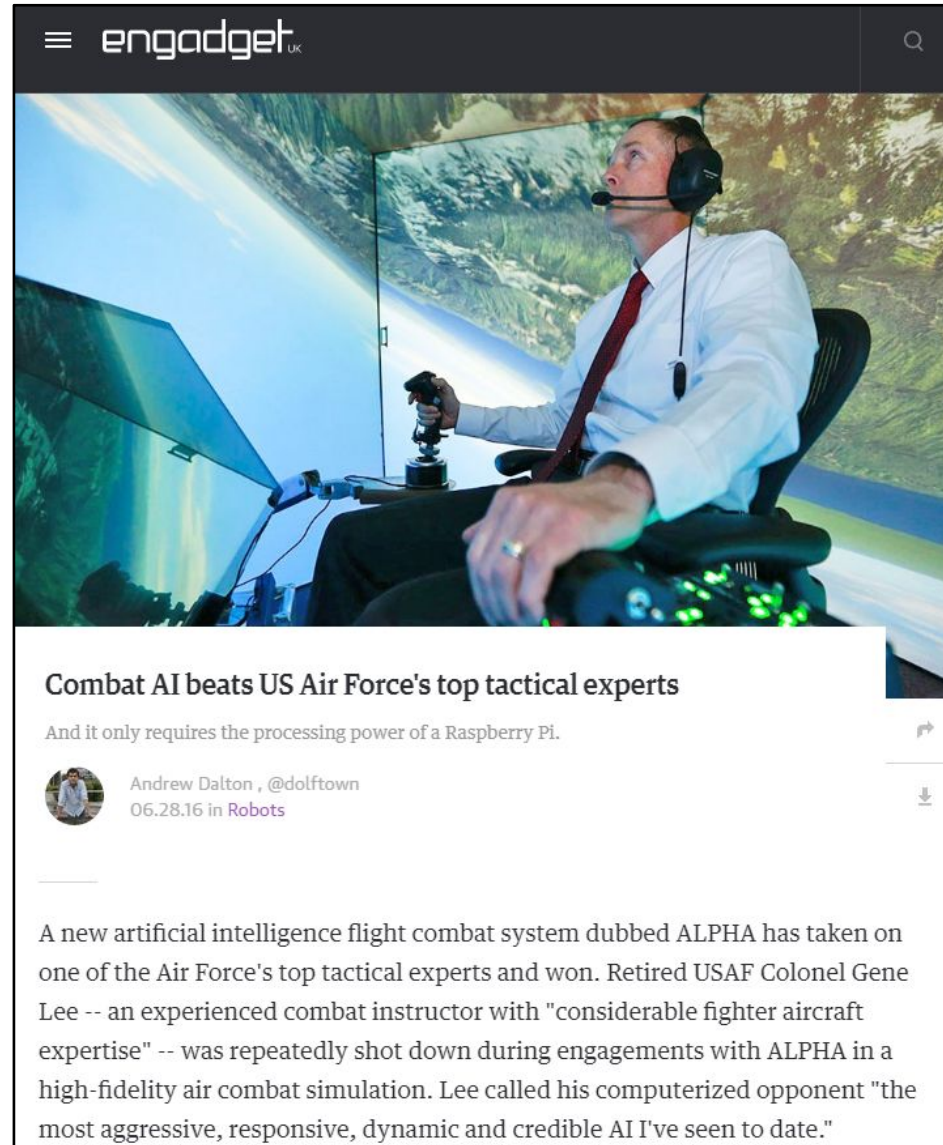
DeepMind's StarCraft 2 AI is now better than 99.8 percent of all human players

AlphaStar is now grandmaster level in the real-time strategy game

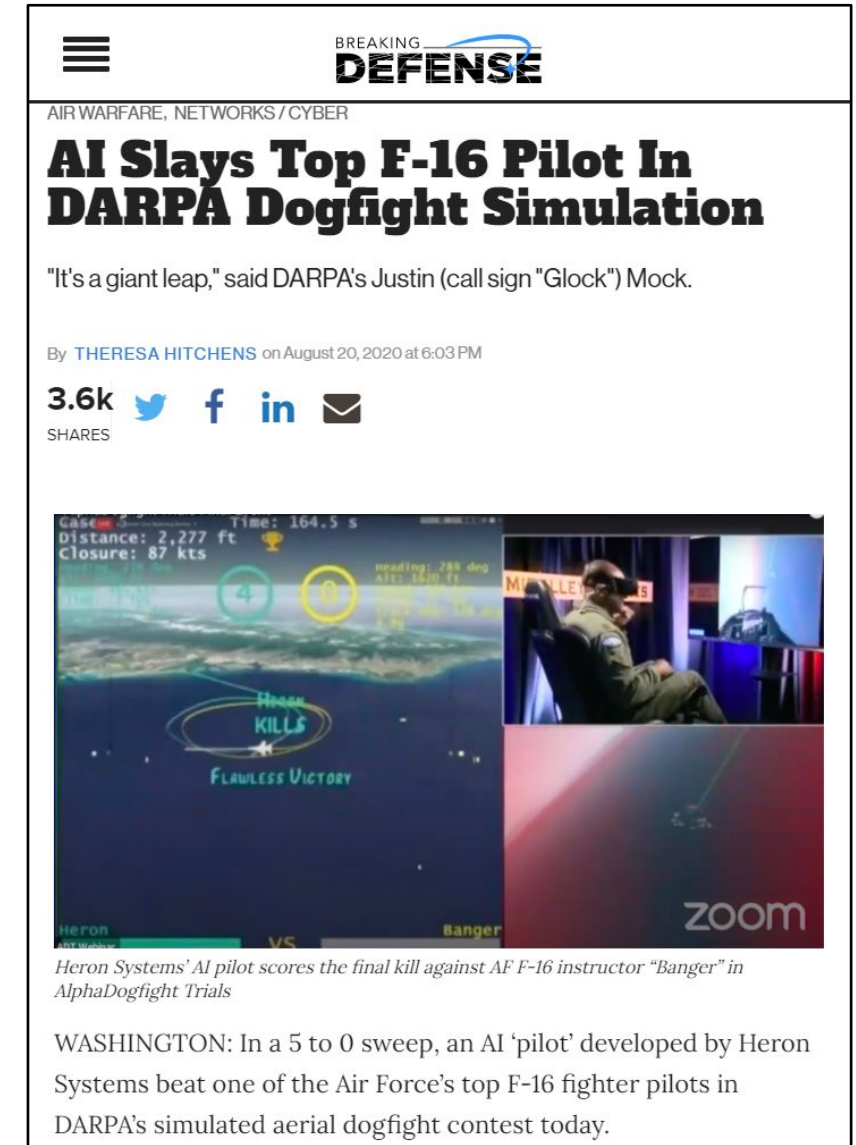
By Nick Statt | @nickstatt | Oct 30, 2019, 2:00pm EDT



Redundant Pilots?

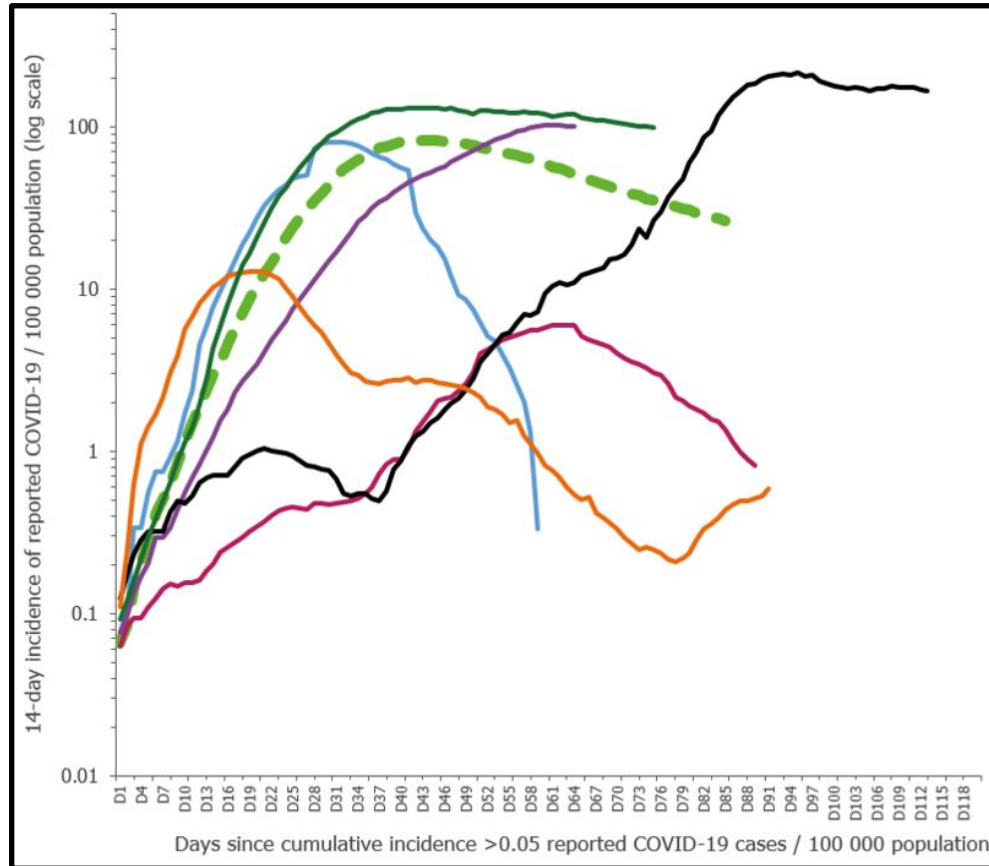


2016



2020

AI Limitations



Artificial intelligence / Machine learning

Our weird behavior during the pandemic is messing with AI models

Machine-learning models trained on normal behavior are showing cracks —forcing humans to step in to set them straight.

by Will Douglas Heaven

MIT
Technology
Review

May 11, 2020

Sign in

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Topics Magazine Newsletters Events

In the week of April 12-18, the top 10 search terms on Amazon.com were: toilet paper, face mask, hand sanitizer, paper towels, Lysol spray, Clorox wipes, mask, Lysol, masks for germ protection, and N95 mask. People weren't just searching, they were buying too—and in bulk. The majority of people looking for masks ended up buying the new Amazon #1 Best Seller, “Face Mask, Pack of 50”.

When covid-19 hit, we started buying things we'd never bought before. The shift was sudden: the mainstays of Amazon's top ten—phone cases, phone chargers, Lego—were knocked off the charts in just a few days. Nozzle, a London-based consultancy specializing in algorithmic advertising for Amazon sellers, captured the rapid change in this simple graph.

Monitoring Systems



The Register

{* INTERNET OF THINGS *}

Army Watchkeeper drone flopped into tree because crew were gazing backwards

Live footage of runway and grass verge more compelling than actual flight instruments

Thu 29 Aug 2019 // 10:11 UTC

98 GOT TIPS?

Gareth Corfield BIO EMAIL TWITTER

SHARE

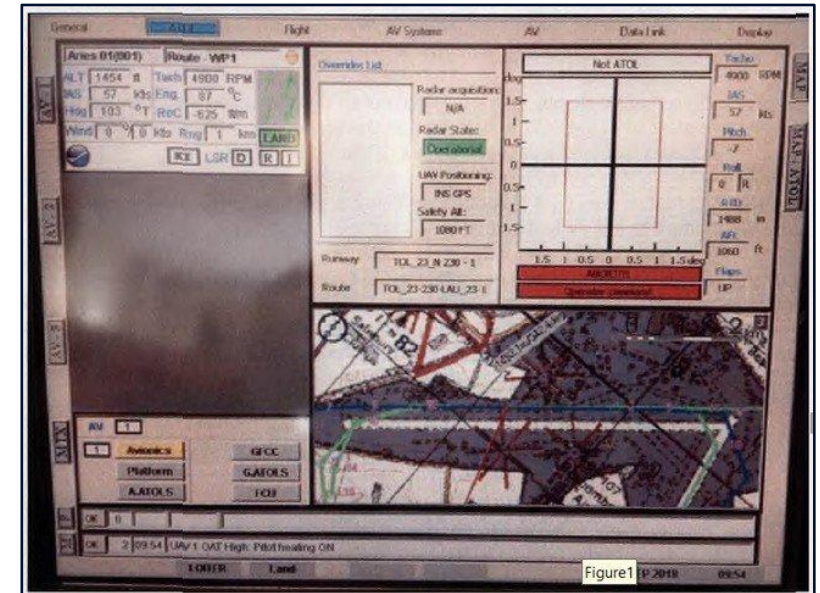
The latest British Army Watchkeeper drone crash happened because its crew became fixated on live footage from an onboard camera instead of their instruments, a Ministry of Defence report has revealed.

An internal Defence Accident Investigation Branch (DAIB) report detailed why the semi-autonomous aircraft, tail number WK050 and flown on the day by two Royal Artillery operators, crashed in June 2018.

The report, dated February 2019, was [published online](#) by the MoD after the BBC made a Freedom of Information request for it, leading to [news reports](#) over the past few weeks.

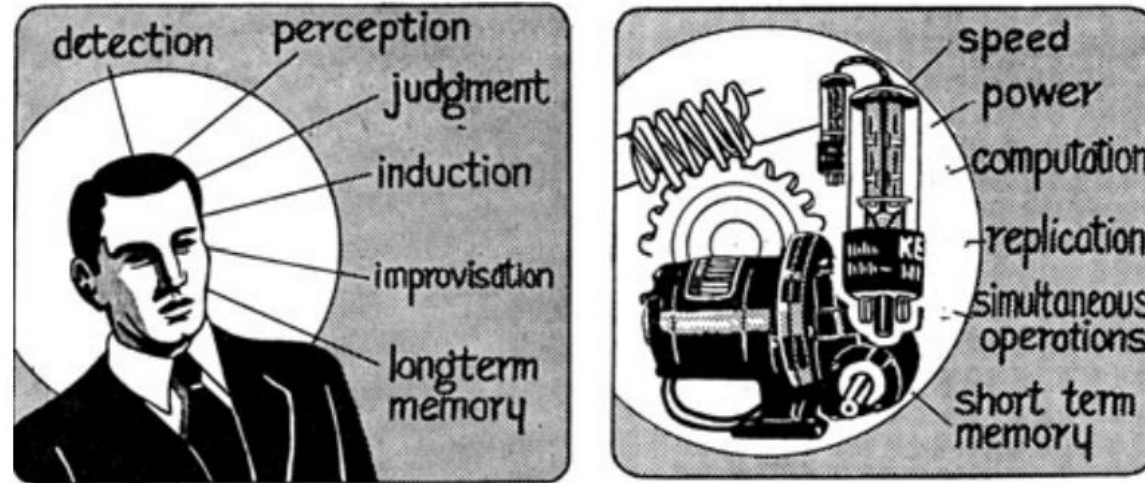
WK050 flopped into a tree just beyond the runway of Aberporth airport on the Welsh coast after its Army operators, under the supervision of contractors from a Thales joint venture company, cut its throttle immediately after the drone had landed and lifted off again.

"Had no action been taken, the [Watchkeeper] would have completed its automatic go-around from which it could have been commanded to conduct a further approach," said the DAIB in its Safety Investigation Report, which was written by a major and a Warrant Officer 1 (WO1).



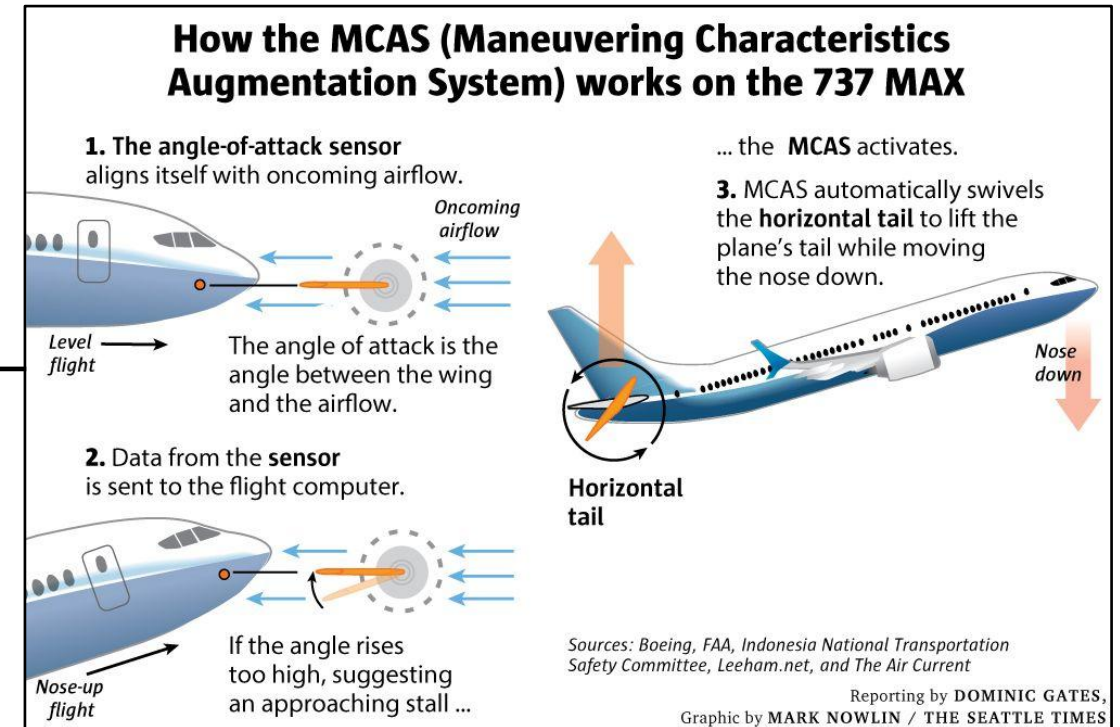
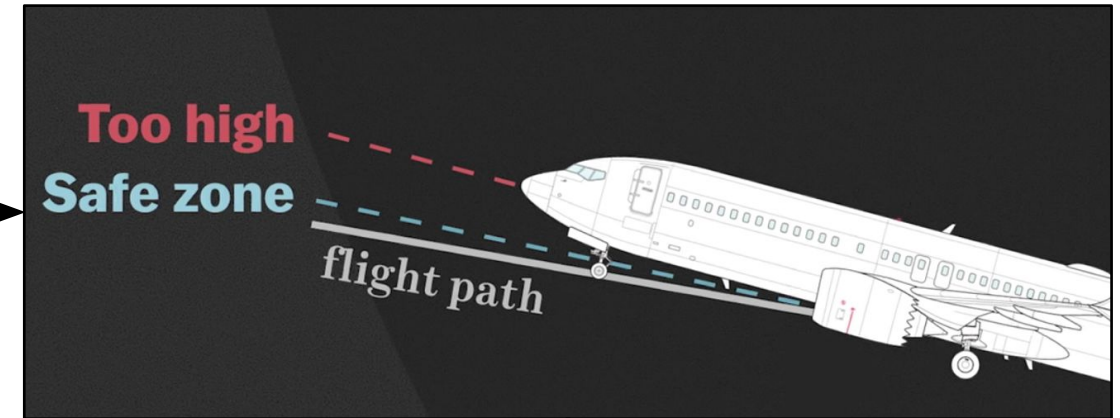
Paul M Fitts (1951)

Human Engineering for an Effective Air Navigation and Traffic Control System



- “great caution be exercised in assuming that men can successfully monitor complex automatic machines and take over if the machines break down”
- “engineers should seriously consider systems in which machines would monitor men and prevent them from making dangerous

Boeing 737 MAX

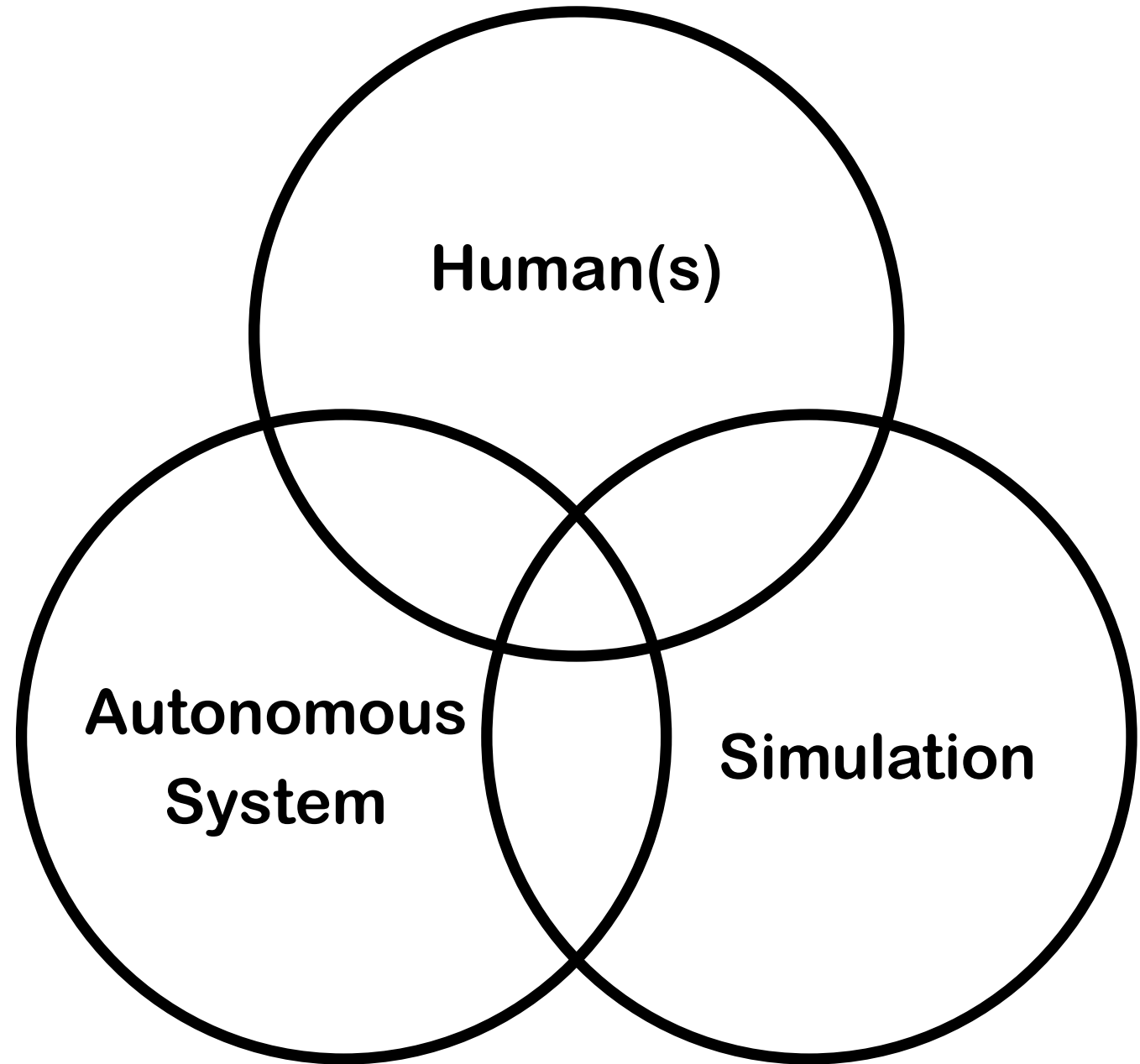


**The Human Needs to
Understand What the
Machine is Thinking?**

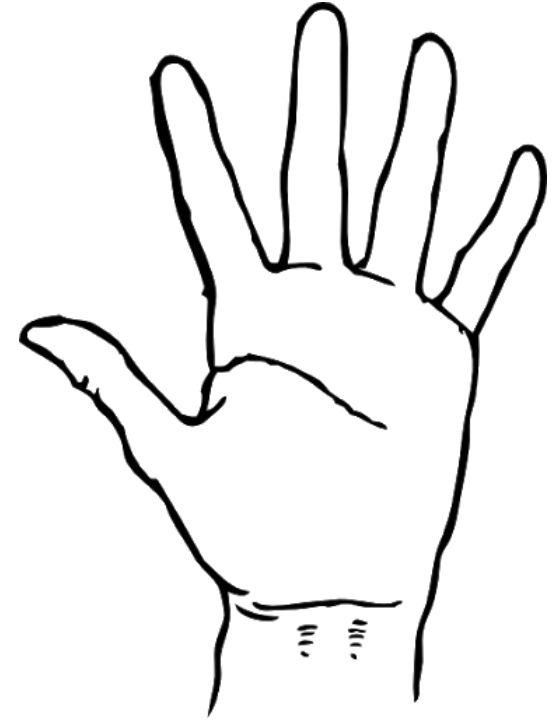
**Test & Train
Test & Train
Test & Train**

.....

Test & Train

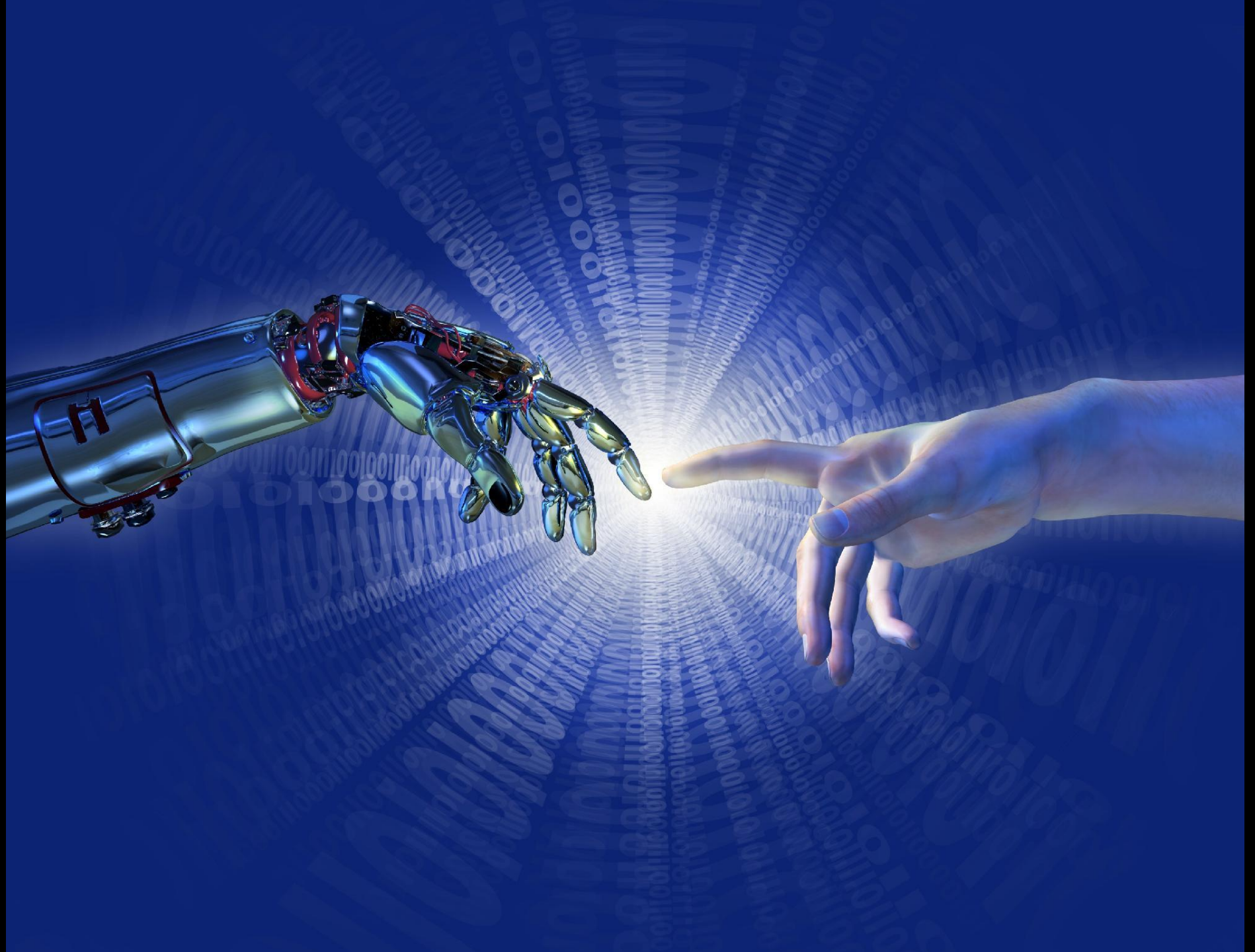


The Human Component of Warfare



Adaptability, Imagination, Dexterity

**Maximise
the
Strengths
of Both**



Questions?

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