



MAJOR PROJECTS REPORT 2022



Front cover: top, HMNZS *Aotearoa* approaches the port of Kure, Japan. Bottom, the first of New Zealand's P-8A Poseidon aircraft takes off on its inaugural flight (supplied: Boeing).

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Other Major Projects Reports

This is the second in a series of reports focusing on major Defence-led projects that, during a financial year, are delivering new capability approved by the Government. Earlier reports, focused on a range of projects during the financial years between 2009/10 and 2018/19, are available under the Publications section of the Ministry of Defence website.

ISBN: 978-0-473-67892-0 (Print)

ISBN: 978-0-473-67891-3 (Online)

Published June 2023

www.defence.govt.nz



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PROJECTS INCLUDED IN THE MAJOR PROJECTS REPORT SERIES

<i>Project name</i>	<i>Editions</i>
• A109 Training and Light Utility Helicopter	2010-2015
• C-130H Life Extension Project (LEP)	2010-2016
• NH90 Medium Utility Helicopter	2010-2016
• P-3K Orion Mission Systems Upgrade	2010-2015
• ANZAC Frigate Phalanx Close-in Weapon System (CWIS)	2010-2012
• ANZAC Frigate Platform Systems Upgrade (PSU)	2010-2017
• Project Protector - Multi-Role Vessel, Offshore and Inshore Patrol Vessels	2010
• Joint Command and Control System Programme (JC2S)	2010
• Defence Command and Control System (DC2S): replaced JC2S	2011-2017
• Project Protector Remediation	2011-2016
• Maritime Helicopter Capability (MHCP)	2013-2016
• Medium/Heavy Operational Vehicles (MHOV)	2013-2015
• Strategic Bearer Network (SBN)	2013-2018
• Pilot Training Capability (PTC)	2014-2016
• ANZAC Frigate Systems Upgrade (FSU)	2014-2022
• Network Enabled Army C4 ¹ (NEA T1 or NEA C4)	2015-2022
• Individual Weapons Replacement (IWR)	2016-2018
• Maritime Sustainment Capability (MSC)	2017-2022
• Special Operations Vehicles (SOV)	2017-2018
• Underwater Intelligence, Surveillance and Reconnaissance (UWISR)	2017-2018
• Dive Hydrographic Vessel (DHV)	2019-2022
• NH90 Simulator	2019-2022
• Air Surveillance Maritime Patrol (ASMP)	2019-2022
• Fixed High Frequency Radio Refresh (FHFRR)	2020-2022
• Future Air Mobility Capability – Tactical (FAMC)	2020-2022
• Operational and Regulatory Aviation Compliance Sustainment (ORACS) Phase One (1A/1B/2A)	2020-2022
• Protected Vehicle – Medium	2021-2022
• Network Enabled Army Reconnaissance and Surveillance (R&S)	2022
• Frigate Sustainment Communications	2022

Previous editions of the *Major Projects Report* series from 2009/10 to 2019/20 are available on the Ministry of Defence website. www.defence.govt.nz

¹ Was Network Enabled Army Tranche One in the editions from 2015 to 2020.

FROM THE SECRETARY OF DEFENCE



The need for military capability is greater than ever. Our forces continue to be called upon to support, protect, and serve New Zealanders, our neighbours in the Pacific, and our international partners.

Challenges have continued – within this year we have moved from major border restrictions to an easing and opening of international travel. However, labour and supply chain constraints continue to be exacerbated by the long tail of COVID-19 and the war in Ukraine.

The Ministry's kaitiakitanga, or good stewardship, of the Government's investment in military capability is measured against the critical metrics of schedule, budget, and capability. As I noted in last year's report, if two of the key metrics are held steady, pressure is often felt on the third.

Where possible, the Ministry's preference is to hold steady on budget (through fixed price contracts) and capability (which is a measure of quality and scope). This means schedule is often under pressure with project risk materialising as a delay.

This has been our experience in 2022. COVID-19 and the war in Ukraine have caused or exposed:

- some suppliers underestimating the complexity of our projects, in particular the systems integration component and not committing and/or unable to commit, due to labour shortages, the necessary resources during the design phase;
- increases to manufacturing lead times and supply chain and freight transportation costs; and
- gaps in the availability of experienced Defence Force personnel required to transition new capability from Interim Operational Release to Operational Release, and the movement of a greater part of the portfolio into the Operational Release phase.

Importantly, delays to achieving a governance milestone does not necessarily mean a capability is not available for use. We continue to take a pragmatic approach.

For example, the Dive & Hydrographic Vessel (HMNZS *Manawanui*), the Maritime Sustainment Capability (HMNZS *Aotearoa*), and the NH90 Flight Simulator, while reporting delays to the achievement of Operational Release, are in use and are delivering or enabling outputs.

While many projects are experiencing schedule pressure, all are forecasting to deliver the agreed quality and scope within their Cabinet-approved appropriations.

Notwithstanding the pressure on project schedules, good progress is still being made in delivering capability to the New Zealand Defence Force. Highlights include, but are not limited to:

- the commencement in early 2022 of the construction of the first NZ P-8A Poseidon aircraft, and the delivery of the finished aircraft to Base Ohakea in December 2022;
- the successful completion of HMNZS *Aotearoa*'s first re-supply mission to McMurdo Sound to deliver bulk liquid and solid cargo as part of the Government's contribution to Antarctica New Zealand operations and the Joint Logistics Pool.
- deployment of HMNZS *Manawanui* to the Southwest Pacific as part of Operation MAHI TAHI 22. Activities included responding to a request from the Government of Tonga through Land Information New Zealand to undertake a hydrographic survey of the Tongatapu outer reef.

Not all Ministry projects are captured in this Report.² The focus remains on those projects in delivery that have a whole-of-life cost greater than \$25 million and are deemed to be medium or high risk. In 2022, one programme and twelve projects were assessed as meeting this scale and risk threshold, and are included in this Report.

The Ministry of Defence continues to oversee and manage a significant investment by the Government in Defence. The 2022 Major Projects Report is evidence of this. Driving this investment is an increasingly complex and dynamic strategic environment.

The Government's investment in Defence capability is a critical component in how we respond to these challenges. This means

scrutiny of the Ministry's performance in delivering this capability is also an opportunity for me to assure Parliament and the public of Aotearoa New Zealand that we are meeting government policy.



Andrew Bridgman
Secretary of Defence / Te Tumu Whakarae mō te Waonga

² A full list of projects in delivery is in *Te Pūrongo-Ā-Tau 2022, Annual Report 2022*.

THE MAJOR PROJECTS REPORT

This report provides information about projects led by the Ministry of Defence that are being delivered in collaboration with the NZDF. These projects have been funded to deliver major defence capability, following approval of their business case by Government.

Projects included in this report are assessed as being of medium or high risk, with whole of life costs greater than \$25 million.

Defence-led projects in this report are at a point in their life cycle³ where a range of activities may be underway, including:

- engaging with industry
- developing contracts for delivery of new or upgraded capability
- designing, building, developing or upgrading capability
- planning for integration of the new capability into service.

As well as providing a reference point for information on each project's purpose, this series of reports provides a longitudinal overview of the Ministry's performance in the management and delivery of significant

³ See the next section, [Delivering Defence Capability](#) for more information on the Capability Management System lifecycle.

capability projects. Almost all projects feature in multiple editions, reflecting the reality of a long-term lifecycle for many major Defence projects. The Major Projects Report provides a summary of each project's history and purpose – what it has been expected to achieve, including policy objectives and capability requirements. It summarises the definition phase that led to each project's funding for delivery, and outlines expenditure for each project across delivery.

A summary of performance in relation to each project's schedule, cost, and capability in the year 1 July 2021 to 30 June 2022 can be found on pages 16 to 18.

This report is designed to be read in conjunction with the Ministry of Defence Annual Report for the same year in review.

Projects in this edition

There are two new projects in this edition of the report, Network Enabled Army Reconnaissance and Surveillance and the Frigate Sustainment Communications project.

In total, 12 projects that are delivering defence capability across the NZDF's services are included in this edition.

- Air Surveillance Maritime Patrol (ASMP): delivering the fleet of P-8A Poseidon aircraft to replace the current P-3K2 Orion fleet, as well as delivering a flight training simulator, infrastructure and other elements to support the capability.
- Anzac Frigate Systems Upgrade (FSU): the latest in a programme of upgrades to extend the operational life of the two Anzac class frigates, HMNZS *Te Kaha* and *Te Mana*.
- Dive and Hydrographic Vessel (DHV): this project has delivered HMNZS *Manawanui*, which was commissioned on 12 June 2019. The fourth RNZN ship to sail under the name, she replaces the former hydrographic survey vessel *Resolution*, and the diving support ship *Manawanui*.

- Fixed High Frequency Radio Refresh (FHFRR): replacing the NZDF's existing high frequency radio system.
- Frigate Sustainment Communications (FSC): part of the ongoing programme of work to ensure the frigates remain operable until the end of their extended service lives, equipment is being replaced to ensure ongoing interoperability with partners and other capabilities recently acquired for the NZDF, such as the P-8A Poseidon.
- Future Air Mobility Capability – Tactical (FAMC): replacing the Royal New Zealand Air Force's tactical airlift fleet of C-130H(NZ) Hercules, as well as training and support equipment, and a flight simulator.
- Maritime Sustainment Capability (MSC): has built and delivered HMNZS *Aotearoa*, a polar-compliant replenishment tanker that will support naval fleet and land operations.
- Network Enabled Army C4⁴ (NEA C4): is the first project under the overarching Network Enabled Army Programme. It is delivering modern communications to land forces to improve situational awareness and support deployed commanders' decision-making at all levels.
- Network Enabled Army Reconnaissance and Surveillance (NEA R&S): these capabilities enable collection of information that can be processed into intelligence to support decision-making by the New Zealand Army. This project will deliver unmanned aircraft and remotely piloted systems, along with remote ground sensors and associated training and through-life support.
- NH90 Simulator: a project that will increase the availability of the fleet of NH90 helicopters and crews through the installation of a flight simulator at RNZAF Base Ohakea. Following its installation, initial and ongoing simulator-based flight training is now able to be conducted in New Zealand.
- Operational and Regulatory Aviation Compliance Sustainment (ORACS): changes to the technological and regulatory aviation environment are being addressed by this project to ensure that the NZDF's air operations are effective, safe and secure, which has two phases in delivery.
- Protected Vehicle – Medium: replacing the armoured Pinzgauer fleet with a fleet of NZ5.5 Bushmaster vehicles, along with spares, ancillaries and a training package.

When projects are complete

When a project finishes its delivery (or acquisition) phase, it is no longer included in the report.

The ten projects included in the Major Projects Report for the year ended 30 June 2021 continued to be in the delivery phase during the 2021/22 year, and so feature in this edition of the report as well.

Previous editions

Previous editions of the Major Projects Report series from 2009/10 to 2020/21 are available on the Ministry of Defence website.

⁴ C4 is the abbreviation for Command, Control, Communications and Computers.

DELIVERING DEFENCE CAPABILITY

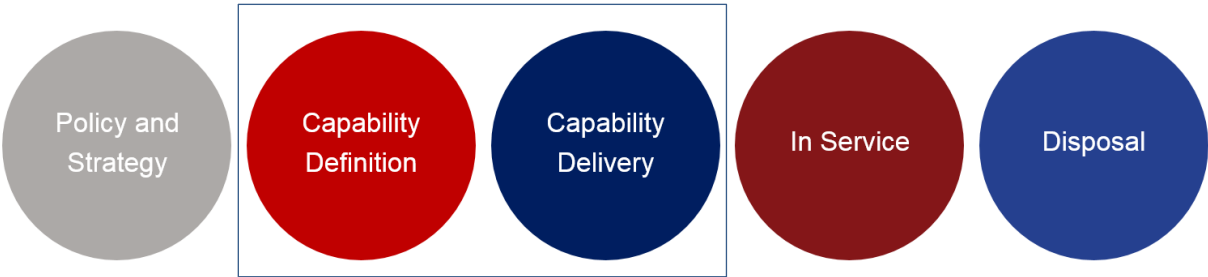
The Defence Capability Management System (CMS) is jointly operated by the Ministry of Defence and the New Zealand Defence Force. It supports cost-effective design, delivery and maintenance – and eventual disposal – of military capability.

The CMS is designed to deliver the right military capability for New Zealand at the right time, for the right price. Within it, a framework provides the guidance, standards, tools, enablers and people that are required to deliver the capability successfully. The system

has been developed specifically for the New Zealand Defence context, based on an assessment of international best practice. The Secretary of Defence and the Chief of Defence Force have separate formal accountabilities for phases of the life cycle (shown below), the CMS’ design reflects the requirement for close collaboration within Defence and shared accountability for the success of the system as a whole.

This is demonstrated in the presence – throughout the CMS’ governance arrangements, management processes and framework – of people from both the Ministry and the NZDF.

For each project that was in the delivery phase of its lifecycle during the 2020/21 financial year, this report outlines key information about the programme of work, along with the work undertaken during its definition phase.



As Defence-led projects, teams are established to define, develop and deliver the capability and are comprised of personnel from both the Ministry and NZDF. They include the Ministry’s policy and project specialists, and draw on NZDF subject matter experts, reflecting the technical and business functions required.

Since 2017 Integrated Project Teams (IPTs) have been established for most major capability projects currently in delivery.

Seven of the projects in this report are being delivered under the IPT structure:

- Air Surveillance Maritime Patrol

- Anzac Frigate Systems Upgrade and Frigate Sustainment Communications
- Dive and Hydrographic Vessel
- Future Air Mobility Capability Tactical
- Maritime Sustainment Capability
- Operational and Regulatory Aviation Compliance Sustainment and
- Protected Vehicle - Medium.

Three projects are led by a project lead (Fixed High Frequency Radio Refresh) or acquisition lead (NH90 Simulator and Frigate Sustainment – Communications) respectively.

The Network Enabled Army C4 and Network Enabled Army R&S projects are managed under a Programme Office that was established in 2021.

Capability Definition Phase

Within the context of Government policy and strategy, in this phase the Ministry and Defence Force work together to define the future capabilities that are needed. Business cases are prepared to enable Government to make investment decisions. Using the Government's Better Business Case model, projects progress through the stages of the investment process, supported at each stage as required by these business cases:

- Initial thinking in the **indicative business case**
- A decision to go to market through the **detailed business case** or **single stage business case**
- The final decision on the capability and the commitment of funding through the **project implementation business case**.

Brief explanations of these terms can be found at the end of this report.

Capability Delivery

The Capability Delivery Phase seeks proposals to deliver the capability required by Government, and has been designed to deliver a solution that achieves the required outcomes and benefits. The process spans the planning to source and integrate new capability, gaining approval to commit to and execute a contract, managing the capability integration process, acquiring and accepting the deliverables, and the interim operational release of the new capability before the transition to operational release and being in service.

Continuous Improvement in Performance

Investment in Budget 2015 increased the Ministry's operating funding by \$27.1 million over four years, enabling the Ministry to implement a significant change programme, which has delivered improvements across the joint Capability Management System (CMS). Reviews undertaken by Sir Brian Roche KNZM and PWC in 2018, 2019, and 2022 reinforced this. In the *Review of Defence Procurement Policies and Practices for Major Capability Projects* (2018), Sir Brian concluded that the change programme had "addressed the structural, operations and information deficiencies of the previous system" and "provides decision makers with a strong level of confidence and assurance to support informed decision making".

The 2019 follow-up review⁵ recommended shifting the programme from an intervention that was special or unique to business as usual and continuous improvement. This has been a focus. In the final report⁶, published in 2022, Sir Brian reported that the "quality of the people working within the system and the level of integration of processes, practices and systematic ways of working across the Ministry of Defence and the New Zealand Defence Force has led us to the conclusion that the system is now successfully embedded". The CMS is an increasingly mature and resilient system that has so far achieved what it was set up to do.

However, as noted by Sir Brian in 2019, it is not possible to completely stop risks from materialising, as uncertain events outside the system's control can and will occur.

⁵ *Follow-up Review: Defence Procurement Policies and Practices for Major Acquisitions* (published August 2019)

⁶ *Review of Defence Procurement Policies and Practices 2021* (published August 2022).

The first Major Projects Report, published in 2010, discussed the difficulty experienced in meeting targets across the key performance metrics of schedule, budget and capability. If two are held steady, pressures is often felt on the third.

Where possible, Defence's preference is to hold steady on budget and capability. This means schedule is often under pressure. COVID-19 has seen this pressure emerge in the form of delays to a number of projects (see pages 16 – 17 for more detail). Vulnerabilities

in international supply chains have been exposed along with availability of specialist expertise, including military expertise, and business continuity planning.

However, as Sir Brian went on to conclude in 2022, the *"quality of people involved in the CMS, the processes and logical management approach and the strategic governance instilled through the system, meant that overall project outcomes held up well"*.

INDEPENDENT REVIEW REPORT

AUDIT NEW ZEALAND
Mana Arotake Aotearoa

INDEPENDENT ASSURANCE REPORT

TO THE READERS OF THE MINISTRY OF DEFENCE'S MAJOR PROJECTS REPORT FOR THE YEAR ENDED 30 JUNE 2022

We have carried out an independent assurance engagement on the project status reports included in the *Major Projects Report 2022* prepared by the Ministry of Defence. The purpose of this report is to express a limited assurance conclusion on whether any matters have come to our attention to indicate that the project status reports provided by the Ministry of Defence are not fairly stated.

The information that falls within the scope of the assurance engagement is the project status reports on pages 14 to 128 that cover the following acquisition projects:

- Air Surveillance Maritime Patrol;
- ANZAC Frigate Systems Upgrade;
- Frigate Sustainment – Communications;
- Dive and Hydrographic Vessel;
- Fixed High Frequency Radio Refresh;
- Future Air Mobility Capability – Tactical;
- Maritime Sustainment Capability;
- Network Enabled Army Programme;
- Network Enabled Army C4;
- Network Enabled Army ISR – Reconnaissance and Surveillance
- NH90 Simulator;
- Operational and Regulatory Aviation Compliance Sustainment; and
- Protected Vehicle – Medium;

These projects are collectively referred to as “the specified acquisition projects”.

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Limited assurance conclusion

Based on our work described in this report, nothing has come to our attention that causes us to consider that the project status reports included in the *Major Projects Report 2022* have not been fairly stated.

Our limited assurance engagement was completed on 20 March 2023 and our conclusion is expressed as at that date.

Basis of conclusion

The review was carried out under section 17 of the Public Audit Act 2002 and in keeping with the Auditor-General's Auditing Standard 5: *Performance audits, other auditing services, and other work carried out by or on behalf of the Auditor-General* and the External Reporting Board's International Standard on Assurance Engagements (New Zealand) 3000 (Revised): *Assurance Engagements Other than Audits or Reviews of Historical Financial Information*.

A limited assurance engagement is not an audit and the procedures that have been performed are substantially less than for an audit where reasonable assurance is provided. As a result, the level of assurance that has been obtained is substantially lower than the assurance that would have been provided had an audit been performed.

Our assurance engagement involved carrying out procedures and making enquiries to obtain evidence about whether the project status reports have been fairly stated. These procedures and enquiries included:

- reconciling the non-financial information in the project status reports to supporting documentation provided by the Ministry of Defence;
- reconciling financial information in the project status reports to the Ministry of Defence's audited financial statements for the year ended 30 June 2022;
- seeking explanations from the Ministry of Defence staff for any questions arising from the reconciliations; and
- considering the effect of events subsequent to 30 June 2022 on the fair disclosure of the project status reports up to the date of this independent review report.

Fair disclosure of the project status reports requires that the information, where applicable, is:

- relevant;
- faithfully represented;
- understandable;
- timely;
- comparable; and
- verifiable.

We have obtained sufficient evidence and explanations that we required to provide a basis for our conclusion.

Inherent limitations

The project status reports contain certain future-focused disclosures about expected achievements, planned time frames, forecast expenditure, and intended capability requirements. There are also disclosures about project risks. Some forecast information relies on the expert judgement of the Defence staff involved in each project and assumptions about future events and management's actions. This information is, by its nature, inherently uncertain, because events do not always occur as expected and variations may be material.

Because of the inherent limitations in evidence gathering procedures, it is possible that fraud or error may occur and not be detected.

Responsibilities of the Secretary of Defence

The Secretary of Defence is responsible for preparing the *Major Projects Report 2022* to fairly disclose information about the specified acquisition projects. It is therefore his responsibility to decide what information is included in the report and what is not. The project status reports are expected to include:

- a description of the project;
- the status of the project as at 30 June 2022;
- financial performance against the budgets approved by Cabinet;
- expected achievements;
- planned time frames; and
- intended capability requirements.

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Audit New Zealand's responsibility

Our responsibility is to express a limited assurance conclusion based on the procedures we have performed and the evidence we have obtained about whether anything has come to our attention that causes us to consider that the project status reports are not fairly stated.

Independence and quality control

We have complied with the Auditor-General's:

- independence and other ethical requirements, which incorporate the independence and ethical requirements of Professional and Ethical Standard 1 (Revised): *Code of Ethics for Assurance Practitioners* issued by the New Zealand Auditing and Assurance Standards Board; and
- quality control requirements, which incorporate the quality control requirements of Professional and Ethical Standard 3 (Amended): *Quality Control* issued by the New Zealand Auditing and Assurance Standards Board.

We are independent of the Ministry of Defence. Audit New Zealand also performs functions and exercises powers under the Public Audit Act 2001 as the auditor of the Ministry of Defence on behalf of the Auditor-General. Other than the audit of the Ministry of Defence, Audit New Zealand has no relationship with, or interests in, the Ministry of Defence.



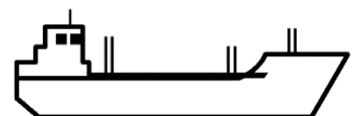
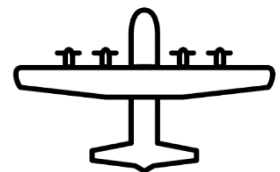
Lyn Daken
Associate Director, Specialist Audit and Assurance Services
Audit New Zealand (Auckland)

20 March 2023

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MAJOR PROJECTS IN DELIVERY 2021/2022



STATUS OF PROJECTS

Project summaries in the Major Projects Report provide a high-level overview of each project, describing policy objectives and capability requirements, recent developments, and financial reporting for the 2021/22 year.

Throughout all phases of a project, Defence works to ensure that the capability and benefits sought can be realised within the approved budget, delivered within the agreed timeframe, and in compliance with contractual requirements that align with government policy.

Performance at 30 June 2022

Defence-led projects that feature within this report do so because they are fit specific criteria. Notably each project is either medium/high scale, medium/high risk, or both.

Even when circumstances in which projects are operating are favourable, the performance measures against which Defence assesses projects – Cost, Schedule and the overall Capability – it is not uncommon for pressures to impact progress, and affect delivery.

With the COVID-19 pandemic well into its third year, the pressures that were identified in previous editions of this report have continued.

Fixed price contracts and strong project management help to maintain projects within their approved budgets. Capability continues to be delivered and – in several instances – are now available for tasking. However the impact on project schedules is clear, and performance has been impacted in the achievement of major milestones.

As reported in the 2021 edition of this report, this does not mean a capability is unavailable and outputs cannot be delivered.

While HMNZS *Aotearoa* and the NH90 simulator⁷ did not achieve operational release during the year in review, they have been delivering operational outputs. HMNZS *Aotearoa* supported New Zealand's response to Tonga after the eruption of the underwater volcano Hunga Tonga-Hunga Ha'apai, provided supplies to New Zealand's Antarctic research presence, and supported at the 2022 Rim of the Pacific exercise. The NH90 Simulator has been providing pilot training since October 2020.

Likewise, ahead of achieving OR, HMNZS *Manawanui* was deployed to Operation MAHI TAHI 22 and completed a hydrographic survey of the Tongatapu outer reef and, together with HMNZS *Matataua*, conducted reconnaissance of waters around Tuvalu for Operation RENDER SAFE, which finds and safely disposes of Explosive Remnants of War.

Schedule

At 30 June, just three of the projects in this report were report Green for schedule, reflecting the impact of COVID-19, and decisions to ensure contracts were able to be delivered.

In August 2021 the Minister of Defence was advised of schedule delays resulting in adjustments to key milestone dates for four projects.

NH90 Simulator and Dive and Hydrographic Vessel delays to OR continued, with OR for the Maritime Sustainment Capability only able to be sought after the completion of the first trip to Antarctica.

The Air Surveillance Maritime Patrol project was also reporting delays to completion of the infrastructure that is being built at RNZAF Base Ohakea.

⁷ The simulator has been delivering pilot training since October 2020.

By January 2022, the Frigate Sustainment Upgrade project had advised of a delay in the return of HMNZS *Te Mana* from Canada, which was required to ensure completion of work and testing.

By the end of June 2022, schedule adjustments were reported across the Operational and Regulatory Aviation Compliance Sustainment project, which is updating communication, navigation, air traffic management and identification systems. Some measure of delay was also forecast by NEA C4 capabilities, the

start of delivery of the Bushmaster capability under the Protected Vehicle – Medium, and Frigate Systems Communications.

Cost

While forecasting to remain within appropriation, some projects have accessed project contingency (see table below).

Capability

All projects continue to expect to achieve delivery of the agreed capability.

Summary of project status at 30 June 2022

This table summarises the projects' status for baseline cost, schedule, and capability to be delivered.

	Risks or issues will have little or no impact on the ability to deliver project outputs, objectives or goals. Little or no resource allocation or management effort is required.
	Risks or issues may temporarily degrade the ability to deliver project outputs, objectives and goals. A moderate level of resource allocation or management effort is required.
	Risks or issues could degrade the ability to deliver project outputs, objectives and goals. A high level of resource allocation or management effort is required.
	The risks or issues could significantly degrade or prevent the ability to deliver project outputs, objectives and goals. Significant resource allocation or management effort is required.

Project	Cost	Schedule	Capability
Air Surveillance Maritime Patrol	G Project remained within appropriation; with use of contingency.	Y Schedule pressure reported at the end of the previous year continued, including supply chain issues. This time was not recoverable and steps to mitigate were being considered.	G No change to the capability that will be delivered.
Anzac Frigate Systems Upgrade	G Project remained within appropriation, with use of contingency.	R Ship 2 (<i>Te Mana</i>) was forecast to be accepted in December 2021 ahead of its return to New Zealand. The Crown required further work and sea trials ahead of the ship's departure from Canada, which took place at the end of May 2022. Acceptance expected to occur in the second half of 2022.	G No change to the capability that will be delivered.

Project	Cost	Schedule	Capability
Dive and Hydrographic Vessel	G Project remained within appropriation, with use of contingency.	R The schedule for Operational Release had been revised to the second quarter of 2022, however further delays arising from the COVID-19 Alert Level 4 lockdowns in late-2021 impacted the OR date. In June 2022 approval was given for the ship to be fully integrated into the fleet.	G No change to the capability that will be delivered.
Fixed High Frequency Radio Refresh	G Project remained within appropriation.	G As of 30 June the Project was tracking to schedule.	G No change to the capability that will be delivered.
Frigate Sustainment Communications	G Project remained within appropriation.	Y A project date was forecast to be delayed, however there is no impact on the project's milestones.	G No change to the capability that will be delivered.
Future Air Mobility Capability – Tactical	G Project remained within appropriation (with some prior use of contingency).	G The project continues to schedule.	G No change to the capability that will be delivered.
Maritime Sustainment Capability	G Project remained within appropriation (with some prior use of contingency).	Y Operational release (OR) date now scheduled for the second half of 2022 ⁸ .	G No change to the capability that will be delivered.
Network Enabled Army C4	G Project remained within appropriation.	Y Some non critical capabilities are experiencing delays due to COVID-19.	G No change to the capability that will be delivered.
Network Enabled Army R&S	G Project remained within appropriation, with use of contingency.	G As of 30 June the Project was tracking to schedule.	G No change to the capability that will be delivered.
NH90 Simulator	G Project remained within appropriation.	R Baseline schedule delay experienced in achieving Ready for Testing milestone (operational release).	G No change to the capability that will be delivered.

⁸ Operational Release for *Aotearoa* was rescheduled in August 2021 and was expected to be completed following the first trip to Antarctica which took place in the first quarter of 2022. The voyage had to take place during the Austral (Southern Hemisphere) summer.

Project	Cost	Schedule	Capability
ORACS ⁹ Phase 1(a)	G Project remained within appropriation.	R While ADSB-Out capability will be delivered by the regulatory deadline, the project's achievement of Operational Release is delayed.	G No change to the capability as signed off in the Business Case
Phase 1(b)	G The projected cost was within budget.	R As reported in the 2021 edition, COVID-19 impacted the software solution's global rollout. Following confirmation of details from the provider, the project timeline would be re-baselined.	G No change to the capability as signed off in the Business Case
Phase 2(a)	G The project remained within appropriation.	R Project governance milestones are forecast to be delayed past the baselined dates in the approved business case.	G No change to the capability as signed off in the Business Case
Protected Vehicle – Medium	G The project remained within appropriation.	A At 30 June the project was forecasting a delay in the delivery schedule.	G No change to the capability as signed off in the Business Case.

⁹ Operational and Regulatory Aviation Compliance Sustainment project.

AIR SURVEILLANCE MARITIME PATROL

In July 2018 the Government decided to acquire four P-8A Poseidon aircraft, replacing the New Zealand Defence Force's P-3K2 Orion aircraft, which need to be retired by 2025. The new fleet will be capable of delivering the maritime patrol function for the next generation. The project will also deliver the infrastructure and training support needed for the new capability.

The P-3K2 Orion fleet, New Zealand's maritime patrol aircraft, have played a significant role in promoting security for more than 50 years, patrolling the ocean to protect New Zealand's sovereignty, trade routes and the international rules-based order. They have also supported search and rescue, resource and border protection, disaster response and engagement with our key security partners.

Government policy has stressed the importance

of maritime patrol over many decades. In April 2017 Cabinet noted the policy value of New Zealand's MPAs, and the *Strategic Defence Policy Statement 2018* stated that they:

- provide a key maritime combat capability that can also support other government agencies on a range of domestic contingencies;
- enable the Government to offer a highly valued capability to international coalition operations; and
- provide a wide area surveillance capability that is critical to maintaining awareness of activities in New Zealand's maritime domain.

THE PURPOSE OF THIS PROJECT

The project was initiated to identify capability and user requirements for a replacement to the current maritime patrol aircraft capability. Options for the type and number of aircraft that would be required to support Government policy would be explored, and recommendations for replacements would be made along with any recommendations relating to infrastructure, training and support requirements.

Following the Government's decision, the project is delivering four P-8 Poseidon aircraft to replace the P-3K2 Orion fleet, a flight training simulator, and infrastructure at RNZAF Base Ohakea, where the new capability will be based.



*P-8A Poseidon
(artist's impression,
supplied)*

The infrastructure component of the project includes an aircraft hangar, squadron headquarters, and operations centre. Airfield works include runway and taxiway strengthening, lighting for maintenance operations at night, the apron where the aircraft will be parked, and an aircraft rinse facility.

The Air Surveillance Maritime Patrol (ASMP) project was part of a wider scope of work, initiated in 2015 under the name Future Air Surveillance Capability. The scope initially included exploring options for a complementary capability to support the work of other government agencies, such as search and rescue and fisheries surveillance. The decision was made to investigate options for delivering the support for this civilian capability under a separate project, the Enhanced Maritime Awareness Capability Project. During the 2021/22 financial year, that project was not in its delivery phase and so does not feature in this edition of the *Major Projects Report*.

CAPABILITY REQUIREMENTS

Capability requirements identified as necessary to support policy objectives are:

The ability to multi-task: New Zealand has a small air force by international standards and therefore its assets are required to perform multiple roles.

Community size/close relationship with user community: Being part of a group of partner countries with the same platform provides access to critical mission and logistics support in different locations. It was considered best for New Zealand to participate in as large a user community as possible, with as many friends as possible, for support.

Already developed: Maritime patrol is a sophisticated technology that requires significant research and development investment to achieve. It was therefore considered that New Zealand should look to identify a capability which had already been developed and worked from the get-go.

Successful introduction into foreign markets: Maritime patrol involves complex systems which

tend to be more demanding to keep operational than basic ones. It was therefore considered best for New Zealand to go with a proven capability.

Support for technology growth path: The *Strategic Defence Policy Statement 2018* stated, “As partners acquire ever-more sophisticated capabilities, contributing to coalition operations will require high-level network interoperability and contributions that do not present a defensive liability to them... To retain New Zealand’s reputation, freedom to act, and mitigate risks to mission and personnel, Defence must strive to keep pace with technological evolutions”.

In the context of maritime patrol technology rapidly advancing, and becoming increasingly IT-based and therefore requiring regular upgrades, it was considered that New Zealand should look to a platform which will be fully supported through the upgrade path and where upgrade costs could be shared with other users.

THE BUSINESS CASE PROCESS

Prior to the approval of an Indicative Business Case for the project, Boeing and the United States Government advised that the last chance for New Zealand to secure the price benefits of being part of a large US purchase was June 2017. This was subsequently extended, at New Zealand’s request, to 30 November 2017, and then 14 July 2018. In relation to the 14 July 2018 deadline Boeing and the US Government advised that if New Zealand delayed beyond that date, price increases were expected.

It was therefore necessary to accelerate consideration of the P-8A to preserve that option for the Government.

In December 2016 Cabinet had invited the Minister of Defence to report back in June 2017 with an Implementation Business Case on which Ministers could make a decision on whether to conclude a US Foreign Military Sales Letter of Acceptance (see page 23 for more details) for the P-8A. The business case took the approach of considering whether an alternative to the P-8A would be available in the same timeframe if

Cabinet decided to not acquire that type of aircraft.

Information used to inform the business case on alternatives was from open source, or was provided by companies in response to a Request for Information.

Information on the P-8A was sourced from the Letter of Offer provided by the United States Government.

On assessing that there was no better alternative to the P-8A (one that would meet all of New Zealand's requirements), a full Implementation Business Case recommending the acquisition of the P-8A was developed for the Government's consideration.

Better Business Case Milestones History

2016	
29 February	Strategic Assessment approved by Vice Chief of Defence Force and Deputy Secretary (Policy)
7 December	Cabinet authorised New Zealand to issue a Letter of Request to the US Government for detailed cost and availability information for the P-8A; and Invited the Minister of Defence to report back in June 2017 with an Implementation Business Case on which Ministers could make a decision on whether to conclude the Letter of Acceptance for the P-8A. EGI-16-MIN-0338
2017	
7 April	Cabinet noted the Policy Value of New Zealand's Maritime Patrol Aircraft CAB-17-MIN-0137
2018	
2 July	Cabinet agreed to recommendations as outlined in the Implementation Business Case for the order of four Boeing P-8A Poseidon maritime patrol aircraft, training systems and other support equipment and services through the United States' FMS process, and acquisition of infrastructure and other components as required to bring the P-8As into service. CAB-18-MIN-0305

CAPABILITY DEFINITION PHASE

From the approval of the Project Charter in March 2015, it was 40 months until the Implementation Business Case was approved by Cabinet in July 2018. During this time a range of work was undertaken by the project.

How Defence identified and assessed operational requirements

Key user requirements

In addition to the capability requirements outlined on page 21, the following key user requirements were developed following consultation across NZDF and the Ministry of Defence in March and July 2017:

Operate: The user shall be able to conduct missions worldwide as directed.

Process and Exploit: The user shall be able to process and exploit all data collected by the MPA.

Interoperability: The user shall have the capability to interoperate with organisations, platforms, systems and applications in a manner necessary to fully utilise the MPA.

Communicate: The user shall have the means with which to receive and disseminate information and intelligence to military and other government agencies, platforms, systems and applications.

'Find, Fix, Track, Target, Engage and Assess' for Anti-Submarine Warfare (ASW): The user shall be able to conduct effective and persistent ASW.

'Find, Fix, Track, Target, Engage and Assess' for Anti-Surface Warfare (ASuW): The user shall be able to conduct effective and persistent ASuW.

Support Search & Rescue and Surveillance of South Pacific and Southern Ocean: The user shall be able to conduct search and rescue including the ability to deploy survival equipment in the New Zealand and Fiji Search and Rescue Regions (Maritime). The user shall be able to conduct surveillance operations in the regions of the South Pacific and Southern Ocean of interest to New Zealand. The user shall be able

to conduct maritime reconnaissance operations for vessels of interest within the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR, April 1982) areas of interest to New Zealand.

Defend from Threats: The user shall be able to defend themselves from threats to the capability.

Support the capability: The user shall have the capability to support the MPA.

How Defence analysed options in the Capability Definition phase

The project team considered each maritime patrol aircraft option available in the market and the indicative costs for each, which were derived from the Request for Information data, and the US Letter of Offer for the P-8A.

It was assessed that a number of a smaller class of maritime patrol aircraft in the market had insufficient range for New Zealand's vast ocean region and would not meet New Zealand's demanding requirements. There were also satellites and remotely piloted aircraft systems, which offered the potential to assist with some lower order, civilian surveillance tasks, but which could not perform the full range of functions.

It was assessed that only large, manned aircraft, like the P-3 Orion, had the full package of speed, endurance and sophisticated military functions necessary. That market was limited to three options:

- **US Boeing P-8A Poseidon** – the US investment in a replacement for its Orion fleet.
- **Japanese Kawasaki P-1** – Japan's investment in a replacement for its Orion fleet.
- **A concept aircraft**, exemplified by the Lockheed Martin "Sea Hercules" - a design proposal based on the well-known military transport aircraft.

How Defence considered interoperability

Interoperability was one of the key considerations of the ASMP project, as reflected in the third key user requirement, and the

capability requirement for the MPA replacement to have a large community size to allow access to critical mission and logistics support in different locations (also noted above).

How Defence considered through-life costs and issues

Maintaining the capability throughout its life will require ongoing upgrades, replacement and planning for obsolescence. An ongoing and planned schedule of upgrades is the preferred approach, rather than major injections of capital funding, as and when obsolescence becomes a pressing requirement.

In general, the ASMP project is replacing the existing maritime patrol aircraft with a contemporary version. In considering the available options it was recognised that one way to reduce through-life risks was to share these with other users. It was known that the P-8A was also being acquired by Australia, the United Kingdom, the United States and Norway, and that operating the same capability as used by allies and partners has advantages. These include leveraging the economies of scale of being part of a much larger fleet, including sharing costs for through-life support and non-recurring engineering costs for upgrades. Without a wide pool of operators to share development costs, New Zealand would need to fund a higher proportion of such costs; what this would amount to would depend on the number of other users of the capability, and whether they would be willing to enter into a shared costs approach.

Estimates for through-life capital sustainment and operating costs were considered, including hardware and software refreshes, major aircraft and engine restoration and overhauls, and personnel costs for operating, maintaining and

sustaining the proposed delivery of outputs from the P-8A capability.

Requirements Analysis

The P-8A was the only capability of the three options that met all of the criteria. It was also the lowest capital cost and lowest risk option.

ACQUISITION PHASE

How Defence decided to acquire the Capability Solution

Procurement of the P-8A capability was only possible from the United States Government via the Foreign Military Sales (FMS) process. FMS is a programme that allows our government to purchase defence articles and services, as well as design and construction services, from the US Government, on a “no-profit” and “no loss” basis to that government.

Following approval from Cabinet in December 2016, Defence issued a formal Letter of Request to the US Government for supply of the P-8A and associated systems.

The final Letter of Offer was issued from the US Government on 1 June 2018. Following Cabinet approval, the Letter of Offer was accepted by the Secretary of Defence on 9 July 2018.

Contract Status at 30 June 2022

MPA: P-8A	The Government of the United States of America, via Foreign Military Sales
Infrastructure: Horizontal Works	Fulton Hogan (Prime)
Infrastructure: Vertical Works	Hawkins Limited (Prime)

SCHEDULE/TIMEFRAME PROGRESS

Schedule of Capability Integration – P-8A fleet

	Initial Estimate	30 June 2022 (Forecast/Actual)	Variance (months)
Delivery of first P-8A to NZ	April 2023	December 2022 (Forecast)	-4
Initial Operational Release 1	July 2023	July 2023 (Forecast)	N/A
Operational Release	2025	2025 (Forecast)	N/A

ASMP CAPABILITY INTEGRATION

Capability Integration Plans (CIP) are designed to be living documents, and are reviewed and updated as required as a project progresses through its life cycle.

For ASMP, the CIP was first released for review in mid-2017, and the fourth, and final planned version of the CIP was approved in November 2021. Any further revisions will be made on an as required basis.

This most recent version has been updated with a range of changes, including consolidating health and safety information, and expanded details of how the capability integration process and initial operational release of the capability will be managed.

The plan is developed to ensure the full benefits of the P-8A capability are realised by the NZDF. It identifies major areas of planning and coordination that are required to deliver all elements of the capability, ensuring operational release takes place. Activities within the CIP include:

Infrastructure: construction of new squadron headquarters and facilities to house aircrew, mission support and maintenance personnel, hangar facilities and the operational apron area in front of the hangar for four P-8A aircraft at RNZAF Base Ohakea.

Mission Support: ensuring the ground functions required to plan a mission are in place.

Training: aircrew, mission support personnel and maintenance staff will be qualified to operate, support and maintain the P-8A aircraft with

training from US Navy and contractor instructors.

Airworthiness: there are required certification activities that will ensure the RNZAF can safely operate and maintain the P-8A capability, and meet safety and legislative obligations. These activities relate to design acceptance of the aircraft and simulators (technical airworthiness), and organisational approvals to ensure the RNZAF can safely operate the aircraft in a mission environment (operational airworthiness). These approvals come from the NZDF Airworthiness Authority.

DURING THE 2021/22 YEAR

The aircraft

In spite of the ongoing impact of COVID-19 on manufacturing and supply chains around the world, in early 2022, construction of the fuselage for the first NZ P-8A aircraft had commenced on schedule at Boeing’s plant in Kansas.

In March a “keeling” ceremony was held in Wichita, attended by the New Zealand Ambassador to the United States, H.E. Rosemary Bank, marking the loading of the fuselage onto a railcar for transportation to Boeing Seattle, where – over April and May – the fuselage would be mated with the wings, and internal fitout would commence ahead of the aircraft being painted.

By the end of June the second fuselage had also arrived at the Boeing facility to undergo the same process.

Infrastructure

In July 2021, piling for the new P-8A facility at Base Ohakea was around 60 percent complete, and two tower cranes had been commissioned on site in preparation for raising the building. Reinforcing steel was raised above ground level as part of preparations for the first aircraft hangar roof to be installed.

On 17 August, however, following the identification of community transmission of COVID-19 in New Zealand the country moved to Alert Level 4. Work on the new P-8A facility paused until all of New Zealand south of Auckland moved to Alert Level 3 on 31 August.

Work onsite in the Manawatū resumed in early September. With Auckland remaining in an extended Level 4 response, infrastructure work experienced delays in delivery of materials.

By the end of 2021 the building foundations were nearing completion, and steel work was being erected, and by February 2022 the main structure for the office, training wing and mission support wing had been largely erected. The main support columns for Hangar 1 had been completed, and assembly of Hangar 1 roof had commenced. The first roof was raised on 26 May, giving a clear indication of the sheer scale of the site.

Supporting capability

The project's work includes acquiring other systems and equipment to support the new capability once it is in service. Several Requests for Tender (RFT) were released to the market through the Government Electronic Tender System (GETS).

One of these tenders, released October 2021, awarded a contract for aircraft stands and access stairs. There is a requirement to access difficult to reach areas of the P-8A aircraft over an extended period of servicing as part of ongoing maintenance. Various stands and stairs are required to provide access to areas on the aircraft for maintenance purposes. Following a virtual industry briefing, the tender closed in November 2021 and was awarded to Altec Aluminium-Technik GmbH & Co KGaA.

Three other RFTs did not result in an award of contract:

- A Mobile Aircraft Wash System (MAWS) RFT was released in August 2021. The MAWS provides a safe, stable work platform from which to access elevated sections of the aircraft – the rudder, vertical and horizontal stabilizers, and well as the fuselage crown – for washing. This access can only be met by the use of a mobile elevated access platform. The responses received did not meet requirements of the RFT and the project subsequently sourced the MAWS directly from Verseng Group Pty Ltd.
- Scissor lifts and an articulated boom, along with support and maintenance, were sought through an RFT released in November 2021. These provide height to assist in the maintenance and cleaning of the P-8A aircraft. There were no responses to the RFT and the project has sourced the equipment directly from Youngman Richardson and Co.
- Negotiations for a dehumidification solution continued after no responses were received to the RFT released in October 2021. Dehumidification prevents corrosion within airframes and engines, and prolongs the lifespan of the aircraft.

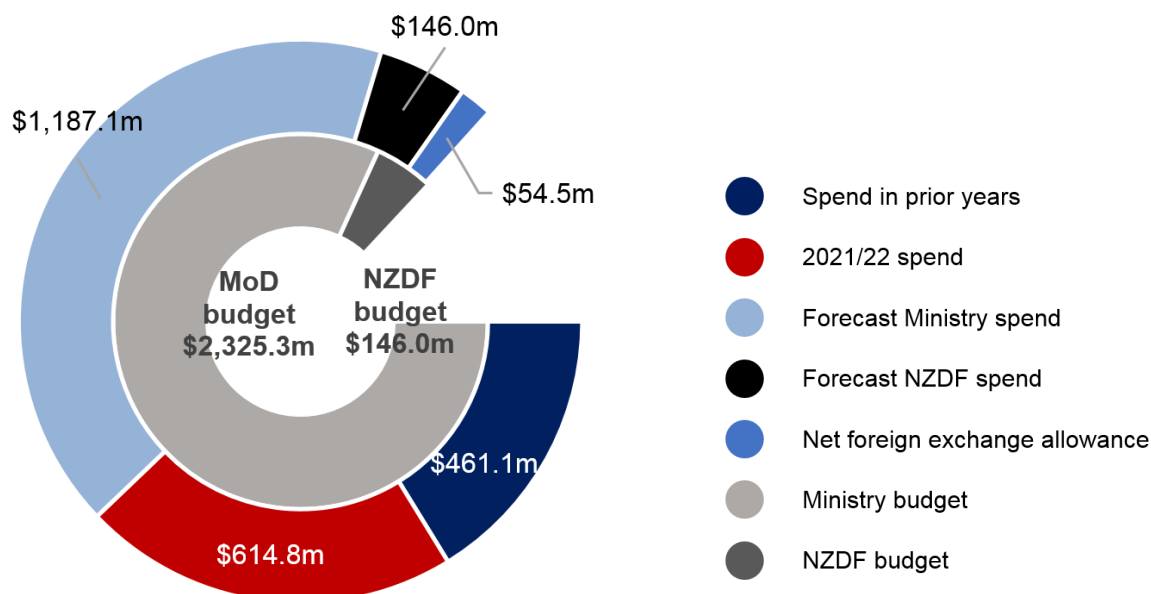
DEVELOPMENTS POST 30 JUNE 2022

The second hangar roof at Ohakea was raised successfully on 26 July, the same month the first aircraft rolled out of Boeing's Seattle paint shop with new livery.¹⁰ In mid-August it took off on its inaugural flight¹¹, heading to another Boeing facility for further equipment installation, prior to delivery to New Zealand in December.

¹⁰ Link to [footage of the newly painted aircraft](#) (YouTube).

¹¹ Link to [footage of the first flight](#) (YouTube).

ASMP PROJECT BUDGET AND EXPENDITURE



At 30 June 2022 expected Air Surveillance Maritime Patrol project costs were:

		Ministry	NZDF	Consolidated project
		\$000	\$000	\$000
Budget	Current approved project budget	2,325,251	145,987	2,471,238
	Allowance for foreign exchange movements	125,140	-	125,140
	Original approved project budget	2,200,111	145,987	2,346,098
Forecast	Forecast total project cost			
	- capital expenditure	2,263,015	145,958	2,408,973
	- non-capitalised expenditure	5,287	-	5,287
	Effect of foreign exchange movements	70,673	-	70,673
	Forecast cost using hedged rate	2,197,629	145,958	2,343,587
	Forecast project underspend	2,482	29	2,511

ANZAC FRIGATE SYSTEMS UPGRADE

This upgrade is restoring the frigates' ability to fulfil combat roles and provide high quality surveillance in the contemporary and emerging security environment. This will ensure that the Government retains the ability to deploy HMNZS *Te Kaha* and *Te Mana* to the Pacific and beyond, enabling them to operate with confidence in low- to medium-threat environments. In December 2020, *Te Kaha* returned from Canada to New Zealand. *Te Mana* returned in July 2022.

THE PURPOSE OF THIS PROJECT

The Frigate Systems Upgrade Project (FSU), originally known as the Self Defence Upgrade, was initiated in 2007. The Royal New Zealand Navy had advised that the frigates were over 10 years old and that many of the surveillance and combat systems were in need of replacement. Threats in the maritime environment had also changed, with new technology – once only available to larger countries – now becoming available to small states and other groups.

This project is ensuring that the mission and weapon systems on board the Anzac-class frigates continue to contribute towards their combat viability, addressing the reduction in capability that has continued to occur.

By maintaining the combat effectiveness and efficiency of the Anzac frigates over their remaining lives, this will sustain and enhance the Naval Combat Force's contribution toward government options for:

- defending New Zealand's sovereignty, its Exclusive Economic Zone and territorial waters

- operating with the Australian Defence Force to discharge our obligations as an ally of Australia
- contributing to peace and stability operations in the South Pacific
- contributing to whole-of-government efforts at home in resource protection
- participating in Five Power Defence Arrangements and other multilateral exercises or operations
- providing a physical demonstration of New Zealand's commitment to regional and global security, including protecting sea lines of communication.

The *Defence White Paper* published in 2010 had reiterated the requirement of the Government at the time that the frigates will provide effective, credible combat capabilities, and for the frigates to be given a self-defence upgrade by 2017¹² to address obsolescence and to improve their defensive capability against contemporary air and surface threats.

CAPABILITY REQUIREMENTS

The capability requirements necessary to support these policy objectives include:

- **Participation:** the ability to participate in national, allied and coalition activities to the Combined Force Commander in order to maximise the effective contribution made.
- **Strategic Situational Awareness:** the ability to achieve situation awareness of electromagnetic emissions to the Combined Force Commander and specified agencies in support of tactical and strategic objectives.
- **Air Threat to Others:** an ability for a defended surface unit to operate in an area

¹² Since publication of the *Defence White Paper 2010*, changes to the project's schedule have seen the completion date updated (see page 33, Schedule of Capability Integration).

under an air threat to the Combined Force Commander in order to undertake its designated mission.

- **Surface Threat to Others:** the ability to deliver the neutralisation of a surface delivery platform prior to its weapon launch to the Combined Force Commander in order for a defended unit in close proximity to be able to continue with its mission.
- **Effects Ashore:** the ability to deliver effects ashore from organic weapons to the Combined Force Commander in order to support land operations.
- **Through Life:** the Logistics Commander (Maritime) is able to deliver availability to the Commander Joint Forces New Zealand of a platform that can complete a mission throughout its remaining life.

FSU Better Business Case Milestones

2007	
June	Secretary of Defence and Chief of Defence Force approve the original Project Charter .
2008	
6 August	Cabinet agreed that all five options in the Indicative Business Case be fully developed for a main gate business case that will be prepared by officials. POL Min (08) 14/6
2012	
29 March	Revised Project Charter approved by Secretary of Defence and Chief of Defence Force.
12 November	Cabinet approved Option 4 of the Detailed Business Case and authorised the Secretary of Defence to issue Requests for Tender. CAB Min (12) 40/5A
2014	
14 April	Cabinet agreed to proceed with the FSU Project Implementation Business Case and authorised the Secretary of Defence to conclude contracts. CAB Min (14) 13/14
2017	
6 December	Cabinet approved \$148 million additional funding to complete equipment installation. CBC-17-MIN-0037

CAPABILITY DEFINITION PHASE

A total of 44 months' work was undertaken during the project's definition phase, from June 2007 to February 2009, at which point work was suspended pending the outcome of the *Defence White Paper*. Following publication of that document, work recommenced in November 2010 and was concluded two years later (November 2012) when the Detailed Business Case (DBC) was approved.

How Defence identified and assessed capability and operational requirements

The project team carried out an analysis to identify technical requirements for the FSU.

A number of mission systems were identified as facing obsolescence and their support was becoming increasingly difficult and expensive. An Indicative Business Case (IBC) was developed and presented to Cabinet in which a range of options of increasing complexity and cost were identified.

Cabinet agreed in August 2008 that all five options should be developed and costed in the Detailed Business Case (DBC). Shortly after work on the DBC had begun, the Government announced work on a new *Defence White Paper*. Work on the FSU was paused until the White Paper had been completed in 2010 and the future of the frigates had been confirmed.

The DBC developed four options. The fifth option presented in the IBC, to counter higher levels of threats, was not advanced in the DBC due to its higher cost. An additional option that closely replicated the upgrade being planned for the Royal Australian Navy was included in the options analysis as an upper bound comparator.

The systems considered for upgrade or replacement were:

- Combat Management System
- Tactical Radar Systems
- Defensive Missile Systems
- Infrared Search and Track
- Radar Electronic Support Measures
- Underwater sonar

- Tactical datalinks
- Decoys
- Torpedo Defence System
- Combat System Trainer.

How Defence analysed the requirements options in the Capability Definition phase

The project team developed a cost-benefit model in order to compare various combinations of core combat system components, user requirements and the indicative costs for each system derived from Request for Information data. It assessed the contribution of each component to the benefits and then compared costs. The most cost-effective packages were grouped into four options that presented the greatest benefit for that level of cost.

How Defence considered interoperability

Interoperability was a key consideration of the FSU project. The frigates need to remain interoperable with our partners, especially Australia. The Anzac frigates are part of a joint capability programme between New Zealand and Australia. As a result, the frigates comprise New Zealand's main contribution toward naval combat force Anzac operations and exercises.

Under the original Anzac acquisition programme, New Zealand and Australia laid the foundations for joint management and support of the ships throughout their lives. This was formalised through the 1991 signing of an Implementing Arrangement for the Management of Assets and the In Service Support of the Anzac class frigates and shore facilities.

The Royal Australian Navy has an upgrade project for their Anzac class frigates underway, and systems common to both navies were incorporated in the options considered. Each of the options was designed to retain interoperability with Australia and other partners while providing a useful level of complementary capabilities.

How Defence considered through-life costs and issues

In general, the FSU project is replacing existing systems with contemporary versions. In many capability areas, the systems have been simplified in both architecture and quantity while increasing capability. However new technologies are being introduced as well, which are not currently in service.

Changes in through-life costs were estimated from a range of sources, including historic costs and industry information. From this broad base of information a cost model was developed resulting in a discounted net present cost for each option, allowing a financial comparison between options.

Requirements Analysis in the Capability Definition Phase

Options considered	Cost Estimates (NZ\$ million)	Advantages	Disadvantages
Option 0: No upgrade	\$0	No capital cost.	Does not meet policy expectations.
Option 1: Surveillance Capability This option would allow the ships to conduct surveillance missions but only in a low threat environment in the Southwest Pacific and to a limited extent elsewhere.	\$253-271	Meets intelligence, surveillance and reconnaissance (ISR) requirements in low threat environments in the Southwest Pacific.	Does not meet ISR requirements, nor combat and protection roles outside the Pacific.
Option 2: Air Threat Capability This option undertakes most of the upgrades listed in Option 1 plus it provides the minimum requirements to defend the ship against air threats.	\$298-318	Meets ISR requirements in all regions plus a minimum air defence capability.	Does not meet combat and protection roles outside the Pacific region.
Option 3: Limited Multi-Threat Capability This option builds on Option 2 by including an obsolescence upgrade to the existing sonar and the missile decoy system.	\$313-332	Meets ISR requirements in all regions. Meets underwater surveillance and missile decoy requirements.	Does not meet combat and protection roles outside the Pacific region, including detection and defence against torpedoes.
Option 4: Multi-threat Capability In addition to Option 3, this option provides a practical and sustainable level of defence against torpedo threats and increases the number of missiles in the anti-ship missile system.	\$354-374	Meets all policy expectations for ISR, combat and protection.	Higher capital cost than other options.

An additional option was developed to replicate as closely as possible the Australian Anzac frigate upgrade. This comparator was used to compare costs, benefits and risks.

<p>Option 5: Australian Upgrade Comparator</p> <p>This option matches closely the upgrade path being pursued for the Australian Anzac frigates.</p>	<p>\$411-431</p>	<p>Meets all policy expectations for ISR, combat and protection. Builds on development work undertaken by Australia.</p>	<p>High capital cost. Likely to incur higher support and maintenance costs. The result is an option of high cost and lower overall benefit compared to Option 4.</p>
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ASSESSMENT: Option 4 was assessed to be the best solution. It restores the frigates to their original baseline against contemporary threats and updates all obsolete equipment. It would give the Government the confidence to deploy the frigates either alone or as part of a joint task force to regions where credible threats are likely to be faced. Option 4 achieves significantly increased deployment options for the frigates, via a relatively small marginal increase in cost over Options 1-3. Option 5 would provide an upgrade at higher cost and lower overall benefit.

Description of the Capability and Operational Requirements

<p>Capability Requirements necessary to support policy objectives include:</p>	<p>Operational Requirements necessary to support the capability include:</p>
<ol style="list-style-type: none"> 1. Participation: The Command shall be able to deliver the ability to participate in national, allied and coalition activities to the Combined Force Commander in order to maximise the effective contribution made. 2. Strategic Situational Awareness: The Command shall be able to achieve situation awareness of electromagnetic emissions to the Combined Force Commander and specified agencies in support of tactical and strategic objectives. 3. Air Threat to Others: The Command shall be able to deliver an ability for a defended surface unit to operate in an area under an air threat to the Combined Force Commander in order to undertake its designated mission. 4. Surface Threat to Others: The Command shall be able to deliver the neutralisation of a surface delivery platform prior to its weapon launch to the Combined Force Commander in order for a defended unit within 4 km to be able to continue with its mission. 5. Effects Ashore: The Command shall be able to deliver effects ashore from organic weapons to the Combined Force Commander in order to support land operations. 6. Through Life: The Logistics Commander (Maritime) shall be able to deliver availability characteristics to the Commander Joint Forces NZ 	<p><u>Combat Management System (CMS).</u> The CMS is the human-machine interface used to control weapons and sensors in manual, semi-automatic and automatic modes. It provides the display mechanism for all ship sensors allowing disparate information from numerous sources to be fused into a single picture. The ship cannot operate in an ISR, intelligence or combat role without the CMS.</p> <p><u>Intelligence Systems.</u> These are highly sensitive radio and radar receivers able to direction find and analyse emissions to aid in identification. They contribute to both tactical and strategic outputs.</p> <p><u>Radar Systems (Surveillance and Reconnaissance).</u> Military radars use sophisticated technologies that allow the tracking of small and fast objects against a background of land and in the presence of a cluttered electromagnetic environment.</p> <p><u>Optronics (Surveillance and Reconnaissance).</u> Use of both the visible and infrared spectra provides a significant passive means of detection, tracking and identification. Infrared Search and Track (IRST) systems provide near continuous 360° observation. The infrared component of these sensors allows a high level of capability to be maintained at night and in poor atmospheric conditions.</p> <p><u>Air Defence.</u> Air defence against attacking aircraft or missiles is local area and point defence. They span a range from approximately 2km to 30km</p>

<p>in order to enable completion of a mission throughout the life of the platform.</p>	<p>from the ship and can include the ability to defend protected units (usually other vessels) within a limited range. This defence is considered credible for a general purpose frigate and is achieved using Point Defence Missile Systems. Closer in defence is conducted at ranges less than 2km and uses systems such as the Phalanx Close-in Weapons System (CIWS) and missile decoys such as chaff.</p> <p><u>Anti-Surface.</u> Existing weapons provide strike capability for anti-surface warfare. The FSU project will need to bridge the capability gap in the sensors necessary to optimise the performance of these weapons.</p> <p><u>Under Sea Warfare.</u> FSU User Requirements are for detection of and defence against a torpedo launched at the ship. Frigates' sensor-sharing capability will usually deter a submarine from undertaking surveillance near the ship.</p> <p><u>Support to Joint Task Force (JTF).</u> The <i>Defence White Paper 2010</i> emphasised the NZDF being able to respond to security events in the Pacific region and further afield into Asia. NZDF frigates have an important role to provide defence for a task group and to provide multi-source high quality surveillance and reconnaissance data.</p>
<p>NOTE: The operational and capability requirements listed here were those identified in the suite of requirement documents produced during the Capability Definition Phase. During the tender and contract negotiation process these requirements are converted into function and performance specifications (FPS) that become the contracted deliverables. During the contract negotiation process the operational requirements have to be balanced against cost or viability considerations.</p>	

History of Cost Estimates in the Capability Definition Phase

	2004	2008	2012
Costs (NZ\$million)	300	287-845	354-374
Explanation	The early estimate was based on an assumed scope for the upgrade, before any planning work had been undertaken. The 2008 range included a high end option as a comparator that was not proceeded with.		

Estimated Acceptance Date in the Capability Definition Phase

Early estimates of an acceptance date, prior to the suspension of work on the project ahead of the *Defence White Paper*, was circa 2010.

ACQUISITION PHASE

Description of acquisition work

On 6 November 2012 the Cabinet Committee on State Sector Reform and Expenditure Control authorised the Secretary of Defence to:

- Issue Requests for Tender for the lead contractor, supply of components and other

items as required to deliver the capability level; and

- Include in the Requests for Tender an option of acquiring a full combat inventory of missiles.

How Defence decided to acquire the Capability Solution

Requests for Tender were issued in February 2013. Evaluation of the five tenders for the Combat System Integrator (CSI) resulted in a clear preferred supplier. Two respondents offered a baselined¹³ solution that was approximately 15-20% less expensive than the other three. The higher cost proposals would have resulted in a compromise in capability to maintain the total project cost within that agreed to at the Detailed Business Case stage. Of the two lower cost solutions, one tender had a noticeably lower evaluation score, and posed a higher level of project and schedule risk. Conversely, the Lockheed Martin Canada (LMC) tender was a thorough response with a lower level of risk reflective of FSU being an extension of LMC’s existing Halifax Class Frigate upgrade for the Royal Canadian Navy.

A number of preferred Original Equipment Manufacturers (OEMs) were also evaluated and identified as being able to provide the stand-alone systems not offered by the CSI, but which are required to meet the level of capability directed by Cabinet.

On 14 April 2014, Cabinet approved the Project Implementation Business Case and authorised the Secretary of Defence to award contracts to LMC and others as required for equipment and services not forming part of the LMC contract. Cabinet approved NZ\$446.193 million of capital expenditure for the acquisition and introduction into service of the FSU project (based on foreign

exchange rates as at 1 April 2014). This included up to \$20 million as a special contingency against risk in the design and installation stages.

In December 2017, following the detailed design phase of the project identifying higher than expected installation costs for the project, Cabinet authorised the Secretary of Defence to commit and approve additional expenditure of \$148 million for the Frigate Systems Upgrade project bringing the total approved budget to \$639.0 million. A contract change proposal for the installation phase was signed with Lockheed Martin Canada in December 2017. The project schedule and costs were re-baselined to reflect these changes.

Contract Status at 30 June 2022

Prime contractor	Lockheed Martin Canada
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¹³ In order to evaluate on an equitable basis, responses were baselined by adding or subtracting components and costs from responses where they differed.

SCHEDULE/TIMEFRAME PROGRESS

Variations in forecast acceptance date

	Original Forecast at Approval to Commit	30 June 2022 Forecast/Actual	Variation (months)
Acceptance: Ship One	March 2017	November 2020 (Actual)	44
Acceptance: Ship Two	February 2018	August 2022 (Forecast)	54

Comment: Initial schedule estimates were made at the time the Project Implementation Business Case was submitted. At the time the contract was awarded, dates were confirmed as much as possible prior to completion of preliminary and detailed designs. Following completion of detailed design, in December 2017 approval for additional funding and a re-baselining of the schedule was received from Cabinet.

History of variations to schedule at 30 June 2022

Date of individual variation	Variation length (months)	Explanation
December 2017	38	Ship One: The forecast variation to the acceptance date as a result of the re-baselining of this project in December 2017. Completion of the Detailed Design for the installation phase had identified that a revised schedule was required.
	39	Ship Two: As with Ship One, the new acceptance date was set as a result of the project's schedule re-baselining.
March 2019	42	Ship one: Due to delays with the industrial phase work for <i>Te Kaha</i> , a revised Acceptance date was provided by Lockheed Martin Canada.
August 2020	44	Ship one: Impact of COVID-19.
June 2022	54	Ship two: Impact of COVID-19, and completion of further work and trials.

FSU CAPABILITY INTEGRATION

Description of Capability Integration

An Introduction into Service Plan was developed to coordinate the test and evaluation processes required to bring the upgraded frigates back into operational service with the following main activities:

Engineering change process: The overarching framework is the RNZN Engineering Change Process. This is a well-established structured process which ensures all elements are completed.

Data Management and Documentation

Deliveries: documentation delivered by the contractors will be reviewed and then entered into the Logistic Information Management System.

Acceptance Testing: Acceptance testing will be based on the Royal Australian Navy (RAN) Test and Evaluation procedures. Testing will include Factory, Harbour and Sea Acceptance Tests. Acceptance testing of the Sea Ceptor missile system will include a significant amount of modelling analysis that will be achieved through collaboration with partner navies.

Operational Test and Evaluation: will be conducted by the NZDF in order to satisfy that

the delivered suite of products meets the original intent. Additionally it baselines the delivered systems and identifies its capabilities and limitations.

Training: Three types of training deliverables are being provided; training systems, training data/documentation and training courses. These deliverables will be managed by the project's ILS manager liaising with the end users.

Leveraging Partner Defence Force

Relationships: In order to both meet system requirements and provide through life support,

Schedule of Capability Integration

Unless stated, all dates are for Ship 1: *Te Kaha*.

arrangements will be leveraged with partner defence authorities. Implementation Arrangements are now in place with both Canada and the UK.

Safety case data has been provided by the FSU Project to allow Defence to raise relevant safety cases for approval by the Naval Capability and Armament Certification boards as appropriate. Similarly, prior to classified data being held on any delivered system, the system must be certified to recognised security standards.

	Initial Estimate (2014)	At 30 June 2022 (Forecast/Actual)	Variance (Months)
Platform accepted by Crown	Ship 1: March 2017	Ship 1: <i>Te Kaha</i> November 2020 (Actual)	44
	Ship 2: February 2018	Ship 2: <i>Te Mana</i> August 2022 (Forecast) ¹⁴	54
Initial Operational Capability	May 2017	August 2021 (Actual)	51
Operational Test and Evaluation (OT&E) begins	May 2017	September 2021 (Actual)	52
OT&E ends	February 2018	Q4 2023 (Forecast)	69
Operational Release	TBC	Q4 2023 (Forecast)	-

Explanation: A contract change proposal for the installation phase was signed with Lockheed Martin Canada in December 2017 following Cabinet approval of additional funding when the project schedule was re-baselined as well. In March 2019 Lockheed Martin Canada advised the Crown of a delay to *Te Kaha's* acceptance date. Since December 2017 further planning and analysis of the scope and scale of the OT&E, including alignment with international exercises required for OT&E, and ship maintenance activities delayed due to the upgrade programme resulted in a revised date of November 2022 both for the end of OT&E and for achieving Operational Release. Since early 2020 COVID-19 in New Zealand and Canada – including social distancing, travel restrictions and the availability of parts and personnel –impacted both New Zealand's integration tasks and the offshore FSU work programme and new forecast dates were set for Initial Operational Capability (now Interim Operational Release), OT&E and Operational Release.

¹⁴ Acceptance of Ship 2 took place in December 2022.

FSU OPERATIONAL CAPABILITY

Progress towards Delivery of Operational Requirements

Note: these are subject to change as the project progresses and solutions are implemented.

Operational Requirements	Requirement likely to be met
Combat Management System (CMS)	Yes. The Lockheed Martin CMS 330 represents a significant upgrade over the current system that will integrate all the necessary sensors being provided under FSU.
Intelligence Systems	Yes. Both Radio and Radar electronic support measures will be enhanced by the provision of separate systems that will bring the Signals Intelligence capability up to date.
Radar Systems (Surveillance and Reconnaissance)	Yes. Provision of Thales SMART S 3 Dimensional Multi Function Radar and SharpEye surface surveillance radar will address obsolescence issues and provide systems capable of detecting modern threats.
Optronics (Surveillance and Reconnaissance)	Yes. A Sagem Vampir Infra Red Search & Track (IRS&T) system will provide additional surveillance plus target indication for the air defence missile system.
Air Defence	Yes. The Sea Ceptor active missile system will provide state of the art defence against the latest types of anti-ship missile.
Anti-Surface	Yes. The new surveillance sensor package combined with improved Command and Control will improve the ship's ability to defend itself against asymmetric surface threats. A new 5 inch gun control system will contribute to this as well as providing additional flexibility for Naval Fire Support to troops ashore.
Under-Sea Warfare	Yes. Modernisation of the Hull Mounted Sonar (HMS) will significantly enhance performance of the detection and tracking of submarines. The introduction of the Sea Sentor Torpedo Defence system will provide for the first time the ability to detect, classify and track torpedoes whilst responding with an integrated set of defensive measures.
Support to Joint Task Force	Yes. The overall upgrade will generate an escort that is capable of maintaining a presence in a contemporary threat environment. It will be able to significantly contribute to the Intelligence, Surveillance and Reconnaissance objectives of a task force commander and provide local area air defence to high value units.
Contracts to achieve all of the above operational requirements have been awarded.	
Benefits realisation is scheduled for 2022. ¹⁵	

¹⁵ While the majority of the project's benefits are expected to be delivered, an early forecast benefit of reduction in through life costs is unable to be realised.

DURING THE 2021/22 YEAR

TE KAHA

Following the ship's return to New Zealand in December 2020, planned maintenance commenced, with routine painting and preservation work, recertification of safety equipment and some machinery maintenance. This was completed in August and training and sea trials got underway prior to the ship sailing on 9 September for Naval Operational Testing and Evaluation (NOTE).

During the NOTE period, a successful visit took place to Guam where the ship conducted operations with the UK Carrier Strike Group, led by HMS *Queen Elizabeth*. The ship also participated in Exercise BERSAMA GOLD, which was held off the coast of Singapore and the Malaysian peninsula, along with HMNZS *Aotearoa* and separate training activities took place with the Royal Australian Navy.

In the first half of 2022, the NZDF's scheduled maintenance of *Te Kaha* was underway at Devonport Naval Base.

TE MANA

The ship remained in Canada throughout 2021, with harbour trials taking place from July to mid-September.

With sea trials set to follow the harbour trials, the additional crew required for that phase left New Zealand for Canada at the end of July.

As scheduled, these Sea Acceptance Trials commenced in October and by November the majority of trials had been completed.

Acceptance of the ship had been scheduled to take place on 21 December 2021, however further progress needed to be made before the vessel could be accepted. A revised plan for completing work and further trials was supplied at the end of January 2022 by Lockheed Martin Canada and agreed to by the Crown in early February.

The ship left Canada at the end of May, completed successful trials in San Diego and was in company with HMNZS *Aotearoa* in

Hawaii before the final leg of her return journey to New Zealand. The ship arrived at Devonport Naval Base on 8 July.

DEVELOPMENTS POST 30 JUNE 2022

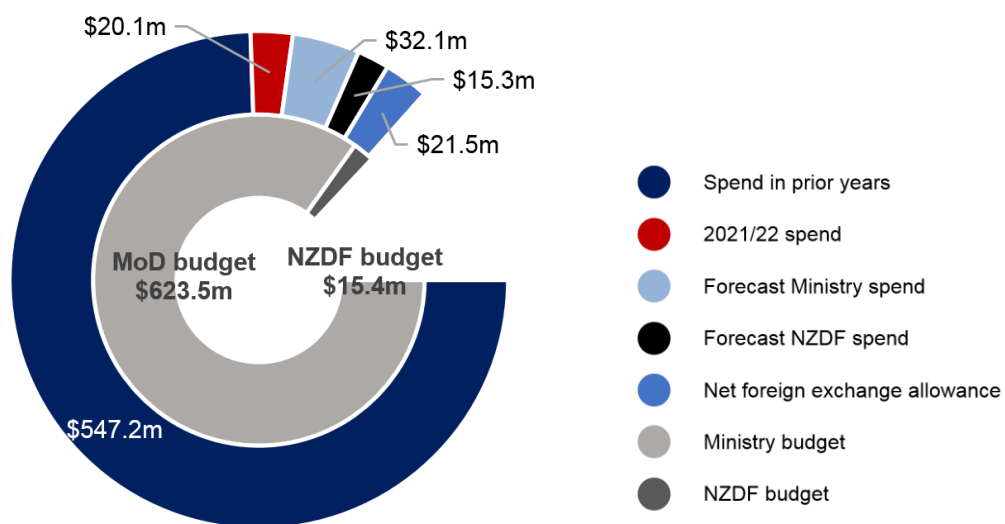
Scheduled maintenance continued on *Te Kaha*, with the NZDF planning for the ship's regeneration to commence early in 2023.

Naval Operational Testing and Evaluation was underway for *Te Mana* alongside the First of Class Flight Trials (FOCFT).

As part of regeneration of the frigates' aviation combat capability, during FOCFT the Seasprite SH-2G(I) maritime attack helicopter has demonstrated take off and landings on *Te Mana*'s flight deck, during both daylight and night hours, and in a range of weather conditions to build a set of ship/helicopter operating limits.

On 15 December the Crown accepted *Te Mana*, four months after the forecast acceptance date as at 30 June 2022.

FSU PROJECT BUDGET AND EXPENDITURE



At 30 June 2022 expected Anzac Frigate Systems Upgrade project costs were:

	Ministry	NZDF	Consolidated project	
	\$000	\$000	\$000	
Budget	Current approved project budget	623,537	15,408	638,945
	Allowance for foreign exchange movements	44,752	-	44,752
	Original approved project budget	578,785	15,408	594,193
Forecast	Forecast total project cost	599,351	15,265	614,616
	Effect of foreign exchange movements	23,272	-	23,272
	Forecast cost using hedged rate	576,079	15,265	591,344
	Forecast project underspend	2,706	143	2,849

FRIGATE SUSTAINMENT – COMMUNICATIONS

This project will upgrade the external tactical and strategic communications capabilities of the two Anzac-class frigates, HMNZS *Te Mana* and HMNZS *Te Kaha*.

The Purpose of this Project

The Frigate Systems Upgrade (FSU) project, covered earlier in this report, was designed to upgrade surveillance and combat systems. Along with other frigate upgrade projects, this has contributed to the planned extension of the life of the ships to the mid-2030s.

Under the Frigate Sustainment - Communications (FS Comms) project, the upgrade of external communications equipment will ensure compliance of the frigates' communications capability with modern standards, and ensure the effectiveness of the communications capability through the remaining life of these ships.

There are two phases to the project. Phase one is underway currently, delivering the detailed system design, a detailed design of the training facility and training material, and purchase of some equipment with long lead times.

The build and installation of the solution will be completed in the second phase.

Capability Requirements

The Anzac-class frigates are a core Defence Force capability, able to be deployed individually or as part of a joint task group in coalition operations. Along with offering a valued contribution that complements partner forces, the capability of these ships also strengthens the New Zealand Defence Force when it is operating independently.

The frigates operate across a spectrum of tasks, from constabulary and humanitarian tasks to combat roles within multinational coalitions.

Through this project, existing capability will be upgraded, replacing systems and equipment to ensure the frigates continue to operate seamlessly, with effective communications that maintain the ability to deliver and receive data and voice transmission to/from our principal partners, and the NZDF's air and land forces, both in training and on operations.

FS Communications Better Business Case Milestones

2014	
3 September	Project charter (Anzac Communications Upgrade) approved by Secretary of Defence and Chief of Defence Force
2019	
25 November	Cabinet confirmed the upgrade option in the Single Stage Business Case and authorised the Secretary of Defence to undertake a competitive tender CAB-19-MIN-0626
2021	
9 August	Cabinet approved commitment of funds for the Design Phase of the project and the Secretary of Defence to commit and approve expenditure for the Frigate Sustainment Communications project as outlined in the Project Implementation Business Case (PIBC) . CAB-21-MIN-0298

Capability Definition Phase

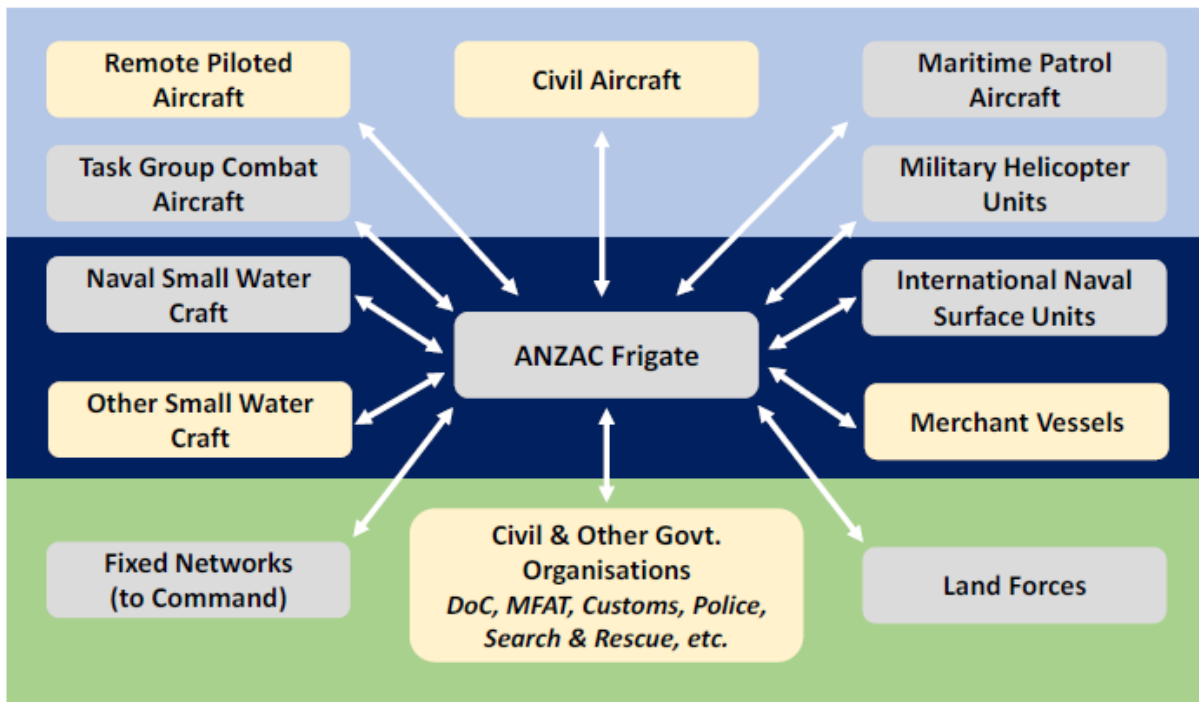
How Defence identified and assessed capability and operational requirements and options

Communications equipment for the frigates is not a new capability, however as the *Defence Capability Plan 2019* outlined, the upgrade to the ships' communications system will ensure continued interoperability with our key Defence

partners and – along with the other upgrades already delivered – provide a greater capability to the New Zealand Defence Force than at any time since their introduction in the 1990s.

This upgrade will support interoperability with other capabilities that are being acquired for the New Zealand Defence Force, such as the P-8A Poseidon fleet and those being delivered under the Network Enabled Army programme.

Figure: Anzac Frigate communications paths



Defence worked through a process to identify an upgrade option that would achieve the best value for money. This included workshoping possible options across dimensions of scale and scope, service solution and delivery, and implementation. Long listed options in each dimension were assessed against the project's investment objectives and critical success factors. From this, a short list was recommended for further analysis.

An economic assessment of short-listed options used a multiple objective decision-making (MODM) methodology, combining cost effectiveness analysis and scenario analysis. Economic analysis was undertaken using the equipment that would be acquired and values for

each option were combined with the weighting information to score and compare each option. Further marginal and sensitivity analysis was carried out and a Monte Carlo simulation conducted to analyse which option would provide the best value for money relative to other options.

How Defence considered interoperability

Interoperability is a core principle considered in Defence major projects, and is embedded in the decision-making process of the Defence Capability Management Framework.

The interoperability of the frigates is a primary consideration for this project, and will ensure the

frigates maintain the ability to undertake the full range of roles required by Government.

Assessment of the changing technological environment in which the frigates and our international partners are expected to be operating formed part of the development of the business case, and recommendations for the preferred solution.

Refining options

The process undertaken included identification of the upgrade option that achieves the best value for money. In one workshop participants examined possible options across scale and scope, service solution and delivery and implementation. A long list of options in each of these were assessed against investment objectives and critical success factors. From this long list analysis, a short list was recommended for further analysis.

How Defence considered through-life costs

Within the proposals presented to the Government, investment objectives included minimising the through-life cost of the frigate communications system. These include elements such as management of training, software, documentation, maintenance, sparring, and base engineering support. The costs considered were based on estimates, with confirmed costs expected to be developed during the design phase.

When reviewing submissions made to the Request for Tenders, which is covered in more detail under the Acquisition Phase section, the evaluation team included a member who was qualified to consider and evaluate the through-life support category. This, and other categories (including technical, commercial, and integrated logistics) were evaluated independently, then a combined evaluation was conducted to deliver a moderated score for each supplier.

Through life support was one of the categories considered in the due diligence analysis of short-listed suppliers. The submission by SEA, the company that was ultimately selected for the design phase, was noted for its detailed through life support model and cost, which included

providing support through experienced New Zealand-based companies and local industries.

Requirements Analysis in the Capability Definition phase

The Strategic Defence Policy Statement 2018¹⁶ (SDPS), approved by Cabinet in May 2018, set out the Government's policy objectives for Defence, providing the policy framework for identifying Defence capabilities required to give effect to the Government's intentions.

Of the ten principal roles of the NZDF set out in the SDPS, frigate communications directly contribute to six of them:

- Defend New Zealand's sovereignty and territory and contribute to protecting New Zealand's critical lines of communication
- Meet New Zealand's commitments to its allies and partners
- Conduct a broad range of operations in the South Pacific, including leading operations when necessary, to protect and promote regional peace, security and resilience
- Make a credible contribution in support of peace and security in the Asia-pacific region, including in support of regional security arrangements
- Protect New Zealand's wider interests by contributing to international peace and security and the international rules-based order
- Be prepared to respond to sudden shifts in the strategic environment.

The analysis of requirements considered current and future communications standards and equipment, and the changing information environment, and was focused on flexibility and adaptability being part of any solution.

¹⁶ The SDPS is on the Ministry of Defence website: <https://www.defence.govt.nz/what-we-do/assessing-our-future-strategic-environment/strategic-defence-policy/>

Acquisition phase

Tender process

The Ministry's focus was on procuring a solution that would support the frigates through to end of life, along with the equipment and supporting services. The preferred solution was to engage a Prime Systems Integrator (PSI) that would:

- provide design services for the upgrade
- procure related equipment and initial spares
- provide integration services for installation and commissioning, including Harbour Acceptance Trials and Sea Acceptance Trials
- design and establish a suitable training facility, including appropriate training material
- and conduct initial training.

A Request for Information in 2017 resulted in 11 responses including several comprehensive responses with estimated costing, which indicated both a level of market capability to deliver, and an interest in the contract. It also provided indicative cost and risk information.

As part of the approval of the Single Stage Business Case, Defence received approval to approach the market with a Request for Tender (RFT), and developed contract and tender documents.

The RFT was issued on 4 December 2019 using the Government Electronic Tender System with

Schedule/Timeframe Progress

As with other projects, the contract's deliverables are tracked against an agreed delivery schedule and payment milestones. This table relates to the design phase alone, with the build and installation phase planned to commence after this is completed.

	Estimate at approval to commit 9 August 2021	As at 30 June 2022 (Forecast/Actual)	Variation in acquisition phase (months)
Contract Execution, Design	July 2021	August 2021 (Actual)	1
Design completion	December 2022	November 2022 (Forecast)	N/A

The month variation for the contract execution relates to the timing of the business case being approved (a pre-requisite for the contract to be signed).

an original closing date of 30 March 2020. The RFT period was extended twice, initially to 30 April to provide additional time for security clearance verification of potential suppliers, and then to the end of May to compensate for the impact of COVID-19. New Zealand had been at a Level 4 response to the pandemic, with the country in lockdown from 25 March to 27 April.

Following assessment of the proposals received, a shortlisting took place, after in-depth due diligence, and Systems Engineering & Assessment Ltd (SEA) was approved as the preferred supplier.

Contract as at 30 June 2022

Prime contractor	Systems Engineering & Assessment Ltd
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Installation process

The installation phase is planned to take place in New Zealand, aligning with ship maintenance periods to reduce potential impact on the NZDF's ability to deliver outputs.

Although SEA is based in the UK, their proposal incorporated heavy use of New Zealand-based subcontractors, which was considered to provide a strong mitigation to COVID-19 related delays and restrictions – the effects of which at the time were still emerging – but were considered to have the potential to impact or delay the installation phase.

FS Communications Capability Integration

Description of Capability Integration phase

The Capability Integration phase is the period of time in which the tasks required to prepare the Service to effectively operate and support the solution that is being introduced. It's about making the capability part of Defence's "business as usual".

Status of the Capability Integration Plan

A Capability Integration Plan (CIP) was approved in 2021 and, as with other CIPs, is a living document that is expected to change in detail and focus as the project progresses through its lifecycle.

During the 2021/22 Year

Following approval of the Project Implementation Business Case in August 2021,

the contract for the design phase was signed by the Ministry of Defence and UK-based Systems Engineering & Assessment Ltd as the Prime Systems Integrator.

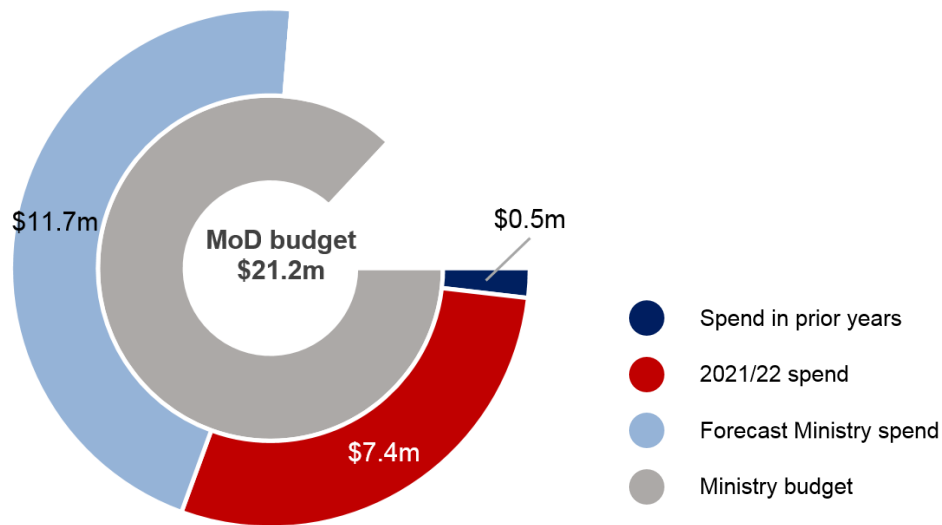
The first milestone for the design phase – completion of the preliminary design review – was achieved on schedule in the first quarter of 2022.

At the end of the year in review, completion of overall design work remained on schedule for the end of 2022.

Developments post 30 June 2022

The design phase progressed with the Detailed Design Review completed in August 2022. Completion of the Critical Design Review continues to be expected to take place before the end of 2022, as scheduled.

FS Communications Project Budget and Expenditure



At 30 June 2022 expected Frigate Sustainment – Communications project costs were:

		Ministry	NZDF	Consolidated project
		\$000	\$000	\$000
Budget	Current approved project budget	21,182	-	21,182
	Allowance for foreign exchange movements	-	-	-
	Original approved project budget	21,182	-	21,182
Forecast	Forecast total project cost	19,547	-	19,547
	Effect of foreign exchange movements	630	-	630
	Forecast cost using hedged rate	18,916	-	18,916
	Forecast project underspend	2,266	-	2,266

DIVE AND HYDROGRAPHIC VESSEL

This project has been responsible for the purchase and modification of a hydrographic and deep diving support capability. The fourth vessel to sail with the Royal New Zealand Navy under the name HMNZS *Manawanui* has been commissioned and is available for tasking.

THE PURPOSE OF THIS PROJECT

The Dive and Hydrographic Vessel (DHV) project was set up to acquire replacement capability for the Royal New Zealand Navy's diving support and hydrographic functions.

The hydrographic survey vessel *Resolution* retired in 2012 and the diving support vessel *Manawanui* was decommissioned in 2018. The replacement vessel was sought to deliver the capability to conduct operational and military tasking including hydrography (mapping the littoral¹⁷ surface and subsurface environment), deep diving¹⁸ operations and other specialist tasks, including support to the New Zealand Police and other government agencies.

THE ORIGINS OF THIS PROJECT

The DHV project's origins are linked with those of an earlier project, the Littoral Operations

¹⁷ When used in a military concept, the littoral zone refers to coastal areas, extending from shallow waters (generally from 60m deep), past the beach and onto land.

¹⁸ Deep diving refers to dive operations approximately 30m below the surface, used in salvage, ship repair, search and recovery, and underwater clearance.

Support Capability (LOSC). Initiated in 2013, LOSC was set up to identify options to ensure the NZDF had equipment to support and enable its operations in the littoral environment and to replace *Manawanui* and *Resolution*, the vessels that were – at the time – supporting the Navy's hydrographic, mine countermeasures and diving capabilities.

The project was initiated in August 2013 and, over the 52-month period that it was active, the team explored options for replacing the two vessels. Information developed as part of LOSC was used to inform recommendations and decisions made in relation to DHV. That work is outlined here to provide background.

The LOSC project team's work included seeking information from industry, developing documentation to support the project, and business case development:

- In October 2013 a request for information (RFI) sought to develop an initial set of user requirements with a target delivery date of mid-2017.
- In November 2014 the Secretary of Defence and Chief of Defence Force approved the project charter.
- In April 2015, Cabinet agreed that two options from the LOSC Indicative Business Case were to be taken forward for consideration during the *Defence White Paper 2016* process: a dive and hydrographic tender that would offer the baseline level of capability; and the enhanced capability of a Littoral Operations Vessel.
- In June 2015 a further RFI released to the market included a refined statement of user requirements, updated project schedule and contract delivery date, enabling Defence to assess the commercial information it was holding, given changes in the ship design and construction market, and the global economy at the time. This information was used to inform the development of the Detailed Business Case.
- In July 2016, Cabinet considered the Detailed Business Case and agreed that a

Littoral Operations Vessel was the preferred solution, authorising the Secretary of Defence to undertake a competitive tender, which was released in September 2016. The request for tender sought a ship suitable for supporting littoral operations, along with a range of documentation, manuals and data, training, spares, support and test equipment. It closed at the end of November that year and an assessment and evaluation process was undertaken of the tenders received.

- By April 2017 costs had been assessed and due diligence activities undertaken to refine costs. During this time options were considered for addressing a funding shortfall within the wider Defence portfolio and LOSC was identified as part of an option for addressing the shortfall, which would reduce the project's funding and scope.

At the end of 2017, Cabinet reprioritised \$148 million from LOSC to the Frigate Systems Upgrade project and directed Defence to report back with costed options for a Dive and Hydrographic Vessel.

LOSC Better Business Case Milestones

2014	
13 November	Project charter approved by Secretary of Defence and Chief of Defence Force
2015	
10 April	Cabinet agreed that two options from the Indicative Business Case be taken forward for further consideration – a Dive Hydrographic Tender and a Littoral Operations Vessel. CAB Min (15) 11/7
2016	
4 July	Cabinet agreed a Littoral Operations Vessel was the preferred solution in the Detailed Business Case and authorised the Secretary of Defence to undertake a competitive tender. CAB-16-MIN-0313
2017	
11 December	Change of Scope Cabinet reprioritised \$148 million of funding to the Frigate Systems Upgrade project, reducing this project's scope from a Littoral Operations Vessel to a Dive and Hydrographic Vessel. CAB-17-MIN-0539

DHV Better Business Case Milestones

2018	
18 June	Cabinet agreed the Single Stage Business Case recommendation to purchase and modify a second-hand commercial offshore support vessel to provide continued support for the NZDF's dive and hydrographic capabilities. Cabinet delegated to Joint Ministers (Finance and Defence) authority to commit funds for the

	purchase, modification, and entry into service of the Dive and Hydrographic Vessel. CAB-18-MIN-0281
19 August	Ministers of Finance and Defence agreed to the procurement and modification of a Dive and Hydrographic Vessel, as recommended in the Project Implementation Business Case.

As a result of the change of scope, the LOSC project team was refocused to source a dive and hydrographic vessel.

THE DHV PROJECT

Overarching benefits that were identified in relation to a Dive and Hydrographic Vessel are:

- Underwater operational competencies are generated and maintained (including the achievement of diving and hydrography seaworthiness, surface supplied breathing apparatus diving, and multi-beam echo sounder).
- The NZDF has the capacity and capability to support domestic operations, including deep diving and hydrography capabilities.
- Regional partners are supported in specialised areas, with improved options for the Government to provide underwater support.

CAPABILITY REQUIREMENTS

Capability requirements that were included in the scope of the DHV project are:

- deep diving
- ship-based military hydrography, including large-area hydrographic survey and precise and accurate data gathering adverse weather conditions
- mine countermeasures
- search and rescue and
- support to other Government agencies.

CAPABILITY DEFINITION PHASE

How Defence identified and assessed capability and operational requirements

With the project scope refocused in the last quarter of 2017, work began on identifying suitable vessels that could meet Defence Force dive and hydrographic capability requirements.

A range of capability and operational requirements identified within the broader LOSC project's scope remained valid under the reduced scope of the DHV project, including:

- dynamic positioning to support use of remotely operated vehicles
- engines that are able to operate at low speed for extended periods of time to support hydrographic surveying
- a ship's crane designed for larger load lifts and operating on a platform that is fixed in location, by either multiple ship's anchors (four point mooring) or a dynamic positioning system
- deep diving below 30m which is required by New Zealand law to be undertaken from a vessel that has a precise-position-keeping system, as well as with hyperbaric support on site to provide divers with a safe environment in which to recover.

In sourcing a vessel from the commercial market, it was noted that capabilities delivered and supported by the NZDF's former dive ship and hydrographic vessel would be available in an existing offshore support vessel designed to support offshore oil and gas activities.

How Defence analysed the requirements options in the Capability Definition phase

The project considered three options for acquiring a suitable vessel; commissioning a new build, leasing and modifying a vessel, and buying and modifying a second-hand vessel.

A range of available ships was assessed against requirements (eg speed, deck area, build quality, accommodation, suitability for conversion to a military vessel, and price). Another key consideration was seakeeping and

stability. Seakeeping refers to a vessel’s motion responses to various sea conditions and is generally expressed in terms of crew comfort and workability, potential for damage to cargo and structure, and equipment/system availability.

An evaluation of shortlisted ships was conducted in early 2018 to evaluate the condition of the vessels and evaluate their suitability for modification, and discussions were held with ship designers to build understanding of the costs and risks of modification.

The comparative assessment of each option resulted in a recommendation in the Single Stage Business Case to acquire a second-hand vessel. Cabinet agreed to this recommendation in June 2018.

How Defence considered interoperability

Defence considered interoperability in the communications capabilities of the vessel, and the ability to conduct vertical replenishment and boat transfer operations with partners.

How Defence considered through-life costs and issues

The DHV through-life costs were assessed using a range of data sources, including:

- operating costs for the platform supplied by the ship owner
- modification costs, based on quotes from the ship owner and estimates from contractors
- personnel costs estimated based on a crew of 39 full-time equivalent personnel
- general operating costs based on costs from *Manawanui*, adjusted to take account of the greater complexity of the vessel and higher number of sea days.

Requirements Analysis in the Capability Definition Phase

- The systems required for a Dive and Hydrographic Vessel to meet New Zealand Defence Force requirements are listed in the table below, along with the capabilities these systems support:

Table 1: System requirements to deliver capability

	Dynamic Positioning System	Dive System	Hydrographic Survey System	Heavy Lift Crane	Military Communications System	Weapons and Armoury
Hydrographic Survey			■		■	
Rapid Environmental Assessment			■		■	
Route Survey	■	■	■	■	■	
Mine Counter Measures		■			■	■
Underwater Search and Recovery	■	■	■	■	■	
Explosive Ordnance Disposal		■	■		■	■
Maritime Presence ¹					■	■
Training	■	■	■	■	■	■

¹ “Maritime Presence” covers generic maritime capabilities such as search and rescue and defence diplomacy.

History of Cost Estimates in the Capability Definition Phase

30 June 2018	
Cost (NZ\$ m)	103.416

Estimates of Acceptance Date made in the Capability Definition Phase

	Initial Estimate	At Contract Signing (August 2018)	Actual date achieved
Vessel delivery commences	January 2019 (start of voyage to New Zealand)	March 2019	March 2019 (Actual)
Vessel delivered	May 2019	May 2019	12 May 2019 (Actual)

ACQUISITION PHASE

Description of DHV Acquisition Work

Following the reprioritisation of funding, the diving and hydrographic vessel option became the preferred option for acquisition.

How Defence Decided to Acquire the Capability Solution

The project had noted that, due to a downturn in the oil and gas industry, purchasing a second-hand offshore support vessel for conversion to a dive and hydrographic vessel was comparable on a cost-benefit basis to purchasing a new purpose-built vessel.

Therefore options that were considered were:

- Commission a new build vessel
- Lease and modify a vessel
- Purchase and modify a second-hand vessel.

A market study was commissioned, which confirmed that the market at the time for offshore support vessel was at an historic low for both lease and purchase, and that – at the time the Ministry of Defence was looking for a suitable vessel – there were early signs of a recovery in the market that would affect ship availability and pricing.

Acquisition and modification of a second-hand vessel was recommended as the preferred acquisition option to ensure the project remained within budget and schedule, and to limit risk.

A commercial shipbroker provided an initial list of offshore support vessels that were available to the market. This was refined to around 150 vessels that had the potential to be suitable for conversion and use as a dive and hydrographic vessel, based on a number of requirements including accommodation on board, speed, deck area, build quality and price.

A further detailed assessment and evaluation process resulted in a shortlist of six vessels with the MV *Edda Fonn* identified as the preferred vessel in April 2018.

Risk reduction, clarification and due diligence activities

Risk reduction and clarification activities had taken place during February and March 2018, and the project team met with ship designers and equipment manufacturers, allowing the Project to:

- undertake due diligence activity in relation to the six shortlisted vessels
- monitor the market while the project was progressing towards contract
- assess customisation costs

- engage early with the Fleet Personnel Training Organisation to ensure sufficient suitably qualified and experienced personnel would be available to crew the ship.
- plan for the development of a support agreement.

Following identification of *Edda Fonn* as the preferred vessel, the vessel was assessed further prior to purchase. The Project Team, enhanced with RNZN personnel and supported by Babcock NZ (the Prime System Integrator), carried out a detailed inspection of the ship. A marine survey of the *MV Edda Fonn* was also conducted by an independent ship surveyor and marine consultant. These surveys confirmed the material condition of the vessel was very good, with the survey company stating the vessel was equivalent to a ship aged five to ten years younger.

An initial comparative seakeeping analysis was also undertaken by an independent contractor to explore the ship's seakeeping characteristics against those of HMNZS *Canterbury* and the RNZN offshore patrol vessels. The analysis assessed the expected characteristics of the vessel were it to be operated in the high to extreme sea conditions that occur in New Zealand's maritime area. It was concluded that the vessel's seakeeping performance was favourable when compared to *Canterbury* or the Otago Class offshore patrol vessels in most sea states, for a given speed and heading. The RNZN Naval Engineering Authority agreed that the initial seakeeping analysis showed *Edda Fonn* exhibited acceptable seakeeping characteristics for New Zealand waters.

The opportunity was taken for Project personnel to take part in 'sea-rides', embarking on the ship when it was carrying out commercial operations in the North Sea in September and October 2018. This greatly added to the knowledge of both the vessel, and helped with the development of procedures for when the ship is in service with the RNZN.

Contractual arrangements

On 20 August 2018 a Memorandum of Agreement was signed between the Chairman of Østensjø Rederi's Board and the Secretary of Defence. The MOA included:

- The purchase of *MV Edda Fonn*.
- Completion of stage one modifications to the vessel by Østensjø Rederi, including changes to the moon pool, installation and integration of a Surface Supplied Breathing Air diving system, installation and integration of a Remotely Operated Vehicle and associated systems and stations, and installation of a Multi Beam, and Single Beam Echo Sounder.
- Specific training in systems and equipment.
- The ship's delivery to New Zealand.

Stage 2 modifications focused on specific communication and military systems and equipment. At the start of the new financial year the project was anticipating signing a contract for the first of two phases of equipment installation as part of this second stage of modifications to *Manawanui*. In August 2019 a contract covering some modifications was signed with Babcock NZ and work orders covering the communications works were issued.

A request for tenders (RFT) was released at that time for the remaining military modifications. Babcock NZ was also the successful tenderer for that work and that modification work was added to the first contract with Babcock, and additional work orders issued.

Contracts

Ship acquisition and Stage 1 modifications	Østensjø Rederi
Stage 2 modifications	Babcock NZ (ongoing at 30 June 2022)

SCHEDULE/TIMEFRAME PROGRESS

Initial activity completion dates in this table were estimates at the time approval to commit to the purchase of the MV *Edda Fonn* was given by the Minister of Defence and the Minister of Finance.

	Estimate at approval to commit 19 August 2018	As at 30 June 2022 (Forecast/Actual)	Variation in acquisition phase (months)
Vessel purchased	August 2018	August 2018 (Actual)	0
Completion of Stage One modifications	March 2019	March 2019 (Actual)	0
Delivery of Vessel to New Zealand/Transfer of ownership to Crown	May 2019	May 2019 (Actual)	0
Completion of Stage 2 modifications	November 2019	June 2023 (Forecast)	43
Interim Operational Release (IOR)	April 2021	February 2020 (Actual)	-14
Operational Release (OR)	April 2021	Q3 2022 (Forecast)	17

At the time of approval to commit, IOR was forecast to commence November 2019 and end April 2021. OR was forecast to start March 2021 and conclude the following month.

A phased IOR for *Manawanui* was approved on 26 February 2020, earlier than the scheduled date of April 2021, and was achieved as part of a wider schedule adjustment to enable the vessel to participate in Exercise RIMPAC later that year.

In August 2020 the OR date was extended by 8 weeks to July 2021 as a result of unrecoverable delays that occurred during the COVID-19 Alert Level 4 and 3 responses. During the following months, the project identified that the July 2021 date would not be met, as a result of factors driven significantly by the ongoing impact of COVID-19, and identification of maintenance for the crane that had delayed testing and release of the capability. In August 2021 OR was re-forecast to take place in the second quarter of 2022, due to the continuing pandemic and unavoidable delays in accessing specialist technical support from overseas.

There has been progressive release of capability ahead of the start of operational release, the ship has been available for operations and at 30 June 2022 was being prepared for deployment. OR is expected to be achieved before the end of 2022. This is not affected by the delay in final completion of Stage 2 modifications, which had been affected by a range of factors including the COVID-19 pandemic.

History of variations to schedule at 30 June 2022

Date of individual variation	Variation length (months)	Explanation
2020/2021/2022	43	Stage 2 modifications: were affected by a range of issues, including technical (eg the complexity of integrating major equipment into the ship's existing infrastructure), to weather-related (strong winds preventing crane operations). In early 2020 some equipment installation was rescheduled for second half of 2020. In mid-2020 the project was reporting that most of the Stage 2 modifications were completed, but COVID-19 related travel restrictions limited the ability of foreign contractors to travel to NZ to implement some remaining modifications. This continued to impact completion through to the end of 2020 and by June were forecasting November 2021. In December 2021 the project had advised that a planned maintenance/modification period experienced delays due to COVID-19 related restrictions and that some work would be completed in the following year, along with contractor sea trials in February 2022. In June 2022 the Defence Capability Governance Board were advised that final modification work would be completed in 2023.
February 2020	-14	Interim Operational Release: the phased release for <i>Manawanui</i> began earlier than the schedule date of April 2021, and was part of a wider schedule adjustment to enable the vessel to participate in Exercise RIMPAC in 2020.
August 2020/August 2021/June 2022	17	Operational Release: Impact of COVID-19 resulted in longer lead times for some equipment and the ongoing inability of overseas contractors to travel to New Zealand to implement modifications and/or conduct training. Estimates for achieving OR were provided during the period that COVID-19 restrictions in relation to international travel were in place. Operational Release had been re-baselined in August 2020 to July 2021, and in August 2021 to the second quarter of 2022. In June 2022, the Defence Capability Governance Board were advised that Operational Release was expected to be achieved in the third quarter of 2022.

DHV CAPABILITY INTEGRATION PLAN

As part of the project's Capability Integration Plan, a Test and Evaluation Master Plan (TEMP) was developed, detailing the range of test and evaluation requirements. The document is usually comprised of a number of supporting test and evaluation plans, which cover the progression of the project's phases.

For the DHV project, developmental testing and evaluation was conducted as part of Stage 1 modifications to the vessel, which were completed ahead of its delivery to New Zealand. This phase included observation by the project team of factory acceptance trials for systems being fitted into the ship.

Completion of installation of Stage 1 modifications led to the start of the acceptance test and evaluation (AT&E) phase. Harbour and Sea Acceptance Trials were completed in March

2019, confirming the materiel fulfilled the requirements and specifications of the contract. AT&E for this project is being completed progressively, with further Harbour and Sea Acceptance Trials to be completed following the Stage 2 modifications.

Operational test and evaluation will test systems in operating conditions to ensure an accurate evaluation of the capability can be made. For this vessel there will be a focus on:

- evaluating the ship's readiness for service

- identifying any issues with individual equipment, sub-systems or systems that may need to be addressed
- evaluating the support system (including training, safety and sustainability)
- validating the standard operating procedures that are being developed for the vessel and crew
- helping in the development of plans for the ship's operational use.

DHV OPERATIONAL CAPABILITY

Delivery of Operational Requirements

Note: these are subject to change as the project progresses and solutions are implemented.

Operational Requirements	Likely to be met
Hydrographic Survey	Yes
Rapid Environmental Assessment	Yes
Route Survey	Yes (supporting capability)
Mine Countermeasures	<i>Manawanui</i> will provide support for delivery of these capabilities.
Underwater Search and Recovery	Yes
Explosive Ordnance Disposal	Yes
Maritime Presence (including search and rescue)	Yes
Training	Yes
Full benefits realisation is scheduled for implementation in 2024.	

DURING THE 2021/22 YEAR

In the second half of 2021 *Manawanui* was undergoing planned maintenance and modifications.

Work was suspended for a period of time during the nationwide response to the community spread of COVID-19 in August. It re-started in September under strict operating protocols that allowed progress to continue, although at a reduced pace.

Sea trials commenced mid-March to test the ship's systems and evaluate the crew's ability to conduct a complex search and recovery task, including using the main crane for salvage in very deep water.

This was followed by the start of final Operational Release activities and preparation for the ship's deployment in the second half of the year.

DEVELOPMENTS POST 30 JUNE 2022

During July preparations for the deployment of *Manawanui* to the Southwest Pacific were completed and the ship left on 25 July.

During the deployment underwater surveying tasks were undertaken. Under Operation MAHI

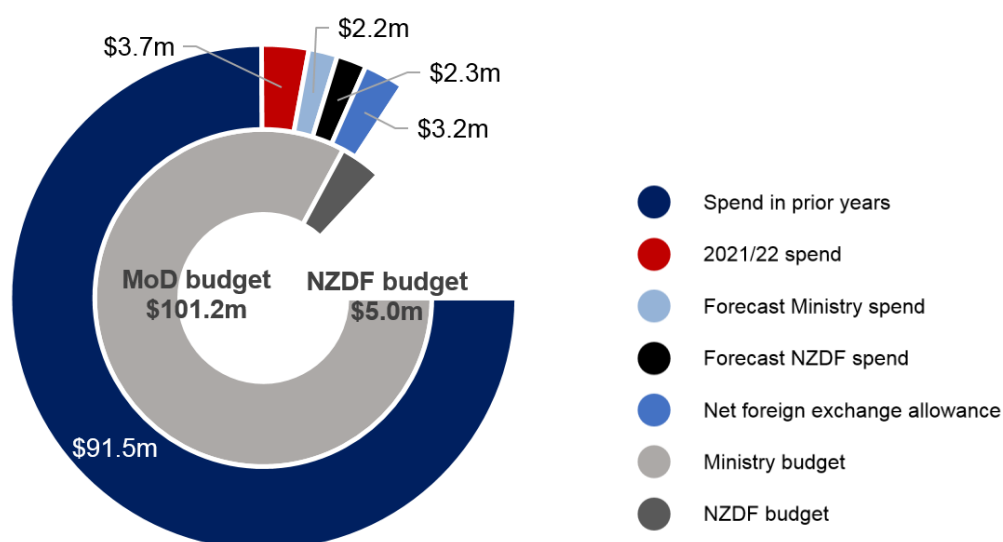
TAHI 22¹⁹, a hydrographic survey was made of the Tongatapu outer reef after a request from the Government of Tonga through Land Information New Zealand.

Also as part of Op MAHI TAHI 22, the ship and HMNZS *Matataua* conducted a reconnaissance for Operation RENDER SAFE, an activity that finds and safely disposes of Explosive Remnants of War. Divers from the Royal Australian Navy, Royal Canadian Navy, United States Marine Corps, and the Royal New Zealand Navy embarked on *Manawanui* and undertook integration training. Reconnaissance of waters around Tuvalu was conducted.

Manawanui returned to New Zealand at the end of September.

¹⁹ Op MAHI TAHI 22 was a coordinated multi-agency activity between NZDF, Ministry for Primary Industries and the Ministry of Foreign Affairs and Trade that took place between 25 July and 7 October.

DHV PROJECT BUDGET AND EXPENDITURE



At 30 June 2022 expected Dive and Hydrographic Vessel project costs were:

	Ministry	NZDF	Consolidated project	
	\$000	\$000	\$000	
Budget	Current approved project budget	101,186	5,000	106,186
	Allowance for foreign exchange movements	2,770	-	2,770
	Original approved project budget	98,416	5,000	103,416
Forecast	Forecast total project cost	97,362	2,326	99,688
	Effect of foreign exchange movements	(406)	-	(406)
	Forecast cost using hedged rate	97,768	2,326	100,094
	Forecast project underspend	648	2,674	3,322

FIXED HIGH FREQUENCY RADIO REFRESH

The Fixed High Frequency Radio Refresh project is replacing the New Zealand Defence Force's existing high frequency radio system, which is at the end of its economic and operating life. It will increase the efficiency of system delivery through the rationalisation of the number of radio sites.

THE PURPOSE OF THIS PROJECT

The New Zealand Defence Force's (NZDF) existing high frequency (HF) radio system is approaching forty years old and, even with maintenance over time, has reached the end of its life. The Fixed High Frequency Radio Refresh (FHFRR) project addresses this by modernising and upgrading the high frequency radio system and ensuring through-life support. This project was formerly known as Strategic Bearer Network Project – Phase Two.

High frequency radio is an important part of NZDF's communications network. It enables long range communications with smaller assets that are deployed far from New Zealand, and provides resilience by acting as a back-up capability if satellite communications are unavailable.

A viable and sustainable high frequency radio system supports NZDF in delivering against the outcomes in the Strategic Defence Policy Statement 2018 in the following ways:

- It supports NZDF operations in the South Pacific and within our Exclusive Economic Zone, where a range of assets rely solely on high frequency radio for long-range communications;

- It is part of a suite of communications tools, including satellite communications, which enable NZDF to operate independently, or lead operations with other government agencies and coalition partners; and
- It is an alternative communications medium for strategic communications with ships and aircraft deployed further afield.

CAPABILITY REQUIREMENTS

To support these policy outcomes, the following investment objectives and requirements were derived for the FHFRR project:

- Communications assurance – to retain alternate communications channels to satellite for deployed force elements. This is necessary for safer and more successful operations, and to provide a back-up system that can be provisioned at short notice.
- Retain communications with deployed force elements unable to use satellite communications. HF radio enables communications to be sent and received as needed.
- Retain communications south of 60° south in the Southern Ocean. Communication with platforms via satellite is difficult or unavailable in this area, and HF enables command and control and other information to be conveyed.
- Improve the efficiency of the high frequency radio capability through the rationalisation of equipment and consolidation of facilities as some radio communications migrates to satellite, and replacing end of life equipment with new equipment.
- Utilise new technology to improve the effectiveness of the high frequency radio capability, with modern equipment providing wider and more efficient communication.

FHFRR Better Business Case Milestones

2014	
4 June	Project charter approved by Secretary of Defence and Chief of Defence Force
2018	
18 June	Cabinet authorised Defence to undertake a competitive Request for Proposal process and evaluations to select a fixed high frequency radio capability as documented in the Single Stage Business Case CAB-18-MIN-0281
2019	
26 August	Joint Ministers (Defence and Finance) approved implementation of approval thresholds . This was agreed to by Cabinet in October 2018 as part of the investor confidence rating assessment of Defence and delegated approval of the FHFRR Implementation Business Case to the Minister of Defence (previously required to be approved by Cabinet). GOV-18-MIN-0075
2020	
19 February	The Minister of Defence agreed to proceed with FHFRR and authorised the Secretary of Defence to conclude acquisition and through-life support contracts as outlined in the Project Implementation Business Case (PIBC) .

CAPABILITY DEFINITION PHASE

Over a 68 month period between June 2014 and February 2020 (from Charter to PIBC approval) the project worked through a definition phase that included a two-part tender process, issuing both a Request for Proposals (RFP) and request for Best and Final Offers (BAFO).

How Defence identified and assessed operational requirements

Investment logic mapping in September 2014 determined key problems associated with the existing high frequency radio capability and the benefits that would occur from addressing those problems. The following were identified:

Problems:

- Deterioration of HF radio capabilities has the potential to impact operations within our region.
- If our satellite communications become unavailable, NZDF's military capability will be severely diminished.
- Our inability to meet the burgeoning demand for data through new technologies is constraining our operational choices.
- Duplication of communications infrastructure causes inefficient delivery.

Benefits:

- Safer, more successful operations through more self-reliant command and control.
- Greater certainty that the Defence Force can meet government requests now and in the future.
- Greater ability to maximise return on investment in new technologies.
- More efficient communications across the range of capabilities.

How Defence analysed options in the Capability Definition phase

The FHFRR project team developed a matrix of long list options to replace NZDF's current high frequency radio capability. A facilitated Multi-Criteria Decision Analysis (MCDA) was held to

assess the long list options, which resulted in the following options being shortlisted:

- **Option A** – this option retains the status quo, meaning that the system will be maintained until it eventually fails and will not be replaced;
- **Option B** – this option replaces the control system, reduces the number of radio sites, and reduces the number of channels. It does not upgrade the wideband radio technology, nor does it put in place support arrangements;
- **Option C** – this option is similar to Option B, but provides a greater number of channels (although this is still a reduction compared to present numbers). It introduces a mix of wideband and narrowband radio technologies and includes long-term support arrangements; and
- **Option D** – this option builds on Option C by increasing the number of channels from the previous option (still less than the current number). It also maintains a mix of mainly wideband radio technologies and involves taking up long-term support arrangements.

The project then considered the extent to which each option fulfilled the five critical success factors, with the findings shown below:

Critical Success Factors	Options			
	A	B	C	D
Strategic fit and business needs	No	Partial	Partial	Yes
Value for money	No	Partial	Yes	Yes
Supplier capacity and capability	Yes	Yes	Yes	Yes
Affordability	Yes	Yes	Partial	No
Achievability	Yes	Partial	Yes	Yes

How Defence considered interoperability

Upgrading NZDF's high frequency radio capability will ensure the continued ability to interoperate with New Zealand's Defence partners, with Government agencies in New Zealand, and with our neighbours.

How Defence considered through-life costs and issues

Through-life costs were calculated on the assumption that the upgraded capability would have a useful service life of 20 years and a residual value of zero.

Initial cost estimates were determined based on pricing information provided by industry in response to a Request for Information, cost information from other representative operators, and internal estimates of current operating costs.

Requirements Analysis in the Capability Definition Phase

Advantages	Disadvantages
Option A (\$20.5m cost estimate ²⁰)	
Affordable. No change required.	Does not provide an enduring communications solution.
Option B (\$28.4–30.5m)	
Affordable. Achieves 75% of the required capacity.	Does not provide NZDF with an acceptable level of resilience in relation to its HF network.
Option C (\$47.9–55.8m)	

²⁰ Cost estimates are for whole of life cost, assuming a 20 year useful service life and NPV discounted at 7%.

Provides for the bulk of expected usage (98% of current usage).	Utilises a mix of modern and legacy radios.
Option D (\$51.6–59.3m)	
Meets NZDF current and future requirements. Greater capacity for All of Government usage.	Provides only marginally better capacity than Option C but at a higher cost.

Option C was recommended as the preferred option. It provides most of the benefit of an upgraded system in terms of meeting capacity requirements for current usage (relative to the cheaper Option B). Option C also provides greater value for money as it provides only marginally less capacity than Option D for a lower whole of life cost.

Description of the Capability and Operational Requirements

The NZDF's Capability Requirements are:

1. To enable strategic communications assurance and effective command and control of deployed units in the event that other communications bearers are unavailable.
2. To allow communications with smaller deployed forces physically unable to use satellite.
3. To enable communications with deployed force elements south of 60° south.
4. To improve the efficiency of the current high frequency radio system by rationalising the equipment being used and replacing obsolete equipment.
5. To provide a more effective communication service that is able to communicate with the Defence Force's next generation of capabilities.

Cost Estimate in the Capability Definition Phase

	2018
Estimate (NZ\$ m)	20.8–27.2

Estimates of Acceptance Dates in the Capability Definition Phase

	Initial Estimate during Definition
Initial Operational Release	May 2021
Operational Release	January 2022

ACQUISITION PHASE

Description of acquisition work

The procurement strategy proposed in the Single Stage Business Case was to hold a competitive tender process for the provision of the fixed high frequency radio system under a purchase contract, and the ongoing support of the system under a through-life support contract.

In June 2018, Cabinet authorised Defence to approach to market with a competitive Request for Proposals process and undertake evaluations to select a fixed high frequency radio capability.

How Defence decided to acquire the Capability Solution

Request for Proposals

The open tender process commenced with a Registration of Interest process. This process invited respondents with the capacity, credibility, and ability to secure appropriate security clearances to express interest in receiving a Request for Proposal for the FHFRR project.

In August 2018, a Request for Proposals was issued to six respondents who had been preselected through the Request for Information process. The objective of the request was to invite respondents to submit proposals for the delivery of a fixed high frequency communications capability that will support NZDF's deployed and domestic operations in a sustainable manner, with appropriate consideration given to through-life support. Four proposals were received from three respondents (one company submitted two proposals).

These proposals were evaluated in accordance with the approved Tender Evaluation Plan. As none of the proposals were both within budget and met NZDF's minimum requirements, the decision was made to invite the three respondents to prepare and submit a Best and Final Offer.

Best and Final Offers

A request for Best and Final Offers was released based on the following revised project scope:

- A reduction in the total number of communications circuits; and
- A reduction in the total number of Internet Protocol (IP) capable channels.

All three respondents submitted responses. The evaluation of the Best and Final offers identified Babcock New Zealand Ltd as the preferred tenderer to upgrade NZDF's fixed high frequency radio capability and to provide through-life support.

Due Diligence

Due diligence was undertaken with Babcock in June 2019. The due diligence activity provided further opportunity to assess how the proposed solution would be delivered, assess the maturity of the proposed solution, assess how Babcock would managed its prime contractor responsibilities, and assess Babcock's ability to sustain the capability through-life.

Contract Negotiation

Initial contract negotiations were undertaken with the preferred supplier, Babcock NZ Ltd, in late 2019.

Following approval of the Project Implementation Business Case in February 2020, a contract was signed with final systems acceptance scheduled to occur in December 2022.

Contract Status at 30 June 2022

Prime contractor	Babcock New Zealand Ltd
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SCHEDULE/TIMEFRAME PROGRESS

Systems Acceptance: variations in forecast

Estimate at Approval to Commit	30 June 2022 Forecast/ Actual	Variation in acquisition phase (months)
July 2023	July 2023 (Forecast)	-

FHFRR CAPABILITY INTEGRATION

Description of Capability Integration Phase

HF is a critical alternative communications channel for NZDF operations and shall be maintained at a level that will not risk impeding operations. Decommissioning of equipment and sites during the upgrade will reduce the number of available operational circuits. The transition to the new HF system will be carefully planned to ensure that both new and legacy systems have sufficient capability to maintain minimum operational requirements.

Status of the Capability Integration Plan

An updated version of the project's Capability Integration Plan (CIP) was approved in 2021. The CIP, which was first approved in 2019, identifies and schedules the tasks necessary to prepare the NZDF to operate the capability effectively and introduce it into service. The CIP outlines the steps required to deliver the Operational Release of the Project, including integrating the capability into NZDF systems and processes.

Benefits Realisation

On 30 June 2022, the Project was forecasting that the Full Benefit Realisation date would continue to be directly impacted by contractual delays. However there were no changes to the benefits that would be fully realised. The Benefits Realisation Plan was reviewed in August 2021 and a date forecast of 2024.

Schedule of Capability Integration

	Initial Forecast	30 June 2022 (Forecast)	Variance (months)
Interim Operational Release	30 March 2023	30 March 2023	Nil
Operational Release	31 August 2023	31 August 2023	Nil

FHFRR OPERATIONAL CAPABILITY

Progress towards Delivery of Operational Capability

Operational Capability	Capability likely to be met
Communications assurance Retain communications with deployed force elements unable to use satellite communications Retain communications south of 60° South in the Southern Ocean Improve HF radio capability efficiency Utilise new technology to improve the effectiveness of the capability	Yes.
At 30 June 2022 Full Benefits Realisation was forecast to be achieved in 2024, reflecting COVID-19 related delays and refinements made to the original timeline.	

DURING THE 2021/22 YEAR

Over the course of the year work was underway in relation to installation of new high frequency antennae and communications equipment at the transmitter and receiver, and operational centre sites.

The design phase was completed and production work commenced with Factory Acceptance Testing (FAT) planned to take place in August.

Over the rest of the year the project focused on the steps required to proceed with the physical infrastructure elements, such as finalising site installation plans.

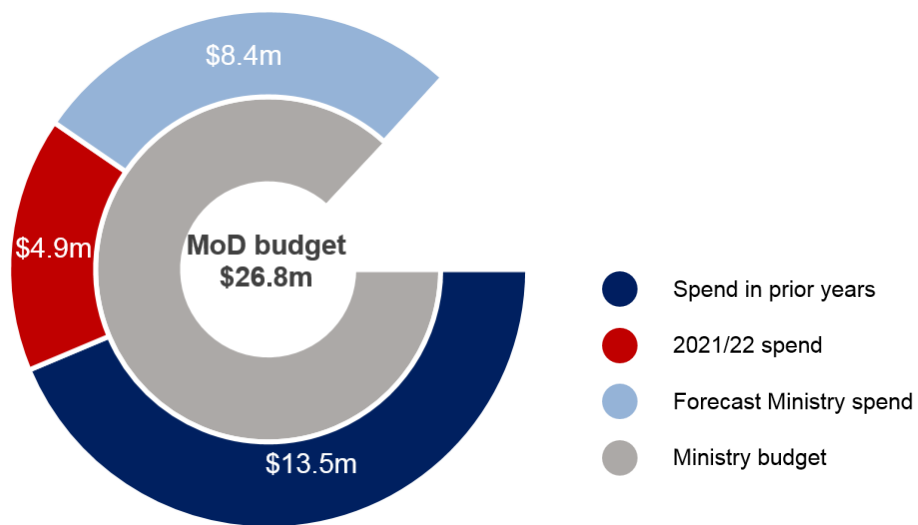
DEVELOPMENTS POST 30 JUNE 2022

In July 2022 the prime contractor, Babcock, advised that the project was experiencing delays and the length of time that would be required to complete the works was being determined.

The project worked with Babcock to confirm the full extent of the delay and to identify mitigations.

Factory Acceptance Testing is projected to be completed in the first quarter of 2023, and the schedule will be reviewed to determine any flow on effects.

FHFRR PROJECT BUDGET AND EXPENDITURE



At 30 June 2022 expected Fixed High Frequency Radio Refresh project costs were:

		Ministry	NZDF	Consolidated project
		\$000	\$000	\$000
Budget	Current approved project budget	26,790	-	26,790
	Allowance for foreign exchange movements	210	-	210
	Original approved project budget	26,580	-	26,580
Forecast	Forecast total project cost	26,763	-	26,763
	Effect of foreign exchange movements	230	-	230
	Forecast cost using hedged rate	26,532	-	26,532
	Forecast project underspend	48	-	48

FUTURE AIR MOBILITY CAPABILITY - TACTICAL

The primary objective of this phase of the Future Air Mobility Capability Project is to replace the Royal New Zealand Air Force's tactical airlift capability – an aging fleet of C-130H Hercules. This will allow the New Zealand Defence Force to maintain timely and effective air transport mobility capability for military and wider government response options.

THE PURPOSE OF THIS PROJECT

The C-130H aircraft are approaching the end of their economic life, with inspection and analysis suggesting that the fleet is able to be maintained as airworthy until at least the early to mid-2020s. In addition, maintenance costs are increasing, and the airframe structure will soon reach the point where the cost and effort required to inspect and remediate structural issues may further impact availability and the ability to retain capability during the managed transition to the new aircraft over a period of time.

The Future Air Mobility Capability (FAMC) project was initiated in 2017 to look at the future of the air mobility capability provided by the Royal New Zealand Air Force (RNZAF). FAMC examined options for air mobility, identified key priorities and made recommendations for the preferred replacement for the C-130H.

Five investment objectives were identified for this project:

- The Defence Force retains an air mobility capability that provides timely and effective air mobility for military response options;
- The Defence Force retains an air mobility capability that provides timely and effective

air mobility for wider government response options;

- The Defence Force retains an air mobility capability that is for the sole use of New Zealand, and able to be employed at the Government's discretion;
- The Defence Force retains an air mobility capability that can support up to three concurrent air mobility operations; and
- The air mobility capability is interoperable with that of key defence partners.

CAPABILITY REQUIREMENTS

The capability requirements necessary to support these objectives are:

- The Defence Force needs a reliable, available and supportable airlift fleet to project and support sustained military operations into the future.
- A reliable, available and supportable airlift fleet is needed to support non-military Government tasks into the future.
- Due to the risks associated with some military airlift operations, and the requirement for a high level of readiness to support a number of non-discretionary and time-sensitive tasks, there is a need for New Zealand to at least own the tactical airlift component within a wider fleet mix.
- The Defence Force and Government agencies need a sufficient reliable and supportable airlift fleet to allow for concurrent tasks.
- The future airlift fleet needs to be interoperable with that of key defence partners.

In addition to these essential requirements, Government agencies registered a number of desirable requirements for the future capability:

- Enhanced surveillance capability for humanitarian and disaster relief missions.
- Reliable cargo and passenger transportation to Antarctica that has no point of safe return.
- Enhanced VIP transport capability.

FAMC Better Business Case Milestones

2017	
10 July	Cabinet approval of the Indicative Business Case CAB-17-MIN-0366
6 September	Approval of the Project Charter by the Secretary of Defence and Chief of Defence Force
2019	
10 June	Cabinet approval for the Secretary of Defence to undertake a formal FMS process for procurement of C-130J-30 tactical aircraft, simulator and associated services and support as proposed in the Detailed Business Case CAB-19-MIN-0268
2020	
2 June	Cabinet approval of procurement via FMS of five C-130J-30 Hercules, training and support equipment, a simulator, and sustainment as recommended in the Project Implementation Business Case CAB-20-MIN-0251

CAPABILITY DEFINITION PHASE

The definition phase took place over a 33 month period from approval of the project charter in September 2017, to Cabinet's decision on the Project Implementation Business Case in June 2020.

How Defence identified and assessed capability and operational requirements

The Indicative Business Case developed a comprehensive long list of possible options for consideration by stakeholders:

- Scale, scope and location: what levels of coverage are possible?
- Service solution: how can airlift be provided?

- Procurement model: how can Government procure air mobility?
- Implementation: when can services be delivered?
- Funding: how can it be funded?

A workshop was convened on 22 September 2016 where subject matter experts evaluated all potential long list options against the project's investment objectives and the critical success factors.

Following this analysis, the Indicative Business Case identified four shortlist options for further detailed analysis:

- Option 0: do nothing: no replacement of current capability (retained as a baseline comparator).
- Option 1: replacement of current capability by procuring a fleet of one aircraft type – a single fleet mix.
- Option 2: replacement of current capability by procuring a fleet of two aircraft types – a dual fleet mix
- Option 3: replacement with an enhanced level of capability.

A multi criteria decision analysis (MCDA) process, involving stakeholders from across the Defence Force and other government agencies, was undertaken in September 2017 to assess fleet mix benefits, costs and risks. The MCDA process examined different numbers of different types of aircraft that were relevant to the project. It included development of a spectrum of plausible fleet mixes for consideration by decision-makers and the criteria against which senior evaluators could evaluate the relative value of these fleet mixes.

The following aircraft classes were in scope for the project: corporate business jet, civilian combi, civilian medium, civilian large, military light tactical, military medium tactical, and military heavy strategic.

The MCDA looked at the whole air mobility fleet, not just the military tactical transport component. A total of 17 fleet mixes were considered by stakeholders. All 17 fleets were judged to be

able to meet the overall air mobility requirements and potentially deliver the desired benefits. However, the MCDA process suggested that some would deliver more benefits than others.

An initial assessment of the MCDA drew the following conclusions:

- A military transport aircraft is essential to meeting the requirements (an air mobility fleet comprising only civilian types is not viable);
- The majority of the overall fleet needs to be military transport aircraft; and
- Seven is the functional minimum size for the overall air mobility fleet.

The MCDA evaluation of the fleet mixes took place in September 2017. The overall conclusion was that:

- Military Medium transports should form the core of any future air mobility fleet; and
- A minimum overall air mobility fleet of seven is desirable.

How Defence analysed the requirements options in the Capability Definition phase

Defence released a Request for Information (RFI) in mid-2016 to canvass the market for potential air mobility options. All major aircraft suppliers responded with various air mobility solutions.

Request for Information responses and other market research indicated that two aircraft were considered to be in the Medium Tactical class as it related to New Zealand's requirements: the Lockheed Martin C-130J (Hercules) and Embraer KC-390.

It was recommended that the KC-390 be discounted from consideration as, at that time, it represented a considerable risk and this recommendation was accepted by Cabinet in June 2019. There was a high degree of uncertainty around its price, and, with no operators at the time of the decision, there was no history of support, training or maintenance. Additionally, the aircraft being made outside of the five eyes nations was going to create issues with installing and integrating the required

systems. The onus of bringing the aircraft up to an operating capability would have fallen primarily on New Zealand. In comparison, the C-130J was a proven aircraft in service with over 20 nations, and in particular all of our five eyes Allies.

This approach was in line with the findings of the independent Review of Defence Procurement led by Sir Brian Roche, which concluded that Defence should "avoid solutions that are unproven, highly developmental and/or unsupported by a reliable evidence base".

The Project Implementation Business Case considered how many C-130J aircraft were necessary. As noted above, the Detailed Business Case analysis looked at the entire air mobility fleet and found that seven was the functional minimum size for the overall air mobility fleet, with medium tactical aircraft as the core. As the current air mobility capability has two B757s, any consideration of a medium tactical replacement has to start from the base of the current two B757 aircraft.

The Project Implementation Business Case noted that our aging fleet of C-130H aircraft are struggling to meet existing demands: the number of aircraft available for operations on any particular day, the range of operations that can be undertaken, and the ability to respond and undertake concurrent tasks are all limited. Further, they will not meet the future demands for response and concurrency that Government has forecast through its policy priorities.

It is estimated that the new C-130J fleet should have around double the availability of the current fleet. This means that from a five aircraft fleet three aircraft should always be available, taking into account scheduled and unscheduled maintenance demands. This would also mean that often four aircraft may be available, especially to meet pre-planned tasks where maintenance can be scheduled around forecast mission.

Reducing the fleet size to four, even factoring in the availability increase, would not consistently provide three aircraft available for operations, which is the minimum needed to deliver against

policy. Five aircraft are the minimum number required to consistently deliver three available aircraft and meet the response and concurrency requirements of Government, whilst also offering the capacity to achieve future expansion of mandated Government outputs and provide surge capacity.

How Defence considered interoperability

The current airlift fleet is interoperable with key partners. The ability to perform airlift missions jointly with or on behalf of partners has been a valuable contributor to New Zealand's defence relationships and to shared security objectives. Therefore, one of the five investment objectives identified for this project is that the air mobility capability is interoperable with that of key defence partners.

One of the key criteria used for determining the preferred option was:

- *Community size/Close relationship with community* - Being part of a group of partner countries with the same platform provides access to critical mission and logistics support in different locations. It would be best for New Zealand to participate in as large a user community as possible, with as many friends as possible, for support.

This was one of the criteria that determined the C-130J was the preferred option. Over twenty countries had fleets of C-130J aircraft, including Five Eye partners Australia, Canada, the United Kingdom and the United States.

The C-130J can be procured either commercially from the manufacturer, or through the US Government Foreign Military Sales (FMS) system. The Detailed Business Case recommended purchase of the C-130J through the US Government FMS system as it offers a number of advantages over a direct commercial sale procurement, one of which is interoperability advantages.

How Defence considered through-life costs and issues

The estimated whole of life costs of the aircraft and systems are based on:

- Initial capital investments that include: five C-130J-30 Hercules Tactical aircraft complete with EO/IR, civilian SATCOM system, and all aircraft fitted for large aircraft infra-red counter measure, with three fitted; initial spares; initial capital support items; full motion simulator (Level D); initial capital deployment requirements; integrated logistics support costs; infrastructure; training and personnel costs; and, estimated end-of-service life disposal costs.
- Foreign Military Sale acquisition process for the airframes, initial aircraft spares, simulator systems, initial training and publications, and other support equipment. The capital costs of the equipment components are based on not to exceed price contracts with the USAF.
- Through-life capital investment reflecting future upgrades and refreshes, through-life capital sustainment, and rotables.
- Through-life operating costs of personnel, direct operating costs and consumables, ongoing training, and maintenance and utility costs.
- The key operating and personnel cost drivers: aircrew numbers and aircrew size, fuel burn, and planned flying hours. The C-130J-30 capability is to operate from one operating base and with one squadron (the unit operating the current C-130H – No. 40 Squadron).
- Personnel requirements being: six crews, maintainers, and logistics support personnel. Other than a simulator manager, no personnel costs are included to operate the simulators/training devices as the Defence Force is planning to use external contractors.
- Defence will internally conduct the two levels of aircraft maintenance and after the initial six year deeper servicing will determine the necessary arrangement for the second deeper level cycle and repaint that occurs 12 years after introduction.
- The Defence Capability Plan Review 2019 economic assumptions for inflation and

forward foreign exchange rates from the Treasury's New Zealand Debt Management office. Foreign exchange risks for projects are managed through forward cover of currency as soon as approval to commit to contract is received.

- Aircraft delivery planned from December 2024 with initial operating capability release expected during FY 2024/25. Expenditure will be capitalised and created at the initial operating capability date encompassing all the capital costs up to that date. Full operating release is planned for December 2025.
- A 30-year service life with each aircraft system, with initial operating capability starting the first year after delivery to the designated main operating base (Whenuapai).

- Infrastructure investment includes a new simulator building and security improvements to the hangars and storage facility. The C-130J-30 fleet will be accommodated in the existing 40 Squadron Hangar and 5 Squadron Hangar.
- Initial capital investment delivery contingency is based on the results of Quantitative Risk Analysis workshops, and project team estimate.

Requirements Analysis in the Capability Definition Phase

The Indicative Business Case assessed that the preferred way forward was to discard shortlist option zero, and to further explore shortlist options one, two and three in a detailed business case.

Description of the Capability and Operational Requirements

<p>Capability Requirements necessary to support policy objectives include:</p>	<p>Operational Requirements necessary to support the capability include:</p>
<p>1. The Defence Force needs a reliable, available and supportable airlift fleet to project and support sustained military operations into the future.</p> <p>2. A reliable, available and supportable airlift fleet is needed to support non-military Government tasks into the future</p>	<p>1. Due to the risks associated with some military airlift operations, and the requirement for a high level of readiness to support a number of non-discretionary and time-sensitive tasks, there is a need for New Zealand to at least own the tactical airlift component within a wider fleet mix. The requirement to own does not apply for an aircraft dedicated to strategic airlift operations or non-military Government tasks where military airlift attributes are not needed.</p> <p>2. The Defence Force and Government agencies need a sufficiently reliable and supportable airlift fleet to allow for concurrent tasks.</p> <p>3. The future airlift fleet needs to be interoperable with that of key defence partners.</p>

History of Cost Estimates in the Capability Definition Phase

	2017	2019
NZ\$(billion)	\$1.6 – \$3.4	\$1.414
Cost estimates developed in the 2017 Indicative Business Case were based on replacement of both Tactical and Strategic Fleets and ranged across all three options. The 2019 figure reflects the tactical fleet costs only. These are initial capital cost estimates.		

ACQUISITION PHASE

Letters of Request seeking details on cost for the aircraft, a full flight simulator, training and sustainment support were submitted under the US Government Foreign Military Sales programme, following the Government’s announcement in June 2019 that the Lockheed Martin C-130J-30 Hercules was the preferred platform.

SCHEDULE/TIMEFRAME PROGRESS

	Estimate at Approval to Commit	30 June 2022 (Actual/Forecast)	Variation in acquisition phase (months)
Delivery of first aircraft	2024	2024 (Forecast)	-
Delivery of final aircraft	2025	2025 (Forecast)	-

The signing and execution of the Letters of Offer and Acceptance for the acquisition and sustainment of the new capability took place on 4 June 2020. The project team worked with the US Air Force (USAF) Program Management Agency to finalise the Statement of Work that the US Government issued to Lockheed Martin for production of New Zealand’s C-130J-30 aircraft. By the end of 2020, the aircraft had been placed on contract with a confirmed price and schedule.



C-130J-30 Hercules (artist’s impression supplied Lockheed Martin)

FAMC CAPABILITY INTEGRATION

Description of Capability Integration phase

A Capability Integration Plan (CIP) has been developed to identify and schedule the range of tasks that are necessary to prepare the NZDF to receive, effectively operate and sustain a C-130J-30 air mobility capability during the 'Capability Delivery' and 'In-Service' phases.

It includes a range of requirements, such as:

- suitably qualified and experienced personnel needed for the process of integrating the capability into service with the NZDF
- training for pilots, and loadmasters (including instructors), maintenance personnel, with subjects from avionics systems (instruments, electrical, communications, navigation, radar, sensors)

to aircraft systems like airframe, propulsion, and aircraft mechanical systems

- sustainment requirements and processes for the capability, such as for engine and propeller maintenance.

Status of the Capability Integration Plan

As a living document, each Capability Integration Plan (CIP) is updated and amended as a project progresses through its lifecycle. The second iteration of the FAMC-Tactical CIP was approved in April 2022, updating the version that was approved initially in November 2019.

With the major support contracts signed in June 2020, the project team continue to refine the detail and work with the NZDF to ensure all arrangements are in place prior to aircraft delivery.

Schedule of Capability Integration

	Initial Estimate	30 June 2022 (Forecast)	Variance (months)
Initial Operational Release	2024/25	2024/25	0
Operational Release	Q4 2025	Q4 2025	0

As at 30 June FAMC – Tactical was forecast to achieve full benefits realisation after Operational Release.

DURING THE 2021/22 YEAR

COVID-19 continued to impact international travel, but the project continued to schedule, holding virtual project management meetings with the US Air Force (USAF) and Lockheed Martin. These meetings ensured detailed design work continued, and that projected stage timelines could be firmed up. Details in relation to spares, training plans, and the introduction into service of the new tactical airlift capability remained a focus.

In New Zealand the project continued to work with NZDF units that will be involved with the new aircraft on delivery and implementation plans.

Training opportunities were extended to qualifying RNZAF aircrew and maintainers, who were able to register their interest in undertaking overseas training to join the C-130J introduction into service effort.

In early 2022 the project team was able to have its first face-to-face engagement with the United States Airforce (USAF) and Lockheed Martin delivery teams in the USA. This included discussions on Aircrew and Maintenance training, design and delivery efforts across all work streams.

Over the remainder of the year:

- work continued in the US on the proposal for development, construction and delivery of the flight simulator,

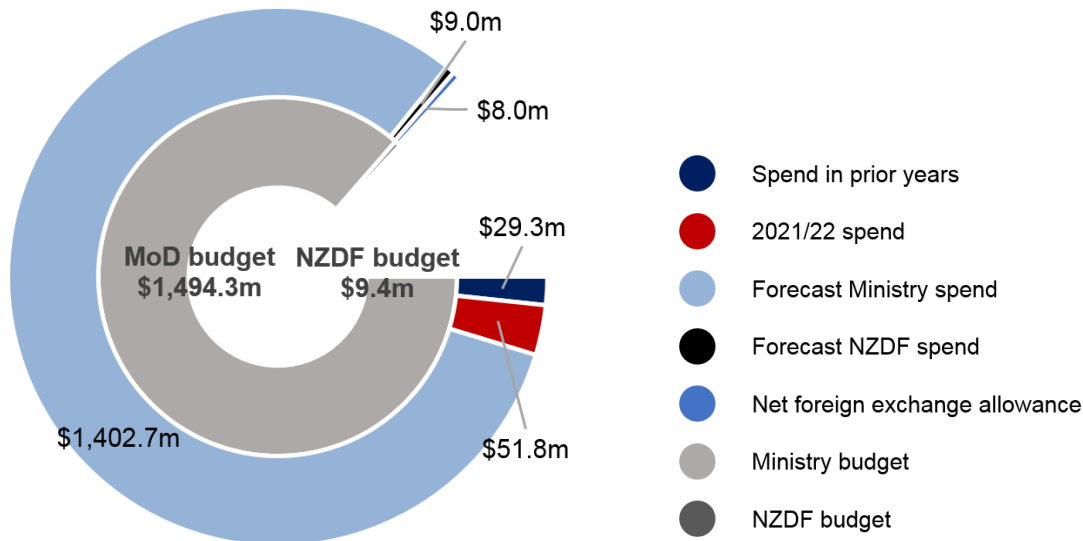
- discussions continued to help refine details around the training programme that will be delivered in early 2023,
- the last of the spare equipment items were being researched as part of confirming support options, and to enable the USAF to place them on order. In excess of 1,200 items were already on contract
- the project was focusing on detailed planning and delivery of the activities required for the introduction of the new capability into service.

By May, the critical design review had been completed and aircraft production was able to begin in earnest.

DEVELOPMENTS POST 30 JUNE 2022

Lockheed Martin commenced production of New Zealand's first aircraft. Mating of the wings to the fuselage is expected to commence in the second quarter of 2023.

FAMC PROJECT BUDGET AND EXPENDITURE



At 30 June 2022 expected Future Air Mobility Capability – Tactical project costs were:

		Ministry	NZDF	Consolidated project
		\$000	\$000	\$000
Budget	Current approved project budget	1,494,255	9,392	1,503,647
	Allowance for foreign exchange movements	-	-	-
	Original approved project budget	1,494,255	9,392	1,503,647
Forecast	Forecast total project cost	1,483,833	9,049	1,492,882
	Effect of foreign exchange movements	(7,973)	-	(7,973)
	Forecast cost using hedged rate	1,491,807	9,049	1,500,856
	Forecast project underspend	2,448	343	2,791

MARITIME SUSTAINMENT CAPABILITY

The arrival of HMNZS *Aotearoa* in New Zealand in June 2020 marked a significant milestone in the Maritime Sustainment Capability project, which has delivered an enhanced replenishment tanker and will provide a capability that is better able to support land operations. As it is polar code-compliant, the ship will be able to operate to Antarctica in the summer season.

THE PURPOSE OF THIS PROJECT

New Zealand's geostrategic environment is unique; no other country of comparable size and political and economic standing has to be able to – at a minimum – deploy equipment and personnel from the Equator to Antarctica.

Naval tankers extend the endurance and range of vessels and other capability such as helicopters.

The former Royal New Zealand Navy replenishment tanker, *Endeavour*, played a key supporting role in the NZDF's ability to deliver its principal roles, and the ship significantly increased the utility of the Defence Force's naval combat capability.

Prior to the retirement of *Endeavour* in 2018, the Maritime Sustainment Capability project was set up to deliver a new replenishment capability. This would maintain the Government's options to contribute to operations outside New Zealand's immediate region by providing a continued ability to sustain Defence Force and coalition platforms deployed further afield.

The overarching benefits of the Maritime Sustainment Capability project are:

- Provision of an independent and complementary Maritime Sustainment Capability to New Zealand and its security partners.
- An improved ability to shape and react to events in New Zealand, Australia and the South Pacific.
- The provision to government of greater flexibility in response options to threats and



emergencies.

- The provision to government of support to New Zealand’s civilian and scientific presence in Antarctica.

CAPABILITY REQUIREMENTS

- Conduct maritime force logistic support
- Maintain deployable bulk fuel reserves
- Provide an effective and appropriate maritime platform
- Provide support to other government agencies with specific fitted capabilities.

MSC’S GOVERNMENT APPROVAL MILESTONES

2011	
26 January	Original Project Charter approved by Deputy Secretary (Policy), Ministry of Defence, and Vice Chief of Defence Force.
2012	
23 October	Cabinet approval of Indicative Business Case - Cabinet invited the Minister of Defence to progress to a Detailed Business Case, which would present Cabinet with a short-list of options. CAB (12) 37/4
2014	
30 June	Approval of Detailed Business Case – Cabinet agreed that a medium-level capability option be taken forward for detailed design as part of a Project Implementation Business Case. CAB Min (14) 22/9
2016	
4 July	Approval of Project Implementation Business Case – agreed that the replacement MSC include winterisation and ice-strengthening, and authorised the Secretary of Defence to conclude contracts. This confirmed the decision of the Cabinet Economic Growth and Infrastructure Committee on 29 June 2016 [EGI-16-MIN-0141]. CAB-16-MIN-0313



In August 2018 keel laying commenced at Hyundai Heavy Industries’ shipyard, Ulsan, Republic of Korea.

CAPABILITY DEFINITION PHASE

How Defence identified and assessed capability and operational requirements

Originally called the Maritime Projection and Sustainment Capability (MPSC) project, preparatory work lasting several years led to the issue of a Project Charter in 2011. Under this, the project would seek to procure and introduce into service a Maritime Sustainment Capability that satisfies user requirements, and would replace what was at the time the Defence Force's naval tanker HMNZS *Endeavour*.

Introduced into service in 1988, *Endeavour* had an expected service life of 20 years. Non-compliance with international maritime regulations and obsolescence of critical ship systems meant that *Endeavour* would need to retire from service in 2018. Without a replacement capability the retirement of *Endeavour* would result in the Defence Force being unable to conduct maritime sustainment, and support its own maritime operations and those conducted with partners.

The *Defence White Paper 2010* signalled that a capability to replace *Endeavour* would be acquired. It also signalled the possibility that the replacement vessel would incorporate some sealift capability to supplement HMNZS *Canterbury*, the Defence Force's multirole vessel.

An Indicative Business Case was approved by Cabinet in October 2012. That paper outlined two broad options for the project; a like-for-like replacement of *Endeavour*, or a replacement that would provide both sustainment and sealift capabilities.

A Detailed Business Case was approved by Cabinet in June 2014, eliminating the option of including sealift capability to allow funding to be prioritised to other capital projects. If additional sealift was required by the Defence Force this would be met through commercial charter. After this decision the project became the Maritime Sustainment Capability.

The option selected by Cabinet in the Detailed Business Case enhanced the Defence Force's

maritime sustainment capability by providing a ship with:

- increased fuel storage over that provided by *Endeavour*
- the ability to transport ammunition
- the ability to operate and support helicopters up to the size of an NH90, and
- the ability to transport aviation fuel allowing the ship to sustain operations by multiple helicopters.

The estimated capital cost was \$452 million.

Cabinet also noted that Defence was in discussion with Antarctica New Zealand on the benefits and costs of winterisation, and that the estimated additional cost of this would be \$15 million.

In the *Defence White Paper 2016* Ministers took a decision to ice-strengthen and winterise the replacement, to increase the ability to replenish New Zealand's and other countries' Antarctic programmes.

Cabinet selected a medium-level Maritime Sustainment Capability, as recommended in the Detailed Business Case, with the addition of winterisation and ice strengthening. The estimated capital cost \$493 million, including \$64 million for winterisation of the vessel.

How Defence analysed requirements options in the Capability Definition phase

Options available for the replacement ship were assessed against the key benefits identified during the business case process.

Each of the options available for the replacement of *Endeavour* was assessed against its ability to deliver these benefits.

The cost of each option, indicated through a Request for Information and other unsolicited proposals, was then compared with the deliverable benefits.

This led to the selection of the replacement option that offered the greatest level of benefits for the Defence Force within the available funding.

How Defence considered interoperability

Interoperability was considered a key attribute for the MSC project. *Endeavour* made an important contribution to the defence alliance with Australia as one of only three replenishment tankers in the combined fleets. Just under 40% of fuel delivered by *Endeavour* had been provided to Australian ships.

The replacement capability has a requirement to operate seamlessly with Australian assets and those of other security partners. As such the capability was required to have NATO compliant replenishment at sea capacities, and to transport NATO standard fuels.

How Defence considered through-life costs and issues

The Maritime Sustainment Capability through-life costs have been based on the historical average operating costs of *Canterbury* and *Endeavour*. These historic costs were applied to the Maritime Sustainment Capability platform expected utilisation of 160 days a year.

REQUIREMENTS ANALYSIS IN THE CAPABILITY DEFINITION PHASE

Options assessed for delivering MSC and operational requirements

Option 1: ‘Renew’ naval tanker: \$358-\$418 million

Advantages: Delivers the same level of capability as *Endeavour* provided when it entered service in 1988. A new commercial naval tanker, optimised for military operations, able to replenish multiple naval vessels and, to a lesser extent, deployed land forces. Additional sealift provided by commercial charter if needed.

Disadvantages: Does not provide for the expected fuel needs associated with deploying a full scale, amphibious-capable Joint Task Force. It has a limited aviation capability, reduced number of supply classes and lack of ability to support the use of landing craft.

Option 2: ‘Renew’ off-the-shelf tanker: \$355-\$410 million

Advantages: Delivers a new commercial naval tanker with selected features designed for Norwegian military. It is not optimised for the New Zealand Defence Force and comes with limited equipment and system installation (in order to reduce its capital cost), although these systems could be fitted at a later date if required. Additional sealift would be provided by commercial charter if needed.

Disadvantages: Provides a lower level of capability than Option 1. Should the strategic environment change, this option has the advantage of providing Government with an ability to increase the ship’s capability in the future because of its ‘fitted for but not with’ design. The cost of retrofitting later, however, would be significantly more than if the systems were included during the initial build.

Option 3: ‘Enhanced’ naval tanker: \$389-\$452 million

Advantages: A commercial naval tanker with selected military features. It would effectively upgrade the NZDF’s maritime, land and air replenishment capability to support a large-scale, amphibious-capable Joint Task Force.

In addition to capabilities offered by Options 1 and 2, it could transport ammunition, operate and support a helicopter up to the size of an NH90, and store a comparatively larger amount of fuel, including sufficient aviation fuel to sustain the deployment of multiple helicopters.

Additional sealift would be provided by commercial charter if needed.

Disadvantages: It could not support amphibious sealift operations and would not have the ability to operate in Antarctic waters.

Option 4: ‘Enhanced’ naval tanker with organic, amphibious sealift: \$429-\$495 million

Advantages: Builds on the capability of option 3, adding design features that allow the ship to act as an organic, amphibious sealift and Humanitarian Assistance and Disaster Relief response vessel. This includes 260 lane metres for vehicle or container transport, faster vessel speed, a role 2 medical facility, two Landing Craft Medium (LCM) to enable amphibious

lodgement of equipment and personnel, and a deck crane to enable lifting and stowage of two LCMs. This option would supplement *Canterbury's* sealift capabilities and capacities, providing an alternative deployment option to *Canterbury* if it was unavailable.

Disadvantages: It would not have the ability to operate in Antarctic waters. Higher capital cost than other options.

Option 5: Additional bolt on option (Antarctic support option): \$493 million (\$64 million for ice features)

Advantages: The addition of winterisation and ice strengthening features to Options 1, 3 and 4 would increase the versatility of the vessel to support operations in Antarctic waters, including resupply of New Zealand and American bases.

Disadvantages: Highest capital cost out of all the options. Would present a potential opportunity cost as employment of the ship in this way would need to be balanced against other tasks, such as support to other New Zealand Defence Force vessels or responding to a Humanitarian Assistance and Disaster Relief event.

Description of the Capability and Operational Requirements

Capability Requirements necessary to support policy objectives

The roles of the Maritime Sustainment Capability (MSC) are derived from the Operational Concept Document, with the exception of Operational Need 4, which is derived from the requirements for support to Antarctica New Zealand. The roles are categorised as:

- **Operational Need 1** - Conduct maritime force logistic support.
- **Operational Need 2** - Maintain deployable bulk fuel reserves.
- **Operational Need 3** - Provide an effective and appropriate maritime platform.
- **Operational Need 4** - Support to other government agencies with specific fitted capabilities.

MSC Vessel Roles

- The primary roles of the MSC are:

- Replenishment of naval ships.
- Sustainment of land/air forces.
- Maintain naval fuel reserves.
- Sustainment of New Zealand Antarctic base.
- The secondary roles of the MSC vessel are:
 - Assistance to civil authorities.
 - Aviation training.
 - Collection of environmental data.
 - Defence diplomacy.
 - Defence training exercises and activities.
 - Generic at sea Core Mariner training.
 - Humanitarian Assistance and Disaster Relief (HADR).
 - Maritime disaster pollution control assistance.
 - Multi-Agency Operations and Tasks.
 - Search and Rescue.
 - Surveillance.
- Logistic support primarily exists to ensure that combat forces can meet readiness levels and be deployed, sustained and re-deployed to meet the operational aims of Command. Logistic support includes provision of the stores and spare parts required by units, the supply and resupply of fuel and lubricants, ammunition and food, and provision of medical support, maintenance support, personnel support and accommodation services.
- An Auxiliary Oiler Replenishment Helicopter (AORH) platform of the New Zealand Defence Force enables all Royal New Zealand Navy platforms to have greater endurance and to remain 'on station' longer by the provision of fuels, stores, rations and ammunition. The endurance of both the Anzac frigates and the Offshore Patrol Vessels are limited both by the space available to carry food (maximum of 28 days) as well as their fuel capacities. While both vessels have relatively long endurance the support of an AORH allows Command greater operational flexibility when employing these vessels.

Operational Requirements necessary to support the capability include:

The key operational requirements are:

- Conduct Maritime Force Logistic Support/Maintain Deployable Bulk Fuel Reserves.
 - Replenishment at Sea (RAS), including light jackstay, and RAS(L) systems.
 - Organic Aviation systems, including Vertical Replenishment (VERTREP), Helicopter In-flight Refuelling (HIFR) and maintenance support systems for organic helicopter.
 - Stowage and distributions systems for bulk supply Classes:
 - 1 (food and water)
 - 2 (general stores)
 - 3 (petroleum, oils, liquids)
 - 5 (ammunition)
 - 9 (repair parts)
- Provide an Effective and Appropriate Maritime Platform.
 - Endurance, speed and range.
 - Navigation and manoeuvring systems.
 - Communications systems.
 - Engineering and logistics management systems.
 - Basic Damage Control systems.
 - Role 1 Medical Facility.
 - Quality of Life systems.
- Provide a Maritime Platform that can integrate effectively with a military force.
 - Self protection systems.
 - Local Intelligence, Surveillance Reconnaissance (ISR) systems.
 - Military communications/network systems.
- Advanced Damage Control systems.
- Provide support to Land Operations
 - Support to Embarked Force systems.
 - Stowage and distributions systems for bulk supply Classes:
 - 1 (food and water)
 - 2 (general stores)
 - 3 (petroleum, oils, liquids)
 - 5 (ammunition)
 - 9 (repair parts)

Support maintenance systems for non-organic helicopters.

NOTE: The operational and capability requirements listed here were those identified in the requirement documents produced during the Capability Definition Phase. During the tender and contract negotiation process these requirements are converted into function and performance specifications (FPS) that become the contracted deliverables. During the contract negotiation process the operational requirements have to be balanced against cost or viability considerations.

Schedule of Capability Definition Phase

Dates	Duration	Note
23 October 2012 to 30 June 2014	20 Months	Cabinet Approval of IBC to Cabinet Approval of DBC
1 July 2014 to 29 June 2016	24 Months	Cabinet Approval of DBC to Cabinet Approval of PIBC – included Capability and Industry Review Activity

Estimates of Ship Acceptance Date made in the Capability Definition Phase

Initial	May 2020 ²¹
At Contract Signing	May 2020
Actual	June 2020
Note: The ship was provisionally accepted on 10 June 2020 for delivery to New Zealand.	

²¹ On 4 July 2016 Cabinet confirmed approval of the MSC Project Implementation Business Case, and agreed that the replacement Maritime Sustainment Capability was to include winterisation and ice-strengthening. The MSC project replaced the Maritime Projection and Sustainment Capability project, which did not have an Antarctic Support Option.

ACQUISITION PHASE

Description of acquisition work

In July 2016 Cabinet approved the Implementation Business Case for the Maritime Sustainment Capability, and authorised the Secretary of Defence to commit to contracts and authorise expenditure of public money.

Following this, the Secretary of Defence signed contracts with Hyundai Heavy Industries (HHI) on 25 July 2016. HHI was the preferred supplier of the four shipyards that participated in the tender process and was contracted as the Prime Contractor for the design, build, acceptance and delivery of the ship. HHI carried full responsibility and risk for any subcontract agreements that it had with other suppliers.

How Defence decided to acquire the Capability Solution

Tender Process

Following Cabinet approval to proceed to tender as part of the Detailed Business Case, the Ministry of Defence issued a Request for Tender based on detailed technical requirements (specification) for a Maritime Sustainment Capability. Included in the Request for Tender was a costed option for support to Antarctica.

Tender responses were received from four shipyards. A fifth company provided an un-costed proposal. The responses were assessed in accordance with the Maritime Sustainment Capability Tender Evaluation Plan, and following this two companies were down-selected for further evaluation.

Risk reduction and clarification activities

Risk reduction and clarification activities were undertaken in September 2015, which complemented the best and final offer process and provided the Project with:

- confidence that both Shipyards could deliver a credible solution;
- clarification of the achievability of the Maritime Sustainment Capability requirements; and

- an opportunity to ask questions regarding the Project Team's observations of their Tender response.

Following risk reduction activities, a tailored request for Best and Final Offer was submitted to the two down-selected companies.

Best and final offer process

The best and final offer process addressed the following issues with the two down-selected companies, prior to selection of the preferred proposal:

- addressed clarification questions that had been generated from the Tender evaluation activities;
- committed to equipment selection for key systems, aligned with the Project's Makers List or agreed alternatives; and
- provided a firm Antarctic support option, with an amended cost structure, project schedule and technical specification.

The evaluation of the best and final offers identified Hyundai Heavy Industries as the preferred Tenderer to provide an enhanced naval tanker and an Antarctic support option.

Due diligence

Due diligence was undertaken with Hyundai Heavy Industries at their shipyard in Ulsan, South Korea. The due diligence activity provided further opportunity to clarify the vessel requirements, view key shipbuilder's internal processes and systems, and support the selection of cost saving options in preparation for contract negotiations.

Contractual arrangements

At contract negotiations, the Crown and Hyundai Heavy Industries negotiated an agreed Contractor's Technical Specification, logistic support including Life Cycle Costing Analysis, an acceptance regime and preliminary selection of major items of equipment (significantly lowering the risk to both the Contractor and the Crown). This strategy supported the aligning of both parties' expectations as well as minimising contingency components built into the

negotiated price. The accurate and comprehensive project costs and data were then incorporated in the Implementation Business Case.

Separate tenders and contracts were established with suppliers of services or systems; examples of this are the shipyard superintendence services and the supply of government furnished equipment. The Project

Team has been responsible for the facilitation and management of these contracts.

Prime Contractor for enhanced naval tanker and Antarctic support option	Hyundai Heavy Industries (HHI)
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SCHEDULE/TIMEFRAME PROGRESS

The following dates were in the Memorandum of Understanding and contract acceptance of acquisitions.

	Original forecast at Approval to Commit	Actual date achieved	Variation in acquisition phase (months)
Contract Award	July 2016	July 2016	0
Preliminary Design Review	April 2017	October 2017	6
Detailed Design Review	February 2018	June 2018	4
Work Commences	February 2018	January 2018	0

History of variations to schedule at 30 June 2022

Date of individual variation	Variation length (months)	Explanation
October 2017	6	Preliminary Design Review (PDR): The scheduled April 2017 completion date for the PDR was not met and in May that year the project was forecasting completion by end June. This was achieved in October 2017. While key elements of the PDR were not completed until October 2017, HHI continued with the detailed design review of main elements in parallel with this process.
June 2018	4	Detailed Design Review completion: although this milestone was achieved four months later than scheduled, it did not impact the commencement of production, which occurred when steel cutting commenced in January 2018. The launch (flooding of the dry dock) was delayed until April 2019 but the overall schedule remained within baseline. HHI advised that it was quicker to complete a greater level of outfitting before construction blocks were assembled in the dry-dock.

CAPABILITY INTEGRATION

Description of Capability Integration phase

At the time the Project Implementation Business Case was being developed, it was envisaged that Introduction into Service, as it was referred to then, would run concurrently with some earlier project stages, and increase in tempo as the emphasis increased on the NZDF being able to receive and safely operate the MSC.

Introduction into Service would be at its peak after Sea Trials. These took place in the first half of 2020, during which the Defence Force tested and measured 'total system performance' against the original User/System Requirements and used this to advise whether or not the originally envisaged capability had been delivered.

Some systems were to be tested following the ship's arrival in New Zealand, and the impact of COVID-19 (international border restrictions preventing representatives of the original equipment manufacturers from traveling to the Ulsan shipyard) has meant additional systems have been tested post-arrival as well.

Introduction into Service would be completed when Operational Release was reached and where the Project Sponsor (Chief of Navy) agreed that the project outcome reflects the User Requirements Document.

Status of the Capability Integration Plan

Version one of the MSC Capability Integration Plan (CIP), which replaced the proposed Introduction into Service Plan, was approved by the MSC Project Board in April 2019.

Schedule of Capability Integration

	Initial Estimate	30 June 2022 (Forecast/Actual)	Variance (months)
Initial Operational Release	December 2020	March 2021 (Actual)	3
Operational Release	November 2021	Q4 2022 (Forecast)	12
Benefits Realisation	January 2022	Q4 2022 (Forecast)	10

Operational release and benefits realisation were unable to take place until successful deployment of the ship to Antarctica in the 2021/2022 summer. This was completed in the first quarter of 2022. The voyage was a dependency as well for full benefits realisation.

HMNZS Aotearoa refuels USS Spruance, left, USS William P. Lawrence during Ex RIMPAC 22



MSC OPERATIONAL CAPABILITY

Progress towards Delivery of Operational Requirements as at 30 June 2022

Operational Requirements	Requirement likely to be met	Comment
<p>Conduct Maritime Force Logistic Support/Maintain Deployable Bulk Fuel Reserves.</p> <p>Replenishment at Sea (RAS), including light jackstay, and RAS(L) systems.</p> <ul style="list-style-type: none"> • Organic Aviation systems, including Vertical Replenishment, Helicopter In-flight Refuelling and maintenance support systems for organic helicopter. • Stowage and distributions systems for bulk supply Classes: <ul style="list-style-type: none"> ○ 1 (food and water) ○ 2 (general stores) ○ 3 (petroleum, oils, liquids) ○ 5 (ammunition) ○ 9 (repair parts). 	Yes	All operational requirements will be satisfied during Operational Testing and Evaluation between Initial Operational release in March 2021 through to Operational Release in the second quarter of 2022.
<p>Provide an Effective and Appropriate Maritime Platform.</p> <ul style="list-style-type: none"> • Endurance, speed and range. • Navigation and manoeuvring systems. • Communications systems. • Conduct maritime force logistic support. • Basic Damage Control systems. • Role 1 Medical Facility. • Quality of Life systems. 		
<p>Provide a Maritime Platform that can integrate effectively with a military force.</p> <ul style="list-style-type: none"> • Self protection systems. • Local Intelligence, Surveillance Reconnaissance (ISR) systems. • Military communications/network systems. • Provide organic anti-piracy self defence. 		
<p>Provide support to Land Operations:</p> <ul style="list-style-type: none"> • Operate and be interoperable with other NZDF naval and allied/coalition naval forces and non naval NZDF/non naval allied/coalition forces. • Stowage and distributions systems for bulk supply Classes: <ul style="list-style-type: none"> ○ 1 (food and water) ○ 2 (general stores) ○ 3 (petroleum, oils, liquids) ○ 5 (ammunition) ○ 9 (repair parts) 		
<p>Support maintenance systems for non-organic helicopters.</p>		
<p>Benefits realisation is scheduled for full implementation by March 2022.</p>		

DURING THE 2021/22 YEAR

During 2021 planning and preparation was underway for the final significant activity required ahead of Operational Release (OR) – the first voyage to Antarctica in early 2022, as part of Operation TIO. A Polar Seaworthiness Board had taken place at the beginning of July, concluding that – subject to completion of a number of planned tasks – *Aotearoa* was safe to the Royal New Zealand Navy's standards for the trip to the ice.

But Operational Tio was one of two major events that took place during the year as part of operational testing of the new capability.

The first to take place was Exercise BERSAMA GOLD in October 2021. This replaced BERSAMA LIMA 21, which *Aotearoa* had been scheduled to attend as part of the ship's Operational Test and Evaluation Phase. In response to COVID-19, the replacement exercise was designed to be non-contact. *Aotearoa* was able to achieve the same Operational Test and Evaluation objectives, delivering Naval Task Group support while operating in company with the Royal Australian Navy, United States Navy, Royal Navy and Republic of Singapore Navy and, by supporting a range of ships. *Aotearoa* achieved the majority of Replenishment At Sea and tactical operating objectives of this phase of Operational Release.

Other release activities included transfer of stores by vertical replenishment from a helicopter, and, a 20 foot container was transferred by crane from *Aotearoa* to HMNZS *Te Kaha* while rafted up.

On return to New Zealand, the ship entered a short maintenance period while preparations continued for *Aotearoa* to be deployed to the Antarctic in the first quarter of 2022.

Preparing for the Ice

Supporting the sustainment of New Zealand's Antarctic base is one of the key roles for *Aotearoa* that was approved in the business case.²²

The ship's first voyage was scheduled to deliver bulk liquid and solid cargo to McMurdo Sound as part of the government's contribution to Antarctica New Zealand operations and the Joint Logistics Pool.

Plans were made for the ship to depart from Devonport Naval Base on 30 January and return in early March. En route the crew would complete a contactless stop at the Port of Lyttelton to uplift cargo and arrive at McMurdo Sound in mid-February.

On the evening of 15 January, the underwater volcano Hunga Tonga-Hunga Ha'apai erupted. The largest in a series of eruptions, this one resulted in a tsunami that caused significant damage and several deaths across the Kingdom of Tonga. Ash and debris caused further damage, polluting water supplies and significantly impacting communications.

Aotearoa was being readied to head to the Southern Ocean but instead headed north, carrying fuel, portable generators, fresh water, shelter tool kits and hygiene kits, along with water containers needed for distribution of the potable water the ship is able to generate.

More than 415,000 litres of water were generated by the ship's plant for Tongan communities. The ship's fuel replenishment capability, which had been a key operational requirement, meant Tongan Navy vessels were refuelled to help distribute aid and fresh water. Ships providing aid from Australia, the United States and the United Kingdom were also supported.

²² Along with replenishment of naval ships, sustainment of land/air forces, and the ability to maintain naval fuel reserves.

After returning from Tonga, *Aotearoa* conducted a non-contact logistics stop in Devonport to collect essential equipment for her deployment to McMurdo Station. A second non-contact stop took place in Lyttelton to board Defence scientists and equipment to be delivered to Scott Base for Antarctica New Zealand.

Aotearoa arrived alongside McMurdo Station on Friday 11 February and departed three days later having successfully completed the tasking.

After returning from Antarctica, the ship underwent a period of maintenance ahead of the next deployment, which saw *Aotearoa* leave on 13 June for Hawaii and Southern California to participate in Exercise Rim of the Pacific 2022 (Ex RIMPAC 22).

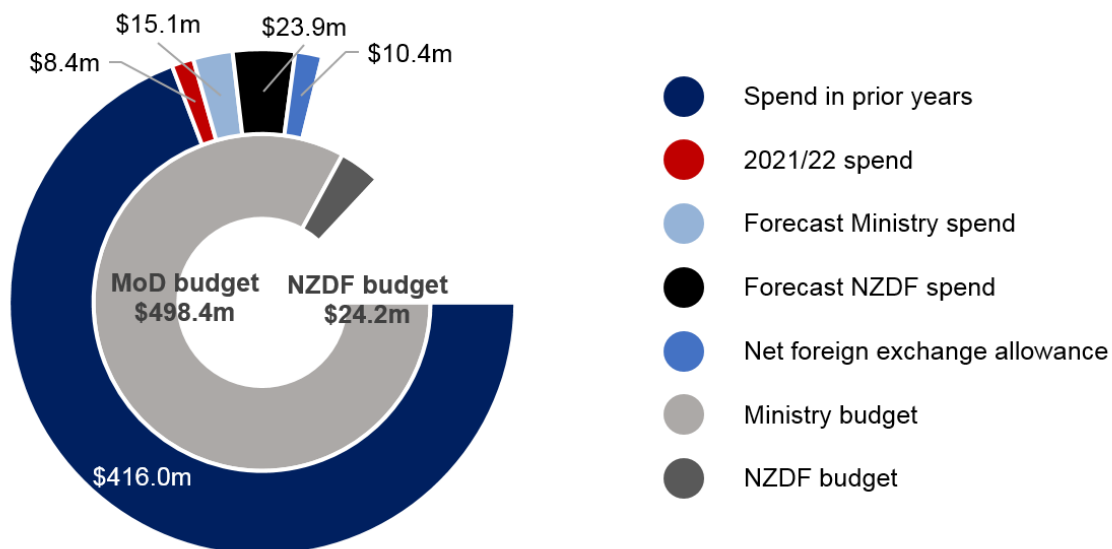
DEVELOPMENTS POST 30 JUNE 2022

Participation by *Aotearoa* in Ex RIMPAC 22 provided an opportunity for completion of the remaining activities that were needed to enable the operational release of capability.

RIMPAC 22 enabled the tests to be conducted in an environment that simulated an operational environment and the ship's range of equipment was able to be evaluated and procedures validated.

Operational Release is expected to occur in the first quarter of 2023, and the ship remains available for tasking.

MSC PROJECT BUDGET AND EXPENDITURE



At 30 June 2022 expected Maritime Sustainment Capability project costs were:

	Ministry	NZDF	Consolidated project	
	\$000	\$000	\$000	
Budget	Current approved project budget	498,447	24,160	522,607
	Allowance for foreign exchange movements	26,832	-	26,832
	Original approved project budget	471,615	24,160	495,775
Forecast	Forecast total project cost	439,552	23,856	463,408
	Effect of foreign exchange movements	16,452	-	16,452
	Forecast cost using hedged rate	423,100	23,856	446,956
	Forecast project underspend	48,515	304	48,819

NETWORK ENABLED ARMY PROGRAMME

The Network Enabled Army (NEA) Programme is moving the New Zealand Army's planning, intelligence and communications functions to modern, interoperable, digital-based systems. This will increase information sharing capabilities between deployed units and the Army's command structure.

THE NEA PROGRAMME

The Network Enabled Army (NEA) Programme will provide the New Zealand Army and Special Operations Forces (SOF) with Command, Control, Communications and Computers (C4), Intelligence, Surveillance and Reconnaissance (ISR) capabilities.

Commanders will be able to make decisions more quickly, based on detailed real-time information. They will be able to communicate effectively with units on operations, other Government agencies, and/or security partners, in New Zealand, the Pacific or further afield.

The programme was planned to be rolled out through four tranches of funding to 2025-26 and currently, within the NEA Programme, the first two tranches have been approved, providing funding for Defence-led projects to deliver C4 and ISR capabilities.

This planned roll out will provide increased capability through each tranche, as well as building incrementally on the capability that is already in place. Managing NEA in successive tranches allows new technologies to be introduced as they mature, ensures that there are ongoing opportunities to evaluate progress and, if necessary, change priorities. It also ensures that the programme progresses at a

rate that can be managed effectively and that does not overwhelm the users.

The Programme's origins lie within several projects that evolved over time. Starting as the ISR Project in 1994, this merged with the Communications Project in 2004 to become Land C4ISR. In 2010 the project combined with three others; Electronic Warfare, Combat Net Radio Replacement and Special Operations to become what is known today as the NEA Programme.

The Programme is providing the technology the Army needs, along with the concepts, training and support to make it work. It prioritises front line soldiers and their commanders, giving them the capabilities they need without burdening them with unnecessary equipment and capability. It allows for expansion and development over time.

APPROVAL OF FUNDING TRANCHES

Two funding tranches have been approved by Government.

Tranche One: The first tranche of \$106 million in capital funding was approved by Cabinet in April 2015, with operating costs of \$36.4 million approved to spend over the next four years, which formed the budget for the NEA C4 project.

Tranche Two: The approval of the Business Case for the second tranche of funding for the NEA Programme was announced in August 2019. The funding of \$106.48 million²³ is being used to continue capability delivery by the C4 project and has enabled the start of delivery of ISR capability. Additional communications and network enhancements are being delivered, as well as new sensor systems, intelligence gathering, and processing capabilities for the Army, equipping elements such as logistics and medical units that support front line soldiers.

²³ Funded from the NZDF's accumulated depreciation reserve.

Tranche Two also extends the capability through use of a combination of hardware, software, and wider sources of information (such as partners' information) that leverage the digital radio networks and information management systems delivered under Tranche One.

Engagement with industry in relation to the wider capability sought under this project has been underway since 2019 when Defence issued a Request for Information for tactical and networked enabled system of systems consisting of Intelligence, Surveillance and Reconnaissance (ISR) and Electronic Warfare (EW) capabilities for the New Zealand Army.

The ISR and EW systems are being sought to enhance the New Zealand Army's decision making cycle, and provide Land Forces and Special Operational Forces with increased Situational Awareness (SA), and improved Force Protection.

The first ISR project in delivery is Reconnaissance and Surveillance (R&S). The business case was approved in 2021 and the R&S project features for the first time in this edition of the report.

Other work streams relating to NEA ISR are in definition, with investment decisions still to be made.

NEA Programme Better Business Case Milestones

2015	
January	Programme charter approved by Secretary of Defence and Chief of Defence Force
March	Tranche One funding approved by Cabinet.
2019	
July	Tranche Two funding approved by Cabinet. CAB-19-MIN-0370
2021	
November	Minister of Defence authorises expenditure for delivery of the Reconnaissance and Surveillance component of NEA Tranche Two. (Approved under Cabinet's Tranche Two funding decision in July 2019.)

PROGRAMME SCHEDULE/TIMEFRAME PROGRESS

The NEA Programme was designed to be rolled out through four successive tranches of funding, based on the concept that each tranche would deliver, incrementally, capability that – while independent from previous tranches – would deliver the full benefits of a network enabled army once the whole programme was complete.

Tranche One had no set Initial Operational Release (IOR) or Operational Release (OR) dates, however the proposal in 2015 was that Tranche One capital funding would conclude in the 2017/18 financial year when the second funding tranche was expected to be sought. The Tranche Two business case approval in 2019 re-baselined the end date for Tranche One to December 2021 to align with activity schedules.

High level schedule dates for IOR and OR for Tranche Two's Reconnaissance and Surveillance capability are shown in the next table and were released during the tender process. Respondents were advised these dates were subject to change depending on information received from providers under the Request for Proposal process.

Baseline dates will be added in future editions and as decisions are made in relation to the Programme as a whole.

Reconnaissance and Surveillance	Original estimate (Released during tender phase)	30 June 2022 (Forecast/Actual)	Variation in acquisition phase (months)
Interim Operational Release	Q4 2023 (2021)	Q4 2023 (Forecast)	-
Operational Release	Q4 2025	TBC	-

At 30 June 2022 Tranche One continued to be in delivery with the project developing a plan to re-baseline the end date and Operational Release of the C4 capability. The extended timeframe for completion reflects, in part, the impact of COVID-19 on project resources and suppliers, with Army personnel required to support Operation PROTECT during a significant period of time from 2020 through to 2022, and providers reporting supply chain issues and constraints on operations due to social distancing and isolation requirements.

Three projects in the delivery phase – CUBS, CCPOE and MTCS (see the next section – Network Enabled Army C4 – for more information on these projects) – are working to dates set internally within Defence with the final Operational Release forecast to be achieved in the 2023/24 financial year.

The history of earlier schedule estimates are documented in the 2021 edition of the Major Projects Report, which is available under the Publications section of the Ministry of Defence website.

NETWORK ENABLED ARMY C4

This project is providing NZDF's land forces with systems, technology and infrastructure, including the basic network architecture on which the future NEA Programme will be built.

NEA C4 was established to deliver capability under funding from Tranches One and Two. The strategic C4 benefits are:

- improved interoperability
- improved Common Operating Picture (COP)
- improved ability to plan
- improved information management
- improved ability to pass data
- improved situational awareness
- improved ability to exercise Command and Control.

The network architecture is a major priority for the project and is delivering a combination of hardware (servers, routers, long distance communications links) and software (such as a battle management system that enables all functions across the network), along with industry specialist support.

The project has established the testing, experimentation and evaluation capabilities that enable hardware and software to be assessed prior to investing in it; ensuring it integrates with other NZDF systems and is compatible with our partners.

The NEA C4 Project was designed to put in place the basic network architecture including key software, battle management systems and communications methods. The required levels of interoperability with Army's Joint, interagency and multinational partners will have been

achieved for the force elements receiving the NEA Capability.

NEA C4 is equipping Special Operations Forces, a deployable Task Group Headquarters, and a Light Infantry Company, and covers the requirements of most land deployments. It also includes smaller headquarters units, and training rotation forces for extended deployments. It puts in place the overall architecture to allow expansion and development over time; provides support, evaluation and testing processes; and establishes key supplier relationships.

C4 Funding

While the project was underway using funding provided under Tranche One, the NEA Programme commenced the definition phase for Tranche Two. The approval of this second set of funding is enabling continued delivery of Tranche One capability, including purchasing of more of the equipment delivered under the project.²⁴

C4 ACQUISITION PHASE

Cabinet approved NEA Tranche One funding for new digital radios and associated equipment in 2015, as the first project of the NEA Programme (CAB Min (15) 11/7 refers).

Five related capability sets are being delivered (summarised below, under *Description of Acquisition Work*).

In September 2017 the date for the Final Operating Capability for Tranche One was revised from June 2018 to 29 June 2020. This milestone was re-baselined within the updated NEA Programme Business Case approved by the Defence Capability Management Group in September 2017.

In 2019 the Tranche One timeline was re-baselined to deliver its combined capability in

²⁴ The second tranche of funding also expanded the programme's focus to identifying and delivering Intelligence, Surveillance and Reconnaissance (ISR) capabilities. See next section.

the fourth quarter of 2021. By the end of the 2020/2021 year, Interim Operational Release was expected to be achieved by the end of 2021, with Operational Release forecast for the second quarter of 2022. This timeline has since been adjusted to reflect the revised structure of the Programme that was approved in 2021.²⁵

How Defence decided to acquire the Capability Solution

Five inter-linked capability sets (described below) are being delivered through a series of acquisitions, developed through the overarching NEA Programme Business Case. This was referred to the Minister of Defence and provided the basis for Tranche One approval by Cabinet.

Description of acquisition work

Integration, Testing, Training, Evaluation and Experimentation: This includes most of the programme services that support the overall development of NEA, such as testing and evaluation of potential hardware and software, integration between capability sets, training for the operation and support to NEA, configuration management for the overall system and related services. It includes a physical test, reference and evaluation centre, based initially at Linton Camp (the main operational unit base) and with staff at Devonport and Papakura providing training, capability systems support, and transition services.

An Engineering Centre has been established at Trentham Camp (the site for the broader support elements for the Army) to provide deeper support to acquisition, integration and test and evaluation activities; including research and integration of NEA capabilities with Land, Air, Maritime, and Special Forces. A new Engineering Centre – the Test, Reference and Evaluation Capability (TREC) Centre – was built at Trentham and opened in September 2018. In

²⁵ The timeline at 30 June 2022 is outlined under the Schedule/Timeframe Progress heading in this NEA C4 section.

April 2021 the new Capability Integration Centre – Te Pokapū Whakauru Māia – was opened. Its primary purpose is to prepare communications networks for rapid deployment.

Common Universal Bearer System (CUBS):

The CUBS system essentially combines strategic and tactical communications systems with computer infrastructure to provide the means of transmitting and receiving voice and data communications between command posts, command teams and liaison teams within the land force Task Groups and deployed SOF elements. It interconnects force elements through terrestrial and/or satellite bearer systems and provides the necessary infrastructure to host collaboration and information services. The infrastructure will be a deployable node of the Defence Information Environment.

In February 2019 a Framework Agreement was signed with GATR Technologies Inc for this work stream, with statements of work used to define specific deliverables and/or services to be provided. Following this, a Statement of Work (SOW) was established for delivery of the Tranche One Tactical Network (TNet).

Common Command Post Operating Environment (CCPOE):

The CCPOE project establishes a set of standard operating procedures, equipment, and service applications suitable for land forces and SOF and that are interoperable with the NZDF and other allied systems. These will be underpinned by an information infrastructure that hosts a set of information services over a number of different networks. The key components of CCPOE are:

- IT systems (e.g. computers, displays and software required to access, manage and display the information carried across the CUBS).
- Operational and tactical core services that will provide a battle management system for use at the Task Group and Sub Unit Headquarters layer.
- The command post infrastructure, including shelters, lighting, generators, environmental management and furniture and trailers to

move them. The CCPOE is designed to support and enable Commanders and Staff to plan and manage operations.

- A training environment that will enable skill levels across the Army. This includes establishing a training centre of excellence, the delivery of training to Headquarters staff and providing access to battle management systems to officers and soldiers when they are in garrison and during field training.

Mobile Tactical Command Systems (MTCS):

The MTCS capability consists of enhanced network-capable digital combat radios and their peripherals, combined with a battlefield management system, to allow secure mobile communications networks in support of high tempo, dispersed operations. The digital combat radio environment includes line of sight and beyond line of sight technology to connect soldiers, platforms and command post at all levels of a Task Group/Battalion Group. MTCS will deliver a mobile tactical internet providing voice, data and position location indication. Interoperability with the NZ Army’s Command Post level C4 systems, and joint partners is of particular importance.

In February 2019 a contract was signed with Harris Defence Australia for a new tactical communications network. Under the \$40 million contract a network has been designed and delivered software, systems and a connecting ‘family’ of equipment (radios, viewing devices) will include new portable radios for soldiers.

Special Forces Electronic Warfare Refresh:

This Electronic Warfare refresh was handled as an Urgent Operational Requirement, with the NZDF Defence Capital Acquisitions staff undertaking acquisitions. This work has now been completed.

All Tranche One NEA capabilities are being delivered concurrently to the Special Forces. This ensures functional interoperability whilst allowing the specific Special Forces requirements to be met. It also ensures that the experience and learnings from Special Forces operations feed back through NEA to support the wider Army.

In summary

Each of the above capability sets are in turn broken down into smaller projects, to ensure that a functional capability that meets user requirements is delivered, that risk is mitigated, advantage can be taken of ongoing technical developments, and to ensure that capability development occurs at a rate that the users can absorb.

Where relevant, NEA builds on extensive work and experience already resident within the NZDF, including the Army’s experimental networking system (TANE), operational experience, and the experiences of New Zealand’s key partners.

The broad breakdown by Capability Set of the \$106 million is shown below. These ratios may change as the Tranche evolves.

Tranche One Capability Sets	NEA Reference	Capital Cost (NZ\$M)
Integration, testing, training, and evaluation	Programme Services	17.4
Mobile satellite terminals, routers, and servers	CUBS	26.5
Headquarters equipment and full network software	CCPOE	5.0
Mobile Tactical Radios	MTCS	46.8
Special Forces electronic warfare refresh	NZSOF EW	3.5
Contingency	Contingency	6.8
Total		106.0

Note: contingency is held within the appropriation baseline and not subject to drawdown approvals.

CAPABILITY INTEGRATION

Schedule of Capability Integration

By early 2017 Special Forces Electronic Warfare capabilities had completed introduction into service and achieved directed operating capability.

	Initial Forecast	30 June 2022 (Forecast/Actual)	Variance (months)
Special Forces Electronic Warfare Introduction into Service complete	June 2015	May 2016 (Actual)	11
Special Forces Electronic Warfare achieve directed operating capability	September 2015	February 2017 (Actual)	17

The delay in achieving the Special Forces Electronic Warfare capability related to a delay in the delivery of two sub-capabilities, however this was reported as having limited impact. The introduction into service was reported as delivering a significant enhancement to the Special Forces' capability.

Description of Capability Integration Phase

With the complexity of workstreams and multiple elements being acquired in NEA Tranche One alone, and this tranche being part of an incrementally introduced programme, an overarching Capability Integration Approach had been developed for the NEA Programme.

In July 2021 NEA transitioned to a Defence led programme under the Ministry of Defence and the remaining C4 Project workstreams – CUBS, CCPOE and MTCS – established as three separate projects.

They remain funded under the appropriations approved by Government under the Tranche One and Two funding decisions in 2015 and 2019.

Updated forecast capability delivery dates have been proposed but at 30 June were yet to be approved by the appropriate governance group.

The equipment and systems being acquired need to be integrated within the Programme to deliver specific capabilities as well as new capability from other projects; and legacy systems and platforms. So capability integration for NEA will not be a single one off process.

Status of the Capability Integration Plan

Within the Capability Integration Approach, plans have been developed for integrating the new capability into service, with a range of acceptance testing and evaluation activities having been completed (eg Exercise FOXHOUND in the second half of 2021) and plans for the operational testing and evaluation to be developed across the work streams.

OPERATIONAL CAPABILITY

Progress towards Delivery of Capability and Operational Requirements

Operational Requirements	Requirement likely to be met	Explanation
--------------------------	------------------------------	-------------

Common Universal Bearer Systems wide-band satellite communications Interim Operational Capability	Yes	Delivery of strategic and ruggedised communication access nodes
Common Universal Bearer Systems wide-band satellite communications Final Operational Capability	Yes	
Mobile Tactical Command Systems Interim Operational Capability	Yes	Includes delivery of core radios, peripherals and ancillaries, developments of their network and physical integration (mounted and dismounted), including other niche radio systems.
Full benefits realisation is forecast to be achieved in 2026.		

DURING THE 2021/22 YEAR

Over the course of the year, Acceptance, Testing & Evaluation (AT&E) activities continued including preparations for testing new network field servers. AT&E was completed for core radios and network bearers.

The move to the COVID-19 Response Alert Level 4 in August 2021 created some disruptions for the project, with specialists unable to travel to help with systems integration ahead of some testing activities however planning for completion of activities continued.

International shipping pressures also delayed delivery of some equipment.

The project also was working to have two capabilities considered by the Defence Landworthiness Board for one type of radio, and for the Common Command Post Operating Environment.

A key milestone for the Programme was the completion, at the end of 2021, of Exercise FOXHOUND at Burnham Military Camp. Acceptance Testing and Evaluation (AT&E) was achieved for components of the network ahead of Operational Test and Evaluation.

This was followed in mid-March 2022 by Exercise FOXHOUND 2 – also at Burnham – during which the Network Enabled Army Programme supported the New Zealand Army in operational testing and evaluation of systems and equipment, such as radios, using battle

management software. This took place during the follow-up Exercise FOXHOUND 2, conducted in the Burnham Military Training Area in mid-March 2022.

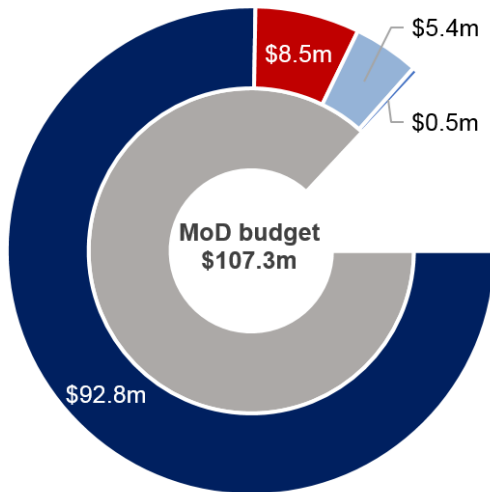
DEVELOPMENTS POST 30 JUNE 2022

Work has been continuing across the workstreams to deliver the capability.

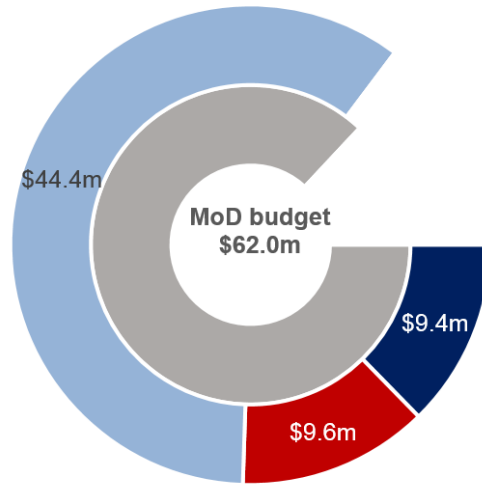
NEA C4 PROJECT BUDGET AND EXPENDITURE

NEA C4

Project costs for Tranche One



Project costs for Tranche Two



- Spend in prior years
- 2021/22 spend
- Forecast Ministry spend
- Ministry budget
- Net foreign exchange allowance

As at 30 June 2022 expected NEA C4 project costs were:

Tranche One funding

	Ministry	NZDF	Consolidated project	
	\$000	\$000	\$000	
Budget	Current approved project budget	107,253	-	107,253
	Allowance for foreign exchange movements	1,253	-	1,253
	Original approved project budget	106,000	-	106,000
Forecast	Forecast total project cost	106,750	-	106,750
	Effect of foreign exchange movements	750	-	750
	Forecast cost using hedged rate	106,000	-	106,000
	Forecast project underspend	-	-	-

Tranche Two funding

	Ministry	NZDF	Consolidated project	
	\$000	\$000	\$000	
Budget	Current approved project budget	62,022	-	62,022
	Allowance for foreign exchange movements	-	-	-
	Original approved project budget	62,022	-	62,022
Forecast	Forecast total project cost	63,402	-	63,402
	Effect of foreign exchange movements	1,526	-	1,526
	Forecast cost using hedged rate	61,876	-	61,876
	Forecast project underspend	146	-	146

NETWORK ENABLED ARMY ISR – RECONNAISSANCE AND SURVEILLANCE

Following the approval of the Reconnaissance and Surveillance Systems business case in 2021, Defence has gone to the market seeking capabilities as part of the NEA Programme’s ISR²⁶ project.

The Purpose of this Project

Reconnaissance and surveillance capabilities enable the collection of information that can be processed into intelligence and used to support decision-making by the New Zealand Army.

The NEA Programme’s Tranche Two Single Stage Business Case in 2019 included the case for investment in R&S capability, with the decision to release funding to be made by the Minister of Defence. Following approval of the subsequent Project Implementation Business Case in 2021, the project was able to proceed to the delivery phase

This project is delivering reconnaissance and surveillance (R&S) collection capabilities; unmanned aircraft and remotely piloted systems, along with remote ground sensors and associated through-life support, including maintenance, technical and operational support, upgrades and training.

Capability Requirements

Tranche One funding has been laying the foundations for the Network Enabled Army,

²⁶ Intelligence, Surveillance and Reconnaissance

through investment in such systems as the communications network that is supporting the Army’s operational capability.

Under Tranche Two, available networked capability is being extended with the addition of complementary sensor systems, and intelligence gathering and processing capabilities. Under the R&S project, unmanned aerial and remotely piloted systems are being acquired, along with ground sensors.

Aerial systems are in use already within the NZDF, and this project is delivering new equipment to a range of force elements (ie company, platoon, regiment). In May 2022 the project sought proposals from industry in relation to a range of systems:

- Fixed wing (or hybrid) unmanned aircraft system (UAS)
- Nano remotely piloted aircraft system (RPAS)
- Micro RPAS, and
- Remote ground sensors.

These types of systems improve the ability to undertake reconnaissance and obtain timely and accurate information on local conditions when they are not otherwise available. The ability to see what is happening on the ground is an important tool to ensure accurate assessment of the risks of a situation, particularly useful in humanitarian and disaster relief response and search and rescue situations.

Capability Definition Phase

Capability and operational requirements

Prior to seeking release of the funding for this project in 2021, the investment rationale defined under the wider NEA Programme was revisited and reaffirmed.

User requirements for R&S capability were identified and refined as part of the definition phase,

Users would need to have the ability to operate effectively, competently and legally in an authorised environment. Along with this, users would need the ability to collect information,

supported by both infrastructure and logistical support, and to analyse, manage and use the information. A combination of equipment and personnel is key to ensuring these high level requirements could be achieved.

R&S capabilities are fast moving and dynamic areas of technology with new equipment and systems being introduced continuously. The aim of the procurement process is to identify proven systems, that have demonstrated effectiveness with partner nations, and that demonstrate they are likely to deliver solutions.

With the need to identify providers who could back up any claims for what they and their systems could deliver, information was developed for the market as part of the Request for Proposal documentation, saying suppliers would:

- have to demonstrate that both the capacity and capability to deliver and provide support, from design through to disposal
- have proven experience of delivering to military customers
- have the ability to deliver the equipment and associated training, and deliver ongoing maintenance and support
- where required, integrate the equipment they supply into the NEA C4 environment
- where conducting integration activities – including hardware, software and data – potentially need to be able to access, and handle and operate, items governed by the United States International Traffic in Arms Regulations (ITAR), and specifically United States Controlled Cryptographic Items (US CCI), or equivalent. Proposals should demonstrate the Respondent's ability to be granted all authorisations, permissions or certifications to allow access to ITAR controlled and US CCI items, or equivalent.

With the large volume of options available through the market, Ministry of Defence criteria for preferred solutions were applied to help ensure any capability meets user requirements, and reduce and manage project risk. These include:

- Any capability should be non-development; existing and proven technology. New/leading edge systems may be unproven and come with associated costs for development, testing and certification.
- Interoperability of the new capabilities with other Government agencies and security partners is a key consideration, and solutions that are in service with partners and allies would ensure commonality of systems, training and support. As with other projects – such as the delivery of the P-8A Poseidon fleet – an established user community is recognised as providing opportunities to leverage industry support and technological upgrade programmes. Interoperability would include the ability of any providers and maintainers of these capabilities to work with ITAR and USCCI requirements.
- Any solution should be able to be integrated with the systems being delivered by the NEA Programme, and should have broad utility; designed to be quickly and easily reconfigured to meet a number of roles. A proven track record, over an extended period of time, and guaranteed supply lines and logistical support also form part of the key criteria.

There are general military requirements, such as the need for equipment to be rugged and versatile as R&S systems will function in multiple conditions, be transported to wherever they are needed, and will be required to function on the move in both tactical and operational vehicles. All components need to be easily transited through both commercial and military air movements.

Appropriate technology is needed to address military environmental requirements (eg heat, dust, shocks, etc.). This includes appropriate "life of type" – how long the equipment is expected to operate before it should be replaced – and replacement periods, along with maintenance and support plans.

Equipment and systems need to be "power-agnostic" as well; able to operate on DC and AC

power sources and optimised for efficient power consumption.

Military equipment like this may also need to comply with standards, rules and requirements while in use, these include Civil Aviation Rules, the New Zealand Information Security Manual published by the GCSB, and NATO standards relating to imagery format and standards.

Alongside this, any capability needs to be acceptable to coalition partners, multi-nation civilian personnel from host nations and other government agencies, and be able to be operated by users across a range of security classifications.

How Defence considered through-life costs

Assumptions in relation to whole of life costs were made using costing models that considered elements from acquisition to through-life support. Information was sought from respondents to the Request for Proposals in relation to options and costs for through-life support of capability. At the time of writing, the procurement process is still underway.

Acquisition phase

In November 2021 the Minister of Defence, Hon. Peeni Henare approved the Project Implementation Business Case (PIBC). This enabled the draw down of capital funding²⁷ to introduce new deployable capability to the Army and its specialist training schools.

Schedule/Timeframe Progress

	Initial Forecast (November 2021)	30 June 2022 (Forecast/Actual)	Variance (months)
Interim Operational Release	Q4 2023	Q4 2023 (Forecast)	N/A
Operational Release	Q4 2025	Q4 2025 (Forecast)	N/A

History of Cost Estimates in the Capability Definition phase

Costs for the R&S component of the NEA Programme were considered under the Tranche Two Single Stage Business Case.

Indicative costs for R&S were determined through a process of selecting 'reference systems' – ones that have been used by the NZ Army, and ones raised in responses to an open market Request for Information conducted in September 2019. Several sets of systems (ie UAS and/or RPAS and ground sensors and associated equipment) were selected and costed to assess and provide an indicated of how much capability could be delivered within the available funding.

²⁷ Cabinet approved the Tranche Two Single Stage Business Case for the NEA Programme in July 2019. This included funds to deliver the Reconnaissance and Surveillance capability once the PIBC was approved.

NEA ISR R&S Capability Integration

As part of the RFP process, respondents were asked to provide details on how they would conduct the integration process in relation to the capabilities they were proposing,

It was not a pre-condition or requirement for a proposal to be considered, with the intention of workshops being held for shortlisted respondents.

It is intended to help identify an effective solution for the new R&S capabilities, including who would be responsible for conducting the integration process with the NEA communication network and Battle Management System.

During the 2021/22 Year

Following approval of the Project Implementation Business Case (PIBC) at the end of November 2021, the project prepared a Request for Proposals for release to the market seeking the Reconnaissance and Surveillance capability.

The RFP, which was released at the end of May 2022 sought capabilities that had been divided into four equipment packages.

- Fixed wing (or hybrid) unmanned aircraft system (UAS)
- Nano remotely piloted aircraft system
- Micro remotely piloted aircraft system, and
- Remote ground sensors.

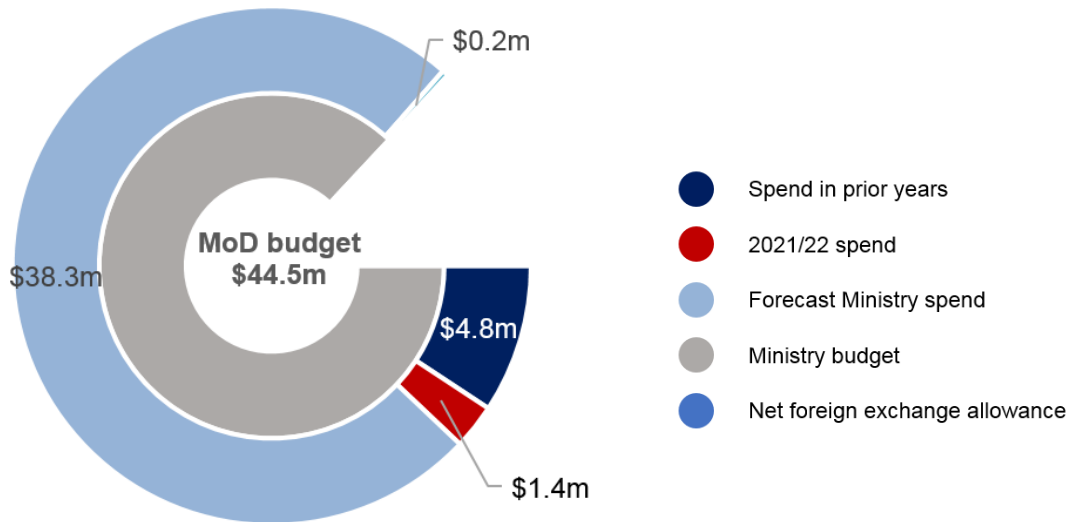
Associated through-life support is also being sought, including operator, instructor and maintenance training plans.

Developments post 30 June 2022

The RFP closed at the end of July and the evaluation process commenced.

Shortlisting was completed in September, and is being followed by evaluation demonstrations and integration workshops, further review and due diligence phases, with the full evaluation process expected to run through to the first quarter of 2023.

NEA ISR Project Budget and Expenditure



As at 30 June 2022 expected NEA ISR project costs were:

		Ministry	NZDF	Consolidated project
		\$000	\$000	\$000
Budget	Current approved project budget	44,459	-	44,459
	Allowance for foreign exchange movements	-	-	-
	Original approved project budget	44,459	-	44,459
Forecast	Forecast total project cost	44,566	-	44,566
	Effect of foreign exchange movements	198	-	198
	Forecast cost using hedged rate	44,368	-	44,368
	Forecast project underspend	91	-	91

NH90 SIMULATOR

This project was set up to increase the availability and sustainability of NH90 aircraft and crews for operational tasking by procuring a simulator, which has been installed at RNZAF Base Ohakea and has been delivering pilot training since October 2020.

THE PURPOSE OF THIS PROJECT

This is the second project related to the delivery of the NH90 medium utility helicopter capability. The original project, which focused on the fleet acquisition, featured in the first seven editions of the *Major Projects Report*. The 2016 edition of the Report stated that all nine NH90 helicopters²⁸ had been delivered and that RNZAF-managed flying operations had been underway since February 2012.

The NH90 fleet replaced the Iroquois as the Air Force's major rotary wing aircraft capability, and provides logistical support, including troop transport and sustainment. It is capable of carrying far bigger loads, further and faster than the previous fleet.

However, the level of capability available to government from this fleet is limited by the number of NH90 pilots the NZDF can train and sustain. Training has been provided through a combination of NH90 flight hours in New Zealand, and the use of NH90 simulators in Germany and Australia. Simulators are used for training for situations that cannot be performed

²⁸ Included one NH90 that was acquired and broken down to form the majority of the spares and logistics package.

safely on the actual helicopter, such as engine failures, and to work through complex tactical scenarios. However, this training approach was recognised as not capable of generating and sustaining sufficient pilots to meet the level of capability required by government.

With no simulator available in New Zealand, crews and instructors had to travel overseas for this training, leaving a reduced number of pilots available to operate the aircraft. Having to train pilots extensively overseas also results in extra costs.

Increased simulation-based training is the most effective way of generating and sustaining sufficient pilots. Acquisition of a simulator to meet training needs has been included in Defence Capital Plans since 2009, however, NH90 simulators had not matured to the point where there was a competitive simulator market available. The emphasis was placed on completing NH90 development, getting support arrangements in place, and getting the fleet into service. With NH90 development completed, simulators are now commercially viable.

Three investment objectives were identified for this project:

- Ensure the Defence Force can produce and sustain a sufficient number of helicopter pilots capable of operating the NH90 to meet required outputs.
- Increase NH90 medium utility helicopter availability for NZDF operations and government agency tasks.
- Ensure NH90 simulator-based pilot training is resource efficient in terms of both crew availability and cost.

CAPABILITY REQUIREMENTS

RNZAF No. 3 Squadron operates eight NH90 helicopters at Ohakea, with an overall planned output of 2,667 aircraft flying hours per year. It provides for:

- Three aircraft, available continuously for domestic tasks and training, including national contingencies.

- Three aircraft available for deployment overseas.
- An additional two aircraft, which covers the fleet for scheduled or unscheduled maintenance.

This allows helicopters to be rotated through maintenance, and sustain the ongoing commitment of up to six aircraft at any given time. Missions include search and rescue, support for Police and counter-terrorism, Government transport, evacuation, disaster relief, and operational support for military tasks including supporting partners. Two helicopters are always available at short notice to support urgent tasks in New Zealand.

When the Squadron gets to full strength, it is planned to have 12 crews. Sustaining this number of crews requires 29 qualified NH90 pilots, but achieving and sustaining that number requires a different approach to training. Greater and easier access to simulation is needed.

The NZDF had a number of over-arching requirements for the NH90 Simulator:

- A solution in place by 2019.
- A minimum of 1500 hours of simulator use per year over 25 years.
- The simulator provider to have all necessary agreements with NATO Helicopter Industries, allowing for the simulator configuration to be updated to remain comparable with the New Zealand NH90 aircraft as it is modified over time.
- The simulator to be European Aviation Safety Agency certified to a minimum of CS-FSTD(H) Flight Training Device Level 3, with documentation delivered that is required for the NZDF to award a Permit To Operate.
- A simulator that replicates the New Zealand version of the NH90 helicopter closely.
- An assessment of the training activities that can be conducted on the simulator in order to gain training credits.
- The simulator contractor to conduct logistics support activities in accordance with a

framework acceptable to the NZDF Airworthiness Authority.

- The simulation of a variety of training components, including emergency scenarios.

NH90 SIMULATOR BETTER BUSINESS CASE MILESTONES

2016	
2 February	Project Charter approved by Secretary of Defence, and Chief of Defence Force.
2017	
10 July	Cabinet approval to issue a tender and delegate financial approval to Joint Ministers (Finance and Defence)
2018	
25 July	Approval to Commit to Contract by Joint Ministers (Finance and Defence)

CAPABILITY DEFINITION PHASE

How Defence identified and assessed capability requirements

In late 2016 the project worked with key stakeholders to gain a better understanding of investment drivers and the need to invest in change. Through an Investment Logic Mapping exercise, it was determined that changes to the simulation-based training regime were required.

By the end of that year a wide range of options had been generated and a long list of in-scope options developed under five dimensions.

- Scale: what levels of coverage are possible?
- Location: Where can services be provided?
- Ownership: How can government acquire services?
- Service solution: How can services be provided?
- Funding: How can services be funded?

The long-list options in each of the dimensions were assessed against critical success factors, and a short-list developed. The following options were carried forward:

- **Option 0: Status quo.** NH90 pilots continue to travel to Europe and Australia to conduct the minimum required of simulation-based training.
- **Option 1: Increased use of Australian simulators.** NH90 pilots continue to travel to Europe for simulation-based conversion training, but qualified NH90 pilots conduct increased simulation-based training in Australia.
- **Option 2: Purchase of a New Zealand-based simulator.** NH90 pilots conduct the maximum amount of simulation-based training in a Defence purchased simulator located at Base Ohakea.
- **Option 3: Lease of a New Zealand-based simulator.** NH90 pilots conduct the maximum amount of simulation-based training in a simulator leased by Defence located at Base Ohakea.

How Defence analysed the requirements options in the Capability Definition phase

The ability of each short-list option to meet the project's goals was assessed. The major benefits assessed were the abilities to:

- enable Defence to raise and sustain 29 pilots for 12 NH90 crews
- increase the NH90 flying hours available for tasking
- have NH90 pilots available at Base Ohakea for tasking
- maximise instructor availability at Base Ohakea.

Each short-listed option was assessed as to whether it met the desired investment objective, then compared to whole-of-life-cost.

How Defence considered interoperability

Interoperability of the simulator with other aircraft and tactical simulators was considered and assessed in the tender, however was not a key consideration of this project. Integration of the simulator with the current NH90 helicopter mission planning system was a key outcome of the project.

How Defence considered through-life costs and issues

Payment to the supplier would be made in instalments, as milestones around production, testing, acceptance and delivery were achieved. The main change to operating expenditure would be adoption of a through life support agreement with CAE New Zealand, an additional expense offset by an annual saving in costs related to overseas simulator use.

REQUIREMENTS ANALYSIS IN THE CAPABILITY DEFINITION PHASE

	Option 0: Status quo	Option 1: Increased overseas simulation	Option 2: Purchase NZ simulation	Option 3: Leased NZ simulation
Total Pilot Training Whole of Life Cost (NPV) (NZ\$M)	577.5	444.6	317.2	330.3
Increases NH90 availability	X	O	O	O
Produces sufficient NH90 pilots	X	X	O	O
Resource efficient	X	X	O	O
Conclusion	Eliminate	Eliminate	Preferred	Not Preferred

Option 2 'procure a New Zealand based simulator' was preferred as it meets all investment objectives at the best value for money of the short-list options. Option 2:

- enables Defence to sustain 29 NH90 pilots, allowing for a sustained international deployment of NH90 aircraft while concurrently maintaining the ability to respond to contingencies in New Zealand.
- is resource efficient as it increases the actual availability of NH90 pilots, particularly instructors, at Ohakea by eliminating the need to travel abroad frequently to access simulators.
- releases aircraft hours for performing tasks through increased use of simulation-based training.

While Option 3 also offers similar benefits as Option 2, it does so at a higher whole of life cost, and is therefore not the preferred option.

Description of the Capability Requirements

Capability Requirements necessary to support policy objectives include:

- Increase NH90 medium helicopter availability for NZDF operations and Government agency tasks
- Ensure the Defence Force can produce and sustain a sufficient number of helicopter pilots capable of operating the NH90 to meet required outputs
- Ensure NH90 simulator-based pilot training is resource efficient in terms of both crew availability and cost.

Schedule of Capability Definition Phase

Dates	Duration	Note
Feb 2016		Project Charter
Feb 2016 – July 2017	17 months	NH90 Sim Project Charter to SSBC (approval to issue request for tender)
July 2017 – July 2018	12 months	Request for tender to approval of PIBC (approval to commit to contract)

History of Cost Estimates in the Capability Definition Phase

Date	2017	2018
Costs (million)	42.4	42.7
Explanation	The Single Stage Business Case in 2017 estimated the cost of the project at \$42.4M (including \$4M project contingency and \$4.4M FX contingency).	

Estimates of Acceptance Date made in the Capability Definition Phase

The Single Stage Business Case estimated the Operational Release (Acceptance) of the simulator as Q1 of 2020.

ACQUISITION PHASE

Description of acquisition work

In July 2017 Cabinet gave approval to issue a tender. The procurement strategy was to hold an open competitive tender for the provision of an NH90 pilot training simulator under a purchase contract.

How Defence decided to acquire the Capability Solution

A Request for Tender was issued on the Government Electronic Tenders Service (GETS) on 19 July 2017. Participants were provided with

tender documents, including a draft procurement contract prepared by Defence.

Five tenders were received by the September 2017 deadline. All proposed a newly built simulator.

The tender evaluation was conducted in three phases in October 2017:

- overall check that each tender was compliant with the request for tender
- detailed evaluation of each tender
- comparison and ranking of tenders.

Four of five tenders were found to be compliant with the basic tender requirements and were carried forward to phase two.

In Phase two, specialist working groups scored each tender against requirements on technical and logistics aspects, and commercial risk. These scores were weighted and combined to give an overall weighted non-financial score.

In Phase three, the Tender Evaluation Management Group reviewed the specialist working group assessments and compared tenders to provide a value for money recommendation. Three tenders were subsequently down selected for additional due diligence information gathering.

Due diligence visits were conducted during November 2017, based on questions and additional information requirements raised during the second and third phases. The information received from the due diligence visits was the basis to making a final recommendation to the Defence Acquisition Review Board which approved the project team's recommendation of the Canadian-based company CAE as preferred tenderer, and directed that initial negotiations commence in January 2018.

Prime contractor	CAE, Montreal, Canada
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SCHEDULE/TIMEFRAME PROGRESS

	Original forecast at Approval to Commit	30 June 2022 (Forecast/Actual)	Variation (months)
Contract signed	August 2018	July 2018 (Actual)	-1
Completion of Detailed Design Review	April 2019	December 2018 (Actual)	-4
Handover to Test	May 2019	March 2019 (Actual)	-2
Handover to Integration	June 2019	May 2019 (Actual)	-1
Completion of In-House Acceptance Testing	November 2019	February 2020 (Actual)	3
Facility Readiness ²⁹	November 2019	November 2019 (Actual)	0
Completion of In-Field Testing	June 2020	October 2020 (Actual)	4
Ready for Training (Operational Release)	July 2020	March 2022 (Not achieved)	20 ³⁰

Initial schedule estimates were made at the time the Project Implementation Business Case was submitted, with dates firmed up as much as possible at the time the contract was awarded, prior to completion of preliminary and detailed designs. Achievement of Operational Release (OR) was delayed due to international travel restrictions arising from COVID-19. To achieve OR, Defence had to achieve formal qualification of the flight training device, which required an international supplier to travel to New Zealand. This certification took place in May 2022. At 30 June, progression to OR was dependent on the RNZAF issuing the Installation Operating Permit.

History of variations to schedule at 30 June 2022

Date of individual variation	Variation length (months)	Explanation
February 2020	3	Completion of In-House Acceptance Testing (IHAT): was completed three months after the initial estimated date following notification by CAE that the simulator was not ready to commence testing in Canada. IHAT was completed in February 2020 rather than November 2019 as estimated.

²⁹ A new building to house the NH90 simulator was a project deliverable.

³⁰ At 30 June 2022 OR had not been achieved and the variation was 23 months.

May 2020	2 (actual 4)	Completion of In-Field Testing: The simulator was shipped to New Zealand for installation, arriving in May 2020. Travel restrictions in place due to COVID-19 prevented CAE's installation team from travelling to New Zealand. In May 2020 it was noted the planned completion date of June 2020 was not going to be met and August 2020 was forecast as the earliest likely date. Defence personnel, local CAE staff and a virtual team of offshore CAE staff completed the installation process in July 2020, and completion of in-field testing took place in October 2020.
August 2020	20	Operational Release: The Minister of Defence approved a change to the baseline date of Operational Release from June 2020 to May 2021. This was due to the impact of COVID-19. OR could not be achieved until the new flight training device had been formally qualified, which needed to be done by an independent company based in Australia. This was completed in May 2022, following the removal of some international travel restrictions.

NH90 SIMULATOR CAPABILITY INTEGRATION PHASE

Description of Capability Integration Phase

A Capability Integration Plan (CIP) was approved in June 2019 and was developed to identify and schedule the tasks and activities, including the qualification processes required to bring the NH90 Simulator into operational service. It records the process that will see the NH90 Simulator transition from the delivery phase to being in-service.

Schedule of Capability Integration

	Initial Estimate	30 June 2022 Forecast/Actual	Variance (months)
Initial Operational Release	May 2020	No longer applicable	-
Operational Release	July 2020	Q4 2022 (Forecast)	28
Full Benefits Realisation	2028	2029 (Forecast)	12

In the 2019 and 2020 editions of the Major Project Report, forecast Initial Operational Release (IOR) dates were included as at 30 June of those years. In 2019 the project was forecasting May 2020 for IOR. The 2020 edition was forecasting delays in completion of In-House Acceptance Testing, which led to the IOR date being forecast as July 2020, a two month variance. COVID-19 impacted the project's schedule and ability to get specialist personnel into New Zealand. The need to commence interim training was identified by the NZDF to ensure that 3 Squadron could maintain aircrew proficiency and complete qualifications. Following a review and endorsement of a risk assessment, the device was to be used in an interim configuration for specific training. IOR will not be sought.

In August 2020 the Minister of Defence approved a change to the baseline date of Operational Release (OR) from June 2020 to May 2021, due to the impact of COVID-19. This revised date was not met as OR could not be achieved until the new flight training device was formally qualified by an independent Australia-based company. This was completed on May 2022, when New Zealand's borders opened. The change in the expected full benefits realisation date reflects the impact of COVID-19.

NH90 SIMULATOR OPERATIONAL CAPABILITY

Progress towards Delivery of Operational Requirements as at 30 June 2022

Note: these are subject to change as the project progresses and solutions are implemented.

Operational Requirements	Requirement likely to be met	Comment
<ul style="list-style-type: none"> NH90 flight training device High fidelity training system qualified (as a minimum) as an EASA CS-FSTD(H) level 3 device with Level D Visual Display system. 	Yes	Contracted with CAE
<ul style="list-style-type: none"> Separate On board and off Board Instructor operating Stations 	Yes	Contracted with CAE
<ul style="list-style-type: none"> Mission Planning System 	Yes	Contracted with Airbus Helicopter
<ul style="list-style-type: none"> Tactical Scenario Generating System 	Yes	Contracted with CAE
<ul style="list-style-type: none"> Initial operating and maintenance/support training 	Yes	Contracted with CAE
<ul style="list-style-type: none"> Delivery of a facility to house, operate and support the simulator at RNZAF Base Ohakea 	Yes	Build completed

Operational Requirements	Requirement likely to be met	Comment
<ul style="list-style-type: none"> NH90 Flight Training Device logistics support agreement (supporting the capability throughout its service life) 	Yes	Contracted with CAE
Benefits realisation is scheduled for full implementation by October 2029.		

DURING THE 2021/22 YEAR

In July, CAE had completed work on the simulator and the Defence Team began the final In Field Acceptance Testing, completing it in August ahead of an independent qualification audit that had been anticipated to take place that month.

However, COVID-19 related travel restrictions in both New South Wales and New Zealand meant the audit process was unable to proceed.

In August, New Zealand went into Alert Level 4 status. The simulator remained available for training activities however, with previously agreed Level 4 procedures in place, including cleaning protocols if 3 Squadron needed to train.

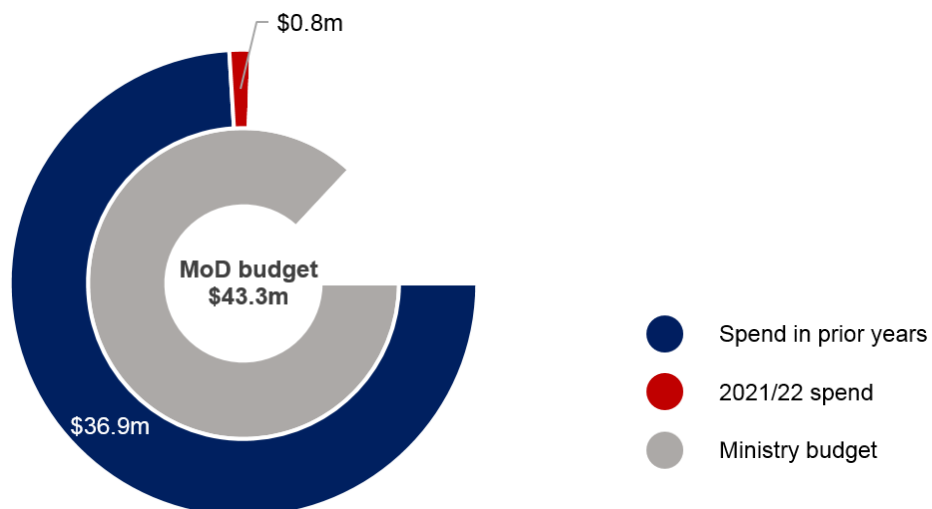
The NH90 simulator remained available, providing interim training capability for pilots, through the rest of 2021 and into 2022.

Following an ease in travel restrictions, the final testing and qualification process was completed successfully on 6 May 2022.

DEVELOPMENTS POST 30 JUNE 2022

Operational Release for the NH90 Simulator capability was approved on 30 January 2023.

NH90 SIMULATOR PROJECT BUDGET AND EXPENDITURE



At 30 June 2022 expected NH90 Flight Simulator project costs were:

	Ministry \$000	NZDF \$000	Consolidated project \$000	
Budget	Current approved project budget	43,344	-	43,344
	Allowance for foreign exchange movements	608	-	608
	Original approved project budget	42,736	-	42,736
Forecast	Forecast total project cost	37,653	-	37,653
	Effect of foreign exchange movements	538	-	538
	Forecast cost using hedged rate	37,115	-	37,115
	Forecast project underspend	5,621	-	5,621

OPERATIONAL AND REGULATORY AVIATION COMPLIANCE SUSTAINMENT

The primary objective of this series of projects is to deliver platform-based capabilities that sustain effective, safe and secure air operations in response to a changing technological and regulatory aviation environment.

THE PURPOSE OF THESE PROJECTS

The Operational and Regulatory Aviation Compliance Sustainment (ORACS) Projects are equipping New Zealand Defence Force aircraft fleets with updated communication, navigation, air traffic management and identification systems. These must be updated due to a changing global aviation environment, new regulations and technological upgrades that improve safety and security. Without this work being completed NZDF aircraft will be unable to sustain effective, safe and secure air operations in the future.

ORACS is being carried out in two phases, ensuring that investment decisions are fully informed and best placed to meet compliance requirements.

Phase One is delivering Automatic Dependant Surveillance-Broadcast (ADS-B Out) to meet changing civil aviation regulations. Phase Two will address Performance-Based Navigation and secure communications systems updates.

This phased approach was approved by the Government in April 2019 under the initial business case. Funding to commence the first phase was approved, enabling the update of

civil air traffic management systems to get underway for a range of NZDF aircraft fleets. The project is referred to in this report as Phase 1(a). These upgrades were prioritised for delivery due to the fast approaching compliance date.

The upgrade of the NH90 helicopter fleet was excluded from the 2019 business case as a solution could not be confirmed and investment-quality information was not available at the time. In May 2020, a separate business case for the NH90 work was approved, meaning that ORACS Phase One could be delivered across fleets. This project is referred to in this report as Phase 1(b).

Phase 2(a) is also underway, following approval by Cabinet in December 2021 to commence delivering secure communication systems updates.

CAPABILITY REQUIREMENTS

The ORACS high level user requirements are:

1. Communications, navigation and surveillance capabilities that enable safe, efficient, compliant and unrestricted flying operations in civil controlled airspace, in order to deploy NZDF capability globally in support of New Zealand government policy objectives.
2. Communications, navigation and surveillance capabilities that enable safe, efficient, compliant and unrestricted military exercise and operational flying in order to deploy NZDF capability globally in support of New Zealand government policy objectives.
3. Communications capabilities that enable NZDF aircraft to securely receive and disseminate information with NZDF, Coalition and Other Government Agencies, in order to exercise and operate with defence partners in support of NZ government policy objectives.
4. Communications, navigation and surveillance capabilities that achieve the directed States of Readiness for operations, in order to meet anticipated flying

requirements for the Government of New Zealand.

5. The ability to sustain communications, navigation and surveillance capabilities for NZDF aircraft fleets, in order to meet anticipated flying requirements for the Government of New Zealand.

The overarching user requirements for ORACS include:

- Compliance with all appropriate operational and technical standards
- Proven non-developmental low risk solutions
- Economy of operation and ownership
- Autonomy and freedom from operational restrictions imposed by third parties.

In addition, ADS-B Out solutions must comply with the equipage requirements of the regions/states the affected platform is likely to operate within, based on the relevant Concept of Employment and Statement of Operating Intent.

ORACS BETTER BUSINESS CASE MILESTONES

2019	
15 April	Cabinet approval of ORACS Single Stage Business Case CAB-19-MIN-0171
2020	
2 June	Cabinet approval of Project Implementation Business Case for Phase One: NH90 CAB-20-MIN-0251
2021	
20 December	Cabinet approval of Single Stage Business Case for phase 2a CAB-21-MIN-0550

CAPABILITY DEFINITION PHASE

How Defence identified and assessed capability and operational requirements

Civil air traffic management

Air traffic management in controlled airspace is moving to a new technology called Automatic Dependant Surveillance – Broadcast (ADS-B) Out. This requires aircraft to continuously broadcast their GPS position, identity and status information, allowing ground controllers to track the aircraft more precisely and efficiently than current RADAR systems. ADS-B Out therefore results in more efficient air traffic management which means better flight times, lower fuel usage and less environmental impact. For ADS-B Out to be effective, all aircraft must have this system installed and operational. As a result, many aviation authorities around the world are requiring all aircraft have ADS-B Out capability to fly in their controlled airspace.

In New Zealand, the deadline was 31 December 2018 for flights above flight level 245 and 31 December 2021 for controlled airspace. In December 2020 the Minister of Transport extended the deadline for all aircraft flying in controlled airspace to be equipped with ADSB-Out to 31 December 2022.

Because the change has been driven by compliance regulations and the need to remain current with technologies, the possible options and the ways in which they were assessed were largely dictated by these changes. Therefore, the range of variables that would typically be considered was significantly decreased.

For example, ADS-B Out and military communications equipment effectively become a permanent and integral part of the aircraft so, realistically, the ownership should be the same as the aircraft in which it is installed (i.e. if the aircraft is owned, the specific compliance equipment should also be owned, as it is not feasible to de-link from the aircraft in the future).

Similarly, it is best installed and maintained through the same support arrangements as the rest of the aircraft.

The key variables when assessing the long list options therefore become scale and timing:

Variable	Description	Options within each variable
Scale	What capability systems should be provided by the project?	ADS-B Out and/or military communications and/or Secure Communications and/or Performance Based Navigation
Timing	When should capabilities be delivered?	Immediate priority or do later

Both of these variables were looked at fleet-by-fleet, and assessed against the critical success factors, which are: strategic fit, value, supplier capacity, affordability, achievability.

From the Long List Options Assessment, the following short-list options were identified for further investigation:

Option 0: Status quo. Platforms continue to use current systems, with no action taken to address regulatory mandates or issues of obsolescence.

Option 1: Immediate priorities only, now. The immediate priorities for each platform are acted on as soon as possible, but the remaining capabilities are not addressed.

Option 2: Immediate priorities now, other priorities phased. The immediate priorities for each platform are acted on as soon as possible, and the remaining capabilities still deemed priorities for each platform are addressed at a later stage with a separate business case.

Preferred Option

'Option 0: status quo' was eliminated as it did not meet the critical success factors or the project's intended benefits/investment objectives.

Option 0:

- Did not enable NZDF to maintain the ability to conduct air operations such as aircrew training and whole of Government support in civil airspace. As such, Defence would be unable to deliver key outcomes to government.
- Did not enable NZDF to maintain the ability to conduct air operations in military airspace such as movement of people and assets to support Government outputs.

Option 1: Immediate priorities only, now: was also eliminated. As with Option 0, it did not meet some of the critical success factors and only met one of the two key investment objectives.

Option 1:

- Did not enable NZDF to maintain the ability to conduct air operations in military airspace with secure communications.
- Did not enable NZDF to maintain the ability to conduct air operations in civil airspace with sufficient navigation systems.

Option 2: Immediate priorities now, other priorities phased: was the preferred option, as it met all investment objectives at the best value for money of the short-list options. Option 2:

- Enables NZDF to maintain the ability to conduct air operations in civil airspace.
- Enables NZDF to maintain the ability to conduct air operations in military airspace.

How Defence analysed the requirements options in the Capability Definition phase

In general, there are two ways to achieve upgraded solutions: off-the-shelf or custom design. An off-the-shelf solution will generally be the lower risk option; however, they often rely on the aircraft to be of a common configuration. As most of the NZDF's aircraft are bespoke they fall outside this category and require a custom design.

Alongside the fleet wide commonalities such as airworthiness certification by the RNZAF, there are three somewhat distinct elements to be considered when forming the procurement strategy:

- Selecting and acquiring the hardware.

- Design, integration and installation onto the first of each aircraft type and support of the airworthiness certification of the capability.
- Subsequent remaining fleet installation.

For work done under Phase One, for example – in some fleets – in order to match existing equipment, the hardware to be fitted to the aircraft will be a combination of an updated version of the current transponders and corresponding equipment that offers ADS-B Out capability. Direct sourcing this hardware is appropriate as there is no reasonable technical alternative and therefore no viable competition, removing the requirement to openly advertise a tender.

Some fleets have in-house RNZAF engineering services design, integrate, install the first prototype and complete the airworthiness certification of the systems. This lessens the complexity, risk and schedule – reducing overall cost.

For other fleets, the avionics software system is both bespoke and highly integrated. The systems are supported by Through Life Support contracts with industry, who will be further contracted to design, integrate, and work with NZDF who will manage the installation of the prototype and complete the airworthiness certification of the systems. Therefore although the system IP is owned by NZDF, a competitive approach to market seeking an alternative supplier would be difficult if not impossible.

How Defence considered interoperability

A key assumption of the ORACS project is that the New Zealand Government wishes to align NZDF capabilities, from an interoperability perspective, with those of Australia, the US Department of Defense, CANZUS, and NATO member states.

This will sustain effective, safe and secure air operations, and maintain interoperability with partners.

How Defence considered through-life costs and issues

The estimated whole of life costs were based on maintained ability to conduct air operations in civil and military airspace.

- As per the accounting standards reflected in Defence Force Order 77, standard avionics equipment depreciation will be assessed at 15 years.
- Cost estimates for the Phase One work stream were based on price estimates gathered from multiple suppliers, including defence industry, which were received during 2017 and 2018.
- Estimation of capability integration, project management costs and personnel costs was based on the project team's estimates of activities, duration, capability, and resource requirements.
- Forecast operating expenditure covers the estimated useful life of the respective capital investments and includes through life operating costs for repairs and maintenance.
- Costs have been converted into New Zealand dollars based on: The Treasury's New Zealand Debt Management forward exchange rate profiles for the Australian dollar, the Euro, and US dollars that were also being used for Defence Capital Plan Refresh 2019.
- Costs were inflated using Defence White Paper 2016 inflation rates.

ACQUISITION PHASE

Description of Phase 1(a) and (b) acquisition work

On 15 April 2019 Cabinet confirmed GOV-19-MIN-0014 which authorised the Secretary of Defence to commit and approve expenditure up to the amount of \$56.832 million for Phase One systems, for most NZDF aircraft fleets.

That 2019 decision did not include upgrade of the NH90 helicopter fleet, as further work was required to confirm a solution.

On 28 May 2020, the Cabinet Government Administration and Expenditure Review Committee approved the ORACS NH90 Phase One Project Implementation Business Case, with \$21.05 million funded from the NZDF's depreciation reserves.

How Defence decided to acquire the Capability Solution

In order to match existing equipment, the hardware to be fitted to most of the aircraft was direct sourced as a combination of updated versions of the current transponders and corresponding equipment. To install the equipment to the aircraft, existing maintenance and logistics support agreements were utilised.

For the T-6C fleet, for example, the solution offered by Textron Aviation Defense was a proven ADS-B solution providing the best balance between the least risk and best value for money. Therefore, a direct source to Textron as the supplier for all elements of the procurement; hardware, design, integration and installation went ahead.

Contracts (at 30 June 2022)

A range of contracts and service level agreements are in place for delivery of ORACS, including:

Fleet	Prime Contactor
T-6C	Textron Aviation Defense
A109	Flight Structures Ltd,
NH90	Nato Helicopter Industries

Service Level Agreements are in place for the B757, C-130 and SH-2G.

Phase 2(a)

The ORACS Project is limited in competitive tendering **options** as it is providing upgrades to existing aircraft fleets, **each of which** each have existing Through Life Support arrangements.

Although these arrangements are different for each fleet, they involve commercial organisations holding intellectual property rights for aircraft software and hardware. Open procurement activities would expose the Government to intellectual property and integration risk. Consequently, commercial activities undertaken for Phase 2a will be sole source through existing through life support contracts.

SCHEDULE/TIMEFRAME PROGRESS

	Original forecast at Approval to Commit	30 June 2022 Forecast/Achieved	Variation (months)
Operational Release (all fleets excluding NH90)	June 2022	March 2023	9
NH90 Helicopter	March 2025	March 2025	-

Overall delays to OR for Phase 1(a) stemmed from a range of issues including alignment with maintenance servicing plans, and delays in delivery of simulator upgrades. For example, the A109 upgrades were programmed to take place during phase checks, which were rescheduled due to lower hours having been flown in 2021 as a consequence of COVID-19.

ORACS CAPABILITY INTEGRATION PHASE

Description of Capability Integration Phase

Following the first of type installation and certification of the ORACS systems, the installation for each aircraft will be actioned as they are scheduled for either a group or phase

maintenance activity – unless an early deployment or commitment dictates otherwise.

Once each entire fleet's platforms have completed the installation and flight test required for certification then that fleet will be submitted for Operational Release.

ORACS OPERATIONAL CAPABILITY

Progress towards Delivery of Operational Requirements as at 30 June 2022

Note: these are subject to change as the project progresses and solutions are implemented.

Operational Requirements	Requirement likely to be met
Improved capabilities that sustain safe, efficient, compliant and unrestricted flying operations in civil controlled airspace, in order to deploy NZDF capability globally in support of NZ government policy objectives.	Yes. Both globally and in New Zealand, NZDF aircraft fly in civil controlled airspace alongside other air traffic. To safely carry out their tasks in this airspace, the aircraft must be equipped with the appropriate systems which must comply with regulations and remain in-step with modern technologies. Modifications on all affected fleets are either underway or are planned.
Improved capabilities that sustain safe, efficient, compliant and unrestricted military exercise and operational flying in order to deploy NZDF capability globally in support of NZ government policy objectives.	Yes. Systems are implemented.
Benefits scheduled for Phase 1 (both a and b) fleets is 2027. Phase 2(a) stated project benefits remained achievable on time as planned.	

DURING THE 2021/22 YEAR

The Phase 1A rollout of ADS-B Out progressed across aircraft types, and testing verification continued to gain civilian certification.

At 30 June the Boeing 757, C-130(H) Hercules, Seasprite SH-2G(I), Texan T-6C rollout had been completed. Final ADS-B Out work on the A109 helicopter fleet was progressing – following the test flight of the first A109 modified with the design solution, and the project was reporting that all aircraft would be completed in 2022.

Simulator updates also progressed to ensure training experiences align with the aircraft experience. By the end of June, the T-6C upgrade had been tested successfully, and the Seasprite simulator was continuing. The A109

helicopter simulator upgrade was ready to commence.

For Phase 1B, the contract for the upgrade of the NH90 helicopter fleet was signed by all global users of the helicopters in September 2021, but at 30 June the embodiment solution had not been confirmed.

During the year, the business case for Phase 2(a) communications was finalised and submitted for Cabinet consideration. The project was approved in December 2021 and work had commenced.

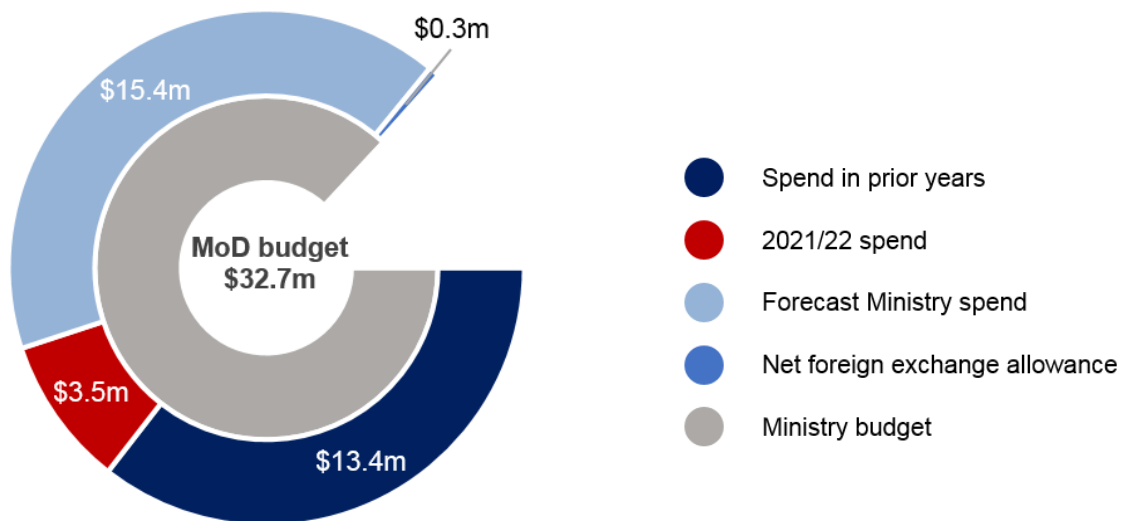
DEVELOPMENTS POST 30 JUNE 2022

The project continued to report that Phase 1(a) fleets would meet ADS-B Out requirements by

the regulatory date. The A109 fleet is expected to be ready for Operational Release (OR) before the end of 2022, however a delay in delivery of the A109 simulator upgrade means OR for that capability is expected to be achieved at a later date.

In relation to Phase 1(b), the project has indicated it will seek to re-baseline the schedule in 2023, once the embodiment dates have been received by New Zealand and other partner nations from NHI and NAHEMA.

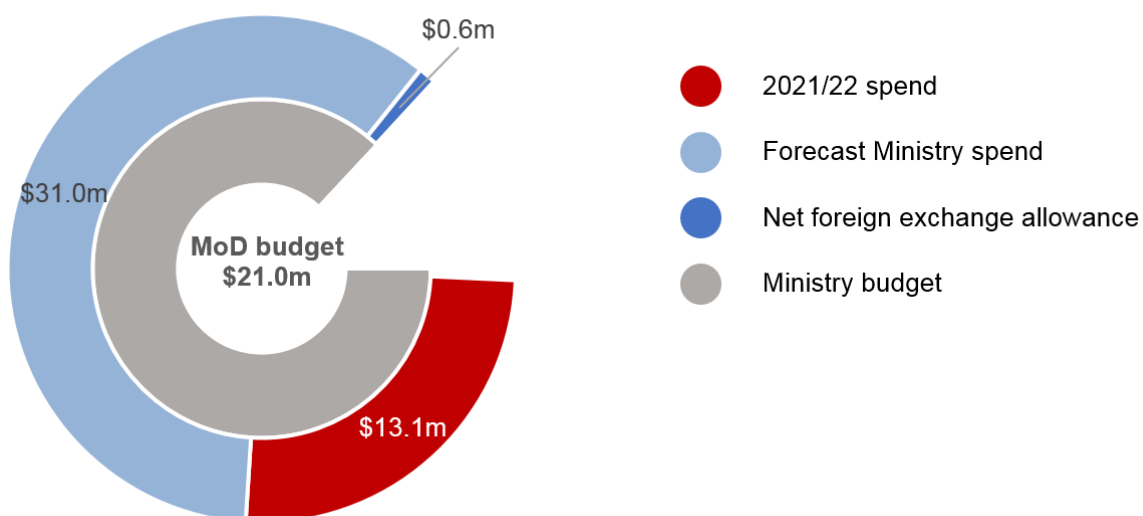
ORACS PHASE ONE (A) PROJECT BUDGET AND EXPENDITURE



At 30 June 2022 expected ORACS: Phase One (A) project costs were:

		Ministry	NZDF	Consolidated project
		\$000	\$000	\$000
Budget	Current approved project budget	32,732	-	32,732
	Allowance for foreign exchange movements	-	-	-
	Original approved project budget	32,732	-	32,732
Forecast	Forecast total project cost	32,349	-	32,349
	Effect of foreign exchange movements	(258)	-	(258)
	Forecast cost using hedged rate	32,607	-	32,607
	Forecast project underspend	125	-	125

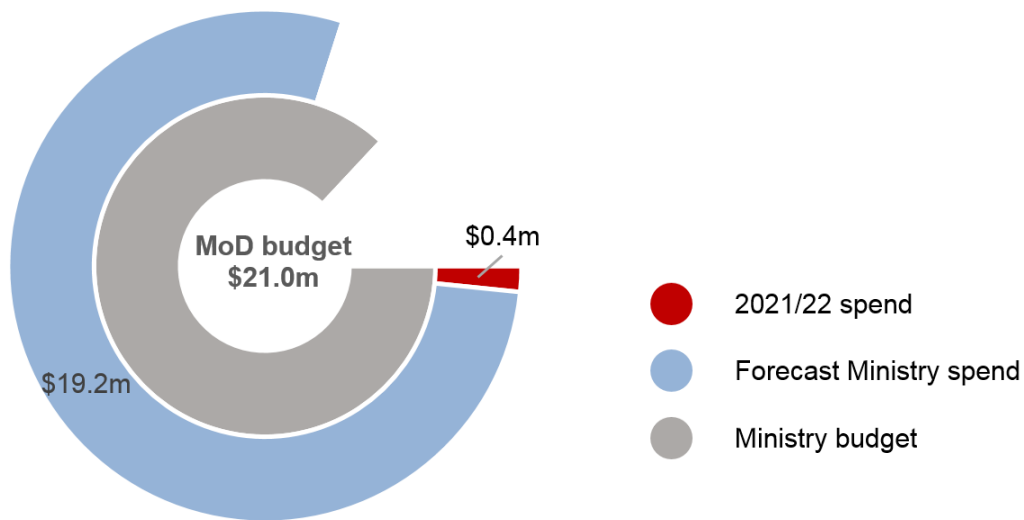
ORACS PHASE ONE (B) PROJECT BUDGET AND EXPENDITURE



At 30 June 2022 expected ORACS: Phase One (B) project costs were:

	Ministry \$000	NZDF \$000	Consolidated project \$000	
Budget	Current approved project budget	45,150	-	45,150
	Allowance for foreign exchange movements	-	-	-
	Original approved project budget	45,150	-	45,150
Forecast	Forecast total project cost	44,520	-	44,520
	Effect of foreign exchange movements	(578)	-	(578)
	Forecast cost using hedged rate	45,098	-	45,098
	Forecast project underspend	52	-	52

ORACS PHASE TWO (A) PROJECT BUDGET AND EXPENDITURE



At 30 June 2022 expected ORACS: Phase Two (A) project costs were:

		Ministry	NZDF	Consolidated project
		\$000	\$000	\$000
Budget	Current approved project budget	19,588	-	19,588
	Allowance for foreign exchange movements	-	-	-
	Original approved project budget	19,588	-	19,588
Forecast	Forecast total project cost	19,619	-	19,619
	Effect of foreign exchange movements	1,013	-	1,013
	Forecast cost using hedged rate	18,606	-	18,606
	Forecast project underspend	982	-	982

PROTECTED VEHICLE - MEDIUM

Significant parts of the New Zealand Army's operational vehicle fleet are being replaced or upgraded over the next decade under the Protected Mobility Capability Project. The armoured Pinzgauer fleet has reached its end of life and is being replaced by a fleet of NZ5.5 Bushmasters.

New Zealand's service men and women undertake a range of missions, from population protection and support, through to pro-active peacekeeping, and they do so in a range of environments.

To undertake missions, it is a priority that people can be transported quickly and safely using vehicles that provide appropriate protection. A range of vehicles are used to provide this protected mobility that is essential to operational capability. The range varies from lightweight and highly mobile vehicles, to the armoured LAV combat vehicles.

The need for these vehicles is demonstrated through their use over the past two decades, from providing support following earthquakes and other natural events in New Zealand and our region of the Pacific, to providing backup to the New Zealand Police in high risk situations, through to population protection and peacekeeping missions around the world.

The Protected Mobility Capability Project (PMCP) is replacing Defence's main operational

land vehicle fleets – both armoured and non-armoured.

PMCP is split into two phases. The first phase is focused on the highest priorities; procurement of the Protected Vehicle - Medium (PV-M), and the High Mobility Vehicle - Light (HMV-L)³¹ and was the focus of the Detailed Business Case approved by Cabinet in April 2019.

That DBC focused on phase one of the Project – replacing the Pinzgauer and operational Unimog vehicles.

Phase two is the upgrade or replacement of the LAV and was not included in the scope of the DBC for Phase One.

THE PURPOSE OF THE PV-M PROJECT

The Protected Vehicle – Medium project is replacing the armoured Pinzgauers with the Australian manufactured Thales Bushmaster, which has seen extensive operational service with the Australian Defence Force and other militaries, including New Zealand. The Ministry of Defence acquired Bushmasters under the Special Operations Vehicles Project³², for use by our own Special Operations Forces.

A contract was signed on 4 September 2020 by the Secretary of Defence with Thales Australia Limited to deliver 43 Bushmasters NZ5.5 (PV-Medium), along with spares, ancillaries, and a training package. The NZ5.5 configuration is an improved build specification for New Zealand, incorporating improvements based on experience and to meet future requirements of the ADF and others.

³¹ This workstream of the PMCP project has delivered highly mobile, lightweight vehicles that can be easily deployed and operated in rugged terrain. It was assessed as a low risk project and so is not included in detail within the *Major Projects Report*.

³² The Special Operations Vehicles project was included in *Major Projects Report* editions for the years ended 30 June 2017 and 2018.

Five variants of the Bushmaster NZ5.5 will be delivered: Troop Carrier, Command and Control, Ambulance, Logistic Support and Maintenance Support. The vehicles and spares will be delivered in tranches throughout 2022.

Overview of PMCP

The first phase of PMCP is expected to run until 2024/25, with fleets being introduced using a staggered delivery model. The timeframe will allow for refinement and balancing of numbers of vehicles across the categories based on experience.

The second phase will make recommendations on whether to upgrade or replace the LAV as the Army's primary combat vehicle, and is expected to run from 2024/25.

The five investment objectives for PMCP overall (of which PV-M procurement is a subset) are summarised below:

- The Defence Force has a strategically mobile and tactically agile Protected Mobility Capability
- The Defence Force has a Protected Mobility Capability with survivability relevant to contemporary and emerging threats
- The Defence Force has a Protected Mobility Capability that enables the ability to defeat adversaries
- The Defence Force's Protected Mobility Capability enables interoperability with partner nations
- Risks posed by the age and technical obsolescence in the existing Protected Mobility Capability are mitigated.

CAPABILITY REQUIREMENTS

A number of requirements were identified as necessary to support the policy objectives of the PMCP. These include:

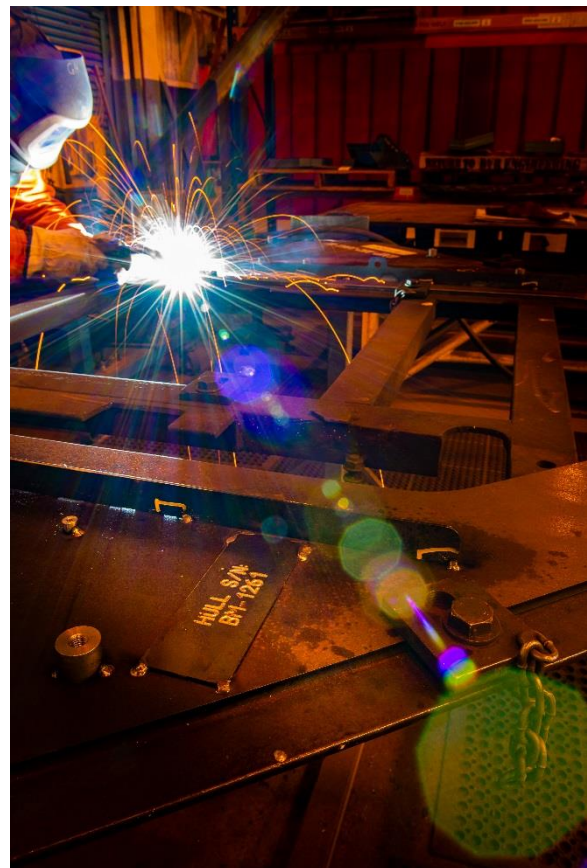
Strategically mobile and tactically agile capability: able to operate in a range of environments, improving the ability to offer the range of military response options required by Government.

Enables the ability to defeat adversaries: through the vehicles themselves and their ability to position and support soldiers.

Interoperability: ensuring common platforms and parts are used by at least one of our major partners.

Improved survivability: with survivability relevant to contemporary and emerging threats, the ability to defeat adversaries.

Improved reliability: with contemporary levels of maintenance, support and operational capability, thereby improving overall reliability.



Above: fabrication of the Bushmaster NZ5.5. (Supplied)

BETTER BUSINESS CASE MILESTONES

2015	
8 December	Project Charter approved by the Secretary of Defence and Chief of Defence Force
2017	
20 March	Indicative Business Case was considered and Cabinet agreed that replacement with new vehicles and a range of vehicles for a flexible capability would best deliver the required benefits. CAB-17-MIN-0098
2019	
15 April	Detailed Business Case (Phase 1): Cabinet authorised the Secretary of Defence to acquire High Mobility Utility Light vehicles ³³ and negotiate for up to 43 Protected Vehicle Mediums. CAB-19-MIN-0171
2020	
22 June	Project Implementation Business Case (PV-M): Cabinet approved the procurement of PV-M and authorised the Secretary of Defence to sign a contract with Thales Australia for the procurement of 43 Bushmaster armoured vehicles. ³⁴ CAB-20-MIN-0296

³³ In addition to trials and risk reduction work to support future Protected Mobility procurements.

³⁴ In addition to training systems, other support equipment, infrastructure and other components.

CAPABILITY DEFINITION PHASE

How Defence identified and assessed operational requirements

In addition to the capability requirements, the following general key user requirements were developed for PMCP. Each category of vehicle will have its own set of specific high level user requirements that is relevant to the vehicle type. For the PV-M:

Communicate with Defined Force Elements: the user shall be able to communicate with NZDF tactical and operational networks.

Defined levels of Situational Awareness: visual, aural, electro-optic and infrared sensors to be considered.

Defined Standards of Protection: will have defined standards of protection based on the North Atlantic Treaty Organization Standardised Agreements 4569.

Fully Compliant: must be fully compliant with legislation, regulations and standards, and be able to be designated “NZDF Armoured Vehicle” if appropriate.

Safe: the Protected Mobility vehicle must be as safe as far as is reasonably practicable, ensuring it is both safe to drive and operate.

Strategic Mobility: the Protected Mobility Vehicle must be able to achieve defined operational strategic mobility, and consideration must be given to interoperability with Royal New Zealand Navy and Royal New Zealand Air Force movement/transport elements. Amphibious employment factors will also be considered.

Operational Mobility: the Protected Mobility Vehicle must be able to achieve defined operational mobility.

Tactical Mobility: The Protected Mobility Vehicle must be able to achieve defined tactical mobility in the medium – high range. In-service military bridging and tactical and operational recovery are also essential.

Integrated Training Solution: trades affected by Protected Mobility Vehicle will be identified to analyse, design and develop fit for purpose, best

practice-blended learning systems for each trade and vehicle type.

Defined Tasks: the Protected Mobility Vehicle must be able to deliver defined tasks eg across command and control, personnel and stores transport, logistic, engineering and evacuation roles.

Firepower: the Protected Mobility Vehicle must be able to deliver defined and scalable levels of firepower.

Interoperability: the Protected Mobility Vehicle must be able to achieve defined levels of interoperability.

Sub-System Integration: the Protected Mobility Vehicle must be able to achieve defined standards of sub-system integration.

Integrated Logistic Support: a costed integrated logistic support solution must be delivered to ensure minimal additional burden will be placed on current NZDF Integrated Logistic Support resources.

How Defence analysed the requirements options in the Capability Definition phase

Specific high level user requirements for the PV-M were considered including requirements for both weight and volume.

Following a Request for Information process, Defence had briefings and presentations from suppliers. A wide variety of PV-M vehicles is offered by different manufacturers, however many of these vehicles were not considered suitable for New Zealand as they were unproven, built to different standards, and did not meet our basic requirements for capacity, protection and performance. Candidate vehicles were assessed against the approved high level user requirements (which set out functional standards) and the project principles that were set out in earlier business cases and are summarised below:

- Non developmental
- Interoperable
- Broad utility
- Proven track record

- Maintenance and support arrangements.

The PV-M vehicles that met the criteria were:

- Thales Bushmaster
- KMW Dingo 2HD
- General Dynamics European Land Systems (GDL) Eagle 6x6.

These vehicles had similar technical specification and performance, but when assessed against the project's Critical Success Factors of strategic fit, market capability, affordability, efficiency, and achievability, the Thales Bushmaster emerged as the most suitable PV-M for New Zealand.

The Bushmaster had been in widespread service with Australia for many years, and a small fleet had entered service in New Zealand with the Special Operations Forces (NZSOF). At the time, it has been exposed to well over 50 blast events – without a fatality. It was a very successful vehicle in service and had saved lives.

By contrast, neither the Dingo nor Eagle 6x6 had seen operational service. Their actual state of development, technology maturity and performance was not as well understood as Bushmaster. This added a small risk element, although both manufacturers have good reputations.

Using the same vehicle as Australia means that personnel from both countries know how each other's vehicles operate and what their advantages and limitations are. Support can potentially be shared. Australian experience can be leveraged, and the work Australia is doing on the integration of ancillaries and future potential upgrades (which are an inevitable feature of modern equipment) can be utilised. The vehicle manufacturer is regionally close to New Zealand.

How Defence considered interoperability

Interoperability is a major consideration for PMCP and a critical factor in considering options for the PV-M procurement. While New Zealand does have the capacity to operate alone, in general we operate alongside partners on

operational deployments. Vehicles – as with other capability – that are the same or similar to those used by our partners ensures that supply and support chains can be leveraged, and support personnel can more easily work on different partners’ equipment. In the case of vehicles, it also means that the characteristics and capabilities of the vehicles are better understood, personnel will have a more in-depth understanding of how to use them, and basic tasks can be simplified.

How Defence considered through-life costs and issues

In order to maintain the PV-M throughout its life, planning is in place to manage obsolescence and required upgrades. A through-life support contract will ensure support for the management of obsolescence.

Schedule of Capability Definition Phase

Dates	Duration	Note
8 December 2015 to 22 June 2020	55 months	Approval of Project Charter to approval of PV-M Implementation Business Case by Cabinet.

ACQUISITION PHASE

How Defence decided to acquire the Capability Solution

Under the Government’s procurement rules at the time (specifically Rule 12.3m), military and essential security interests can be considered for an ‘opt-out procurement’, and therefore Defence could proceed with a preferred vehicle solution. In practice, there was a contestable supply for Bushmaster:

- new build direct from Thales
- refurbished, from Thales
- used refurbished, with vehicles purchased from the Australian Defence Force.

These options were tested against the Critical Success Factors of strategic fit, market

capability, affordability, efficiency and achievability.

Critical Success Factor	New build	Refurbished
Strategic fit	Meets	Meets with risk
Market capacity and capability	Meets	Meets with risk
Affordability	Meets	Partially meets
Efficiency	Meets	Meets with risk
Achievability	Meets	Partially meets

Whole of life costs were calculated for both new and refurbished vehicles, with a 30 year future life comparison used for both options. Acquiring new vehicles incurs a high initial cost, but the need to refurbish, alter and upgrade the used vehicles meant the whole of life cost of new vehicles would be lower.

Along with this, the new build has improved features that were considered a better fit for New Zealand’s current and future needs, there was less risk with the new build, and overall awareness of the work required was known in advance. The new vehicle option was considered to be more efficient in both operation and support.

It was determined that procuring newly built Bushmasters was the best option. Thales proposed a variation (NZ5.5) of the earlier configuration of the vehicle, which would include a range of new specifications:

- up to 2.5 tonne additional payload
- anti-lock braking system
- no spare wheel, which improves the shape of the armoured hull (the use of run-flat tyres means a spare is not needed on the vehicle
- side doors in the front of the vehicles, which improves flexibility for interior layout and improves escape paths

- larger rear door allowing faster access and egress, and the ability to carry bulkier cargo
- the ability to incorporate new technology electronic wiring/computing systems, to better support equipment, such as that being delivered by the Network Enabled Army Programme
- and minor difference between each of the five variants of the NZ5.5 Bushmaster that are being delivered to New Zealand, and which can be incorporated on the production line.

On 22 June 2020, Cabinet authorised the Secretary of Defence to sign a contract with Thales Australia for the procurement of 43 Bushmaster armoured vehicles, training systems, other support equipment, and goods and services as required. The contract was entered into on 4 September 2020.

Contract Status (as at 30 June 2022):

Prime contractor	Thales (Australia)
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SCHEDULE/TIMEFRAME PROGRESS

	Estimate at Approval to Commit	30 June 2022 forecast/achieved	Variation (months)
Vehicle delivery commences	Late-2022	Late 2022 (Forecast)	N/A

PV-M CAPABILITY INTEGRATION PHASE

Description of Capability Integration Phase

The Capability Integration Plan (CIP) for the PV-M was approved in December 2019. The plan was developed as a living document to ensure the full benefits of the vehicle’s capabilities are realised by the NZDF.

The plan identifies the major areas of planning and coordination that are required to deliver all elements of the capability, such as the Operational Test and Evaluation process, ensuring operational release takes place as needed and appropriate. Examples of areas of focus within the CIP include:

Infrastructure: use of existing infrastructure and construction of new facilities are considered in infrastructure planning.

Training: ensuring that initial individual training can begin once the first vehicles are accepted and the project has a clear directive to plan any collective training activities to align with existing scheduled exercises as much as possible. The plan includes the design of vehicle operator, instructor and maintainer modules.

Landworthiness: PV-M will be introduced using the NZDF’s landworthiness process which ensures vehicles are safe to operate and capable of delivering the defined effects.

Schedule of Capability Integration

	Estimate at Approval to Commit	30 June 2022 (Forecast/Actual)	Variance (months)
Interim Operational Release commences	July 2023	July 2024	12
Operational Release commences	September 2024	September 2025	12
The Benefits Realisation Schedule forecasting delivery PV-M benefits by December 2024 was to be updated once any schedule revisions were confirmed.			

DURING THE 2021/22 YEAR

Part of this project is confirmation of the design for the five variants of the Bushmaster that are being acquired. In working with the manufacturer, Thales (Australia), Defence will ensure the vehicles can integrate New Zealand's modern military equipment, and fit the requirements that have been identified through the project. This work began in the 2020/21 financial year.³⁵

The five variants are Troop, Command and Control, Logistics, Maintenance, and Ambulances, with the Troop variant the first to undergo the design review process.

By October 2021, as design work for the other types of vehicles continued, the first troop vehicle hulls were being assembled. This continued into 2022, and – while Thales was reporting that delivery of components to the assembly line was impacted by international shipping delays – the initial vehicle was ready for testing to commence in the first quarter of 2022.

The testing programme continued through the second quarter.

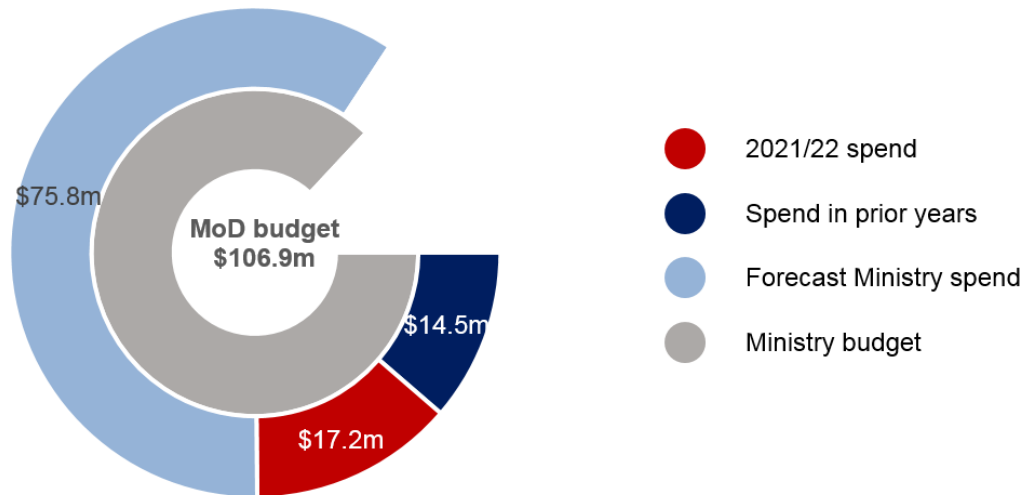
DEVELOPMENTS POST 30 JUNE 2022

Technical issues identified during the year were rectified and an agreement reached that the initial delivery of the Bushmaster fleet will take place in the second quarter of 2023. The full fleet is scheduled to be delivered during the year.

³⁵ See the [Major Projects Report 2021](#) (link to Ministry of Defence site)

PV-M PROJECT BUDGET AND EXPENDITURE

Protected Mobility Capability: Medium (Bushmaster NZ5.5)



At 30 June 2022 expected project costs were:

		Ministry	NZDF	Consolidated project
		\$000	\$000	\$000
Budget	Current approved project budget	106,873	-	106,873
	Allowance for foreign exchange movements	-	-	-
	Original approved project budget	106,873	-	106,873
Forecast	Forecast total project cost	107,556	-	107,556
	Effect of foreign exchange movements	2,384	-	2,384
	Forecast cost using hedged rate	105,172	-	105,172
	Forecast project underspend	1,701	-	1,701

EXPLANATION OF TERMS

BETTER BUSINESS CASES:

Project Charter: Defence project initiation is guided by the Defence White Paper 2010 and the 2011 Defence Capability Plan. Projects commence following notification to the Minister of Defence and approval of a project charter by the Capability Management Board.

Approval of Indicative Business Case (IBC): Attained when Cabinet agrees to the strategic context for an investment and agrees to progress a short list of capability options to the Detailed Business Case stage.

Approval of Detailed Business Case (DBC): Attained when Cabinet agrees to a refined capability requirement and authorises Defence to commence formal engagement with industry (through a request for proposal or request for tender) on a preferred capability option.

Approval of Project implementation Business Case (PIBC): Attained when Cabinet agrees that Defence can conclude a contract based on the preferred supplier, the negotiated services, the maximum funding level and the arrangement to manage the project and the ongoing delivery of services.

GOVERNMENT APPROVAL MILESTONES

Project Initiation: Occurs once a capability requirement has been identified by Defence and a broad assessment of the options for meeting the capability requirement has been authorised by the Chief Executives and noted by the Minister of Defence.

Approval to Initiate: Attained when Cabinet agrees to the project's inclusion on the capital acquisition plan and authorise Defence to engage with industry to refine its initial assessment with more accurate information.

Approval to Commence: Attained when Cabinet agrees to the refined capability requirement and authorises the Ministry of

Defence to commence a formal tender and tender evaluation process.

Approval to Negotiate: Attained when Cabinet agrees to the selection of a preferred tender, specifies funding limits, and authorises the Ministry of Defence to enter into contract negotiations.

Approval to Commit: Attained when Cabinet agrees to the final contract and authorises the Ministry of Defence to sign the contract and commit funding.

PROJECT PHASES

The capability definition phase: During the capability definition phase, capability and operational requirements are assessed and refined. Stakeholder needs are considered. Scenarios may be used to identify requirements. Hypothetical options which include a rough order of costs are used to analyse affordability and evaluate requirements. A capability requirement is a description of the ability needed to achieve the policy objective. An operational requirement is a description of a component of what is required to complete a task. Options analysis in the capability definition phase is used as a tool to compare, assess, and evaluate capability and operational requirements. Options analysis in the acquisition stage identifies the best procurement solution to deliver the capabilities required.

The acquisition phase: procures the capability solution. Deeper analysis of requirements and options may be required once defence industry is engaged. Included in this stage are processes for tendering, contract negotiation and acceptance of what will be delivered.

The capability integration phase: develops the force elements required to generate NZDF outputs at a specific level of capability. Part of this stage is the operational test and evaluation process, which demonstrates the capability has met specific standards of safety and is operationally effective in accordance with the suite of operational concept documentation.

COMMONLY USED TERMS

- **Capability:** in the Defence Capability Management System this refers to not only equipment, but also the people who operate it, their training, technical systems, and management and support structures. These components make up the PRICIE construct which is used by Defence to determine the fundamental inputs to capability. (See below.)
- **Capability Integration Plans:** Capability Integration Plans (CIP) are single cohesive plans that pull together all of the planning and activities that need to be undertaken by the project, the owners of the capability and those who are working with Defence to ensure the capability is integrated. These groups work from and contribute to this plan and each CIP is a living document that is updated regularly.
- **Integrated Project Team:** A team comprised of personnel from both the Ministry of Defence and NZDF, with professional project specialists and subject matter experts. It is led by a dedicated resource (IPT leader). The team is based on the project's requirements at any given point in the life cycle to define, develop and deliver a supportable capability, and is closely aligned to the requirements of the project life cycle.
- **Interim Operational Release/Initial Operational Capability:** the point at which the inherent capability is understood so that it can be most effectively employed on operations.
- **Interoperable:** the ability of military forces to work alongside civil agencies and other nations' militaries through having compatible doctrine, equipment and training, as well as the compatibility of communications and command and control systems.
- **Multi-Criteria Decision Analysis (MCDA):** an analytical method that compares options using weighted benefit, risk and cost criteria. It is used for prioritisation and options analysis, particularly in support of business cases.
- **Operational Release/Full Operational Capability:** the point at which the capability system has proven to be effective, safe and suitable for its intended roles and, in all respects, is ready for operational service.
- **PRICIE:** an acronym for the elements used to determine the fundamental inputs to capability: Personnel; Research and Development; Infrastructure and Organisation; Concepts and Collective Training; Information Technology; Equipment, Logistics and Resources.
- **Request for Information (RFI):** this is a market research tool and does not initiate a procurement process. RFIs are used solicit feedback from industry with respect to subject matter described in an RFI and are not used to select or shortlist suppliers. Respondents information is used to inform Defence of current market information and to help in the continued development of user requirements in respect of Defence's general procurement needs.

OTHER TERMS

- **Rotables:** aircraft parts or components that are able to be rebuilt or overhauled (in-house or by a vendor) and put back in stock to use again. Rotables are basically the opposite of expendable or throw-away parts.