

RV Investigator Voyage Plan

Voyage #:	IN2017_E04		
Voyage title:	Sea Trials, Calibration & Training		
Mobilisation:	Hobart, Wednesday December 06, 2017		
Depart:	Hobart, Thursday December 07, 2017 – 0800		
Return:	Hobart, Tuesday December 12 , 2017 – 0230 (NOTE: Tentative based on operational requirements)		
Demobilisation:	Hobart, Thursday December 13, 2017		
Voyage Manager:	Mark Scanlon	Contact details:	Mark.scanlon@csiro.au
Chief Scientist:	N/A		

General

This trial voyage will start and finish in Hobart and will conduct tests and calibration of MNF equipment plus training for MNF staff and future scientific voyage participants.

Scientific Objectives

Nil

Permit Requirements

Wind Profiler Transmitting Procedure

Hobart Port Testing –Thursday 7th

- Prior to the testing day (7th) confirmation via email or phone to Vodafone that testing will go ahead the following morning/evening
- Transmission testing will be conducted between the hours of 7am-8am or 9pm-12am. The duration of the test will be 30 mins
- The responsible person for notifying Vodafone will be Aaron Tyndall
- Prior to the wind profiler being switched on the responsible person will call Vodafone to allow monitoring of transmission.
- When testing is complete Vodafone will again be contacted notifying that transmission testing is complete

Radiosondes Release Procedure

Marine National Facility hold a standing Australian Communications and Media Authority license for the operation of Radiosondes. In addition, the requirement for '*Notice to Airmen*' applies prior to the release of any weather balloon. Communications made with Hobart International Airport prior to operations, to ensure no interference with Hobart sounding.

Voyage Objectives

Refer to overleaf.

ID	Trial	Requirement of success	Owner	Priority	Time (Hr)	Trial Location
1	Test & calibrate EM710	Fully functional and calibrated	GSM	High	2	East of Fluted Cape on Bruny (43°21.05'S 147°25.84E) OR South of Tasman Island (general location 43°15'S 148°00'E) (NOTE: completed in shallow water sites)
2	Test & calibrate EM122	Fully functional and calibrated	GSM	High	2	East south of Tasman Island off the shelf general location 42°45'S 149°37'E (NOTE: completed in deep water sites)
3	Test & calibrate the EK60	EK 60 fully operational and recalibrated	GSM	High	12	Storm Bay/ Adventure Bay (NOTE: At anchor in shallow and sheltered water)
4	CTD Operations	3000 - Consistent results in CTD operations, with data spikes resolved 1000/ 200 - Downward looking LADCP connected to CTD and fully functioning 2000 - TBC	SIT	1000m – High 3000m – Med 2000m – Low 200m – High	Total 18	Purposes of CTD operations: <ul style="list-style-type: none"> - Verify data spikes removed and settle on what effects really made and effect (or not) - Confirm all systems ok using Seasave instead of CAP - Select a second altimeter to use as a backup for in2017_v01 next year - Analysis of performance of alternative CTD-cable modems (development project)
5	Triaxus Tow	Functional USBL beacon with consistent data stream.	SIT	Med	4 (on transit)	
6	Towed Body Winch	Consistent Active Heave Compensation operation on the stern of the vessel from the A frame	SIT	Low	3 per trial	Deploy weight fitted with depth sensor to 500-1000m. Activate AHC. Log data from GP Depth Sensor, vessel motion, and winches for assessment of AHC performance.
7	MIDOC Operations	Successful deployment with single wire trawl.	SIT	Cast 1 – Med Cast 2 – Low	2 per cast	

ID	Trial	Requirement of success	Owner	Priority	Time (Hr)	Trial Location
8	Training in preparation for IN2018_V01	collaborative project with Global FIA, USA using an automated system for the preparation of high quality nutrient standards	HYD. CH	High	N/A	
9	CTD Data acquisition and processing modifications	Implementation of CTD data acquisition and processing system. (NOTE: In place for IN 2018_V01)	DAP	High (1000m/200m casts: See above)	See CTD Operations	(TBC) Multiple casts Depth: Shallow One cast Depth: within altimeter range of the seafloor
10	Calibration of 150kHz (OS150) ADCP	Fully functional and calibrated	DAP	High	See CTD Operations	East of Fluted Cape on Bruny (43°21.05'S 147°25.84E) OR South of Tasman Island (general location 43°15'S 148°00'E) (NOTE: completed in shallow water sites)
11	Testing network changes	Successful network changes: - Firewall - Core switch upgrade - Wireless access points	DAP	High	N/A	In transit (NOTE: testing can be completed in conjunction with other operations)
12	Voyage Management Training	Effective training to all personnel on board with Voyage Management training requirements	MNF	N/A	6	In transit
13	Crane Operations	New crane stinger arrangement effective in lifting operations	ASP	High	4	Weather dependent
14	Work Boat Deployment	Safe and efficient deployment and recovery of workboat in seas up to 1.5 m	ASP	High	4	Weather dependent
15	Thermal imaging of the switch boards	Any apparent issues with switchboards are detected and actions allocated	ASP	High	N/A	In transit
16	Variable Frequency Drives	Results of harmonics testing is compliant	ASP	High	N/A	In transit

ID	Trial	Requirement of success	Owner	Priority	Time (Hr)	Trial Location
17	Drop Keel testing	Lowering and raising of drop keels are functional with successful integration of new locking pins.	ASP	High	6	Test in sea trial each location.
18	CTD Winch Test and Trials	Demonstration of functioning winch after recent spooling VFD upgrades. Typically 2-3 casts to be performed.	RAPP	High	6	3000+
19	Vertical Sediment winch tests & trials	Demonstration of functioning winch after recent spooling VFD upgrades. Typically 2-3 casts to be performed.	RAPP	High	6	3000+
20	Long sediment coring winch tests & trials	Demonstration of functioning winch after recent spooling VFD upgrades. Typically 2-3 casts to be performed.	RAPP	High	6	3000+
21	GP Winch tests & trials	Demonstration of functioning winch after recent spooling VFD upgrades. Typically 2-3 casts to be performed.	RAPP	High	6	3000+
22	Towed body winch tests & trials	Demonstration of functioning winch after recent spooling VFD upgrades. Typically 2-3 casts to be performed.	RAPP	High	6	3000+

ID	Trial	Requirement of success	Owner	Priority	Time (Hr)	Trial Location
23	Trawl winch (PS&SB) winch tests & trials	Demonstration of functioning winch after recent spooling VFD upgrades. Typically 2-3 casts to be performed.	RAPP	High	6	3000+
24	Net Drum winch tests & trials	Demonstration of functioning winch after recent spooling VFD upgrades. Typically 2-3 casts to be performed.	RAPP	High	6	3000+
25	Test and calibrate the NCAR Integrated Sounding System	Fully functional NCAR Integrated Sounding System. Consistent data collection from Lidar and wind profiler.	UCAR		48	In transit and on location.

University Corporation for Atmospheric Research (UCAR) – IN2018_V01 preparation

Proposed Time Required:

Test and calibrate the NCAR Integrated Sounding System, particularly the radar wind profiler. This trial voyage will be our first opportunity to test recent upgrades to the wind profiler. No special ship operations are required during testing, although ideally should total at least two days and include both underway time and on-station time to simulate the underway voyage movements expected during IN2018_V01.

Operational Risk Management

The key challenge around completion of the sea trials program will be managing safe operations in testing new / modified equipment for the first time. A number of high risk activities have been identified and will be mitigated as follows:

- Maintaining exclusion zone around wires under tension during load / function testing;
- Ensuring all personnel wear appropriate ear protection during all on deck operations;

ASP Standard Operating Procedures, JSA's and toolbox meetings will be followed throughout the voyage to reduce risk to operations.

Voyage Activity Summary

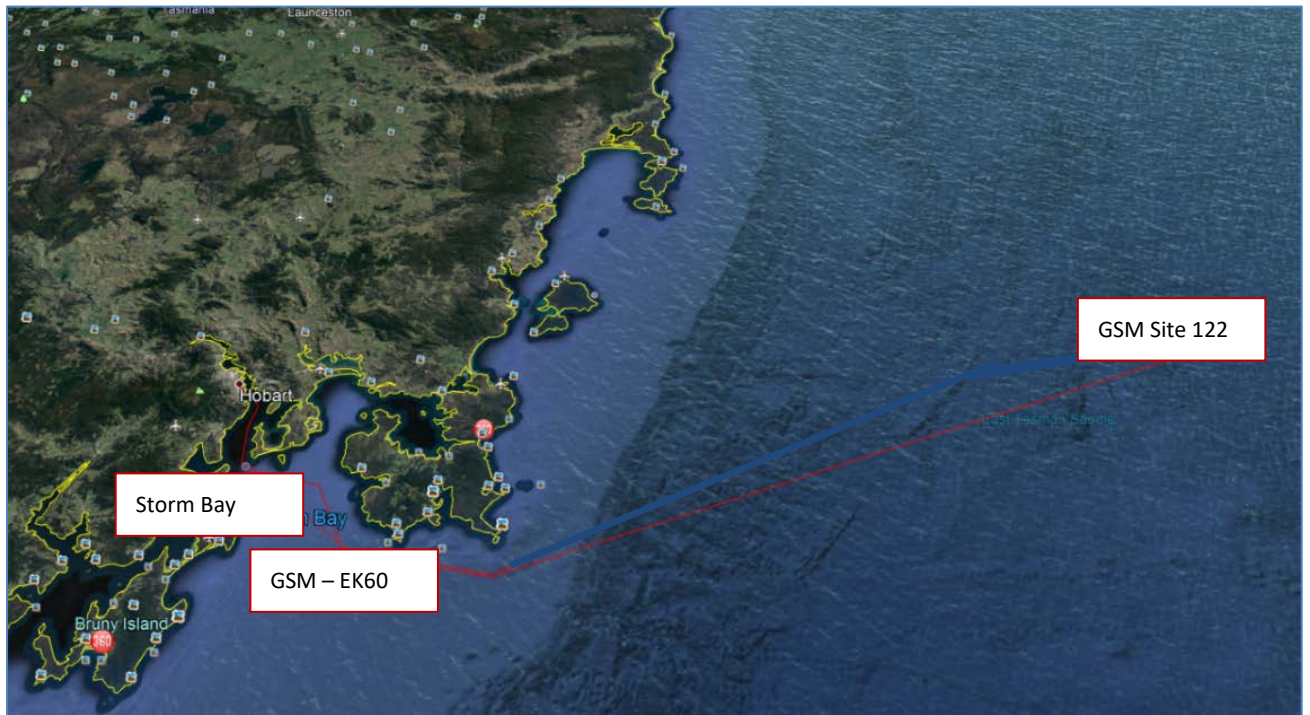
See Voyage Objectives for activity summary. Additional activity details found in Time Estimates section.

Waypoints and Stations

NOTE: Based on a travel speed of 11 knots

	Latitude	Longitude	Distance (nm)	Total Distance (nm)	Steaming time (hrs)	Total Steam (hrs)
Hobart	42°53.170'S	147°20.321'E	0	0		
Storm Bay site	43°07.000'S	147°35.000'E	20.1	20.1	~ 2.0	
EM122 Testing Site	42°45.000'S	149°37.000'E	103.7	123.8	~ 9.5	~11.5
EK60 Testing Site	43°15.000'S	148°00.000'E	51.5	201.6	~ 5.0	~ 21.0
Hobart	42°53.170'S	147°20.321'E	42.9	244.5	~ 4.0	~ 25.0

Voyage Track



Time Estimates

The following time estimates are based on a steaming speed of 11 knots. Refer to overleaf.

	Site	Target depth	Lat	Long	Operation	Duration (hours)	Start date	End date	Notes
							and time	and time	
Pre Departure Activities	Selfs Point	N/A	42°53.170'S	147°20.321'E	Bunkering	8	3/12/2017 TBC	3/12/2017 TBC	200m3 required
					Preparation of MIDOC on Main Deck	2	3/12/2017 TBC	3/12/2017 TBC	
					Set up USBL Beacon Main Deck	1	3/12/2017 TBC	3/12/2017 TBC	
					Mobilise remaining trials Equipment	5	3/12/2017 TBC	3/12/2017 TBC	refer to mobilisation task list
Day 1	Transit				Depart PW4 & transit to Hobart PBG	0.5	7/12/2017 8:00	7/12/2017 8:30	
					Disembark pilot at Hobart PBG and commence transit	0.5	7/12/2017 8:30	7/12/2017 9:00	
					Transit to shallow water test site <i>Meanwhile activities during transit:</i> - Hydrochemistry - Training in Preparation for IN2018_V01	2	7/12/2017 9:00	7/12/2017 11:00	
	Shallow Water Test Site	Shallow	43°07.000'S	147°35.000'E	Test and calibrate EK60	12	7/12/2017 11:00	7/12/2017 23:00	NO SIMOPS Opportunistic if it is good weather
Day 2	Shallow Water Test Site	Shallow	43°07.000'S	147°35.000'E	Towed Body Winch Trials (Trial 1 of 2)	3	7/12/2017 23:00	8/12/2017 2:00	
		Shallow			Test and Calibrate EM710 (Trial 1 of 2)	2	8/12/2017 2:00	8/12/2017 4:00	NO SIMOPS
	Transit				Transit to deep water test site <i>Meanwhile activities during transit:</i> - Test and calibrate the NCAR Integrated Sounding System (Transit 1 of 3) - IT Network testing - Triaxus tow (1 of 2) - Thermal imaging of switchboards - Voyage manager training	9.5	8/12/2017 4:00	8/12/2017 13:30	
	Deep Water Test Site	N/A	42°45.000'S	149°37.000'E	Crane Trials (1200-2400 crew)	3	8/12/2017 13:30	8/12/2017 16:30	
		3000+			CTD Tests & Trials - Nominally 2 x Deep cast to 3000m (Trial 1 of 2) Drop Keel testing	6	8/12/2017 16:30	8/12/2017 22:30	24 Bottle Rosette
		3000+			Test and calibrate EM122	2	8/12/2017 22:30	9/12/2017 0:30	NO SIMOPS
Day 3	Deep Water Test Site	N/A	42°45.000'S	149°37.000'E	Crane Trials (2400-1200 crew)	3	9/12/2017 0:30	9/12/2017 3:30	
		3000+			Towed Body Winch Trials (Trial 2 of 2) -RAPP Towed Body winch tests and trials	4	9/12/2017 3:30	9/12/2017 7:30	36 bottle rosette deployed from A frame
		3000+			Triaxus Trials (Trial 1 of 2)	3	9/12/2017 7:30	9/12/2017 10:30	
		3000+			MIDOC Trials (Trial 1 of 2)	2	9/12/2017 10:30	9/12/2017 12:30	
		3000+			Work Boat deployment Trials (1200-2400 crew)	3	9/12/2017 12:30	9/12/2017 15:30	weather dependent. To be done in storm bay when returning to port if conditions don't allow
		3000+			Vertical Sediment winch tests and trials	4	9/12/2017 15:30	9/12/2017 19:30	NO SIMOPS
		3000+			CTD Tests & Trials - Nominally 1 x Deep cast to 3000m (Trial 2 of 2) CTD Test & Trial - 1 x cast to 2000m (Trial 1 of 1) - RAPP CTD Winch tests and trials	6	9/12/2017 19:30	10/12/2017 1:30	24 Bottle Rosette
Day 4	Deep Water Test Site	3000+	42°45.000'S	149°37.000'E	MIDOC Trials (Trial 2 of 2)	2	10/12/2017 1:30	10/12/2017 3:30	36 bottle rosette deployed from A frame
		3000+			Triaxus Trials (Trial 2 of 2)	2	10/12/2017 3:30	10/12/2017 5:30	
		N/A			ROV Trials (0000-1200 crew)	2	10/12/2017 5:30	10/12/2017 7:30	
		3000+			CTD Tests & Trials - Nominally 4 casts to 1000m (Trial 1 of 2)	4	10/12/2017 7:30	10/12/2017 11:30	
		1000			RAPP Long sediment winch tests and trials	4	10/12/2017 11:30	10/12/2017 15:30	
		3000+			RAPP - Trawl Winch tests and trials (Starboard & Port)	10	10/12/2017 15:30	11/12/2017 1:30	

	Site	Target depth	Lat	Long	Operation	Duration (hours)	Start date	End date	Notes
							and time	and time	
Day 5	Transit				Transit to shallow water test site <i>Meanwhile activities during transit:</i> - Hydrochemistry - Training in Preparation for IN2018_V01 - Test and calibrate the NCAR Integrated Sounding System (Transit 3 of 3) - Triaxus tow (2 of 2) - CTD Data acquisition and processing modifications	9	11/12/2017 1:30	11/12/2017 10:30	
	Shallow Water Test Site	TBC	43°15.000'S	148°00.000'E	RAPP - Net Drum winch tests and trials	6	11/12/2017 10:30	11/12/2017 16:30	
		200 - 400			CTD Tests & Trials - Nominally 2 casts to 200-400m (Trial 2 of 2)	2	11/12/2017 16:30	11/12/2017 18:30	
		TBC			ASP - ROV Trials (1200-2400 crew)	2	11/12/2017 18:30	11/12/2017 20:30	
		Shallow			Allowance for further testing / calibration of EM710	2	11/12/2017 20:30	11/12/2017 22:30	NO SIMOPS
Day 6	Transit				Transit to Hobart PBG	3.5	11/12/2017 22:30	12/12/2017 2:00	
					Transit to PW4	0.5	12/12/2017 2:00	12/12/2017 2:30	

Personnel List

1.	Mark Scanlon	Voyage Manager	CSIRO MNF
2.	Zoe Burton	Deputy Voyage Manager	CSIRO MNF
3.	Lisa Woodward	MNF Operations	CSIRO MNF
4.	Dr Barbara Musso	MNF Facilities Director	CSIRO MNF
5.	Brett Muir	SIT Support	CSIRO MNF
6.	Aaron Tyndall	SIT Support	CSIRO MNF
7.	Ben Baldwinson	SIT Support	CSIRO MNF
8.	Trevor Goodwin	SIT Support	CSIRO MNF
9.	Stuart Edwards	GSM Support	CSIRO MNF
10.	Frances Cooke	GSM Support	CSIRO MNF
11.	Amy Nau	GSM Support	CSIRO MNF
12.	Tara Martin	GSM Support	CSIRO MNF
13.	Matthew Boyd	GSM Support	CSIRO MNF
14.	Bernadette Heaney	GSM Support	CSIRO MNF
15.	Dave Watts	GSM Support	CSIRO MNF
16.	Francis Chui	DAP Support	CSIRO MNF
17.	Hugh Barker	DAP Support	CSIRO MNF
18.	Steve Van Graas	DAP Support	CSIRO MNF
19.	Peter Shanks	DAP Support	CSIRO MNF
20.	Christine Rees	Hydrochemistry Support	CSIRO MNF
21.	Kendall Sherrin	Hydrochemistry Support	CSIRO MNF
22.	William Brown	UCAR support - IN2018_V01	UCAR
23.	Isabel Suhr	UCAR support - IN2018_V01	UCAR
24.	John Sobtzak	UCAR support - IN2018_V01	UCAR
25.	Lynnth Beckley	V/I orientation - IN2019_V03 CS	Murdoch University
26.	Robert Kay	Oceanographic Calibration Facility	CSIRO
27.	Paul Livingston	Acting Ship Manager	ASP Ship Management
28.	Grenville Walsh	Winch Harmonics Measurement	Cromarty
29.	David Booth	MarineIR	Thermal Imaging of switchboards
30.	Ken Karlsen	RAPP Marine	Upgrade and testing of scientific winch system
31.	Sondre Aspmo	RAPP Marine	Upgrade and testing of scientific winch system

Signature

Your name	Mark Scanlon
Title	Voyage Manager
Signature	
Date:	3/11/2017

Special Requests/Equipment

- Various test weights to suit winch tests, negotiate with Rapp (e.g. 500kg for towed body, 1000kg for GP Winch, suitable weight for corer winch)
- Pressure-compensator for Towed Body Termination

Scientific equipment and facilities provided by the Marine National Facility

Some equipment items on the list may not be available at the time of sailing. Applicants will be notified directly of any changes.

Indicate what equipment and facilities you require from the Marine National Facility by placing an X in the relevant box.

(i) Standard laboratories and facilities

Name	Essential	Desirable
Aerosol Sampling Lab		
Air Chemistry Lab		
Preservation Lab		
Constant Temperature Lab		
Underway Seawater Analysis Laboratory		
GP Wet Lab (dirty)		
GP Wet Lab (Clean)		
GP Dry Lab (Clean)		
Sheltered Science Area		
Observation deck 07 level		
Walk in Freezer		
Clean Freezer		
Blast Freezer		
Ultra-Low Temperature Freezer		
Walk in Cool Room		

(ii) Specialised laboratory and facilities

May require additional support

Name	Essential	Desirable
Modular Radiation Laboratory		
Modular Trace Metal Laboratories		
Modular Hazchem Locker		
Deck incubators		
Stabilised Platform Container		

(iii) Standard laboratory and sampling equipment

Name	Essential	Desirable
CTD - Seabird 911 with 36 Bottle Rosette		
CTD -Seabed 911 with 24 Bottle Rosette	X	
LADCP	X	
Sonardyne USBL System	X	
Milli -Q System		
Laboratory Incubators		
Heavy Duty Electronic Balance		
Medium Duty Electronic Balance		
Light Duty Electronic Balance		
Surface Net		
Bongo Net		
Smith Mac grab		
Dissecting Microscopes		
MIDOC	X	

(iv) Specialised laboratory and sampling equipment

May require additional support

Name	Essential	Desirable
TRIAXUS – Underway Profiling CTD	X	
Continuous Plankton Recorder (CPR)		
Deep tow camera		
Piston Coring System		
Gravity Coring System		
Multi Corer		
XBT System		
Trace Metal Rosette and Bottles		
Sherman epibenthic sled		
Trace- metal in-situ pumps		
Rock Dredges		
EZ Net		
Rock saw		
Portable pot hauler		
Beam Trawl		
Trawl doors (pelagic or demersal)		
Stern Ramp		
Trawl monitoring instrumentation (ITI)		

Name	Essential	Desirable
Radiosonde	X	

(v) Equipment and sampling gear requiring external support

May require additional support from applicants

Name	Essential	Desirable
Seismic compressors		
Seismic acquisition system		

(vi) Underway systems

Acoustic Underway Systems

Name	Essential	Desirable
75kHz ADCP	X	
150kHz ADCP	X	
Multi Beam echo sounder EM122 12kHz (100m to full ocean depth)	X	
Multi Beam echo sounder EM710 70-100kHz (0-1000m approx.)	X	
Sub-Bottom Profiler SBP120		X
Scientific Echo Sounders EK60 (6 bands, 18kHz-333kHz)	X	
Gravity Meter		X
Trace metal clean seawater supply		

Atmospheric Underway Sensors

Name	Essential	Desirable
Nephelometer		
MAAP (multi angle absorption photometer)		
SMPS (scanning mobility particle sizer)		
Radon detector		
Ozone detector	X	
Manifold instrumentation (intake temperature and humidity)		
Picarro spectrometer (analysis of CO ₂ /CH ₄ /H ₂ O)		
Aerodyne spectrometer (analysis of N ₂ O/CO/H ₂ O)		
O ₂ analyser		
CCN (Cloud Condensation Nuclei)		
MOUDI (Micro-Orifice Uniform Deposit Impactors)		
NO _x monitor		
Polarimetric Weather Radar		

Underway Seawater Instrumentation

Name	Essential	Desirable
Thermosalinograph	X	
Fluorometer		
Optode		
PCO2		