Australian Government
Department of Defence
Science and Technology

Intelligent Decision Superiority

DST is developing a capability to intelligently and automatically fuse, analyse and make sense of data and information from disparate and distributed sources at speed to enable distributed decision superiority for commanders and warfighters.

Defence is acquiring a large number of next generation platforms and systems that collect vast amounts of data from which high value intelligence can be extracted. However, the largely manual methods of processing this data means that up to 85% of the data collected may never be looked at.

DST is researching concepts, techniques and technologies to automate the processing and sense-making of this high-value data.

Autonomous processing and reasoning

To leverage the expertise within academia and industry, DST is establishing the Intelligent Decision Superiority research network under the Next Generation Technologies Fund. The first theme being explored is "Autonomous processing and reasoning" as one of the critical enablers for decision superiority. The objective of this network is to exploit and develop emerging technologies to support enhanced decision-making across Defence.
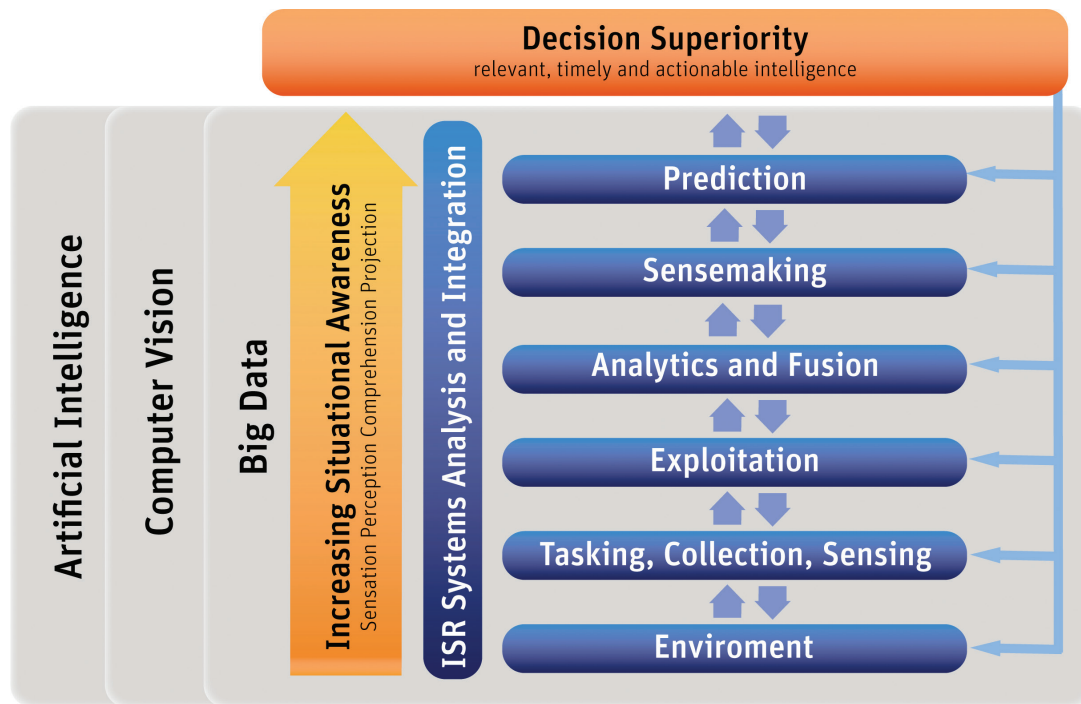
Decision superiority requires us to make better decisions faster than an adversary. Automation is imperative to help analysts, operators and decision-makers deal with the overwhelming volume, velocity, variety and uncertain veracity of available ISR information.

Today, much of this fusion and sense-making currently happens in the analyst's head. If these processes are to be reliably automated, the meaning and uncertainty of the information must be available and amenable to automated reasoning, the automated reasoning system must be able to justify its conclusions to decision-makers, and it must be able to answer "why" questions.

By drawing on the capacity and capability of Australian academia and industry, DST hopes to accelerate the achievement of real-time automation of data processing.

This will significantly increase the amount of information available to generate knowledge and high-value intelligence, greatly enhancing the situational awareness of military commanders and enabling them to make better decisions, faster.

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Decision Superiority
relevant, timely and actionable intelligence

Artificial Intelligence

Computer Vision

Big Data

Increasing Situational Awareness
Sensation Perception Comprehension Projection

ISR Systems Analysis and Integration

- Prediction
- Sensemaking
- Analytics and Fusion
- Exploitation
- Tasking, Collection, Sensing
- Enviroment

Today

- ► Human-intensive process
- ► Increasing number of ISR collection assets
- ► New sources of data such as social media
- ► Many sources, multiple access methods
- ► Hierarchical and sequential processing and decision-making
- ► Limited machine assistance
- ► Around 85% of collected data is never used
- ► Information provided in non-real time.

Tomorrow

- ► Automatic fusion of collected intelligence, military sensing, social media, text, voice
- ► Use of advanced AI and machine learning for automated exploitation and sense-making
- ► Distributed processing and decision-making
- ► Production of connected, live, data sets
- ► Increasingly integrated ISR and combat cloud
- ► Real-time actionable and explainable information to decision-makers
- ► Answers Why and Who, not just What and When.

Partnering opportunities

DST is seeking to establish collaborative partnerships with industry and academia to undertake R&D in areas relating to real-time automation, human and artificial intelligence interaction and distributed multi-domain networking.

Key areas of interest include:

- ► ISR automation & integration,
- ► Soft and hard data & information fusion,
- ► Big data analytics,
- ► Computer vision, machine learning, artificial intelligence
- ► Human and AI interaction
- ► Distributed and resilient multi-domain networking.

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