

Lab and Test Tank

Comps

Before adding any oil to comps, make sure there is no water in the QD, and no air in the line of the comp pump.

Battery Comp reservoir plug should extend ~1/4 inch.

Tailcone Comp reservoir plug should extend 2 ½ to 3 inches.

Motor

Motor compensator is located on the starbord side of the tail cone, accessible through the access door.

Motor compensator should have the piston extended about three fingers down, close to but not touching the fairing.

Motor Comp fluid is Tellus 22.

Battery

Battery compensator is located inside the midbody, visible thru an access door on the port side. Check that the plunger is between a protruding 1/16 (1/8" max) to 1/16" recessed. Make sure that the pressure in the battery comp does not exceed **4psi** to prevent delamination.

Battery compensator fluid is Drakol 9.

USBL battery

Battery Charger is in lab on Bench.

Charge battery a day or so prior to deployment

Charged battery is over 16.5v DC

To change battery

Remove wire from transducer.

The Port Bracket needs to come all the way off, Starboard needs only loosening.

Remove white plastic "wire" by hand. Slide off end cap.

Carefully remove board and battery. CAUTION: an inductor stands up proud, and can easily get damaged.

Replace battery, check board set for corrosion or damage.

Clean o-ring groove, check o-ring, lubricate, install new dessicant, and reassemble.

Be sure to record the Xmit and Rcv frequencies.

Test the USBL beacon and transducer after battery replacement.

ORE USBL beacons and transducers must be replaced as a **SET**; frequencies are tuned.

Dummy Plugs

This is mostly an issue when installing and removing Biolume and LISST.

Pull plugs straight out of jacks. Use silicone spray before re-inserting connections.

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The only plug that is installed and removed regularly is the tether (no spray).

Floatation

Two half's in Instrument nose bolted transversely
One large section with lifting ring over mid body payload bay bolted at base to rails.
Two half's over batteries in midbody bolted longitudinally.
One tail section over control servos on pins.

Sphere vacuum

Check sphere with fairings off for damage.
Pressure gauge inside sphere should read ~3.8 to 4.2 psi

Instrument nose

Visually inspect instruments
Plumbing volume should contain a small amount of water prior to deployment.
Leave the tubes containing the water in place for testing. Be sure to remove prior to deployment!

Check ballast

Without any sensors:	
Aft joining ring:	7 lb
Batt. Oil Comp.:	10
Fwd joining ring:	23
Nose:	28
With Biolume (3 lb in water):	
Aft joining ring:	7 lb
Batt. Oil Comp.:	11
Fwd joining ring:	19
Nose:	28

Batteries charged

See battery section.

Test Tank

Strap the AUV to the cart and bring it around to the test tank door
Lift with 6' green strap on lifting ring, 10' around body, just aft of joining ring.
Check to make sure tether plug is in place before putting AUV in the tank.
Once in the tank, sink, spin and work as many bubbles out as possible.
Let her settle in for 5 or so minutes.
Using water line check for pitch trim
Find neutral buoyancy using dive weights. Optimal 7-10lbs.
Remove AUV from tank and rinse with fresh water.

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Loading and setup**Bring AUV to Zephyr.**

Use at least three straps to tie AUV to cradle

Be careful on the bumps crossing the street; AUV is top-heavy.

Lifting Slings and tag lines set up

6 foot sling in lifting ring

10 foot sling around AUV aft of tail section joining ring.

Deck Bolts and spacers ready

Spacers go between deck and cradle, on the aft tie down bolts

Spacers are labeled port and stb

Lift AUV with cradle

Transport cradle is the deck cradle

(Supports:

CTD AUV: E7 1110 0111

Mapping: A5 1010 0101)

Remove Wheels from cradle

Remove pin and remove wheels.

Store wheels on LARS cart.

Crane to Zephyr

Louis Martinez or Zephyr crew will handle crane

Zephyr Crew will handle LARS

Assist as necessary

Tie AUV down to deck

Three tie down straps

Setup laptops in Lab

“mission control” laptop (AUV-2) is closest to the Winfrog monitor

“science” laptop (AUV-1) on the aft-side of the bench.

Tether on AUV

Inspect connections carefully. (termination is expensive)

Carefully dry off endcaps and cables before making connections/disconnections.

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Green tote box with leash on board

This box contains the recovery line, Sea Dummies Kit, as well as other small parts

Deck Checkout**Laptop Setup**

login as dorado1 (network name AUVn (this computer)) on both laptops
Power up with Shore Power (see section on powering up)

Programs running on “**mission control**”: AUV-2

Interactive Syslog Server(remember to start logging before running missions)(ie, right away).

Mission GUI “vehiclelog” (Visual Basic connected to Access 97 database).

Cygwin terminal windows (for telneting to vehicle and/or a ping window “ping -t mvc-dmo1-rf” to monitor whether the link is up or not; leave ping running in background as a quick check to see if link is up).

resetdw (reset dropweight timer) program lives on the laptop. Run from its own fresh cygwin window.

Programs running on “**science**”: AUV-1

Matlab.

Two Cygwin terminal windows (to bring over the data and/or ping window as mentioned above) (in one do cd /cygdrive/c/dorado/data.

Login

telnet mvc-dmo1 (*tether connection*)

--or--

telnet mvc-dmo1-rf (*Freewave connection*)

(login:**dorado1** pass:**dorado1**)

cd \$AUV/bin

(to end telnet session: <ctrl-]> close)

(If unable to telnet mvc-dmo1-rf, in a Cygwin window, give the command: export AUV_HOST=mvc-dmo1-rf)

Log to: “Vehicle Predive” in AUV Mission Log

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[\\Tornado\ProjectLibrary\368000_DMO_AUV\manuals\OpsManual\CTD_AUV_Ops_Manual.doc](#)

CTD AUV DMO1 3kw Batt CTD Nose
RDF Freq: 160.785

enable batteries (remove magnet), use qtalk to test.

qtalk -m/dev/ser10

!? (reports battery number)

#95q0 (Battery Stats, should be in d for discharge)

Ctrl+a (to quit)

x (exit)

Also log the **highest** and **lowest** cell reading!

Can test batteries with command: **td bluefinBatt**

To control the Xantrex power supply via RS-232: telnet ets89p-1 3002

ISET 5.0

VSET 35.0

Test vehicle instruments

td newTailCone

Make sure no one is working near the tailcone.

r 10 r -10 r 0 (rudder)

e 10 e -10 e 0 (elevator)

p 100 p 0 (prop)

Ctrl+c (exit)

td crossbow (AHRS Compass)

examine values (should be near level, temp is for inside mvp)

td parosci (Paroscientific pressure sensor)

check pressure and temperature

td dvl (Doppler Velocity Log)

check range, pitch, and temp

td gps (Global Positioning System)

run for a while, do several Ctrl+c, then **date** in rapid succession

check *date time* against *gps time*

if time is off. su, then date -u dd mm yy hh mm ss

fanTest (Environmental Fan Board in MVC sphere)

<r> option reads values

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Test Payload Scientific Instruments:

Change directory:

cd \$AUV_CONFIG_DIR

Check devices.cfg

is Biolume off/on

is LISST off/on

(vi devices.cfg if necessary to make changes)

td isus (Dissolved nitrogen sensor)

td hydroscat (HS2 Backscatter optical sensor)

td biolume (Bioluminescence pump and PMT)

seabirdTest -n ctdDriver -dev tcp:sci1-dmo1:10001

(to pull up cmds:
history | grep -i seabird
!cmd #)

seabirdTest -n ctdDriver2 -dev tcp:sci1-dmo1:10002

(to see if seabird is working,
telnet sci1-dmo1 10002
CTRL-Z = power up cmd)

td lisst (Laser based particle size analyzer)

Deck Test Mission

Submit Log Entry from Event Log window

Fill in values

select mission (deck test with heading closest to dock heading)

Check mission

Run

Abort after completion

Launch

Disconnect tether, install Dummy plug

Wind up the tether and hang on scuba rack

Inspect the dummy plug carefully for dirt, cracks etc

Disconnect nose instrument dampening hoses

Set elevator and rudder to zero

td new Tail Cone

e 0 , r 0

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Examine ping window to make sure comms are up and working.

There should be a Cgwin window open for this.

Close tether door

Single socket head screw (*1/4-20 1" flathead*)

Run thru Pre-Launch Visual Checklist:

- Listen for Bathy Pump sound
- Check the Capture Line and Pole
- See that LISST In/Out tubing is in place
- Check Battery Comp
- Check Tailcone Comp
- Make sure fairings and rings are secure
- Make sure all three doors are secure
- See that the Strobe is On
- See that the PTT Magnet is removed
- Be sure Tether is dummied off
- Remove CTD Wetting Tubes from Nose

Unstrap AUV from cradle

Work vehicle back in cradle with LARS.

Zephyr crew will lead this

Lift vehicle into LARS

Zephyr crew will get AUV in the water.

Ensure the USBL is working.

Run Mission

From Visual Basic Mission Vehicle Log

Mission location: C:\Dorado\Missions

chedkonsurf.cfg (zero speed surface mission)

Sonardyne USBL: to reset the system, do a CTRL-C on its keyboard
Then hit "1" to navigate

Emergency abort: give this command in any cygwin window: sss

NOTE: if the AUV aborts the mission, be sure to hit the "Abort Mission" button on the laptop's "Slay Supervisor" window.

Recover

gripe down the AUV

rinse out instruments w/garden hose

put dampening tubes on nose instruments

turn off rack power supply, install tether, turn on power supply

resetdw

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Post Dive Checklist

- resetdw
- Rinse out instruments, install dampening hoses
- Clean LISST windows
- Inspect Tail Cone
- Check tailcone compensation
- Check Sphere pressure
- Check battery compensation
- Get batteries on charge
- Upload Data

View The Data At Sea:

1. In a new, freshly opened cygwin window, give these commands:

```
cd /cygdrive/c/dorado/data
mkdir data          (data eg: 2005.021.05)
ncftp -u dorado1 mvc-dmo1
ncftp> cd auv/altex/onboard/logs
ncftp> cd data      (data eg: 2005.021.05)
ncftp> get *.log
ncftp> get syslog
ncftp> exit
```

2. Run MATLAB

```
cd \dorado\data
cd data      (data eg: 2005.021.05)
loaddata
plotSwSci =2
review
```

(Getlogs – currently not operable

getlogs copies mission data to either laptop. In a new, freshly opened cygwin window, give the command:

```
cd /cygdrive/c/dorado/data
getlogs data          (data eg: 2005.021.05)
```

Run Matlab

```
cd data_dir, loaddata, review, auvqsci      (eg: \dorado\data\2005.021.05)
```

)

Back in port:**Upload Data To SSDS**

Logon to the MVC

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[\\Tornado\ProjectLibrary\368000_DMO_AUV\manuals\OpsManual\CTD_AUV_Ops_Manual.doc](#)

Give command: upload
 Script will prompt for mission to upload (eg: 2005.021.00)
 Script will prompt for campaign name (AUVCTD, BIOLUME, or OCCO)
 Multiple mission syntax example:

upload 2005.021.00 BIOLUME; upload 2005.021.01 BIOLUME; ... upload 2005.021.nn BIOLUME

Demobilize or Charge Batteries

Depth rating of various components:

Biolume (Rev. B)	250m
LISST	300m
Syntactic Foam	1000m
ISUS	1000m
Data Con	2000m
Hydroscat (deep)	4000m
SBE 4 (Conductivity)	6800m
SBE 3F (Temp.)	6800m
SBE 43 (Oxy)	7000m
SBE 5T (Pump)	10,500m

Directories, files, useful commands:

\$AUV = /home/dorado1/auv/altex/onboard	(ex. cd \$AUV)
\$AUV_CONFIG_DIR	(current vehicle configuration directory vehicle.cfg, devices.cfg, worksite.cfg)
\$AUV/bin	(dir containing vehicle drivers)
\$AUV/logs/latest	(most recent mission log file)
syslog	(file found in the mission log directory; useful for finding mission problems)
grep -i abort syslog	(did the mission abort?)
date +%j	(day of the year, used in mission name)

Syslog Daemon

Program lives on the MVC. If syslog isn't running, reset:

```

su                (become root)
ps -elf | grep syslog
/usr/bin/syslogd
use slay          (gives info)
slay -s SIGHUP syslogd
exit              (exit root)
```

Filename:

[\\Tornado\ProjectLibrary\368000 DMO AUV\manuals\OpsManual\CTD AUV Ops Manual.doc](#)

```
rsh -l dorado1 $AUV_HOST "(su; slay -s SIGHUP syslogd)"
```

DCON Instrument Comms

```
CTD1 telnet sci1-dmo1 10001
CTD2 telnet sci1-dmo1 10002
      ds      (display settings)
      cc      (configure)
      sd      (magnetic switch disable)
      se      (magnetic switch enable)
```

(Config Address: telnet sci1-dmo1 9999)

Flashing the LISST

```
AUV-1 goto c:\lisst
Look in devices.cfg
sci3-dmo1: 14001 is the address
telnet sci3-dmo1 9999
setup channel 1
set port # 10001
run TTOOLS
alt-T load program alt-L
program is in dorado\documents and settings
BIOLUME.TTB (yes, that really is the LISST program! historical reasons)
now in c:\lisst\
alt-f-q exit
telnet sci3-dmo1 9999
config ch1 to14001
```

Bluefin Batteries

Inrush problem:

A battery high side switch can shut down due to excessive current when the vehicle is started up by removing the MVC magnet. The battery will appear to be discharging.

Therefore, if starting vehicle on batteries, once it is running, turn on the power supply, then reset the batteries either by swiping the magnet or "qtalk."

With "qtalk" do the sequence (nn=batt num in hex):

```
#nnbf
#nnbd
```

Filename:

\\Tornado\ProjectLibrary\368000_DMO_AUV>manuals\OpsManual\CTD_AUV_Ops_Manual.doc

#nnwf

Be sure to do wf, which turns off the watchdog.

With the vehicle running on the power supply, turn down the p/s voltage so that the batteries are carrying the load, then do a “qtalk q0” on each battery and observe the current drawn from each.

It is OK to enable a battery using “qtalk” with the vehicle in the water.

Battery Commands :

While in qtalk session (qtalk -m /dev/ser10):

!?	(display batteries on line)
#96q0	(display stats on battery number 96 {hex})
#96q1	(display individual battery 96 voltages)
#96q2	(display cell temperatures battery 96)
#96bf	(turn off battery 96)
#96bd	(turn on battery 96)
#96wf	(turn off watchdog on battery 96)
<ctr A> X	(to eXit qtalk)

Cells are fully charged at 4.2volts, relaxation drops a tenth or so.

Cells can cutoff at 3.65, Firmware at 3.4volts

Individual Battery Checkout

Connect 7-pin lab test cable to the battery (4-pin cable not necessary)

Turn on the battery switch (located on the lab test cable)

Computer command:

```
telnet ets8p-3 3004
```

Then use same Battery Commands as above.

Battery charger software lives in the MVC

On the Zephyr

```
cd /home/dorado1/auv/altex/battcharger/logs
```

```
../charger
```

```
3    automated charging
0    set Hotel   V 35.5 I 2.0
2    check I    4 3 2
3    set batts to charge
4    charge
5    to stop charging
D    set batts to Discharge state
```

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In the downstairs AUV lab:

```
cd /home/dorado1/auv/altex/battcharger/logs  
../charger -cdev tcp:ets8p-3:3002 -bdev /dev/ser10
```

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