Project Instructions

Date Submitted: September 21, 2016

Platform: NOAA Ship *Rueben Lasker*

Project Number: RL-16-05 (OMAO)

Project Title: CCE1 and CORC Moorings

Project Dates: October 06 to October 13, 2016

Prepared by: U. Send Dated: September 19, 2016

Dr. Uwe Send
Chief Scientist
Scripps Institution of Oceanography

Approved by: GLEDHILL.DWIGHT.KUEHL.1014418144 Digitally signed by GLEDHILL.DWIGHT.KUEHL.1014418144 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=GLEDHILL.DWIGHT.KUEHL.1014418144 Date: 2016.10.03 13:01:22 -04'00' Dated: 10/03/2016

Dwight Gledhill
Deputy Director
NOAA Ocean Acidification Program

Approved by: N/A Dated: N/A

Lab Director Name
Title
Affiliation (Program or Lab)

Approved by: Digitally signed by PARKER.BRIAN.W.1076514042 Date: 2016.10.05 16:38:33 -07'00' Dated:

CDR Brian W. Parker, NOAA
Commanding Officer
Marine Operations Center - Pacific

I. Overview

A. Brief Summary and Project Period

Mooring replacement cruise for the CCE1 Surface Mooring, CORC4 &CORC3 subsurface mooring, CCE1 Deep HARP mooring, CORC4 PIES bottom lander with CTD casts for validation and calibration of mooring instrumentation. Departure October 6 and return to port October 13, 2016.

B. Days at Sea (DAS)

Of the 8 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation, 8 DAS are funded by a Line Office Allocation, 0 DAS are Program Funded, and 0 DAS are Other Agency funded. This project is estimated to exhibit a medium Operational Tempo.

C. Operating Area (include optional map/figure showing op area)

Offshore Southern California. See Appendix #1 & #12

D. Summary of Objectives

- Deployment of the CCE1-10 Surface Mooring
  - Pre-deployment CTD cast calibration/validation of mooring instrumentation
    - 50m Load Cage Instrumentation CTD Cast
    - 500m Microcats CTD Cast
    - 2000m Microcats CTD Cast
  - Pre-deployment checks of acoustic releases at depth
  - Drift test to determine mooring deployment track
- Recovery of the CCE1-09 Surface Mooring
  - Post-deployment CTD cast calibration/validation of mooring instrumentation
    - 50m Load Cage Instrumentation CTD Cast
    - 500m Microcats CTD Cast
    - 2000m Microcats CTD Cast
- Recovery of the CORC4-02 subsurface mooring
  - Post-deployment CTD cast calibration/validation of mooring instrumentation
    - 1000m Microcats CTD Cast
    - 2000m Microcats CTD Cast
  - Pre-deployment checks of acoustic releases at depth
- Deployment of the CORC3-02 subsurface mooring
  - Pre-deployment CTD cast calibration/validation of mooring instrumentation
    - 1000m Microcat CTD Cast
  - Post-deployment acoustic communication with mooring modem for functionality
  - Post-deployment triangulation of acoustic releases for mooring position
- Deployment of CCE1 Deep HARP mooring

- Pre-deployment checks of acoustic releases at depth
- Drift test to determine mooring deployment track
- Post-deployment triangulation of acoustic releases for mooring position

- CORC4 PIES bottom lander recovery
- CORC3 PIES bottom lander deployment

E. Participating Institutions

Scripps Institution of Oceanography, UC San Diego

NMFS Southwest Fisheries Science Center

F. Personnel/Science Party: name, title, gender, affiliation, and nationality

Name (Last, First)	**Title**	**Date Aboard**	**Date Disembark**	**Gender**	**Affiliation**	**Nationality**
Send, Uwe	Chief Scientist	10/06	10/13	M	SIO/UCSD	USA
Belmonte, Manuel	Lab Assistant	10/06	10/13	M	SIO/UCSD	USA
Berg, Chris	Technician	10/06	10/13	M	SIO/UCSD	USA
Chua, Paul	Engineer	10/06	10/13	M	SIO/UCSD	CANADA
Durette, Jessica	Technician	10/06	10/13	F	SIO/UCSD	USA
Lankhorst, Matthias	Scientist	10/06	10/13	M	SIO/UCSD	GERMANY
Lilly, Laura	Grad Student	10/06	10/13	F	SIO/UCSD	USA
Lineback, Aaron	Engineer	10/06	10/13	M	SIO/UCSD	USA
Liu, Chris	Engineer Assistant	10/06	10/13	M	SIO/UCSD	USA
Lowcher, Caroline	Grad Student	10/06	10/13	F	SIO/UCSD	USA
Morris, Ethan	Technician	10/06	10/13	M	SIO/UCSD	USA
Reshef, Eadoh	Grad Student	10/06	10/13	M	SIO/UCSD	USA
Palance, Danial	NOAA Corps	10/06	10/13	M	NMFS/NOAA	USA

G. Administrative

1. Points of Contacts:

Chief Scientist: Uwe Send, usend@ucsd.edu , (858) 822-6710

Chief Scientist/alternate: Matthias Lankhorst, mlankhorst@ucsd.edu, (858) 822-5013

Project Operation Leads: Paul Chua, pchua@ucsd.edu, (858) 534-4607

Project Operation alternate: Matthias Lankhorst, mlankhorst@ucsd.edu, (858) 822-5013

HAZMAT contact: Jessica Durette, jdurette@ucsd.edu, (858) 822-3583

Address for all:

8810 Shellback Way

Nierenberg Hall Room 116

La Jolla, CA 92037

NOAA Ship Reuben Lasker: Operations Officer, ops.reuben.lasker@noaa.gov,

(541) 867-8925

2. Diplomatic Clearances: None Required.

3. Licenses and Permits: Coast Guard approval for CCE1 surface mooring on hand.

II. Operations

The Chief Scientist is responsible for ensuring the scientific staff are trained in planned operations and are knowledgeable of project objectives and priorities. The Commanding Officer is responsible for ensuring all operations conform to the ship's accepted practices and procedures.

A. Project Itinerary: See Appendix #1 & #9

B. Staging and Destaging:

Tenth Avenue Marine Terminal, San Diego, Ca. Staging October 3-5. Destaging October 13-14.

C. Operations to be conducted:

Operation Name	Task	Overboard Equipment Depth (m)	Est. Operations Area (nm)
CTD Cast #1	CTD shallow pre-deployment calibration cast to 500m with water samples (Salinity, chl). Attach microcats to CTD rosette.	500	1
CTD Cast #2	CTD shallow pre-deployment calibration cast to 50m with water samples (O, S, chl, nuts, C)	50	0.5
CTD Cast #3	CTD deep pre-deployment calibration casts to 2000m for instrument calibration and 4 acoustic release testing; water samples (salinity)	2000	2

Operation Name	Task	Overboard Equipment Depth (m)	Est. Operations Area (nm)
Deployment of CCE1-10	Deployment of CCE1-10 surface mooring	Full	10
CTD Cast #4	CTD Cast 4 calibration cast to 1000m between CCE buoys with water samples (O, S, Chl, nuts, C), and 2 acoustic releases for testing	1000	
Deploy CCE1 Deep HARP Mooring	Deployment of Deep HARP subsurface mooring	Full	7
CCE1-09 Recovery	Recovery of CCE1-09 surface mooring	Full	10
CTD Cast #5	CTD deep post-deployment calibration casts to 500m for instrument calibration; water samples (salinity, chl). Attach seacat w/FLNTUS to CTD rosette.	500	2
CTD Cast #6	CTD shallow post-deployment calibration cast to 50m with water samples (O, S, chl, nuts, C), Attach Biopackage cage to rosette	50	0.5
Recover CORC4-02	Recovery of CORC4-02 subsurface mooring	Full	10
Recover CORC4 PIES	Recover of PIES bottom lander.	Full	2
CTD Cast #7	CTD deep post-deployment calibration casts to 3300m for instrument calibration near mooring; water samples (salinity). Attach microcats to CTD rosette.	3000	2
CTD Cast #8	CTD deep post-deployment calibration casts to 1000m for instrument calibration; water samples (salinity). Attach microcats and 2 acoustic releases to CTD rosette.	1000	1
(left blank)	(left blank)	(left blank)	(left blank)
Multibeam Survey	Mutlbeam Bathymetry survey of new CORC5 deployment site		40
Deployment of CORC3-02	deploy new CORC3-02 mooring	Full	7
Deploy CORC3 PIES	Deployment of PIES bottom lander.	Full	1
CORC3 PIES Communication	Acoustic data communication		0.5
CTD Cast #9	CTD deep post-deployment calibration casts to 800m for mooring calibration near CORC3-02; water samples (salinity).	800	1

D. Dive Plan

Dives are not planned for this project.

E. Applicable Restrictions

Conditions which preclude normal operations: Poor weather events will limit the overboard deployment and recovery of the large surface buoy. Failure of the mooring winch will have significant impacts on operations. Mooring deployment and recovery operations may be possible using the ship's capstans. CTD issues will delay calibration/validation of data from mooring instruments.

III. Equipment

A. Equipment and Capabilities provided by the ship (itemized)
   a. Mooring Winch
   b. Deck Cleats
   c. Deck mounts for Mooring H-bit
   d. Overboard Crane
   e. A-Frame
   f. 12 bottle CTD Rosette
   g. 12khz bathymetric echosounder
   h. Multibeam bathymetric echosounder (ME70 for seabed mapping)
   i. Sound Velocity Profiles with XBT for calibration of echosounders
   j. 75khz ADCP

B. Equipment and Capabilities provided by the scientists (itemized)
   a. Mooring recovery and deployment equipment
   b. Teledyne Benthos Universal Deckbox
   c. Teledyne Benthos Portable modem
   d. PIES deployment and recovery equipment
   e. Lithium Fire Extinguisher (Class D Fire Extinguisher)
   f. Small laboratory Spill kit
   g. Personal Floatation Equipment
   h. Personal Protective Equipment

IV. Hazardous Materials

A. Policy and Compliance

The Chief Scientist is responsible for complying with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties (or the OMAO procedure that supersedes it). By Federal regulations and NOAA Marine and Aviation Operations policy, the ship may not sail without a complete inventory of all hazardous materials by name and quantity, MSDS, appropriate spill cleanup materials (neutralizing agents, buffers, or absorbents) in amounts adequate to address spills of a size equal to the amount of chemical brought aboard, and chemical safety and spill response procedures. . Documentation regarding

those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

Per OMAO procedure, the scientific party will include with their project instructions and provide to the CO of the respective ship 30 days before departure:

- List of chemicals by name with anticipated quantity
- List of spill response materials, including neutralizing agents, buffers, and absorbents
- Chemical safety and spill response procedures, such as excerpts of the program's Chemical Hygiene Plan or SOPs relevant for shipboard laboratories
- For bulk quantities of chemicals in excess of 50 gallons total or in containers larger than 10 gallons each, notify ship's Operations Officer regarding quantity, packaging and chemical to verify safe stowage is available as soon as chemical quantities are known.

Upon embarkation and prior to loading hazardous materials aboard the vessel, the scientific party will provide to the CO or their designee:

- An inventory list showing actual amount of hazardous material brought aboard
- An MSDS for each material
- Confirmation that neutralizing agents and spill equipment were brought aboard sufficient to contain and cleanup all of the hazardous material brought aboard by the program
- Confirmation that chemical safety and spill response procedures were brought aboard

Upon departure from the ship, scientific parties will provide the CO or their designee an inventory showing that all chemicals were removed from the vessel. The CO's designee will maintain a log to track scientific party hazardous materials. MSDS will be made available to the ship's complement, in compliance with Hazard Communication Laws.

Scientific parties are expected to manage and respond to incidental spills of scientific hazardous materials. Large spills will be reported to the bridge immediately, and responded to by the ship's Emergency Response Team Overboard discharge of hazardous materials is not permitted.

B. Inventory

See attached Appendix #10 (HAZMAT list *CCE1_CORC4_Hazmat_2016_Final.xlsx*)

C. Chemical safety and spill response procedures

See attached Appendix #10 (HAZMAT list *CCE1_CORC4_Hazmat_2016_Final.xlsx*)

D. Radioactive Materials

No Radioactive Isotopes are planned for this project.

V. Additional Projects

A. Supplementary ("Piggyback") Projects

No Supplementary Projects are planned.

B. NOAA Fleet Ancillary Projects

No NOAA Fleet Ancillary Projects are planned.

VI. Disposition of Data and Reports

Disposition of data gathered aboard NOAA ships will conform to NAO 216-101 *Ocean Data Acquisitions* and NAO 212-15 *Management of Environmental Data and Information.* To guide the implementation of these NAOs, NOAA's Environmental Data Management Committee (EDMC) provides the *NOAA Data Documentation Procedural Directive* (data documentation) and *NOAA Data Management Planning Procedural Directive* (preparation of Data Management Plans). OMAO is developing procedures and allocating resources to manage OMAO data and Programs are encouraged to do the same for their Project data.

A. Data Classifications: *Under Development*

a. OMAO Data
b. Program Data

B. Responsibilities: *Under Development*

VII. Meetings, Vessel Familiarization, and Project Evaluations

A. Pre-Project Meeting: The Chief Scientist and Commanding Officer will conduct a meeting of pertinent members of the scientific party and ship's crew to discuss required equipment, planned operations, concerns, and establish mitigation strategies for all concerns. This meeting shall be conducted before the beginning of the project with sufficient time to allow for preparation of the ship and project personnel. The ship's Operations Officer usually is delegated to assist the Chief Scientist in arranging this meeting.

B. Vessel Familiarization Meeting: The Commanding Officer is responsible for ensuring scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting shall be conducted in the first 24 hours of the project's start and is normally presented by the ship's Operations Officer.

C. Post-Project Meeting: The Commanding Officer is responsible for conducted a meeting no earlier than 24 hrs before or 7 days after the completion of a project to discuss the overall success and short comings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's officers, applicable crew, the Chief Scientist, and members of the scientific party and is normally arranged by the Operations Officer and Chief Scientist.

D. Project Evaluation Report

Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Chief Scientist. The form is available at https://sites.google.com/a/noaa.gov/omao-intranet-dev/operations/marine/customer-satisfaction-survey and provides a "Submit" button at the end of the form. It is also located at https://docs.google.com/a/noaa.gov/forms/d/1a5hCCkgIwaSII4DmrHPudAehQ9HqhRqY3J_FXqbJp9g/viewform. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. Though the complete form is not shared with the ships, specific concerns and praises are followed up on while not divulging the identity of the evaluator.

VIII. Miscellaneous

A. Meals and Berthing

The ship will provide meals for the scientists listed above. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the project, and ending two hours after the termination of the project. Since the watch schedule is split between day and night, the night watch may often miss daytime meals and will require adequate food and beverages (for example a variety of sandwich items, cheeses, fruit, milk, juices) during what are not typically meal hours. Special dietary requirements for scientific participants will be made available to the ship's command at least seven days prior to the project.

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Chief Scientist. The Chief Scientist and Commanding Officer will work together on a detailed berthing plan to accommodate the gender mix of the scientific party taking into consideration the current make-up of the ship's complement. The Chief Scientist is responsible for ensuring the scientific berthing spaces are left in the condition in which they were received; for stripping bedding and linen return; and for the return of any room keys which were issued. The Chief Scientist is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the project and at its conclusion prior to departing the ship.

All NOAA scientists will have proper travel orders when assigned to any NOAA ship. The Chief Scientist will ensure that all non NOAA or non Federal scientists aboard also have proper orders. It is the responsibility of the Chief Scientist to ensure that the entire scientific party has a mechanism in place to provide lodging and food and to be reimbursed for these costs in the event that the ship becomes uninhabitable and/or the galley is closed during any part of the scheduled project.

All persons boarding NOAA vessels give implied consent to comply with all safety and security policies and regulations which are administered by the Commanding Officer. All spaces and equipment on the vessel are subject to inspection or search at any time. All personnel must comply with OMAO's Drug and Alcohol Policy dated May 17, 2000 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

B. Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, NF 57-10-01 (3-14)) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Chief Scientist or the NOAA website http://www.corporateservices.noaa.gov/noaaforms/eforms/nf57-10-01.pdf.

All NHSQs submitted after March 1, 2014 must be accompanied by NOAA Form (NF) 57-10-02 - Tuberculosis Screening Document in compliance with OMAO Policy 1008 (Tuberculosis Protection Program).

The completed forms should be sent to the Regional Director of Health Services at the applicable Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the Health Services Office no later than 4 weeks prior to the start of the project to allow time for the participant to obtain and submit additional information should health services require it, before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of either form. Ensure to fully complete each form and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

The participant can mail, fax, or email the forms to the contact information below. Participants should take precautions to protect their Personally Identifiable Information (PII) and medical information and ensure all correspondence adheres to DOC guidance (http://ocio.os.doc.gov/ITPolicyandPrograms/IT_Privacy/PROD01_008240).

The only secure email process approved by NOAA is Accellion Secure File Transfer which requires the sender to setup an account. Accellion's Web Users Guide is a valuable aid in using this service, however to reduce cost the DOC contract doesn't provide for automatically issuing full functioning accounts. To receive access to a "Send Tab", after your Accellion account has been established send an email from the associated email account to accellionAlerts@doc.gov requesting access to the "Send Tab" function. They will notify you via email usually within 1 business day of your approval. The 'Send Tab" function will be accessible for 30 days.

Contact information:

Regional Director of Health Services
Marine Operations Center – Pacific
2002 SE Marine Science Dr.
Newport, OR 97365
Telephone 541-867-8822
Fax 541-867-8856
Email MOP.Health-Services@noaa.gov

Prior to departure, the Chief Scientist must provide an electronic listing of emergency contacts to the Executive Officer for all members of the scientific party, with the following information: contact name, address, relationship to member, and telephone number.

C. Shipboard Safety

Hard hats are required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. At the discretion of the ship CO, safety shoes (i.e. steel or composite toe protection) may be required to participate in any work dealing with suspended loads, including CTD deployment and recovery. The ship does not provide safety-toed shoes/boots. The ship's Operations Officer should be consulted by the Chief Scientist to ensure members of the scientific party report aboard with the proper attire.

D. Communications

A progress report on operations prepared by the Chief Scientist may be relayed to the program office. Sometimes it is necessary for the Chief Scientist to communicate with another vessel, aircraft, or shore facility. Through various means of communications, the ship can usually accommodate the Chief Scientist. Special radio voice communications requirements should be listed in the project instructions. The ship's primary means of communication with the Marine Operations Center is via email and the Very Small Aperture Terminal (VSAT) link. Standard VSAT bandwidth at 128kbs is shared by all vessels staff and the science team at no charge. Increased bandwidth in 30 day increments is available on the VSAT systems at increased cost to the scientific party. If increased bandwidth is being considered, program accounting is required and it must be arranged through the ship's Commanding Officer at least 30 days in advance.

E. IT Security

Any computer that will be hooked into the ship's network must comply with the *OMAO Fleet IT Security Policy* 1.1 (November 4, 2005) prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to:

(1) Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.
(2) Installation of the latest critical operating system security patches.
(3) No external public Internet Service Provider (ISP) connections.

Completion of the above requirements prior to boarding the ship is required.

Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA's IT Security Awareness Course within 3 days of embarking.

F. Foreign National Guests Access to OMAO Facilities and Platforms

All foreign national access to the vessel shall be in accordance with NAO 207-12 and RADM De Bow's March 16, 2006 memo (http://deemedexports.noaa.gov). National Marine Fisheries Service personnel will use the Foreign National Registration System (FNRS) to submit requests for access to NOAA facilities and ships. The Departmental Sponsor/NOAA (DSN) is responsible

for obtaining clearances and export licenses and for providing escorts required by the NAO. DSNs should consult with their designated Line Office Deemed Export point of contact to assist with the process.

Full compliance with NAO 207-12 is required.

Responsibilities of the Chief Scientist:

1. Provide the Commanding Officer with the email generated by the Servicing Security Office granting approval for the foreign national guest's visit. (For NMFS-sponsored guests, this email will be transmitted by FNRS.) This email will identify the guest's DSN and will serve as evidence that the requirements of NAO 207-12 have been complied with.
2. Escorts – The Chief Scientist is responsible to provide escorts to comply with NAO 207-12 Section 5.10, or as required by the vessel's DOC/OSY Regional Security Officer.
3. Ensure all non-foreign national members of the scientific party receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the Servicing Security Office.
4. Export Control - Ensure that approved controls are in place for any technologies that are subject to Export Administration Regulations (EAR).

The Commanding Officer and the Chief Scientist will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.

Responsibilities of the Commanding Officer:

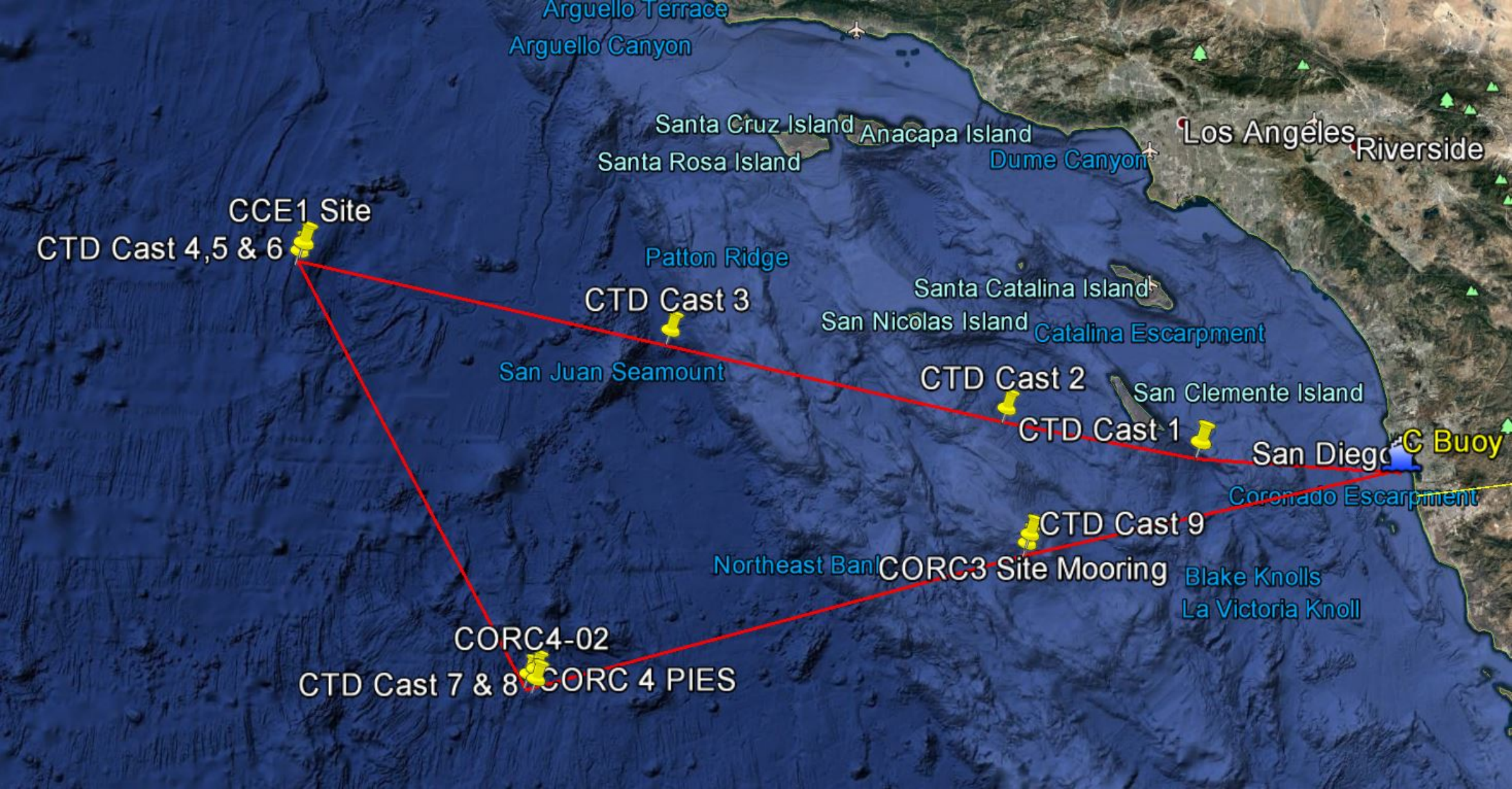
1. Ensure only those foreign nationals with DOC/OSY clearance are granted access.
2. Deny access to OMAO platforms and facilities by foreign nationals from countries controlled for anti-terrorism (AT) reasons and individuals from Cuba or Iran without written approval from the Director of the Office of Marine and Aviation Operations and compliance with export and sanction regulations.
3. Ensure foreign national access is permitted only if unlicensed deemed export is not likely to occur.
4. Ensure receipt from the Chief Scientist or the DSN of the FNRS or Servicing Security Office email granting approval for the foreign national guest's visit.
5. Ensure Foreign Port Officials, e.g., Pilots, immigration officials, receive escorted access in accordance with maritime custom to facilitate the vessel's visit to foreign ports.
6. Export Control - 8 weeks in advance of the project, provide the Chief Scientist with a current inventory of OMAO controlled technology onboard the vessel and a copy of the vessel Technology Access Control Plan (TACP). Also notify the Chief Scientist of any OMAO-sponsored foreign nationals that will be onboard while program equipment is aboard so that the Chief Scientist can take steps to prevent unlicensed export of Program controlled technology. The Commanding Officer and the Chief Scientist will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.
7. Ensure all OMAO personnel onboard receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the Servicing Security Office.

Responsibilities of the Foreign National Sponsor:

1. Export Control - The foreign national's sponsor is responsible for obtaining any required export licenses and complying with any conditions of those licenses prior to the foreign national being provided access to the controlled technology onboard regardless of the technology's ownership.
2. The DSN of the foreign national shall assign an on-board Program individual, who will be responsible for the foreign national while on board. The identified individual must be a U.S. citizen and a NOAA or DOC employee. According to DOC/OSY, this requirement cannot be altered.
3. Ensure completion and submission of Appendix C (Certification of Conditions and Responsibilities for a Foreign National

IX. Appendices

1. Cruise track (*CCE & CORC_Cruise_Track.JPG)*
2. CCE1-09 mooring diagram to be recovered (*CCE1_09_deployed_dwg.pdf*)
3. CCE1-10 mooring diagram to be deployed (*CCE1_10_dwg.pdf*)
4. Deep HARP Mooring diagram to be deployed (*DEEP_HARP_MOORING_dwg.pdf*)
5. CORC4-02 mooring diagram to be recovered (*CORC4_02_deployed_dwg.pdf*)
6. CORC5-01 mooring diagram to be deployed (*CORC5_01_dwg.pdf)*
7. Main Deck layout plan (*CCE_CORC_Lasker_deck_layout.pdf)*
8. CCE1 Assets Map (*CCE1_assets_map.pdf)*
9. Station/Waypoint List (*201610_Lasker_Send_Cruise_plan.xlsx*)
10. Cruise Participants (*CCE1CORC4_participants.xls*)
11. HAZMAT list (*CCE1_CORC4_Hazmat_2016_Final.xlsx*)
12. Chart 18020 (*18020.pdf*)


Arguello Terrace
Arguello Canyon
Santa Cruz Island
Anacapa Island
Santa Rosa Island
Dume Canyon
Los Angeles
Riverside
CCE1 Site
CTD Cast 4,5 & 6
Patton Ridge
CTD Cast 3
Santa Catalina Island
San Nicolas Island
Catalina Escarpment
San Juan Seamount
CTD Cast 2
San Clemente Island
CTD Cast 1
San Diego
C Buoy
Coronado Escarpment
CTD Cast 9
Northeast Ban
CORC3 Site Mooring
Blake Knolls
La Victoria Knoll
CORC4-02
CTD Cast 7 & 8
CORC 4 PIES

CCE1−09 Surface Buoy

Deployment 18−Nov−2015 33N00.000, 122W00.000 Recovery ??−??−2016

Source: 18−Nov−2015 21:02:37, ...\Projects\Paul's m−files\CCE\CCE1−09\cce1_09_deployed.cfg
Author: 18−Nov−2015 21:02:41, pchua@(PCWIN64)

depth (incl. stretch)	component	S/N description	rope # & Length	Distance from Upper / Lower rope end	in/out of water comment
33N00.00, 122W00.00			!!! Check for Cotter Pins !!!		*18−Nov−2015 ??−??−2016*
−0 m	Seaward Buoy	MELO _____ Yellow Light VAISALA _____ OCR #_____ Shutter #_____ Controller #_____			880kg Mooring load *UTC* *Deploy Tower first, short sling*
		MapCO2 #_____ LR−ADCP #_____ SeapHet #_____ PMEL SBE16+V2 #_____ FLNTUS #_____ Optode #_____	PL 5t 1" chain 1.3m 5/8" MR PL 3t 3/4" #1 35m 3/8" ins	AS 8t 1" AS 5t 3/4" AS 5t 3/4" AS 5t 3/4"	upper Seawater Ground bypass up insulated termination
10 m	MC−IM	MC#6991/ID91		6.0 29.0	
21 m	SC−IM	SeaCat IM #4599/ID99 FLNTUS #1803		16.0 19.0	
31 m	MC−IM	MC#4826/ID26		26.0 9.0	
41 m	Frame	Controller #_____ FLNTUS #_____ Suna #_____ SeapHOx, Pump MC #6976/ID86	#1 bottom PL 3t 3/4" PL 3t 3/4" PL 3t 3/4" #2 38m 3/8" ins	AS 5t 3/4" AS 5t 3/4" AS 3t 5/8" AS 5t 3/4" AS 5t 3/4"	insulated termination insulated termination
61 m	MC−IM	MC#5132/ID32		19.0 19.0	
76 m	MC−IM	MC#6357/ID57		34.0 4.0	
81 m	Frame	OCR #_____ Shutter #_____ Controller #_____	#2 bottom PL 3t 3/4" PL 3t 3/4" PL 3t 3/4" #3 70m 3/8" ins	AS 5t 3/4" AS 3t 5/8" AS 3t 5/8" AS 5t 3/4" AS 5t 3/4"	insulated termination insulated termination
151 m	ECHOTAG	AOS #3 SBE UIMM ID#3		69.0 1.0	13mm and 17mm Hex Nuts
152 m	MC−IM	MC#6352/ID52	above term. #3 bottom PL 3t 3/4" #4 351m 3/8" ins	AS 5t 3/4" AS 5t 3/4"	insulated termination
302 m	MC−IM	MC#6977/ID77		150.0 201.0	
503 m	MC−IM	MC#5133/ID33		349.9 1.1	

CCE1−09 Surface Buoy

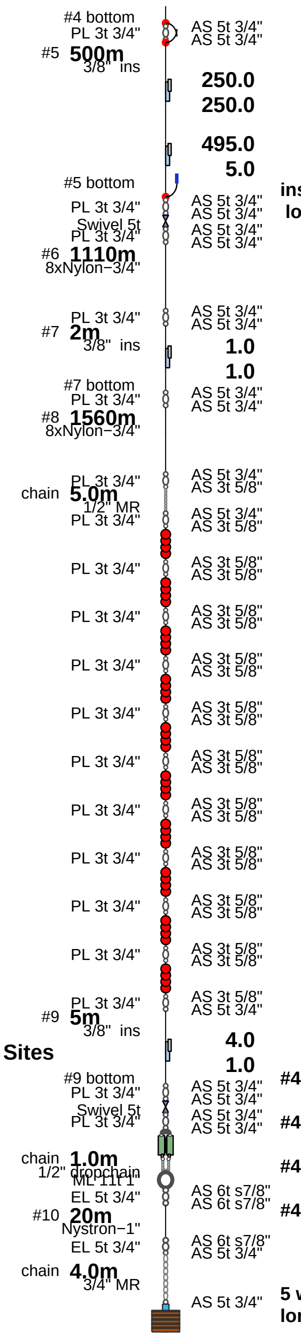
Deployment 18−Nov−2015 33N00.000, 122W00.000 Recovery ??−??−2016

Source: 18−Nov−2015 21:02:37, ...\Projects\Paul's m−files\CCE\CCE1−09\cce1_09_deployed.cfg
Author: 18−Nov−2015 21:02:41, pchua@(PCWIN64)

depth (incl. stretch)	component	S/N description	rope # & Length	Distance from Upper / Lower rope end	in/out of water comment

33N00.00, 122W00.00 **!!! Check for Cotter Pins !!!** ***18−Nov−2015 ??−??−2016***

depth	component	S/N description	comment
754 m	MC−IM	MC#6994/ID94	
999 m	MC−IM	MCp#5954/ID54	insulated termination lower Seawater Ground — *Setup H−bit & Water cooling*
2215 m	MC−IM	MCP#3464	
3905 m	40 17" Float (42m)		
3949 m	MCP−IM	MC#10604 Ocean Sites	
3952 m	2 AR Benthos	#41853	#41853 : RX 11.5 / TX 12.0; #41853 : Enable A / Release F
		#45249	#45249 : RX 9.5 / TX 12.0; #45249 : Enable B / Release G
3980 m	Anchor 2500 kg dry 2182 kg wet		5 wheels, long post



drop: 33N______, 122W______

median: 33N______, 122W______

CCE1−10 Surface Buoy

Deployment ??−Oct−2016 33N00.000, 122W00.000 Recovery ??−??−2017

Source: 28−Jun−2016 18:21:00, ...\Projects\Paul's m−files\CCE\CCE1−10\cce1_10_old_WBAT.cfg
Author: 28−Jun−2016 18:22:16, pchua@(PCWIN64)

depth (incl. stretch)	component	S/N description	rope # & Length	Distance from Upper / Lower rope end	in/out of water comment
33N00.00, 122W00.00			!!! Check for Cotter Pins !!!		*??−Oct−2016 ??−??−2017*
−0 m	Seaward Buoy	MELO _____ Yellow Light VAISALA _____ OCR #_____ Shutter #_____ Controller #_____		880kg Mooring load	*UTC* *Deploy Tower first, short sling*
		MapCO2 #_____ LR−ADCP #_____ SeapHet #_____ PMEL SBE16+V2 #_____ FLNTUS #_____ Optode #_____	PL 5t 1" chain 1.3m 5/8" MR PL 3t 3/4"	upper Seawater Ground bypass up insulated termination	AS 8t 1" AS 5t 3/4" AS 5t 3/4" AS 5t 3/4"
9 m	MC−IM	MC#_____ /ID ___	#1 35m 3/8" ins	6.0 29.0	
19 m	SC−IM	SeaCat IM #_____ /ID ___ FLNTUS #_____		16.0 19.0	
29 m	MC−IM	MC#_____ /ID ___		26.0 9.0	
39 m	Frame	Controller #_____ FLNTUS #_____ Suna #_____ SeapHOx, Pump MC #_____/ID ___	#1 bottom PL 3t 3/4" PL 3t 3/4" PL 3t 3/4"	insulated termination insulated termination	AS 5t 3/4" AS 5t 3/4" AS 3t 5/8" AS 5t 3/4" AS 5t 3/4"
			#2 38m 3/8" ins		
60 m	MC−IM	MC#_____ /ID ___		19.0 19.0	
75 m	MC−IM	MC#_____ /ID ___		34.0 4.0	
80 m	Frame	OCR #_____ Shutter #_____ Controller #_____	#2 bottom PL 3t 3/4" PL 3t 3/4" PL 3t 3/4"	insulated termination insulated termination	AS 5t 3/4" AS 3t 5/8" AS 3t 5/8" AS 5t 3/4" AS 5t 3/4"
			#3 70m 3/8" ins		
150 m	ECHOTAG	AOS #___ SBE UIMM ID#___		69.0 1.0	13mm and 17mm Hex Nuts
151 m	MC−IM	MC#_____/ID___		above term.	
			#3 bottom PL 3t 3/4"	insulated termination	AS 5t 3/4" AS 5t 3/4"
			#4 351m 3/8" ins		
301 m	MC−IM	MC#_____/ID___		150.0 201.0	
501 m	MC−IM	MC#_____/ID___		349.9 1.1	

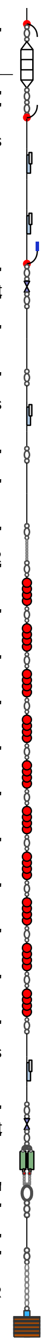
CCE1−10 Surface Buoy

Deployment ??−Oct−2016 33N00.000, 122W00.000 Recovery ??−??−2017

Source: 28−Jun−2016 18:21:00, ...\Projects\Paul's m−files\CCE\CCE1−10\cce1_10_old_WBAT.cfg
Author: 28−Jun−2016 18:22:16, pchua@(PCWIN64)

depth (incl. stretch)	component	S/N description	rope # & Length	Distance from Upper / Lower rope end	in/out of water comment

33N00.00, 122W00.00 **!!! Check for Cotter Pins !!!** ***??−Oct−2016 ??−??−2017***



depth	component	S/N description	Distance from Upper / Lower rope end	in/out of water comment
504 m	Frame	WBAT NOAA NMFS SN________		
755 m	MC−IM	MC#_____/ID___	250.0 / 250.0	
1000 m	MC−IM	MCp#_____/ID___	495.0 / 5.0	
			insulated termination lower Seawater Ground	*Setup H−bit & Water cooling*
2215 m	MC−IM	MC#______ /ID ___	1.0 / 1.0	
3905 m	40 17" Float (42m)			
3949 m	MCP−IM	MC#______ Ocean Sites	4.0 / 1.0	
3952 m	2 AR Benthos	#______		#______: RX _____ / TX _____
				#______: Enable ___ / Release ___
		#______		#______: RX _____ / TX _____
				#______: Enable ___ / Release ___
3980 m	Anchor 2500 kg dry 2182 kg wet			5 wheels, long post

drop: 33N______, 122W______

median: 33N______, 122W______

CCE1−10 Surface Buoy

Deployment ??−Oct−2016 33N00.000, 122W00.000 Recovery ??−??−2017

Source: 28−Jun−2016 18:21:00, ...\Projects\Paul's m−files\CCE\CCE1−10\cce1_10_old_WBAT.cfg
Author: 28−Jun−2016 18:22:16, pchua@(PCWIN64)

Element List

Code	Count	Description	Label	Weight in air	/ water
Components					
32	24	5/8" BTAS 3.2t	AS 3t 5/8"	18.2 kg	15.9 kg
33	34	3/4" BTAS 4.7t	AS 5t 3/4"	41.8 kg	36.3 kg
34	3	7/8" BTAS 6.5t	AS 6t s7/8"	5.4 kg	4.7 kg
35	1	1" BTAS 8t	AS 8t 1"	2.9 kg	2.5 kg
53	29	3/4" pear link 2.7t	PL 3t 3/4"	24.9 kg	21.5 kg
55	1	1" pear link 4.8	PL 5t 1"	2.0 kg	1.7 kg
63	2	3/4" end link 5.4t	EL 5t 3/4"	1.3 kg	1.2 kg
75	1	1" master link 11t	ML 11t 1"	2.6 kg	2.3 kg
94	2	SS Swivel 5t	Swivel 5t	12.4 kg	10.7 kg
196	1	Benth-AR DropChain SL 1/2"-4ft	1/2" dropcha	7.8 kg	6.8 kg
284	10	4 17" 204H serial	H17-4 serial	1040.0 kg	-880.0 kg
301	3	Instrument Frame	Frame	195.0 kg	135.0 kg
331	1	Seacat 16plus IM	SC-IM	10.7 kg	9.8 kg
336	10	MicroCAT IM37	MC-IM	38.0 kg	28.0 kg
337	1	MicroCAT IM37 + pressure	MCP-IM	3.8 kg	2.8 kg
398	1	Echotag	ECHOTAG	1.8 kg	6.0 kg
421	1	Buoy + Bridle + RDI-WH 300	Seaward Buoy	600.0 kg	-0.0 kg
476	1	Dual AR Benthos 865 A	2 AR Benthos	75.0 kg	62.0 kg
			Components weight:	2083.7 kg	-532.8 kg
Ropes					
104	1001m	3/8" 3x19 NILSPIN insulated	3/8" ins	446.4 kg	317.3 kg
112	2670m	8 strand Nylon 3/4"	8xNylon-3/4"	571.4 kg	69.4 kg
113	20m	Samson Nystron 1"	Nystron-1"	10.1 kg	2.0 kg
181	5m	Mooring chain 1/2", 2.7t	1/2" MR	17.5 kg	15.2 kg
182	1m	Mooring chain 5/8", 4.0t	5/8" MR	6.5 kg	5.7 kg
183	4m	Mooring chain 3/4", 6.0t	3/4" MR	30.4 kg	26.4 kg
			Ropes weight:	1082.3 kg	436.0 kg
Summary					
		Components		2083.7 kg	-532.8 kg
		Ropes		1082.3 kg	436.0 kg
520	1	Anchor variable	Anchor	2500.0 kg	2181.5 kg
			Mooring total weight:	5666.1 kg	2084.7 kg

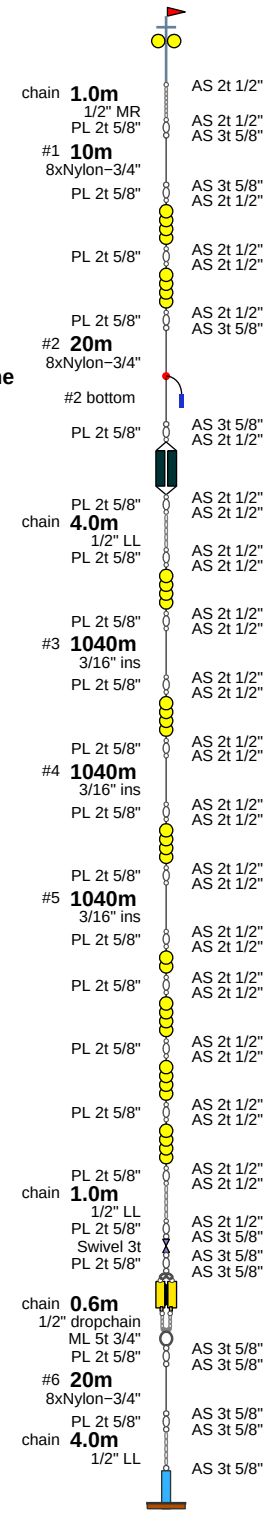
Safe Clump Anchor Weight (no currents): 1505kg wet (1725kg dry)

DEEP MOORING HARP SUBSURFACE 4000m

Deployment Oct−2015Recovery Apr−2016

Source: 12−Oct−2015 09:40:06, ...\Paul's m−files\DEEP_MOORING_HARP\DEEP_MOORING_HARP.cfg
Author: 12−Oct−2015 09:40:09, megaalien@(PCWIN64)

depth (incl. stretch)	component	S/N description	rope # & Length	Distance from Upper / Lower rope end	in/out of water comment	Oct−2015	Apr−2016
			!!! Check for Cotter Pins !!!				
768 m	BE2−frame	GPS BEACON Radio Flasher					
			chain 1.0m 1/2" MR	AS 2t 1/2"			
			PL 2t 5/8"	AS 2t 1/2" AS 3t 5/8"			
			#1 10m 8xNylon−3/4"				
			PL 2t 5/8"	AS 3t 5/8" AS 2t 1/2"			
784 m	8 17" Float (8m)						
			PL 2t 5/8"	AS 2t 1/2" AS 2t 1/2"			
			PL 2t 5/8"	AS 2t 1/2" AS 3t 5/8"			
			#2 20m 8xNylon−3/4"				
		HARP Hydrophone	#2 bottom				
			PL 2t 5/8"	AS 3t 5/8" AS 2t 1/2"			
812 m	HARP						
			PL 2t 5/8"	AS 2t 1/2" AS 2t 1/2"			
			chain 4.0m 1/2" LL				
			PL 2t 5/8"	AS 2t 1/2" AS 2t 1/2"			
819 m	4 17" Float (4m)						
			PL 2t 5/8"	AS 2t 1/2" AS 2t 1/2"			
			#3 1040m 3/16" ins				
			PL 2t 5/8"	AS 2t 1/2" AS 2t 1/2"			
1865 m	4 17" Float (4m)						
			PL 2t 5/8"	AS 2t 1/2" AS 2t 1/2"			
			#4 1040m 3/16" ins				
			PL 2t 5/8"	AS 2t 1/2" AS 2t 1/2"			
2910 m	4 17" Float (4m)						
			PL 2t 5/8"	AS 2t 1/2" AS 2t 1/2"			
			#5 1040m 3/16" ins				
			PL 2t 5/8"	AS 2t 1/2" AS 2t 1/2"			
3955 m	14 17" Float (15m)						
			PL 2t 5/8"	AS 2t 1/2" AS 2t 1/2"			
			PL 2t 5/8"	AS 2t 1/2" AS 2t 1/2"			
			PL 2t 5/8"	AS 2t 1/2" AS 2t 1/2"			
			PL 2t 5/8"	AS 2t 1/2" AS 2t 1/2"			
			chain 1.0m 1/2" LL				
			PL 2t 5/8"	AS 2t 1/2" AS 3t 5/8"			
			Swivel 3t	AS 3t 5/8"			
			PL 2t 5/8"	AS 3t 5/8"			
3971 m	2 AR ORE						
			chain 0.6m 1/2" dropchain ML 5t 3/4"				
			PL 2t 5/8"	AS 3t 5/8" AS 3t 5/8"			
			#6 20m 8xNylon−3/4"				
			PL 2t 5/8"	AS 3t 5/8" AS 3t 5/8"			
			chain 4.0m 1/2" LL				
4000 m	Anchor 700 kg dry 611 kg wet			AS 3t 5/8"			



DEEP MOORING HARP SUBSURFACE 4000m

Deployment Oct−2015Recovery Apr−2016

Source: 12−Oct−2015 09:40:06, ...\Paul's m−files\DEEP_MOORING_HARP\DEEP_MOORING_HARP.cfg
Author: 12−Oct−2015 09:40:09, megaalien@(PCWIN64)

Element List

Code	Count	Label	Weight in air	/ water
Components				
31	32	1/2" BTAS 2.0t	11.5 kg	10.0 kg
32	12	5/8" BTAS 3.2t	9.1 kg	7.9 kg
52	21	5/8" pear link 1.9t	10.1 kg	8.8 kg
73	1	3/4" master link 5.5t	0.9 kg	0.8 kg
93	1	SS Swivel 3t	3.1 kg	2.6 kg
240	1	2−Benthos 17" − Top Frame	65.0 kg	−38.0 kg
272	1	2 17" 204HR serial	48.0 kg	−44.0 kg
274	8	4 17" 204HR serial	768.0 kg	−704.0 kg
302	1	HARP	53.0 kg	45.0 kg
478	1	Dual AR ORE 8242XS	75.0 kg	60.0 kg
480	1	DropChain 1/2"−4ft	7.8 kg	6.8 kg
		Components weight :	1051.6 kg	−644.0 kg
Ropes				
101	3120m	3/16" 3x19 NILSPIN insulated	343.2 kg	240.9 kg
112	50m	8 strand Nylon 3/4"	10.7 kg	1.3 kg
171	9m	Long Lk chain 1/2", 2.9t	27.0 kg	23.5 kg
181	1m	Mooring chain 1/2", 2.7t	3.5 kg	3.0 kg
		Ropes weight :	384.4 kg	268.7 kg
Summary				
		Components	1051.6 kg	−644.0 kg
		Ropes	384.4 kg	268.7 kg
520	1	Anchor variable	700.0 kg	610.8 kg
		Mooring total weight :	2136.0 kg	235.5 kg

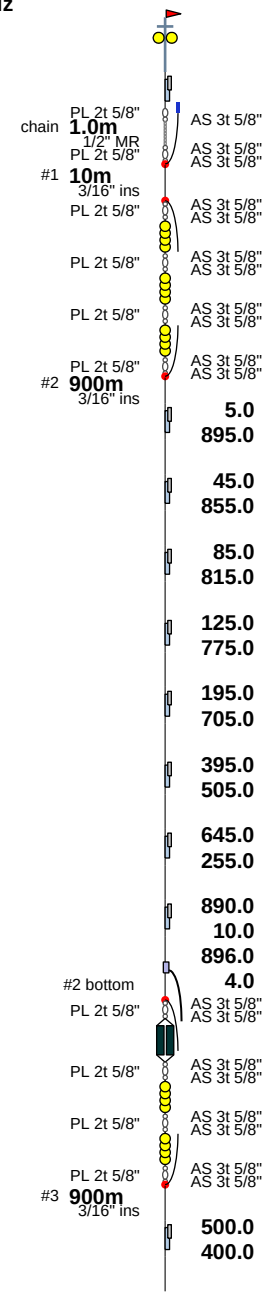
CORC4−02 deep mooring Rev 2

designed for 3945m

By: P. Chua/CB	11−Feb−2015	CORC4−02_3870m	31N45.95, 121W20.25, 3945m

Source: 11−Feb−2015 10:18:20, ...\Paul's m−files\CORC\Corc4_02\corc4_02_deployed.cfg
Author: 11−Feb−2015 10:19:22, pchua@(PCWIN64)

depth (incl. stretch)	component	S/N description	rope # & Length	Distance from Upper / Lower rope end	in/out of water comment
31N46.35, 121W21.18			!!! Check for Cotter Pins !!!	*29−APR−2014*	*2016*
28 m	BE2−frame	IMEI 300034012835520 Radio 156.875 MHz Flasher upper SW ground			
30 m	MCP−IM	#9301 / 1000m			
44 m	12 17" Float (12m)				
60 m	MC−IM	#6350		5.0 895.0	
100 m	MC−IM	#5113		45.0 855.0	
140 m	MC−IM	#6978		85.0 815.0	
180 m	MC−IM	#9903 / 1000m		125.0 775.0	
250 m	MC−IM	#5131		195.0 705.0	
450 m	MCP−IM	#7993 / 1000m		395.0 505.0	
700 m	MC−IM	#6358		645.0 255.0	
946 m	MCP−IM	#7994 / 1000m		890.0 10.0	
952 m	Hydrophone			896.0 4.0	
957 m	HARP				HARP
960 m	8 17" Float (8m)				
1467 m	MCP−IM	#5118 / 3500m		500.0 400.0	



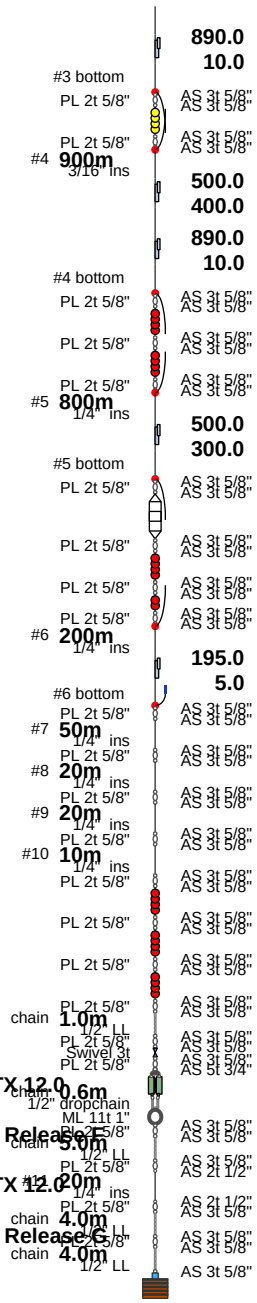
CORC4−02 deep mooring Rev 2
designed for 3945m

By: P. Chua/CB	11−Feb−2015	CORC4−02_3870m	31N45.95, 121W20.25, 3945m

Source: 11−Feb−2015 10:18:20, ...\Paul's m−files\CORC\Corc4_02\corc4_02_deployed.cfg
Author: 11−Feb−2015 10:19:22, pchua@(PCWIN64)

depth (incl. stretch)	component	S/N description	rope # & Length	Distance from Upper / Lower rope end	in/out of water comment

31N46.35, 121W21.18 **!!! Check for Cotter Pins !!!** ***29−APR−2014*** ***2016***



1858 m **MCP−IM** **#6362 / 3500m**

1870 m **4 17" Float (4m)**

2373 m **MC−IM** **#7377**

2764 m **MC−IM** **#5130**

2776 m **8 17" Float (8m)**

3283 m **MCP−IM** **#6361 / 3500m**

Controller #___

3584 m **Frame** **ATM #40788, ID:88**
ICC

3587 m **6 17" Float (6m)**

3787 m **MCP−IM** **#6366 / 6885m**

lower SW ground

3895 m **12 17" Float (12m)**

3908 m **2 AR Benthos** **#41848: RX 13.0 / TX 12.0**

#41848: Enable B / Release E

#41847: RX 11.5 / TX 12.0

#41847: Enable C / Release G

3945 m **Anchor**
1350 kg dry
1178 kg wet

CORC4−02 deep mooring Rev 2

designed for 3945m

By: P. Chua/CB	11−Feb−2015	CORC4−02_3870m	31N45.95, 121W20.25, 3945m

Source: 11−Feb−2015 10:18:20, ...\Paul's m−files\CORC\Corc4_02\corc4_02_deployed.cfg
Author: 11−Feb−2015 10:19:22, pchua@(PCWIN64)

Element List

Code	Count	Description	Label	Weight in air	/ water
Components					
31	2	1/2" BTAS 2.0t	AS 2t 1/2"	0.7 kg	0.6 kg
32	63	5/8" BTAS 3.2t	AS 3t 5/8"	47.9 kg	41.6 kg
33	1	3/4" BTAS 4.7t	AS 5t 3/4"	1.2 kg	1.1 kg
52	33	5/8" pear link 1.9t	PL 2t 5/8"	15.8 kg	13.8 kg
75	1	1" master link 11t	ML 11t 1"	2.6 kg	2.3 kg
93	1	SS Swivel 3t	Swivel 3t	3.1 kg	2.6 kg
240	1	2-Benthos 17" - Top Frame	BE2-frame	65.0 kg	-38.0 kg
274	6	4 17" 204HR serial	HR17-4 seria	576.0 kg	-528.0 kg
282	1	2 17" 204H serial	H17-2 serial	52.0 kg	-44.0 kg
284	6	4 17" 204H serial	H17-4 serial	624.0 kg	-528.0 kg
300	1	Controller Frame	Frame	50.0 kg	30.0 kg
302	1	HARP	HARP	105.0 kg	39.0 kg
336	8	MicroCAT IM37	MC-IM	30.4 kg	22.4 kg
337	7	MicroCAT IM37 + pressure	MCP-IM	26.6 kg	19.6 kg
344	1	Hydrophone Down	Hydrophone	2.0 kg	1.0 kg
476	1	Dual AR Benthos 865 A	2 AR Benthos	75.0 kg	62.0 kg
480	1	DropChain 1/2"-4ft	1/2" dropcha	7.8 kg	6.8 kg
			Components weight:	1685.2 kg	-895.1 kg
Ropes					
101	2710m	3/16" 3x19 NILSPIN insulated	3/16" ins	298.1 kg	209.2 kg
102	1120m	1/4" 3x19 NILSPIN insulated	1/4" ins	215.0 kg	157.9 kg
171	14m	Long Lk chain 1/2", 2.9t	1/2" LL	42.0 kg	36.5 kg
181	1m	Mooring chain 1/2", 2.7t	1/2" MR	3.5 kg	3.0 kg
			Ropes weight:	558.6 kg	406.7 kg
Summary					
		Components		1685.2 kg	-895.1 kg
		Ropes		558.6 kg	406.7 kg
520	1	Anchor variable	Anchor	1350.0 kg	1178.0 kg
			Mooring total weight:	3593.9 kg	689.6 kg

CORC5−01
designed for 900m

By: P. Chua/CB	19−Sep−2016	CORC5−01	36N31.30', 122W04.50', 900m

Source: 19−Sep−2016 12:52:19, ...\Projects\Paul's m−files\CORC\CORC5−01\corc5_01.cfg
Author: 19−Sep−2016 13:08:06, pchua@(PCWIN64)

depth (incl. stretch)	component	S/N description	rope # & Length	Distance from Upper / Lower rope end	in/out of water comment

36N31.30, 122W04.50 **!!! Check for Cotter Pins !!!** *??−OCT−2016* *2018*

IMEI _____
Radio _____ **MHz**
Flasher
upper SW ground

22.4 m **BE2−frame**

24.3 m **MCP−IM** **#_____ / _____m**

PL 2t 5/8" — chain **1.0m** 1/2" MR — AS 3t 5/8"
PL 2t 5/8" — AS 3t 5/8"
#1 **10m** 3/16" ins
PL 2t 5/8" — AS 3t 5/8"

38.0 m **12 17" Float (12m)**

PL 2t 5/8" — AS 3t 5/8"
PL 2t 5/8" — AS 3t 5/8"
PL 2t 5/8" — AS 3t 5/8"
#2 **800m** 1/4" ins

53.7 m **MC−IM** **#_____** — **5.0** / **795.0**

93.7 m **MC−IM** **#_____** — **45.0** / **755.0**

133.7 m **MC−IM** **#_____** — **85.0** / **715.0**

173.8 m **MC−IM** **#_____** — **125.0** / **675.0**

243.8 m **MC−IM** **#_____** — **195.0** / **605.0**

444.0 m **MCP−IM** **#_____ / _____m** — **395.0** / **405.0**

694.1 m **MC−IM** **#_____** — **645.0** / **155.0**

#2 bottom
PL 2t 5/8" — AS 3t 5/8"

Controller #___
850.2 m **Frame** **ATM #_____, ID:___**
Lower SW ground

PL 2t 5/8" — AS 3t 5/8"
chain **1.0m** 1/2" LL — AS 3t 5/8"
PL 2t 5/8" — AS 3t 5/8"

854.4 m **16 17" Float (17m)**

PL 2t 5/8" — AS 3t 5/8"
PL 2t 5/8" — AS 3t 5/8"
PL 2t 5/8" — AS 3t 5/8"
PL 2t 5/8" — AS 3t 5/8"
chain **2.0m** 1/2" LL — AS 3t 5/8"
PL 2t 5/8" — AS 3t 5/8"
Swivel 3t — AS 3t 5/8"
PL 2t 5/8" — AS 5t 3/4"

872.6 m **2 AR Benthos** **#_____**

chain **0.6m** 1/2" dropchain ML 11t 1
#_____
PL 2t 5/8" — AS 3t 5/8" / AS 2t 1/2"
#3 **20m** 1/4" ins
chain **4.0m** PL 2t 5/8" — AS 2t 1/2" / AS 3t 5/8"
1/2" LL — AS 3t 5/8"

900.0 m **Anchor**
1350 kg dry
1178 kg wet

Controller in Deploy Loop?

Release ON/ARMED?

#_____: RX _____ / TX _____
#_____: Enable ___ / Release ___
#_____: RX _____ / TX _____
#_____: Enable ___ / Release ___

Drop at Lat: 36N_____ Long: 122W_____
Target at Lat: 36N31.30' Long: 122W 04.50'
at bottom:_____

CORC5−01

designed for 900m

By: P. Chua/CB	19−Sep−2016	CORC5−01	36N31.30', 122W04.50', 900m

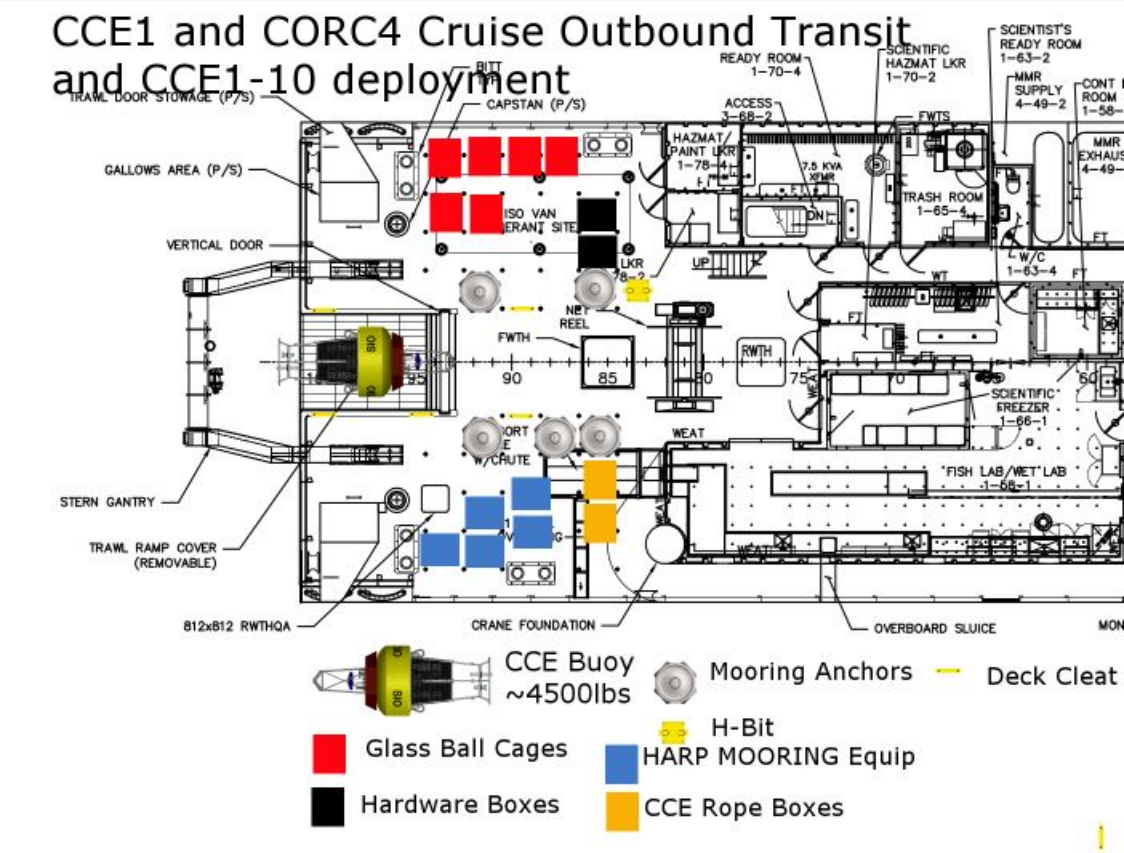
Source: 19−Sep−2016 12:52:19, ...\Projects\Paul's m−files\CORC\CORC5−01\corc5_01.cfg
Author: 19−Sep−2016 13:08:06, pchua@(PCWIN64)

Element List

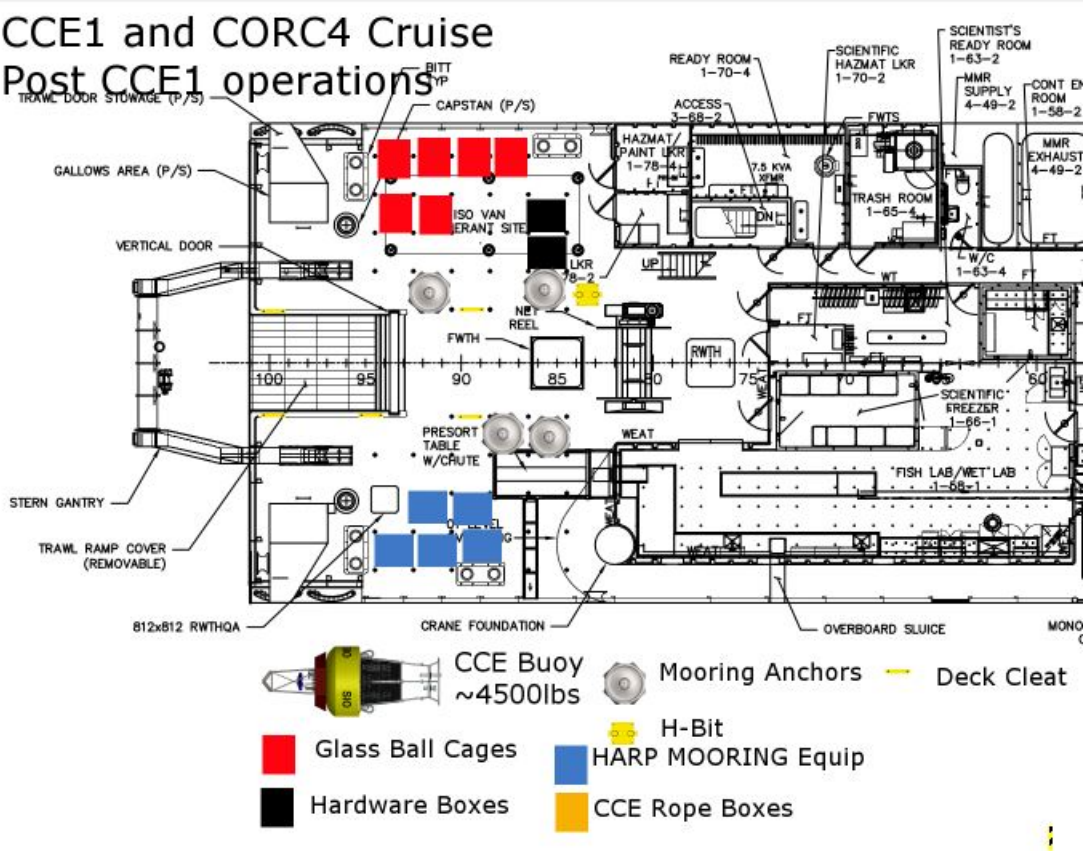
Code	Count	Description	Label	Weight in air	/ water
Components					
31	2	1/2" BTAS 2.0t	AS 2t 1/2"	0.7 kg	0.6 kg
32	31	5/8" BTAS 3.2t	AS 3t 5/8"	23.6 kg	20.5 kg
33	1	3/4" BTAS 4.7t	AS 5t 3/4"	1.2 kg	1.1 kg
52	17	5/8" pear link 1.9t	PL 2t 5/8"	8.2 kg	7.1 kg
75	1	1" master link 11t	ML 11t 1"	2.6 kg	2.3 kg
93	1	SS Swivel 3t	Swivel 3t	3.1 kg	2.6 kg
240	1	2-Benthos 17" - Top Frame	BE2-frame	65.0 kg	-38.0 kg
274	7	4 17" 204HR serial	HR17-4 seria	672.0 kg	-616.0 kg
300	1	Controller Frame	Frame	50.0 kg	30.0 kg
336	6	MicroCAT IM37	MC-IM	22.8 kg	16.8 kg
337	2	MicroCAT IM37 + pressure	MCP-IM	7.6 kg	5.6 kg
476	1	Dual AR Benthos 865 A	2 AR Benthos	75.0 kg	62.0 kg
480	1	DropChain 1/2"-4ft	1/2" dropcha	7.8 kg	6.8 kg
			Components weight:	939.6 kg	-498.5 kg
Ropes					
101	10m	3/16" 3x19 NILSPIN insulated	3/16" ins	1.1 kg	0.8 kg
102	820m	1/4" 3x19 NILSPIN insulated	1/4" ins	157.4 kg	115.6 kg
171	7m	Long Lk chain 1/2", 2.9t	1/2" LL	21.0 kg	18.3 kg
181	1m	Mooring chain 1/2", 2.7t	1/2" MR	3.5 kg	3.0 kg
			Ropes weight:	183.0 kg	137.7 kg
Summary					
		Components		939.6 kg	-498.5 kg
		Ropes		183.0 kg	137.7 kg
520	1	Anchor variable	Anchor	1350.0 kg	1178.0 kg
			Mooring total weight:	2472.7 kg	817.2 kg

Safe Clump Anchor Weight (no currents): 541kg wet (620kg dry)

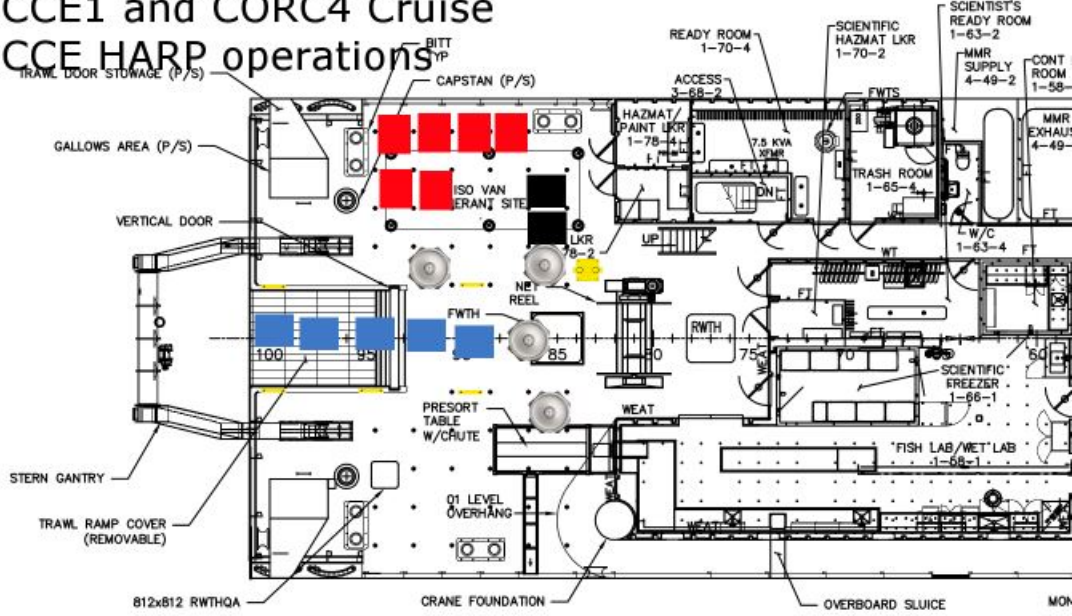
CCE1 and CORC4 Cruise Outbound Transit and CCE1-10 deployment



CCE1 and CORC4 Cruise
Post CCE1 operations



CCE1 and CORC4 Cruise
CCE HARP operations



CCE Buoy ~4500lbs

Mooring Anchors

Deck Cleat

H-Bit

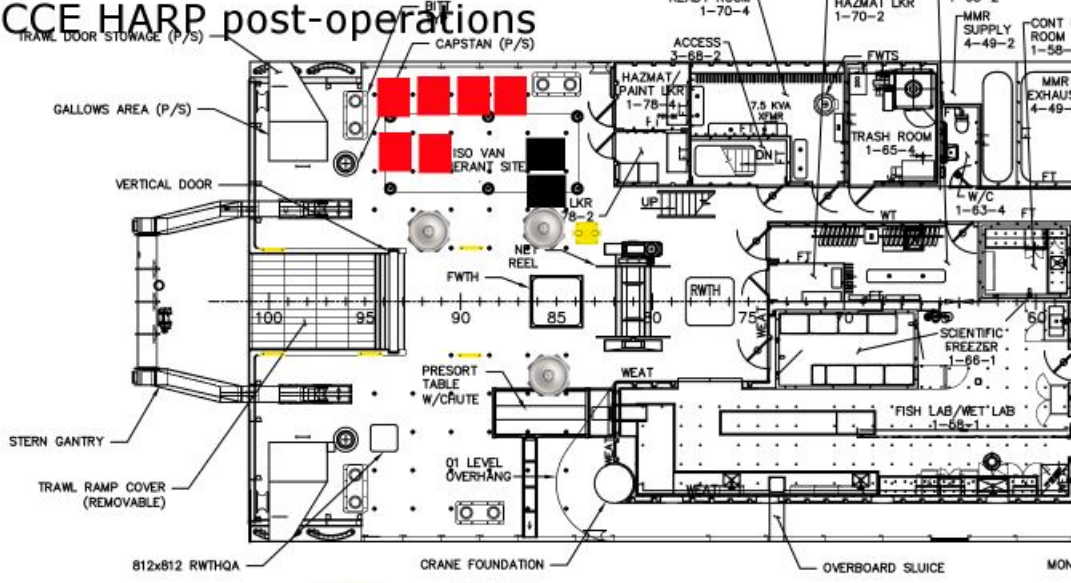
Glass Ball Cages

HARP MOORING Equip

Hardware Boxes

CCE Rope Boxes

CCE1 and CORC4 Cruise
CCE HARP post-operations



CCE Buoy
~4500lbs

Mooring Anchors

Deck Cleat

H-Bit

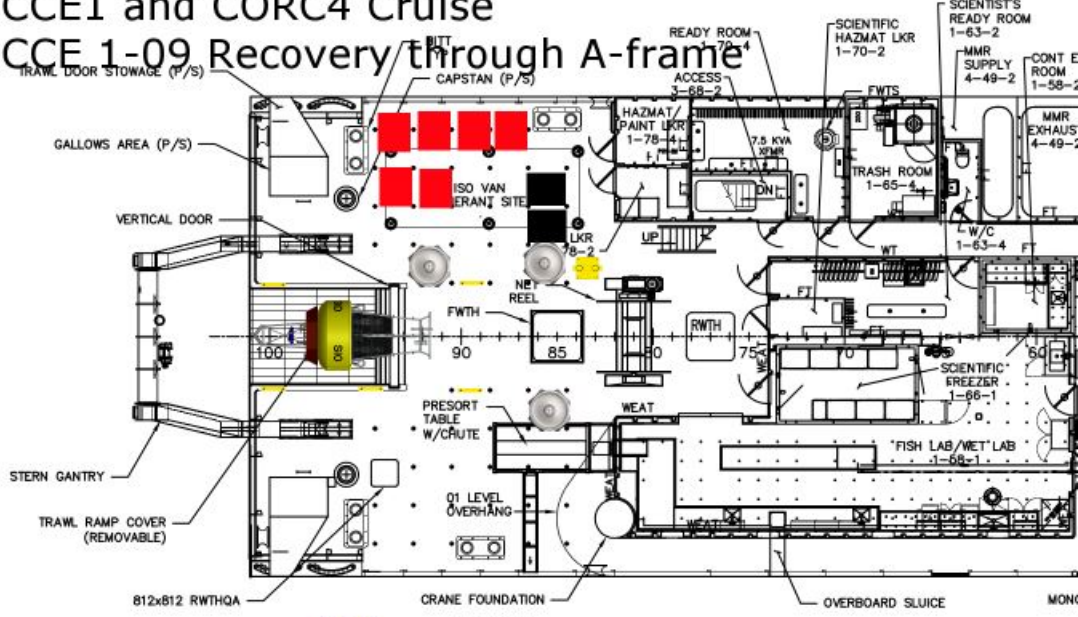
Glass Ball Cages

HARP MOORING Equip

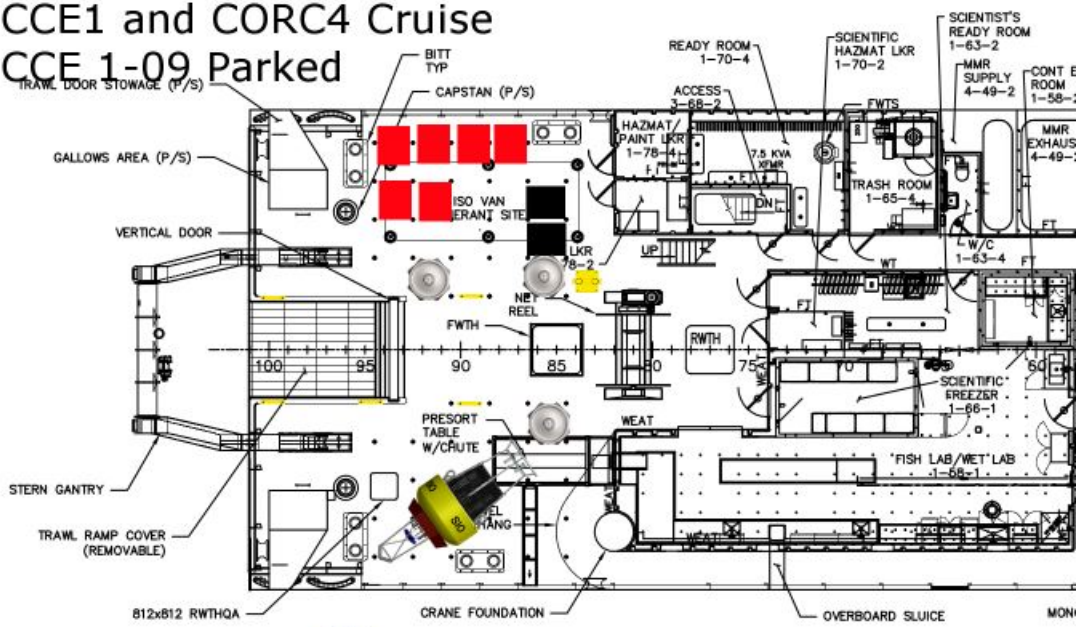
Hardware Boxes

CCE Rope Boxes

CCE1 and CORC4 Cruise
CCE 1-09 Recovery through A-frame



CCE1 and CORC4 Cruise
CCE 1-09 Parked



CCE Buoy ~4500lbs

Mooring Anchors

Deck Cleat

H-Bit

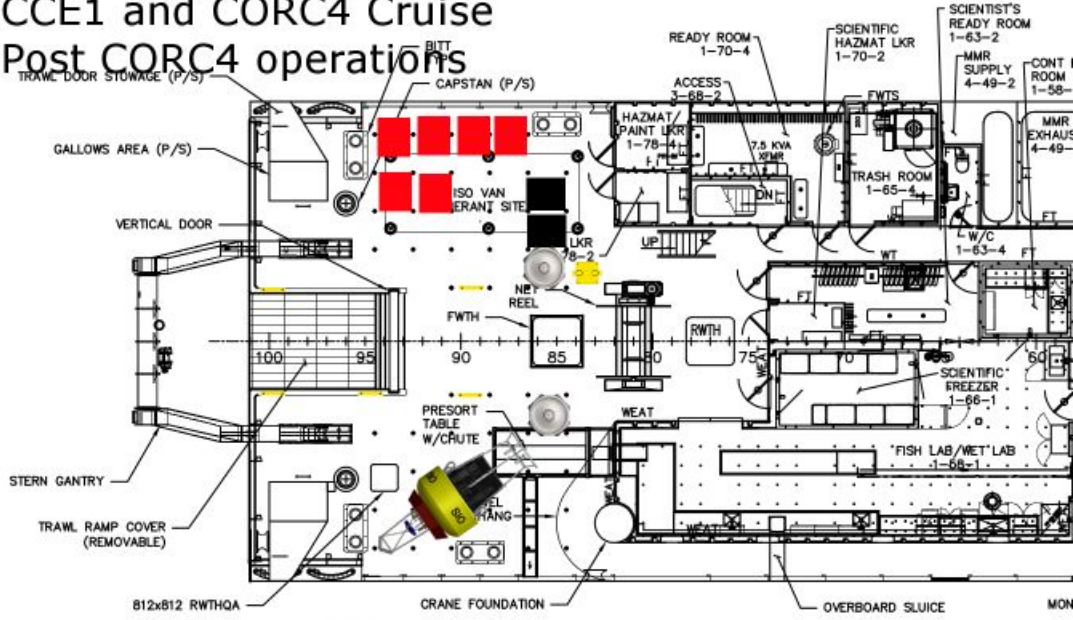
Glass Ball Cages

HARP MOORING Equip

Hardware Boxes

CCE Rope Boxes

CCE1 and CORC4 Cruise
Post CORC4 operations



CCE Buoy ~4500lbs

Mooring Anchors

Deck Cleat

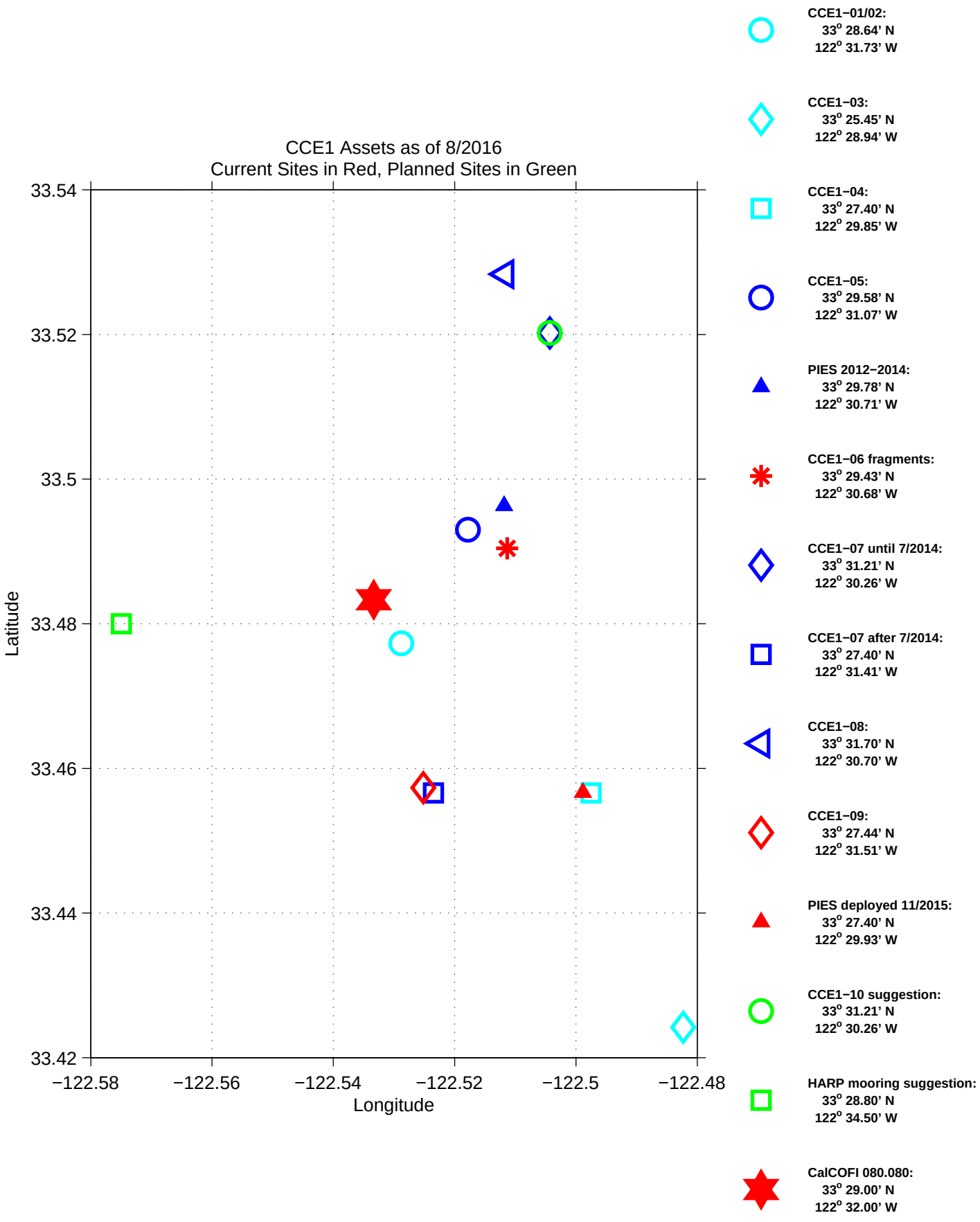
H-Bit

Glass Ball Cages

HARP MOORING Equip

Hardware Boxes

CCE Rope Boxes


CCE1 Assets as of 8/2016
Current Sites in Red, Planned Sites in Green
Latitude
Longitude
33.54
33.52
33.5
33.48
33.46
33.44
33.42
−122.58
−122.56
−122.54
−122.52
−122.5
−122.48
CCE1−01/02:
33° 28.64' N
122° 31.73' W
CCE1−03:
33° 25.45' N
122° 28.94' W
CCE1−04:
33° 27.40' N
122° 29.85' W
CCE1−05:
33° 29.58' N
122° 31.07' W
PIES 2012−2014:
33° 29.78' N
122° 30.71' W
CCE1−06 fragments:
33° 29.43' N
122° 30.68' W
CCE1−07 until 7/2014:
33° 31.21' N
122° 30.26' W
CCE1−07 after 7/2014:
33° 27.40' N
122° 31.41' W
CCE1−08:
33° 31.70' N
122° 30.70' W
CCE1−09:
33° 27.44' N
122° 31.51' W
PIES deployed 11/2015:
33° 27.40' N
122° 29.93' W
CCE1−10 suggestion:
33° 31.21' N
122° 30.26' W
HARP mooring suggestion:
33° 28.80' N
122° 34.50' W
CalCOFI 080.080:
33° 29.00' N
122° 32.00' W

Cruise Plan for CCE1, CCE HARP, & CORC4 cruise 2016
RV Lasker

0800 departure / 1600 arrival = **16hr time loss**

From	To
6-Oct-2016 8:00	13-Oct-2016 17:00

Time start	Time end	hours (hh:mm)	Activity	Starting point	End Point	Distance in nautical miles	transit (hrs) @10 knots
6-Oct-2016 8:00	**6-Oct-2016 8:00**		**Depart 10th Ave Marine Terminal, San Diego**				
6-Oct-2016 8:00	6-Oct-2016 10:00	02:00	Harbor transit				2
6-Oct-2016 10:00	6-Oct-2016 16:00	06:00	Transit to CCE via CTD Site1	San Diego 32.7166N, 117.175W	32N 41.894', 118W 11.875'W	60	6.0
6-Oct-2016 16:00	6-Oct-2016 18:00	02:00	CTD Cast 1 pre-deployment calibration cast to 500m with water samples (Salinity, chl)				
6-Oct-2016 18:00	6-Oct-2016 21:00	03:00	Continue transit to CCE1 site	32N 41.894', 118W 11.875'W	32N 50.55', 119W 7.75'	40	4.0
6-Oct-2016 21:00	6-Oct-2016 23:00	02:00	CTD Cast2 pre-deployment calibration cast to 50m with water samples (O, S, chl, nuts, C)				
6-Oct-2016 23:00	7-Oct-2016 6:00	07:00	Continue transit to CCE1 site	32N 50.55', 119W 7.75'	33N 8.671'N, 120W 44.322'	70	7
7-Oct-2016 6:00	7-Oct-2016 8:00	02:00	CTD Cast 3 pre-deployment calibration casts to 2000m for instrument calibration and 4 acoustic release testing; water samples (salinity, O)				
7-Oct-2016 8:00	7-Oct-2016 17:30	09:30	Continue transit to CCE1 site	33N 8.671'N, 120W 44.322'	33N 31.21'N, 122W 30.26'	95	9.5
7-Oct-2016 17:30	**7-Oct-2016 17:30**	**00:00**	**Arrive at CCE1 site**				
7-Oct-2016 17:30	8-Oct-2016 1:30	08:00	Deployment of CCE1-10	33N 31.21'N, 122W 30.26'			
8-Oct-2016 1:30	8-Oct-2016 8:00	06:30	Downtime				
8-Oct-2016 8:00	8-Oct-2016 9:00	01:00	CTD Cast 4 calibration cast to 1000m between CCE1-09 & CCE1-10 buoys with water samples (O, S, chl, nuts, C), CORC3 microcats pre-deployment & 2 acoustic releases				
8-Oct-2016 9:00	8-Oct-2016 14:00	05:00	Deploy CCE1 Deep HARP Mooring	33N 28.80', 122W 34.50'			
8-Oct-2016 14:00	8-Oct-2016 16:00	02:00	Clean deck, prepare CCE1-09 Recovery				
8-Oct-2016 16:00	8-Oct-2016 23:00	07:00	CCE1-09 Recovery	33N 27.44', 122W 31.51'			
8-Oct-2016 23:00	9-Oct-2016 0:00	01:00	CTD Cast 5 post-deployment calibration casts to 500m for instrument calibration near CCE1-10 Buoy; water samples (S, chl),				
9-Oct-2016 0:00	9-Oct-2016 1:00	01:00	CCE DEEP HARP Mooring Triangulation				
9-Oct-2016 1:00	9-Oct-2016 8:00	07:00	Downtime				
9-Oct-2016 8:00	9-Oct-2016 22:00	14:00	CCE1-06 Dragging Operations	33N 29.43', 122W 30.68'			
9-Oct-2016 22:00	10-Oct-2016 0:00	02:00	CTD Cast6 post-deployment calibration cast to 50m with water samples (O, S, chl, nuts, C) near CCE1-10 Buoy				
10-Oct-2016 0:00	10-Oct-2016 12:00	12:00	transit to CORC4	33N 28.80', 122W 34.50'	31N 46.35', 121W 21.18'	117	11.7
10-Oct-2016 12:00	**10-Oct-2016 12:00**	**00:00**	**Arrive CORC4 Site**				
10-Oct-2016 12:00	10-Oct-2016 17:00	05:00	Recover CORC4-02	31N 46.35', 121W 21.18'			
10-Oct-2016 17:00	10-Oct-2016 18:00	01:00	Transit to PIES Site	31N 46.35', 121W 21.18'	34N 45.09', 121W 23.10'	12	1
10-Oct-2016 18:00	10-Oct-2016 22:00	04:00	Recover CORC4 PIES	31N 45.09', 121W 23.10'			
10-Oct-2016 22:00	11-Oct-2016 0:00	02:00	CTD Cast 7 post-deployment calibration casts to 3000m for instrument calibration; water samples (salinity)				
11-Oct-2016 0:00	11-Oct-2016 8:00	08:00	Transit to CORC3 Site	31N 45.09', 121W 23.10'	32N 18.336', 119W 02.017'	80	8
11-Oct-2016 8:00	11-Oct-2016 10:00	02:00	CTD Cast 8 post-deployment calibration casts to 1000m for instrument calibration; water samples (salinity) & 2 acoustic releases				
11-Oct-2016 10:00	11-Oct-2016 14:30	04:30	Transit to CORC3 Site	31N 45.09', 121W 23.10'	32N 18.336', 119W 02.017'	45	4.5
11-Oct-2016 14:30	**11-Oct-2016 14:30**	**00:00**	**Arrive CORC3 Site**				
11-Oct-2016 14:30	12-Oct-2016 2:30	12:00	CORC3-01 Dragging Operations	32N 18.09', 119W 01.83'			
12-Oct-2016 2:30	12-Oct-2016 5:30	03:00	Mutlbeam Bathymetry survey of new CORC3 deployment site				
12-Oct-2016 5:30	12-Oct-2016 9:00	03:30	Downtime				
12-Oct-2016 9:00	12-Oct-2016 13:00	04:00	deploy new CORC3-02 mooring				
12-Oct-2016 13:00	12-Oct-2016 15:00	02:00	deploy new CORC3 PIES and communicate with and triangulate new CORC3-02 mooring				
12-Oct-2016 15:00	12-Oct-2016 16:00	01:00	CORC3-01 PIES Communication				
12-Oct-2016 16:00	12-Oct-2016 17:00	01:00	CTD Cast 9 post-deployment calibration casts to 800m for instrument calibration; water samples (salinity)				
12-Oct-2016 17:00	13-Oct-2016 5:00	12:00	Scheduled Reserve				
13-Oct-2016 5:00	13-Oct-2016 15:00	10:00	Transit to San Diego	32N 18.336', 119W 02.017'	San Diego 32.7166N, 117.175W	95	9.5
13-Oct-2016 15:00	13-Oct-2016 17:00	02:00	Harbor transit				

2016 CCE1 &CORC4 Cruise

Name	Title	Role
Send, Uwe	Professor	Chief Scientist
Belmonte, Manuel	Lab Asst.	CTD operations and deck operations
Berg, Chris	Mar. Tech	Deck operations, winch and overboard handling
Chua, Paul	Asc. Dev. Eng	Deck Operations and mooring component lead
Durrette, Jessica	Dev. Tech	Hazmat, water sampling lead and deck operations
Lankhorst, Matthias	ProJ. Scientist	CTD lead, Data lead and deck operations
Lineback, Aaron	Ast. Dev. Eng	Deck operations, mooring components and overboard handling
Lowcher, Caroline	Grad Student	CTD operations and deck operations
Lilly, Laura	Grad Student	biogeochemical sensors, water sampling and deck operations
Morris, Ethan	Mar. Tech	Deck operations, winch and overboard handling
Reshef, Eadoh	Grad Student	HARP tech and deck operations
NMFS EMPLOYEE	?	WBAT tech and deck operations

12 total, with 3 grad students

Affiliation	TWIC Expiration	Citizenship	email	phone	
SIO/UCSD		USA	usend@ucsd.edu	(858) 822-6710	cleared
SIO/UCSD		USA	mbelmont@ucsd.edu		cleaered
SIO/UCSD	2017	USA	caberg@ucsd.edu		cleared
SIO/UCSD	Jun-17	Canada	pchua@ucsd.edu	(858) 534-4607	cleared
SIO/UCSD	Aug-19	USA	jdurette@ucsd.edu	(858) 822-3583	cleared
SIO/UCSD		Germany	mlankhorst@ucsd.edu	(858) 822-5013	cleared
SIO/UCSD		USA	aklineback@ucsd.edu	(858) 534-9413	cleared
SIO/UCSD		USA	clowcher@ucsd.edu		cleared
SIO/UCSD		USA	l1lilly@ucsd.edu		cleared
SIO/UCSD	Sep-19	USA	e2morris@ucsd.edu	(858) 534-5477	cleared
SIO/UCSD		USA	ereshef@ucsd.edu		cleared
NMFS/NOAA		USA	??	??	

Common Name of Material	Qty	Notes	Trained Individual
Lithium Metal Batteries Contained in Equipment	48 Instruments containing Li Batteries.	See Inventory	Durette, Jessica / Chua,Paul
Spare Lithium Metal Batteries	153 Li Cells.	See Inventory	Durette, Jessica / Chua,Paul
Nitrogen Compressed	1	See Inventory	Durette, Jessica
CO_2 Compressed	1	See Inventory	Durette, Jessica
Aerosols	40 cans	See Inventory	Durette, Jessica
Isopropyl Alcohol	1 Liter		Durette, Jessica
HgCl2 Dilution	3ml		Durette, Jessica
MnCl2 Dilution	500ml		Durette, Jessica
NaI + NaOH Solution	500ml		Durette, Jessica

APPENDIX

A: Aerosols

SPILLS / LEAKS

- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Do not direct water at spill or source of leak.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water r
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Prevent entry into waterways, sewers, basements or confined areas.
- Allow substance to evaporate.

FIRE

- Use Dry Chemical, CO_2 Extinshuigher, or foam

C: Compressed Nitrogen, Compressed CO2

SPILLS / LEAKS

- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water r
- Do not direct water at spill or source of leak.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Prevent entry into waterways, sewers, basements or confined areas.
- Allow substance to

FIRE

- Use an extinguishing agent suitable for the surrounding fire.

I: Isopropyl Alcohol

SPILLS / LEAKS

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate are
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- A vapor suppressing foam may be used to reduce vapors.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer
- Use clean non-sparking tools to collect absorbed material.

FIRE

- Use Dry Chemical, CO_2 Extinshuigher, foam or water spray

L: Lithium Metal Batteries

SPILLS / LEAKS

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate are
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water ru

DO NOT GET WATER on spilled substance or inside containers.

- Cover with DRY earth, DRY sand or other non-combustible material followed with pla
- Dike for later disposal; do not apply water unless directed to do so.

FIRE

- **Use Dry chemical, soda ash, lime or sand (Yellow Li Extinguisher we are providing)**
- **DO NOT USE WATER OR FOAM.**

O: Other: HgCL2, MnCl2, NaOH / NaI

SPILLS / LEAKS

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate are
- Do not touch damaged containers or spilled material unless wearing appropriate prot
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer
- DO NOT GET WATER INSIDE CONTAINERS.

FIRE

- Use Dry Chemical, CO_2 Extinshuigher, foam or water spray

Spill Control
L
L
C
C
A
I
O
O
O

Inventory of Spill Kit supplies		
Product Name	**Amount**	**Chemicals it is useful against**
Polypropylene Sorbent Pads	50 pads	Isopropyl Alcohol, $HgCl_2$ Dilution, NaI + NaOH Solution
Copper Dry Powder Extinguisher	1 x 30lb tank	Li Metal Natteries
KOLORSAFE® Dry Acid Neutralizer	1 x 2lb bottle	Acids
Kolorsafe dry BASE neutralizer	1 x 2lb bottle	Bases

runoff to contact spilled material.

unoff to contact spilled material.

ea).

to containers.

a).

noff to contact spilled material.

stic sheet to minimize spreading or contact with rain.

a).
tective clothing.

to containers.

Amount it can clean up
13 gallons
4 sq ft area

Formerly C&GS 5002, 1st Ed., Mar. 1900 C-1687-19 KAPP 1604

JOINS CHART 18007

CONTINUED ON CHART 530

CONTINUED ON CHART 530

CONTINUED ON CHART 530

CONTINUED ON CHART 530

THE NATION'S CHARTMAKER SINCE 1807

UNITED STATES - WEST COAST

CALIFORNIA

SAN DIEGO TO CAPE MENDOCINO

Mercator Projection
Scale 1:1,444,000 at Lat. 38°

North American Datum of 1983
(World Geodetic System 1984)

SOUNDINGS IN FATHOMS
AT MEAN LOWER LOW WATER

Additional information can be obtained at nauticalcharts.noaa.gov.

For offshore navigation only

ABBREVIATIONS (For complete list of Symbols and Abbreviations, see Chart No. 1.)
Aids to Navigation (lights are white unless otherwise indicated):

AERO aeronautical	G green	Mo morse code	R TR radio tower	
Al alternating	IQ interrupted quick	N nun	Rot rotating	
B buoy	Iso isophase	OBSC obscured	s seconds	
Bn beacon	LT HO lighthouse	Oc occulting	SEC sector	
C can	M nautical mile	Or orange	St M statute miles	
DIA diaphone	m minutes	Q quick	VQ very quick	
F fixed	MICRO TR microwave tower	R red	W white	
Fl flashing	Mer marker	Ra Ref radar reflector	WHIS whistle	
		R Bn radiobeacon	Y yellow	

Bottom characteristics:

Blds boulders	Co coral	gy gray	Oys oysters	so soft
bk broken	G gravel	h hard	Pk rock	Sh shells
Cy clay	Grs grass	M mud	S sand	sy sticky

Miscellaneous:

AUTH authorized	Obstn obstruction	PD position doubtful	Submg submerged
ED existence doubtful	PA position approximate	Rep reported	

△ Wreck, rock, coastwise or shoal swept clear to the depth indicated.
(+) Rocks that cover and uncover, with heights in feet above datum of soundings.

NOTE K

IMO - adopted Recommended Tracks for vessels carrying hazardous cargo in bulk (excluding ore concentrates, explosives, munitions, chemicals, liquefied gases, refined products, distillates or other non-persistent cargo). Vessels using these tracks should use the Western TSS when entering or leaving San Francisco.

NOTE L

IMO - adopted Recommended Tracks for vessels 300 gross tons and above (except those carrying hazardous cargo in bulk or crude oil).

NOTE B
NATIONAL MARINE SANCTUARIES & MARINE PROTECTED AREAS

National Marine Sanctuaries are protected areas, administered by NOAA, which contain sensitive and diverse natural and cultural resources. These areas are particularly sensitive to environmental damage such as spills of oil and other hazardous materials, discharges and groundings. Exercise particular caution and follow applicable Sanctuary regulations when transiting these areas. A full description of Sanctuary regulations may be found in 15 CFR 922 and in the U.S. Coast Pilot. A full description of the federal regulations governing the Marine Protected Areas located within Channel Islands National Marine Sanctuary boundaries may be found in 15 CFR 922 and 50 CFR 660. A full description of the state regulations governing the Marine Protected Areas located within Channel Islands National Marine Sanctuary boundaries may be found in Title 14 California Code of Regulations (CCR) section 632.

MINERAL DEVELOPMENT STRUCTURES

Obstruction lights and sound (fog) signals are required for fixed mineral development structures shown on this chart, subject to approval by the District Commander, U.S. Coast Guard (33 CFR 67).

NOTE A

Navigation regulations are published in Chapter 2, U.S. Coast Pilot 7. Additions or revisions to Chapter 2 are published in the Notice to Mariners. Information concerning the regulations may be obtained at the Office of the Commander, 11th Coast Guard District in Long Beach, California, or at the office of the District Engineer, Corps of Engineers in San Francisco and Los Angeles, California.
Refer to charted regulation section numbers.

NOTE C
TRAFFIC SEPARATION SCHEME

Recommended traffic lanes established for the approaches to San Francisco Bay are shown on charts 18645, 18680, and 18640.

NOTE I

The U. S. Coast Guard operates an Offshore Vessel Movement Reporting System (OVMRS) covering the seaward approaches to San Francisco Bay. All commercial vessels over 300 gross tons and all tugs with tows are requested to contact Vessel Traffic Service San Francisco on VHF-FM channel 12 (156.60 MHz) when entering this area. All vessels in the area are encouraged to make an inbound report fifteen and forty-five minutes past each hour. Vessels not equipped with VHF-FM should report in the area. Additional information on the OVMRS is published in Coast Pilot 7 and information concerning specific operating procedures is available from the VTS.

LOCAL MAGNETIC DISTURBANCE

Differences of as much as 5° from the normal variation have been observed in the vicinity of San Clemente Island and as much as 4° in the vicinity of Sixtymile Bank.

RADAR REFLECTORS

Radar reflectors have been placed on many floating aids to navigation. Individual radar reflector identification on these aids has been omitted from this chart.

POLLUTION REPORTS

Report all spills of oil and hazardous substances to the National Response Center via 1-800-424-8802 (toll free), or to the nearest U.S. Coast Guard facility if telephone communication is impossible (33 CFR 153).

NOTE F
CHEMICAL MUNITIONS DUMPING AREA - RESTRICTION

Site was formerly used or designated for U.S. chemical munitions dumping. Such use has been discontinued. Designation of such area in no way constitutes authority for dumping.

SEA OTTER REFUGE

The State of California Fish and Game Code prohibits the use of bows or firearms and the trapping of birds or mammals in the California Sea Otter Game Refuge.

NOTE J

See Coast Pilot 7, Chapter 5 for information pertaining to Naval Operating Area in Bechers Bay.

NOTE H
AREAS TO BE AVOIDED

All ships, except those bound to and from ports on one of the islands within the areas, engaged in the trade of carrying cargo, including but not limited to tankers and other bulk carriers and barges, should avoid the areas (MSC, IMO 58/33 Annex 21).

NOTE E
TRAFFIC SEPARATION SCHEME

Recommended traffic lanes established in Santa Barbara and San Pedro Channels are shown on charts 18022, 18720, 18740, and 18746.

NOTE M
MARINER ACTIVATED SOUND SIGNAL (MRASS)

Horn is activated by keying the mic 6 times on VHF-FM Ch 81A - Horn will operate for thirty minutes.

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HORIZONTAL DATUM

The horizontal reference datum of this chart is North American Datum of 1983 (NAD 83), which for charting purposes is considered equivalent to the World Geodetic System of 1984 (WGS 84). Geographic positions referred to the North American Datum of 1927 do not require conversion to NAD 83 for plotting on this chart.

VESSEL TRANSITING

The U.S. Coast Guard and the Pacific States/British Columbia Oil Spill Task Force endorse a system of voluntary measures and minimum distances from shore for certain commercial vessels transiting along the coast anywhere between Cook Inlet, Alaska and San Diego, California. See U.S Coast Pilot 7, Chapter 3 for details.

MAGNETIC VARIATION

Magnetic variation curves are for 2012 derived from 2010 World Magnetic Model and accompanying secular change. If annual change is in same direction as variation it is additive and the variation is increasing. If annual change is opposite in direction to variation it is subtractive and the variation is decreasing.

HEIGHTS

Elevation of rocks, islets, ledges, landmarks and lights are in feet and refer to Mean High Water. Contour and summit elevation values are in feet and refer to Mean Sea Level.

CAUTION

Temporary changes or defects in aids to navigation are not indicated on this chart. See Local Notice to Mariners.

CAUTION

Limitations on the use of radio signals as aids to marine navigation can be found in the U.S. Coast Guard Light Lists and National Geospatial-Intelligence Agency Publication 117.
Radio direction bearings to commercial broadcasting stations are subject to error and should be used with caution.
Station positions are shown thus:
◎Accurate location) ○(Approximate location)

AUTHORITIES

Hydrography and topography by the National Ocean Service, Coast Survey, with additional data from the U.S. Coast Guard and National Geospatial-Intelligence Agency.

AIDS TO NAVIGATION

Consult U.S. Coast Guard Light List for supplemental information concerning aids to navigation.
See National Geospatial-Intelligence Agency Center List of Lights and Fog Signals for information not included in the U.S. Coast Guard Light List.

ACOUSTIC RANGE FACILITY

Numerous shore connected bottom cables are located within the outlined area.

CAUTION
SUBMARINE PIPELINES AND CABLES

Charted submarine pipelines and submarine cables and submarine pipeline and cable areas are shown as:

Pipeline Area — Cable Area

Additional uncharted submarine pipelines and submarine cables may exist within the area of this chart. Not all submarine pipelines and submarine cables are required to be buried, and those that were originally buried may have become exposed. Mariners should use extreme caution when operating vessels in depths of water comparable to their draft in areas where pipelines and cables may exist, and when anchoring, dragging, or trawling.
Pipeline Areas may be marked by lighted or unlighted buoys.
Oil well structures and submarine pipelines and cables are charted only where outside of the indicated limits of charts 18720 and 18740.

NOTE S

Regulations for Ocean Dumping Sites are contained in 40 CFR, Parts 220-229. Additional information concerning the regulations and the exact limits or use of the dump sites may be obtained from the Environmental Protection Agency (EPA). See U.S. Coast Pilot appendix for addresses of EPA offices.

SOUNDINGS IN FATHOMS

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NATIONAL OCEAN SERVICE
COAST SURVEY

FATHOMS 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
FEET 0 6 12 18 24 30 36 42 48 54 60 66 72 78 84 90 96 102 108 114 120 126 132 138 144 150 156 162 168 174 180 186 192 198 204 210 216
METERS 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33

San Diego to Cape Mendocino
SOUNDINGS IN FATHOMS - SCALE 1:1,444,000