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Australian Government  
Department of Defence  
Science and Technology

# HPR*net*

Human Performance Research *network*

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– Army

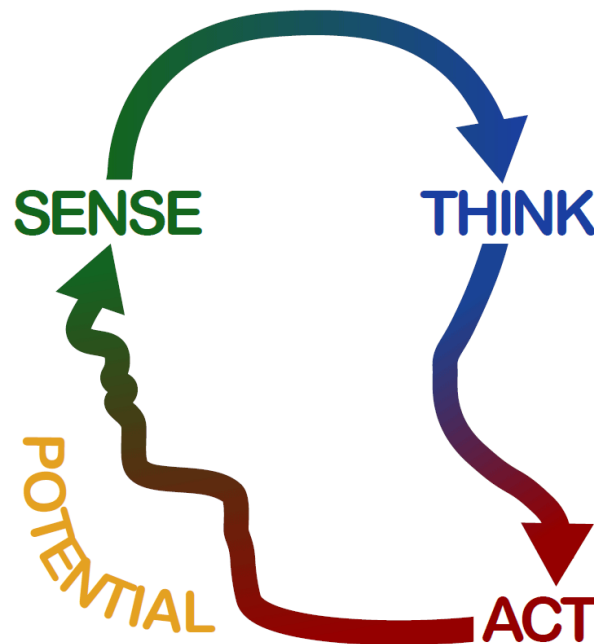


**DST**  
GROUP

Science and Technology for Safeguarding Australia

# Focus

Focusing on the way entities (people/robots) function in the world, individually and in aggregate, can help to identify the practical relevance of emerging technologies.

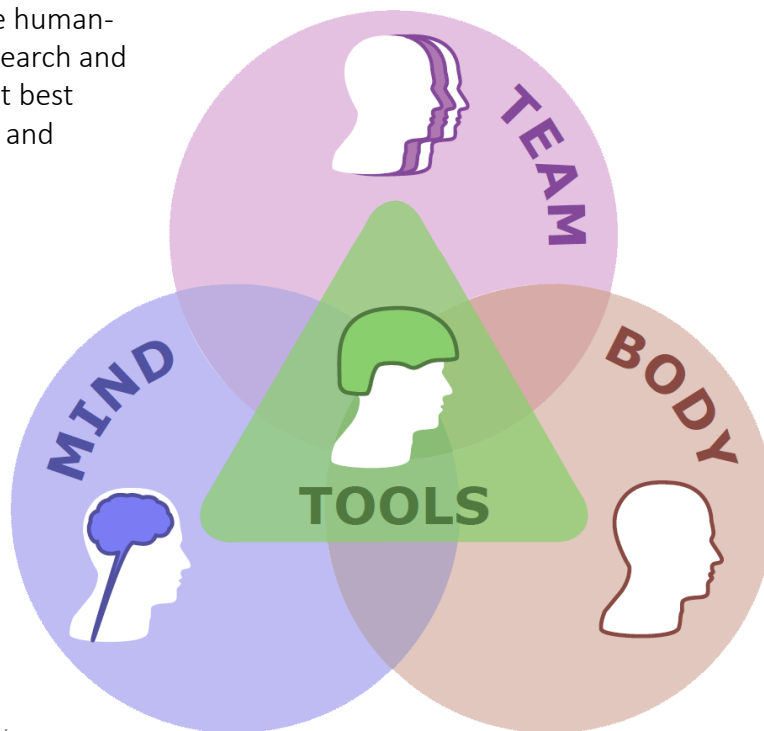


Core Functions

*Living things (and autonomous systems) operate in a continual cycle. We sense **our status and the world** around us ... we **reflexively or reflectively** respond ... interacting with the world through **action or communication** ... continually assessing the immediate and cumulative effects of our actions and considering our next response. Our potential to perform these functions over time is strongly influenced by our **health, energy and emotions**.*

# Expertise

Considering the intersection of the human-system can help to identify the research and development disciplines that might best combine to optimise performance and resilience for mission success.

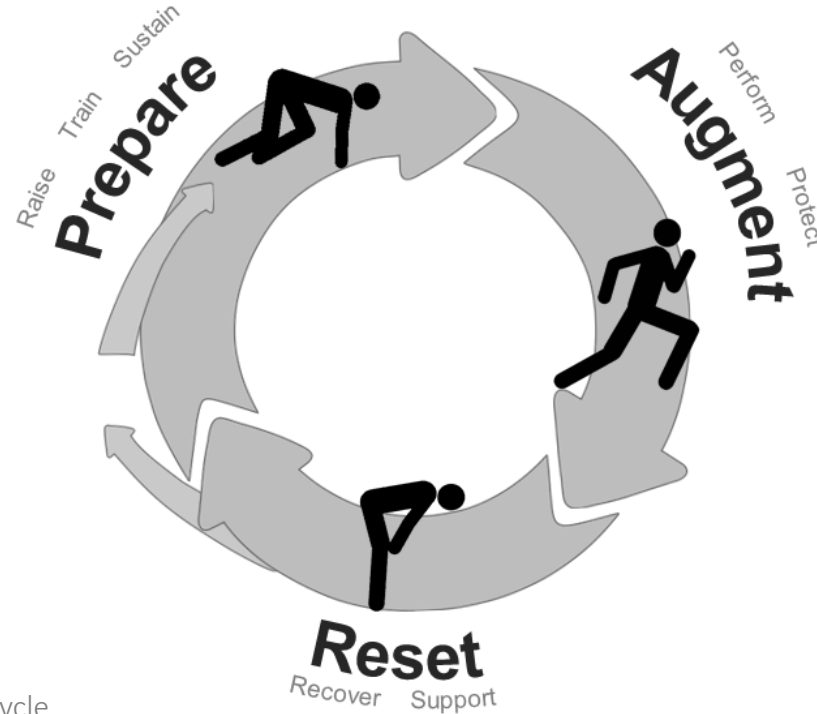


The Human System

*There are a broad range of human science disciplines advancing our understanding of human performance and resilience. The many specialisations across **physiology** and **psychology** intersect when studying real world performance. Methods related to behaviours and **social** interaction at the team, organisation and population levels further inform human-system performance. Enhancing military capability requires a range of research disciplines overlaid with the methods that **design, integrate and iterate** the tools and techniques of the warfighter’.*

# Impact

The operational lifecycle can help to understand the path to achieving a capability impact through research and development.



The Operational Lifecycle

*The investment of time and money on research demands a viable path to impact. It is important to understand how the ADF **prepare to perform** their missions, **augment** warfighters with tools and techniques, and support **recovery and resilience** to prevail and reset. Army, Navy and Air Force appoint senior officers with responsibility for these distinct phases. Impact through S&T depends on the insights and ongoing support of these stakeholders.*

# Cognitively

## Prepared

Select and prepare individuals to make **effective decisions** in challenging operational conditions?

Select and prepare **adaptive and resilient** individuals to perform effectively in challenging operational conditions?

**Prepare teams** to operate effectively in challenging operational conditions?

Deliver effective, affordable, **training** and feedback tailored to the learning opportunities of individuals within teams?

Achieve tailored training outcomes through the application of **immersive** technology and tools?

Make use of **synthetic** teammates to reduce the size of the personnel footprint required for effective collective training?

## Augmented

Exploit emerging **information systems** to reduce cognitive burden and enhance performance in challenging operational conditions?

Mitigate the performance **decrements** of personnel on sustained operations?

Exploit **wearable** technologies to enhance and track cognitive performance and behaviours?

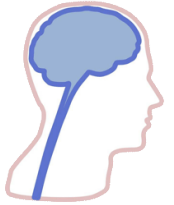
Team personnel with **autonomous** systems to increase combat effectiveness?

Enhance cognitive performance through **nutrition** and supplementation?

Make sense from complex **information** from multiple sources of variable reliability to inform military decision making?

Increase the capacity for accurate and timely decision making by distributing the load across and team and software **agents**?

Overcome battlefield **deception** and uncertainty and apply them for military advantage?



# Physically

## Prepared

Select and prepare personnel to be **physically resilient** for roles conducted in challenging operational conditions?

Exploit emerging methods to optimise the **physical performance** in challenging operational conditions?

Optimise **nutrition** and feeding systems to enhance performance in challenging operational conditions?

## Augmented

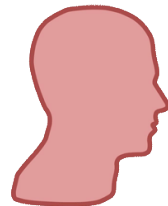
Reduce the **physical burden** on combatants through emerging technologies?

Continually develop and improve **platforms, individual equipment & clothing** to survive and thrive on operations?

Exploit **wearable** systems to enhance and monitor physical performance?

Exploit emerging food and **drug** technologies for the enhancement of physical performance and resilience?

Exploit emerging **bio-enhancement** technologies for the optimisation of physical performance and resilience?



# HPRnet Applications



HPRnet CDIC

Business.gov.au search menu

Home > Centre for Defence Industry Capability (CDIC) > Defence Innovation Portal > Next Generation Technologies Fund > Current opportunities - Next Gen Tech Fund > Defence expanding future-focused human performance research

## Defence Innovation Portal

### Defence expanding future-focused human performance research

Last updated: 14 February 2019

Defence is expanding and expanding scientific research in human performance through its Human Performance Research network (HPRnet). Universities can receive funding of up to \$500,000 from the Next Generation Technologies Fund for innovative, future-focused research on Defence's human performance priorities.

**HPRnet information sessions** for university scientific researchers are being conducted across Australia during the week of 18 -22 February. Hear and discuss how you can help soldiers enhance their physical and cognitive performance.

The performance of Australian Defence Force (ADF) people and their ability to adapt and prevail in future operational scenarios is a critical factor in building and sustaining the ADF's capability edge.

Defence Science and Technology (DST) established HPRnet in 2016 with a \$4 million investment over four years from Army. HPRnet is currently funding research by universities across Australia focused on enhancing the cognitive and physical performance and resilience of military personnel.

HPRnet is expanding to include the human performance research priorities of Air Force and Navy, with an investment of a further \$4 million from the Next Gen Tech Fund.

DST is seeking proposals for innovative, future-focused research that address one or more of the ADF's human performance priorities. These include:

- physical preparation
- physical augmentation
- cognitive preparation
- cognitive augmentation

Successful universities could receive funding of up to \$500,000 per study over four years and become members of the HPRnet research community.

For more information and to submit a proposal see the [DST website](#).

<https://www.business.gov.au/Centre-for-Defence-Industry-Capability/Defence-Innovation/Next-Generation-Technologies-Fund/Current-opportunities-Next-Gen-Tech-Fund/Defence-expanding-future-focused-human-performance-research>

Australian Government Department of Defence Science and Technology DST Science and Technology for Safeguarding Australia

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Home > Partner with us > Next Generation Technologies Fund > Human Performance Research network (HPRnet) 2019 Call for Study Proposals

## HUMAN PERFORMANCE RESEARCH NETWORK (HPRNET) 2019 CALL FOR STUDY PROPOSALS

DST and its military stakeholders are seeking to extend and expand the Human Performance Research network (HPRnet), an enduring network of leading research teams partnered in the advancement of human performance of direct relevance to the military context.

### BACKGROUND

The performance of its people and their ability to adapt and prevail in future operational scenarios is a critical factor in building and sustaining the ADF's capability edge. The absolute priorities for research and development (R&D) are set out in the research priorities set out in Annex A of this document. HPRnet was established in 2016 through Army funding to help to address its top Human Performance research requirements and is currently supporting that plan while being considered to seven universities for 2019 funding. With this funding for these studies concluding in 2020, this next round funding will support future enhancements to ADF capability and ensure the continuity of HPRnet as a community of researchers focused on delivering Human Performance outcomes for the ADF.

### RESOURCES

Enhanced Human Performance is one of the key S&T themes identified in the Defence White Paper 2016. As a consequence, funding for this extension of HPRnet has been allocated from the Next Generation Technologies Fund. Human Performance is a priority for our international partners and we are pleased to announce that plans are in place to expand the network through a contribution from the US Office of Naval Research (ONR). As a result, it is projected that around ten new HPRnet studies will be selected for funding of up to \$500,000 each.

### PARTNERSHIP OPPORTUNITY

DST is seeking Demonstrations of Interest (DOI) for innovative proposals of future focused research that can meaningfully address one or more of the ADF's Human Performance priorities (see Annex A). The intention is to fund against the DOI to include Australian Universities who are signatories of the Defence Science Partnership (DSP) Deal.

Based on a positive investment of up to \$500,000 study, proposals will be asked to detail:

- How funds would be allocated (R&D, Field Ops, Undergraduate, cadets, consumables, etc.) in order to deliver the study's ADF focused outcomes.
- Commitment to build trust partnership through the appointment of an academic chair in HPRnet and the investment of university resources to maintain outcomes for Defence.

Cross-university discussion and alignment of study proposals will be viewed positively where a systematic case is made.

### HOW TO APPLY

<https://www.dst.defence.gov.au/hprnet2019>

DST Science and Technology for Safeguarding Australia

WITH US CAREERS MEDIA CENTRE CONTACT US ALUMNI

CLASSIFIED information by law. For submission, please contact the HPRnet team via [this link](#).

### KEY INFORMATION

Future Information

Applications

### ATTACHED FILES

- HPRnet Application A&I PDF document (2018.11.01)
- HPRnet Information session PDF document (2018.11.01)

### RELATED CONTENT

- Defence expands future-focused human performance research centres
- Human Performance Research network
- Research Innovation

Department within the organisation

State  - Select-

ABN

Department within the organisation

State  - Select-

Associate Investigator #2

Title  Name

- None-

University, Company or Publicly Funded Research Agency  Department within the organisation

<https://www.dst.defence.gov.au/form/hprnet>

# HPRnet

Human Performance Research network



Selection, training and intervention strategies to improve warfighter situation awareness

A Dynamic and Temporal Perspective to Optimise Team Resilience



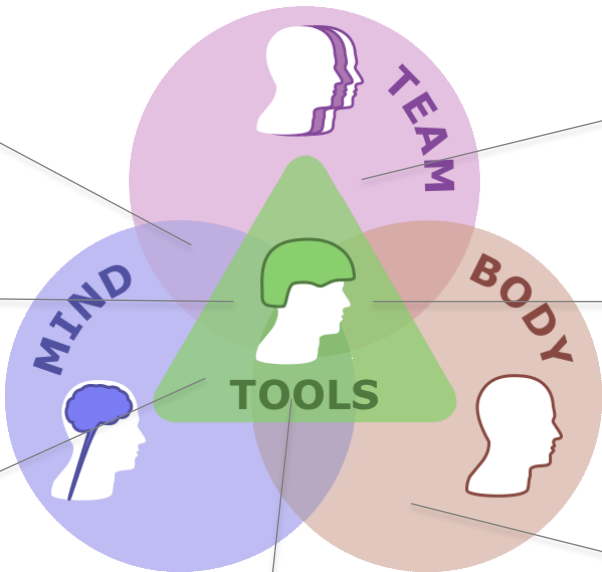
Trusted Human-Autonomy Teaming in Teleoperations

Soldier performance management: monitoring and modelling of load, adaptation and performance



Psychological methods for improving cognitive performance

Combat genes & bioinformatics for physical training

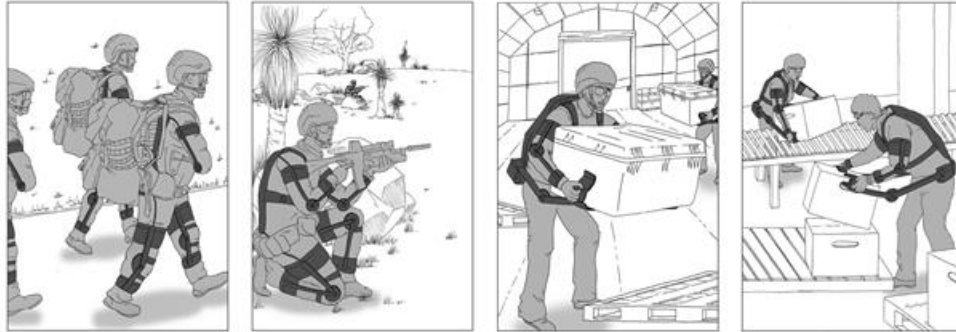


An integrated approach to enhancing cognition and decision-making under stress





## Wearable Assistive Technologies : Enhancing the Physical and Physiological Performance of the Dismounted Combatant



Wearable assistive devices support and augment the body's natural physical ability and are rapidly maturing. These devices come in many different forms and range from full body exoskeletons, to joint support and augmentation. DST Group is seeking to build a larger capability in the wearable assistive technology research space to help fast-track the development of this exciting technology, through a partnership with an Australian University

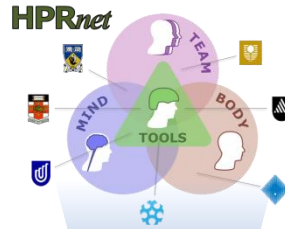
**Duration:** 3 year program starting FY 19/20

**Key work areas:** Identify, develop and evaluate assistive technologies that could offer significant potential within Defence other physically demanding industries

**Projected timeline:** To be released by end of February



# Next Generation Technologies Fund



Grand Challenges

Defence Cooperative Research Centres

University Research Networks

Strategic Research Program

Small Business Innovation Research for Defence

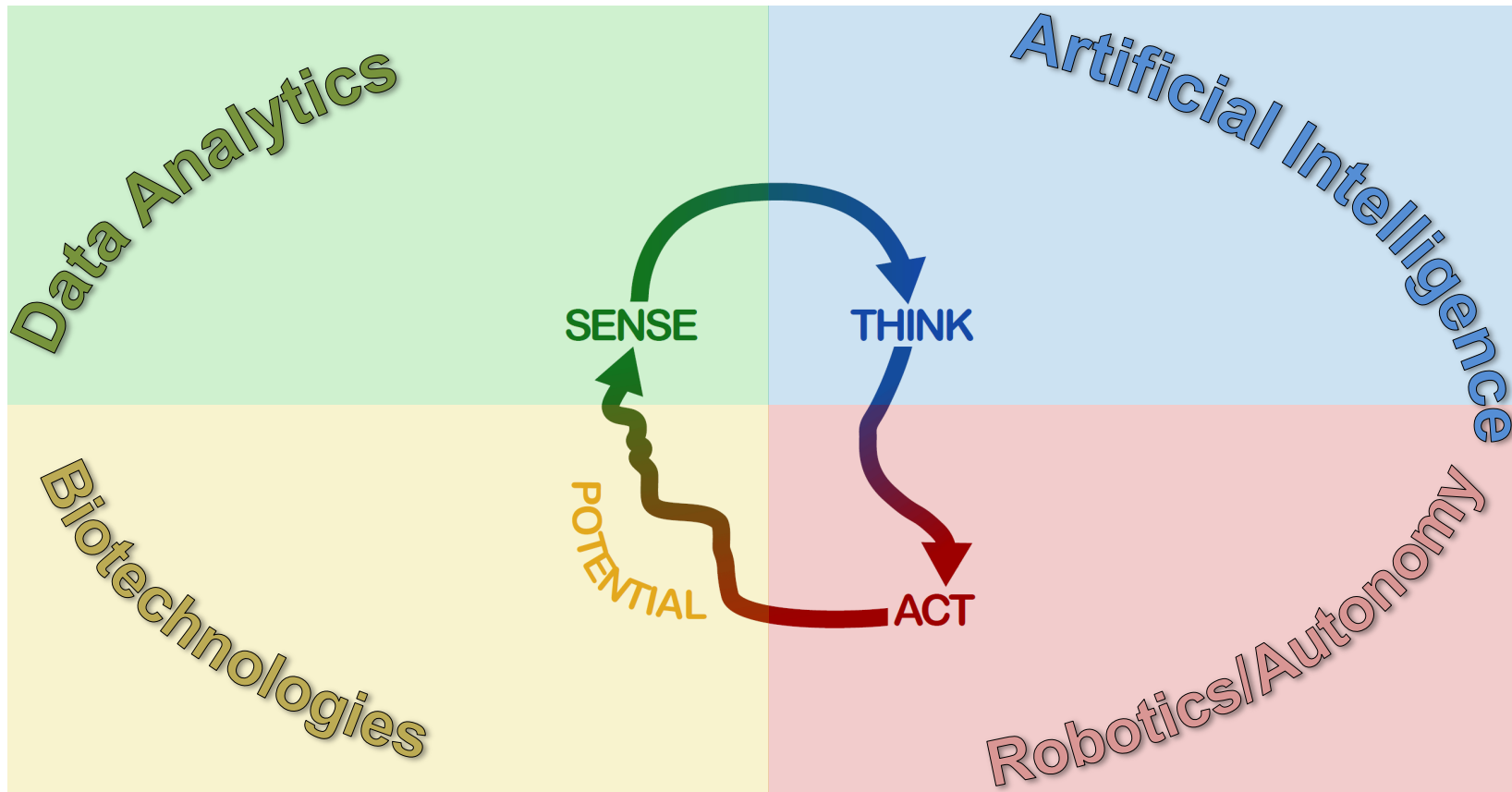
Defence Research Accelerator

Technology Foresighting

← AGILITY ACROSS THE PORTFOLIO, INDEPENDENT OF SCALE →



# Future Horizons





# Questions?

