RV *Investigator* Voyage Summary

Voyage #:	IN2018_V03		
Voyage title:	Integrated Marine Observing System: monitoring of East Australian Current property transports at 27°S		
Mobilisation:	Hobart, Wednesday 04 April – Thursday 05 April, 2018 Brisbane, Wednesday 18 April, 2018		
Depart:	Brisbane, 0700 Thursday 19 April, 2018		
Return:	Brisbane, 1200 Thursday, 10 May 2018		
Demobilisation:	Hobart, 22 May 2018		
Voyage Manager:	Stephen McCullum	Contact details:	Stephen.McCullum@csiro.au (03) 6232 5415
Chief Scientist:	Dr. Bernadette Sloyan		
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Principal Investigators:			
Project name:			
Affiliation:		Contact details:	

VOYAGE SUMMARY

Objectives and brief narrative of voyage

Scientific objectives

The East Australian Current (EAC) is a complex and highly energetic western boundary system of the South Pacific Ocean off eastern Australia. It closes the South Pacific subtropical gyre, transporting heat, salt and other nutrients southward and onto the continental shelf. Off Brisbane (27°S), north of the high eddy variability region, the EAC approaches its maximum strength and is relatively uniform and coherent. The mooring array is located near the existing long-term XBT transect and satellite altimetry ground tracks. The aim of this observing system is to capture the mean and time-varying flow of the EAC.

This EAC mooring array is a component of IMOS. These observations will provide an intensive reference set of measurements of the EAC over a sustained period for improved understanding of the relationship of EAC with the basin-scale South Pacific gyre, its impact of the coastal marine ecosystem, and validation and interpretation of the current system in numerous climate and ocean models.

Voyage objectives

This voyage will recover and re-deploy an array of six full-depth velocity and property (temperature, salinity and pressure) moorings from the continental slope to the abyssal waters off Brisbane (27°S). The observing system is designed to capture the mean and time-varying flow of the EAC. In order to resolve interannual and decadal signals we aim to maintain multi-year deployments of the array.

We will also undertake CTD/0_2 and numerous Triaxus and ship ADCP sections across the EAC mooring line and to the north and south of the mooring line. These operations will occur in between the mooring operations and at the completion of the mooring operations. We will also undertake a number of CTD cast to test the performance of a new induction salinity sensor. These sensors (2000 m) and (6000 m) depth rated instrument are self-contained instruments and will be strapped to the rosette frame in a location closest to the Seabird 9+ sensor unit.

We will use the 36-bottle rosette (only 24 Niskin bottle on rosette) with the lowered ADCPs (150 kHz and 300 kHz) attached. We will collect salinity and oxygen samples for calibration of the CTD salinity and oxygen sensors, and nutrient (silicate, phosphate and nitrate) samples.

1. The following specific objectives will be performed:
2. Recover and deploy moorings at appropriate locations
3. Complete CTD/rosette stations at each mooring location, with LADCP
4. Complete a number of Triaxus and Ship ADCP sections along the mooring line

5. Complete a SADCP/Triaxus box survey surrounding the mooring array.
6. Complete approximately 10-15 2000 m and full-depth CTD stations to assess a new conductive salinity sensor. These stations will be completed at mooring locations during non-mooring operations days and at the eastern corners of the box survey.

Results

All voyage objectives were completed successfully, except for the sensor testing CTD stations

1. The methodical and cautious approach of CSIRO mooring team of Jamie Derrick, Curt Chalk, Jim Laduke and the ships deck team resulted in successful and safe mooring operations. This team work was highlighted with the continued smooth mooring operations after the ship's boson departed the voyage due to illness.
2. 14 CTD stations, including a test CTD station, were completed by the science crew and MNF hydrochemistry team of Bernadette Sloyan, Bea Pena-Molino, Rebecca Cowley, Carly Tozer, Christine Rees and Julie Janssens.
3. We completed 3 Triaxus tows and 5 ship ADCP sections along the mooring line collecting unprecedented horizontal and vertical resolution data of the EAC.
4. We completed a larger scale Triaxus tow and ship ADCP box survey around the mooring line The MNF SIT personnel of Will Ponsonby and Jay McGlashon with the assistance of MNF DAP personnel of Steve Van Graas and Karl Malakoff monitored the Triaxus tows.
5. The planned 2000m and full-depth CTD stations to test new temperature, conductivity and oxygen sensors were not achieved due to the RBR instruments not being received to the vessel prior to our departure.
   In addition to the planned objectives, we undertook a numerous swath surveys of the surrounding area.

Voyage Narrative

(Note all times are local)

18 April

We departed Brisbane at 0700h and cleared Brisbane piloted area by noon. We then made our way to the offshore EAC_4800 (M6) mooring location. On route a voyage meeting, toolbox on mooring operations, test lift and at test CTD (CTD 001) were completed.

20 April

Arrived at the EAC_4800 mooring recovery site in the early morning. We undertook a CTD (CTD 002) prior to the mooring toolbox. We established communication with the EAC_4800 mooring. With the ships officers, crew and mooring team in place we released the mooring at approximately 0745h. The mooring was sighted and ship manoeuvred into position for recovery.

Mooring recovery was a smooth operation, apart from a number of wuzzles (Cullen, 2005: 75 Years of Ocean Research, Education, and Exploration at the Woods Hole Oceanographic Institution) in the Dynex.

We then began our transit to EAC_4700 recovery site.

21 April

Between early morning and mid-afternoon we completed a number of CTDs:

CTD 003 EAC_4700 recovery site

CTD 004EAC_4200 recovery site

CTD 005 Mid-point EAC_4700 and EAC_4800.

At the completion of the CTDs we began to swath map the seamount to the north of the mooring line.

During the day the mooring team unspooled the recovered mooring line and spooled on the EAC_4800 mooring in preparation for tomorrows mooring deployment, cleaned and prepared the deck for mooring deployment. The science and instrument team downloaded the data from all instruments and then cleaned and packed instruments. Finally, we prepared all instruments for tomorrow's deployment.

22 April

We held a no go/go assessment for mooring deployment at 0630h for EAC_4800 (M6). Conditions were winds Southeast 10-15 knots, with slight seas. These conditions were predicted to persist during mooring operations.

Jamie Derrick provided a comprehensive mooring toolbox. Mooring deployment began at 0745h and were completed at 1650h with the deployment of the anchor.

The mooring triangulation was completed – EAC_4800 mooring location is 27.1078 S, 155.2971 E.

CTD 006 was completed at the mooring site.

Swath mapping was completed overnight

23 April

We arrived at the EAC_4700 (M5) recovery site. The mooring was located and released at 0730h. Mooring recovery was completed by 1520h.

We then transited to the EAC_4800 site. A Triaxus toolbox was held at 1830 and the Triaxus was deployed shortly after.

The Triaxus was towed overnight – in the offshore to inshore direction.

24 April

The Triaxus was recovered at 0530h.

We swath mapped the region surrounding the mooring locations.

The mooring and science team began deck work – cleaning instruments, off-spooling and on-spooling, downloading data and preparing for the next mooring deployment.

25 April

We arrived at the deployment site of EAC_4700 (M5) at 0500h. Sea and wind condition were favourable for deployment operations. Mooring deployment began at approximately 0730h and the mooring anchor was deployed at 1607h.

We completed the triangulation of the mooring at 1830 – EAC_4700 mooring location is 27.2064 S, 154.6487 E- and the CTD 007 was completed by midnight.

Overnight we swath mapped the surrounding region.

26 April

We arrived at the EAC_4200 (M5) recovery site at 0500h and "talked " to the mooring at 0600h. The mooring was released at 0730h. The top floats of the mooring were sited on the surface shortly after and the complete mooring was on the surface by 0830h. The mooring was secured onto the back deck and mooring recovery operations were completed by mid-afternoon.

We completed a SADCP line from the EAC_4200 site to the 500 m isobath and data download began.

Swath mapping was undertaken during the evening and overnight.

27 April

A number of CTD were completed

CTD 008 EAC_4200 recovery site

CTD 009 EAC_20000 recovery site

CTD 010 EAC_500 recovery site.

We spooled off and on mooring wire, cleaned instruments and downloaded data.

The weather conditions increased to SE wind up to 35 knots and 2-3 meter seas. The Triaxus was not deployed as planned and we only ran a Ship ADCP line from the shelf to the outside mooring.

28 April

The science and mooring team spent the day cleaning instruments, downloading data and rearranging the deck.

The vessel returned to Caloundra pilot station to off-load a sick crew member.

Overnight we transited to the EAC_4200 mooring site

29 April

We arrived at the EAC_4200 (M3) mooring deployment site in the early morning. The EAC strength was 1 knot and given the time to lay the mooring we positioned the ship 20 NM to the north of the target location.

The mooring operation began after 0800h and the anchor was deployed at 1515h.

The mooring triangulation was completed – EAC_4200 mooring location is 27.2397 S, 154.277 E.

CTD 011 was completed at the mooring site. We transited overnight to EAC_3200 recovery site.

30 April

We arrived at EAC_3200 (M3) mooring site in the early hours of the morning. Weather conditions were SE winds 15-20 knots in rain squalls. The mooring was released at 0734h. Sighting of the mooring was made difficult due to low visibility in rain showers. The complete mooring was located on the surface by 0900h and the ship positioned for a port-side pickup. The third grapple attempt was successful and the mooring was recovered to the deck in a confused sea and increasing winds (23-30 knots). The complete mooring was on board by 1630h.

The strong winds and sea state prevented consideration of a Triaxus tow, so we transited to the offshore end of the mooring.

1 May

We ran a Ship ADCP line along the mooring line during the morning and afternoon.

During the day the mooring and deck crew spooled-off the recovered EAC_3200 mooring line and spooled-on the EAC_3200 deployment line. They prepared the deck for the next mooring operation. The science team downloaded data and cleaned instruments. Recovered cleaned instruments were packed and stored.

Swath mapping occurred overnight

2 May

We held a no go/go meeting and toolbox at 0645h in preparation for the deployment of EAC_3200. The mooring deployment began at 0730h and was completed 1400h.

Triangulation was completed at approximately 1700h – EAC_3200 mooring location is 27.2841 S, 154.130 E and a CTD 012 completed at the mooring site.

Swath mapping occurred overnight

3 May

We began the recovery of the EAC_2000 (M2) mooring recovery at 0733h and the mooring was on board by 1210h.

We moved to the EAC_500 mooring site and began recovery of the mooring after lunch. With weak currents the mooring wire contained many wuzzles.

We began to download the mooring ADCP data

At approximately 1800h we began a Triaxus tow from inshore (200 m) to the offshore location

4 May

The Triaxus was completed at 0730h and recovered to the deck by 0900h. We began a ship ADCP line from off-shore to on-shore.

The day was spent spooling off and on the EAC_2000 and EAC_500 (M1) mooring line and deck preparation for the deployment of EAC_500 and EAC_2000. We also cleaned instruments and downloaded data.

The length of data on one of the ADCP was only 12 months, however the batteries were still operating.

Swathing mapping occurred during the day and overnight.

5 May

We completed the go/no go and toolbox meeting in anticipation for the deployment of EAC_500. We delayed the start of the deployment until 0930 by which time the SE wind shift was expected to have settled in. While waiting we investigated the reason for shortened time series on the ADCP – too small memory card. We then discovered that the same size memory card was in the ADCP unit on the mooring to be deployed. After a discussion, it was decided to reverse the order of deployment of the last two moorings. Thus was moved to EAC_2000 deployment site and began preparation to deploy this mooring. The mooring, science and ship's crew all worked together to setup for the deployment of EAC_2000.

Mooring operation began at 1000h and were completed by 1630h. Triangulation of mooring was completed – EAC_2000 mooring location is 27.3129 S, 153.999- E and mooring deployment CTD 013 were completed by 2030.

Swath mapping overnight.

6 May

We held a no go/go and tool box meeting at 0645h. Deployment operation for the EAC_500 mooring begin and 0745h. Mooring anchor was deployed at 1140h.

During the afternoon we completed the triangulation – EAC_500 mooring location is 27.327 S, 153.899 E – and a CTD 014. We then began cleaning and packing the back deck as we made our way to the southwest corner of the Triaxus box.

We began the southern section of the Triaxus survey.

7 May

We completed the southern section of the Triaxus survey at approximately 0900h. The mooring team and crew worked on the back deck finishing cleaning and storing mooring gear into the container. The final ADCP instruments were loaded. Swath mapping was undertaken until 1500h.

Back deck work was completed by 1500h and the eastern boundary of the Triaxus survey was begun.

8 May

We completed the eastern section of the Triaxus survey at approximately 0400h. The Triaxus was recovered to the deck and the secondary conductivity senor and primary oxygen sensors were replaced. The Triaxus was redeployed at 0600h, and the northern section of the Triaxus survey was begun.

We completed the Triaxus survey at 2130h. We transited to the mooring line to begin a final Triaxus line along the mooring line.

9 May

The final Triaxus survey of the mooring line began at 0100h and completed by 1600h. Once the Triaxus was recovered we set sail for the Brisbane pilot station.

10 May

Pilot onboard at 0600h and we began our transit to port.

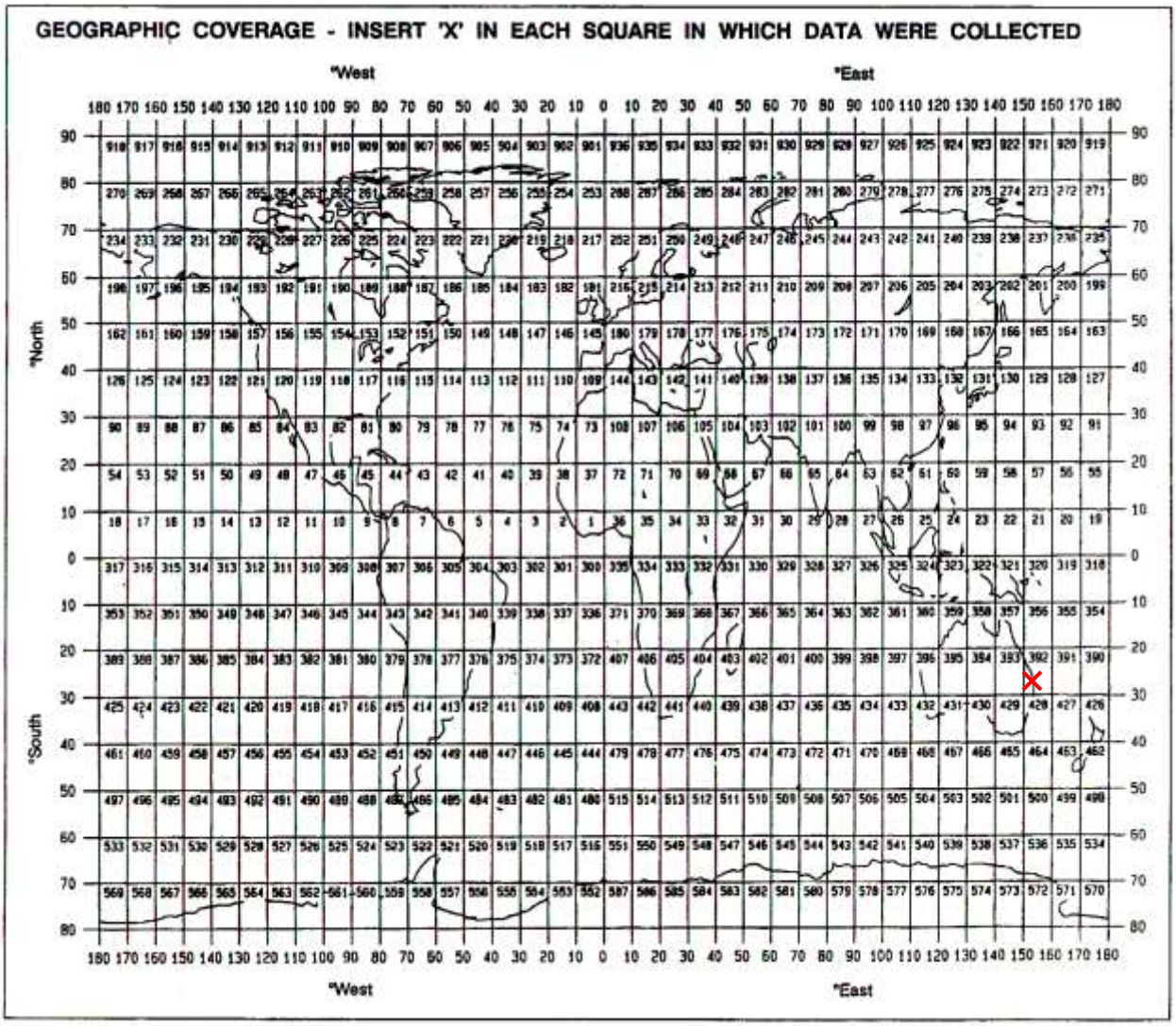
Summary

This voyage achieved all its primary science objectives. The ship, MNF and science teams work together to deliver a successful voyage.

Marsden Squares

Move a **red "x"** into squares in which data was collected

× × × × ×



Moorings, bottom mounted gear and drifting systems

Item No	PI See page above	APPROXIMATE POSITION						DATA TYPE enter code(s) from list on last page	DESCRIPTION Identify, as appropriate, the nature of the instrumentation the parameters (to be) measured, the number of instruments and their depths, whether deployed and/or recovered, dates of deployments and/or recovery, and any identifiers given to the site.
		LATITUDE			LONGITUDE				
		deg	min	N/S	deg	min	E/W		
1	Sloyan	27	06.414	S	155	17.256	E	H11, D01, D71	Recovery of EAC_4800 (M_6) Deployed Date : 31 October 2016. Recovered Date : 20 April 2018 Appendix B: Provides information on instruments and depth on mooring
2	Sloyan	27	6.467	S	155	17.827	E	H11, D01, D71	Deployment of EAC_4800 (M_6) Deployed Date : 22 April 2018. Appendix B: Provides information on instruments and depth on mooring
3	Sloyan	27	12.533	S	154	38.703	E	H11, D01, D71	Recovery of EAC_4700 (M_5) Deployed : 3 November 2016. Recovered : 23 April 2018 Appendix B provides information on instruments and depth on mooring
4	Sloyan	27	12.3858	S	154	38.9208	E	H11, D01, D71	Deployment of EAC_4700 (M_5) Deployed : 25 April 2018. Appendix B provides information on instruments and depth on mooring
5	Sloyan	27	14.344	S	154	17.461	E	H11, D01, D71	Recovery of EAC_4200 (M_4) Deployment Date : 6 November 2016. Recovered : 25 April 2018 Appendix B Figure 6 provides information on instruments and depth on mooring
6	Sloyan	27	14.3874	S	154	17.8320	E	H11, D01, D71	Deployment of EAC_4200 (M4) Deployed : 29 April 2018. Appendix B provides information on instruments and depth on mooring

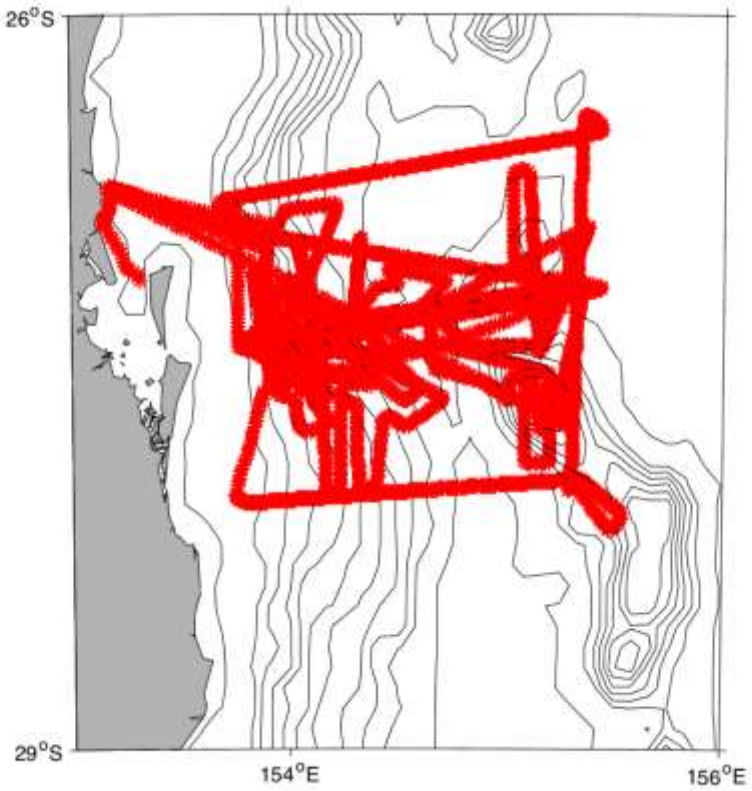
Item No	PI See page above	APPROXIMATE POSITION						DATA TYPE enter code(s) from list on last page	DESCRIPTION Identify, as appropriate, the nature of the instrumentation the parameters (to be) measured, the number of instruments and their depths, whether deployed and/or recovered, dates of deployments and/or recovery, and any identifiers given to the site.
		LATITUDE			LONGITUDE				
		deg	min	N/S	deg	min	E/W		
7	Sloyan	27	17.036	S	154	8.201	E	H11, D01, D71	Recovery of EAC_3200 (M_3) Deployment Date : 8 November 2016. Recovered : 20 April 2018 Appendix B provides information on instruments and depth on mooring
8	Sloyan	27	17.048	S	154	7.805	E	H11, D01, D71	Deployment of EAC_3200 (M_3) Date : 2 May 2018. Appendix B provides information on instruments and depth on mooring
9	Sloyan	27	19.048	S	154	0.101	E	H11, D01, D71	Recovery of EAC_2000 (M_2) Deployment Date : 11 November 2016. Recovered Date : 3 May 2018 Appendix B provides information on instruments and depth on mooring
10	Sloyan	27	19.748	S	153	53.931	E	H11, D01, D71	Recovery of EAC_500 (M1) DeploymentDate : 11 November 2016. Recovered Date : 3 May 2018 Appendix B provides information on instruments and depth on mooring
11	Sloyan	27	18.7782	S	153	59.967	E	H11, D01, D71	Deployment of EAC_2000 (M_2) Date : 5 May 2018. Appendix B provides information on instruments and depth on mooring
12	Sloyan	27	19.568	S	153	53979	E	H11, D01, D71	Deployment of EAC_500 (M_1) Date : 6 May 2018 Appendix B provides information on instruments and depth on mooring

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	Sloyan	14	CTD stations	H09,H10	24 bottles (on the 36 bottle rosette) CTD/rosette were taken. At each CTD station water samples were collected for nutrients, salinity and oxygen.
2	Sloyan	6	Towed undulating CTD profiles	H09,H10	Pressure, Temperature, Conductivity, oxygen, and other sensors were deployed on the triaxus

Track Chart

Voyage track. Bathymetry contours are 0 200 500 and 500m intervals from 1000 m to 5000 m.



Personnel List

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

	Name	Organisation	Role
1.	Stephen McCullum	CSIRO MNF	Voyage Manager
2.	Bernadette Sloyan	CSIRO O&A	Chief Scientist
3.	Jamie Derrick	CSIRO O&A	Mooring Leader
4.	Rebecca Cowley	CSIRO O&A	Mooring Data
5.	Jim La Duke	CSIRO O&A	Mooring Instrument Tech
6.	Curt Chalk	CSIRO O&A	Mooring Tech
7.	Beatriz Pena-Molino	CSIRO O&A	Scientist
8.	Carly Tozer	CSIRO O&A	Scientist
9.	Will Ponsonby	CSIRO MNF	SIT support
10.	Jay McGlashen	CSIRO MNF	SIT support
11.	Dave Watts	CSIRO MNF	GSM support
12.	Steve Van Graas	CSIRO MNF	DAP support
13.	Karl Malakoff	CSIRO MNF	DAP support
14.	Christine Rees	CSIRO MNF	Hydrochemistry support
15.	Julie Janssens	CSIRO MNF	Hydrochemistry support
16.			
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Marine Crew

List all crew members and their position on the ship

Name	Role
Gurmukh Nagra	Master
Adrian Koolhof	Chief Mate
James Hokin	Second Mate
Samuel Edwardds	Third Mate
Christopher Minness	Chief Engineer
Samuel Bensen	First Engineer
Michael Sinclair	Second Engineer
Damien Wright	Third Engineer
Robert Kinsey	Electrical Engineer
Gary Hall	Chief Caterer
Emma Lade	Caterer
Adrian Hughes	Chief Cook
Paul Stanley	Cook
James Hogg	Chief Integrated Rating
Matthew Schmierer	Integrated Rating
Paul Langford	Integrated Rating
Roderick Langham	Integrated Rating
Dennis Bassi	Integrated Rating
Peter Taylor	Integrated Rating
Daniel Morse	Integrated Rating

Acknowledgements

This voyage was support by the Integrated Marine Observing System funded by the National Infrastructure Collaborative Research Infrastructure and CSIRO.

Signature

Your name	Dr. Bernadette M. Sloyan
Title	Chief Scientist
Signature	
Date:	

List of additional figures and documents

Attach any numbered and titled figures here. Delete section if not applicable.

Appendix A CSR/ROSCOP Parameter CodeS

Appendix B Mooring Diagrams

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

	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

D06	Neutrally buoyant floats
D09	Sea level (incl. Bottom pressure & inverted echosounder)
D72	Instrumented wave measurements
D90	Other physical oceanographic 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

B28	Acoustic reflection on marine organisms
B37	Taggings
B64	Gear research
B65	Exploratory fishing
B90	Other biological/fisheries 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 – MOORING DIAGRAMS

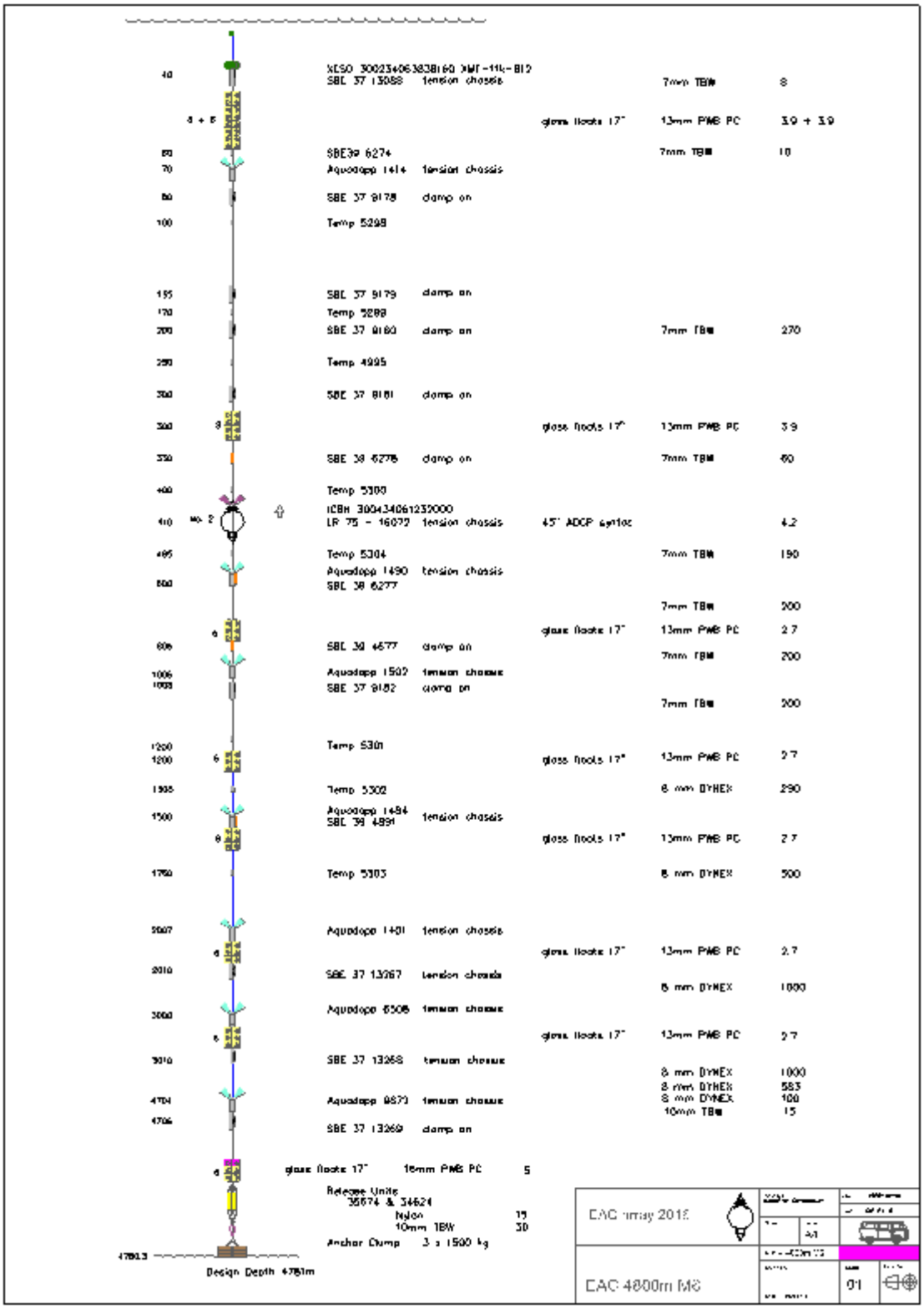

Figure 1. EAC_4800 (M_6) recovered on the voyage. The mooring provides a time series of temperature, salinity, pressure and currents are varying vertical resolution. Instruments types and deployment depth are noted. Instruments include Sea Bird Electronics 37 and 39 units and Starmon mini, RDI Acoustic Doppler Current Profile 75 kHz, and Nortec Aquadopp.

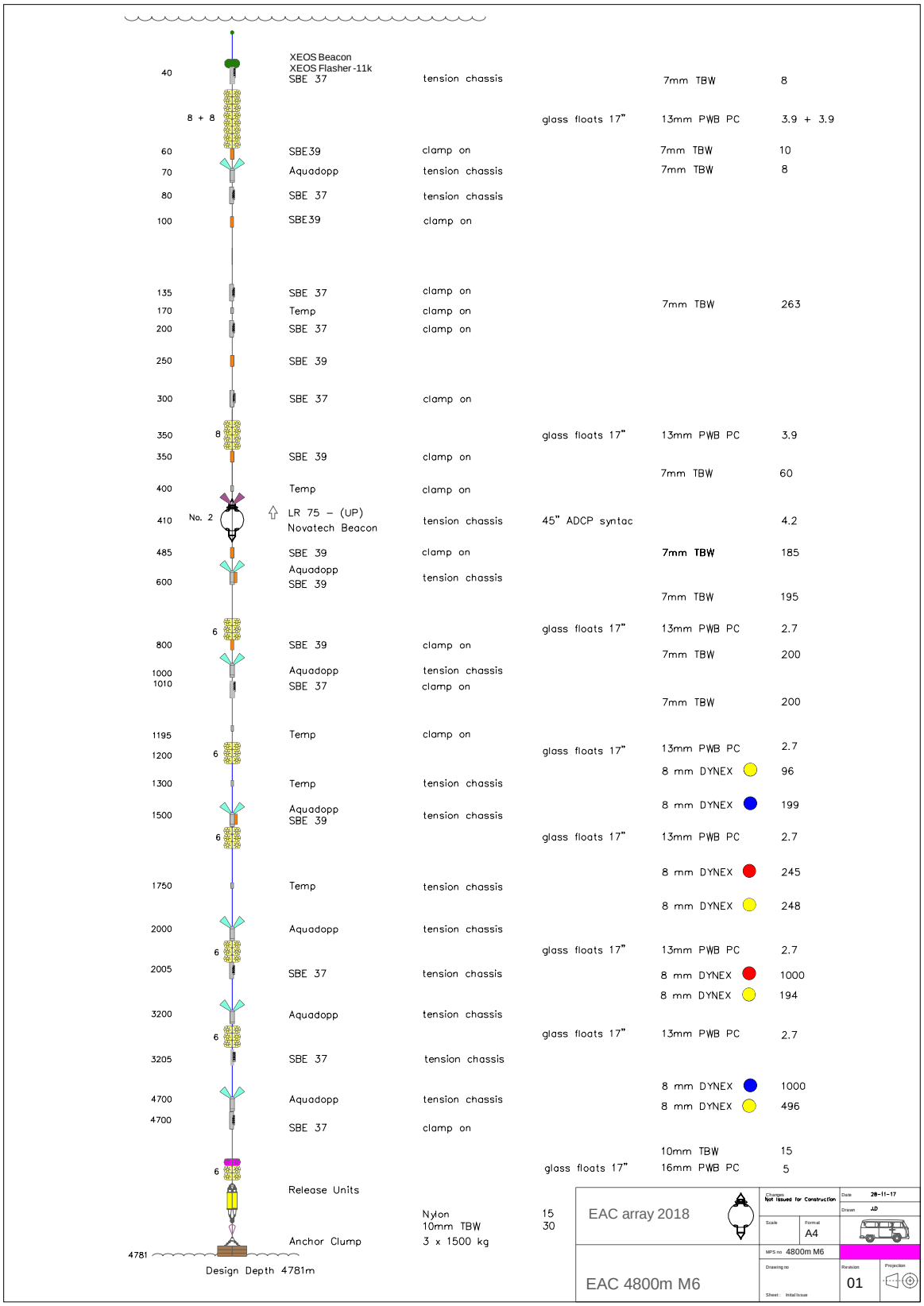

Figure 2. EAC_4800 (M6) deployed on the voyage. Diagram annotation as for figure 1.

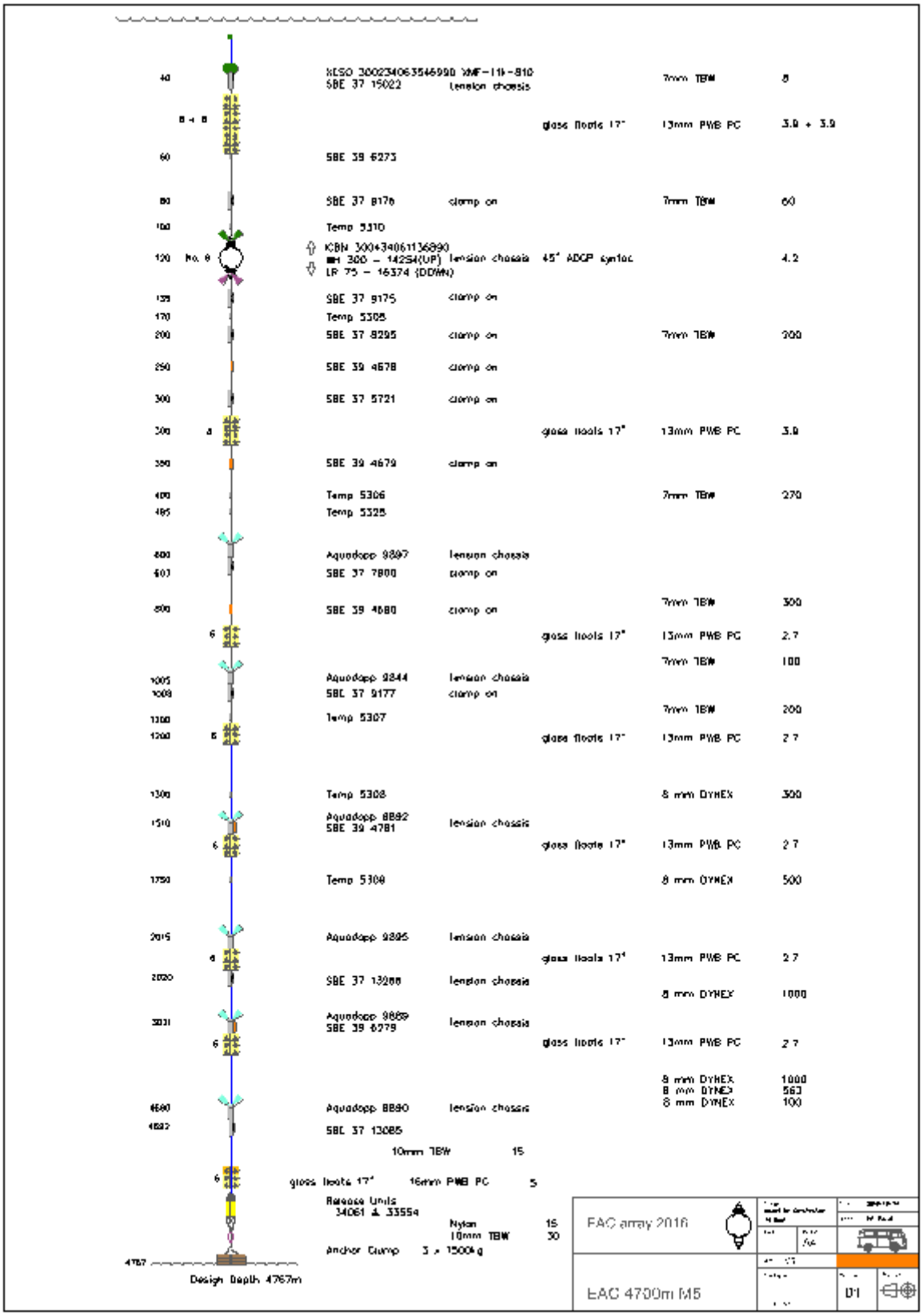

Figure 3. EAC_4700 (M5) recovered on the voyage. Diagram annotation as for figure 1, with the addition of an RDI ADCP 300 kHz unit.

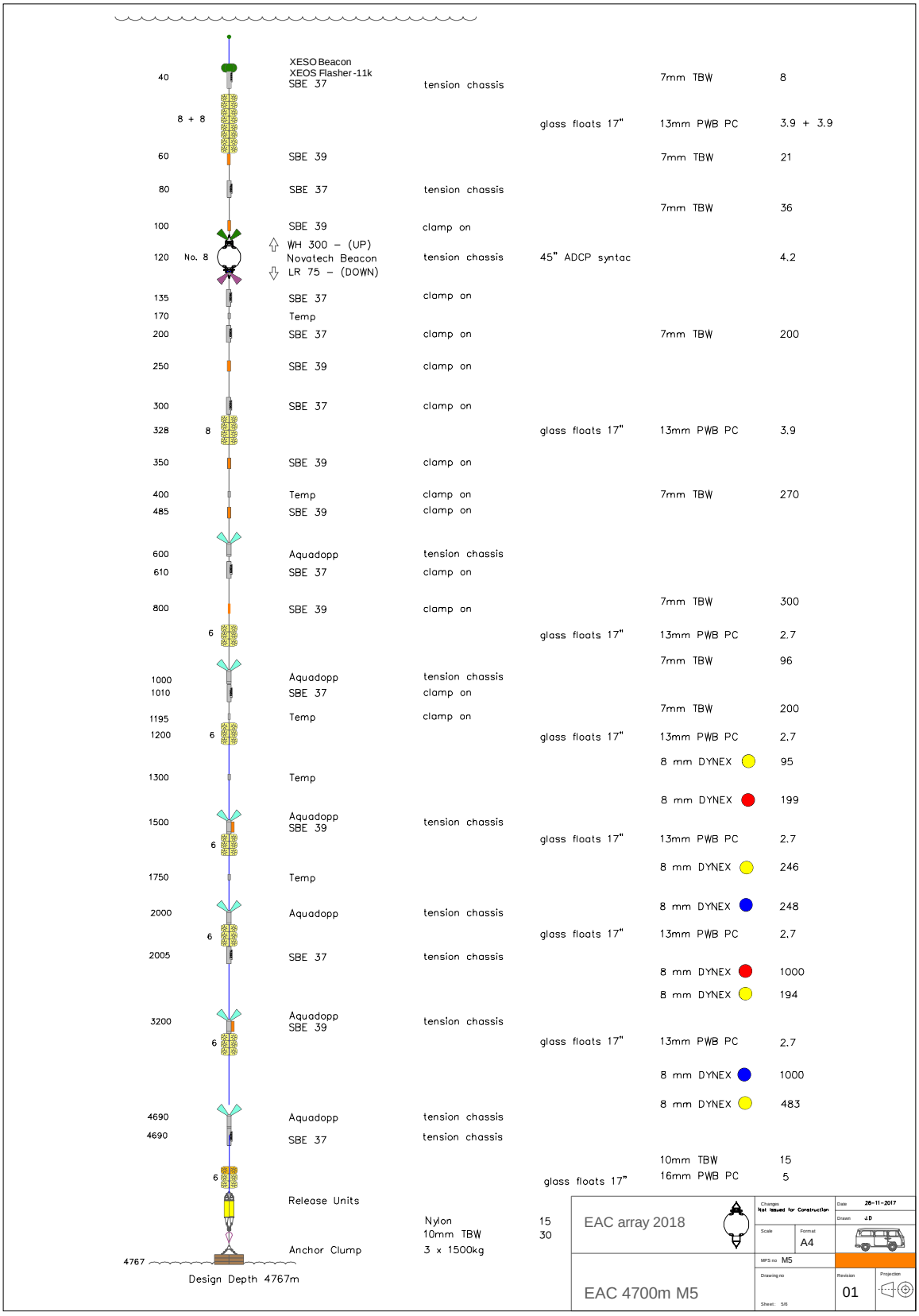

Figure 4. EAC_4700 (M5) deployed on the voyage. Diagram annotation as for figure 2, with the addition of an RDI ADCP 300 kHz unit.

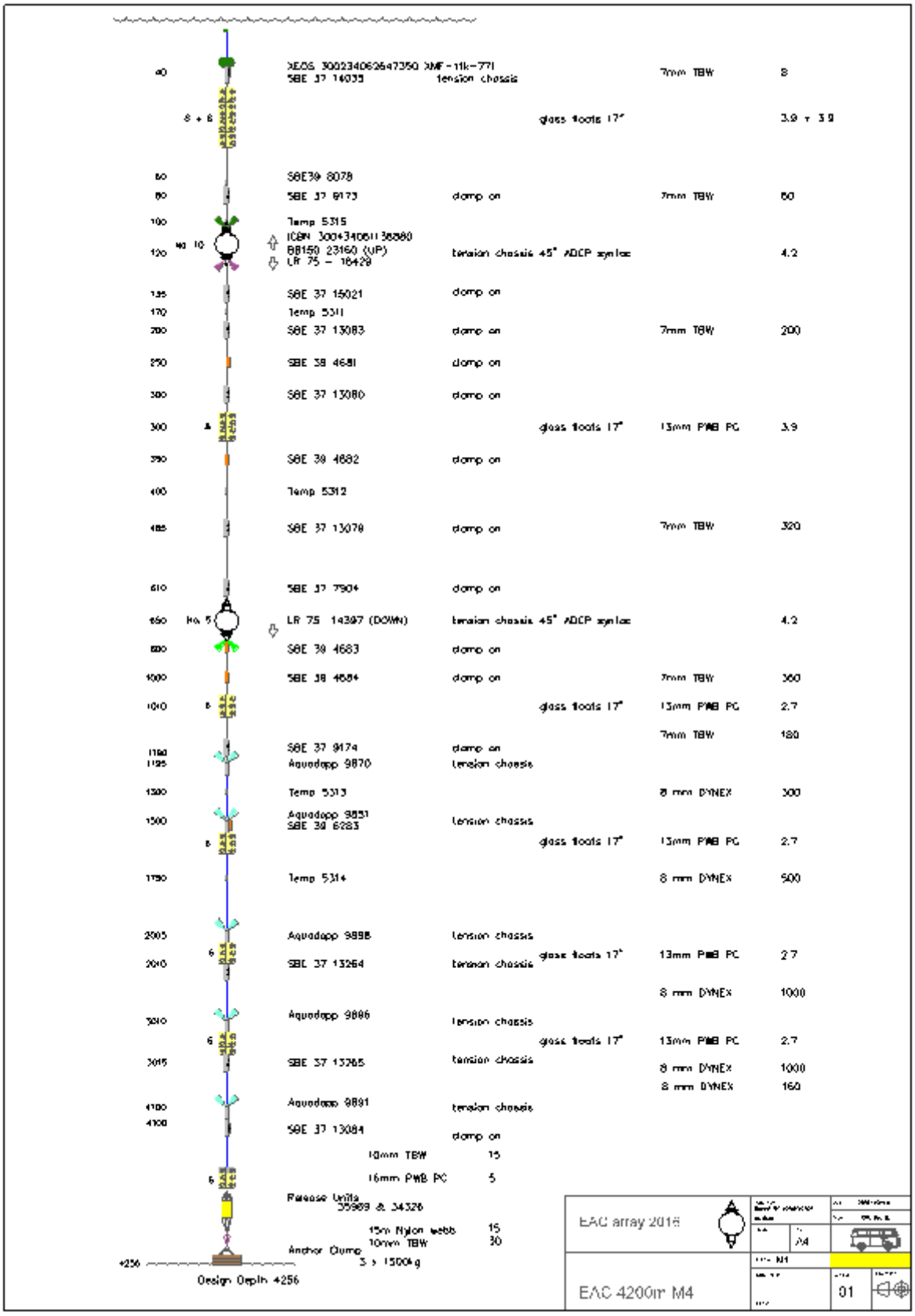

Figure 5. EAC_4200 (M4) recovered on the voyage. Diagram annotation as for figure 2, with the addition of an RDI ADCP 300 and 150 kHz unit.

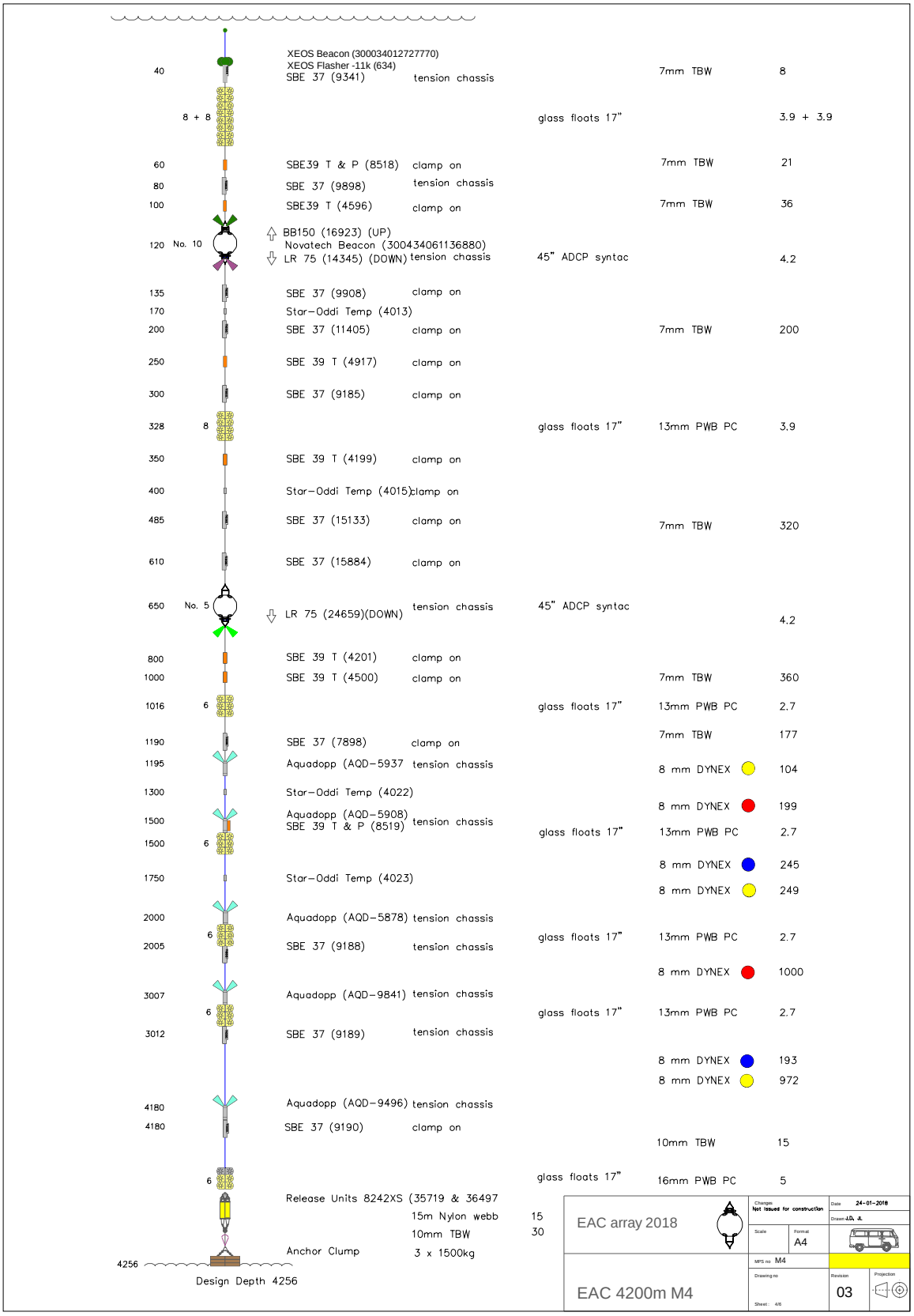

Figure 6. EAC_4200 (M4) deployed on the voyage. Diagram annotation as for figure 2, with the addition of an RDI ADCP 300 and 150 kHz unit.

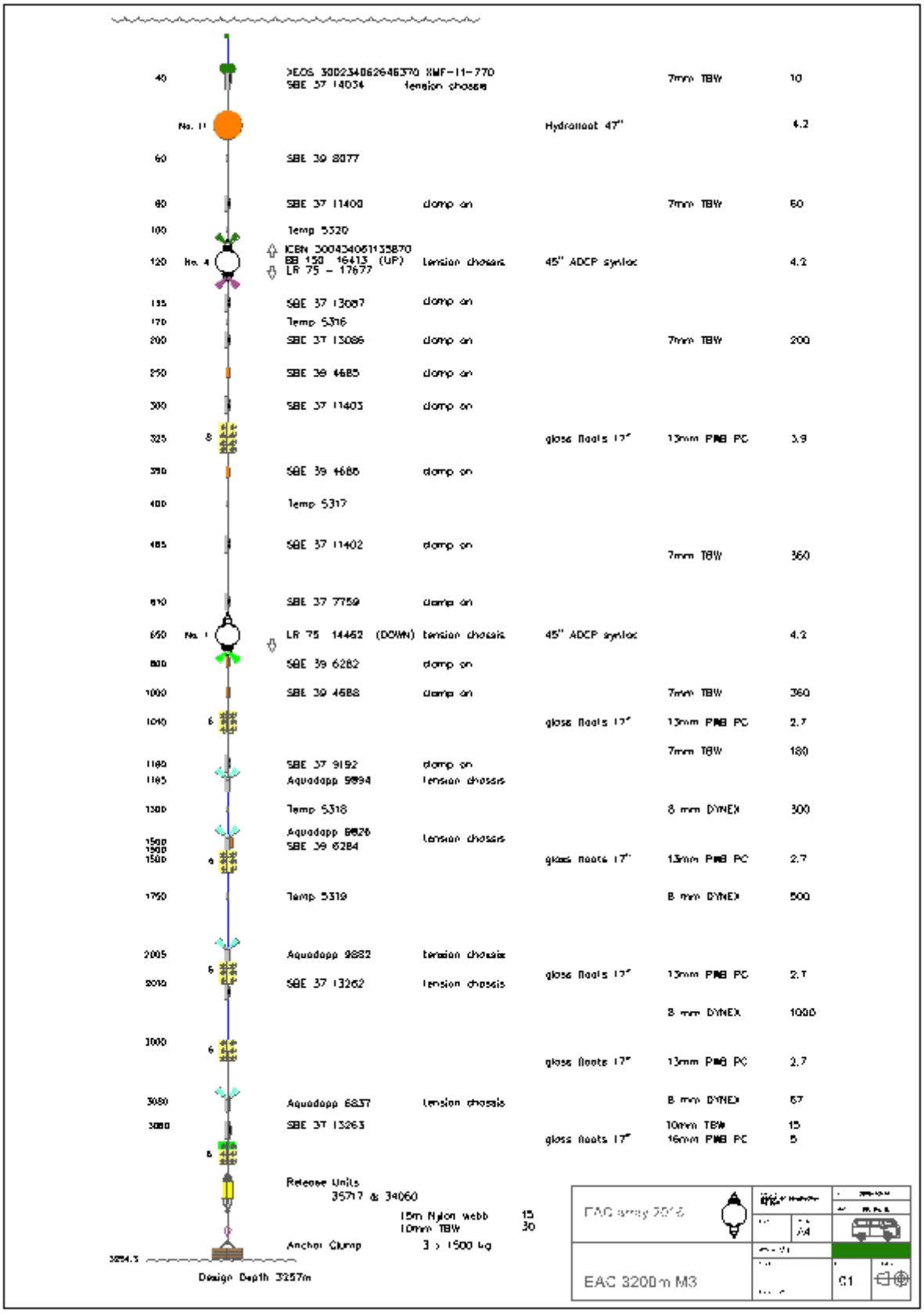

Figure 7. EAC_3200 (M3) recovered on the voyage. Diagram annotation as for figure 2, with the addition of an RDI ADCP 300 and 150 kHz unit.

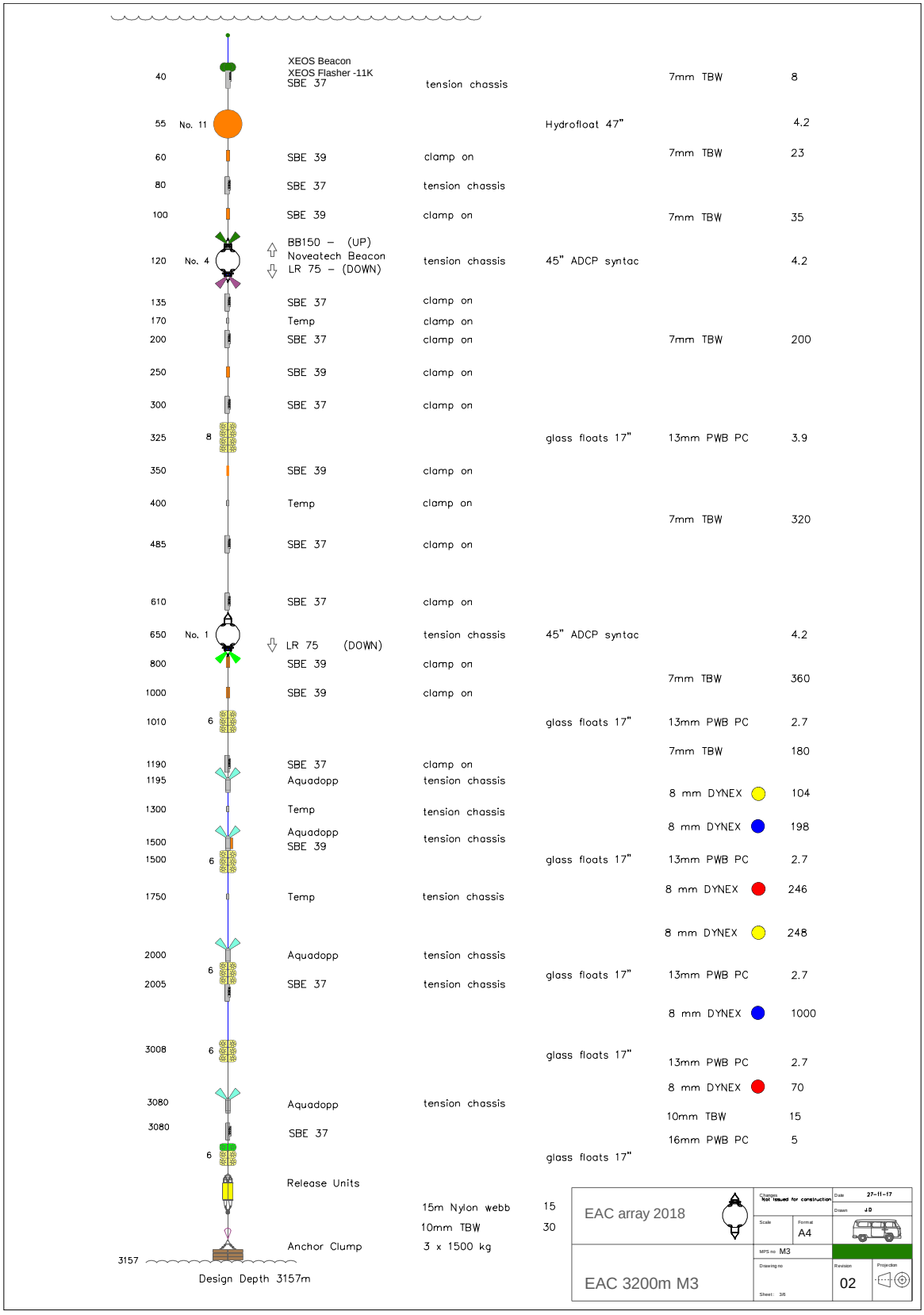

Figure 8. EAC_3200 (M3) deployed on the voyage. Diagram annotation as for figure 2, with the addition of an RDI ADCP 300 and 150 kHz unit.

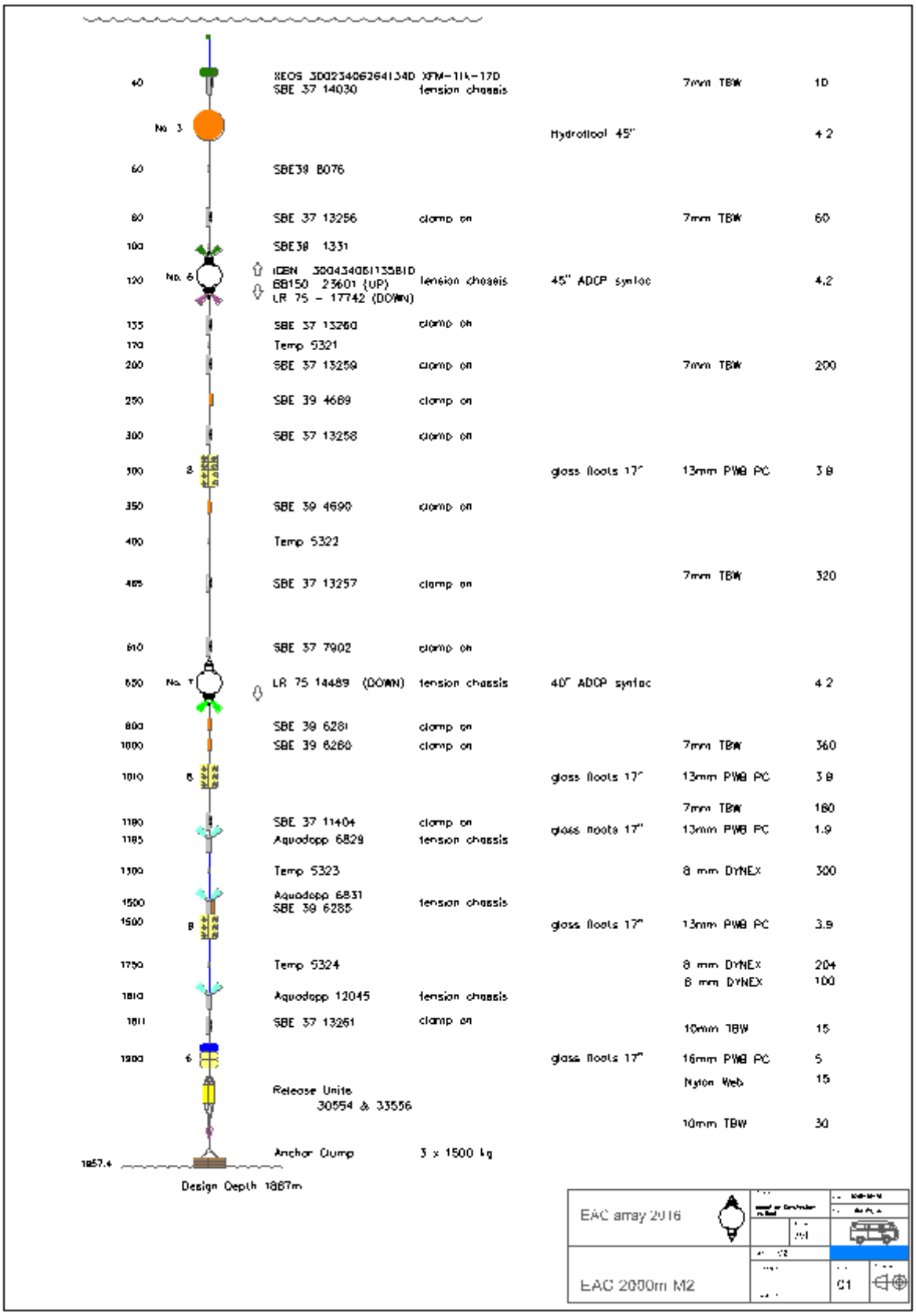

Figure 9. EAC_2000 (M2) recovered on the voyage. Diagram annotation as for figure 2, with the addition of an RDI ADCP 300 and 150 kHz unit.

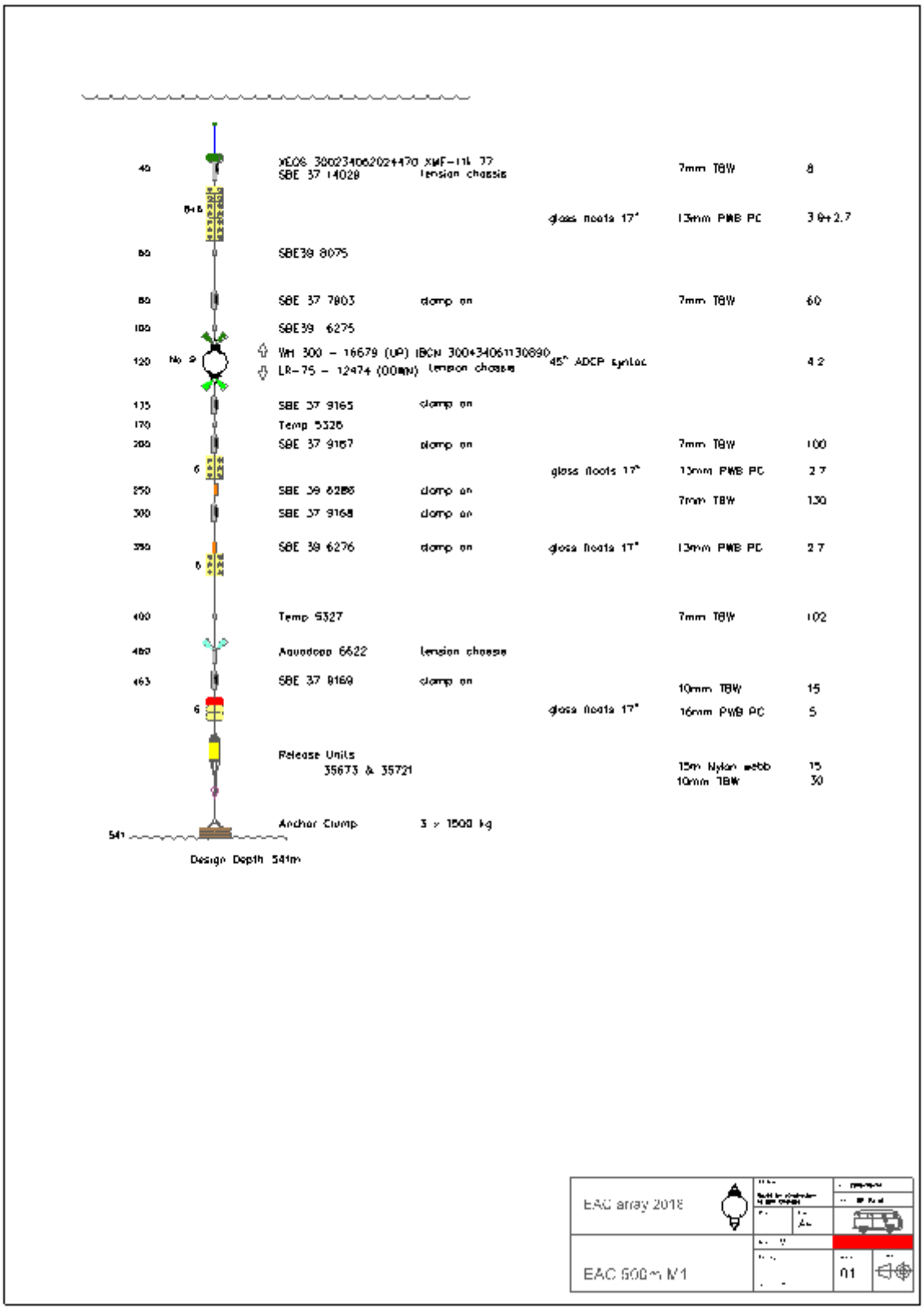

Figure 10. EAC_500 (M1) recovered on the voyage. Diagram annotation as for figure 2, with the addition of an RDI ADCP 300 and 150 kHz unit.

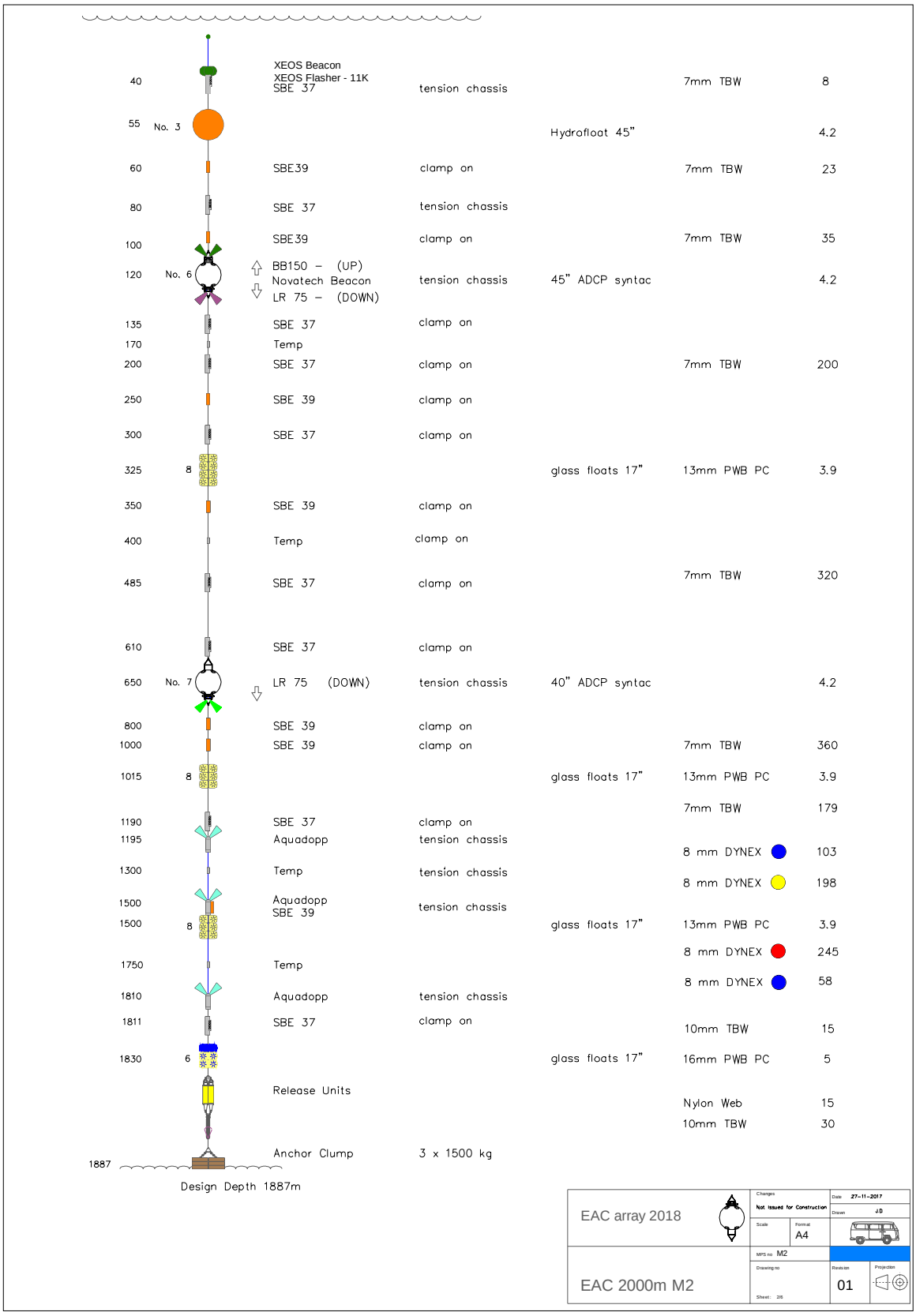

Figure 11. EAC_2000 (M2) deployed on the voyage. Diagram annotation as for figure 2, with the addition of an RDI ADCP 300 and 150 kHz unit.

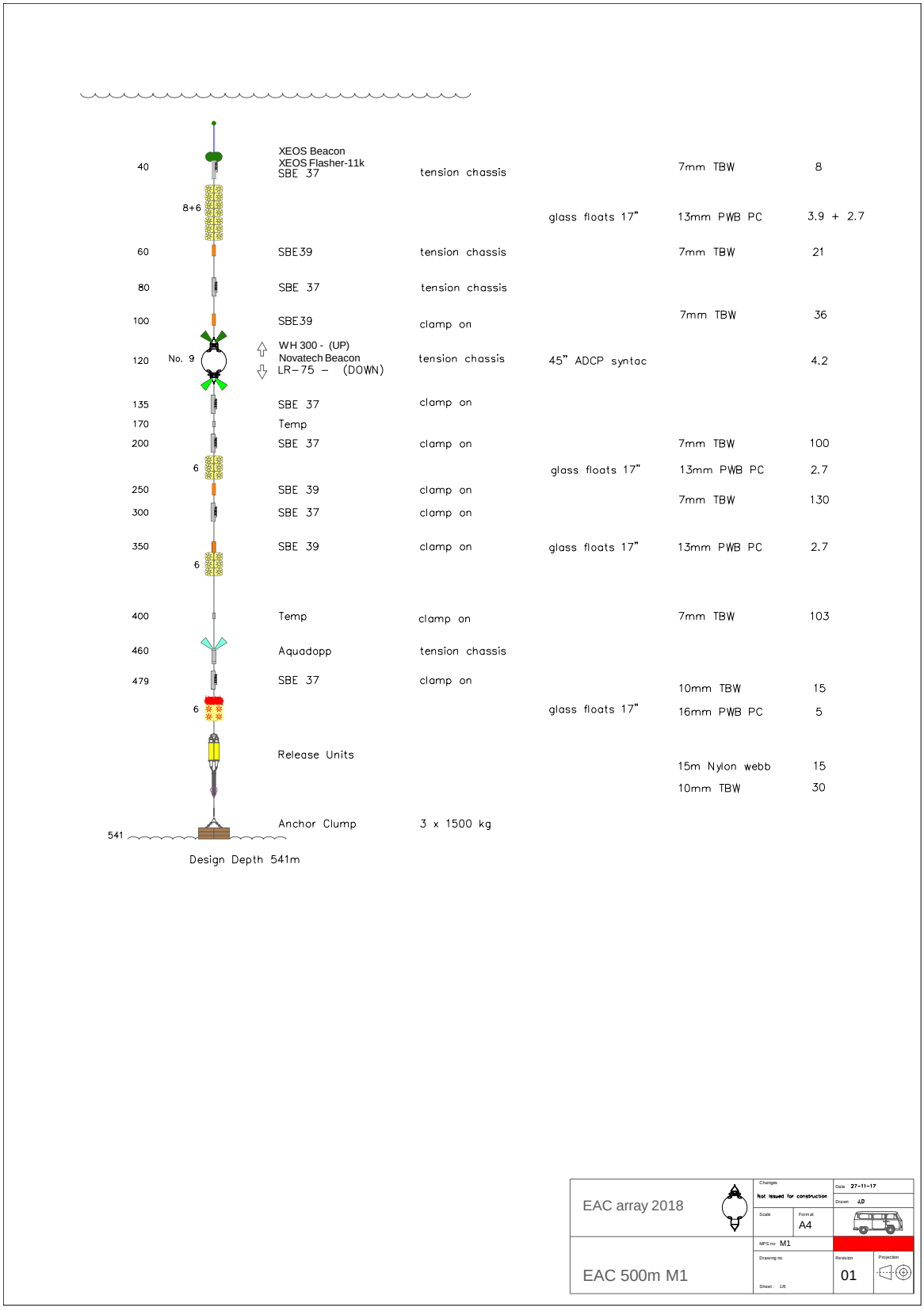

Figure 12. EAC_500 (M1) deployed on the voyage. Diagram annotation as for figure 2, with the addition of an RDI ADCP 300 and 150 kHz unit.