Space Details

Key:	UPCYN
Name:	900820_MOOS_Upper_Canyon_Experiment
Description:	
Creator (Creation Date):	kgomes (Jun 12, 2008)
Last Modifier (Mod. Date):	kgomes (Jun 12, 2008)

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Home

This page last changed on Feb 08, 2012 by chma.

Current Schedule

The surface buoy was deployed on November 5, 2009 and re-deployed on May 7, 2010 after a release failure (see report below). Reconnection of the benthic instrumentation was planned for late summer 2010, however the spare benthic cable was damaged during the lay operations. Following this the buoy broke it's anchor tackle a second time and the experiment has been recovered and is on shore pending further plans. See the full report below, "MTM5 Breakaway and Lessons Learned".

Project Documentation Link

Quick links

FAQ

Iridium modem

Iridium console HOWTO

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Emergency tracking link (Username: mbari, Password: iridium) http://charthorizon.com/m/wb/map

dpaView Command Reference

MTM5 deployment locations

DATA (deployed system)

quick-look data plots

MUCE buoy watch circle

SIAM MUCE portal summaries

DATA (lab test system)

lab quick-look data plots

REPORTS!

MTM5 Breakaway and Lessons Learned

MTM5 FailureAnalysisReportRev1.0

MTM5C Deployment video

Comments

I have moved the instrument tracking spreadsheet into the project folder in the "Deployed Configuration Tracking" folder. It is available through the Project Documentation Link above. Here's also the direct link. UpperCanyonInstrumentTrackingDatabase.xls

Posted by chma at Aug 20, 2008.

Here's is a link to the UPDATED Upper Canyon Optical Network diagrams for the "deployed" 10020208-1.2_DeployedOpticalConfig.pdf and "backup" 10020209-1.2_BackupOpticalConfig.pdf systems in the building G lab. The latest versions of these documents are also in the document library in the node-to-node communications folder.

Posted by chma at Sep 25, 2008.

I added the Globalstar connectivity test procedure.

Posted by oreilly at Sep 09, 2009.

Thanks to the hard work of many, the Surface buoy was deployed at about 5PM yesterday (Thursday) from the Pt. Sur. I'm pretty sore today - as I'm sure are a few others - from dragging the Snubber around and attaching over a hundred floats. Andy, everyone kept asking where you were! The loading on the Pt. Sur went very smoothly with the winch and buoy being loaded on Tuesday and the hookups, totes and final preparations on Wednesday. We sailed at 7:30AM Thursday on schedule with 11 hands from OSG, Marine Ops, Engineering and CeNCOOS into perfect weather for a buoy deployment. The buoy and Snubber were staged on the Pt. Sur deck as they had been for the MSE deployment with the top of the buoy facing outboard and the Snubber looped out through the starboard deck bulwark and around the stern and though the A-frame. After we left the dock and there was vertical clearance the wind generator was erected in place. The 400V safety switch was also put in the "on" position. The buoy was rigged with a lifting strap bridle that included a strap to the tower which forced the buoy to about a 45 degree angle on the pick. This was an improvement over the single point lift of previous deployments where the buoy balanced more horizontally. One consequence of this was that after the Snubber was attached it made this pick difficult in the constrained space for the Snubber and the buoy between the deck crane and the bulwark around the A-frame. The buoy was therefore lifted horizontally with a single pick and positioned outboard of the interference area and re-acquired with the two strap bridle. Once the Snubber and buoy had enough room there was no more difficulty. The two point pick and taglines kept the buoy very stable after it was moved outboard and there was no urgency in slipping the Snubber over the side and out the stern. Mike fully slipped out both splice tubes and we dragged the pre-installed bending strain relief and about 5-8 floats out to the stern to act as a bending strain relief for the riser cable as the last of the Snubber was slipped out. Even with all the Snubber off the boat, the buoy riding at 45 degrees gave the impression it could have gone either way if just dropped, however there was a controlled lowering into the water and as the buoyancy of the float began to assert itself the buoy stood up. The release was not popped until it was clear that the buoy had found its feet and was stable. The weather really helped here. The next steps proceeded as they had for the last deployment. After paying out a few hundred meters of cable with the pre-installed upper floats and bending strain relief providing cable protection over the stern, all the floats above the clamp were installed in stages. This actually went pretty smoothly with everyone helping out in assembly line fashion. The only improvement that was obvious to me, as I was continually blasted in the face with abrasive cutoff and metal debris at high velocity, was a good hand shear to efficiently cut off the band extra lengths. The band tightening and crimping tools worked perfectly. With the cable floats going over the stern and on the water surface the cable could be let out easily and there was little cable tension. As more cable was paid out the tension gradually increased but the floats provided excellent cable protection. When the cable clamp location was reached tension was quite high, but the floats were still on the surface off the stern so the cable environment was still good. After the float clamp attachment the installation of the remainder of the floats took place, now with the floats paying out with the cable. The rest of the float and bending strain relief installation took place without incident. Although he was not there, Andy did a good job of making sure that all the float system and anchor elements were staged properly and we had no problems with installation. When the last of the floated section was complete the cable was now moved to the 48" stringing block and hoisted aloft. The tensions were now about 1000 lbs. or more on the cable. The wind began to blow harder (~ 10-15 kts.?) from the south and the big bluff bow the Pt. Sur caused some crabbing along as they tried to maintain heading at slow speed. With the stringing block craned all the way aft and the A-Frame moved up this was not much of a problem. The cable was payed out to the end termination. There was some difficulty with getting the last few wraps of cable off the winch, there is little room around the termination hardware and the cable tends to get under and caught on it. At this point the cable normally has high tension and the sharp edges of the termination could spell disaster here. Fortunately Johnny

was able to get the cable past the termination, aided by good work from the Pt. Sur skipper who backed down to ease cable tension at the critical moments. We had a problem with this last time also. Need to figure out how to improve the situation here. Maybe there should be less than one wrap of cable and the termination in this drum section. The pilot line on the winch was paid out to bring the termination down to the stern of the vessel and the cable load transferred to shackles on the termination body and a strap. The end tube was attached with difficulty due to the hardware moving around, the thick cable protection we installed and the inherent difficulty of mating the ODI dry-mate connector which has poor alignment keys. The job was also made much more difficult by my attempt to save time by pre-attaching the jumper lead to the bottom float. I thought that by careful measurement I could attach the jumper as we wanted it in the final configuration and not be time pressured for this important job. On the last deployment the entire jumper was allowed to float free from the anchor chain below the releases to the ROVmate connector in the holder on the anchor after ROV mating. This turned out to be a mistake as the extra length of cable ended up wrapping around the anchor chain, chaffing on the anchor float and also getting pinched between a shackle and the anchor tube. For this deployment the length of jumper above the float was only that amount needed to remain unloaded. This length was fastened securely with tie wraps to the first tie point on the float. The length of the jumper from the float to the anchor ROVmate connector holder was also measured, a few extra feet added for slack and the extra jumper fastened permanently to the float with heavy duty tie wraps (175lbs. breaking strength). The length reserved for the ROV connection was bungee corded in as usual. One extra loop was attached with weak tie wraps so that the ROV could have an additional loop of cable if necessary. As stated above, this pre-work constrained the cable jumper when it came time to attach it and the bottom termination tube on the rear deck. Because there is usually a reasonable final tow time before anchor release, it would have been faster probably to leave the jumper free and only make the anchor float attachment after mating it to the riser cable termination. It was tricky and risky to make the optical connector mate under constrained conditions. Once the termination was complete we turned on 400V in the riser cable. The results were that we saw nominal current through the power loopback resistor and we had 400V ground fault readings of a few micro Amps, also OK. We checked the optics and the optical loopback readings were good, port 0 was -15dB and port 1 was -11dB. Note that these are loopback readings and therefore approximately twice the actual optical attenuation of a channel. These readings are identical to those measured on shore prior to breaking the system down for loading and are very good (link max. is -30dB). After testing the power was shut back down and final preparations were made for the anchor drop. The target drop was calculated to be 225 meters or 0.12 nm. A final warning was given by the Pt. Sur mate when we were about 3 minutes from the drop site. It took a little longer than 3 minutes however to transfer the cable load from the deck crane to the anchor float and then reposition the crane for lifting the anchor skid plate. I believe we dropped at 0.15nm or slightly more past the anchor site or at least 270 meters. A little better communication with the Pt. Sur crew on my part here would have helped. In the past we have had a way point for the exact drop site and a more careful countdown so there was adequate preparation time and the anchor went over exactly at the intended drop site. Following the anchor drop we immediately left the site and steamed for Moss Landing. We were able to see the buoy being dragged along at what the buoy GPS data reported as 7.5 kts with bow waves breaking against the solar panels! At this time we have not yet performed a post-deployment verification of the 400V or optical systems. We currently are not getting data from the Secondary node or the Surface Medusa, we suspect due to a wedged Surface Medusa board. When that is back up we will check out the post-drop cable integrity - stay tuned. As we worked at the site we were able to maintain a high speed Wi-Fi connection for at least 1 nm from the mooring. This is great results and should allow "data vacuuming" of high resolution data from vessels in the area when the system is fully operational.

Posted by chma at Nov 11, 2009.

I have placed the final version of the MTM5 breakaway report in the project Alfresco space and put a link to it under quick links. Here's a direct link also: MTM5 5MAY10 Break away .

Posted by chma at May 19, 2010.

I have updated the MUCE breakaway report with all the facts known to date. It is available through the link above and also here: MUCE breakaway report

Posted by chma at Feb 04, 2011.

About Vertical Profiler Software

This page last changed on Jul 30, 2009 by graybeal.

This is the short-form explanation of the status of Vertical Profiler data processing software. If there are any questions you are welcome to contact me.

There are two profilers, the SeaHorse and the McLane Mooring Profiler (MMP).

SeaHorse Vertical Profiler

In 2007 I wrote software for the SeaHorse, based on some rough Matlab code by Andy Hamilton, that did the following:

- unpacked the data transmitted across the network (Perl)
- ran the Seabird analysis program on the unpacked raw data/metadata files
- ran analysis/plotting code (Perl) on the resulting data files

This software produced some plots that John Ryan used to consider the data from the initial SeaHorse deployment, but never was deployed in a real-time operational scenario, although that was the original goal. (To the best of my knowledge the SeaHorse VP has not been redeployed since then.)

Work for this project was saved in the CVS repository, in DPforSSDS/mse/profilers/seahorse/batchscripts. (Auxiliary files folder in there also has the useful configuration files for the SeaBird software.) Quoting from the README file therein,

```
These scripts are simply a quick first version that does not copy any data or metadata
back to SSDS.  Instead data and images are copied to the ssdsdata directory, in a temporary
location, for use until the permanent software is released.

To execute the scripts, run PlotVPData from Matlab.

You will need the following local files and directories along with these scripts:
```

For more information, see that README file, which leads to the scripts that are used.

If you are eager to try to run with the original development environment, it is on MBARI 877, SeaFarer, a PC being left in my office. It is deployed under SeaHorseProcessing\ in my Documents\ directory on that machine.

Original Priorities

Incidentally, the following answers to questions when I worked on that project may be a useful starting point for someone else.

```
Who are the customers for this data?
Francisco, John Ryan


Priorities:
A) 1d: Get an interim 'production' system putting SeaHorse information up on some web pages.
B) Replicate MMP processing.
C) Interim production system for MMP.
D) Work on SSDS-based processing, submission, and plotting.

> This order is good.

How important will it be to regularly re-process the raw data that's in a HEX file?
> Probably not so much. More important to have the cnv files.

What data is worth moving forward into analyzed/binned data?
- nominal bin depth
- median value
- mean depth of samples
- mean time of samples
```

```
- stdev of values of samples
- time range
- bin #
- # samples

How can we identify the actual sample time for each sample (interval=seconds:0.25)?
> yes, use that information.

What other data and metadata is in the .HEX file that we haven't captured?
> No telling, go take a look once this other stuff is done.
(Note: There is some useful stuff there, it's worth looking at this
if you're going to rev up a service.--JBG)
```

McLane Mooring Profiler

In 2009 I was asked to write software to post-process the McLane Mooring Profiler data. Toward this end, I collected all the information that Andy Hamilton had. He told me he had run the software only once, and never automatically.

Automating post-processing

To run in a real-time operational scenario, we had to either use the provided 3rd-party software (which only ran on a PC), or convert the data ourselves. Favoring the latter option, I contacted the vendor, who provided 2 attachments under the following emails. I have put those attachments into CVS under DPforSSDS/mse/mmp/.

======
John,

Here's some additional descriptive information on the MMP files of interest. This, together with the structures sent last week, should do the trick. (Note: the TT8 uses Big Endian ordering.)

Let me know how you make out.

~Cleo

======

John,

Here are the structure definitions for MMPX3_14. Hope these prove helpful
for you.

~Cleo

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=====

I looked at these only long enough to see that they looked non-trivial. (Actually, now that I just looked again, they aren't so bad – just the Engineering data has a variable format. And we have the C headers.)

Necessary software

Andy pointed me to, or delivered to me on CD actually, a collection of software that he had accumulated. The README file for the collection says:

```
This directory contains:

- the raw binary data retrieved from the MMP (Data\MMPFileSystemImage)
- the unpacked and processed data (Data\UnpackedData and Data\ProcessedData)
- the McLane tool used to convert the binary data to ascii files
(McLaneSoftware\3_04Unpacker\UnPackerV304.exe)
- the matlab tools used to process the data (DataProcTools)
- some documentation for all of this (Doc)
```

The software includes both manufacturer and science analysis software (the latter has a how_to.html file that looks pretty helpful at explaining things).

I have uploaded a copy of this software to the old 600027.MOOS.Mooring folder on the old ProjectLibrary; it's in "MMP Profiler Store". (It's a 0.4GB Zip file, apparently too big for Alfresco to upload.) To start you'll probably want to grab this file and unzip it and start poking around.

How to download large files via Globalstar

This page last changed on Dec 28, 2009 by oreilly.

This document describes how to retrieve a single large file to shore, utilizing several separate Globalstar connections.

The Globalstar satellite link duration is limited to roughly ten minutes on average due to several factors, including problems aboard the satellites themselves. Thus the number of bytes that can be downloaded during a single connection is limited to several megabytes. However in some cases we would like to download files that exceed this size, e.g. selected portions of instrument logs that capture an interesting science event.

We can now download a single large file over several Globalstar connections, utilizing the onboard 'boa' version 94.14 server and its "ranging" feature, and portal-based 'wget' client. This version of boa and wget are designed for robustness over slow or unstable network connections; if a download fails due to a network problem, wget will keep retrying until the whole file has been retrieved from the onboard boa server.

As of September 2009 each MMC node includes an old version of 'boa' (/bin/boa) that does not support ranging, as well as boa version 94.14 (/mnt/hda/boa.94.14/boa) which does support ranging. The old boa is configured to listen on port 80, is used to download Java classes, and is automatically started when the node boots. The newer boa 94.14 listens on port 8080 and must be manually started when you wish to download a large file.

First create the file to be downloaded on the at-sea "target node". (It is easiest if the target node is "surface" since this node is guaranteed to be awake during a Globalstar connection.) You could do this through the Iridium console. You could also 'ssh' to the target node over the Globalstar ppp link, but this link could disconnect at any time. Another alternative is to create the file with 'autoscript'. Suppose you wish to download all packets from a particular instrument over a specified time range. In this case use the getPackets utility to create log files that contain packets from the specific time range.

NOTE: getPackets will create log files in the current working directory, so it is VERY important that you do NOT execute getPackets from the $SIAM/logs directory!

Once you are on the target node, execute the following to create a tar file containing the desired packets (e.g. from device 1452 on node21 during a two-day period):

```
cd /mnt/hda/tmp;
getPackets node21 -between 2/5/2010 2/7/2010 1452
tar cf myFile.tar 1452.idx 1452.dat
```

Now follow these steps:

1. Start the boa.94.14 server on the target node if it is not already running:

```
cd /mnt/hda/boa.94.14
./boa -c conf
```

2. Copy the download file to the boa server's "served" directory:

```
cp /mnt/hda/tmp/myFile.tar /mnt/hda/boa.94.14/served/.
```

3. On the shore portal machine, add the following to /etc/ppp/ip-up.local, to initiate/continue download via 'wget' when the Globalstar link is connected:

```
# Download a file via 'wget' to the SIAM logs directory, using the "continue" option
cd $SIAM/logs;  wget -c -a wget.log http://surface:8080/myFile.tar
```

4. On the shore portal machine, add the following to /etc/ppp/ip-down.local, to terminate any 'wget' processes when the Globalstar link disconnects:

```
# Kill any running wget processes
killall wget
```

Now the portal will start a 'wget' process to download your file from the target node ("surface" in this case) when the Globalstar link is connected, and will terminate that wget process when the link is

disconnected. Each 'wget' will pick up where the last one left off until the entire file has been retrieved. Subsequent wget processes will immediately abort as long as the complete myFile.tar remains in the portal's $SIAM/logs directory. Informational wget messages will be logged to $SIAM/logs/wget.log.

Once the complete file has been downloaded, you can remove the lines added in step 3 to disable automatic execution of 'wget'.

Iridium modem

This page last changed on Nov 13, 2009 by oreilly.

The single MOOS onboard Iridium modem currently has two uses:

1) User console - users can dial-in from shore to use this function. The onboard modem periodically listens for incoming calls to implement this function.

2) Shore-messaging link - Onboard applications can send SBD messages back to shore (via the SIAM ShoreMessaging interface). The onboard modem periodically waits for onboard client connection requests to implement this function.

As of August 2009, the onboard modem is an A3LA installed on the secondary node, port /dev/ttySX12.

Modem phone number

As of August 2009, the onboard MUCE Iridium modem can be reached by dialing 011-8816-9375-7168 from a console application such as 'minicom' or 'hyperterm'. When dialing from an MBARI phone, you must first dial '8' to get an outside line. Your console application baud can be configured for 19200 baud. The Iridium console "How To" can be found here.

Configuring the Iridium node

Management of the Iridium modem is rooted in /etc/inittab. When configuring the Iridium host node, you ensure that /etc/inittab is identical to /etc/inittab.iridium. This inittab respawns several tasks:

runShoreMsgService - runs the SIAM shore-messaging RMI service

manageIridium - alternates between 'getty' (listen for incoming calls) and establishing SBD connection (downlink queued messages to shore)

Shore Messaging Service

The SIAM shore messaging service enables onboard clients to send SBD messages to shore via the Iridium modem. We have service implementations based on the A3LA modem and the NAL9601 modem. As of August 2009 the onboard Iridium is an A3LA on the second node, port /dev/ttySX12. Normally the shore messaging service is launched automatically via the /etc/inittab script. The A3LA-based message service is launched by utils/a3la script; the NAL9601-based is launched by the utils/nal9601 script.

You can queue an Iridium message to be downlinked via Iridium through the utils/shoremsgclient script. The script has options to accept an interactively typed message as well as a file. Just type 'shoremsgclient' with no arguments to get a brief description of available options. **NOTE: In general do not specify the connect ('-c') option, as then the shore messaging service will contend with getty for the serial port; instead rely on the manageIridium script running on the modem host node to periodically connect the modem (once every several minutes**).

Globalstar connectivity test procedure

This page last changed on Sep 15, 2009 by oreilly.

Take the following steps on the Globalstar MMC node to start the test:

1. Ensure that SIAM node application is not running on the node
1a. Ensure that the SIAM portal application is not running on the portal host
1b. Execute /etc/siam/renewWDT.sh as a background job, to prevent FPGA watchdog reset

2. Edit /etc/ppp/peers/globalstar, set 'maxConnect' to the maximum test duration in seconds,
e.g. for a 24-hour test, set 'maxConnect=86400'

2a. Edit /etc/ppp/dialMBARI - verify that 'ATD' command specifies correct phone number for portal.

3. export MAX_COMM_TRIES = 1000000

4. Issue 'pon globalstar persist'

5. Note the start time of the test

To end the test:

6. Issue 'globalstarOff' on the Globalstar MMC node

7. Note the end time of the test

To analyze test results:

8. Make a copy of the portal host's /var/log/messages file

9. Edit the copy of the message file, removing all entries that do not fall within the test period

10. Run the analysis script on the edited message file:
awk -f $SIAM_HOME/shoreUtils/shoreConnectTime.awk 2008 messageFile

(Note that you must specify the year as the first argument, because /var/log/messages does not specify it!)

MMC-SIAM FAQ

This page last changed on Aug 27, 2009 by oreilly.

Q How do I configure the system so that the SIAM application utilizes the correct IP interface?

A: The 'hostname' command must be configured such that it resolves to the correct IP interface. For example if the ppp interface is to be utilized instead of the ethernet interface, you must set hostname to return either the ppp's IP address, or a name that resolves to that address (/etc/hosts could be used to map from name to IP address).

Q: How do I put the sidearm into single-user mode?

A: Get into the bootloader and issue the following boot command:
```
IBoot> boot "console=ttySA0 cpufreq=191700 root=1f04 rw S"
```

The 'S' at the end tells our version of init to go into single user mode, which invokes a root login command:

```
Loading modules:
Setting the System Clock using the Hardware Clock as reference...
Give root password for maintenance
(or type Control-D for normal startup): ******
sh-2.03#
```

Enter the standard root password, and you then should have a prompt.

Q: How do I interpret the LEDs on a DPA channel?

A: Using the silk screen on the back to identify the light:

Ch1 and Ch2 (amber)
485 - channel communication configured for RS-485
232 - channel communication configured for RS-232
These two are mutually exclusive

Over Curr (red) - The Electronic circuit breaker has been tripped. Channel must be turned off before it can be reenergize

Instr 12V (green) - Indicator showing power applied to instrument connection.
+3.3 - Communications 3.3V power is on.

COM (green) - When illuminated the communications ground is tied common with the instrument ground.

System
SYS +3.3 (amber) - indication of the main 3.3v power from the backplane.

Q: How are sidearm serial ports named?

A: Standard serial ports are named as follows:

Console port - /dev/ttySA0

Synchronous serial port - /dev/ttySA1

Debug port - /dev/ttySA2

Instrument backplane serial ports - /dev/ttySX0 through /dev/ttySX11

RF modem/transceiver port 0 - /dev/ttySX13 (RFIO connector closest to edge of sidearm)

RF modem/transceiver port 1 - /dev/ttySX12

Uplink RS-485 port - /dev/ttySX14

MSP-430 - /dev/ttySX15

Q: The portal log shows all instrument packets as "null" - what's going on?

A: This is a symptom of the MMC's FLASH memory being full. You must stop the application, remove the log files, and restart.

Q: How do use HyperTerm as the MMC console? Editors like 'emacs' and 'vi' scramble the HyperTerm output!

A: After logging into the MMC with HyperTerm, set the TERM environment variable to 'ansi' and issue command 'stty sane'.

Project Meeting Notes

This page last changed on Nov 24, 2008 by chma.

2008_08_27MeetingNotes.doc

2008_09_10MeetingNotes.doc

2008_09_24MeetingNotes.doc

2008_10_01MeetingNotes.doc

2008_10_08MeetingNotes.doc

2008_10_15MeetingNotes.doc

2008_10_22MeetingNotes.doc

2008_10_29MeetingNotes.doc

2008_11_05MeetingNotes.doc

2008_11_12MeetingNotes.doc

2008_11_19MeetingNotes.doc

Comments

Gee, these haven't been updated in a while!

Posted by oreilly at Aug 27, 2009.