



MNF Voyage Highlights and Summary

Voyage #:	IN2021_E02
Voyage title:	Trials and Calibrations (Winches)
Mobilisation:	Monday, 15 November – Wednesday, 17 November 2021, Hobart
Depart:	Saturday, 20 November 2021, Selfs Point
Return:	Sunday, 28 November 2021, Hobart PW04 ~1100hrs
Demobilisation:	Sunday, 28 November – Monday, 29 November 2021, Hobart PW04
Voyage Manager:	Tegan Sime
Technical Lead:	Jason Fazey
Affiliation:	CSIRO

PART A – Voyage Highlights

This voyage's primary aims were to test and calibrate (mechanical and digital) of the following systems:

- General Purpose Winch with new Heavy Ocean Towing System (HOTS) Fibron cable Annual Calibration
- Annual calibrations of:
 - CTD Winch #1 & 2
 - Deep Corer winch
 - Towed Body winch
 - Port and Starboard trawl winch
- Automatic Heave Compensation testing on all capable winches
- Deep Tow Camera (DTC) 'flight testing' deployments on new HOTS cable, adjustments to package weights/tow speed.
- Commission fishery mode software for auto-spool adjust on ship turns
- Test and familiarisation with pelagic & demersal trawl equipment and rigging for RV Investigator with support of external fishing master

With a new swing of ship crew, the voyage had significant work to complete for primary winch calibrations.

The outcomes of these projects will allow *Investigator* to continue to support multi-disciplinary research on behalf of the nation.



Fig 1. Deep Corer Winch line post re-spooling showing minor burying on cheekplate (left). Deep Tow Camera prepared for first deployment on HOTS (right).

Voyage Highlights

Technical Lead

Jason Fazey is the MNF's Science Technology Coordinator and has many years' experience onboard RV Investigator. Jason was also involved in the early project management, scoping, assessment and procurement of the Giant Piston Corer and Core Handler systems prior to this voyage.



Title

IN2021_E02 Trials and Calibrations (Winches).

Purpose

The purpose of this Marine National Facility (MNF) voyage was to calibrate and commission new, upgraded, and existing critical equipment (with sea trials and personnel training) onboard *Investigator* for upcoming voyages in the 2022 schedule and beyond.

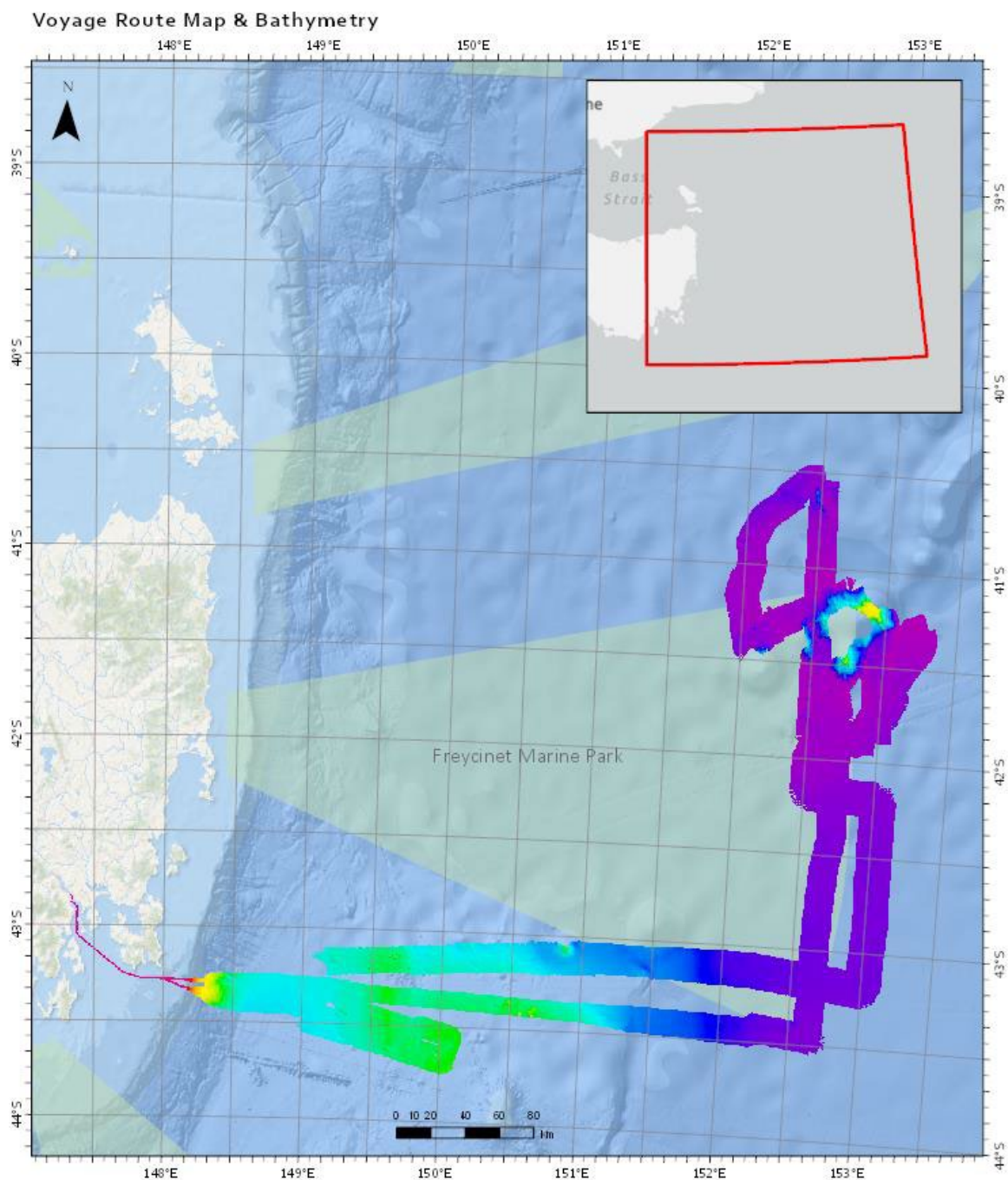
The primary objectives for this voyage were testing and calibrating all primary and auxiliary winch systems including the General Purpose winch with new HOTS cable and the Deep Corer Winch. Additional tests of end-user equipment such as the Deep Towed Camera were also planned for after successful winch calibrations. Broadly another purpose of this voyage was to maintain, repair, test & report on other ship systems after significant time alongside.

Contribution to the nation

The outcomes of these projects together are of significance to the Australian community because they provide the MNF and therefore the nation with confidence of ship systems onboard *Investigator*.

As a result of this voyage

1. We have a better understanding of ship winches and system operating performance and constraints.
2. We have mapped approximately 2291 line kilometres (1237 nautical miles) whilst underway using approximately 7 oceanic acoustic profiling devices onboard.



Voyage Summary

Objectives and brief narrative of voyage

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The primary objectives for this voyage were testing and calibrating all primary and auxiliary winch systems including the General Purpose winch with new HOTS cable and the Deep Corer Winch. Additional tests of end-user equipment such as the Deep Towed Camera were also planned for after successful winch calibrations. Broadly another purpose of this voyage was to maintain, repair, test & report on other ship systems after significant time alongside.

Scientific objectives

The primary aim of this voyage was ship calibrations, however, additional activities such as seafloor mapping and Deep Tow Camera footage work to meet future voyage science objectives were also planned.

Voyage objectives

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Results

ASP crew, RAPP MacGregor, the Fishing Master and support staff were successful in trailing and calibrating all primary and auxiliary winches onboard including the critical deep corer winch, with the exception of CTD #2 due to time constraints.

The General Purpose winch with increased capacity HOTS Fibron cable performed well with spooling, mechanical terminations, A-Frame block functionality and electro-optical termination.

Voyage narrative

Departing from Selfs Point bunkers on Saturday, 20 November 2021, voyage activities started with testing the General Purpose Winch and new HOTS electro-optical cable. Performance of the HOTS was as expected or better, including Automatic Heave Compensation.

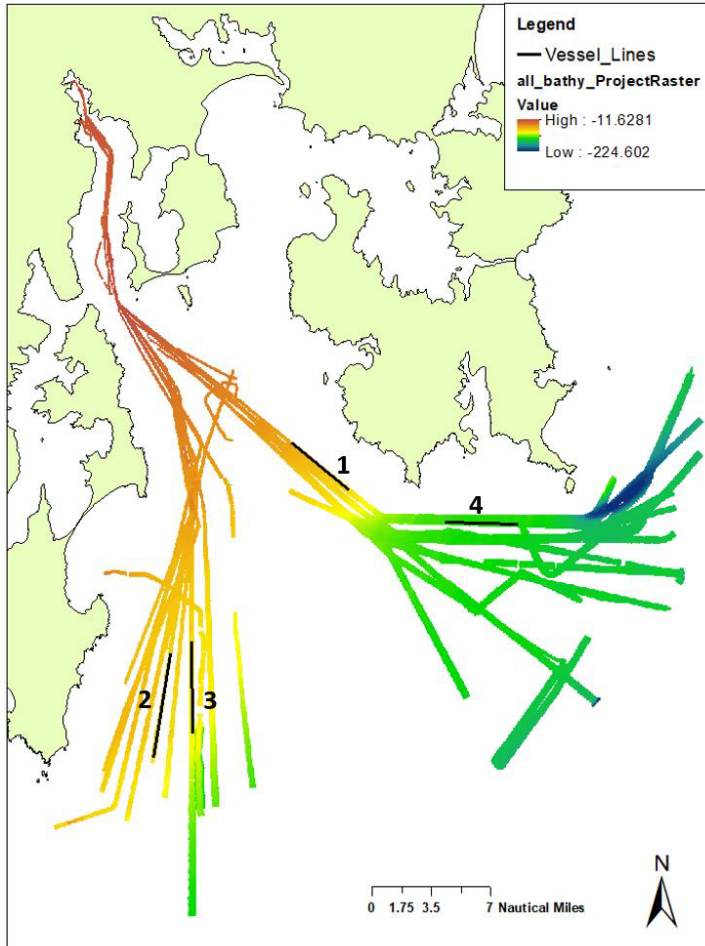
Testing the Deep Corer Winch displayed symptoms of 'buried rope' deeper on the drum. The onboard team performed a risk assessment through ASP's standard JSA process and the rope was paid out astern of the vessel with a drogue and float until the drum was almost empty (~7.8km). Careful manual respooling here laid a good foundation and permitted auto-respooling functionality to return.

Port and Starboard trawl winches, using new trawl gallows, were calibrated using the resistance from trawl doors (otter boards) and associated fishing net, bridles and gear. After calibration, fishery mode software was commissioned to allow greater control of winch tension, net mouth spread and wire-water entry points, especially during vessel turns. This was successfully completed with some large and some almost-nil differences in performance between manual and auto fishery mode.

Deep Tow Camera testing was conducted, however, almost immediately upon first deployment the video functionality failed. Onboard SIT performed extensive troubleshooting of the video camera systems and prepared deployments for the next voyage (IN2021_E03).

CTD #1 winch was calibrated using the 24 rosette with additional weights added to reach minimum 500kg requested by chief engineer. Due to time constraints, the calibration of CTD #2 winch was moved to IN2021_E03.

Backscatter checks and calibrations of the EM710 were performed underway when transiting through sites #1 and #4 as pictured below.



Throughout the voyage, routine underway data collection was performed including echosounders, underway seawater (including calibration of new PCO₂ sensor), gravity meter, sea surface temperature radiometer, Sound Velocity profiles from XBT launches and other means.

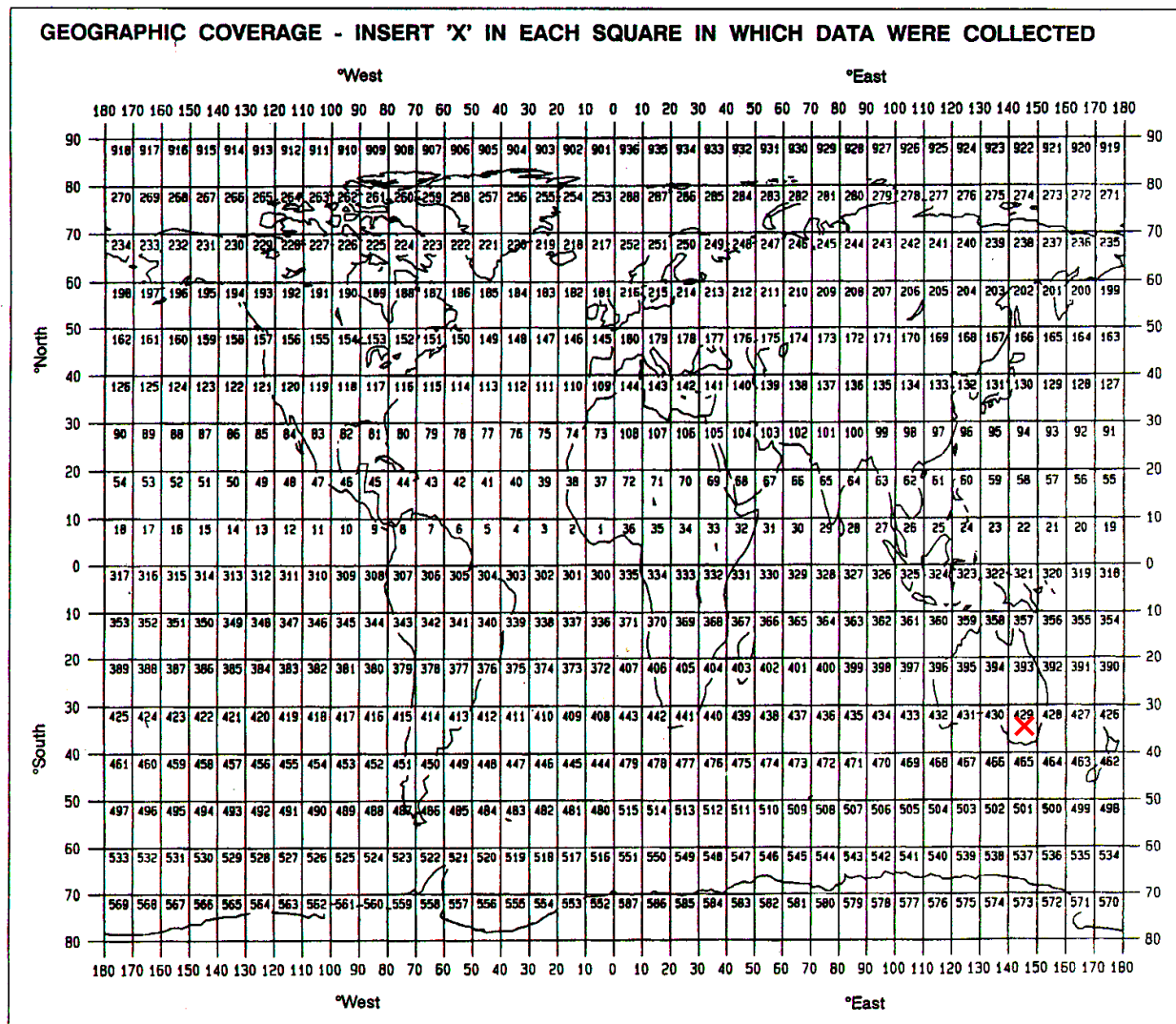
Summary

Overall, this voyage was successful in achieving almost all planned scope of works for trials and calibrations of winches (except CTD #2), though it was at significant effort to maximise all possible time from unplanned errors & troubleshooting during calibrations. The planning and delivery of this voyage was highly compressed, facing many changes and challenges such as changed ports and areas of operation, unconfirmed departure time, personnel changes and further onboard winch faults.

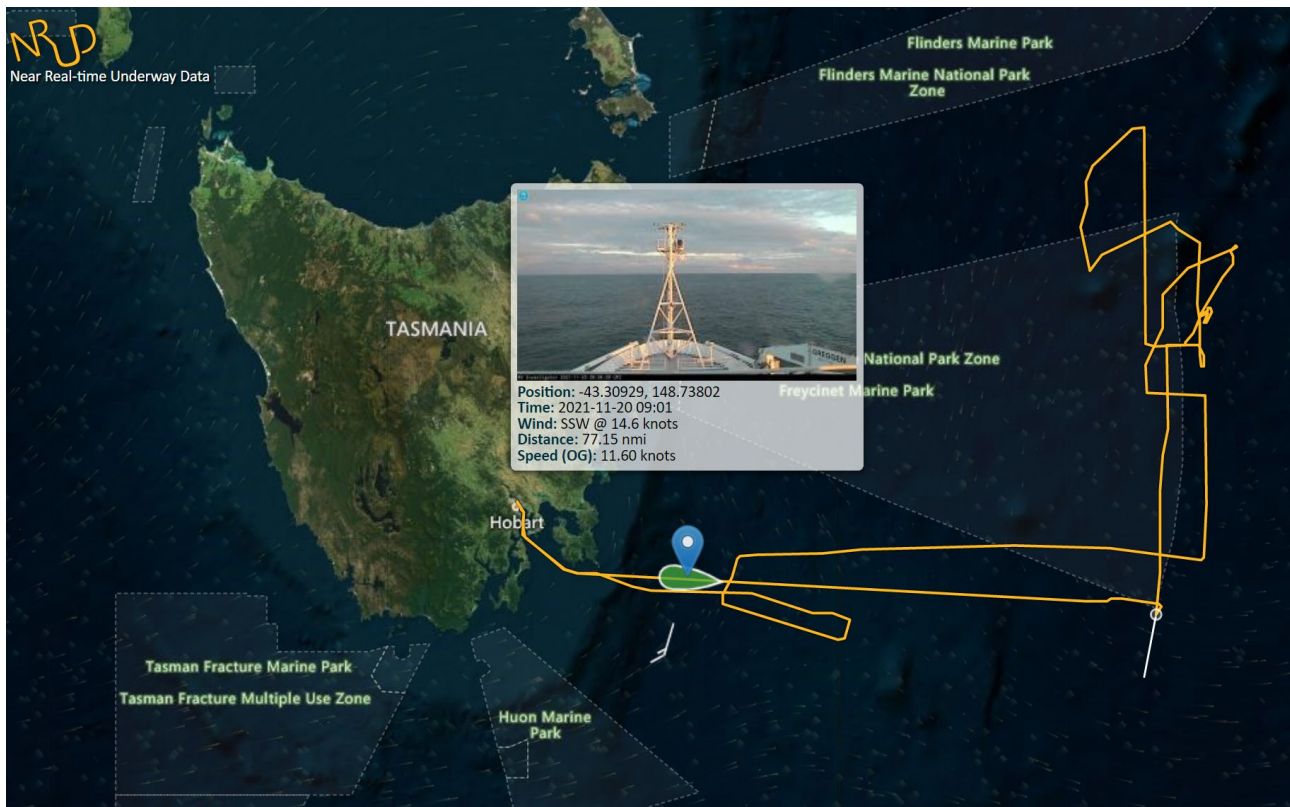
Considering the context of these challenges, the problems uncovered (many resolved onboard) and the volume of work completed and feedback of participants – many consider this voyage a positive and important restart to operations for the Marine National Facility, following from our extended Long Maintenance Period of 2021. This voyage was successful because of the skills and experience of the ship's crew, MNF staff, the science teams and their ability to work together in any conditions.

Marsden Squares

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Track Chart



Acknowledgements

Acknowledgement and thanks to ASP crew, Technical Lead, Jason Fazey and Voyage Manager, Tegan Sime who were instrumental in supporting a high workload of winch calibrations in a short timeframe.

Acknowledgement and thanks to Kate Kiefer from MNF Facilities and Logistics who was able to procure an important test weight at short notice.

Thanks also to Engineering and Technology team members who were supportive, understanding and flexible during dynamic operations whilst at sea.

Signature

Your name:	David Flynn
Title:	Voyage Delivery Coordinator
Signature:	(insert signature)
Date:	05/01/2022

Appendix A – CSR/ROSCOP Parameter Codes

	METEOROLOGY
M01	Upper air observations
M02	Incident radiation
M05	Occasional standard measurements
M06	Routine standard measurements
M71	Atmospheric chemistry
M90	Other meteorological measurements

	PHYSICAL OCEANOGRAPHY
H71	Surface measurements underway (T,S)
H13	Bathythermograph
H09	Water bottle stations
H10	CTD stations
H11	Subsurface measurements underway (T,S)
H72	Thermistor chain
H16	Transparency (eg transmissometer)
H17	Optics (eg underwater light levels)
H73	Geochemical tracers (eg freons)
D01	Current meters
D71	Current profiler (eg ADCP)
D03	Currents measured from ship drift
D04	GEK
D05	Surface drifters/drifting buoys
D06	Neutrally buoyant floats
D09	Sea level (incl. Bottom pressure & inverted echosounder)
D72	Instrumented wave measurements
D90	Other physical oceanographic measurements

	MARINE BIOLOGY/FISHERIES
B01	Primary productivity
B02	Phytoplankton pigments (e.g. chlorophyll, fluorescence)
B71	Particulate organic matter (inc POC, PON)
B06	Dissolved organic matter (inc DOC)
B72	Biochemical measurements (e.g. lipids, amino acids)
B73	Sediment traps
B08	Phytoplankton
B09	Zooplankton
B03	Seston
B10	Neuston
B11	Nekton
B13	Eggs & larvae
B07	Pelagic bacteria/micro-organisms
B16	Benthic bacteria/micro-organisms
B17	Phytobenthos
B18	Zoobenthos
B25	Birds
B26	Mammals & reptiles
B14	Pelagic fish
B19	Demersal fish
B20	Molluscs
B21	Crustaceans
B28	Acoustic reflection on marine organisms
B37	Taggings
B64	Gear research
B65	Exploratory fishing

H21	Oxygen
H74	Carbon dioxide
H33	Other dissolved gases
H22	Phosphate
H23	Total - P
H24	Nitrate
H25	Nitrite
H75	Total - N
H76	Ammonia
H26	Silicate
H27	Alkalinity
H28	PH
H30	Trace elements
H31	Radioactivity
H32	Isotopes
H90	Other chemical oceanographic measurements

	MARINE CONTAMINANTS/POLLUTION
P01	Suspended matter
P02	Trace metals
P03	Petroleum residues
P04	Chlorinated hydrocarbons
P05	Other dissolved substances
P12	Bottom deposits
P13	Contaminants in organisms
P90	Other contaminant measurements

	MARINE GEOLOGY/GEOPHYSICS
G01	Dredge
G02	Grab
G03	Core - rock
G04	Core - soft bottom
G08	Bottom photography
G71	In-situ seafloor measurement/sampling
G72	Geophysical measurements made at depth
G73	Single-beam echosounding
G74	Multi-beam echosounding
G24	Long/short range side scan sonar
G75	Single channel seismic reflection
G76	Multichannel seismic reflection
G26	Seismic refraction
G27	Gravity measurements
G28	Magnetic measurements
G90	Other geological/geophysical measurements