RV *Investigator* Voyage Summary

Voyage #:	**IN2017_C02**		
Voyage title:	RAN Hydrographic Survey		
Mobilisation:	Hobart, Wednesday, 03 May 2017		
Depart:	Hobart, 0810, Thursday, 04 May 2017		
Return:	Bell Bay, 0800, Monday, 15 May 2017		
Demobilisation:	Bell Bay, Monday, 15 May 2017		
Voyage Manager:	Matt Boyd	Contact details:	Matt.boyd@csiro.au
Chief Scientist:	Richard Cullen		
Affiliation:	Royal Australian Navy	Contact details:	richard.cullen@defence.gov.au

Objectives and brief narrative of voyage

1. Conduct a bathymetric survey to improve navigational safety between Wilson's Promontory and the Hogan Group. Survey to be conducted in accordance with International Hydrographic Organisation standards S44 Order 1a.
2. Improve the charting standard of charts AUSENC 439146, 439147, 440146, 440147 and AUS 148, 357, 487, 802
3. Assess current Hydrographic surveying skill sets for nautical charting activities.
4. Assess equipment capabilities for geospatial data collection.
5. Assess the vessel capabilities for conducting geospatial data collection activities in remote and varying environmental conditions.

Scientific objectives

Nil.

Voyage objectives

As per dot points above.

Results

Objective 1 – Completed data pack has not yet been rendered to the Australian Hydrographic Office for internal quality control. Therefore this objective cannot be fully evaluated at this time. Preliminary onboard results indicated that the data acquisition was within specification however it is the entire report and product that requires evaluation.

Objective 2 – Reliant on Objective 1.

Objective 3 – Feedback provided via the Chief Scientist's report. Additional preparation for the conduct of nautical charting survey is required. The survey processes and documentary evidence requirements are different to that of a science survey voyage.

Objective 4 – Operational systems were assessed and information fed back to project teams. Information on systems not in use was gathered through document exchange and interviews with ship and MNF staff. This objective has primarily been achieved.

Objective 5 - Operational systems were assessed and information fed back to project teams. Information on ship systems was gathered through document exchange and interviews with ship's crew and MNF staff. The Engineering Officer provided an excellent tour of the machinery and explained short comings identified after commissioning that have been slowly improved. This objective has primarily been achieved.

Voyage Narrative

Having departed Hobart on day 1, the first objective was to conduct a multibeam patch test on a previously surveyed area. Following this, passage to the survey area commenced. At all times, bathymetric passage sounding, Acoustic Doppler Current Profiling (ADCP), gravity and acoustic sub-bottom profiling were conducted. Upon arrival at the survey area on day two, sounding operations commenced in a systematic manner.

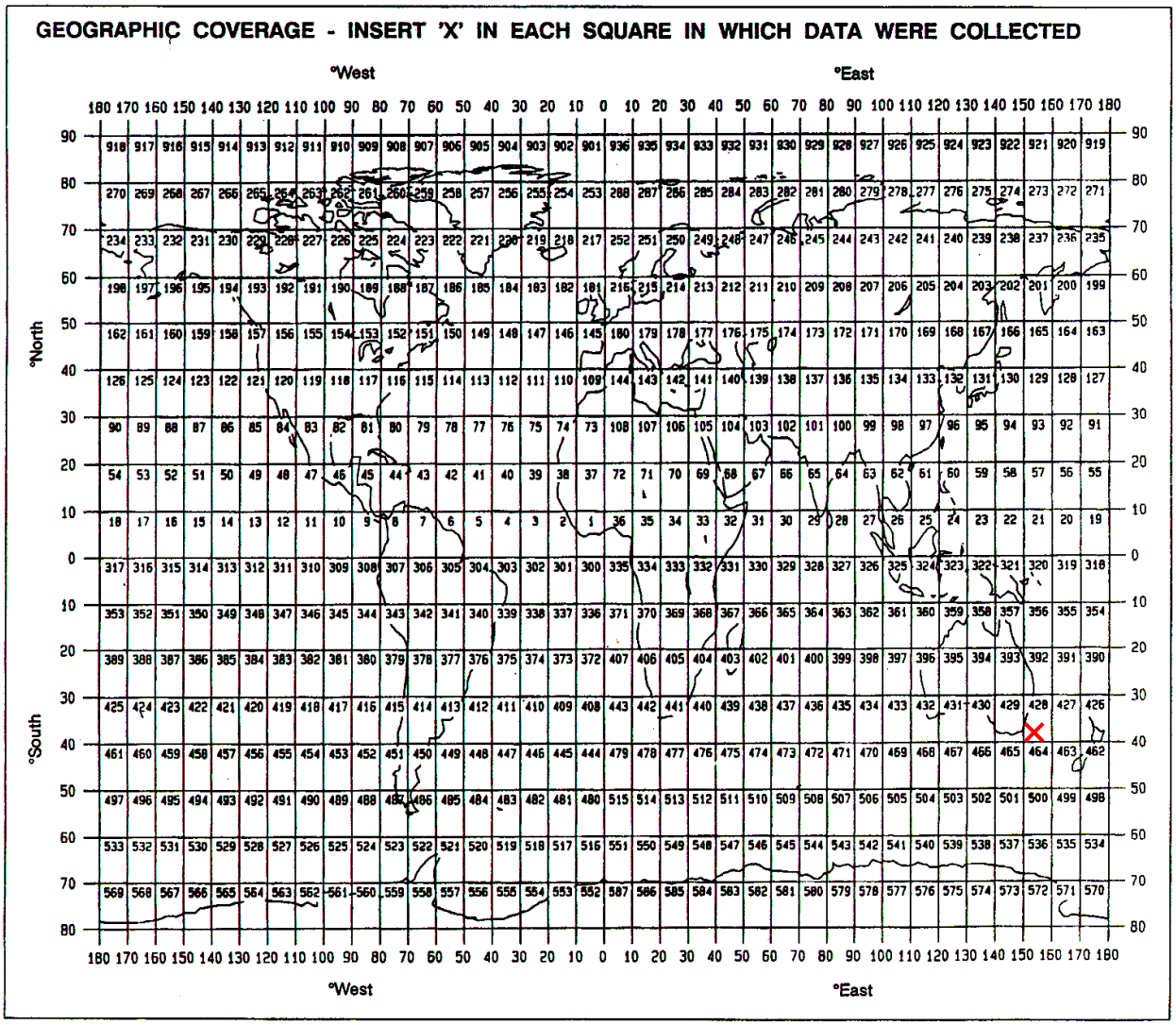
The weather deteriorated on 06 May and the survey team needed to consider a variety of amendments to the survey plan to alleviate data acquisition issues and maintain or suspend ancillary operations. Seabed sampling and wreck investigations occurred toward the final two days in the survey area. An opportunity presented to use the drop camera on a wreck during the day which was very successful. Another wreck like feature was identified and a night drop camera was attempted to trial the lighting system. The feature was a large rock. While disappointing, it did allow the technical staff to identify some improvements in the camera system lighting to provide better imagery in the future.

Passage sounding continued from the survey area to Bell Bay and up the river to the berth. The Navy team departed shortly thereafter.

Summary

Data collection was very successful with many lessons learned on how best to prepare the MNF teams for future activities for nautical charting survey. Equipment capability is always a key factor in the planning phase of the Australian Hydrographic Service. As a better understanding has been achieved with respect to types of data collection and limitations due to system conflicts, it is expected that more focus can be given to these areas to maximise geospatial data collection.

Marsden Squares



Moorings, bottom mounted gear and drifting systems

Nil.

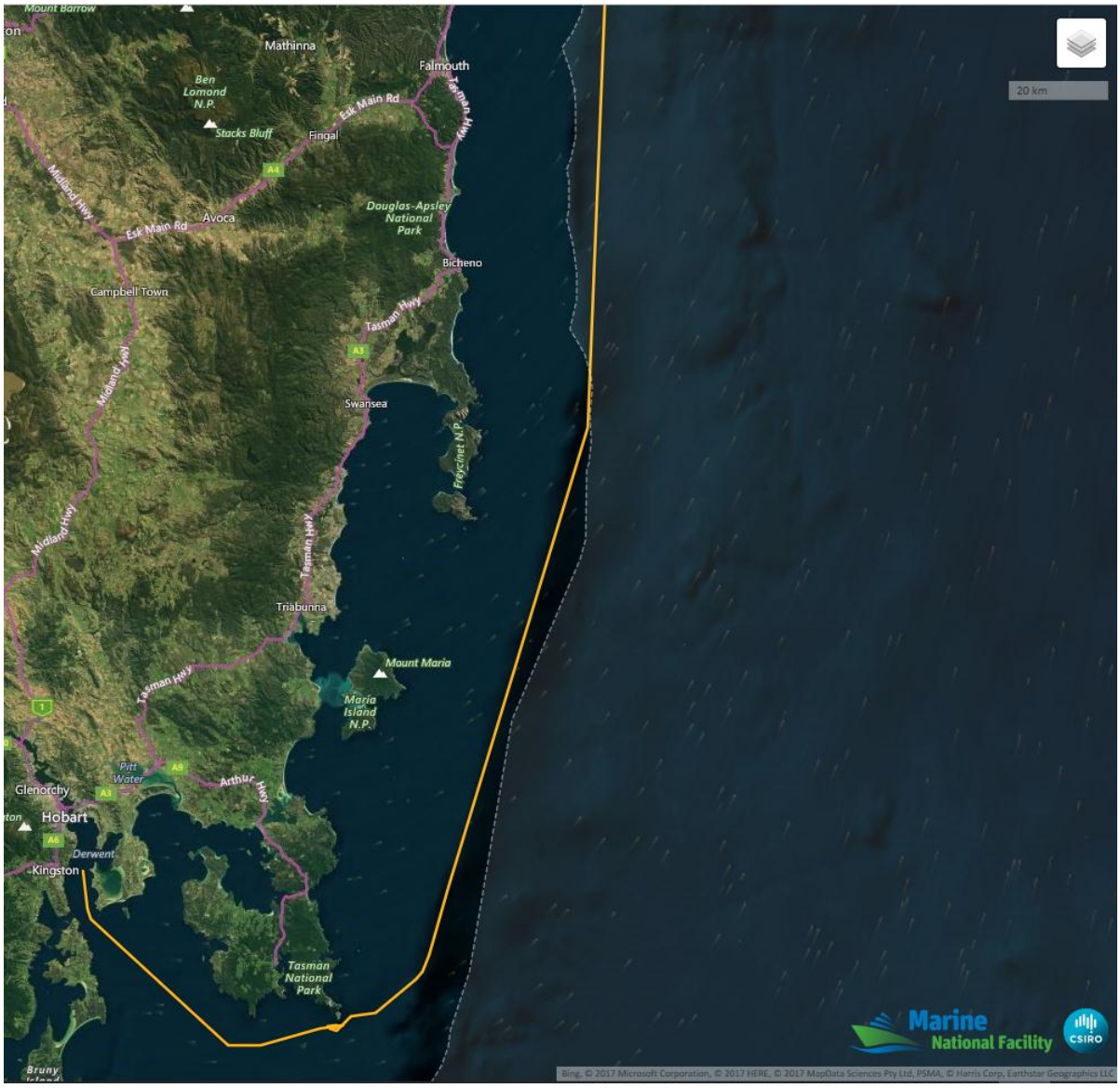
Summary of Measurements and samples taken

Item No.	PI see page above	NO see above	UNITS see above	DATA TYPE Enter code(s) from list at Appendix A	DESCRIPTION Identify, as appropriate, the nature of the data and of the instrumentation/sampling gear and list the parameters measured. Include any supplementary information that may be appropriate, e. g. vertical or horizontal profiles, depth horizons, continuous recording or discrete samples, etc. For samples taken for later analysis on shore, an indication should be given of the type of analysis planned, i.e. the purpose for which the samples were taken.
1			m	H16, M05	Images 7 & 8. Secchi disc. Observations include cloud cover, sea state, position, water colour, depth of observation, wind, swell, temperature
2			m/sec	H11	Sound velocity profile using Valeport SVP. Position also observed.
3				G02, M05	Peterson grab (equivalent). Sea bed sampling and interpretation in accordance with AHS Quality Management System procedures. Onboard photographic imagery captured of samples.
4				G08	Drop camera imagery on wreck and suspected wreck.
5			m/sec	D71	ADCP while on passage. System turned off during main sounding due to cross talk.
6			m	G74	EM710 and EM2040c. Used to provide bathymetry, water column analysis and sea floor classification based upon backscatter.
7				G27	Continuously run during all CSIRO cruises. MNF conducted this activity however an output sample should be provided for review and consideration in further activities.

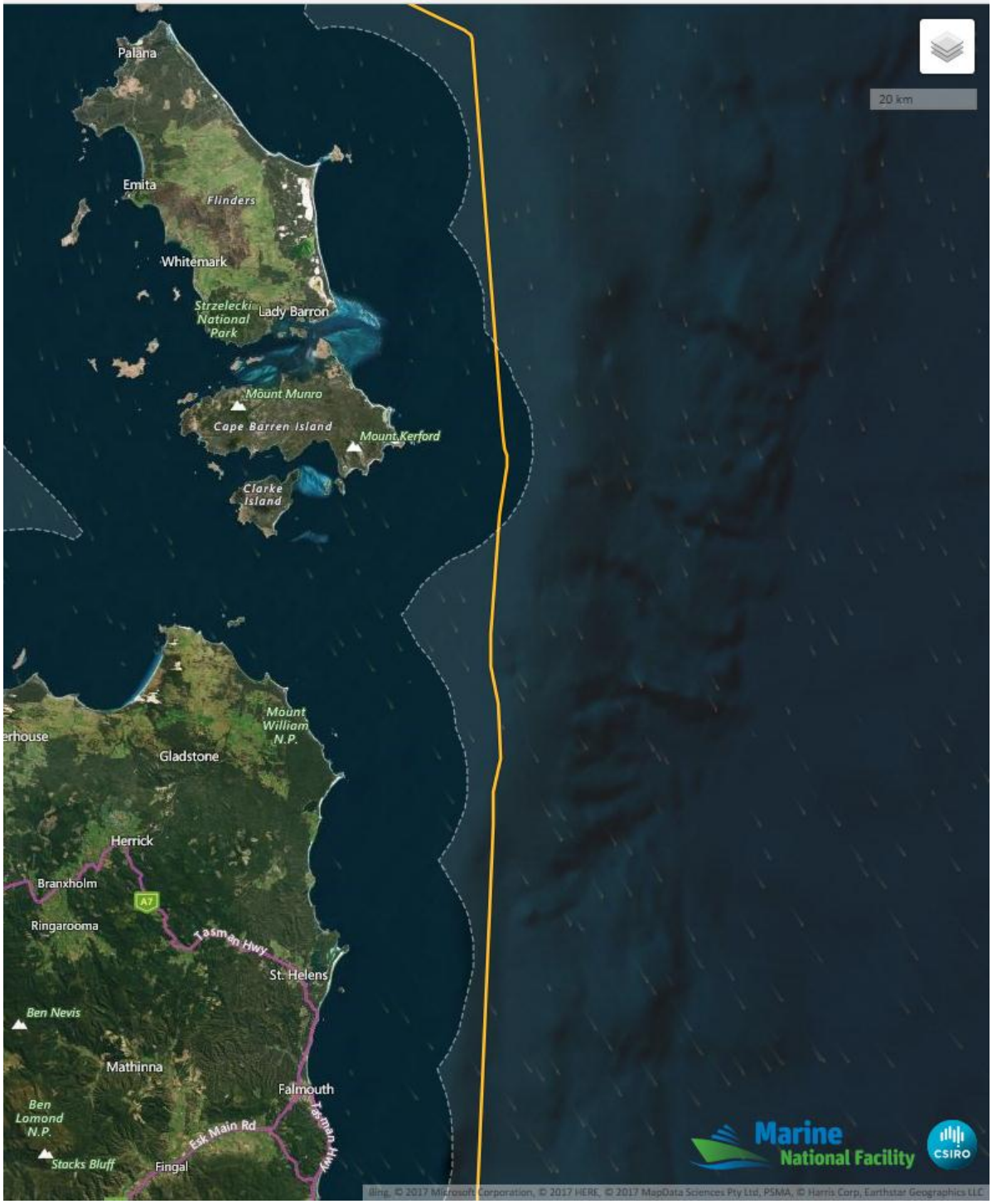
Curation Report

N/A.

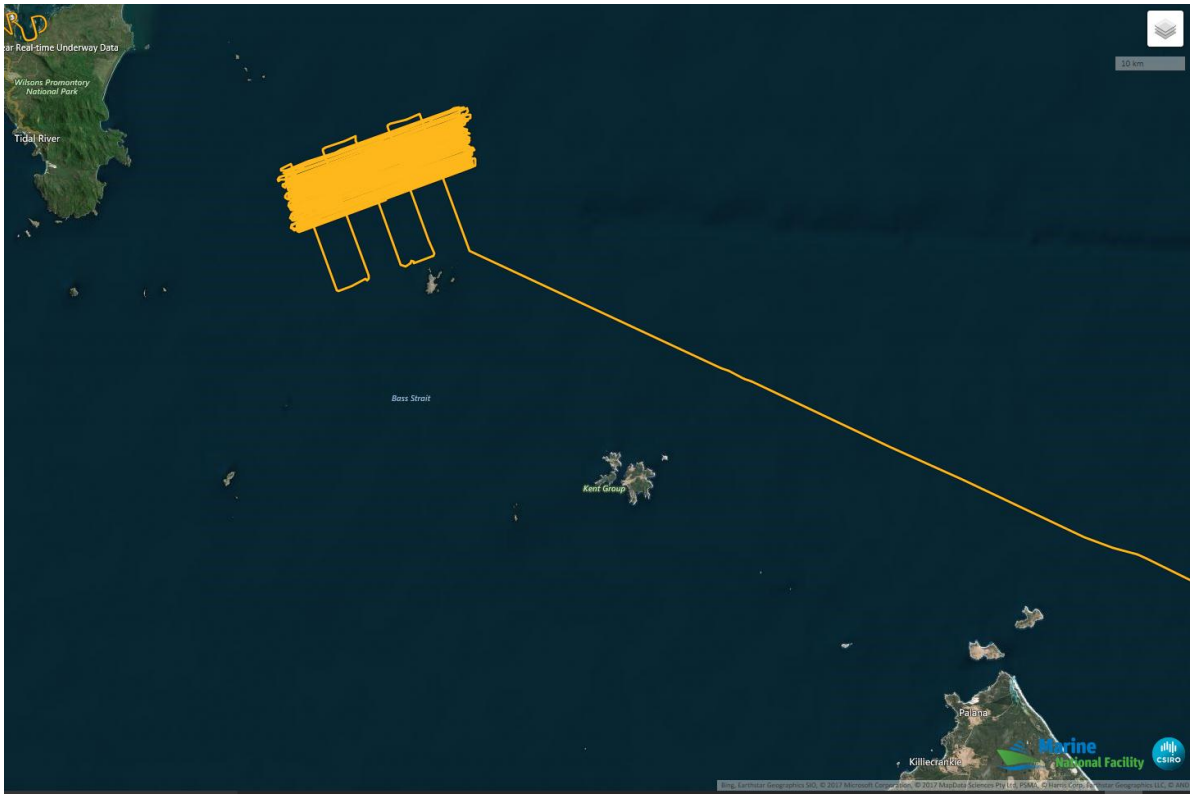
Track Chart



Hobart departure 04 May 17



East coast Tasmania – Northern transit to Hogan Island



Northwest transit to bathymetric survey area North of Hogan Island followed by departure on 14 May 17 for transit to Bell Bay.

Personnel List

List all scientific participants, their affiliation and role on the voyage

	Name	Organisation	Role
1.	Matt Boyd	CSIRO MNF	Voyage Manager / GSM Support
2.	Stuart Edwards	CSIRO MNF	GSM Support
3.	Amy Nau	CSIRO MNF	GSM Support
4.	Ian Hawkes	CSIRO MNF	DAP Support
5.	Pamela Brodie	CSIRO MNF	DAP Support
6.	Aaron Tyndall	CSIRO MNF	SIT Support
7.	LCDR Richard Cullen	RANR	Chief Scientist / Lead Hydrographic Surveyor
8.	LCDR Scott Rivett	RAN	Lead Meteorologist / Oceanographer

Marine Crew

Name	Role
Mike Watson	Master
Rod Quinn	Chief Mate
Brendan Eakin	Second Mate
Andrew Roebuck	Third Mate
Gennadiy Gervasiev	Chief Engineer
Ian McDonald	First Engineer
Ryan Agnew	Second Engineer
Paris Strachan	Third Engineer
Shane Kromkamp	Electrical Engineer
Alan Martin	Chief Caterer
Emma Lade	Caterer
Keith Shepherd	Chief Cook
Paul Stanley	Cook
Kel Lewis	Chief Integrated Rating
Matthew McNeill	Integrated Rating
Darren Capon	Integrated Rating
Christopher Dorling	Integrated Rating
Timothy Freeman	Integrated Rating
Dean Hingston	Integrated Rating
Murray Lord	Integrated Rating

Acknowledgements

N/A.

Signature

Your name	Richard Cullen
Title	Chief Scientist AHSCP Certified Professional Hydrographic Surveyor Level 1 (CPHS 1) Member - Surveying & Spatial Sciences Institute
Signature	OSB – LCDR R. CULLEN, RANR
Date:	15 May 17

List of additional figures and documents

Appendix A CSR/ROSCOP Parameter CodeS

Appendix B Photographs

Appendix A - CSR/ROSCOP Parameter CodeS

Primary Parameters Observed: M05, H11, H16, D71, G02, G08, G27, G74

	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) SVP**
H72	Thermistor chain
H16	**Transparency (eg transmissometer) Secchi Disc**
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 (eg chlorophyll, fluorescence)
B71	Particulate organic matter (inc POC, PON)
B06	Dissolved organic matter (inc DOC)
B72	Biochemical measurements (eg 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
B90	Other biological/fisheries measurements

	CHEMICAL OCEANOGRAPHY
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 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

	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

Appendix B – Photographs

Image 1.
File Name: IMG_0021.jpg (AA985172)
Activity: Sea state 4+
Photographer: LCDR Scott Rivett, RAN
Date: 06 May 17

Image 2.
File Name: IMG_0022.jpg (AA985176)
Activity: Sea state 4+
Photographer: LCDR Scott Rivett, RAN
Date: 06 May 17

Image 3.
File Name: IMG_0100.jpg (AA985124)
Activity: CSIRO MNF team member Amy Nau assesses the multibeam acquisition screen displaying an unexpected wreck. Sediment accumulation along the leading edge, scour on the following edge (Starboard side), bow and stern proud of seafloor.
Photographer: LCDR Scott Rivett, RAN
Date: 13 May 17

Image 4.
File Name: IMG_129.jpg (AA985142)
Activity: Drop camera File Name of the stern of the wreck.
Photographer: LCDR Scott Rivett, RAN
Date: 13 May 17

Image 5.
File Name: IMG_0130.jpg (AA985143)
Activity: Drop camera File Name of the mid-ships of the wreck.
Photographer: LCDR Scott Rivett, RAN
Date: 13 May 17

Image 6.
File Name: IMG_0134.jpg (AA985141)
Activity: Drop camera File Name of the Derek located on the bow of the wreck.
Photographer: LCDR Scott Rivett, RAN
Date: 13 May 17

Image 7.
File Name: IMG_0073.jpg (AA985162)
Activity: CSIRO MNF Team members Matt Boyd (front) and Amy Nau (back) prepare to lower the secchi disc for water clarity observations and sound velocity probe.
Photographer: LCDR Scott Rivett, RAN
Date: 12 May 17

Image 8.
File Name: IMG_0070.jpg (AA985161)
Activity: Secchi disc observation for water clarity.
Photographer: LCDR Scott Rivett, RAN
Date: 12 May 17

Image 1

Image 2

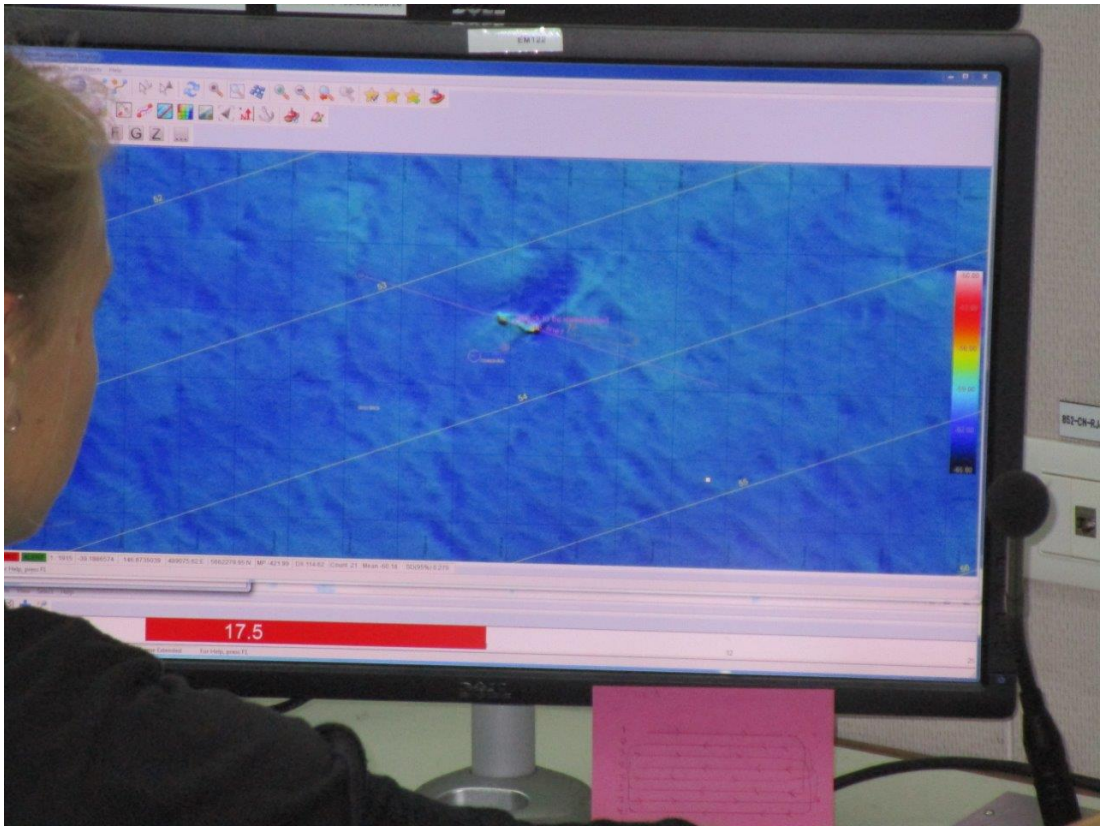


Image 3

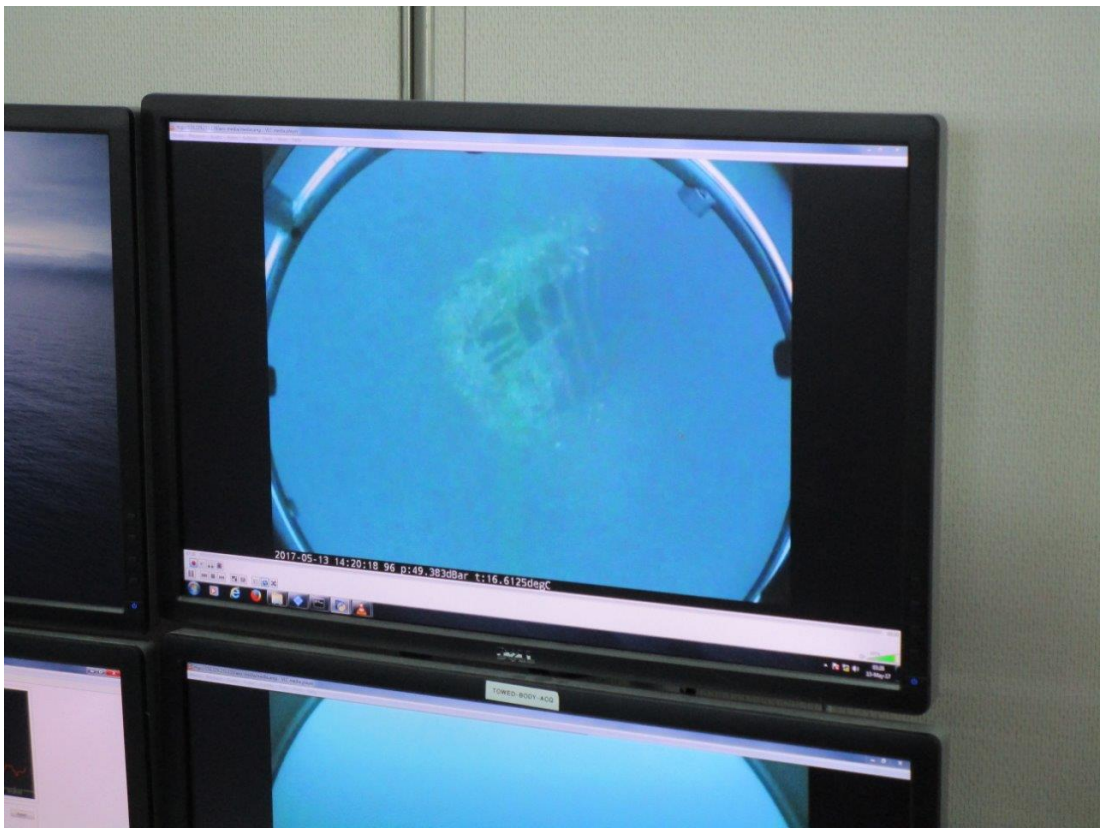


Image 4

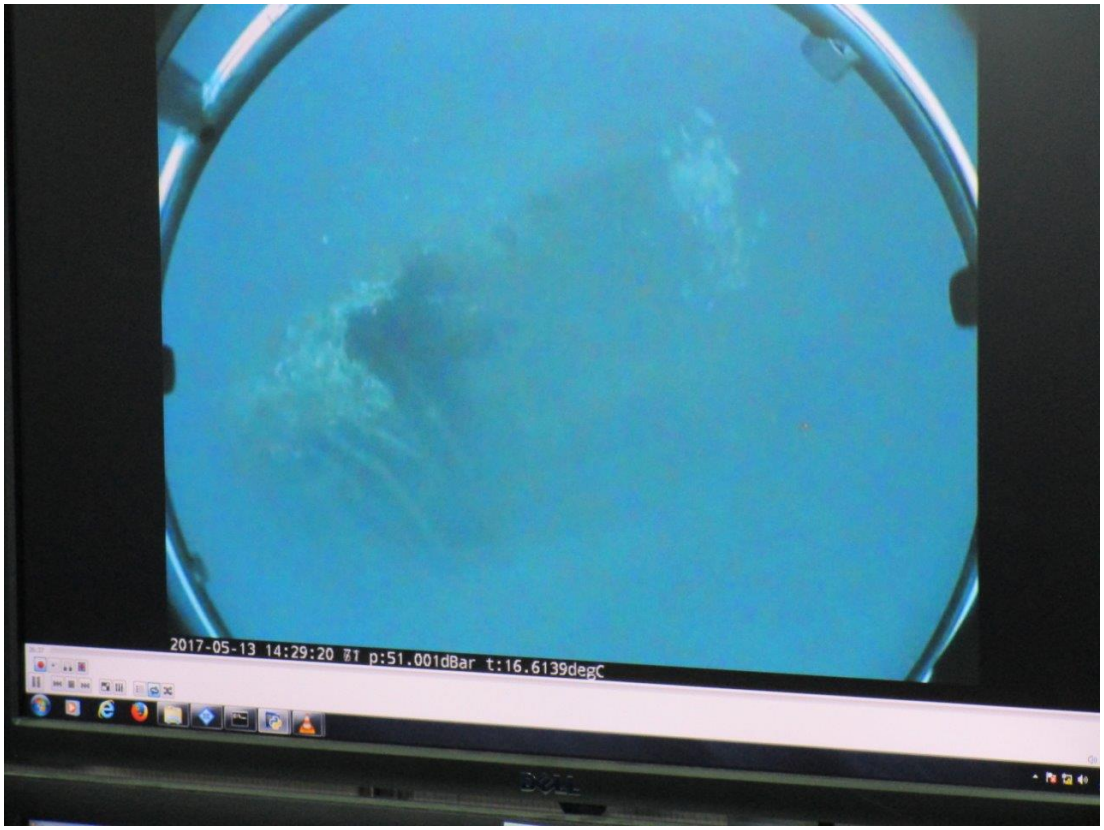


Image 5

Image 6

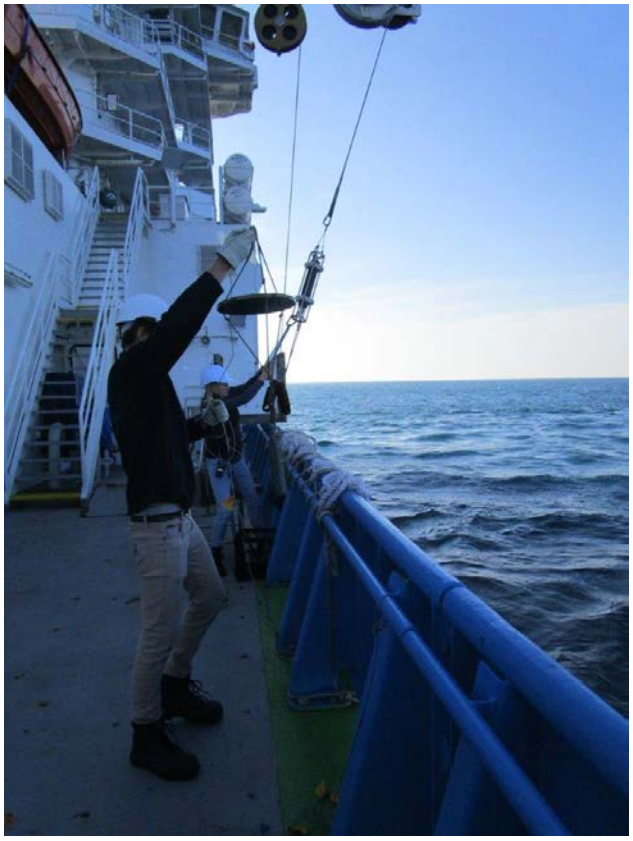


Image 7

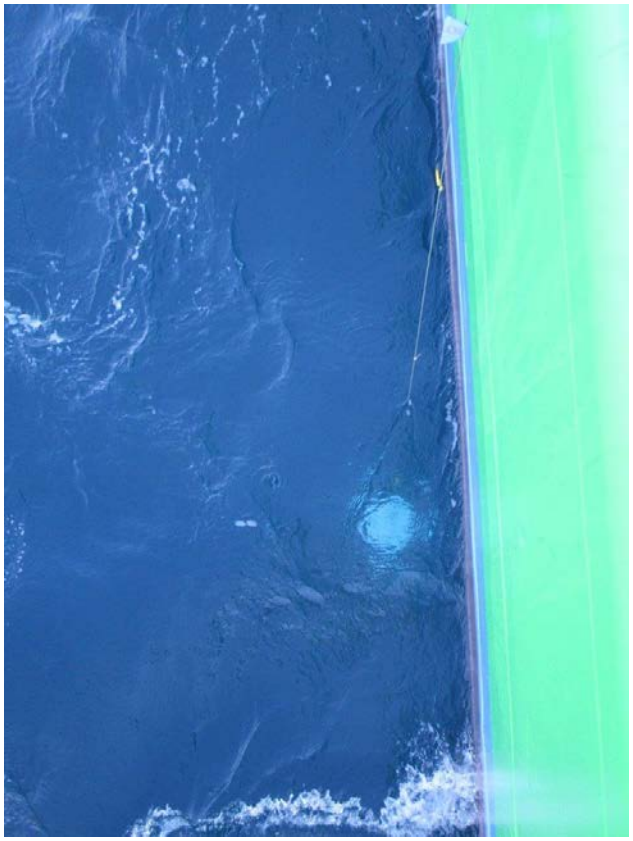


Image 8