# ENGINEERING REPORT EXP 378: South Pacific Paleogene Climate
## 6 Jan 2020 to 4 Mar 2020

Mike Meiring and Andrew Howard

## OVERVIEW:

- Training of Andrew Howard on JR Engineering systems.
- Changed out VIT Survey camera with new OE pan/tilt/zoom camera.
- Evaluated Inertial lab IMU-P gyro for COT project.
- Created image spare of RigWatch cRIO.

## VIT:

### IMENCO OE14-522D PTZ CAMERA:

- Made and installed plastic bracket for the new pan/tilt/zoom camera. The camera is horizontally orientated pointed forward and slightly down. This will limit the ability to look "behind" the VIT but will allow for significantly more intuitive control using the joystick. As the Survey cam can only look forward, it was mounted aft in the place previously occupied by the Reentry cam. The search camera has been moved sideways to the old survey camera position. The re-entry camera was moved forward to the where the Search cam was. The old survey HD-camera has been removed from the VIT and is now a spare for the re-entry camera.

- No changes were made to the Survey cam video distribution setup. The Imenco camera just replaced the old Survey HD cam.
- PTZ control is via GUI/joystick from OPS-Sup PC and GUI only from the VIT-PC in DP.
- All VIT documentation were updated with the changes made.

## VIT TEST DEPLOYENT:

After arriving at anchorage in Panama, we conducted a test deployment of the VIT to verify the proper operation of all the cameras and their placements and orientation. All cameras worked as expected and despite low visibility of about 1 meter, the PATZ camera provided some interesting views (see below). The resulting test videos can be found at: P:\2-Engineering Files\1 VIT\VIT PHOTOS and VIDEO\VIT Videos\Exp 378 PATZ camera test

After the test deployment, the tool pusher requested we put the re-entry camera back to its original, aft-most position. Placement of cameras and lighting on the VIT frame requires careful consideration, both to satisfy physical/technical constraints but also to maximize the usefulness of the various devices to their different users. At the time of writing the request was not yet quantified.



## IMENCO PTZ CONTROL:

When the camera is directly connected to the controlling PC Comport with a serial cable, control functions react as expected. Both by the GUI and the joystick. However, when connected via the network and Black box serial server, it appears the STOP command is not always recognized or it is not received at times. This allows the function being controlled to creep or run away.

Port 2 of the existing Black box serial server in DP named *VIT Telemetry* is being used for the PTZ control. IP is 192.168.1.28. See communication setup for Black Box server below.

**DIN Server Web Configuration - Serial Server**

*Note: If you leave this page without saving, all changes will be ignored!*

| | |
|---|---|
| Serial port: | 2 |
| Serial port mode: | RS-232 |
| Baud rate: | 9600 |
| Data/Stop bits: | 8-1 |
| Parity: | None |
| Flow control: | None |
| Delimiter Hex 1: | 00 |
| Delimiter Hex 2: | 00 |
| Force transmit: | 0  x100ms (0-65535) |
| Inter-byte: | 0  x100ms (0-65535) |
| Port status: | Not connected |

Server
Serial Port
Operation

Save  Default  Running  Reset

*Note: If you leave this page without saving, all changes will be ignored!*

## SUBCDVR:

Ongoing issue: CPU usage can max out at 100% and fail when recording during deployment:

What had been previously determined:
- Fault is intermittent.
- It is caused by overlay data. No overlay data, no problem.
- Fault remained when SUBCDVR PC was replaced with spare.
- All external related programs/devices have been reset/started.
- Four serial overlays, from Com5&6, on each of the 3 videos simultaneously indicated CPU usage <30% when system running normally
- Adding one serial overlay, from either Com5 or Com6, to each of the three videos. CPU usage >100% in fault condition.

Steps previously taken to address the issue:
- Updated Windows 7 to Windows 10.
- Updated SUBC DVRO software to version 5.7.4RC.
- Reduced the capture frame rate from 59.9 to 29.9 frames per second.

Reason this is still a potential issue: With no VIT deployments in expedition 378, it is unclear if recording at the reduced 29.9 frames/sec has fully resolved the issue. It is advised to keep a close watch on the CPU usage percentage during the next expedition that deploys the VIT, *especially* if recording more than one channel at a time.

## HD VIT SOFTWARE UPGRADE SUMMARY:

HD-VIT software renamed to VITOF and appears to be running stable.
Issues:
- Earthrate calculations appears to be done in radians and added to heading value which is in degrees.

Suggestions:

- Remove all Survey cam related code.
- Remove all camera control options from the Simple Interface.
- Default value for *Apply Correction* box should be un-ticked on start-up.
- Make a button on the home page that enables/disables the ship heading indicator (some ETs want it, some do not).

## SIEM DOCUMENTS HANDOVER:

We handed over hard and electronic copies of latest VIT User manuals and schematics to the Siem Electrical Supervisor.

## GENERAL MAINTENANCE:

- Flushed devices/connectors with fresh water and sprayed with silicon lubricant.
- Replaced O-rings on re-entry and survey cameras. Cleaned and sprayed pressure housings with silicon lubricant.
- Optical link integrity:
  OTDR measurements are periodically made on the spare Brown Fiber from DP to the VIT Frame J-Box. Compared against measurements from previous Expeditions, this could be an early indication of potential issues especially on the FORJ and Umbilical. OTDR measurements on the BRN reference fiber shows no evidence of optical link degradation.

| EXPEDITION | SUBSEA J-BOX (db) | FORJ (db) | Total (db) | Length (m) |
|---|---|---|---|---|
| Exp 362T | 1.26 | 1.3 | 3.8 | 7513 |
| Exp 362T 700m | 1.6 | 1.54 | 4.12 | 7513 |
| Exp 366 Start | 1.12 | 1.02 | 3.66 | 7512 |
| Exp 366 3670m | 1.16 | 1.1 | 3.74 | 7511 |
| Exp 366 End | 1.59 | 1.48 | 4.11 | 7511 |
| Exp 368 Start | 1.35 | 1.17 | 3.88 | 7512 |
| Exp 368 2780m | 1.52 | 1.42 | 4.09 | 7511 |
| Exp 371 Start | 0.35 | 0.95 | 3.54 | 7512 |
| Exp 372 End | 0.94 | 0.85 | 3.51 | 7511 |
| Exp 375 Start | 0.34 | 0.94 | 3.43 | 7510 |
| Subic Dry dock | 0.9 | 0.79 | 3.37 | 7467 |
| Exp 368X | 0.31 | 0.9 | 3.42 | 7467 |
| Exp 379 | 0.31 | 0.94 | 3.36 | 7466 |
| Exp 383 | 1.05 | 1.05 | 3.61 | 7466 |
| Exp 385 End | 1.03 | 0.81 | 3.49 | 7466 |

## Total (db)
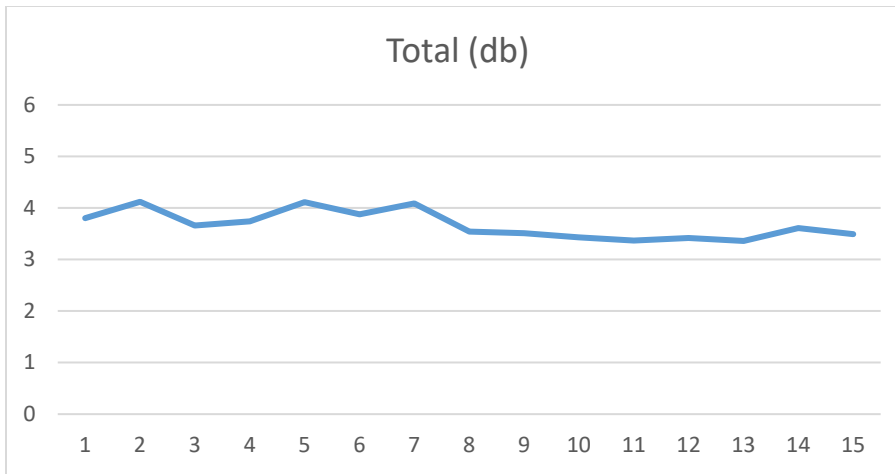


## PROJECTS:

### CORE ORIENTATION TOOL (GYRO):

- Received IMU-P from Inertial lab for evaluation.
- Although the Inertial lab Sales Engineer assured us that gyro drift will be ~1deg/hr, it now appears that this is not possible on a moving platform. We have been working with Inertial lab software engineers in an attempt to reduce the drift, hopefully to a level acceptable for our application.

## RIS RIGWATCH:

### GENERAL MAINTENANCE:

End of leg maintenance was performed on the Master and all slave PC's.

### SPARE CRIO IMAGE:

National Instruments' Replication and Deployment Utility (RAD) was downloaded to the engineering computer to attempt to copy and apply RigWatch's cRIO's control software to the spare cRIO so that there would be a working spare for the system. The RAD's user guide was very helpful in understanding the process by which to create a backup image of the working cRIO to the engineering computer's hard drive and then deploy the image to the spare cRIO. The only issues were that the RAD program would reboot the cRIOs immediately before trying to copy or apply the image that would lead to an error popup, additionally RAD requires a cRIO to have a non-0.0.0.0 network address before deploying an image to it. From what I found, the pop-up errors are ignorable as a second attempt to copy or deploy an image will not reboot the cRIO and will instead successfully create or deploy the image. The non-zero network address error was easy to address as the User Guide clearly explains how to configure the spare cRIO's network settings. The spare cRIO is set to have the identical network settings as the working cRIO, after that the RAD program didn't have any more issues.

The biggest potential issue with the RAD program is that it requires the model number of the target cRIO (for an image to be deployed to) to have an identical model number as the cRIO that the image was created from. In short, any new cRIOs we might need to obtain in the future for the current RigWatch system must be a cRIO-

9014. With the image successfully copied over to the spare cRIO, it was put into service to verify the installation and network settings work with the RigWatch system. As the spare is currently working properly, the original cRIO has been re-designated the spare and been labeled, dated, and stored in the Rig Instrumentation drawer of the downhole lab.

The backed-up image, installation of RAD, screen grabs, RAD documents, and cRIO documents are on the engineering computer in the Ops office. They have also been copied to the Novarupta server.

Locations of RAD installer, documents, and the cRIO image:
- C:\Users\daq\Documents\NI cRIO documents
- C:\AppImages
- P:\2-Engineering Files\2 RIS_RigWatch\RIS SOFTWARE\NI cRIO

## TRAINING:

IODP: During this expedition, Mike Meiring trained new staff engineer Andrew Howard in the use and maintenance of the VIT system, RigWatch, and various downhole tools that IODP commonly deploys along with the less frequently or rarely used downhole tools that are available for scientific exploration of the seafloor.

As part of this training, Mike covered the following areas of the VIT system:
- Umbilical
- Telemetry pod and cables to end devices
- Cameras
- LED Lights
- Sonar
- Altimeter
- Gyro
- Power supply
- Schematic diagrams
- FORJ Slipring
- J-boxes, Multiplex/Demultiplex boxes, and the oil-filled hydrostatic J-box
- Fiber optic capabilities, splitters, transceivers/receivers and terminations.
- FO Test equipment and fusion splicers
- VITOF program and its operation and troubleshooting
- VITOF communication with the SUBCDVR computer
- VIT winch and line counter
- Veeder root and LCI-90
- Location of VIT parts, spares, and critical spares
- Imenco OE14 GUI software for the PATZ camera
- SUBCDVR program, controls, and troubleshooting
- Data and video distribution to and from the SUBCDVR
- Video backup of recorded VIT operations from the SUBCDVR computer

For RigWatch training Mike covered the following areas:
- RigWatch networking between Master and Slaves
- RigWatch operation, commands, equations, graphs and troubleshooting
- RigWatch computer locations (master and slaves)
- Altech tracer pump and sensors

- Compensator stroke sensor
- Draw works encoder
- Pipe counter sensors
- Live Data ASCII capture in RigWatch
- End of expedition data backup and maintenance of the RigWatch computer network

Downhole tool training covered the following tools and their purpose, use, and maintenance:
- APCT3
- DSS
- ERS
- ETBS
- Kuster
- MDHDS
- SET2
- SETP
- T2P
- TPFIT for data analysis of APCT3 and SET2 data

Siem: Training was given to Siem personnel on VIT system and Measurement techniques. Andrew gave training on VITOF control software and SUBCDVR software.

## DHML:

## MSS:

Return Electronics package to CS for repair.

## DOWNHOLE TOOL INVENTORY:

| | |
|---|---|
| APCT3 | S/N 002 |
| APCT3 | S/N 041 |
| APCT3 | S/N 035 |
| | |
| SET2 | S/N 449 |
| | |
| MicroSmart 10k | S/N 40129 |
| MicroSmart 10k | S/N 40121 |
| MicroSmart 10k | S/N 40060 |
| MicroSmart 10k | S/N 4986 |
| MicroSmart 15k | S/N 4997 |
| | |
| ERS | S/N 1 |
| ERS | S/N 2 |
| | |
| ETBS | S/N 1 |

| Kuster | S/N 1 |
|--------|-------|
| Kuster | S/N 2 |

## ACTION ITEMS:

- No spare VIT Main hybrid connector/ pigtail.
- Start planning to replace the ROS LED lights.
- SUBCDVR CPU 100% issue.
- VITOF code changes.
- ETBS/KUSTER deployment procedures.
- VIT Hand-over to Siem
- MicroSmart 15k S/N 4981 could not be located

## SHIPPING RECEIVED:

- Imenco OE14-522A PATZ camera received.
- Joystick for operating the PATZ received.
- InertialLabs IMU-U Gyro

## SHIPPING RETURNED:

| 1 | APCT3 S/N 32 (battery) |
|---|------------------------|
| 1 | APCT3 S/N 31 (battery) |
| 1 | APCT3 S/N 007 (loose probe) |
| 1 | MSS Electronics Package S/N EC4 |

## ORDERS/REQUESTS OUTSTANDING:

None