

AT THE EDGE:

*exploring and exploiting
fifth-generation edges*

A Whole-of-Force Approach
to
Confronting Complex Air Defences

Presentation to DSEI 19 Aerospace Capability Conference

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#JerichoEdge

#PartneringAtTheEdge

www.airforce.gov.au/our-mission/plan-jericho

UNCLASSIFIED

UNCLASSIFIED

AIR FORCE
JERICHO
CONNECTED • INTEGRATED

RAAF Leadership's Air Power themes



- Previously (currently?) narrow lens of aircraft
- **People** leading **disruptive transformational innovation** to deliver the best Air Force and provide the best effects within the **joint force**
- Disruptive technologies increasingly important
- **Speed and scale** at which game-changing tech proliferates will really challenge our older thinking about maintaining a capability edge
- Get the best from our people by **augmenting their intelligence**
- **Early investment** in artificial intelligence, predictive analytics, natural language processing and heuristics
- Moral responsibility = **trusted** + **ethical** technology
- **Develop** our people as **innovators**
- **Identify early adopters** of innovation
- Provide pathways for innovations to be developed and assessed for future force enhancers
- **Win without fighting**

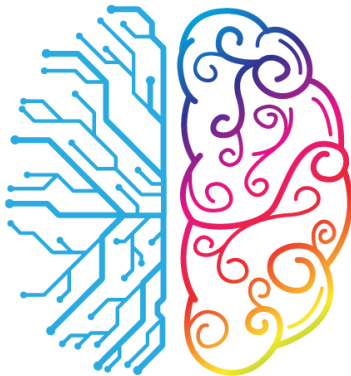
OUR COMPARITIVE ADVANTAGE WILL COME FROM UNDERSTANDING OUR SOCIETAL STRENGTHS

ARTIFICIAL INTELLIGENCE

Machine processing is needed to gain insight from the volume, velocity, and variety of information we encounter in the Information Age.

We can use the tempo, precision, pattern recognition, and mass of machine processing to overcome human cognitive limitations.

CONTROL



HUMAN INTELLIGENCE

Human cognition allows us to go beyond data and patterns to imagine alternative worlds and infuse events and ideas with social meaning and value.

We can harness the creativity, power, flexibility, and empathy of human cognition to explore ambiguity and worlds beyond the grasp of data-dependent machine processing.

FREEDOM

AUGMENTED INTELLIGENCE

OUR COMPARATIVE ADVANTAGE

Our society's emphasis on individual freedom means our people have grown up using their own creativity and flexibility to make decisions under ambiguity. This is our human edge in the Information Age.

OUR FIFTH-GENERATION EDGE WILL COME FROM **COMBINING HUMAN COGNITIVE FLEXIBILITY WITH MACHINE POWER** TO MAKE SMARTER DECISIONS FASTER

COMBAT CLOUD

Network integration, including machine-machine integration, that enables the unified distribution, management, and application of resources at machine speed.

HUMAN-MACHINE AUGMENTATION

Develop human cognitive attributes and development pathways; human-machine interfaces; and operating concepts to optimise human, machine and combined performance.



ADVANCED SENSING

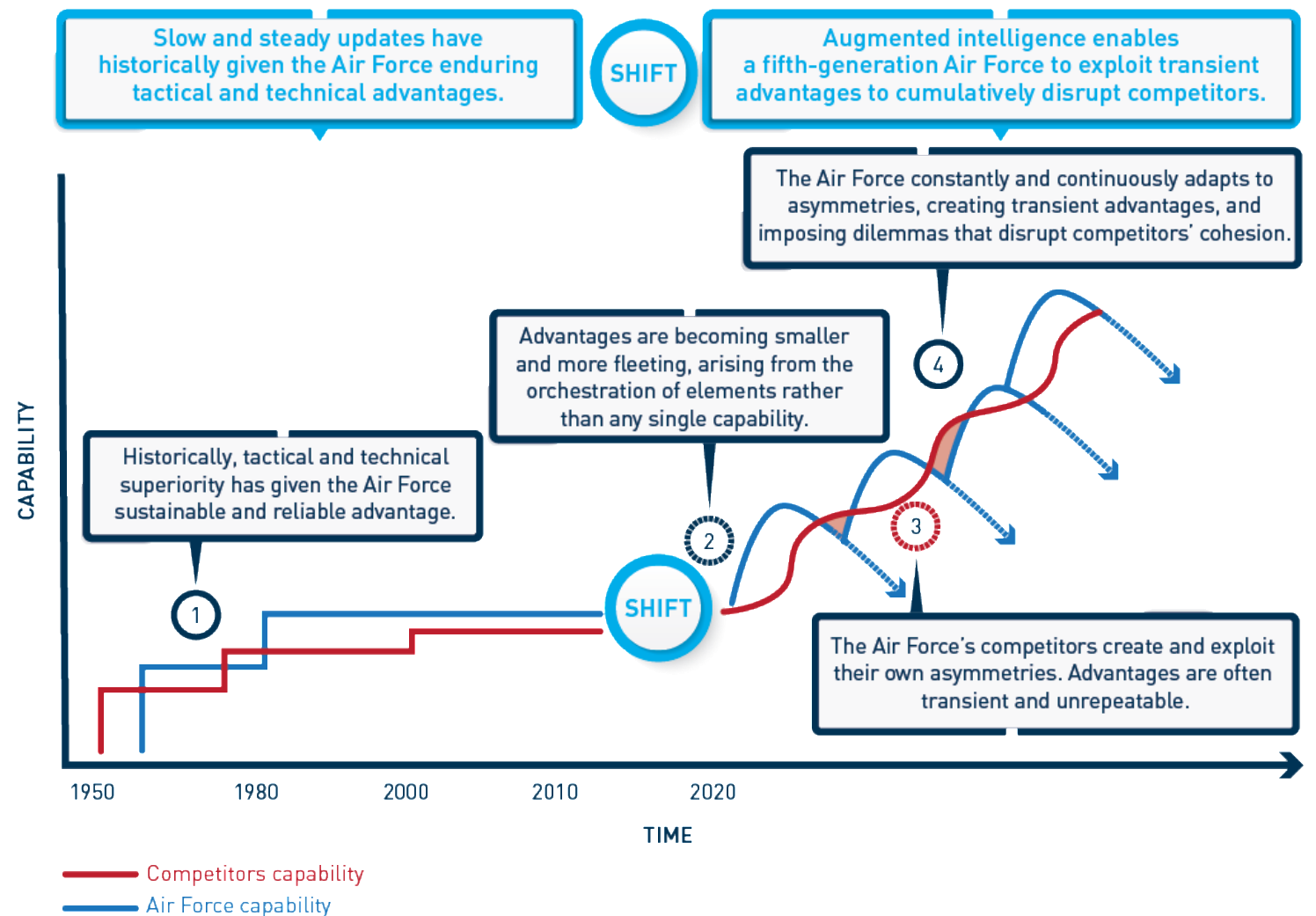
Advanced sensors to detect and track challenging targets in difficult environments and improve situational awareness.

AUTONOMOUS PROCESSING

Development of artificial intelligence and machine learning that enable Defence to rapidly understand and implement broader AI developments in a transparent, explainable, and trusted manner.

CHALLENGE

1. War will remain by nature a clash of human wills; human direction and control remains essential.
2. Pervasive information and machine processing changes the character of war by creating new domains and accelerating its tempo.
3. Competitors' equipment will be more numerous, and may be as good or better than our own. Small advantages may be decisive.
4. Competition will be constant and continuous. Our competitors will study us to target perceived vulnerabilities. Advantages will be temporary.



Competition is accelerating and the margins of success are becoming smaller and less enduring.

How does Air Force combine humans and machines to compete in the Information Age?
How does Air Force bridge the gap between reliability and risk to find transient advantage?

Question

How does the joint force prevail in a complex environment?



Mechanism



Answer

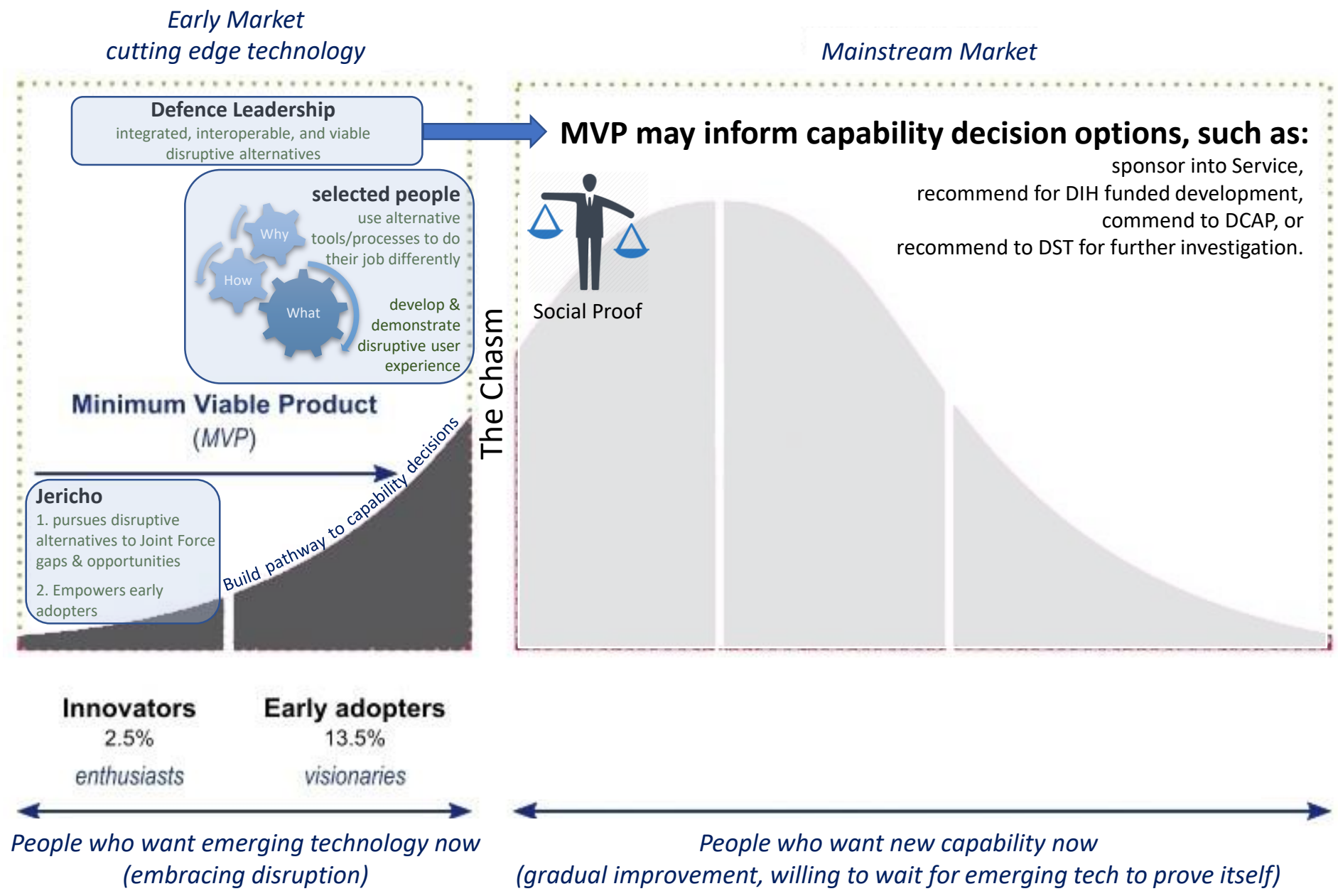
5th Generation



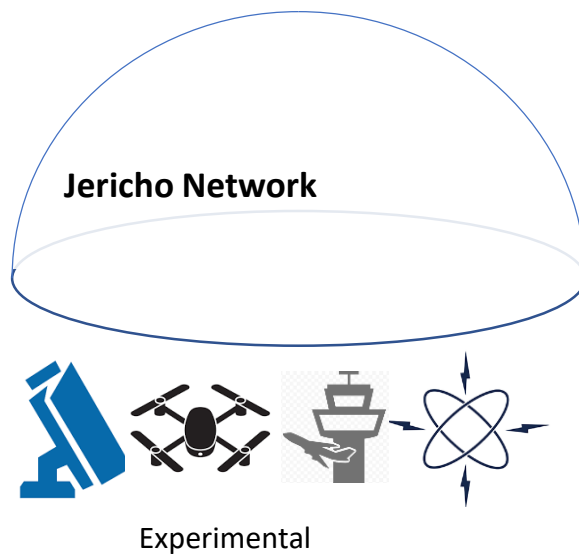
Answer

With people 'designed' and equipped to make better informed decisions with machine tempo and precision wherever they are

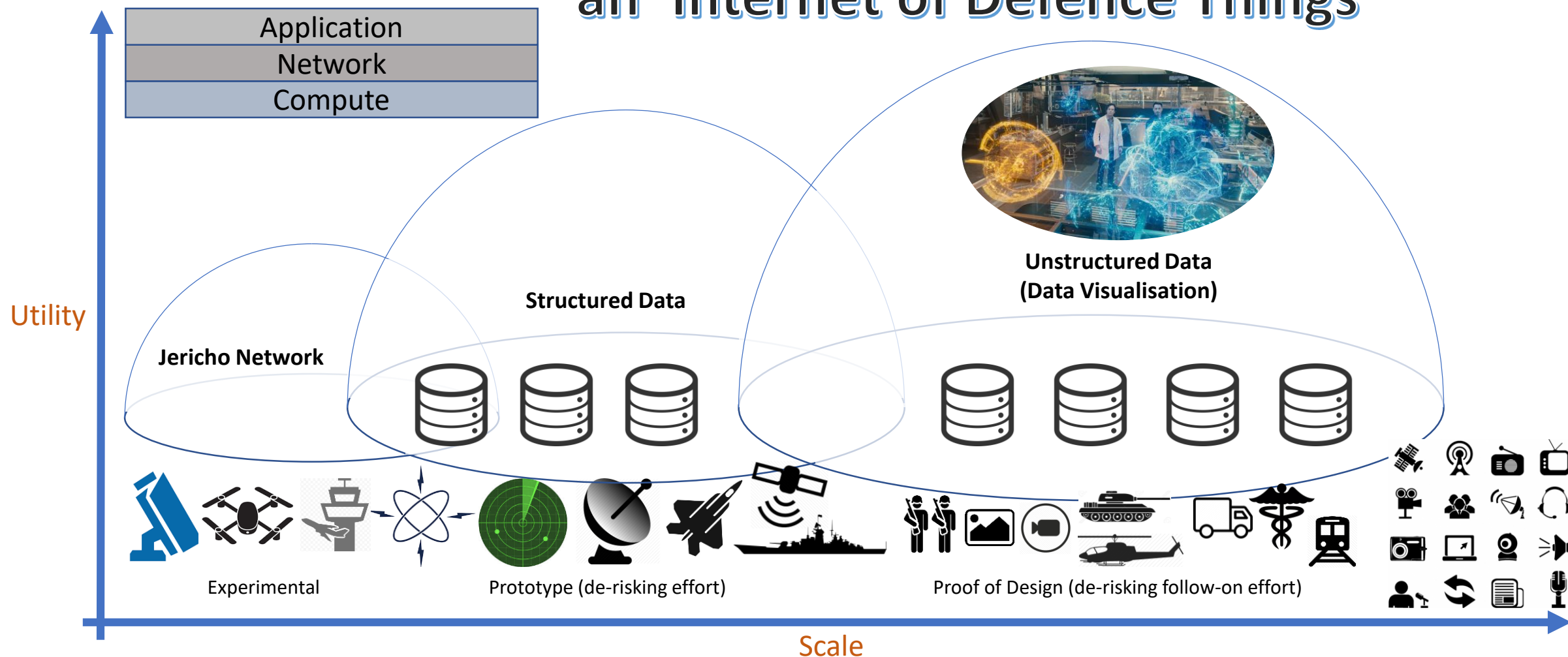
Air Force's Disruptive Innovation Adoption Concept



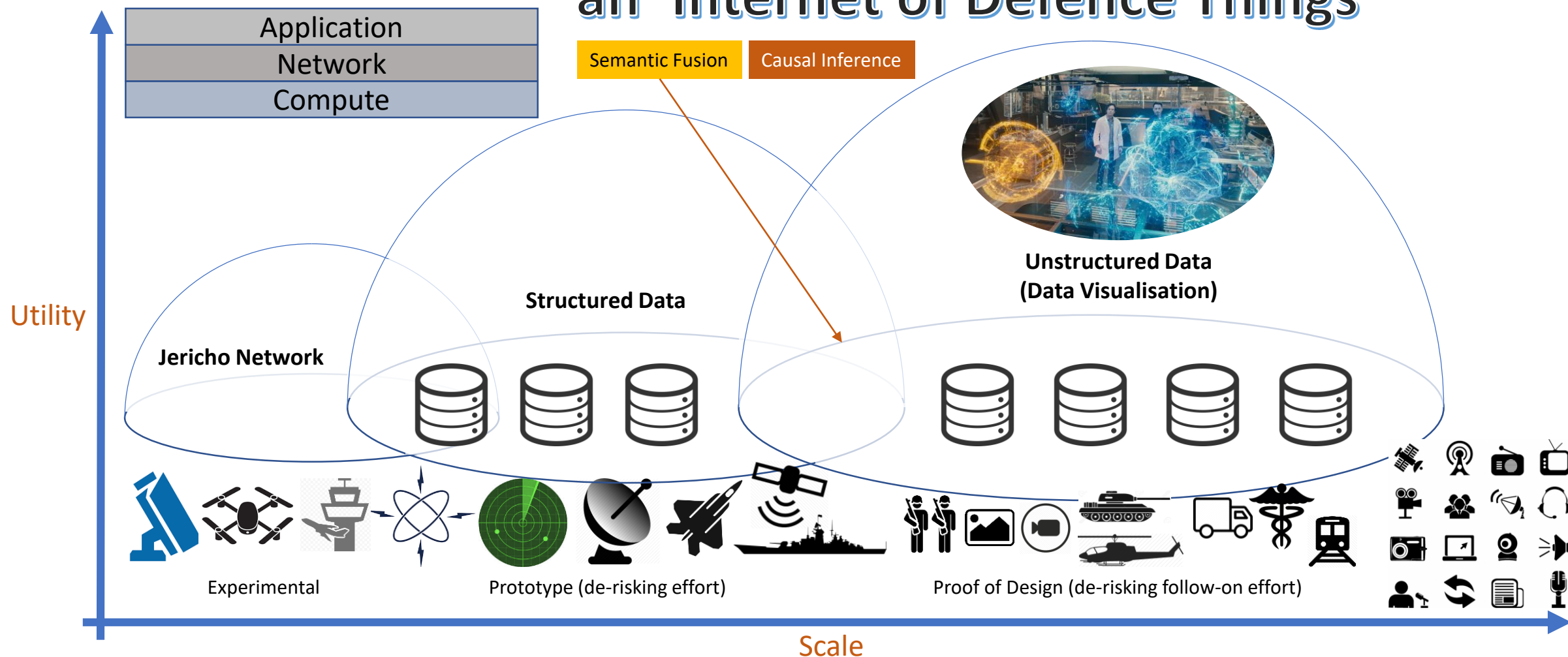
Application
Network
Compute



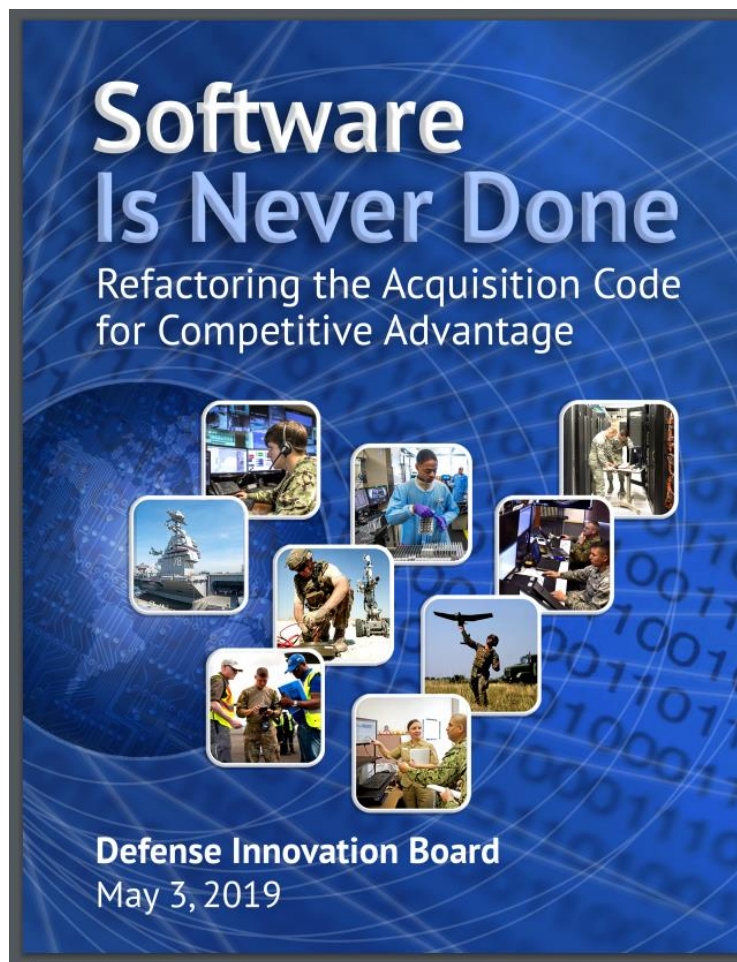
an 'Internet of Defence Things'



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A disruptive concept - an Air Force becomes an app store



- **Digital talent matters.**
 - Software is made by people and for people.
- **Speed of relevance.**
 - Streamline **process** and transform **culture** to enable **effective delivery and oversight** of multiple types of software-enabled systems, **at scale**.

<https://media.defense.gov/2019/May/01/2002126688/-1/-1/0/SWAP%20ABRIDGED%20REPORT.PDF>

'Sync Me, See Me, Know Me, Be Me' - AI to aid battlefield decision-making?



"the guy behind the guy"
'Mike' to 'Trent'

Mike's value is that he has the know-how to get things done, acts quickly, and therefore is indispensable to a leading figure.

Swingers, directed by Doug Liman,
Miramax;(1996) / Source: Pinterest

Marshal Louis-Alexandre Berthier
Napoleon Bonaparte's
Chief of Staff 1796 - 1814



What if had a 'Digital Chief of Staff'?

Commander can command

- make better decisions
- act with an inherent intuition
- clearly consider more factors
- imaginative
- compel others

AI filters knowledge

- finds, processes, and presents the needed information in relevant time
- Notice things humans don't – or at least notice them faster and alert them
- Shrink and sequence problems to make them more solvable

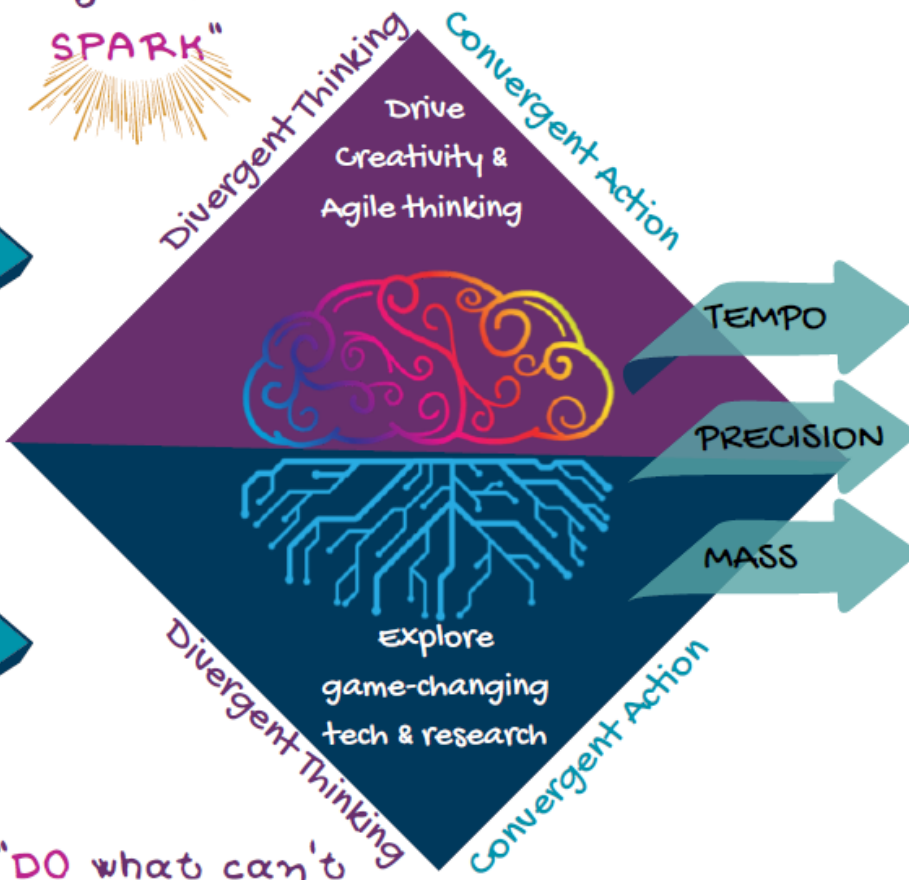
<https://madsciblog.tradoc.army.mil/tag/napoleon-bonapartes-chief-of-staff/>



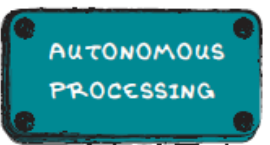
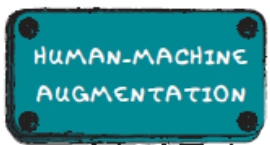
JERICHO EDGE ACCELERATION PLAN

WHY?

PARTNERING TO ACCELERATE AIR FORCE
IN A CHALLENGING WORLD



AUGMENTED INTELLIGENCE



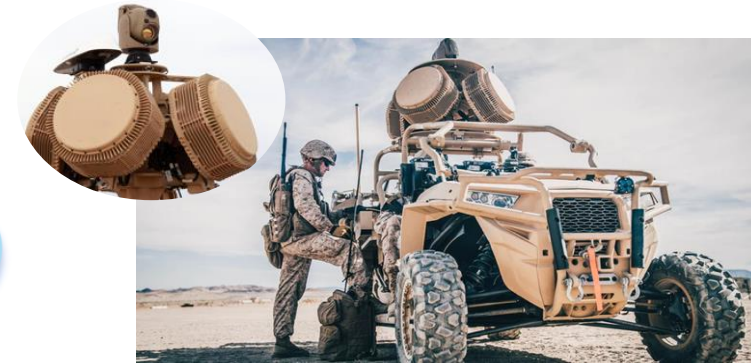
"DO what can't be done"

DESIGN. THINK. MAKE. BREAK. REPEAT

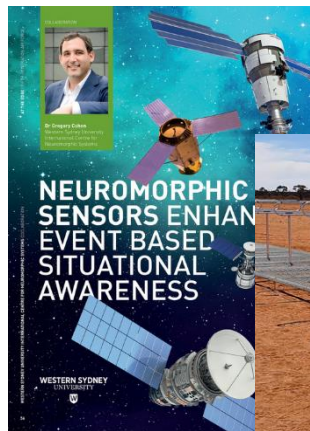
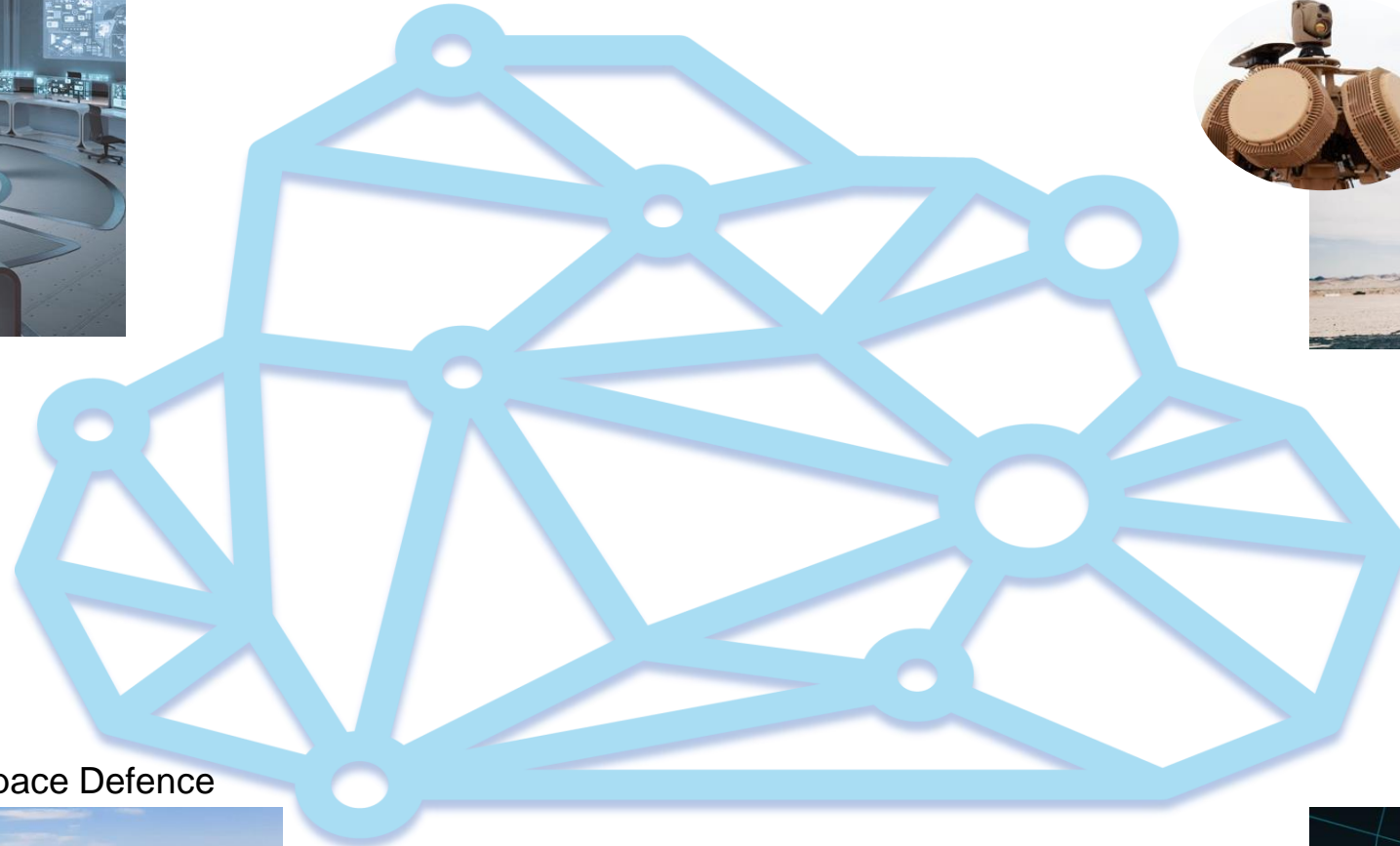
THE CATALYST FOR ACCELERATING AIR POWER'S 5th-GEN IMPACT IN THE JOINT FORCE



Virtual Operations Centre



CUAS Laser



Passive Air & Space Defence



AI ethics, assurance, trust
Data practitioner community



QUESTIONS?

