

Charting the Course:

A Strategic Framework for Science Systems Uplift on RV Investigator

Andrew Martini | 25 September 2025 | IRSO Bergen, Norway







Marine
National Facility



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National Facility

Australia's National
Science Agency

MNF 2030

A 10-year strategy for the Marine National Facility to guide the use of Australia's dedicated blue-water research capabilities

September 2020



The Marine National Facility is funded by the Australian Government, and is owned and operated by CSIRO on behalf of the nation.

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Our mission

We facilitate safe, efficient and excellent marine and atmospheric research aligned with national priorities and addressing Australia's grand challenges for society, the economy and the environment.

Annual MNF Operations Rolling Plan

1

Maximum impact

2

Broad access

3

Streamlined operations and optimal use

4

Advanced capabilities and innovation

5

Training future generations

6

Connecting with Australians and the world

Safe operations for our people and the environment

“keep pace with emerging technological capabilities and research needs and play an active role in promoting and adopting marine technology innovation.”

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Pillar 4 - Advanced Capabilities and Innovation

Key Action

4.1

MNF 25-Year Capability Framework

The MNF has developed a 25-year capability investment framework to identify, prioritise, procure and review MNF capital investment through the remaining life of RV Investigator and beyond. The framework identifies gaps in marine research infrastructure capability in Australia and proposes a roadmap for securing investment for high-value.



Key Action

4.2

Technology and Innovation Advisory Group

Central to the framework is the establishment of the Technology and Innovation Advisory Group (TIAG) with membership from the research and technology development communities. The TIAG will advise MNF on the evolving demands of research and emerging technologies to guide strategic capital investment. Further, they will ensure that acquisition of new equipment fits the needs of Australia's blue-water research users and is interoperable across the national research fleet where possible. The TIAG will also play a role in assessing proposals for sea time under Stream 4, technology and innovation research



Key Action

4.3

Promote innovation and technology

The dedicated technology and innovation access stream will allow public sector technology developers to apply for sea time. It is designed to attract proposals that foster development of new marine research technologies and build on Australia's reputation for innovation. Private sector technology developers can also access MNF facilities under Stream 4, either in partnership with research organisations or through fully funding the sea time, as long as their proposals meet the eligibility and merit criteria.



25-Year Capability Framework

25-Year Critical Investment Schedule

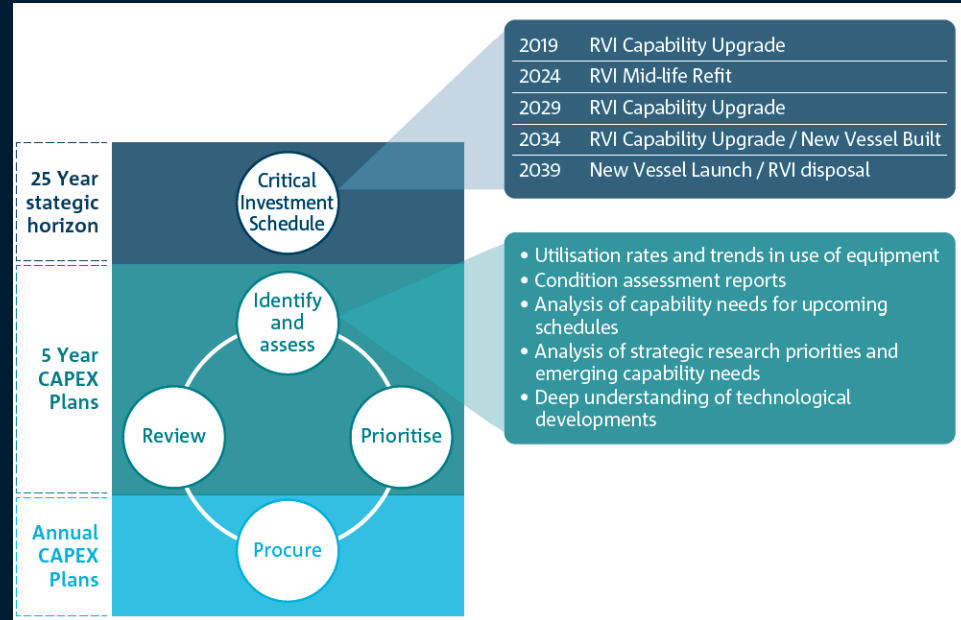
- Sets the pace for essential and major spending

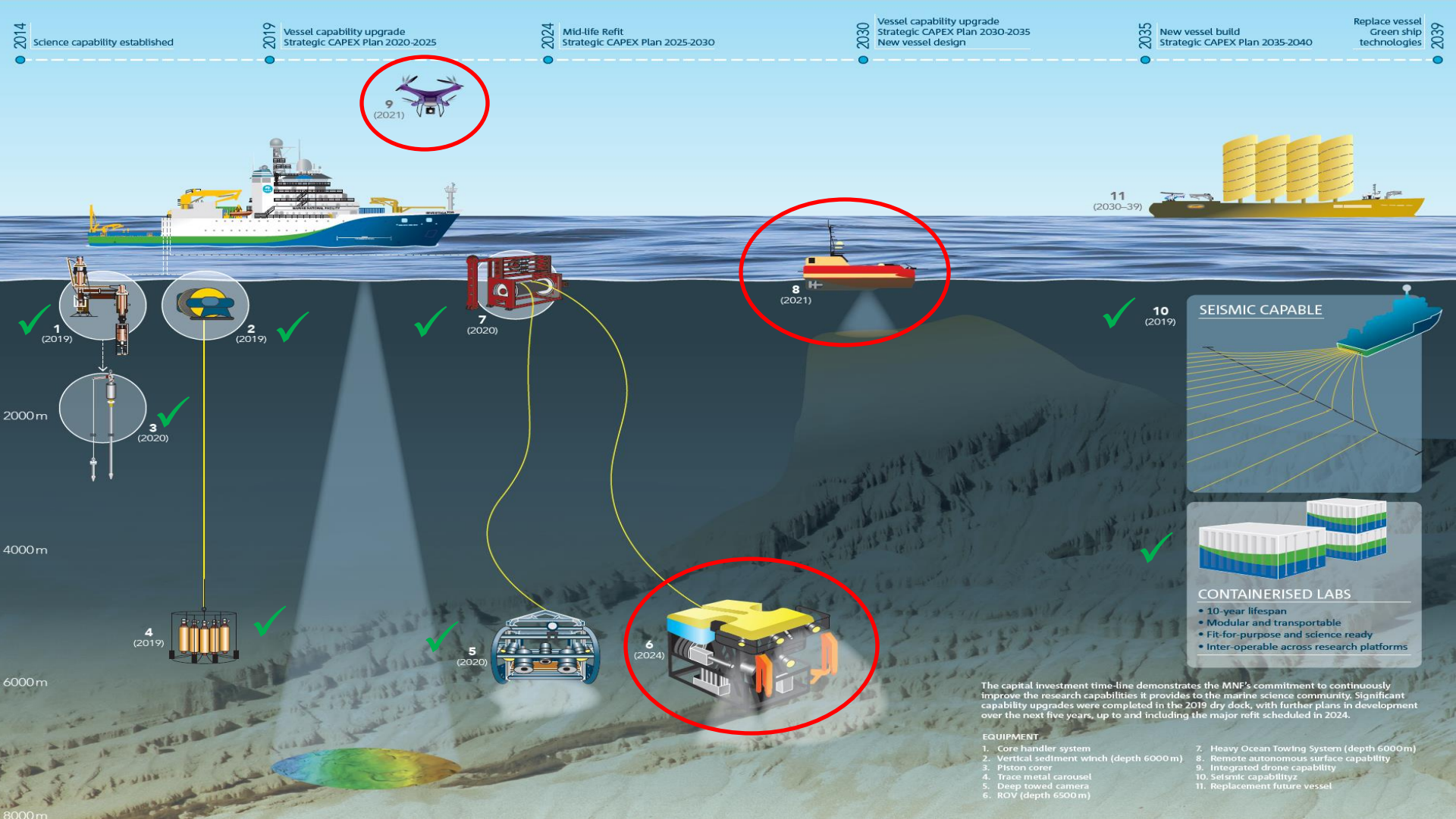
5-Year Capital Investment Plan

- Emerging Upgrade and Replacement
- Trends in Capability Demand and Technology

Annual Capital Expenditure Plan

- Both strategic investment and regular R&M





2014 Science capability established

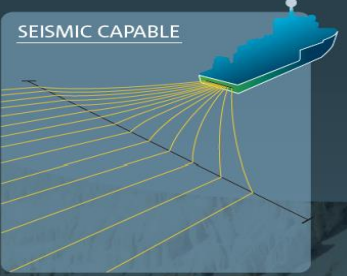
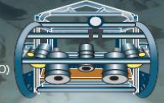
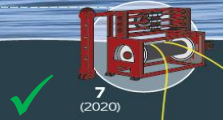
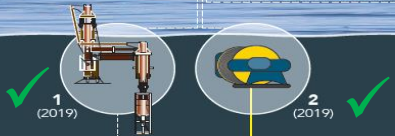
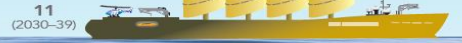
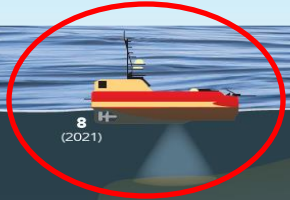
2019 Vessel capability upgrade
Strategic CAPEX Plan 2020-2025

2024 Mid-life Refit
Strategic CAPEX Plan 2025-2030

2030 Vessel capability upgrade
Strategic CAPEX Plan 2030-2035
New vessel design

2035 New vessel build
Strategic CAPEX Plan 2035-2040

2039 Replace vessel
Green ship technologies



CONTAINERISED LABS

- 10-year lifespan
- Modular and transportable
- Fit-for-purpose and science ready
- Inter-operable across research platforms

The capital investment time-line demonstrates the MNF's commitment to continuously improve the research capabilities it provides to the marine science community. Significant capability upgrades were completed in the 2019 dry dock, with further plans in development over the next five years, up to and including the major refit scheduled in 2024.

EQUIPMENT

- 1. Core handler system
- 2. Vertical sediment winch (depth 6000m)
- 3. Piston corer
- 4. Trace metal carousel
- 5. Deep towed camera
- 6. ROV (depth 6500m)
- 7. Heavy Ocean Towing System (depth 6000m)
- 8. Remote autonomous surface capability
- 9. Integrated drone capability
- 10. Seismic capability
- 11. Replacement future vessel

Identifying emerging science needs

1. Engagement through external consultative forums such as Technical & Innovation Advisory Group
2. Open call for capability submissions from external marine science industry
3. Identification of research priorities through national and international strategic plans / white papers
 - Australia's Sustainable Ocean Plan
 - National Marine Science Decadal Strategy (2025-2035)
 - Trends – Climate Interventions (mCDR), Integrated Ocean Management, Ocean Accounting, Underwater Cultural Heritage, AI/ML
4. Market sounding of marine research technologies becoming commercially available
5. Global benchmarking of research vessels and new capabilities being commissioned



Mid or Deepwater ROV

- Broad requests as capability not elsewhere in Australia
- Operating Model
- Depth requirements v. operational costs



Omics Technologies

- Autonomous eDNA surface sampler entering operation
- Passive eDNA sampler operational on camera tows (6000m rated)
- Needs of future eDNA laboratories?



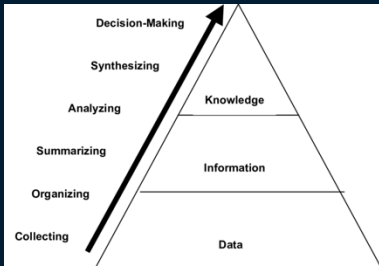
Autonomous Technologies

- History of research, design and operation within CSIRO
- Dedicated autonomous capabilities within MNF still being assessed
- Field testing deployment of gliders from Antarctic bases



Interdisciplinary Science

- Increasing process studies in recent years
- Challenging existing processes and coordination on board
- NZOC KF 1.2 / 1.3 – efficient data collection b/w platforms increasingly important



Data to Information

- Data audit to identify current practice and uptake
- Enhance pipeline automation
- Interface modernisation – Analysis or AI ready data



Remote Science

- Starlink has created many new possibilities
- MNF VISTA – Virtual Investigator Systems for Telepresence and Access
- Benefits to Science Ops, Outreach Activities and Data Publishing



Seeking Best Practice – Questions for IRSO

- How do you assess and prioritise science system upgrades?
- How do you manage (or force) obsolescence?
- What frameworks or tools do you use to evaluate return on investment (ROI)?
- How do you manage trade-offs across diverse stakeholder groups?



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Thank you

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