



Strategic Investment Plan

Research Network for Undersea Decision Superiority



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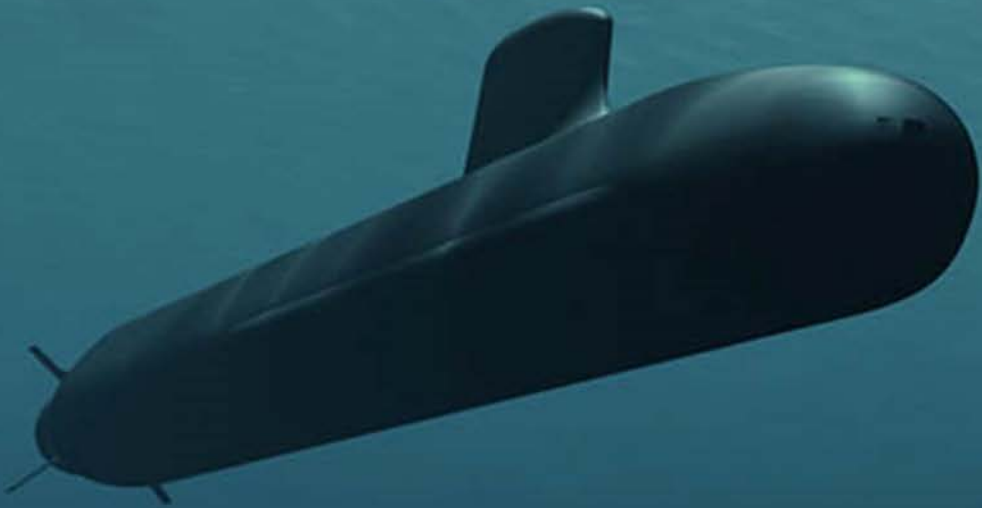
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OUR VISION

A sustainable sovereign research capability that delivers enhanced human decision making to support regional undersea superiority



OUR MISSION

By investing in research on the human aspects of submarine operations today, we will build the capability and capacity of Australian researchers to respond to the research needs of tomorrow

Table of Contents

1. Introduction
2. Framework of the Strategic Investment Plan
3. Network Objectives
4. Research Investment Strategy
 - Human Physical Performance
 - Human Mental Performance
 - Team Performance
 - Data and Information
5. Monitoring and Evaluation

Introduction

Research Network for Undersea Decision Superiority

Submarines are a key strategic military asset. In recognition of the vital role they play, the Australian Government has committed to spending over \$50 billion over the next 30 years to produce 12 new submarines and upgrade Australia's existing submarine assets.

The performance of these submarines is highly dependent on not only their technical sophistication but also the performance of the submariners who operate these machines. Enabling submariners to make the best decisions possible in a unique, increasingly complex and typically low information environment has been identified by the Australian Navy (through the SEA 1000 project) as an area of research focus and an area where future research capability needs to be developed.

The Research Network for Undersea Decision Superiority (RN-UDS) is being established by Defence Science and Technology Group (DST) on behalf of Defence and the Future Submarine Program to ensure Australia has the research capability and capacity to deliver undersea decision superiority into the future.

Introduction

Building Research Capability

The key objective of the RN-UDS is to build and support Australia's sovereign Submarine capability by leading Australian research contributing to undersea decision superiority. The Network will achieve this through two core activities:



Fostering opportunities that build research capability

- Providing leadership to initiate and accelerate research on factors that impact undersea decision making.
- Identifying opportunities that build research capability aligned to the strategic investment priorities.
- Supporting research aligned to the future needs of the Future Submarine Program.
- Building research capability aligned to the major and minor investment priorities.
- Monitoring and evaluating progress against the Strategic Investment Plan.



Sharing and transferring knowledge for the benefit of the Nation

- Providing a platform for Members to share and build knowledge to support undersea decision superiority.
- The delivery of activities and programs that support the research community in building their capability.

Introduction

Purpose of the Strategic Investment Plan

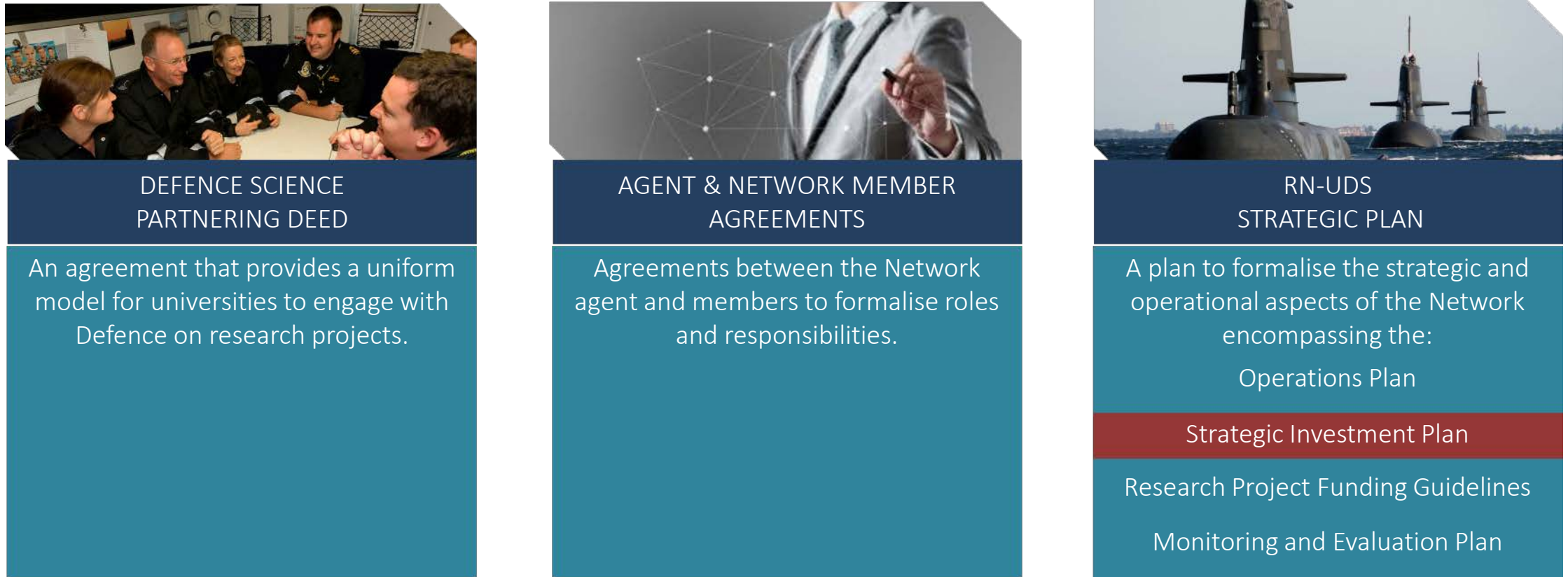
The RN-UDS Strategic Investment Plan has been developed to guide the Network's Board and stakeholders as to where investment should be made to build Australia's research capacity and capability, so as to maximise undersea decision making in the future. This plan encompasses:

- The research themes that are of significant importance to Australia's future submarine;
- The major and minor areas of research that the Network will be supporting;
- Potential areas of research under each of the major and minor research areas; and
- Measures that will reflect the success of the Strategic Investment Plan.

The Strategic Investment Plan forms part of the Network's set of corporate documents which outlines its organisational structure, operations and strategic direction (refer Figure 1).

Introduction

Figure 1. RN-UDS Corporate Documents Structure



Strategic Investment Plan Framework

The framework for the RN-UDS Strategic Investment Plan is structured to ensure there is a clear line of sight between the Network's goals and how these goals are going to be achieved. Three key strategic questions (Table 1) were considered by the Network and developed into a framework (refer Figure 2).

Figure 2. Framework for the strategic investment plan

What do we want to achieve?	The development of the Network's objectives including its vision and mission.
How do we get there?	The development of a research investment strategy outlining areas where the Network will invest to support the development of research capability and capacity. These investment areas are considered of significant importance to future undersea decision making superiority.
How do we know we have achieved our goal?	The development of a monitoring and evaluation process for the Strategic Investment Plan, including measures of success and how progress should be monitored and tracked.

Framework of the Strategic Investment Plan

Figure 2. Framework for the Strategic Investment Plan



Network Objectives

The Network's objectives are represented in the following statements.

VISION

A sustainable sovereign research capability that delivers enhanced human decision making to support regional undersea superiority.

MISSION

By investing in research on the human aspects of submarine operations today, we will build the capability and capacity of Australian researchers to respond to the research needs to tomorrow.

CORE ACTIVITIES

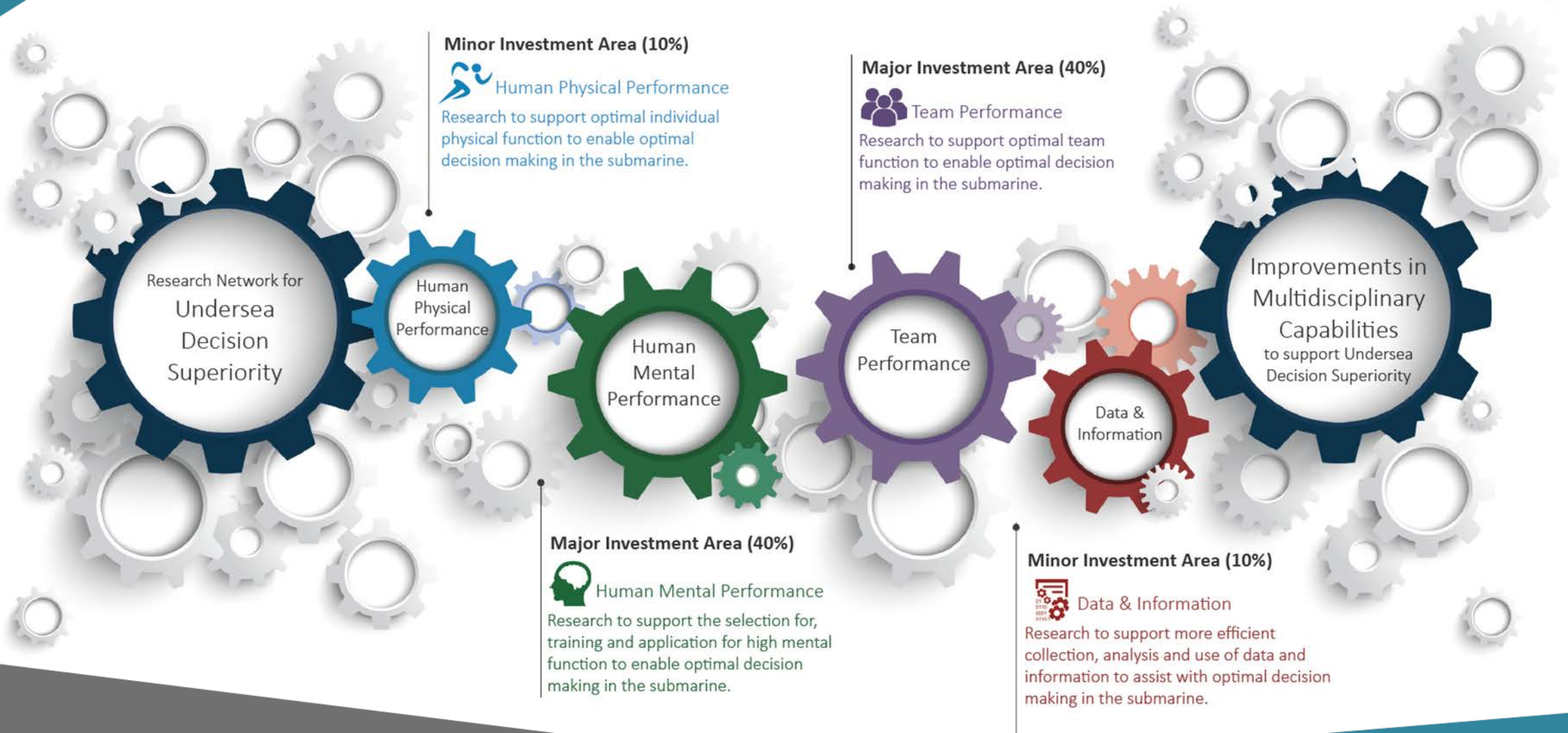
Fostering opportunities that build research capability

- Providing leadership to initiate and accelerate research on factors that impact undersea decision making.
- Identifying opportunities that build research capability aligned to the strategic investment priorities.
- Supporting research aligned to the future needs of the Future Submarine Program.
- Building research capability aligned to the major and minor investment priorities.
- Monitoring and evaluating progress against the Strategic Investment Plan.

Sharing and transferring knowledge for the benefit of the Nation

- Providing a platform for Network Members to share and build knowledge related to the future research needs of the Future Submarine Program.
- The delivery activities and programs that support the research community in building their capability.

Research Investment Strategy



Key Elements of the Investment Strategy

Strategic Investment Priorities

The investment priorities are categorised into two streams:

- **Major investments**

These are areas the Network has identified as key priority areas for investment. These areas of investment have been assessed as being of significant importance to decision making in the submarine, would benefit from an increase in research capability or capacity and have aspects that are sufficiently unique and so may not be addressed through other research activities. Major investments have a larger pool of funding available to support capability building.

- **Minor investments**

These are areas the Network has identified as a secondary interest. Whilst important to decision making in the submarine, there is an existing research capability in these areas or research is of more general applicability and is supported more widely. Minor investments have a smaller pool of funding available to support capability building.

Key Elements of the Investment Strategy

Multidisciplinary Research

The challenges faced by the submariner are often complex with a large number of interrelated components. The complexity of the submarine ecosystem presents challenges that span across the investment priorities identified and will more often than not, require a multidisciplinary approach. To encourage this, the Network will place a greater emphasis on projects with multidisciplinary research that can build capability across investment priorities.

Annual Review

The Network's investment strategy is subject to annual review by the RN-UDS Board to ensure the research priorities and areas of investment continue to build capability in research areas that support undersea decision making into the future, for Australia. Where new investment areas are identified the Network will release a new investment strategy applicable to that year.

Key Elements of the Investment Strategy

Capability Building Activities

Capability building under each of the investment priorities will be focused on two main activities:



Research projects

Calls for research project proposals will be released by the Network. The call for research projects will be in line with the investment priorities identified in the Strategic Investment Plan for that year. *Refer to the Research Project Funding Guidelines for further information.*



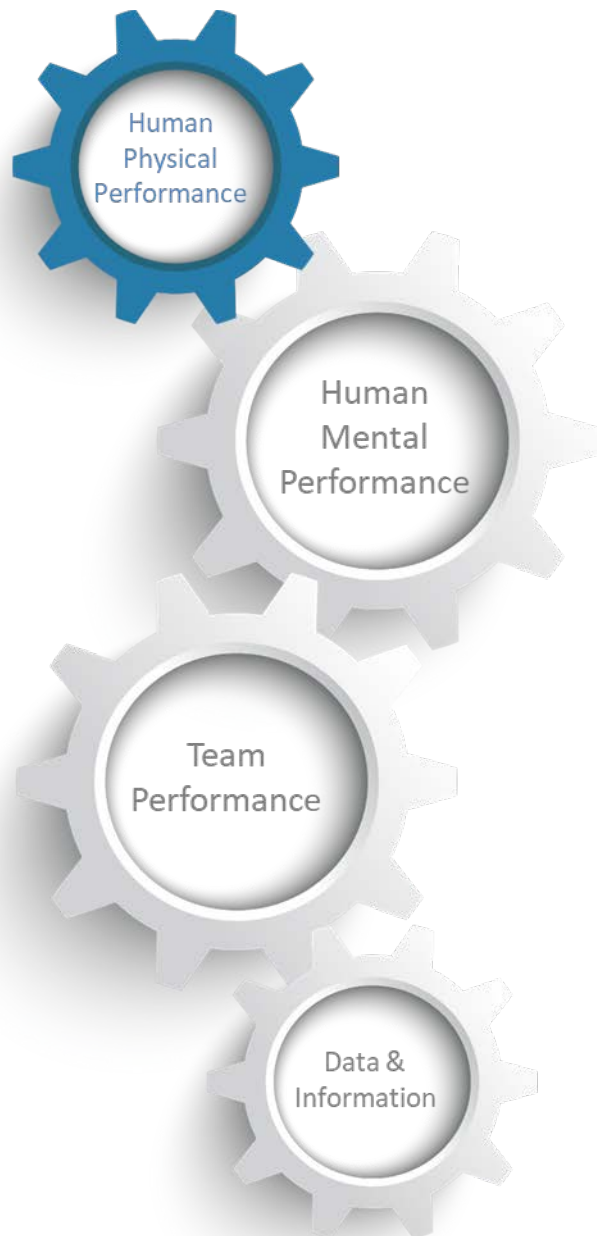
Education and Training

The Network will also look to invest in activities that support the research community in building their capability under each of the investment priorities. This may include activities such as:

- Student scholarships
- Seminars and conferences
- Workshops

INVESTMENT PRIORITY

Human Physical Performance



Scope of Priority

Research to support optimal individual physical function to enable optimal decision making in the submarine.

Investment Stream

Minor investment.

Potential Areas of Investment

Areas of investment under the Human Physical Performance priority *include but are not restricted to* the following areas of research:



Space and ergonomics

Research into areas that improve the way submariners operate and interact with the unique space and environment of a submarine. This may include research into interior design to maximise performance for work and rest, or how microbiomes impact on submariner interactions with the environment.



Physical health

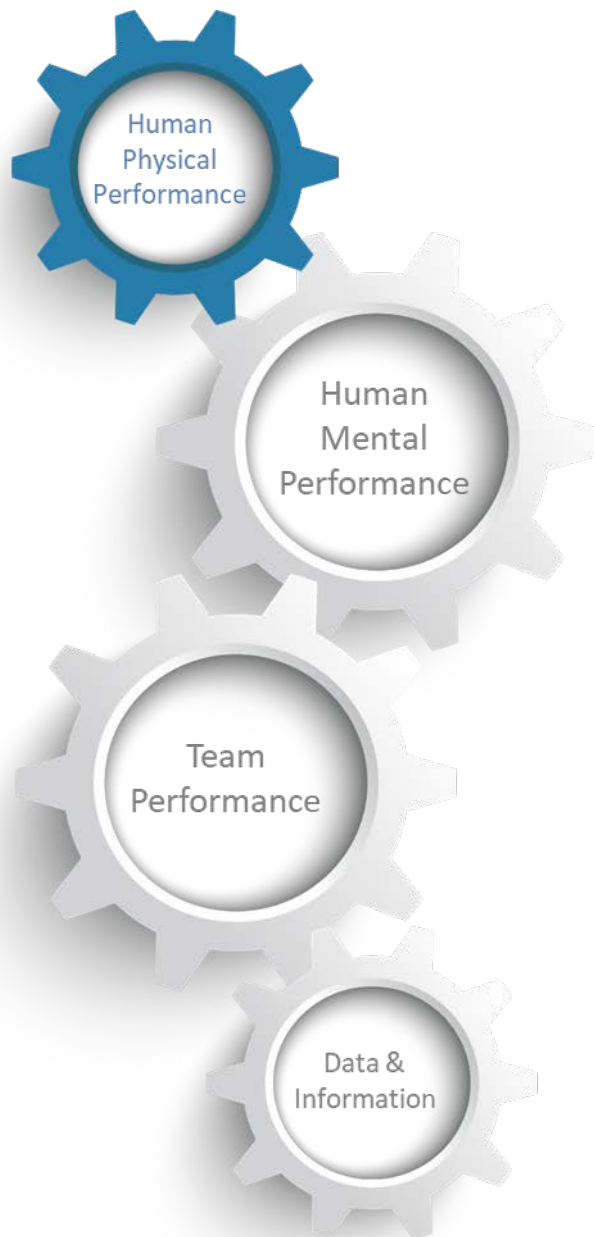
Research into areas that improve the physical health of submariners on board a submarine. This may include research into customised fitness programs for team members, fitness in confined spaces and the use of virtual reality.



INVESTMENT PRIORITY

Human Physical Performance

Potential Areas of Investment



Environmental adaptation

Research into areas that improve the ease of submariners adapting to work on board a submarine. This may include research into alertness and fatigue management including recovery, sleep and self awareness and management techniques, as well as improving the external environment on board a submarine.



Food and nutrition

Research into areas that improve the food and nutrition on board a submarine. This may include research into psychological impacts of food and nutrition management and frameworks to influence good food and nutrition intake.



Other

Research into other areas aligned to the investment priority that represent a significant opportunity to build research capability.



INVESTMENT PRIORITY

Human Mental Performance



Scope of Priority

Research to support the selection for, training and application for high mental function to enable optimal decision making in the submarine.

Investment Stream

Major investment.

Potential Areas of Investment

Areas of investment under the Human Mental Performance priority *include but are not restricted to* the following areas of research:



Training for experience

Research into areas that accelerate submariner skill and experience. This may include research into skills training in sub-optimal environments, tacit knowledge transfer and training methods to improve instinct and emergency responses.



Psycho-social well-being

Research into areas that improve submariner interactions and cohesion in the unique social environment on board a submarine. This may include research into conflict resolution, support mechanisms in a closed environments, resources to maintain mental health on/off duty, and team interactions in the work environment.



INVESTMENT PRIORITY

Human Mental Performance

Potential Areas of Investment



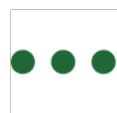
Cognitive performance

Research into areas that improve cognitive performance on board a submarine. This may include research into developing better theories of learning and awareness, the impacts of automation on cognitive performance and decision making, or applicability of current cognitive models in the context of a submarine.



Right people, right role

Research into areas that improve the selection and retention of people aligned to the skillset required in a submarine. This may include research into screening methodologies for skills such as resilience, endurance and leadership, and understanding innate and learnt skills.



Other

Research into other areas aligned to the investment priority that represents a significant opportunity to build research capability.



INVESTMENT PRIORITY

Team Performance

Scope of Priority

Research to support optimal team function to enable optimal decision making in the submarine.

Investment Stream

Major investment.

Potential Areas of Investment

Areas of investment under the Team Performance priority *include but are not restricted to* the following areas of research:



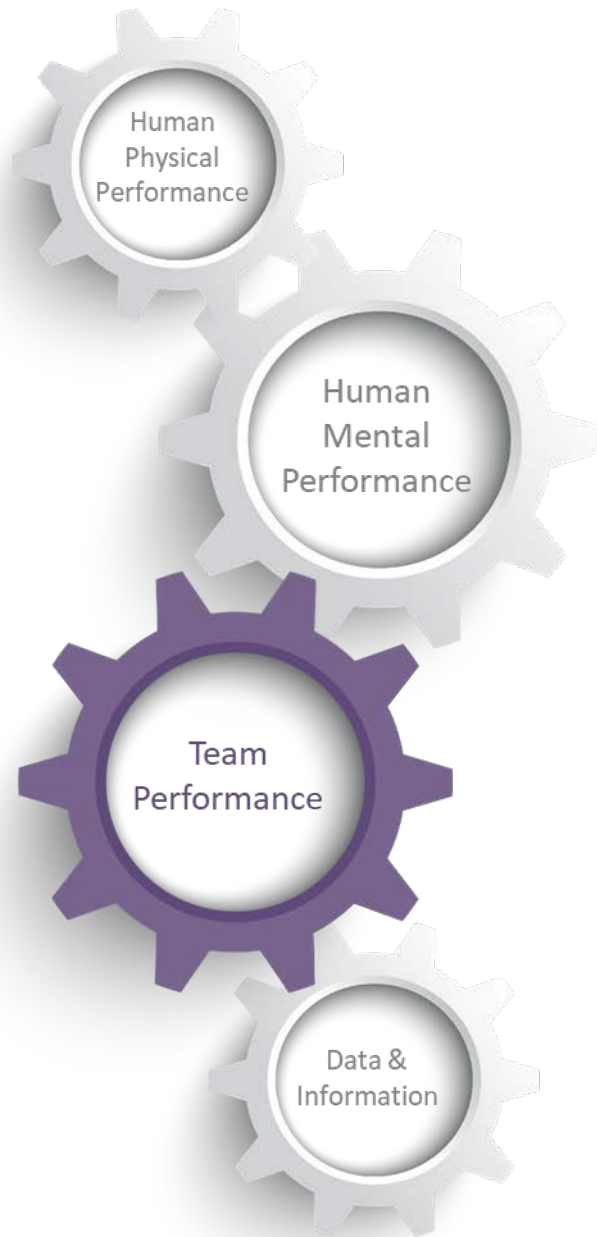
Team dynamics

Research into areas that improve how the team on board a submarine operate and interact with each other. This may include research into leadership and culture, team knowledge, crew diversity, team resilience and collaborative decision making.



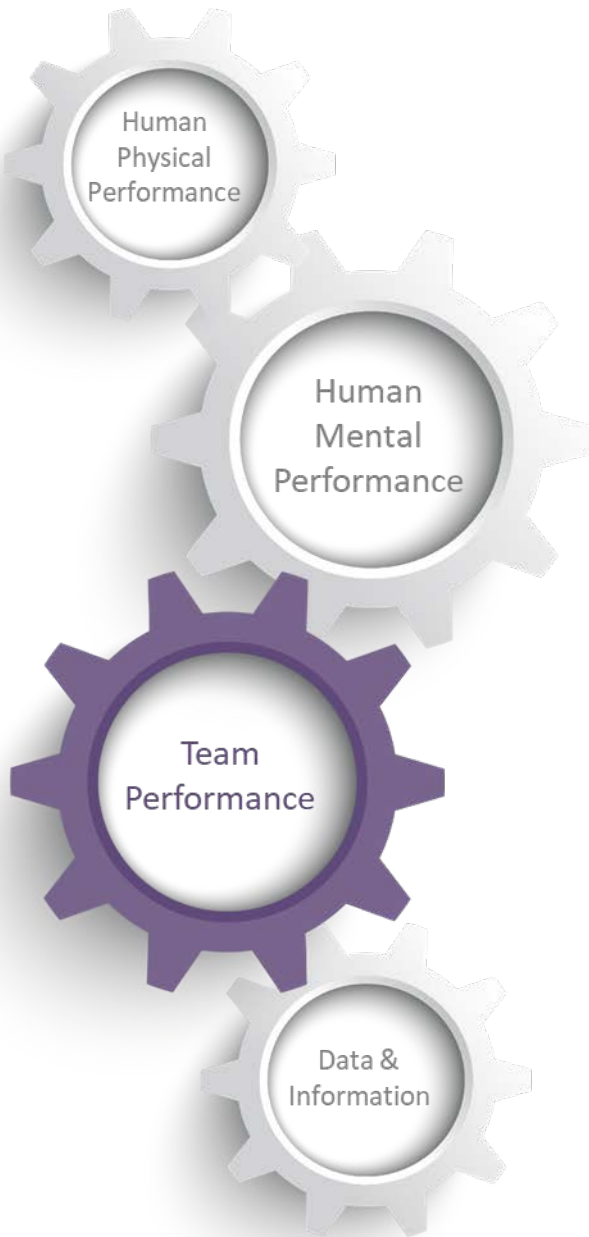
Technology in teams

Research into areas that allow for seamless integration of technology to improve team performance on board a submarine. This may include research into new team frameworks, understanding automated systems in normal operations and failure modes and human computer interaction design.



INVESTMENT PRIORITY

Team Performance



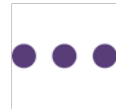
Potential Areas of Investment

**Work-life systems**

Research into areas that improve the work-life systems on board a submarine. This may include research into leadership and culture, team knowledge, crew diversity, team resilience and collaborative decision making.

**Team effectiveness**

Research into areas that improve the effectiveness and performance of the team on board a submarine. This may include research into effectively leveraging individual skills in a team environment, shared learning and team resilience.

**Other**

Research into other areas aligned to the investment priority that represent a significant opportunity to build research capability.



INVESTMENT PRIORITY

Data & Information

Scope of Priority

Research to support more efficient collection, analysis and use of data and information to assist with optimal decision making in the submarine.

Investment Stream

Minor investment.

Potential Areas of Investment

Areas of investment under the Data & Information priority *include but are not restricted to* the following areas of research:



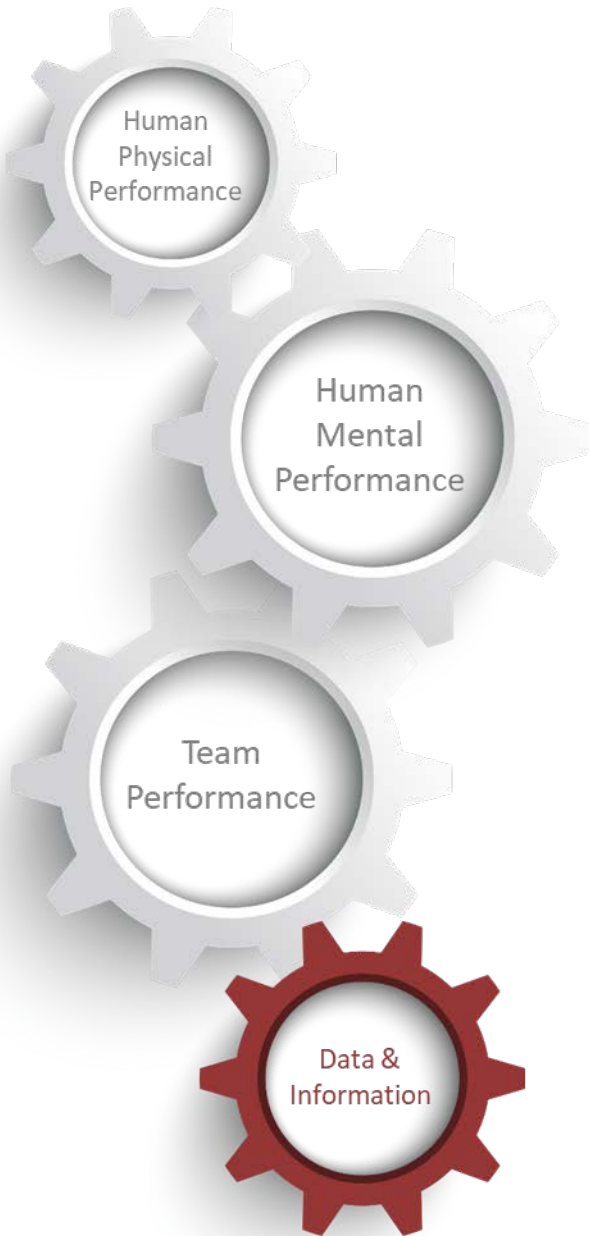
Data processing

Research into areas that improve the translation of data into information to support decision making. This may include research into data translation, real time analysis, data fusion, processing optimisation, and the management of uncertain and incomplete data sets.



Human centred design

Research into areas that integrates the human perspective into the collection, management and analysis of data and information on a submarine. This may include research into mastering complexity and designing for better decision making.



INVESTMENT PRIORITY

Data & Information

Potential Areas of Investment



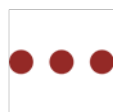
Cognitive systems engineering

Research into areas that improve the socio-technical system on board a submarine; a system where submariners provide essential functionality related to deciding, planning, collaborating and managing. This may include research into understanding peak performance and the optimal environment for this to occur.



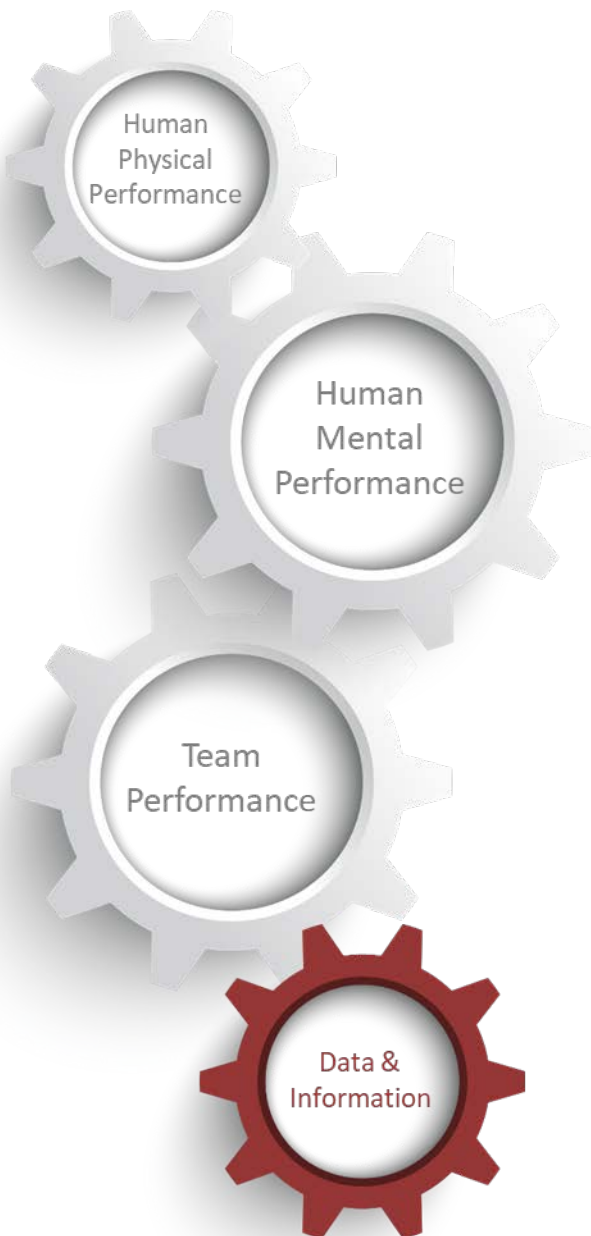
Human machine interface

Research into areas that improve the interface in which submariners work with on a day to day basis. This may include research into virtual reality, artificial intelligence, new and customised interfaces, and interface optimisation to reduce workloads.



Other

Research into other areas aligned to the investment priority that represents a significant opportunity to build research capability.



Monitoring and Evaluation Plan

Measures of Success

The goal of the Network is to build Australia's research capability aligned to the investment priorities outlined in the Strategic Investment Plan. This will be monitored and evaluated using measures of success aligned to two key areas: capability building and funding allocation. A greater focus will be placed on the capability building measures while the funding allocation measures will be used as a secondary assessment to understand the variance of actual progress against the plan.



Capability Building

Measures associated with human resources, research outputs and other related capability measures aligned to each investment priority and capability area (Figure 3 & 4).



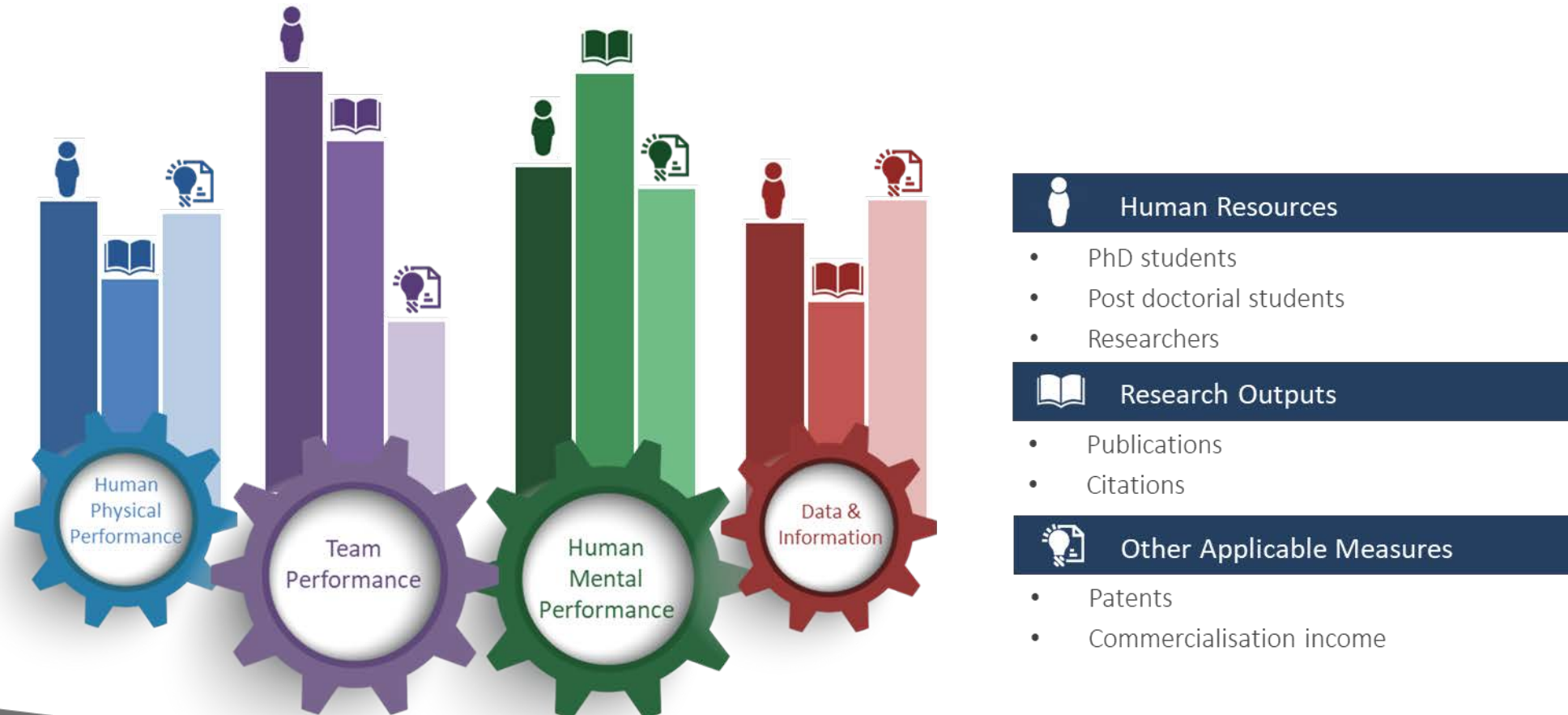
Funding Allocation

Measures associated with the allocation of funding across the investment priorities.

In developing the monitoring and evaluation plan it was important that measures of success were simple to collect and implement.

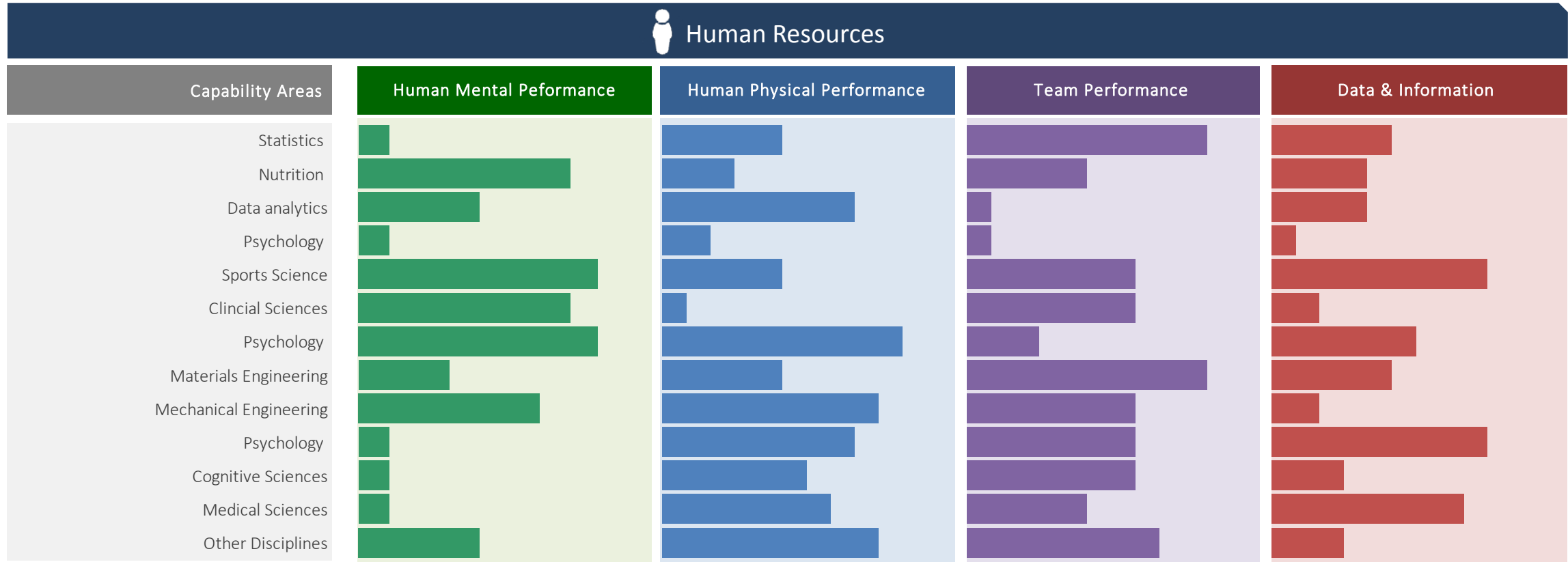
Monitoring and Evaluation Plan

Figure 3. Measures of Success – Capability Building (*examples across Investment Priorities*)



Monitoring and Evaluation Plan

Figure 4. Measures of Success – Capability Building *(examples across Capability Areas)*



Monitoring and Evaluation Plan

Monitoring and Evaluation Framework

The monitoring and evaluation process for the Strategic Investment Plan forms a component of the overall plan for the Network (Figure 5) and will follow the same review process as the overall plan.

Figure 5. Framework of Monitoring and Evaluation Plan

NETWORK OBJECTIVE	To foster the development of a sustainable, long term sovereign research capability to improve future submarine crew performance.		
M&E OBJECTIVES	NETWORK PERFORMANCE	INVESTMENT	CAPABILITY BUILDING
SOURCE	RN-UDS STRATEGIC PLAN	STRATEGIC INVESTMENT PLAN	STRATEGIC INVESTMENT PLAN
REVIEW PROCESS	Aligned to timing of Board meetings		

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