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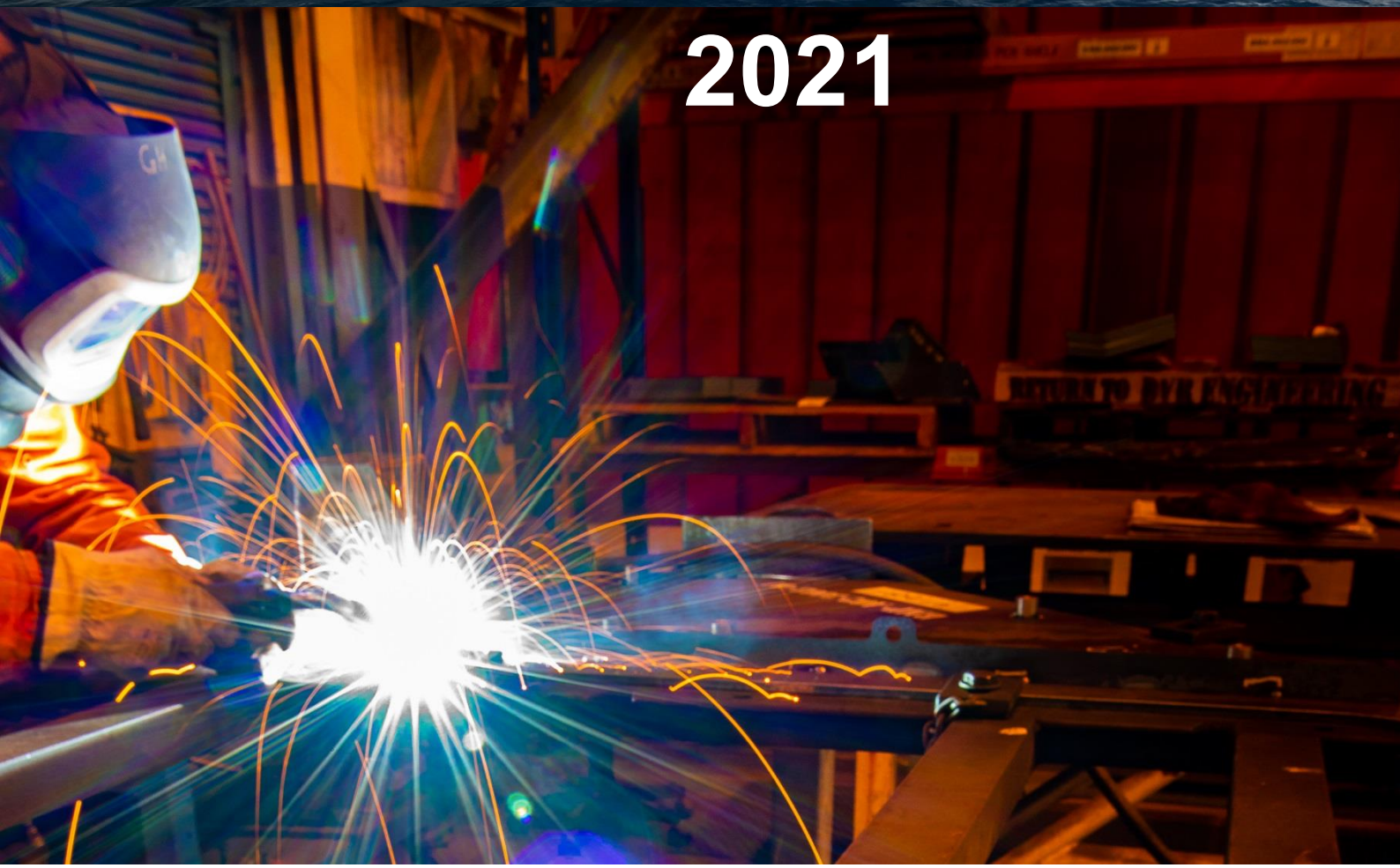
MAJOR PROJECTS REPORT 2021



MANATŪ KAUPAPA WAONGA
NEW ZEALAND MINISTRY OF DEFENCE

Te Kāwanatanga o Aotearoa
New Zealand Government

Front cover: top, from let, HMNZS *Te Kaha* receives supplied through the new Replenishment at Sea capability delivered by HMNZS *Aotearoa*. Bottom, fabrication of the NZ5.5 Bushmasters, which are being delivered under the Protected Mobility Capability Project (supplied).

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.

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PROJECTS INCLUDED IN THE MAJOR PROJECTS REPORT SERIES

Project name	*Editions*
• 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)	2014-2021
• Network Enabled Army C4[1] (NEA T1 or NEA C4)	2015-2021
• Individual Weapons Replacement (IWR)	2016-2018
• Maritime Sustainment Capability (MSC)	2017-2021
• Special Operations Vehicles (SOV)	2017-2018
• Underwater Intelligence, Surveillance and Reconnaissance (UWISR)	2017-2018
• Dive Hydrographic Vessel (DHV)	2019-2021
• NH90 Simulator	2019-2021
• Air Surveillance Maritime Patrol (ASMP)	2019-2021
• Fixed High Frequency Radio Refresh (FHFRR)	2020-2021
• Future Air Mobility Capability – Tactical (FAMC)	2020-2021
• Operational and Regulatory Aviation Compliance Sustainment (ORACS) Phase One	2020-2021
• Protected Vehicle – Medium	2021

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 Major Projects Report (the Report) has been published by the Ministry of Defence since 2010. For over a decade, it has given Parliament, the public, and other stakeholders visibility of how the Ministry is discharging Kaitiakitanga, or stewardship, of the Government's significant investment in military capability.

The focus of the Report is on projects in delivery that have a whole-of-life cost greater than $25 million and are deemed to be medium or high risk. In 2021, one programme and ten projects were assessed as meeting this scale and risk threshold, and are included in this Report. Compared to the 2020 Report, which included nine projects, in this Report Network Enabled Army is captured as a programme and the Protected Vehicle Medium project makes its first appearance. All the projects reported in 2020 remain in delivery and are included here.

The Ministry's performance in managing the Government's investment in military capability is measured against the critical metrics of cost, quality, and schedule. Being successful across all three is always challenging. As noted in this Report, if two metrics hold steady, pressure is often felt on the third. COVID-19 workplace and travel restrictions have added to this challenge.

The metric most impacted by COVID-19 was, and continues to be schedule. The standard terms and conditions in the Ministry's capability contracts allow both Parties to claim an excusable delay for force majeure events, such as a pandemic and/or quarantine restrictions, and to seek relief. Where there is an excusable delay, suppliers can submit a zero cost Contract Change Proposal requesting postponement of an affected contract milestone. If excusable delay relief is provided, the relief is time only and does not result in any additional payment to the supplier or a reduction in quality. That is, cost and quality hold steady.

The schedule impact of COVID-19 on each project is explained in this Report. The projects most impacted were the NH90 Simulator and Dive and Hydrographic Vessel. In both cases, travel and border restrictions, while keeping the country safe, have prevented or delayed our ability to access critical technical support from overseas.

However, where there have been delays, the impact on the New Zealand Defence Force's ability to continue to deliver high quality outcomes for New Zealanders has been limited. This is because the delays have been mitigated, in part, by the use of interim approvals (e.g. NH90 Simulator) and the progressive release of capabilities (e.g. Dive and Hydrographic Vessel).

Despite these challenges, the reporting period of 1 July 2020 to 30 June 2021 has seen good progress made in delivering military capability. Important milestones include, but are not limited to:

- the attendance of the new dive and hydrographic vessel, HMNZS *Manawanui*, at the Rim of the Pacific Exercise in Hawaii in August 2020, as part of the ship's introduction into service;
- entering into contract in September 2020 with Thales Australia Ltd for the acquisition of 43 Bushmaster NZ5.5 protected medium vehicles, along with spares, ancillaries and training;
- the acceptance off contract and the return to Devonport Naval Base of HMNZS *Te Kaha* in December 2020, having completed the industrial and sea

acceptance phases of the ANZAC Frigate Systems Upgrade project; and

- the commencement of the vertical construction works at Ohakea Air Force Base to provide the supporting infrastructure, including new squadron headquarters, for the P-8A Poseidon maritime patrol aircraft.

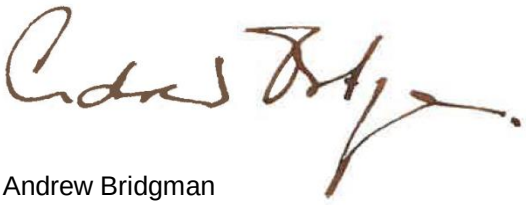
The format of this Report is the same as the 2020 version. The approach adopted in 2020 was to align the Report with the publication of the Ministry of Defence's Annual Report, thereby reducing repetition of information and better streamlining the processes for preparing and reviewing the Report. The latter undertaken by Audit New Zealand.

The changes were made so that the Report could be completed within six months of the end of the financial year to which it relates. Achieving this target in 2020, without any significant loss of detail, was welcomed by members of Parliament's Foreign Affairs, Defence, and Trade Select Committee. I am very pleased that the 2021 Report has also met the six-month target, reinforcing the value of the new approach.

Just over a month after the end of the 2020/21 financial year, we found ourselves, as a nation, having to respond to community transmission of the highly infectious Delta variant of COVID-19. Another nationwide lockdown was implemented, with the people of Auckland particularly hard-hit. It was a reminder that Aotearoa has blended its strong and focused management of the pandemic response with our overwhelming determination as a nation to protect one another. Given our projects involve providers around the world, who have lived every day with the limitations on work and personal lives that we have escaped largely, there is a recognition that sourcing equipment and specialist help will remain challenging.

Against this backdrop, the Government has prioritised delivering on the commitments already made. That is appropriate. Of the $5.4 billion currently under contract with the Ministry for new or upgrade military capability, milestone payments worth around $3.4 billion are still to be earned. Having responsibility for navigating what is a challenging project management environment is something which the Ministry of Defence takes very seriously.

The importance of the Major Projects Report is that it provides the public with an objective measure in which to assess our performance in meeting the challenges of delivery.



Andrew Bridgman
Secretary of Defence
9 December 2021

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 cycle[2] 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 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 2020 to 30 June 2021 can be found on pages 15 and 16.

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 is one new project in this edition of the report, Protected Vehicle - Medium, which is being delivered as part of a wider Protected Mobility Capability Project.

In total, 10 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*.

[2] See the next section, Delivering Defence Capability for more information on the Capability Management System lifecycle.

- Fixed High Frequency Radio Refresh (FHFRR): replacing the NZDF's existing high frequency radio system.
- 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 C4[3] (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.
- 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 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.
- 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.

All nine projects that were included in the Major Projects Report for the year ended 30 June 2020 continue to be in delivery, 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 2019/20 are available on the Ministry of Defence website.
www.defence.govt.nz

[3] C4 is the abbreviation for Command, Control, Communications and Computers.

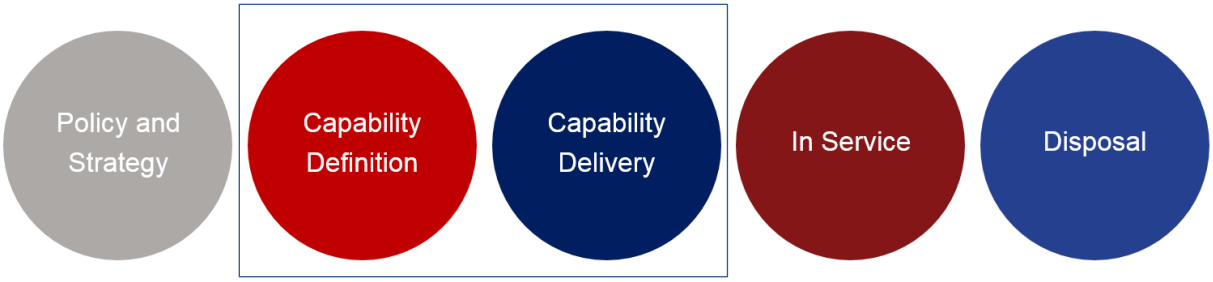
DELIVERING DEFENCE CAPABILITY

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 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 10 projects in this report are being delivered by IPTs:

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

Two projects led by a project lead or acquisition lead; Fixed High Frequency Radio Refresh and NH90 Simulator respectively.

And Network Enabled Army C4, which is managed under a Programme Office that was established during the year.

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.

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

Defence's major projects have been considered in this report across three metrics: schedule, budget and capability. The first Major Projects Report, published in 2010, discussed the difficulty experienced in meeting targets across all three of these performance metrics for the projects in that Report. If two metrics hold steady, pressures may often be felt on the third. Where possible, Defence's preference is to hold steady on cost, through fixed price contracts, and performance. This means schedule may face pressure if contractual timeframes are not met at any point during the project. However, operational consequences may result from this approach, impacting on platform availability, scheduled maintenance, and training, which require careful management and an integrated approach between the Ministry of Defence and the New Zealand Defence Force.

To mitigate this, Defence's objective has been to ensure no schedule slippage occurs through options such as buying capability "off the shelf" and minimising, where possible, the need to undertake configuration changes. This reflects and is consistent with comments that focused on improving Defence's project management, which were made by the Controller and Auditor-General in 2010 – the year in which the first Major Projects Report was published.

For complex projects, "off the shelf" solutions may not be possible, but where a supplier has proven experience in delivering a solution, that experience may help in planning and delivering to the standard sought across all three metrics.

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. Reviews undertaken by Sir Brian Roche KNZM in 2018 and 2019 reinforced this. In the *Review of Defence Procurement Policies and Practices for Major Capability Projects* (2018), it was 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"*.

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 2021

We have carried out an independent assurance engagement on the project status reports included in the *Major Projects Report 2021* 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 108 that cover the following acquisition projects:

- Air Surveillance Maritime Patrol;
- ANZAC Frigate Systems Upgrade;
- Dive and Hydrographic Vessel;
- Fixed High Frequency Radio Refresh;
- Future Air Mobility Capability – Tactical;
- Maritime Sustainment Capability;
- Network Enabled Army C4 (tranche one and two);
- NH90 Simulator;
- Operational and Regulatory Aviation Compliance Sustainment Phase One; and
- Protected Vehicle – Medium.

These projects are collectively referred to as "the specified acquisition projects".

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 2021* have not been fairly stated.

Our limited assurance engagement was completed on 10 December 2021 and our conclusion is expressed as at that date.

A business unit of the Controller and Auditor-General | www.auditnz.parliament.nz

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 2021;
- 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 2021 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 2021* 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 2021;
- financial performance against the budgets approved by Cabinet;
- expected achievements;
- planned time frames; and
- intended capability requirements.

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)

10 December 2021

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MAJOR PROJECTS IN DELIVERY 2020/2021

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 2020/21 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 2021

The COVID-19 pandemic entered its second year, and Ministry-led projects adjusted plans and responses through the 2020/21 year to address schedule and cost pressures. Additional costs were anticipated as a direct impact of COVID-19, along with delays and issues arising from international travel restrictions and lockdowns around the world affecting both supply chains and the ability of specialist suppliers and Defence staff to travel.

However projects continued to expect to deliver the capability, and some projects had already delivered benefits from some of the capability that was delivered. The NZDF has been able to use the NH90 simulator for pilot training, and capability offered by the new replenishment vessel HMNZS *Aotearoa* and the dive and hydrographic vessel, HMNZS *Manawanui*.

Schedule

In August 2020 the Minister of Defence was advised of schedule delays resulting in adjustments to key milestone dates for three projects; Anzac Frigate Systems Upgrade (FSU), Dive and Hydrographic Vessel, and NH90 Simulator. Contracts for these projects had made provision for the parties to claim Excusable Delay, which included pandemics and/or quarantine restrictions, and to seek relief on a no-fault basis.

By the end of June 2021, further adjustments to project schedules had been identified. Affected projects were the NH90 Simulator, Dive and Hydrographic Vessel and Maritime Sustainment Capability projects, which were reporting COVID-19-related delays to their Cabinet-approved baselines for Interim and Operational Release.

Air Surveillance Maritime Patrol and Fixed High Frequency Radio Refresh reported minor delays from COVID-19, but these were not expected to affect the baseline schedule.

Phase 1 of the Operational and Regulatory Aviation Compliance Sustainment project is updating communication, navigation, air traffic management and identification systems. It is split into two parts, both of which were reporting delays; Phase 1A to Interim Operational Release, and Phase 1B planning to rebaseline its schedule when further information was received from the supplier of the NH90 solution.

Cost

While forecasting to remain within appropriation, Air Surveillance Maritime Patrol, Dive and Hydrographic Vessel, Maritime Sustainment Capability, Frigate Sustainment Upgrade and the NH90 Simulator expected some use of contingency. Phase 1(B) of the Operational and Regulatory Aviation Compliance Sustainment project reported that final costs had not been confirmed for the NH90 solution by the end of June 2021.

Capability

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

Summary of project status at 30 June 2021

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.	G	Schedule pressure was reported by the project at year end, with steps identified to maintain Interim Operational Release (IOR).	G	No change to the capability that will be delivered.
Anzac Frigate Systems Upgrade	G	Project remained within appropriation, with use of contingency.	G	As flagged in the 2020 report, the Ship 2 acceptance date moved five months (from May 2021) due to the impact of COVID-19 restrictions. At 30 June 2021, the acceptance date continued to be December 2021.	G	No change to the capability that will be delivered.
Dive and Hydrographic Vessel	G	The project remained within appropriation, with use of contingency.	A	COVID-19 restrictions impacted modifications, with supplier technicians unable to travel to New Zealand. Operational Release had moved to July 2021, with partial release of capability, but further delay expected.	G	No change to the capability that will be delivered.
Fixed High Frequency Radio Refresh	G	The project remained within appropriation.	G	COVID-19 has impacted the delivery schedule. However, it is not anticipated that this delay will impact the final delivery into service or operational release of the capability.	G	No change to the capability that will be delivered.
Future Air Mobility Capability - Tactical	G	The project remained within appropriation (some contingency has been utilised).	G	The project continues to schedule.	G	No change to the capability that will be delivered.

Project	Cost		Schedule		Capability	
Maritime Sustainment Capability	G	Project remained within appropriation, with use of contingency.	Y	Operational release (OR) date now scheduled for Q1 2022[4].	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.
NH90 Simulator	G	Project remained within appropriation.	Y	Baseline schedule delay experienced in achieving Ready for Testing milestone (operational release).	G	No change to the capability that will be delivered.
ORACS[5] Phase 1(a)	G	The project remained within appropriation.	Y	The project expects a delay to Interim Operational Release, but to meet the agreed Operational Release date.	G	No change to the capability as signed off in the Business Case
Phase 1(b)	R	The provider had not confirmed the final cost at this time, but it was expected to be higher than the appropriation.	R	COVID-19 impacted the global rollout of the software solution. Following confirmation of details from the provider, the project timeline would be rebaselined.	G	No change to the capability as signed off in the Business Case
Protected Vehicle – Medium	G	The project remained within appropriation.	G	The project expects to meet forecast delivery dates.	G	No change to the capability as signed off in the Business Case.

[4] Operational Release for *Aotearoa* was rescheduled in August 2021 and is expected to be completed by the end of the first quarter of 2022, following the first trip to Antarctica. This voyage must take place during the Austral (Southern Hemisphere) summer.
[5] 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 2020/21 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 21 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 18, 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 2021

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

SCHEDULE/TIMEFRAME PROGRESS

Schedule of Capability Integration – P-8A fleet

	Initial Estimate	30 June 2021 (Forecast/Actual)	Variance (months)
Delivery of first P-8A to NZ	April 2023	April 2023 (Forecast)	N/A
Initial Operational Release 1	July 2023	July 2023 (Forecast)	N/A
Operational Release; available for overseas deployment	2025	2025 (Forecast)	N/A

ASMP CAPABILITY INTEGRATION

Capability Integration Plans (CIP) are designed to be a living document. For the ASMP, the CIP was first released for review in mid-2017, and the third iteration was released for review in May 2021 and approved in June 2021. 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 2020/21 YEAR

Infrastructure

The infrastructure work programme is comprised of Horizontal and Vertical Works.

Horizontal infrastructure works at Ohakea have been underway since the end of November 2019, with Fulton Hogan constructing the apron, preparing the ground for the building platform, taxiway improvements, and drainage.

By September 2020, while work was continuing on the apron and taxiway, and the replacement fire pump facility was being constructed, ground works that were needed for Vertical Works to commence had been completed.

The Vertical Works tender process had been underway since September 2019 when industry were invited to register interest in delivering the buildings and building foundations that will support the capability at Ohakea. These include two hangars, along with maintenance, mission support and simulator facilities, and squadron offices.

A shortlist, comprised of providers that met security clearance requirements, were invited to submit a tender in the first half of 2020, with the deadline for submissions extended following the declaration of Alert Level 4 in response to the COVID-19 pandemic.

In July 2020, assessment of the tenders was underway and negotiations began with the preferred provider in September. A fixed price

contract was signed with Hawkins Limited in December 2020.

By July 2021, foundation piling for the new P-8A facility at Base Ohakea had been completed, despite autumn weather creating more difficult ground conditions. The foundations were 60 percent complete overall and two tower cranes had been commissioned on site in preparation for raising the building.

Other project work

The project team continued to work on other components of the project, progressing the development of sustainment contracts (provision of spares, providing maintenance, etc.) that will be used to support the capability once introduced into service.

Training for maintenance personnel continued, with another group deploying to Australia in late May 2021 to work with the Royal Australian Air Force to gain experience of working with the P-8A ahead of New Zealand taking delivery of its aircraft.

Additionally, initial training of New Zealand Mission Support operators commenced in the United States. *Left: Ongoing groundworks at RNZAF Base Ohakea.*

Training devices (simulators) are another component that the project is delivering, through the Foreign Military Sales (FMS) process. Following confirmation of the pricing with Boeing, all major components being delivered under FMS had been firmed up.

Other equipment is being sourced to support operations, such as an aircraft loading vehicle, which is required to support loading and unloading operations for the P-8A aircraft fleet.

Following a request for tender process, a contract was signed in May 2021 with Mallaghan Engineering Ltd for the supply of the vehicle.

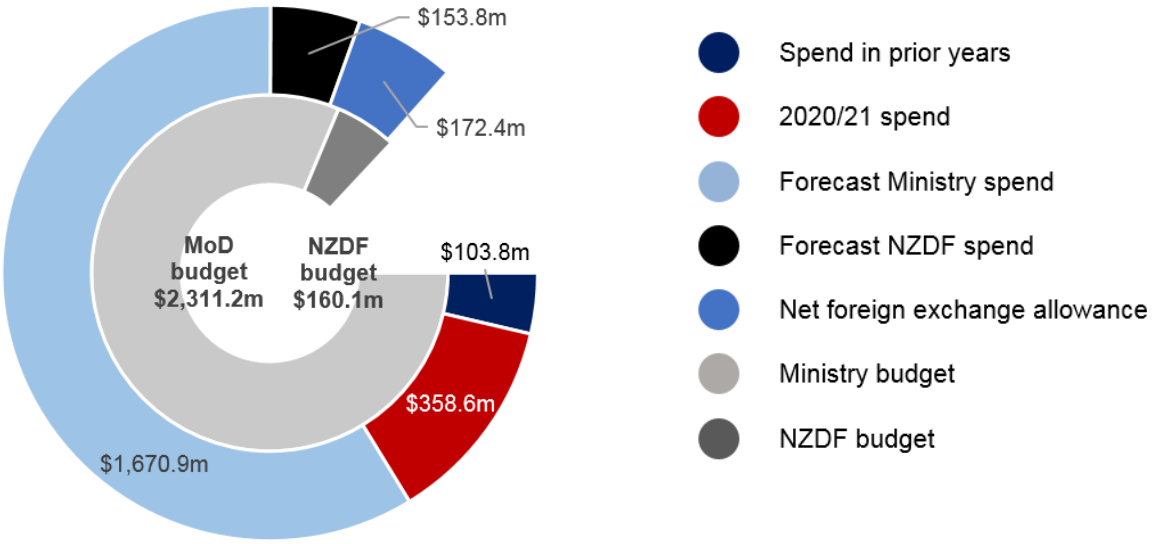
The impact of COVID-19 in 2020/21

Despite the ongoing global impact of COVID-19, the schedule for delivery of New Zealand's new fleet continues as planned.

Construction of the facilities at Base Ohakea is, however, seeing both cost and delivery time pressures due to the impact of COVID-19 on international supply chains and workplace operations. The project will use temporary facilities at Base Ohakea to allow delivery of the new capability to proceed as originally planned.

Left: groundworks at RNZAF Base Ohakea.

ASMP PROJECT BUDGET AND EXPENDITURE



At 30 June 2021 expected Air Surveillance Maritime Patrol project costs were:

		Ministry	NZDF	Consolidated project
		$000	$000	$000
Budget	Current approved project budget	2,311,151	160,087	2,471,238
	Allowance for foreign exchange movements	125,140	-	125,140
	Original approved project budget	2,186,011	160,087	2,346,098
Forecast	Forecast total project cost	2,133,316	153,791	2,287,107
	Effect of foreign exchange movements	(47,286)	-	(47,286)
	Forecast cost using hedged rate	2,180,602	153,791	2,334,393
	Forecast project variance	5,409	6,296	11,705

DEVELOPMENTS POST 30 JUNE 2021

Works at Base Ohakea continued with reinforcing steel being raised above ground level for the first aircraft hangar roof.

The hangar roofs will be constructed at ground level to maximise safety with the first roof expected to be raised early in 2022.

With discovery of the COVID-19 Delta variant in the community, New Zealand returned to a state of COVID-19 Alert Level 4 (nationwide lockdown) on 17 August 2021. The country, excluding Auckland and Northland, returned to Alert Level 3 on 31 August. The site remained closed, however, until requirements for working at alert level 3 were confirmed on 3 September allowing personnel to return to work on-site.

The project released a Request for Tenders (RFT) to the market in August 2021 for a Mobile Aircraft Wash System that will support maintenance of the aircraft while in service. The RFT closed in October.

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.

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 2017[6] 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

[6] 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.

Option 5: Australian Upgrade Comparator This option matches closely the upgrade path being pursued for the Australian Anzac frigates.	$411-431	Meets all policy expectations for ISR, combat and protection. Builds on development work undertaken by Australia.	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.
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

Capability Requirements necessary to support policy objectives include:	**Operational Requirements** necessary to support the capability include:
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	Combat Management System (CMS). 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. Intelligence Systems. 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. Radar Systems (Surveillance and Reconnaissance). 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. Optronics (Surveillance and Reconnaissance). 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. Air Defence. Air defence against attacking aircraft or missiles is local area and point defence. They span a range from approximately 2km to 30km

in order to enable completion of a mission throughout the life of the platform.	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. Anti-Surface. 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. Under Sea Warfare. 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. Support to Joint Task Force (JTF). The *Defence White Paper 2010* 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.
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.	

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 baselined[7] 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 2021

Prime contractor	Lockheed Martin Canada

[7] 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 2021 Forecast/Actual	Variation (months)
Acceptance: Ship One	March 2017	November 2020 (Actual)	44
Acceptance: Ship Two	February 2018	December 2021 (Forecast)	46
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 2021

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 *Te Kaha*, a revised Acceptance date was provided by Lockheed Martin Canada.
August 2020	44	**Ship one:** Impact of COVID-19.
	46	**Ship two:** Impact of COVID-19.

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, 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.

Schedule of Capability Integration

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

	Initial Estimate (2014)	At 30 June 2021 (Forecast/Actual)	Variance (Months)
Platform accepted by Crown	Ship 1: March 2017 Ship 2: February 2018	Ship 1: *Te Kaha* November 2020 (Actual) Ship 2: *Te Mana* December 2021 (Forecast)	44 46
Initial Operational Capability	May 2017	August 2021 (Forecast)	51
Operational Test and Evaluation (OT&E) begins	May 2017	September 2021 (Forecast)	52
OT&E ends	February 2018	November 2022 (Forecast)	57
Operational Release	TBC	November 2022 (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 the impact of COVID-19 in New Zealand and Canada – including social distancing, and the availability of parts and personnel – has 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.

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.[8]	

[8] 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 2020/2021 YEAR

COVID-19-related delays to the project were addressed in the beginning of the year through the agreement between the Crown and Lockheed Martin Canada on an Excusable Delay period in relation to *Te Kaha*.

Assessment of the pandemic's impact on the work programme for *Te Mana* continued. With the industrial phase of work still underway at the time, and ongoing COVID-19 restrictions in place, certainty about a revised schedule was difficult to provide. The industrial phase was expected to conclude in December 2020,

Work to quantify the effects of the COVID-19 pandemic resulted in agreement to adjust the schedule for acceptance of *Te Kaha*, which took place on 27 November 2020, two months later than scheduled. Ship acceptance of *Te Mana* was re-scheduled from mid-2021 to the fourth quarter of that year.

Te Kaha

Harbour trials were able to get underway for *Te Kaha*, and continued through August in preparation for Sea Acceptance Trials (SATs) to commence. Navy personnel returned to Canada for the preparation for SATs and set to work for the ship, including further training. The Maritime Operational and Evaluation Team also travelled to Canada and completed an assessment of the ship's crew; a pre-requisite for sea trials to commence.

The sea acceptance trials took place in the waters surrounding Vancouver Island between September 2020 and the end of October. Minor work identified during sea trials was completed in early November and after further testing, the ship was accepted by the Crown on 27 November. Following the return of negative COVID-19 tests for everyone planning to sail, the ship left Esquimalt Naval Base on 30 November, bound for New Zealand. The ship arrived on Sunday, 20 December, after a 21-day journey, which included a day berthed (non-contact) in Hawaii, marking the 79th anniversary of the attack on Pearl Harbour.

Following a series of trips to sea throughout February and March 2021, as part of preparations for the Naval Operational Test and Evaluation phase and ongoing crew familiarisation, *Te Kaha* entered a phase of planned maintenance that included routine painting and preservation work, re-certification of safety equipment, and some machinery maintenance.

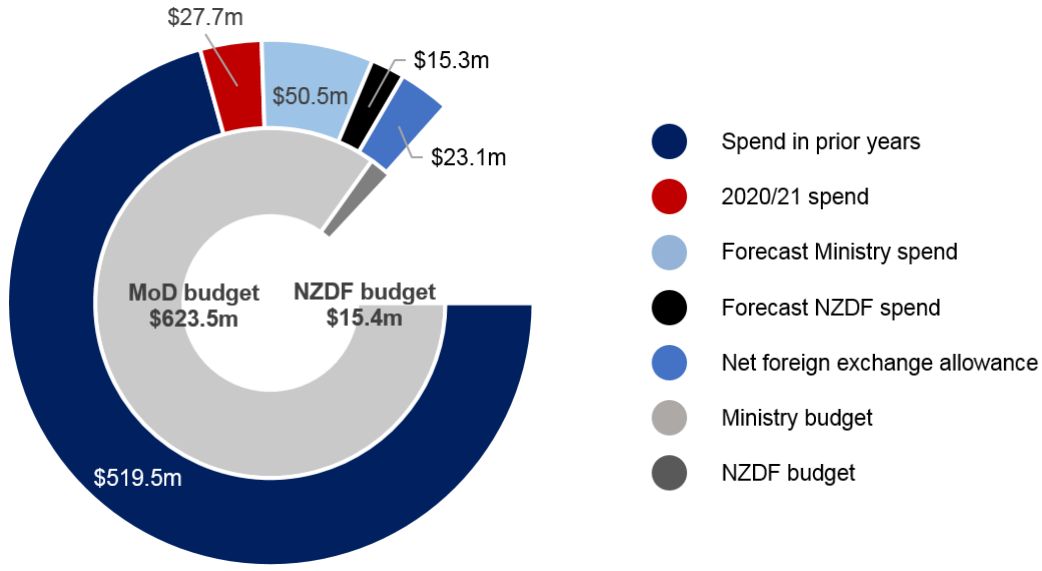
Te Mana

The industrial phase was completed in mid-November, ahead of schedule. The Crown took custody of *Te Mana* on 4 March, and the ship was moved to the Canadian Navy's Fleet Maintenance Facility where set to work activities commenced. As with *Te Kaha*, this included system activation and testing, crew familiarisation and sea trials, and the work was supported by the Royal New Zealand Navy personnel, who had arrived in Victoria at the end of January 2021.

Work ceased in mid-April, however, when a number of crew and dependents tested positive for COVID-19, during a marked increase in cases in British Colombia at the time. A regime of testing and isolation was initiated and has proved effective, and work onboard recommenced on 21 April.

Activities impacted by the closure period were rescheduled and good progress made with the remaining set to work activities and preparations for harbour and sea trials. At the end June the project continued to forecast an acceptance date of December 2021 for the ship.

FSU PROJECT BUDGET AND EXPENDITURE



At 30 June 2021 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	597,713	15,326	613,039
	Effect of foreign exchange movements	21,630	-	21,630
	Forecast cost using hedged rate	576,083	15,326	591,409
	Forecast project variance	2,702	82	2,784

DEVELOPMENTS POST 30 JUNE 2021

Te Kaha began training and sea trials in August, ahead of the resumption of the Naval Operational Testing and Evaluation (NOTE) period. The ship sailed on 9 September from Devonport Naval Base for the NOTE period, which will run until December and will include training activities with the Royal Australian Navy.

Following Set to Work and Reactivation work on *Te Mana*, harbour trials commenced on 20 July and were completed in September. Additional crew required for sea trials left New Zealand at the end of July.

DIVE AND HYDROGRAPHIC VESSEL

This project has been responsible for the purchase and modification of a hydrographic and deep diving support capability. It has resulted in the purchase, modification and commissioning of the fourth vessel to sail with the Royal New Zealand Navy under the name HMNZS *Manawanui*.

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 a range of operational and military tasking including hydrography (mapping of the littoral surface and subsurface environment), deep diving[9] 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 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

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

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.

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 2021 (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	November 2021 (Forecast)	24
Interim Operational Release (IOR)	April 2021	February 2020 (Actual)	-14
Operational Release (OR)	April 2021	July 2021 (Forecast)	3
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. As at 30 June 2021, the project had identified that the July 2021 date would not be met, as a result of factors driven significantly by the impact of COVID-19, and identification of maintenance for the crane that had delayed testing and release of the capability. A new OR date had not been confirmed at that time.[10]			

History of variations to schedule at 30 June 2021

Date of individual variation	Variation length (months)	Explanation
2020-2021	24	**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.

[10] In August 2021 OR was forecast to take place in the second quarter of 2022, reflecting the ongoing impact of COVID-19 and the unavoidable delays in accessing specialist technical support from overseas.

February 2020	-14	**Interim Operational Release:** the phased release for *Manawanui* 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	3	**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.

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) *Manawanui* will provide support for delivery of these capabilities.
Mine Countermeasures	
Underwater Search and Recovery	Yes
Explosive Ordnance Disposal	Yes

Operational Requirements	Likely to be met
Maritime Presence (including search and rescue)	Yes
Training	Yes
Full benefits realisation is scheduled for implementation by March 2024.	

DURING THE 2020/21 YEAR

At the start of July 2020, *Manawanui* conducted a brief port visit to Tauranga, where an open ship invitation drew around 1200 people who had the opportunity to go on board.

Following that, a series of operational release activities took place in and around the Hauraki Gulf with the focus on testing all the capability that had been released at that time.

A Humanitarian Aid and Disaster Recovery (HADR) exercise centred on a rapid hydrographic survey and assessment of a port entrance. This successful exercise produced survey information that showed a safe passage route and landing area.

In late-July, *Manawanui* departed for Hawaii to participate in Exercise RIMPAC the following month, exercising with other ships from around the world. The ship and crew completed 54 continuous days at sea, which included a stop in Tonga on the return trip, where a container of medical equipment was unloaded. During this time the crew continued to observe COVID-19 distancing rules, with no direct contact with anyone outside the ship's staff.

On the ship's return to Devonport Naval Base, a planned 5-week period of maintenance and continued modifications commenced.

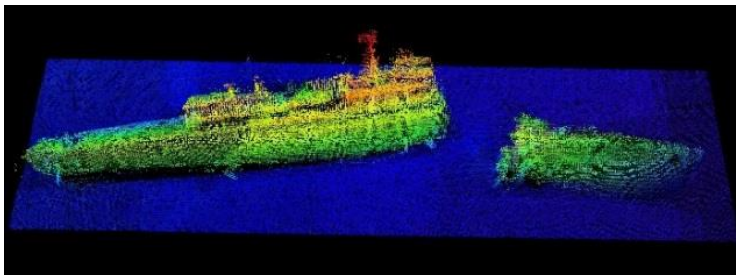
ROV and survey system testing

By November the ship had commenced the salvage capability phase of training. Throughout the month, the Remote Operated Vehicle (ROV) capability was the main focus. Although at the end of the month, the ship and crew were able to visit Gisborne, for her first home-port official visit.

In early February, HMNZS *Manawanui* successfully completed the maximum depth test for the Remote Operated Vehicle (ROV). Operating at 1000 metres, the ROV was able to transmit images to the ship.

By April, Remote Operative Vehicle (ROV) training had been completed with three ROV pilots qualified from within the RNZN.

Manawanui continued with survey exercises using the echo-sounding capability. The primary focus has been on sea-bed searches for sunken aircraft and vessels. High quality images have been processed from these soundings.



Echo-sound image, produced on Manawanui*, of the former Leander-class warship,* Waikato*. The ship was sunk in 2000 off the Northland coast, near Tutukaka to create an artificial reef.*

Crane training

The project had aimed to incorporate use of the crane into the combined operations activity, which required completion of specialist crane training. That training had been proposed to take place in April, but was deferred to the end of 2021 to allow time to undertake maintenance work on the crane, following identification of some corrosion on the equipment.

Dive capability

Between April and June the Royal New Zealand Navy (RNZN) diving team prepared for and carried out wet-bell diving in the Hauraki Gulf and out from the Tutukaka coast. Using the ship's moon pool, the crew completed over 200 dives and amassed more than 4,700 minutes underwater, operating down to a depth of 50 metres.

The ROV was used to support these diving operations, providing greater situational awareness as well as useful experience for the operators.

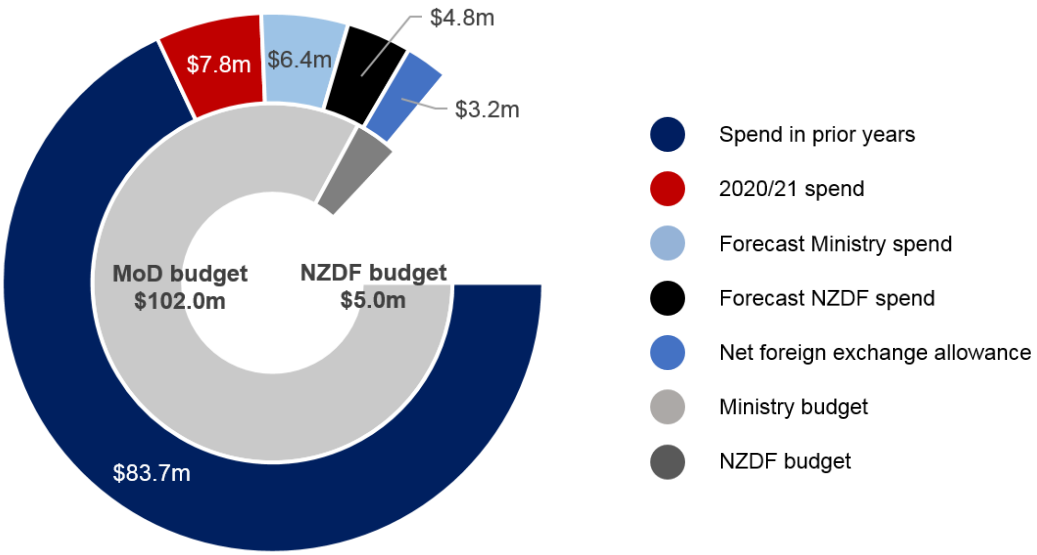
In June 2021, *Manawanui* entered a planned maintenance/modification period until October, ahead of completing final Operational Release activities. The maintenance period included:

- application of new anti-fouling paint to the hull
- installation of the remaining two new engines ordered from Denmark
- completion of the comprehensive magazine installation
- other maintenance, repair and overhaul tasks that will be carried out concurrently.

The impact of COVID-19 during 2020/21

At the start of the year, an assessment was undertaken of the impact of COVID-19 on the ship's Operational Release (OR) date. In August 2020, this led to a shift in the OR date, from April to July 2021, to address some of the delays arising from the lockdown period, and to take into account any ongoing border restrictions that might affect essential personnel from entering the country to support ongoing completion and release of the ship's capability.

DHV PROJECT BUDGET AND EXPENDITURE



At 30 June 2021 expected Dive and Hydrographic Vessel project costs were:

		Ministry	NZDF	Consolidated project
		$000	$000	$000
Budget	Current approved project budget	101,976	5,000	106,976
	Allowance for foreign exchange movements	2,770	-	2,770
	Original approved project budget	99,206	5,000	104,206
Forecast	Forecast total project cost	97,838	4,777	102,615
	Effect of foreign exchange movements	(417)	-	(417)
	Forecast cost using hedged rate	98,255	4,777	103,032
	Forecast project variance	951	223	1,174

DEVELOPMENTS POST 30 JUNE 2021

Manawanui has been in a planned maintenance/modification period since June. The project team is expected to remain in place until December 2021, following its completion.

Manawanui is then expected to complete final Operational Release (OR) activities, however OR is not expected to be achieved until the second quarter of 2022 due to the ongoing impact of COVID-19 and difficulties in accessing technical support from overseas. *Manawanui* remains available for tasking prior to achieving OR.

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 Community, Nation, and World 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^{o} 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 to 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[11])	
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)	

[11] 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 2021

Prime contractor	Babcock New Zealand Ltd

SCHEDULE/TIMEFRAME PROGRESS

Systems Acceptance: variations in forecast

Estimate at Approval to Commit	30 June 2021 Forecast/ Actual	Variation in acquisition phase (months)
July 2023[12]	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

A Capability Integration Plan (CIP) has been approved and identifies and schedules the tasks necessary to prepare the NZDF to effectively operate the capability 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

As of 30 June 2021, the Project has forecast that the Full benefit realisation will be directly impacted by the contractual delays to date, and so will be fully realised in 2023. The project is currently working to finalise and formalise the details of this change.

[12] The 2020 edition incorrectly stated the system acceptance estimated date at the time approval to commit was made as December 2022.

Schedule of Capability Integration

	Initial Forecast	30 June 2021 (Forecast)	Variance (months)
Interim Operational Release	30 March 2023	21 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 60º South in the Southern Ocean Improve HF radio capability efficiency Utilise new technology to improve the effectiveness of the capability	Yes.
Full benefits realisation at 30 June 2021 was scheduled for 2022 but the project was forecasting a shift to 2023, reflecting COVID-19 related delays.	

DURING THE 2020/21 YEAR

In July 2020 discussions between the project and its prime supplier, Babcock, focused on the impact of COVID-19 on the project. One example, reported in the 2020 edition of this report, was the delay in shipping equipment from New Zealand to the United Kingdom for the integration and testing activities needed to support the design of the new system.

A delay of three months to the company's contractual timeframe was approved, but did not affect the Operational Release date of the overall capability, which remained at August 2023.

A significant component of the work for this project is designing and testing the new system. Design activities that began during the 2019/20 year continued, with a preliminary design review completed in October 2020.

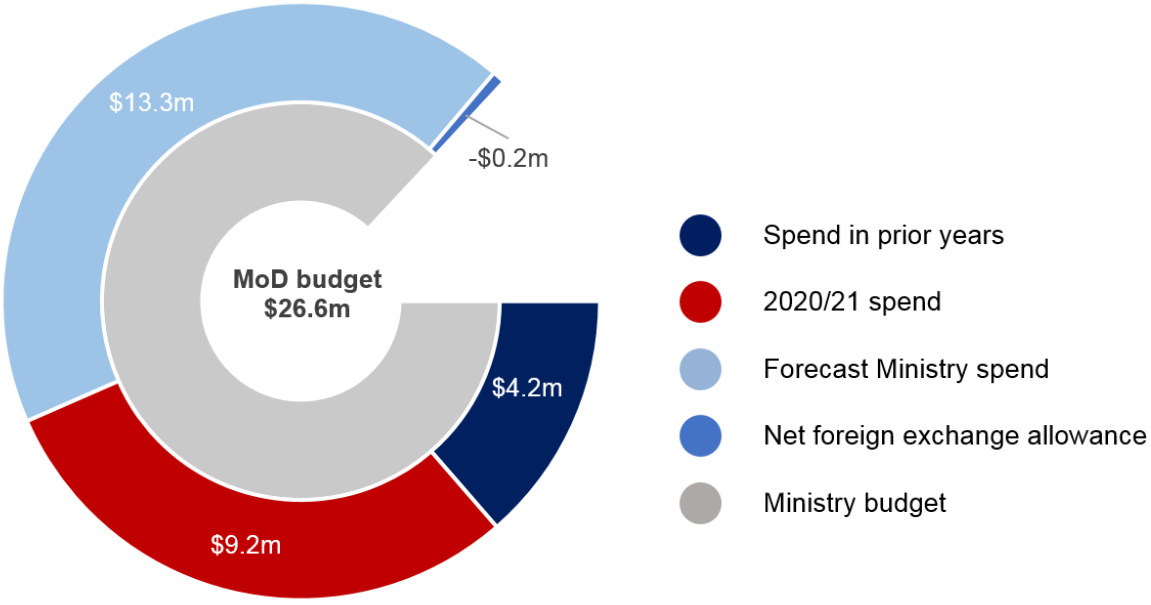
A Systems Integration Lab had been established at Babcock's facilities in the United Kingdom, and equipment integration and testing began.

Surveys and layout planning for transmitter and receiver sites, and operations centres commenced, and was completed by September 2020. This was followed by the start of planning for new installations at each site.

Through the rest of the year, development of the design solution for the new system (the critical design review) continued, along with the programme of equipment integration and testing, and installation planning.

The project accepted an additional four month delay to the main contract timeline, due to unavoidable delays in providing Government Furnished Materials, the delivery of which was in part impacted by COVID-19. The delay and resulting cost increases will not require access to contingency or changes to critical milestones.

FHFRR PROJECT BUDGET AND EXPENDITURE



At 30 June 2021 expected Fixed High Frequency Radio Refresh project costs were:

		Ministry	NZDF	Consolidated project
		$000	$000	$000
Budget	Current approved project budget	26,580	-	26,580
	Allowance for foreign exchange movements	-	-	-
	Original approved project budget	26,580	-	26,580
Forecast	Forecast total project cost	26,724	-	26,724
	Effect of foreign exchange movements	222	-	222
	Forecast cost using hedged rate	26,502	-	26,502
	Forecast project variance	78	-	78

DEVELOPMENTS POST 30 JUNE 2021

In July the Critical Design Review documentation was reviewed and accepted by Defence.

This key project milestone means the design phase has been completed and production has commenced.

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

Capability Requirements necessary to support policy objectives include:	**Operational Requirements** necessary to support the capability include:
1. The Defence Force needs a reliable, available and supportable airlift fleet to project and support sustained military operations into the future. 2. A reliable, available and supportable airlift fleet is needed to support non-military Government tasks into the future	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. 2. The Defence Force and Government agencies need a sufficiently reliable and supportable airlift fleet to allow for concurrent tasks. 3. The future airlift fleet needs to be interoperable with that of key defence partners.

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 2021 (Actual/Forecast)	Variation in acquisition phase (months)
Delivery of first aircraft	2024	2024 (Forecast)	-
Delivery of final aircraft	2025	2025 (Forecast)	-

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

The initial release of the Capability Integration Plan was approved in November 2019 with the next iteration due for circulation and approval in December 2021. 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 2021 (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 2020/2021 YEAR

Following the signing and execution on 4 June 2020 of the Letters of Offer and Acceptance for the acquisition and sustainment of the new capability, 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.

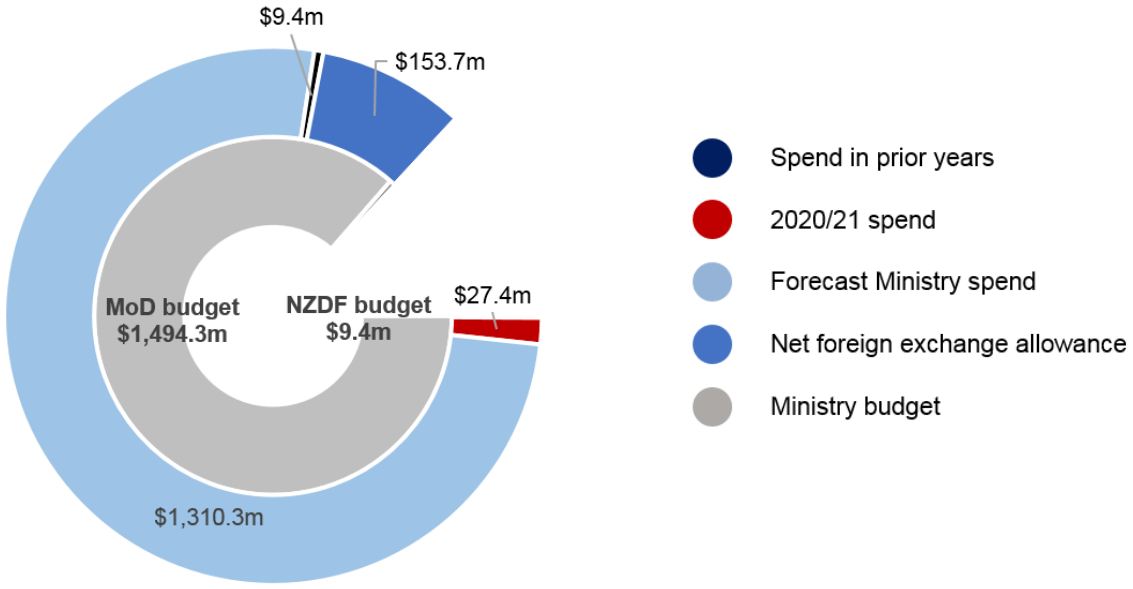
Work also continued with the US Air Force (USAF) Program Management Agency to finalise the Statement of Work for the US Government to issue to Lockheed Martin for production of the flight simulator.

Work continued throughout the year with the NZDF to develop the in-depth plans and schedules that will enable the requirements to be in place for the introduction and integration of the capability. The project also focused on elements such as support equipment and spares that should be held for the aircraft.

Development of training courses was underway, including programmes and publications, and places on USAF aircrew training courses were requested.

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

FAMC PROJECT BUDGET AND EXPENDITURE



At 30 June 2021 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	1,339,652	9,367	1,349,019
	Effect of foreign exchange movements	(153,683)	-	(153,683)
	Forecast cost using hedged rate	1,493,335	9,367	1,502,702
	Forecast project variance	920	25	945

DEVELOPMENTS POST 30 JUNE 2021

The work programme continued to be implemented, with a focus on design and projected timelines for upcoming stages of work.

The detailed work to finalise spares and costings continues, along with development of training materials, and detailed plans to introduce the new tactical airlift capability into service.

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 a greater flexibility in response options to threats and emergencies.
- The provision to government of support to New Zealand's civilian 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.

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

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

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 hotel 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[13]
At Contract Signing	May 2020
Actual	June 2020
Note: The ship was provisionally accepted on 10 June 2020 for delivery to New Zealand.	

[13] 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 will act as the Prime Contractor for the design, build, acceptance and delivery of the ship. HHI carries full responsibility and risk for any subcontract agreements that it makes 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)

SCHEDULE/TIMEFRAME PROGRESS

The following dates are 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 2021

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 travel restrictions preventing representatives of the original equipment manufacturers 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. Development of version two is underway.

Schedule of Capability Integration

	Initial Estimate	30 June 2021 (Forecast/Actual)	Variance (months)
Initial Operational Release	December 2020	March 2021 (Actual)	3
Operational Release	November 2021	April 2022 (Forecast)	5
Benefits Realisation	January 2022	March 2022 (Forecast)	2
The planned voyage to Antarctica in the 2021/2022 summer is the final activity prior to operational release being sought. This is expected to be completed in the second quarter of 2022. The voyage is a dependency as well for full benefits realisation.			

MSC OPERATIONAL CAPABILITY

Progress towards Delivery of Operational Requirements as at 30 June 2021

Operational Requirements	Requirement likely to be met	Comment
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, Helicopter In-flight Refuelling 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).	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.
Provide an Effective and Appropriate Maritime Platform. • 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.		

Operational Requirements	Requirement likely to be met	Comment
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. • Provide organic anti-piracy self defence.		

Provide support to Land Operations:
• 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:
  ○ 1 (food and water)
  ○ 2 (general stores)
  ○ 3 (petroleum, oils, liquids)
  ○ 5 (ammunition)
  ○ 9 (repair parts)		

Support maintenance systems for non-organic helicopters.		
Benefits realisation is scheduled for full implementation by March 2022.		

DURING THE 2020/21 YEAR

Following the ship's arrival in New Zealand on 26 June 2020, and a 10-day handover period, the commissioning ceremony was held on 29 July 2020 at Devonport Naval Base, when the ship became HMNZS *Aotearoa*.

The fleet integration phase began in July with Hyundai Heavy Industries starting the process of completing outstanding work that had not been able to be completed in South Korea due to COVID-19 travel restrictions.

Although international restrictions continued to affect some activities, border control exceptions were granted for overseas technicians who were essential to the completion of remaining work. Following completion of quarantine requirements, they were able to be on-site.

By November, customisation activities had been completed, and the formal Safety and Readiness Check began (16 November), ahead of *Aotearoa* sailing for the first time under naval command on 4 December. After three days of sea safety and training activities, the ship berthed at Marsden Point on 7 December to uplift cargo fuel, enabling the release of the first major capability to the RNZN; the ability to uplift, transport and store strategic fuel reserves for the NZDF.

A training programme – both development and implementation – has been a key part of the ship's delivery and integration process. In September 2020 the training passed the safety assurance check, and some of collective crew training got underway, ahead of the Safety and Readiness Check by the Maritime Operational Evaluation Team, which was held in November 2020.

The busy work programme continued into 2021. *Aotearoa* attended Waitangi celebrations to support the Offshore Patrol Vessel HMNZS *Otago*. The ship then returned to Devonport Naval Base to prepare for further Sea Acceptance Readiness Trials. On 18 February *Aotearoa* deployed to Australia to continue development of the ship and crew's capability in company with Royal Australian Navy ships off the coast of Sydney. The focus of the deployment was trials of the ship's RAS capability and involves passing fuel to other ships.

Interim operational release to the Navy was achieved in March 2021.

Another key capability was released following a successful Replenishment at Sea activity that took place when *Aotearoa* visited Sydney in March. The ability to replenish ships and other capability with liquid cargo is the core capability of the ship.

Over two weeks *Aotearoa* participated in the Royal Australian Navy (RAN) Fleet Certification Period, alongside several RAN ships, and completed a number of 'dry-runs' before successfully completing her first Replenishment At Sea (Liquid) with the Hobart-class destroyer, HMAS *Stuart*.

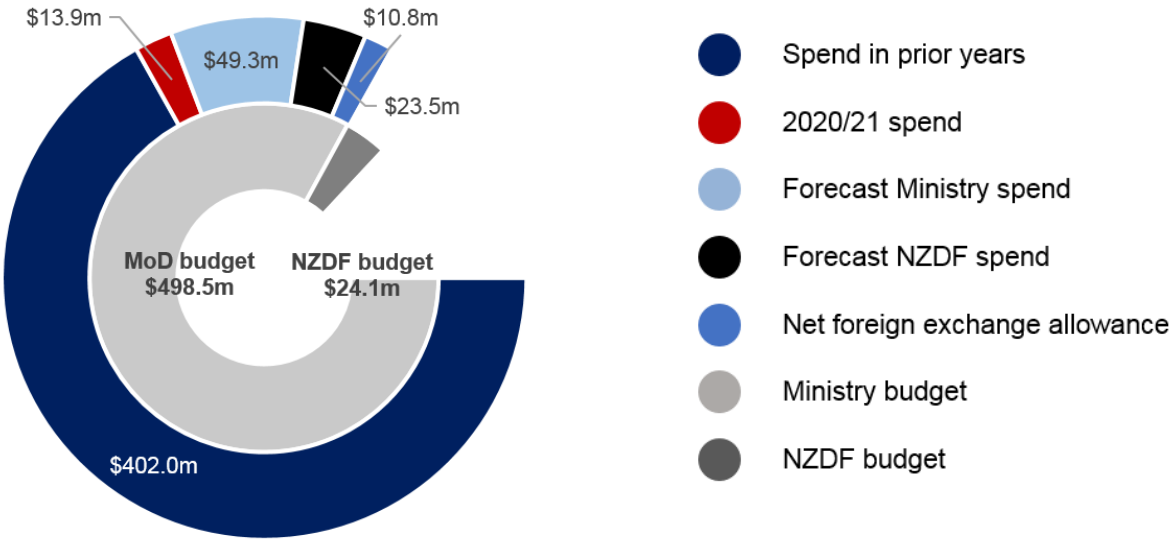
After returning from the successful deployment to the East Australian Exercise Area, a visit to the ship's home port city of New Plymouth took place where *Aotearoa* was welcomed by Ngāti Te Whiti with a pōwhiri at Puke Ariki. A Charter Parade through the city on 23 April was followed the next day by an open day that saw the ship's crew welcome thousands of locals for a tour.

Maintenance is a part of ongoing management of defence capability. Plans for a maintenance period in July were finalised and implemented, along with a further customisation period that would include further equipment installation, and associated training for the ship's company in the new equipment.

Planning and engagement was also underway for the inaugural Antarctic Resupply Operation in the first quarter of 2022, which is the final major activity ahead of the ship's operational release.

Exercise Bersama Lima 21 had been scheduled to take place in October 2021, but was cancelled due COVID-19. As a result, the ship's company and project team was working with HQ Joint Forces on how else the benefits and outputs that would have been achieved at this exercise could be realised.

MSC PROJECT BUDGET AND EXPENDITURE



At 30 June 2021 expected Maritime Sustainment Capability project costs were:

		Ministry	NZDF	Consolidated project
		$000	$000	$000
Budget	Current approved project budget	498,512	24,095	522,607
	Allowance for foreign exchange movements	26,832	-	26,832
	Original approved project budget	471,680	24,095	495,775
Forecast	Forecast total project cost	465,288	23,459	488,747
	Effect of foreign exchange movements	16,036	-	16,036
	Forecast cost using hedged rate	449,252	23,459	472,711
	Forecast project variance	22,428	636	23,064

DEVELOPMENTS POST 30 JUNE 2021

Following the cancellation of Exercise Bersama Lima 21, the Five Power Defence Arrangement Exercise Bersama Gold was confirmed as a replacement, and designed as a non-contact event in response to the COVID-19 pandemic.

Aotearoa will be able to achieve the same Operational Test and Evaluation objectives.

Planning continues for the inaugural Antarctic Resupply Operation in the first quarter of 2022, and *Aotearoa* remains on schedule to undertake the ship's first Antarctic mission.

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 currently has one project in the delivery phase, which 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 is 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. That funding of $106.48 million[14] will deliver additional communications and network enhancements, as well as new sensor systems, intelligence gathering, and processing capabilities for the Army. This will see a continuation of capability delivery by the C4 project, and with the investment in ISR capability the project has commenced its delivery phase.

[14] Funded from the NZDF's accumulated depreciation reserve. In addition, operating funding of $7.67 million at steady state is required to operate and maintain the new capabilities being delivered.

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 is being delivered under funding from Tranches One and Two. The project's 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 been establishing 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, which is expected to achieve Interim Operational Release by the end of 2021, puts 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 Tranche Two Funding

While the project was underway with Tranche One funding, the NEA Programme commenced the definition phase for Tranche Two[15]. This second tranche of funding is enabling continued delivery of Tranche One capability, including purchasing of more of the equipment delivered under the project.

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.

[15] The second tranche of funding has also expanded the focus to identifying and delivering Intelligence, Surveillance and Reconnaissance (ISR) capabilities. At 30 June 2021, the NEA ISR project was in its definition phase – developing a business case – and therefore is not included in this edition of the *Major Projects Report*.

In 2019 the Tranche One timeline was re-baselined to deliver its combined capability in the fourth quarter of 2021. As of 30 June 2021, Interim Operational Release is expected to be achieved by the end of 2021, with Operational Release forecast for the second quarter of 2022.

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 (as this is 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 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 the 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 be 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.

SCHEDULE/TIMEFRAME PROGRESS

An estimated Operational Release (OR) date was not set when approval to commit was made by Cabinet. An estimated OR date of July 2018 was approved for the first time by an internal defence management group when the Tranche One Acquisition Phase Charter went through the Defence NEA Governance process in April 2016. This established the agreed schedule with NEA C4's Tranche One deliverables expected to achieve OR by July 2018. The history of variations to the schedule are noted in the second table below.

NEA C4	Original estimate at Approval to Commit	30 June 2021 (Forecast/Actual)	Variation in acquisition phase (months)
Tranche One Interim Operational Release[16], [17]	-	June 2021 (Forecast)	-
Tranche One Operational Release[18]		December 2021 (Forecast)	-
Tranche Two Interim Operational Release	-	December 2021 (Forecast)	-
Tranche Two Operational Release	-	June 2022 (Forecast)	-

History of variations to schedule at 30 June 2021

Date of individual variation	Cumulative variation (months)	Explanation
8 September 2017	24	NEA Programme Business Case update revised the forecast Operational Release to 29 June 2020, reflecting that the acquisition of the radio fleet that will underpin the MTCS had begun, but will require a further two years to complete.
1 May 2019	41	Proposals received during the RFP process for MTCS had indicated this work stream would push the project timeframes out to July 2021. With the work stream underway, the date for achieving full operational capability has been revised to December 2021.

[16] This term replaced Interim Operational Capability.
[17] See "Developments post 30 June" at the end of this section for an update on IOR and OR dates.
[18] The term replaced Full Operational Capability.

CAPABILITY INTEGRATION

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 has been developed for the NEA Programme.

The Programme and project work streams within each tranche, are delivering capabilities that require a high level of ongoing integration due to the nature of the system and the long-term delivery approach.

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 under this Tranche with a range of acceptance and operational testing and evaluation proposed across the work streams between September 2019 and October 2021.

Schedule of Capability Integration

<table>
<tr><th></th><th>Initial Forecast</th><th>30 June 2021
(Forecast/Actual)</th><th>Variance (months)</th></tr>
<tr><td>Special Forces Electronic Warfare Introduction into Service complete</td><td>June 2015</td><td>May 2016 (Actual)</td><td>11</td></tr>
<tr><td>Special Forces Electronic Warfare achieve directed operating capability</td><td>September 2015</td><td>February 2017 (Actual)</td><td>17</td></tr>
<tr><td>Battalion Headquarters Command Post Systems capability integration complete</td><td>December 2017</td><td rowspan="4">From September 2017 these work streams were working to deliver capability against a single IOC and FOC milestone.

Interim Operational Release
June 2021
(Forecast)

Operational Release
December 2021
(Forecast)</td><td>N/A</td></tr>
<tr><td>Battalion Headquarters Command Post operational test and evaluation (OT&E)</td><td>June 2018</td><td>N/A</td></tr>
<tr><td>Battalion Headquarters Command Post achieve directed level of capability</td><td>June 2018</td><td>N/A</td></tr>
<tr><td>CUBS Wide Band SATCOM capability integration</td><td>March 2018</td><td>N/A</td></tr>
<tr><td colspan="4">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.</td></tr>
</table>

	Initial Forecast	30 June 2021 (Forecast/Actual)	Variance (months)
From September 2017 IOC and FOC dates for capability delivery under Tranche One were applied across all capability work streams, as IOC and FOC (now IOR and OR respectively) will be achieved when all work streams within the Tranche have been delivered. Since then the IOR / OR dates for Tranche 1 related capability, reported in each Major Projects at 30 June of the year in review have been: - 2018: December 2019 / June 2020 - 2019: August 2021 / December 2021 - 2020: June 2021 / December 2021 Adjustment of the OR date for Tranche One, as reported in the 2019/2020 editions, was approved by the Defence Capability Governance Board, an internal body comprised of both Ministry of Defence and NZDF, at the time the Tranche Two Business Case was approved for submission to Cabinet.			

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 2021.		

DURING THE 2020/21 YEAR

The second infrastructure component to be delivered under NEA C4 was opened by the Minister of Defence at Linton Military Camp in April 2021. The primary purpose of Te Pokapū Whakauru Māia – the new Capability Integration Centre – is to prepare the Army's communications networks for rapid deployment. Equipment and systems will be able to be deployed in a matter of hours rather than days, bringing greater flexibility and efficiencies for the Army.

It will be used to train Defence Force personnel to operate and maintain all of the new technologies, software and devices being introduced by the Network Enabled Army programme.

The new capabilities being introduced under this project, and over the life of the programme, will increase the safety of personnel. For example, new digital tools and devices will replace planning charts and 3D terrain models, delivering more accurate and timely situational awareness, which can be instantly updated and communicated to all levels of the battlefield. Personnel will have greater awareness of where

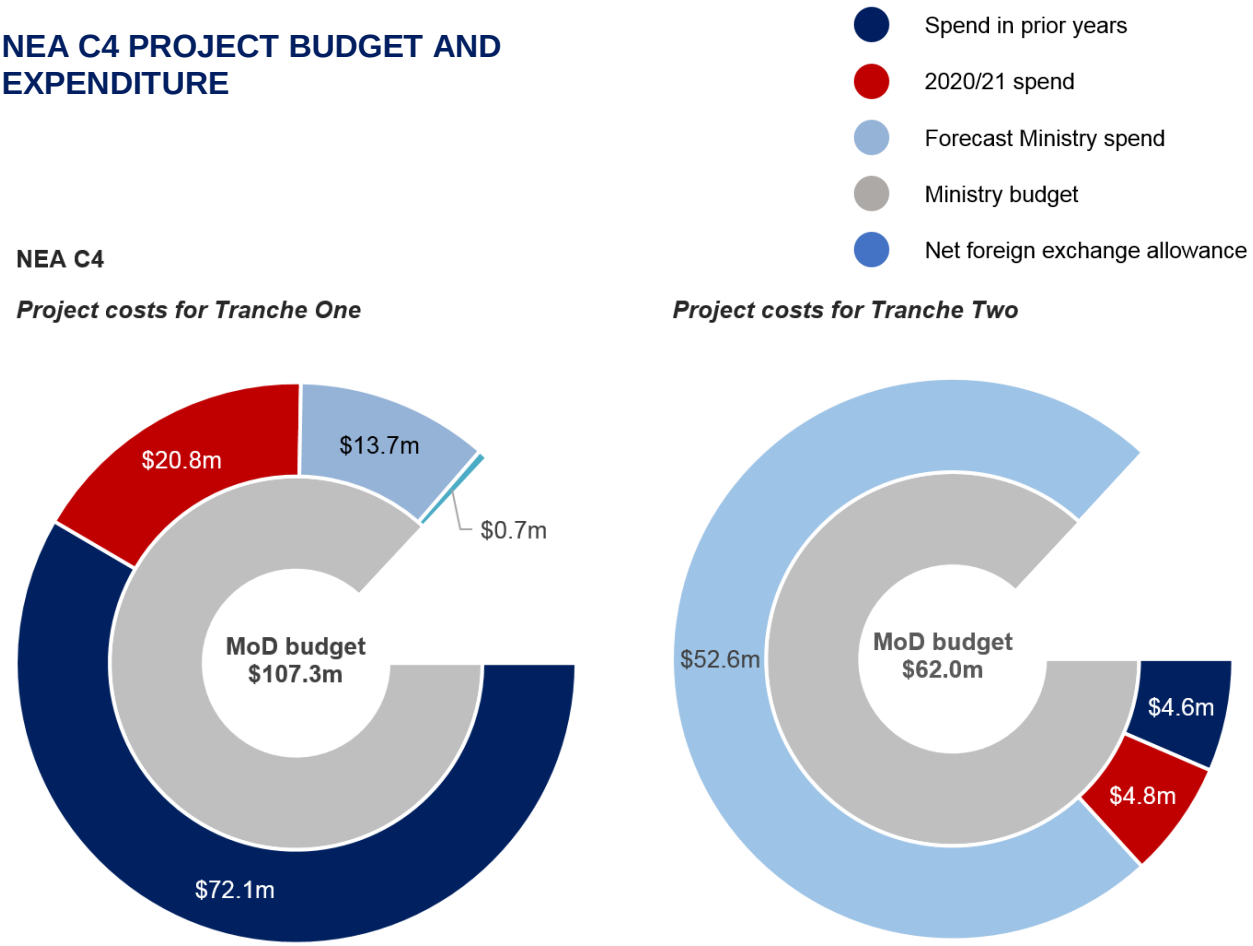
friendly and opposition forces are situated. Army will have greater connectivity and interoperability with Navy and Air Force personnel, as well as international partners.

Within the Common Universal Bearer System (CUBS) workstream, the satellite communications terminals that have been delivered to Army are in use. The Operational Release application has been submitted to Landworthiness for their approval.

These terminals have been designed specifically for use in the field, and the software configuration is being confirmed.

NEA C4 PROJECT BUDGET AND EXPENDITURE

NEA C4



As At 30 June 2021 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	106,541	-	106,541
	Effect of foreign exchange movements	545	-	545
	Forecast cost using hedged rate	105,996	-	105,996
	Forecast project variance	4	-	4

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	61,992	-	61,992
	Effect of foreign exchange movements	17	-	17
	Forecast cost using hedged rate	61,975	-	61,975
	Forecast project variance	47	-	47

DEVELOPMENTS POST 30 JUNE 2021

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

A revised forecast of December 2021 for achieving IOR and June 2022 for OR was identified. This was a variation of six months to the earlier scheduled dates for both.

NH90 SIMULATOR

This project seeks to increase the availability and sustainability of NH90 aircraft and crews for operational tasking by procuring a simulator, which will be located at RNZAF Base Ohakea.

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 helicopters[19] 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 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.

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

- 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.

a. Scale: what levels of coverage are possible?

b. Location: Where can services be provided?

c. Ownership: How can government acquire services?

d. Service solution: How can services be provided?

e. 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:
1. Increase NH90 medium helicopter availability for NZDF operations and Government agency tasks
2. Ensure the Defence Force can produce and sustain a sufficient number of helicopter pilots capable of operating the NH90 to meet required outputs
3. 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.

Contract Status (as at 30 June 2021):

Prime contractor	CAE, Montreal, Canada

SCHEDULE/TIMEFRAME PROGRESS

	Original forecast at Approval to Commit	30 June 2021 (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[20]	November 2019	November 2019	0

[20] A new building to house the NH90 simulator was a project deliverable.

		(Actual)	
Completion of In-Field Testing	June 2020	October 2020 (Actual)	4
Ready for Training (Operational Release)	July 2020	May 2021 (Forecast)	10
Initial schedule estimates were made at the time the Project Implementation Business Case was submitted. At the time the contract was awarded, dates were firmed up as much as possible prior to completion of preliminary and detailed designs. Achievement of Operational Release (OR) has been delayed due to international travel restrictions arising from COVID-19. To achieve OR, Defence must achieve formal qualification of the flight training device, which relies on an international supplier travelling to New Zealand. At 30 June 2021 the timeframe for reopening of New Zealand's borders remained unknown.			

History of variations to schedule at 30 June 2021

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.
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	10	**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 Cannot be achieved until the new flight training device has been formally qualified. This must be done by an independent company, which is based in Australia. This will be completed when New Zealand borders open.

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 2021 Forecast/Actual	Variance (months)
Initial Operational Release	May 2020	No longer applicable	-
Operational Release	July 2020	May 2021 (Forecast)	10
Full Benefits Realisation	2028	2028 (Forecast)	0

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 cannot be achieved until the new flight training device has been formally qualified. This must be done by an independent company, which is based in Australia. This will be completed when New Zealand's borders open.

NH90 SIMULATOR OPERATIONAL CAPABILITY

Progress towards Delivery of Operational Requirements as at 30 June 2021

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

Operational Requirements	Requirement likely to be met	Comment
• 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
• Separate On board and off Board Instructor operating Stations	Yes	Contracted with CAE
• Mission Planning System	Yes	Contracted with Airbus Helicopter
• Tactical Scenario Generating System	Yes	Contracted with CAE
• Initial operating and maintenance/support training	Yes	Contracted with CAE
• 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
• 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 December 2028.		

DURING THE 2020/21 YEAR

All components for the new simulator had arrived on base, delivered in containers in 'kitset' form, at Royal New Zealand Air Force Base Ohakea at the beginning of May 2020. Installation began on 11 May and by June the dome and projector structure were completed.

The installation had originally been planned to be completed by a team of engineers from CAE Canada, however the impact of COVID-19 restrictions meant a new approach had to be used. The installation process was undertaken by a small team of local installers, with virtual engineering support supplied by the company. Two Air Force Avionics personnel attached to the installation team proved invaluable.

The aim was to provide an interim capability, by enabling NH90 pilot simulation training from October 2020, and because of the installation work, on 3 July, power was applied to the simulator and initial testing of each component got underway.

On 30 July, the simulator was run successfully for the first time, and acceptance testing activities, involving both RNZAF personnel and CAE staff, began at the start of August. With the simulator operational, ongoing testing of the system's software was able to be done, and any issues cleared.

Motion seats, which provide an additional immersive experience for trainees, were the final component to be installed after arriving from Canada at Ohakea in early August, ahead of schedule.

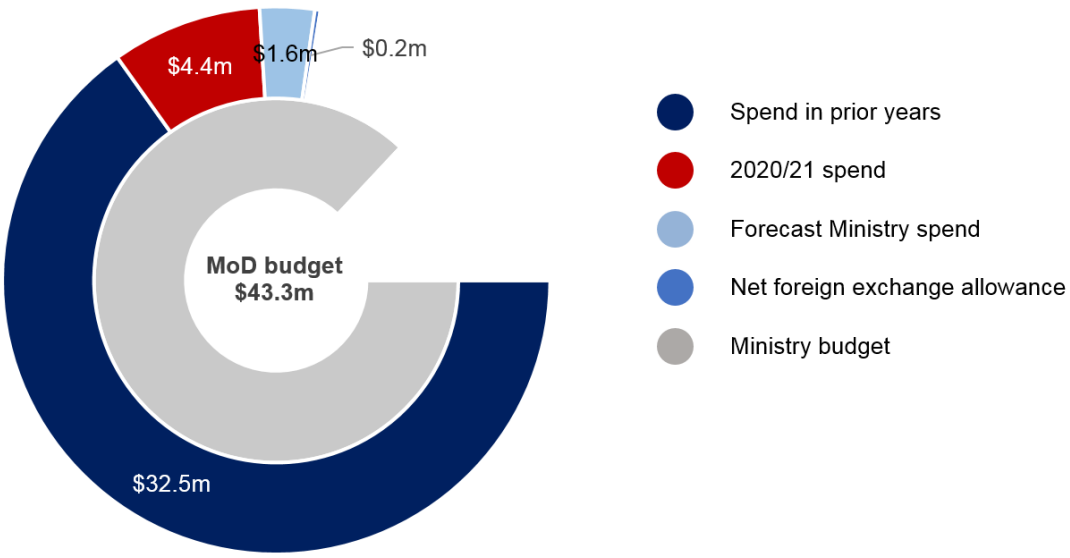
Validation of the simulator was completed on 7 October and two days later the simulator was handed over to the RNZAF.

Air Component Commander, Air Commodore Tim Walshe, approved Interim Training Capability and initial training of 3 Squadron pilots began on 12 October.

By February 2021, 3 Squadron had concluded their initial training and routine training was underway.

However further work was required with the simulator's software needing to transition to the final configuration for the contract with CAE Canada to be completed. This work commenced in April, and was planned to continue through until August.

NH90 SIMULATOR PROJECT BUDGET AND EXPENDITURE



At 30 June 2021 expected NH90 Flight Simulator project costs were:

		Ministry	NZDF	Consolidated project
		$000	$000	$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	38,513	-	38,513
	Effect of foreign exchange movements	446	-	446
	Forecast cost using hedged rate	38,067	-	38,067
	Forecast project variance	4,669	-	4,669

DEVELOPMENTS POST 30 JUNE 2021

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 scheduled to take place that month. The audit, however, was dependent on any COVID-19 restrictions that might affect travel for the specialist personnel who have to travel to New Zealand to undertake the work.

In August, however, New Zealand entered its second nationwide lockdown and final certification as a flight training device and operational release was not expected to be achieved before the final quarter of the 2021 year at the earliest; although this remains dependent on New Zealand's COVID-19 status and international travel restrictions.

With previously approved procedures in place to ensure it was safe to use, the simulator at RNZAF Base Ohakea remained available for training activities.

OPERATIONAL AND REGULATORY AVIATION COMPLIANCE SUSTAINMENT PHASE ONE

The primary objective of this project 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 THIS PROJECT

The Operational and Regulatory Aviation Compliance Sustainment (ORACS) Project is 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.

The project is being carried out in two phases. Phase One encompasses civil air traffic management systems for most aircraft. Phase Two will encompass navigation and communication systems.

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. In New Zealand, the deadline was 31 December 2018 for flights above flight level 245 and is 31 December 2021 for controlled airspace. As a result, many aviation authorities around the world are requiring all aircraft have ADS B Out capability to fly in their controlled airspace.

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 **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

CAPABILITY DEFINITION PHASE

How Defence identified and assessed capability and operational requirements

Because the need for change has been driven by compliance regulations and obsolescence of current systems, 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 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.

For some fleets, in-house RNZAF engineering services will 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 avionic 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.

Contract Status (as at 30 June 2021):

Fleet	Prime Contactor
T-6C	Textron Aviation Defense
NH90	Nato Helicopter Industries

SCHEDULE/TIMEFRAME PROGRESS

	Original forecast at Approval to Commit	30 June 2021 forecast/achieved	Variation (months)
T6-C ADS-B acceptance on first aircraft	March 2020	June 2021 (Actual)	+15
T6-C ADS-B operational release	January 2021	February 2022 (forecast)	+13
The variance does not extend past the mandated ADS-B date of December 2022 in New Zealand.			

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 deemed to have obtained Operational Release. For the T-6C, for example, this will be declared once the fleet is certified ABS-B Out compliant.

ORACS OPERATIONAL CAPABILITY

Progress towards Delivery of Operational Requirements as at 30 June 2021

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
Full benefits realisation for all Phase One fleets is scheduled to be achieved in December 2025.	

DURING THE 2020/21 YEAR

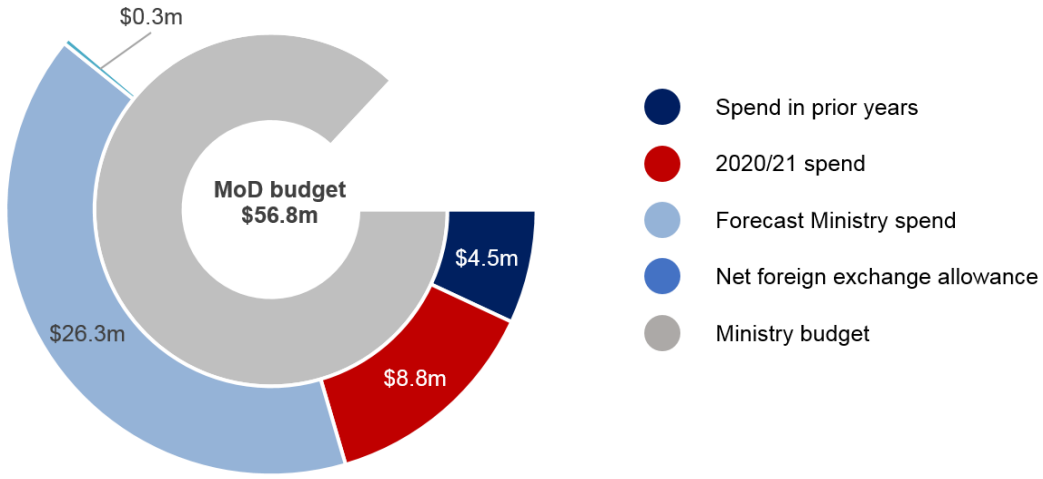
Phase 1(A): Modifications to B757 and C130H aircraft and the first aircraft of both T-6C and SH-2G(I) have been completed. A contract was signed for the A109s and hardware development is on schedule. Modification of all remaining aircraft will take place during planned maintenance throughout 2021/22.

Phase 1(B): A contract was signed with NATO Helicopter Industries, the manufacturer of the

NH90s, to complete Phase 1 modifications. This allowed software development to commence.

COVID-19 continues to impact the project causing delays due to specialist testing activities, and delays with supply chains. The project team has adapted procurement and integration activities to mitigate delays, including engaging New Zealand suppliers to provide alternative solutions for some fleets.

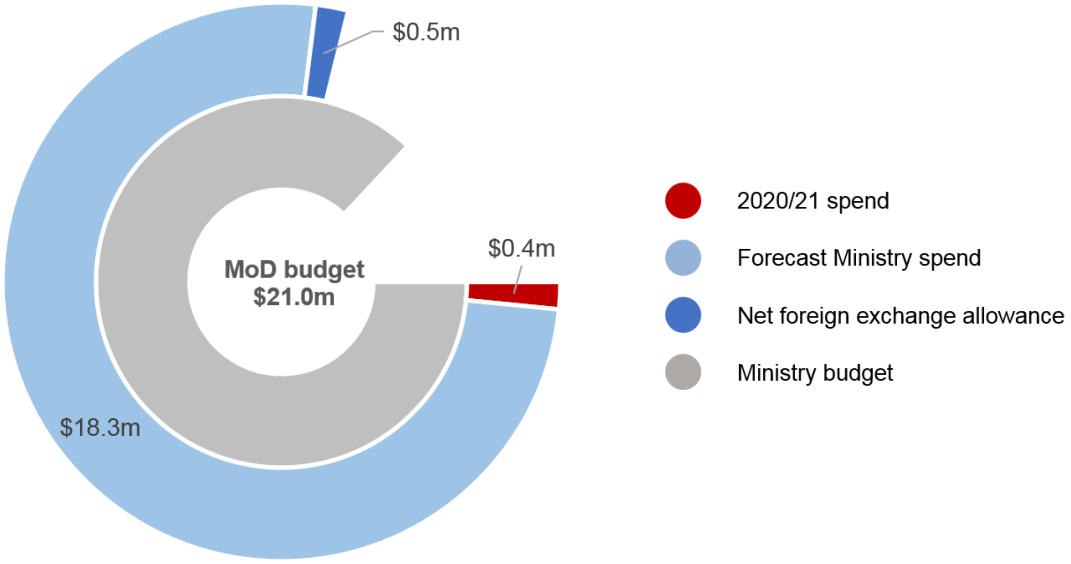
ORACS PHASE ONE (A) PROJECT BUDGET AND EXPENDITURE



At 30 June 2021 expected ORACS: Phase One (A) project costs were:

		Ministry	NZDF	Consolidated project
		$000	$000	$000
Budget	Current approved project budget	56,832	-	56,832
	Allowance for foreign exchange movements	-	-	-
	Original approved project budget	56,832	-	56,832
Forecast	Forecast total project cost	39,715	-	39,715
	Effect of foreign exchange movements	(266)	-	(266)
	Forecast cost using hedged rate	39,981	-	39,981
	Forecast project variance	16,851	-	16,851

ORACS PHASE ONE (B) PROJECT BUDGET AND EXPENDITURE



At 30 June 2021 expected ORACS: Phase One (B) project costs were:

		Ministry	NZDF	Consolidated project
		$000	$000	$000
Budget	Current approved project budget	21,050	-	21,050
	Allowance for foreign exchange movements	-	-	-
	Original approved project budget	21,050	-	21,050
Forecast	Forecast total project cost	18,634	-	18,634
	Effect of foreign exchange movements	(455)	-	(455)
	Forecast cost using hedged rate	19,089	-	19,089
	Forecast project variance	1,961	-	1,961

DEVELOPMENTS POST 30 JUNE 2021

Phase 1A is progressing well against the new mandated date of December 2022 for delivery of ADS-B Out across the fleets, although the operational release for the T-6 Texan is now forecast to be achieved in June 2022 rather than February 2022.

Phase 1B costs and schedule were being confirmed, using information provided by NHI, once the timeline for the solution's release is confirmed.

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)[21] 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 Project[22], 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.

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[21] 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*.

[22] 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:

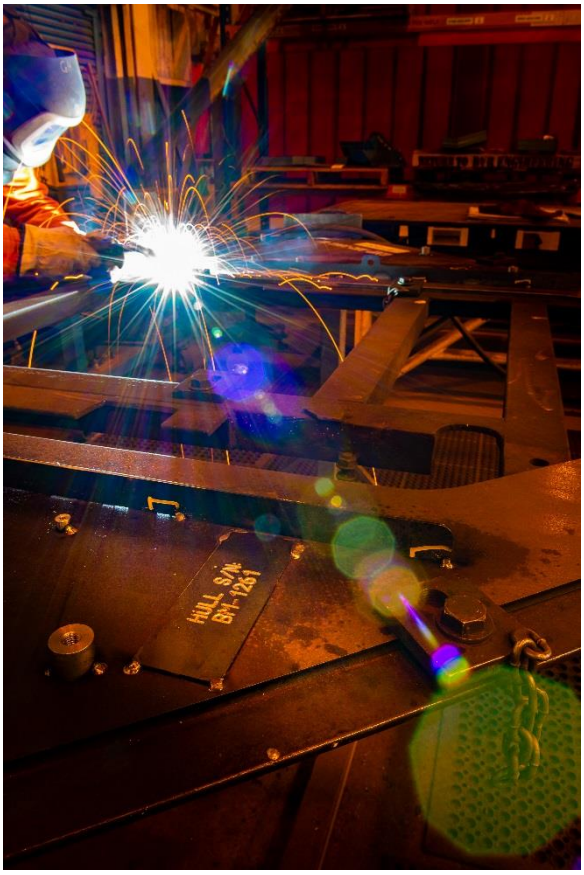
Strategically mobile and tactically agile capability: able to operate in a range of environments, improving the ability to offer the range of military response options required by Government.

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[23] 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.[24] CAB-20-MIN-0296

[23] In addition to trials and risk reduction work to support future Protected Mobility procurements.
[24] 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 interoperability with Royal New Zealand Navy and Royal New Zealand Air Force movement/transport elements must be considered. 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 (GDLS) 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.

SCHEDULE/TIMEFRAME PROGRESS

	Estimate at Approval to Commit	30 June 2021 forecast/achieved	Variation (months)
Vehicle delivery commences	Late-2022	March 2022 (Forecast)	-8

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 2021 (Forecast/Actual)	Variance (months)
Interim Operational Release commences	July 2023	March 2023	-4
Operational Release commences	September 2024	December 2024	3
Benefits delivered through the PV-M will be realised incrementally out to December 2024.			

DURING THE 2020/21 YEAR

Following Cabinet approval for the Secretary of Defence to sign a contract for the procurement, the Project focused on finalising contract negotiations.

On 4 September the Secretary of Defence and Thales Australia Ltd entered into the contract for the acquisition of 43 (five variants) Bushmaster NZ5.5 protected vehicle medium, spares, ancillaries and a training package.

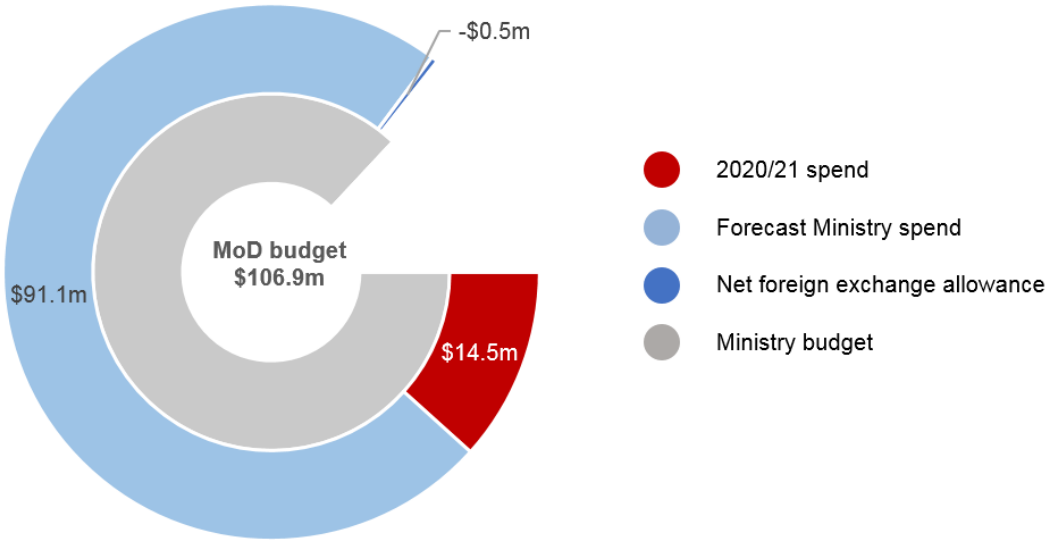
Design reviews for the NZ5.5 Bushmaster vehicles began with the manufacturer, to deliver the five variants of the vehicle: troop carriers, command and control, logistics, ambulance, and maintenance support.

This significant area of work for the project continued throughout the rest of the year in review.

Among other outcomes, it will ensure that the vehicles can integrate modern New Zealand military equipment.

Bushmaster NZ5.5 design concept (supplied)

PV-M PROJECT BUDGET AND EXPENDITURE



At 30 June 2021 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	105,589	-	105,589
	Effect of foreign exchange movements	497	-	497
	Forecast cost using hedged rate	105,092	-	105,092
	Forecast project variance	1,781	-	1,781

DEVELOPMENTS POST 30 JUNE 2021

Design review work for the variants of the Bushmaster NZ5.5 continued into the 2021/22 financial year. Delivery of the first vehicle is now expected to take place in May 2022.

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.

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.