

12/13 April 2021
SMi Future Armoured
Vehicles Situational
Awareness

Enhancing Situational Awareness

A Focus on Training
and Simulation



Andy Fawkes

The High and the Mighty (1954)



Battlesbury Barracks, Warminster UK



World of Tanks





The Presenter

Twitter
@andyfawkes1

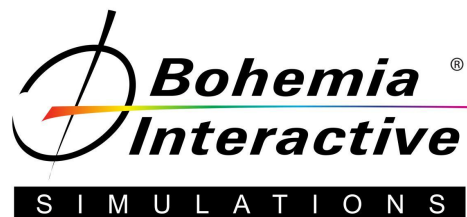
LinkedIn
andyfawkes

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Before



Ministry
of Defence



Now



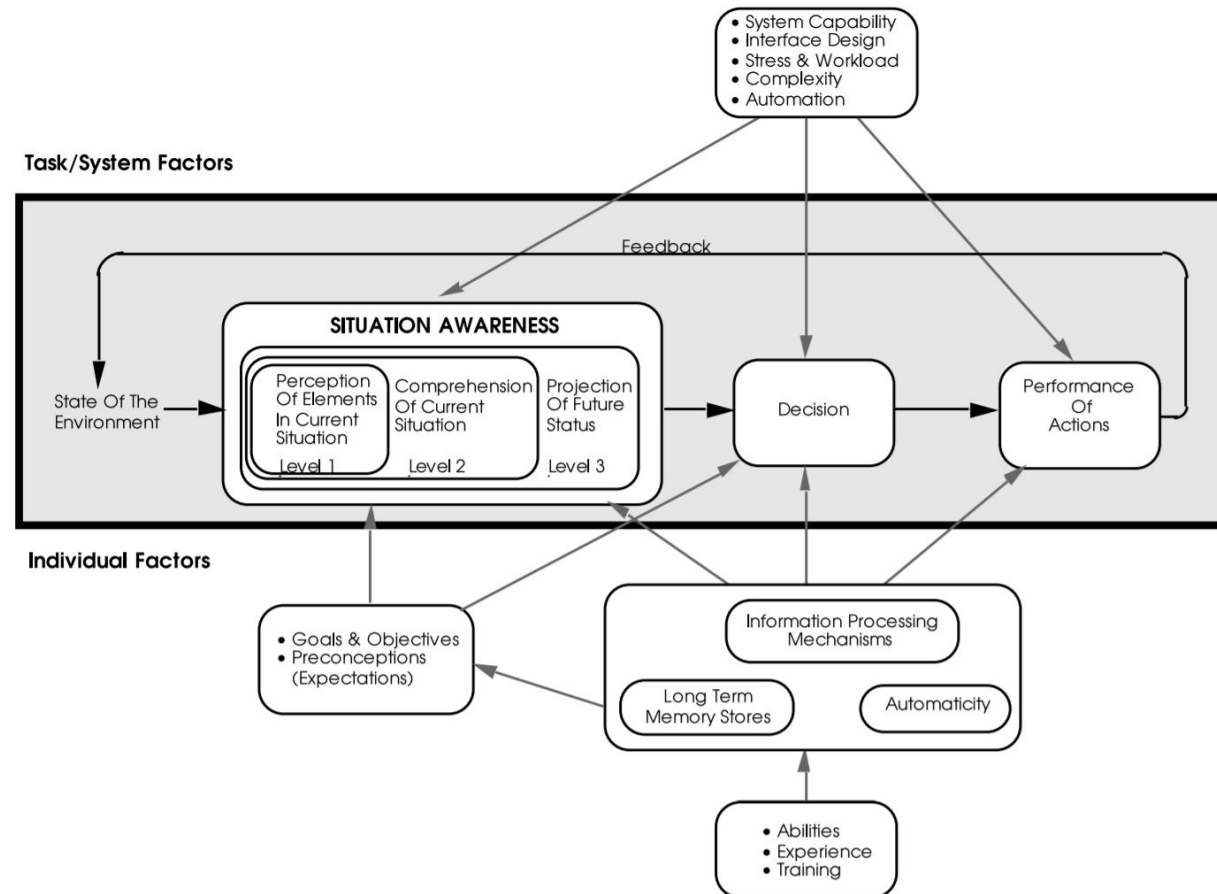
Presentation Overview

- **SA and Perception**
- **Generating and
Maintaining Expertise**
- **Exploiting VR in Armoured
Warfare Training**
- **The Future Soldier?**

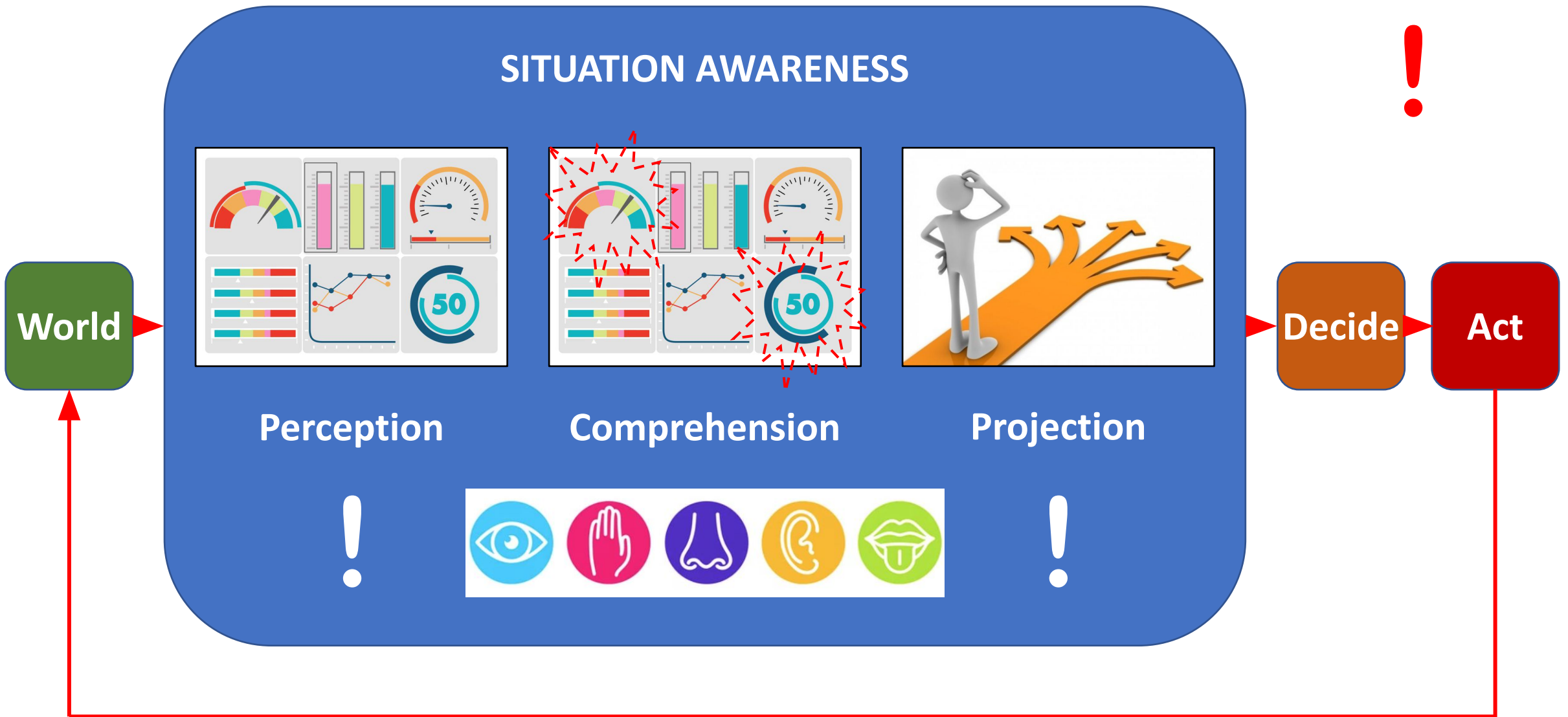


The Three Level Model of Situation Awareness (Endsley 1995)

Situational awareness is the perception of environmental elements and events with respect to time and/or space, the comprehension of their meaning, and the projection of their future status.

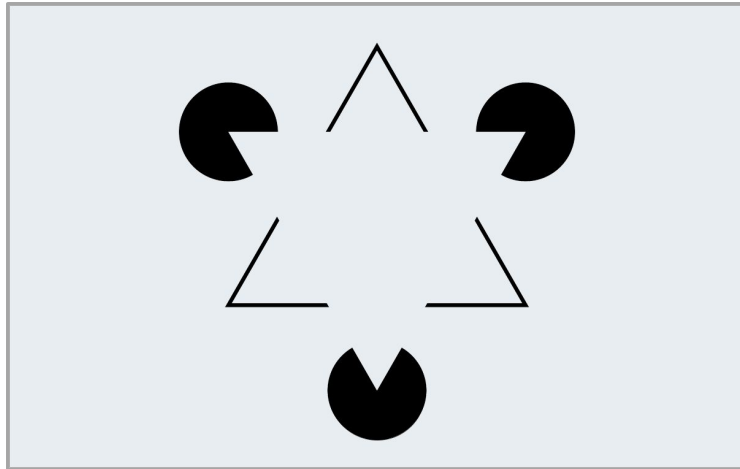


Based on Endsley's SA Three Level Model



Perception Challenges

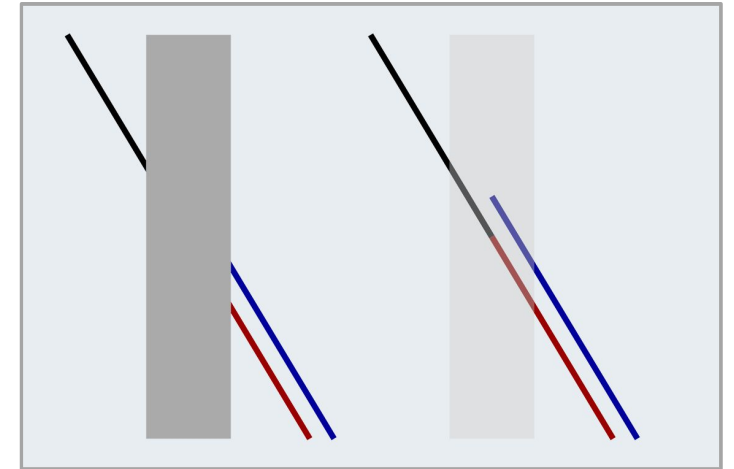
Kanizsa's Triangle



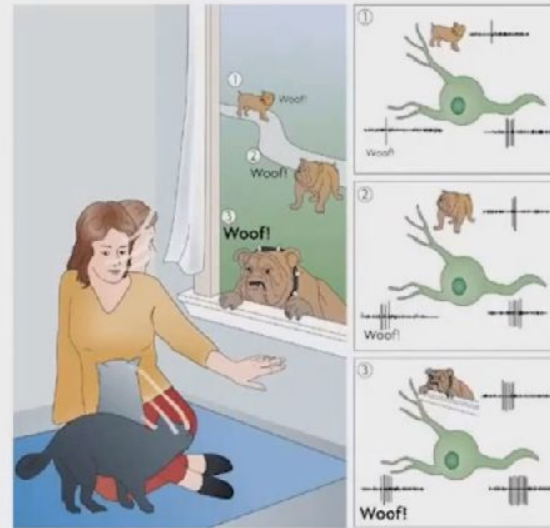
The Stroop Effect



The Poggendorff Illusion

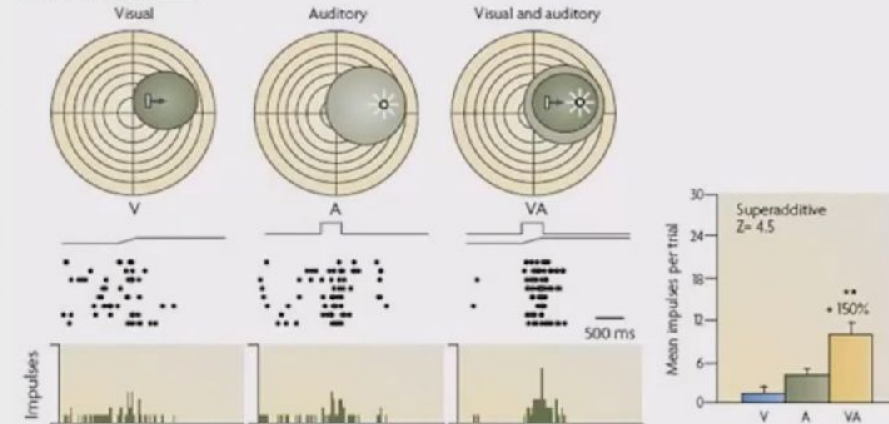


Multisensory Integration



Nature Reviews | Neuroscience

Multisensory integration



Stephanie L. Miller, et al. It's 150 percent more than the sum of the parts. R. Stanford. "Multisensory integration: current brain activation data and perspectives of the single neuron." *Nature Reviews Neuroscience* 9.4 (2008): 255-266.

Avatars: Finding a sense of self and others in the virtual world

829 views • 29 Mar 2021

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Microsoft Research
195K subscribers

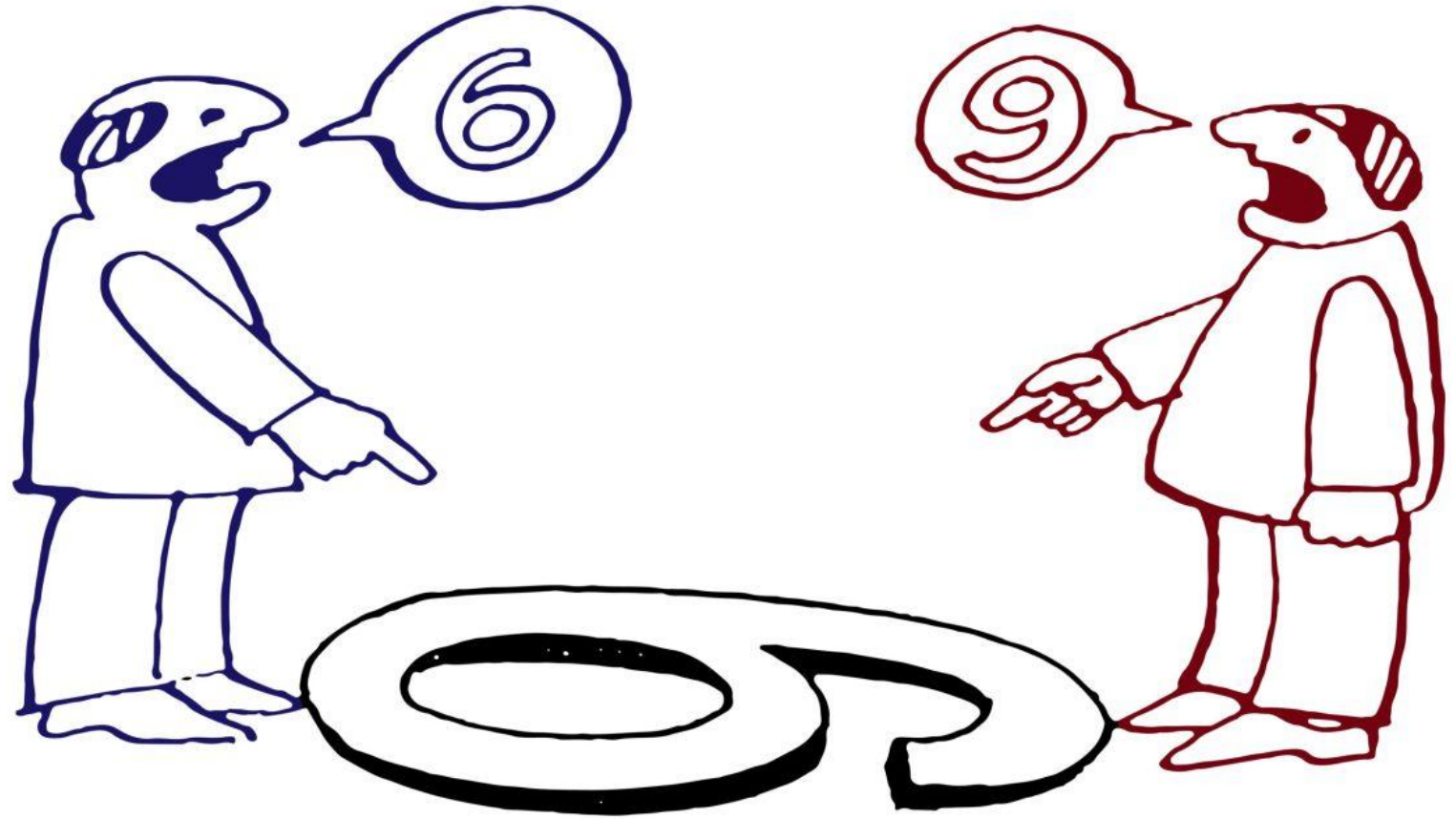
SUBSCRIBED



Multi-Sensor y Perception



Differences of Perception



Airplane! (1980)



The Pandemic and Pilots

Civil Aviation Training 7 April 2021

 **LEADER FORUM**
SKILLS DECAY



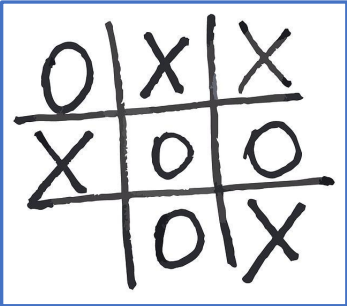
 **HalldaleGroup**

Science

- Why do skills degrade?
- Manual skills
- Cognitive skills
- Long term effects of not flying



- Working Memory
- Long Term Memory
- Pathways





What Makes an Expert?



Harvard
Business
Review

Managing People

The Making of an Expert

by K. Anders Ericsson, Michael J. Prietula, and Edward T. Cokely

From the Magazine (July–August 2007)

- “a person who is very knowledgeable about or skilful in a particular area”
- *experts are always made, not born*
- Superb performers have:
 - Practiced intensively, on tasks that they can, and that they *can't* do well
 - Studied with devoted teachers/mentors
 - Been supported enthusiastically



What About an Expert Team?



- An expert team, consists of individuals who have expertise, but more important, they have the ability to work effectively with others, resulting in a high-performing team
- For a team to succeed, team members need to be skilful in teamwork competencies such as knowing how to correctly coordinate and communicate



The Nature of Warfare

- **War is chaotic**
- **No battle plan withstands contact with the enemy**
- **“All but war is simulation”**
- **“Train as you Fight”**

Practice, Practice, Practice!

Individually and in Teams

Live Training



Times Photographer
Richard Pohle

THINKE

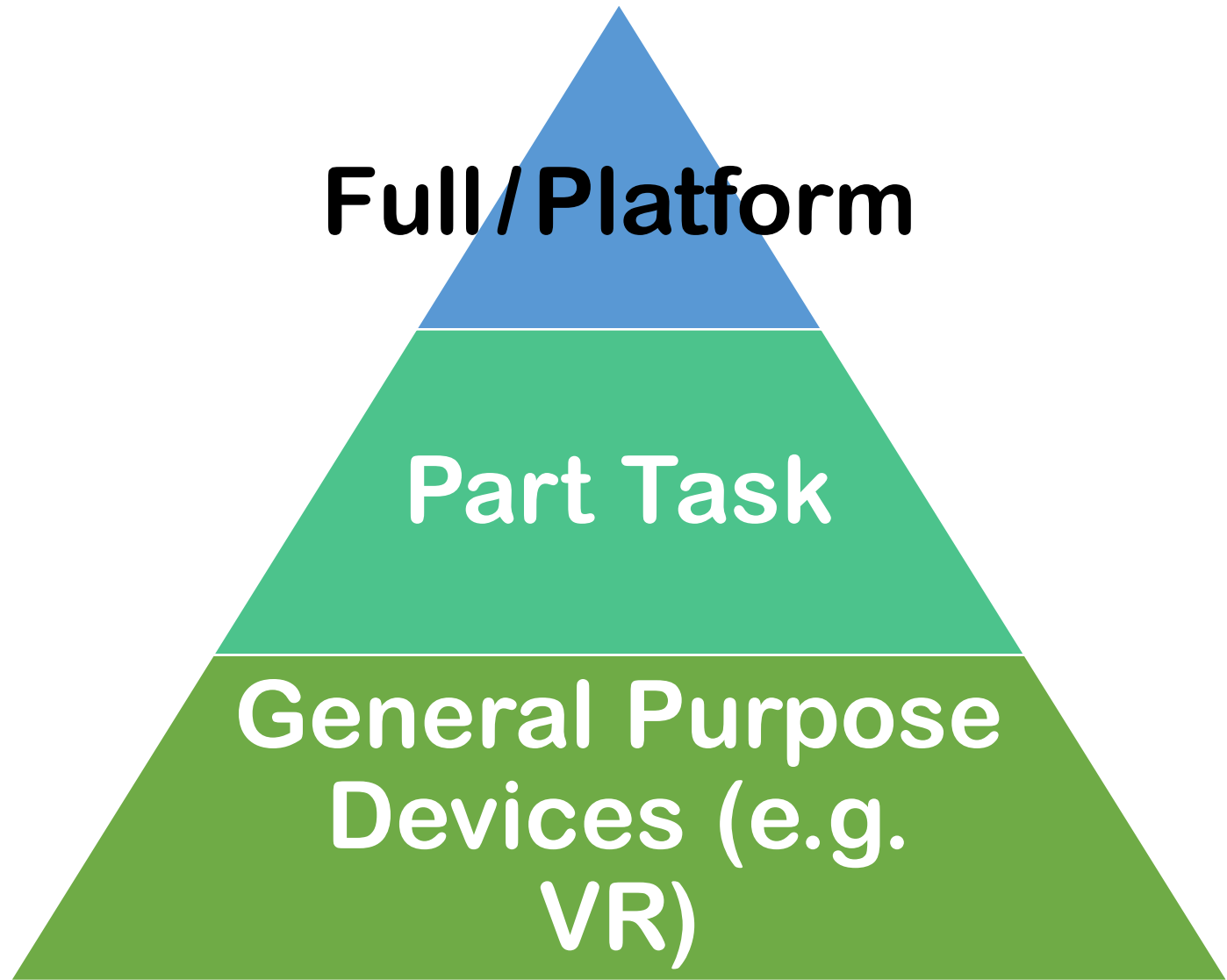
UK Combined Arms Tactical Trainer (CATT)



Mixed Fleet for Many Years



**Training
System
Availability**



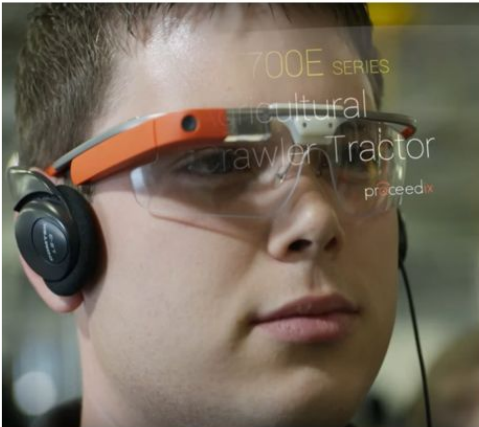
Virtual Reality in Land Training (VRLT) Pilot Q1 2019

- 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



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
			

VR-Based Training at Scale (2019)



- 18,500 Lufthansa cabin crew practice safety-related training required by the authorities in 18 VR cabins located in Frankfurt and Munich

Mixed Reality in Operations

Microsoft is supplying 120,000 HoloLens-based headsets to the US Army

The contract could be worth up to \$21.88 billion over 10 years

By Tom Warren and Sean Hollister | Mar 31, 2021, 4:11pm EDT



Image: US Army

Microsoft has won a contract to supply the US Army with HoloLens-based headsets. The contract could be worth up to \$21.88 billion over 10 years, and [CNBC reports](#) that it will involve Microsoft supplying 120,000 headsets. The software maker has been working closely with the Army since 2018, and soldiers have been testing the Integrated Visual Augmentation System (IVAS) headsets over the past two years. These devices combine high-resolution night, thermal, and soldier-borne sensors into a heads-up display.

Why VR for Collective Training?

- Immersive environment creates a challenging environment
- Can rapidly rehearse and repeatedly practice in a variety of scenarios
- Flexible, scalable, deployable and cost effective
- “in desktop simulation you look at the virtual world, in VR, you are in it”



VRLT1's Principal Training Audience

Warrior
1

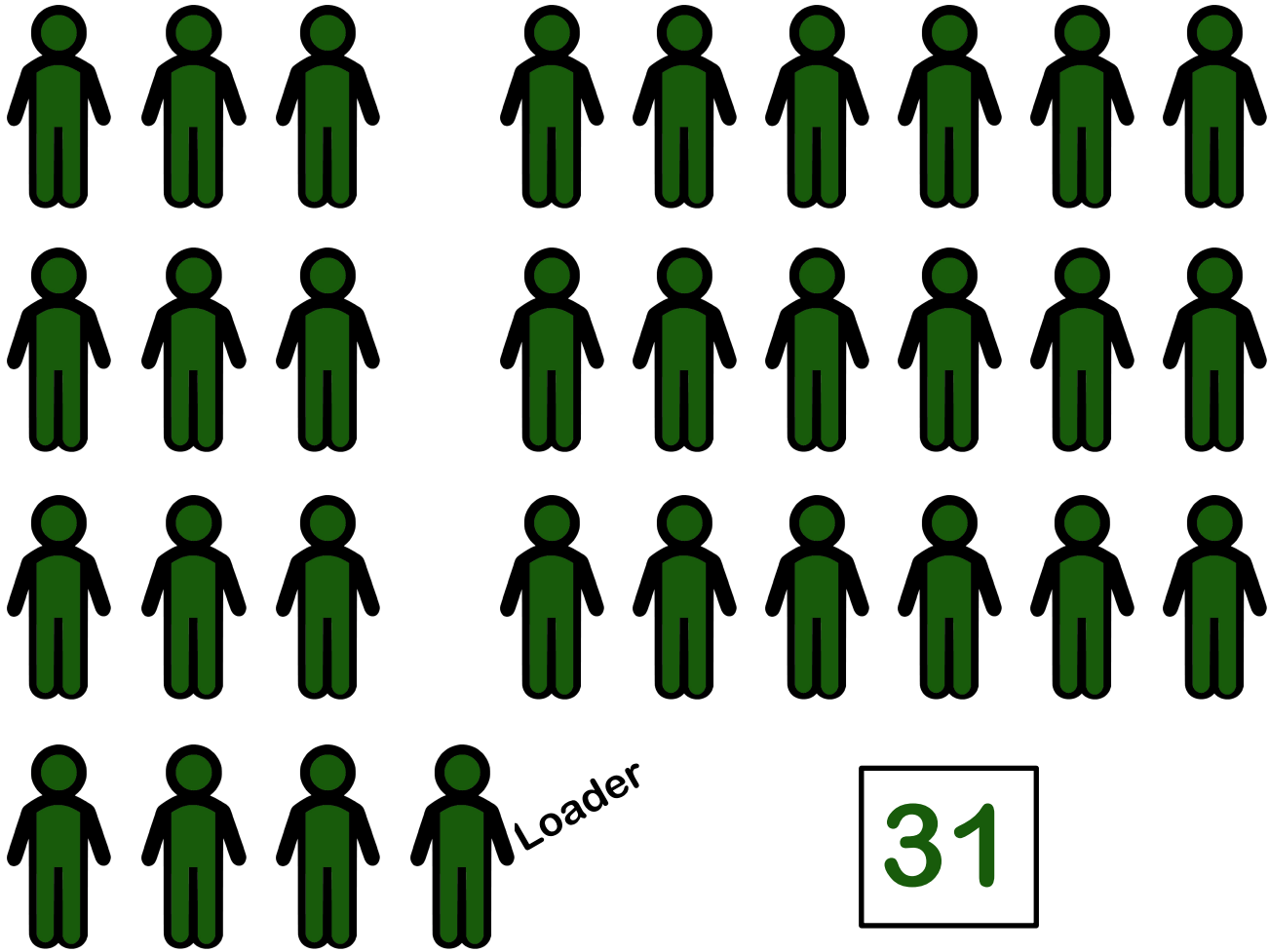
Commander
Driver
Gunner

Dismounts

Warrior
2

Warrior
3

Challenger 2
Tank



31



VRLT ORBAT



VRLT1

The Video



VRLT1

The Video





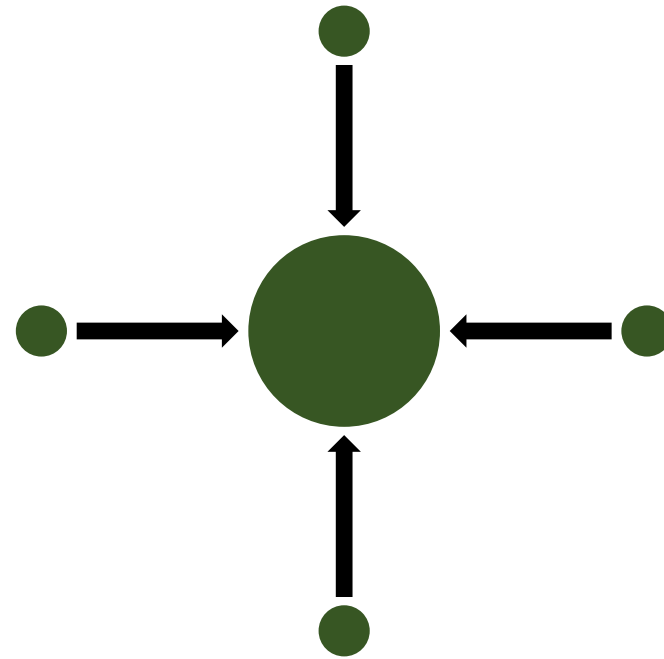


Future
Emphasis?

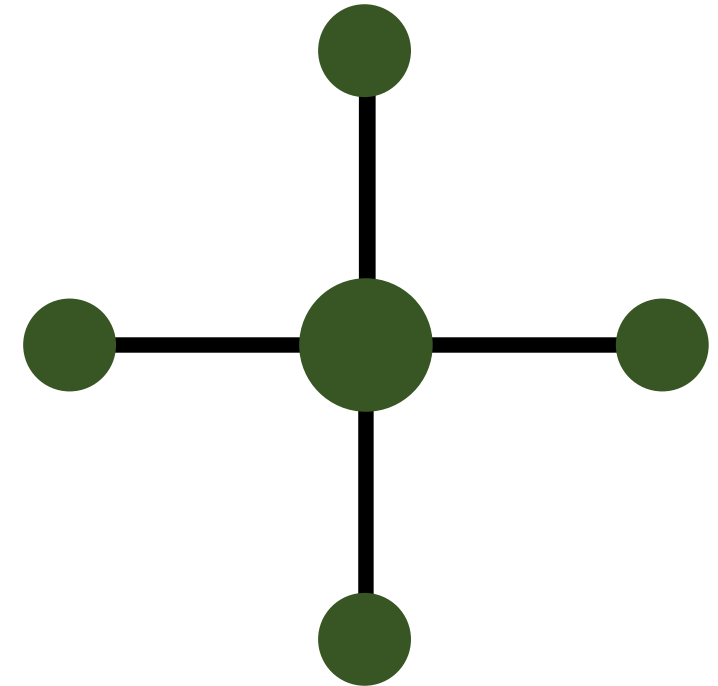
Now



Future



Training Centres



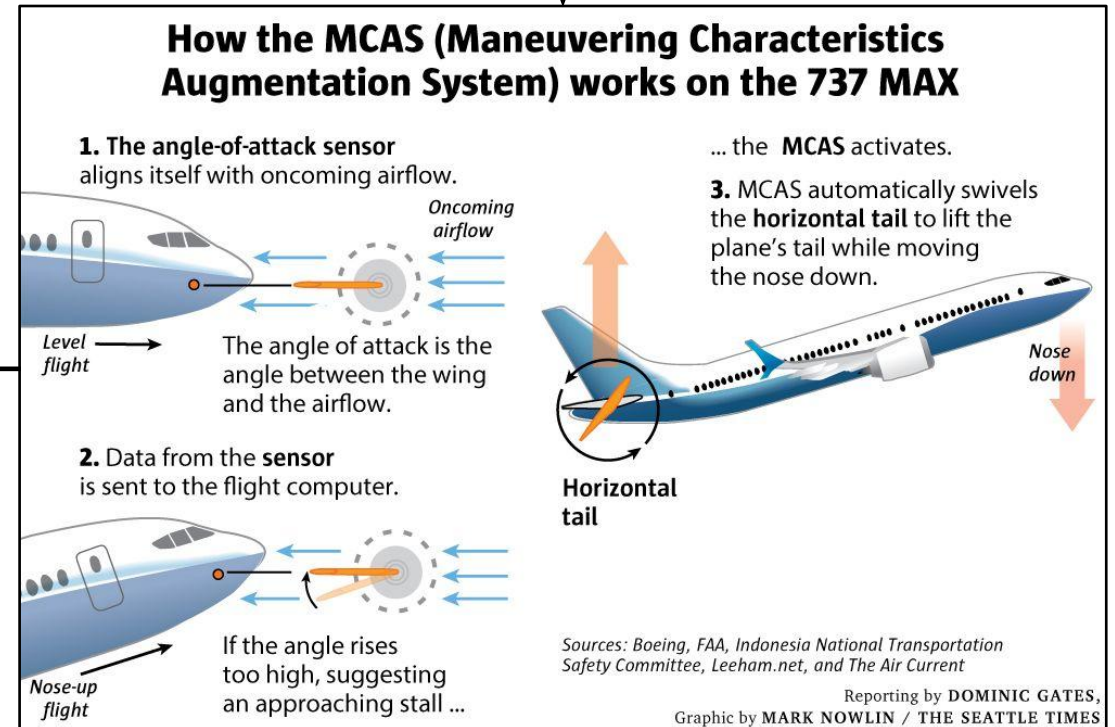
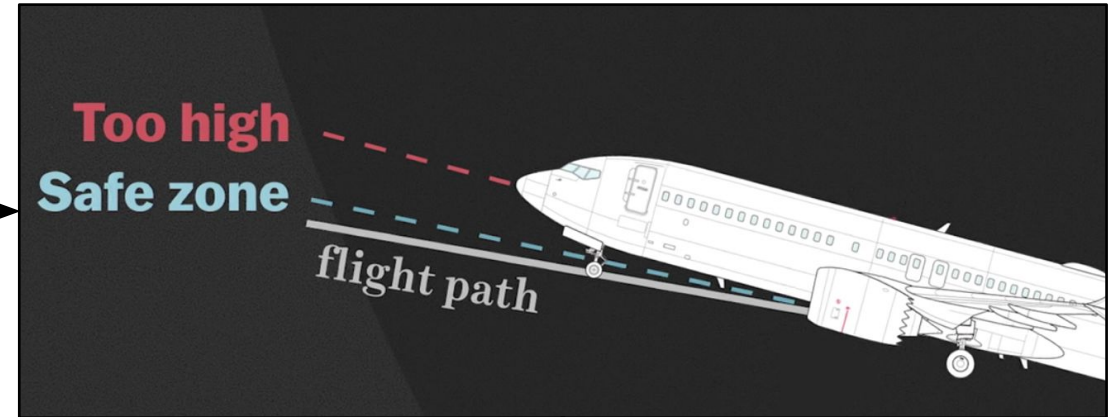
In Barracks

Simulation
(VBS3)

What About
Autonomous
Systems and SA?



Boeing 737 MAX – Sensors, Automation & Humans

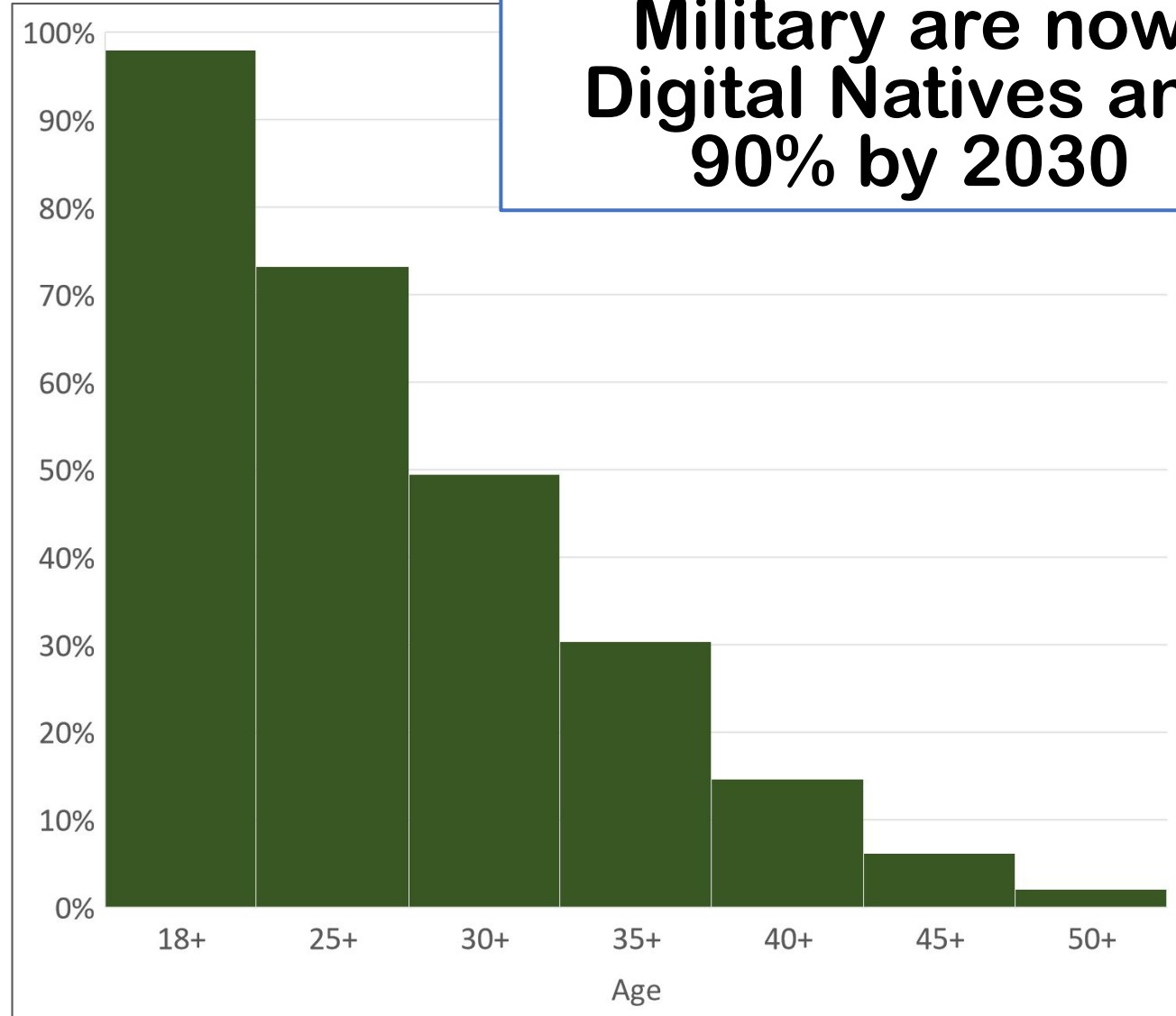


Future Soldier?



- Who will they be?
- What will they do?
- Where will they be?
- How will they train?
- Will we need them?

British Army Age Distribution

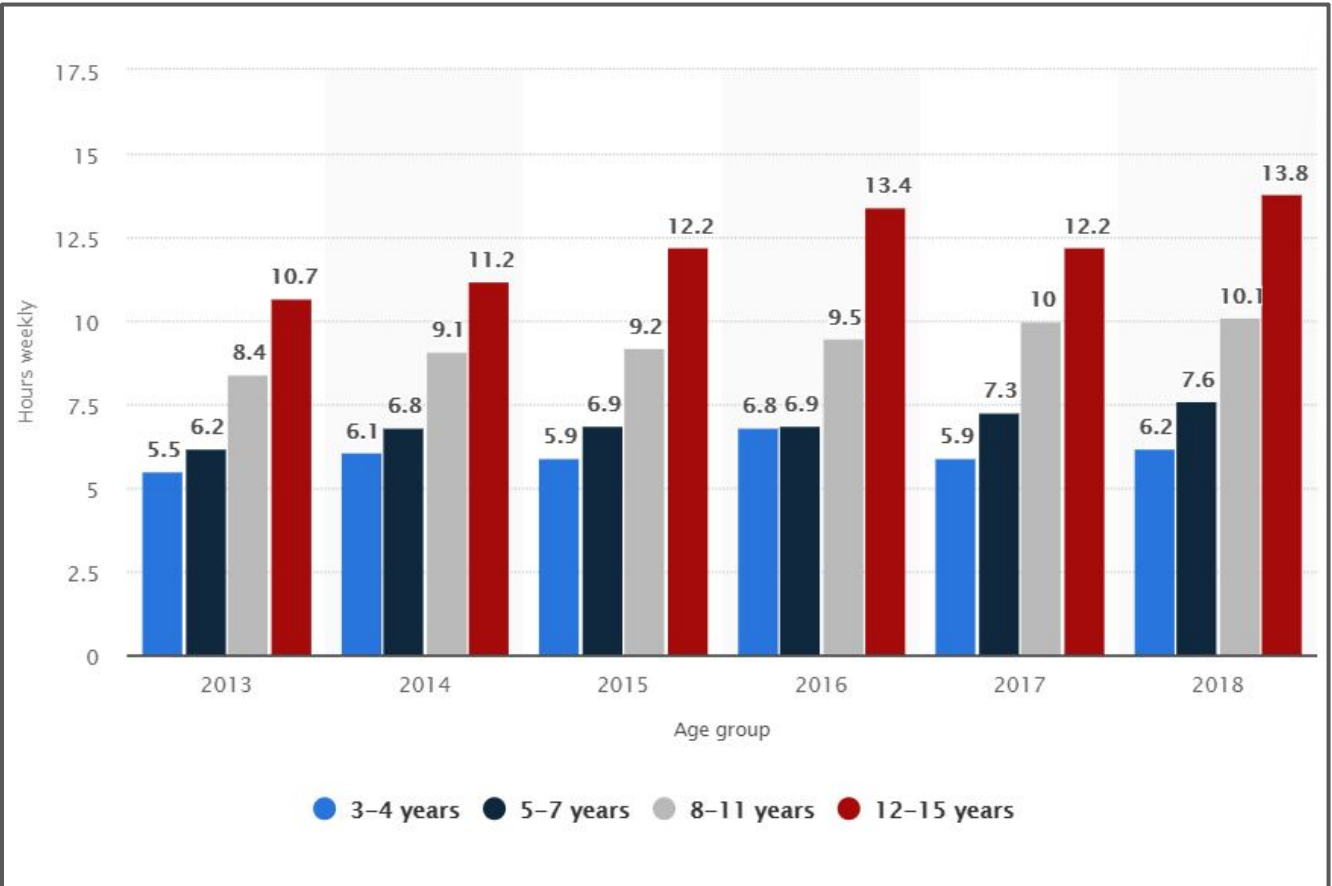


**Broadly, 2/3rds of the
Military are now
Digital Natives and
90% by 2030**



93% of Children Play Video Games

Children's Commissioner for England (2019)



Air Chief Marshal Sir Stephen Hillier Jan 18

“teenagers playing on their Xbox at home should take their gaming to the next level and join the RAF to operate real drones”

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Join the RAF for the real thing, Xbox teenagers are told: Head of the air force says young gamers should take it to the next level by operating drones

- Air Chief Marshal Sir Stephen Hillier wants more young people to join the RAF
- The service will be celebrating their 100th anniversary with events this year
- Among the major events planned is a flypast along the Mall before the Queen
- RAF chiefs hope a display of military might could provide a boost to recruitment

By LARISA BROWN FOR THE DAILY MAIL

PUBLISHED: 00:32, 12 January 2018 | UPDATED: 00:53, 12 January 2018



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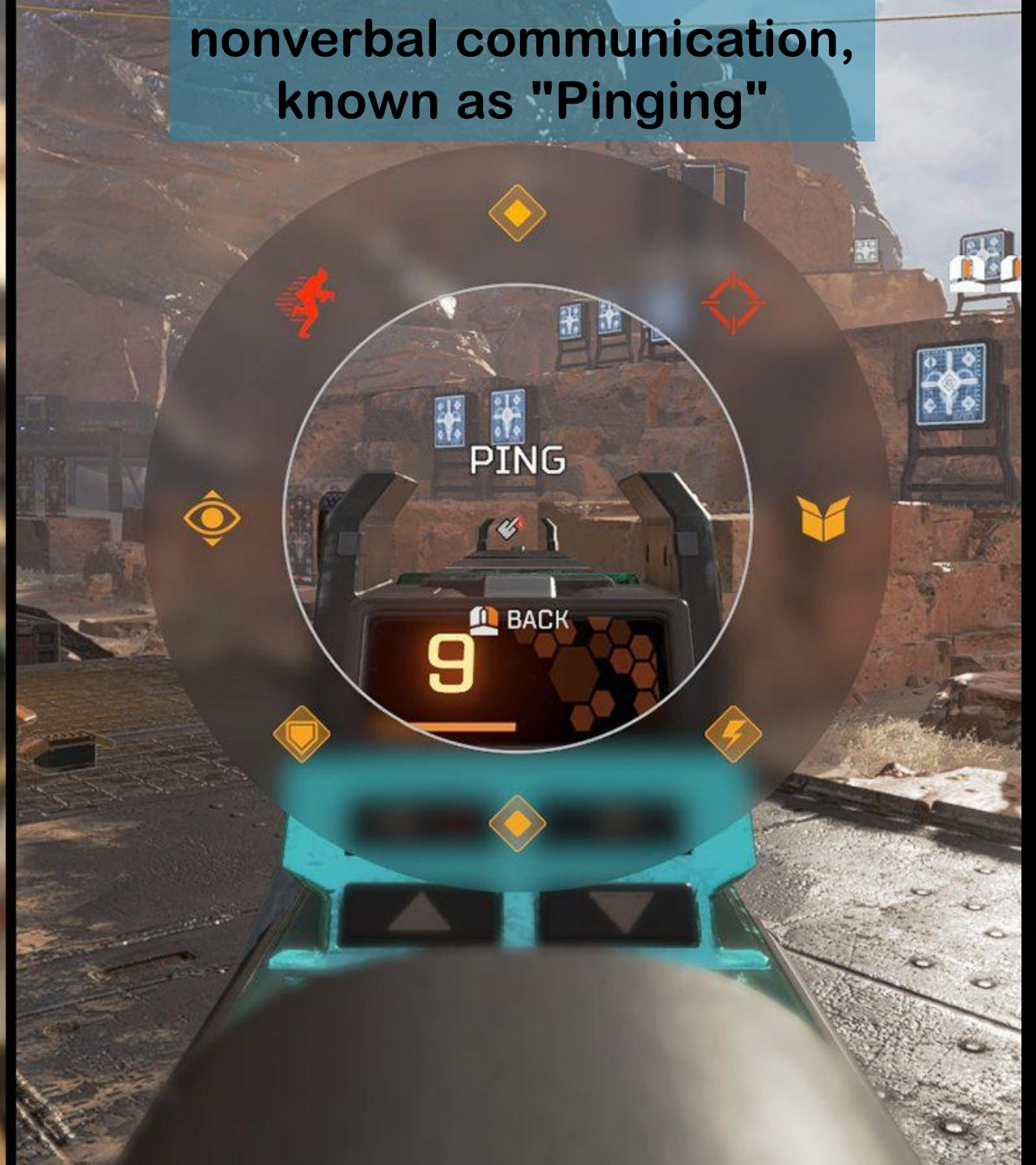


Teenagers playing on their Xbox at home should take their gaming to the next level and join the RAF to operate real drones, the head of the air force said yesterday.

Air Chief Marshal Sir Stephen Hillier said the RAF's next 100 years will see a huge shift towards unmanned flying machines as he outlined plans for centenary celebrations.



nonverbal communication,
known as "Pinging"



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





Questions?

Twitter - @andyfawkes1 | LinkedIn - andyfawkes | email - andy.fawkes@thinke.co.uk

UK Fight Club

“Bottom-up Initiative”

or

Practitioner-le d



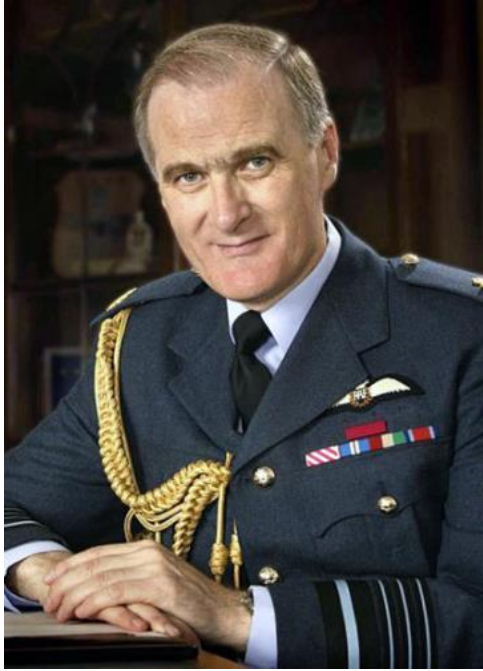
Human Factors and Training Always Last?



Trends of Interest in Training and Simulation

**- Next 10
Years**

- **Simulation and Gaming**
- **XR**
- **Haptics**
- **AI and Data**
- **Cloud and Edge Computing**
- **5G**
- **Digital Twins**



Sir Jock Stirrup

Chief of Defence Staff

2007 RAeS Edwin Link Lecture

- “...the crew of a submarine when it is submerged at least is in many ways already operating in a virtual environment...”
- “...we can see emerging *the fuzing of* synthetic and real world environments *such* that would be it would it make increasingly difficult to distinguish between training carried out in simulation and the real thing.”



Why Join the British Army? (2016)

youtu.be/AMl3bW7BdLI

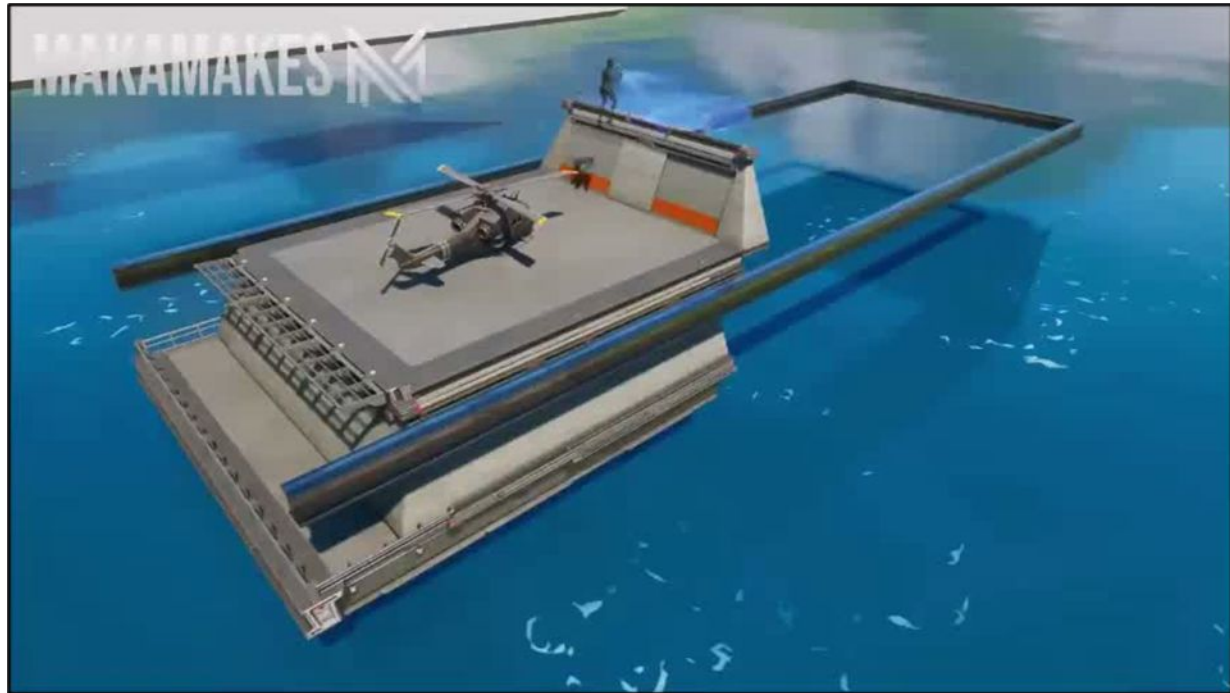




Fortnite Party Royale

&

Fortnite Creative

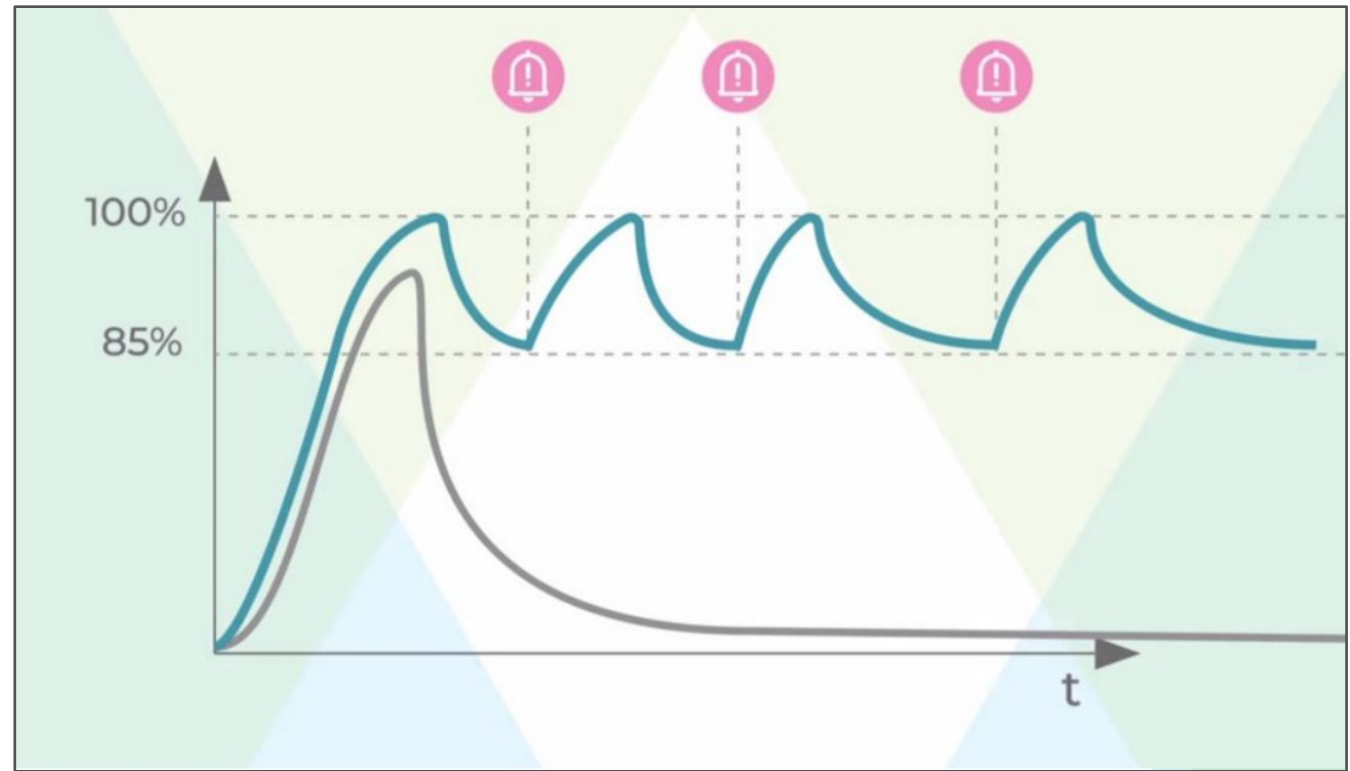


VRLT Pilot Introductory Brief

SANDBOX



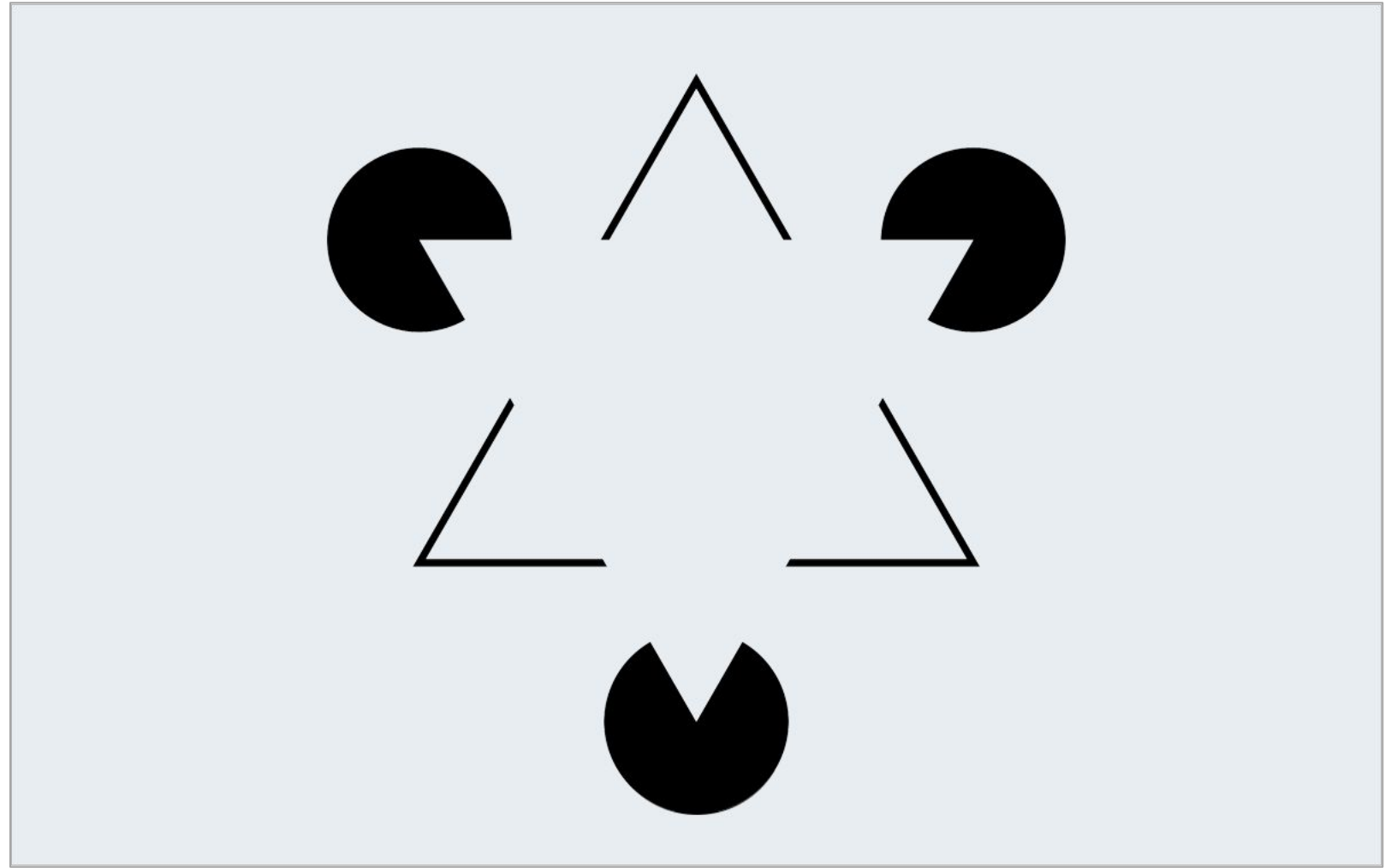
Skill Fade



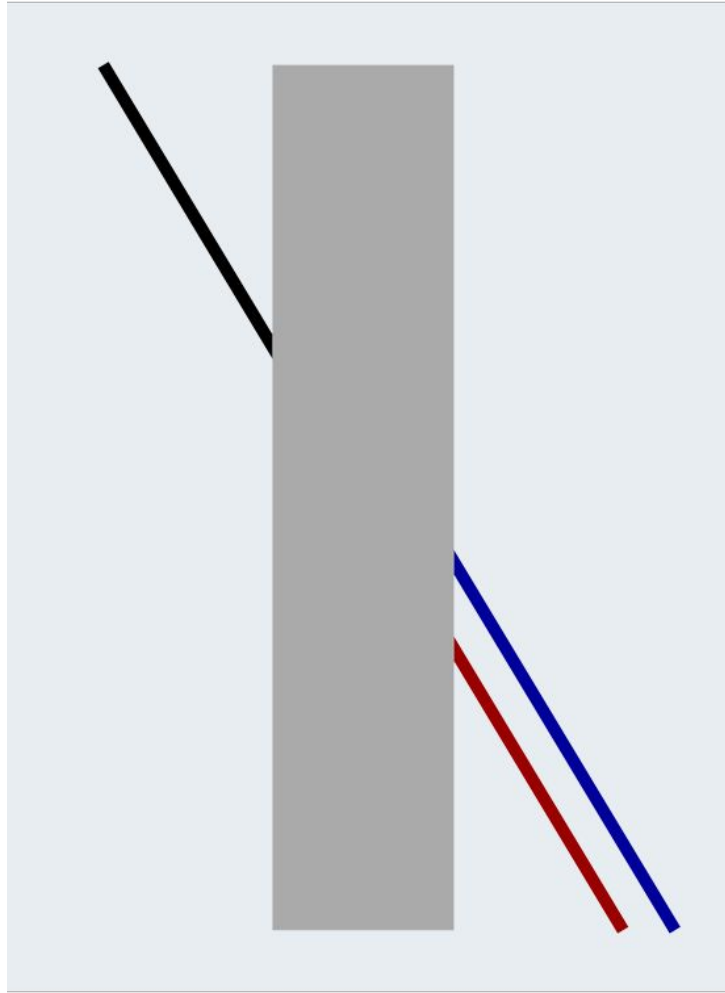
Collective Training Teamwork Taxonomy

- Leadership – character, knowledge and action that inspires
- Situation Awareness – shared mental model of team situation
- Decision Making – team collectively makes a choice
- Communication – right information, right people, right time
- Co-operation – team goals over individual's

Kanizsa's Triangle



The Poggendorff Illusion



The Stroop Effect

