

AOML Auto-launcher & AMVER/SEAS data acquisition software

User manual

V 1.3

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Hardware

Hardware list

1. Auto-launcher

- 8 shooter auto-launcher and base



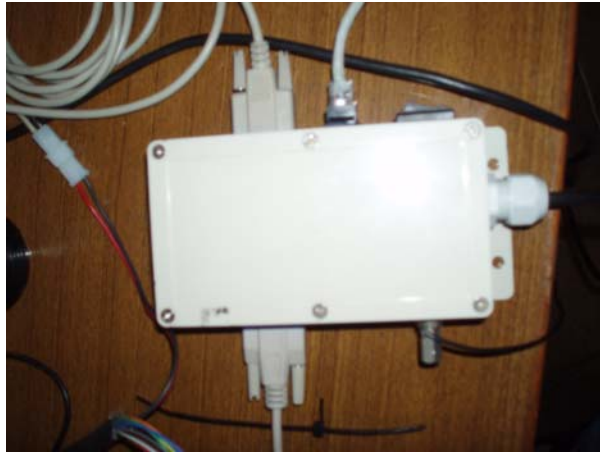
AOML 8 shooter auto-launcher (mounted on ship)

- MK21 USB DAQ



MK21 USB

- AOML auto-launcher (AL) interface box

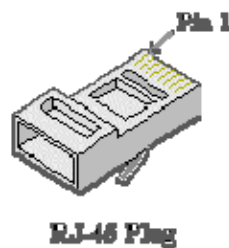
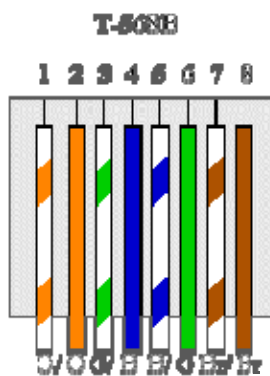


AL interface box

- Test Canister



- AL cable (CAT5)



Please use the “b” format for recrimping the CAT5 cable, shown above.

- Hand-launcher

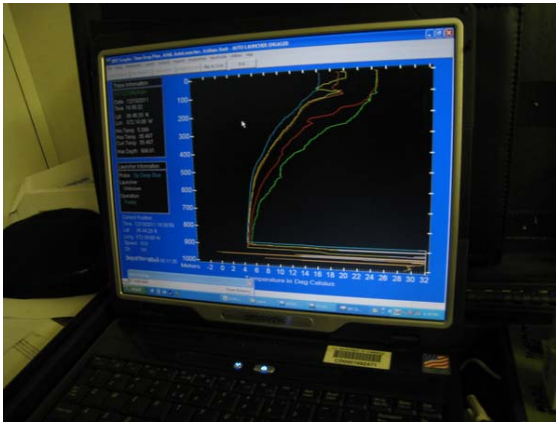


- Mount and plastic ground isolation



2. Computer

- Laptop



- If no laptop, Shuttle computer, keyboard, mouse, and monitor



- PCMCIA serial card and cable

3. Transmitter and GPS

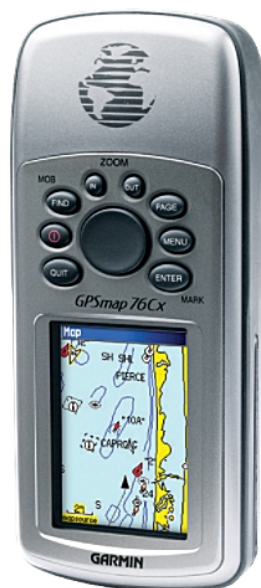
- Thrane & Thrane (T&T) Mini-C antenna/transmitter



- Serial cable for GPS streaming and data transmission from/to T&T transceiver to/from AMVER/SEAS
- Secondary GPS unit, Magnetic antenna with serial connection as a backup (not in all equipment)



- Handheld GPS for use when deploying floats/drifters (not in all equipment)



Hardware setup

4. Considerations before starting hardware setup:

The following three considerations should be kept in mind before and during the set up:

4.1. MK21 USB box must be on before any other hardware component

MK21 USB box should be set up with all power OFF. Then, in step **9.3** the MK21 USB box must be started before anything else. This assures that no voltages enter the MK21 USB box while it is off. This has been known to damage MK21 cards.

4.2. Keep MK21 USB cable unplugged during hardware setup.

Do not connect the MK21 USB cable to the computer during this step of the setup process. Specific instructions on how to plug the USB cable are provided during the step 3 (Hardware Startup) in order to make sure the MK21 USB box is recognized by the computer.

4.3. Delay auto-launcher setup until software is up and running

Always leave the AL setup until after AMVER/SEAS is up and running. Test the connection between the AL and AMVER/SEAS with the AL inside the cabin. Once the connection is tested and the XBT test probe is run, then proceed to the deployment of the cable and the mounting of the AL on the stern.

5. Antennae installation

Mount the T&T antenna on the bridge railing with hose-clamps. Make sure the location does not interfere with the normal operations of the vessel; ask the chief mate if your mounting is acceptable.



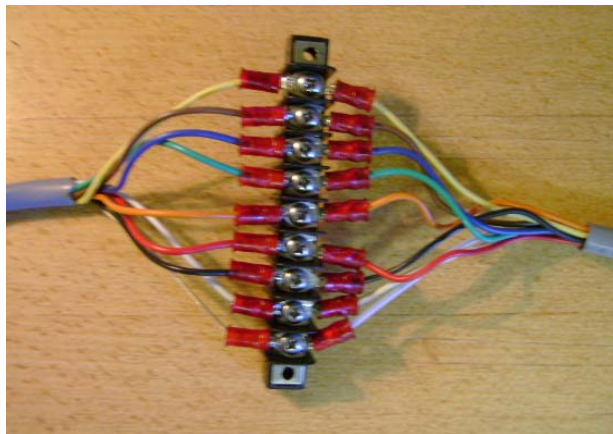
Run the antenna cables to your cabin window, tie-wrapping neatly, and out of the way.

6. Inside the cabin

- 6.1. Plug AOML AL controller box into the PC's COM port using an adequate serial cable.
- 6.2. Plug Trane & Trane serial cable into another COM port. (These ports are usually labeled, for reference.)
- 6.3. Make sure the MK21 USB box is off, then plug in the power source.
- 6.4. Plug the MK21 box into the AL Interface box via a serial cable.

7. Auto-launcher setup (cabin side)

- 7.1. Connect the AL cable to the interface box. (Cat5 receptacle)
- 7.2. **Non-Cat5:** Connect the AL cable connector with the AL cable by matching their colors:



8. Auto-launcher setup (stern side)

8.1. Run the AL cable from the cabin to the stern

First run the AL cable (probably the best would be to string it going aft) paying out from the porch outside your cabin. Feed it thru the holes in the railing – or secure with tie-wraps going aft.

*Make sure the cable will remain out of the way of **ANY** anticipated ship operation.*

Mount the flat plate secured with C-clamps, isolating the ground by placing the hard plastic barriers between the railing and the mount. In the event that a flat rail is not available, mount the pipe on the railing where you think it will be most of the time downwind.



Mount the AL's base to the AL with the 7/16 wrench and nut driver. The downward angle of the AL should be just enough to allow an XBT to slide out. (One set of holes lower than the middle of the AL should usually work.)

Slide the AL rig onto the pipe attached to the flat base. In the event of wind causing xbt drop failures, you may have to move the autolauncher to a less windy side of the stern. In the event of a pipe mount, slide the AL rig onto the pipe (you may have to rotate the AL to shoot more downwind in heavier weather- about 30 deg. maximum). Tighten down the set screws to hold the AL to the base/pipe.

8.2. Connect the waterproof CAT5 connector to the box attached to the autolauncher.

Make sure that the clip is on tightly, and tape up the connection to the box. Make sure that there is tape around the edges of the box, and that the connection is taped to prevent water from penetrating the seal.

8.3. Ground the AL to the ship's hull inside the cabin.

To do so, find an area that will be touching the hull with a metallic surface. For instance, clean an area on the edge of the window to bare metal and use a c-clamp to ground from the interface box to the window.



Cable c-clamped outside the cabin on the ship's structure.

*Always make sure both contact surfaces are cleaned to **BARE** metal. Use a file if necessary. A good ground is very important for a proper AL operation.*

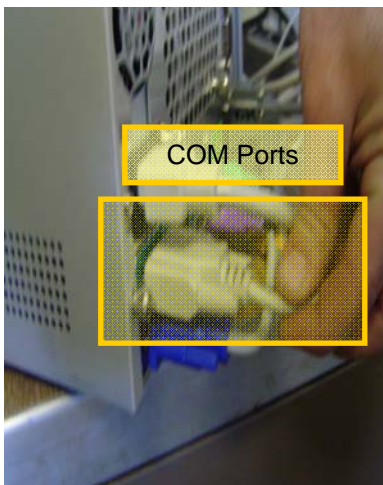
Notes:

- If there is no protective cover for the auto-launcher you may have to rinse salt off occasionally.
- Spray the AL's pins with silicone lubricant every two days to prevent them from getting stuck.

Hardware startup

9. Hardware startup sequence

- 1.1. Start with computer, MK21 USB box, and AL interface box off.
- 1.2. Make sure the AOML auto-launcher interface box is plugged into the PC's COM port. (You may have to check the assigned COM port in the settings of Amverseas.)
- 1.3. Plug in and power the MK 21USB box up.
- 1.4. Power the AL controller box up.
- 1.5. Make sure T&T is plugged into the PC's COM port. The secondary COM port on a laptop is supplied by a black cable that plugs into a long, thin port on the right side of the computer. There is also a backup with the PCMCIA card that provides two additional com ports. This plugs into the card slot on the left side of the laptop.



Comports are located at the back of the shuttle computer, if supplied.

- 1.6. Power the T&T transceiver up.
- 1.7. Power the computer up and log on.

Running AMVER/SEAS

Software startup

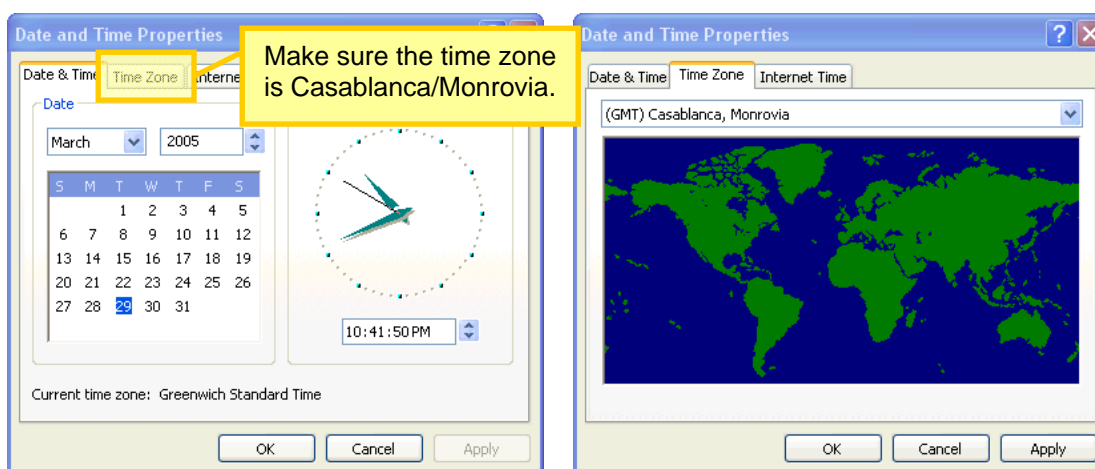
1. Starting AMVER/SEAS up

When the PC starts up it should automatically run AMVER/SEAS. Identify the AMVER/SEAS main screen among all open windows. Start AMVER/SEAS if no windows are open.



1.1. Time zone check

For proper operation of AMVER/SEAS, the computer time and time zone must be set correctly to (GMT) **Casablanca Monrovia** time. Once the computer time zone is set correctly, it should not be changed.



1.2. Ship call sign check

The ship call sign must be entered in the administration screen for proper real-time transmission of XBT profiles. Go to the **Setup | Administration** menu in the main AMVER/SEAS screen to open the following screen:

Administration

File Transmit Help

Ship Information

Company Name: Hapag Lloyd

Call Sign*: ZCDJ6

Maximum Speed Knots*: 20

Ship Name*: Barcelona Express

IMO Number: 8406286

Sail Plan Default Navigation Method: GC

Sensor Information

Thermometer Height: [] meters

Anemometer Height: []

Barometer Height: []

Sea Surface Temp Depth: []

Sea Surface Temp Type: []

Wet Bulb Temp Method: []

Anemometer Method: []

floppy drive: A

INMARSAT Data

INMARSAT-C Mobile ID*: 430372060

Emergency Watch (GMDSS) INMARSAT-C Mobile ID: []

INMARSAT-A Number: []

Medical Staff *

☐ Nurse ☐ MD ☐ VOSCLIM Participant

☐ PA ☒ None

Forward

☐ AmVer ☐ Marep

☐ Jasrep

Transmit Binary Cancel

* Mandatory

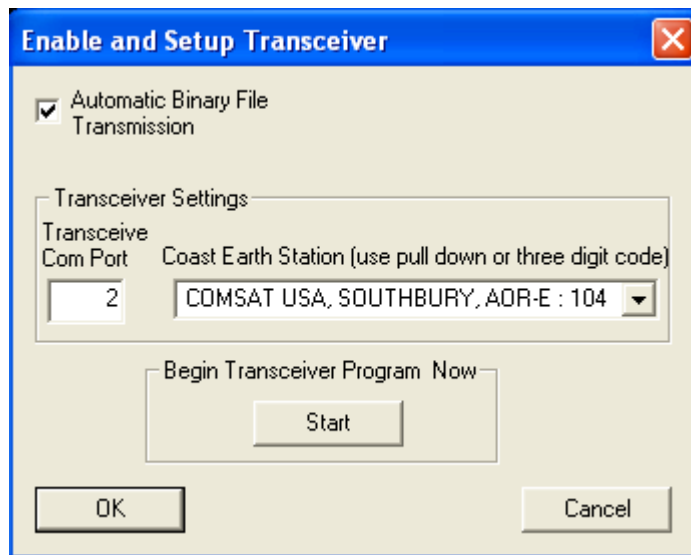
At this juncture, also ensure that the rest of the fields filled in above are filled in properly. Once completed, click on “Transmit Binary” button, this will bring up a “save file for later” menu. Click “browse” here and save it in **AMVERSEAS | Reports | Amver_Admin**. Save it as Admin.bin, replacing the one that is there if there is one.

1.3. Transceiver interface program start up

This program acts as a go-between for AMVER/SEAS and the transceiver. The Transceiver Program has two functions:

- Transmission of binary XBT profile data via the transceiver through PC’s COM1 port.
- GPS streaming to the Time server. The XverXface (Transceiver Interface) reads GPS data from the transceiver through the PC’s COM port.

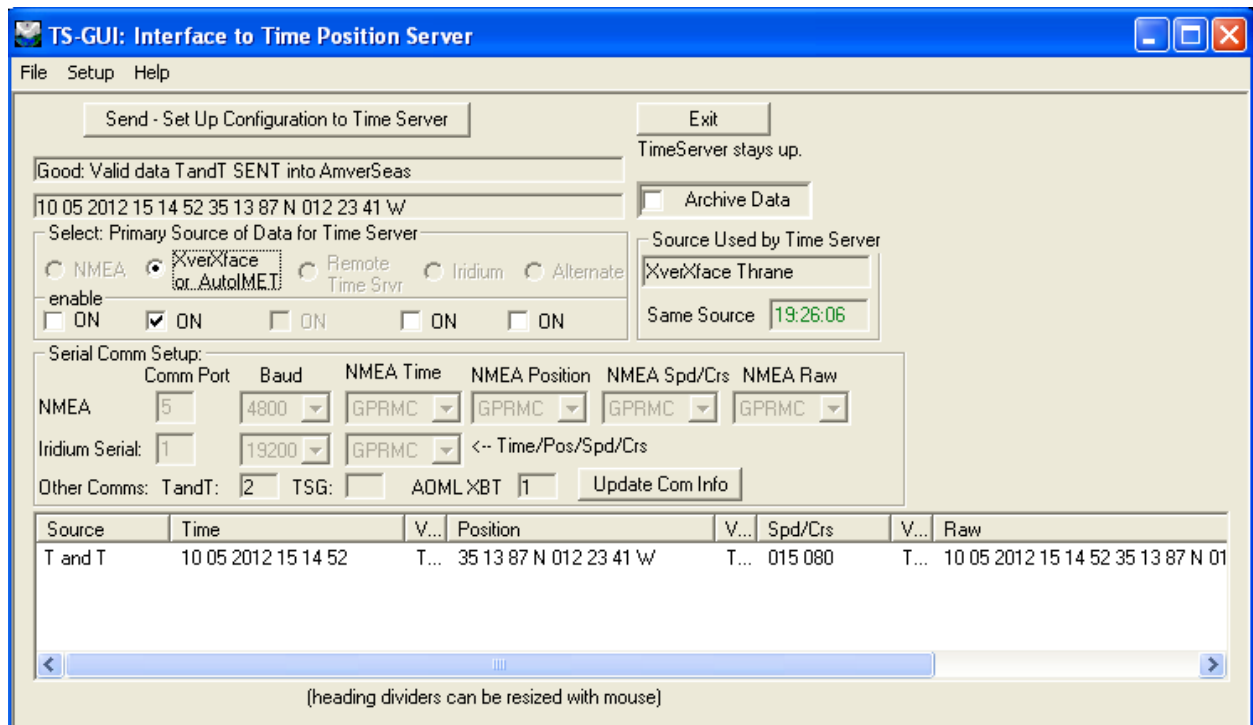
This function is critical for the Time server to get good GPS positioning. Always check that XverXface is up when starting up AMVER/SEAS. If the XverXface is not started automatically



when AMVER/SEAS starts, go to the **Setup | Transceiver** menu on the AMVER/SEAS main screen to enable and start it.

1.4. Time server: GPS positioning and time check

Identify the Timeserver screen among all open windows in the screen and make sure both boxes are checked to have good GPS streaming to AMVER/SEAS. If the Timeserver screen is not available go to the main AMVER/SEAS screen and select the **Setup | Time Server** menu to start this program up.

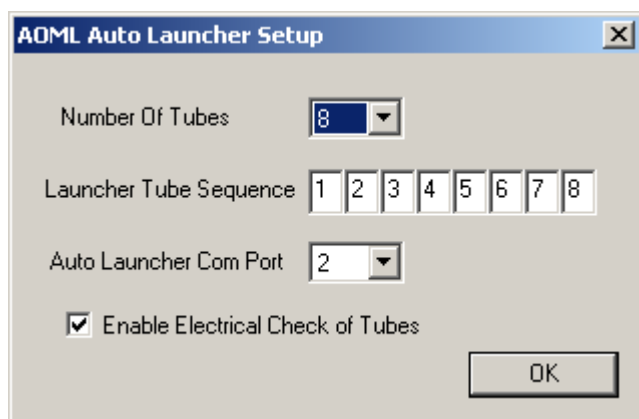


2. Running AMVER/SEAS XBT at the beginning a cruise

*Open the AMVER/SEAS XBT screen from the **SEAS / XBT** menu in the main AMVER/SEAS screen. From now onwards all operations will be controlled from this screen.*

2.1. Auto-launcher COM port check

Go to **Setup | AutoLauncher | Setup** on the AMVER/SEAS XBT screen and make sure the Auto Launcher COM port option is set to the corresponding com port that the autolauncher is plugged into.

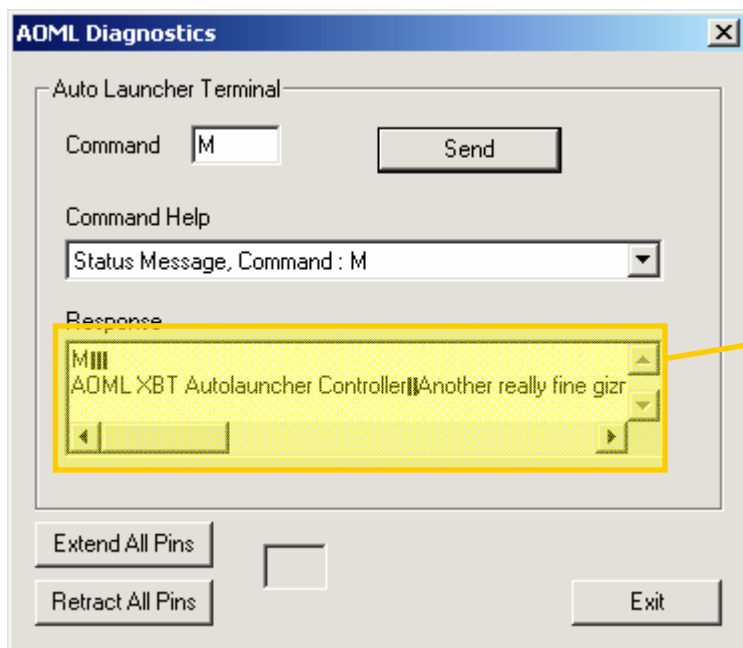


The screenshot shows a dialog box titled "AOML Auto Launcher Setup". It contains the following fields and controls:

- Number Of Tubes:** A dropdown menu with the value "8" selected.
- Launcher Tube Sequence:** A row of eight individual input boxes containing the numbers 1, 2, 3, 4, 5, 6, 7, and 8 in order.
- Auto Launcher Com Port:** A dropdown menu with the value "2" selected.
- Enable Electrical Check of Tubes:** A checked checkbox.
- OK button:** A button located at the bottom right of the dialog.

2.2. Auto-launcher connection check

To test that all connections with the AL are properly working, go to **Setup | AutoLauncher | Diagnostics** on the AMVER/SEAS XBT screen. Select the **Status Message** option in the drop down menu. Click the Send button to send the message to AOML's auto-launcher. If the connection with the AL is properly setup, the status message should appear in the response box.



If the connection with the AL is properly setup, the status message should appear in the response box.

2.3. MK21 connection check using XBT test probe

Load the XBT test probe in the AL. Click **Begin Manual AL** on the AMVER/SEAS XBT screen toolbar. Select the appropriate tube number and run the test profile. After AMVER/SEAS goes through the launch sequence you should see a constant temperature profile on the screen.

If the test probe drop runs successfully then all your hardware and software is properly setup. Congratulations! Just a few extra steps will be needed to have AMVER/SEAS ready to start your cruise.

Now the autolauncher will need to be set up on the stern. Please see step: 8. Auto-launcher setup (stern side).

2.4. Drop plan setup

Drop plans are setup either on a position-basis or on a time-basis. Position based drop plans are useful when non-homogeneous or specific sampling locations are required (i.e. near boundaries). Consequently position based drop plans take longer to setup since each sampling location needs to be defined on it.

To setup a position based drop plan go to the **Setup | Drop Plans | Position** menu In the AMVER/SEAS XBT screen.

Drop Plan

File

Drop Plan Path Name

Get Drop Plan

Redrops and Retrys

Retry if No Splash Detect:

☐ Auto Re-Drop On Fail

No Re-try

Number of mins for speed/dir calc:

10

Edit Plan - Click List Box Selection to Edit

☐ Latitude
 ☐ Longitude

Position:

Edit Pos

Delete Pos

Insert After Pos

Pos

DD

MM.MM

N-S

Or

DDD

MM.MM

E-W

Notes

Calculate Increments

Clear All

Save Plan For Future Use

File Name

Save

No	Plan Type	Value	Status
<div> <div>The drop positions of your selected plan will appear here for you to preview before saving your plan.</div> </div>			

Save Plan

Cancel

Time based drop plans are useful when homogeneous sampling is required (i.e. Open Ocean). Time based drop plans are faster to setup since just the time spacing between drops is required. A constant ship speed is required for this time based drop plans to ensure homogeneous sampling in distance. Whenever the ship speed changes considerably, +/- 1 knot, adjust the time sampling by setting a new drop plan.

To setup a position based drop plan go to the **Setup | Drop Plans | Time** menu In the AMVER/SEAS XBT screen.

For instance, for sampling every 50km and ship speed of 19 knots, then drops must be every 1h 25 min.

Setup Time Drop Plan

Create/Edit Plan

Start Time: 2012 10 05 06 49 Update Drop 65 mins
 YYYY MM DD HH : MM

Ship Speed 015 Calculate nm 16.3 Nautical miles between drops

Optional:

Drop Plan Name: (No need to fill this out, it defaults to Time_Drop.dat)
 Time_Drop

Or load existing Plan:
 Get Drop Plan

Quality Control For XBT in Water

Number of: No Re-drop

Temp Limits

Max Depth to Test for Redrop: 0	Min Temp limit to signal breach: -3 deg C
Num Breaches causing Redrop: 5	Max Temp limit to signal breach: 40 deg C

Stop Drop
☐ Stop Drop When Temperature Limit Breached the specified number of times.

QC No Splash Detect
 Retry: No Re-try

Save Plan Cancel

Make sure to select re-drops for No Splash Detect and QC. Also ensure that your drop plan is saved once entered.

2.5. Start an Auto Launcher cycle

Click on the **Begin AL Cycle** button in the AMVER/SEAS XBT screen and the AL will now drop XBTs according to the selected drop plan.

2.6. Load the auto-launcher with XBTs

2.7. Reset tube status in AMVER/SEAS

Reset the tubes in AMVER/SEAS by going to the **Report | Launch Status** menu. AMVER/SEAS will electrically test each XBT loaded on the AL and return either a green or red indication

Status Report / Drop Plan: Time

Ship Info

Name: Barcelona Express

Call: ZCDJ6

Cruise: AX07SEP12

Op: Zach Barton

GPS

Date: 10/05/20

Time: 15:11:32

Lat: 35 13.74 N

Lon: 012 24.46 W

Ship Spd: 015

Ship Dir: 079

Data: Valid

Sats:

Drop Plan

Starting Time: 10/05/2012 06:49

Increment mins: 65

Drop Pos: 9

Auto Launcher Engaged: ☒

Upcoming Launches

Tube	Date(dmy)	Time Arrival	Count Down
3	05/10/12	15:29:00	0days 00:17:38
4	05/10/12	16:34:00	0days 01:22:38
5	05/10/12	17:39:00	0days 02:27:38
6	05/10/12	18:44:00	0days 03:32:38
7	05/10/12	19:49:00	0days 04:37:38
8	05/10/12	20:54:00	0days 05:42:38

Next Drop

Tube Information

Reset Tubes ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒

Electrical Test and Reset

Status: ☒ 1 2 3 4 5 6 7 8

Next Tube No: 3

Set Next Tube 1

View Resistances

Previous Profiles

Drop	T	Date(dmy)	Time	Latitude	Longitude	SST	700m	ChkPrf	Edit	Xmt
175	2	10/05/12	14:24	35 11.66 N	012 39.05 W	23.28	11.21	NoCk	No	Yes
174	1	10/05/12	13:19	35 08.62 N	012 59.91 W	23.12	11.14	NoCk	No	Yes
173	7	10/05/12	12:14	35 05.41 N	013 20.04 W	23.01	11.40	NoCk	No	Yes
172	5	10/05/12	10:04	34 58.62 N	014 00.48 W	23.17	11.04	NoCk	No	Yes
171	4	10/05/12	08:59	34 56.14 N	014 20.20 W	23.39	11.05	NoCk	No	Yes
170	3	10/05/12	07:54	34 53.05 N	014 40.02 W	23.32	10.91	NoCk	No	Yes

The “Reset Tubes” process will take a few minutes to complete. Make sure that all new probes are reading green. Also ensure that this process is done after refilling, before removing the pins. This can be an early detection of a bad probe. The program uses this to discern what tube to use next, so make sure it is done to ensure that the probes are correctly launched.

Software operation

3. Running AMVER/SEAS XBT during a cruise

3.1. View the status of good drops by going to the **Report | Launch Status** menu. This screen is useful to see the upcoming drops based on the selected drop plan. This is a very useful screen and may be kept open while dropping.

Status Report / Drop Plan: Time

Ship Info		GPS		Drop Plan	
Name:	Barcelona Express	Date:	10/05/20	Ship Spd:	015
Call:	ZCDJ6	Time:	15:11:32	Ship Dir:	079
Cruise:	AX07SEP12	Lat:	35 13.74 N	Data:	Valid
Op:	Zach Barton	Lon:	012 24.46 W	# Sats:	

Auto Launcher Engaged: ☒

Upcoming Launches

Tube	Date(dmy)	Time Arrival	Count Down
3	05/10/12	15:29:00	0days 00:17:38
4	05/10/12	16:34:00	0days 01:22:38
5	05/10/12	17:39:00	0days 02:27:38
6	05/10/12	18:44:00	0days 03:32:38
7	05/10/12	19:49:00	0days 04:37:38
8	05/10/12	20:54:00	0days 05:42:38

Next Drop

Tube Information

Reset Tubes: ☒ ☒ ☒ ☒ ☒ ☒ ☒ ☒

Electrical Test and Reset

Status: ☒ 1 2 3 4 5 6 7 8

Next Tube No: 3

Set Next Tube 1

View Resistances

Close Window

Previous Profiles

Drp	T	Date(dmy)	Time	Latitude	Longitude	SST	700m	ChkPrf	Edit	Xmt
175	2	10/05/12	14:24	35 11.66 N	012 39.05 W	23.28	11.21	NoCk	No	Yes
174	1	10/05/12	13:19	35 08.62 N	012 59.91 W	23.12	11.14	NoCk	No	Yes
173	7	10/05/12	12:14	35 05.41 N	013 20.04 W	23.01	11.40	NoCk	No	Yes
172	5	10/05/12	10:04	34 58.62 N	014 00.48 W	23.17	11.04	NoCk	No	Yes
171	4	10/05/12	08:59	34 56.14 N	014 20.20 W	23.39	11.05	NoCk	No	Yes
170	3	10/05/12	07:54	34 53.05 N	014 40.02 W	23.32	10.91	NoCk	No	Yes

3.2. Drop outside a drop plan.

First stop the Auto Launcher by selecting the **End AL Cycle** button in the AMVER/SEAS XBT screen toolbar. Select either **Begin Hand Launch** to drop an XBT with the hand launcher connected to the controller box or **Begin Manual AL** to make a single drop with the AL. After the drop is done, do **step e** above and turn the AL back on by selecting **Begin AL Cycle** button (AMVER/SEAS will offer the option to re-engage the AL once the manual drop is finished).

3.3. Profile transmission

You can verify that a drop was transmitted by looking at the Transceiver Interface window.

Hardware/software troubleshooting

Basic troubleshooting for cruise rider.

Quick checks:

AmverSeas:

- Is AmverSeas frozen, needing a restart?
- Is the computer frozen, needing a restart?
- Is there just one seas window that is frozen?
- Are there any software alarms? What are they?
- Are there any error dialog boxes present?

Autolauncher:

- Do communications between the computer and autolauncher occur? (Check in the setup window in AmverSeas.)
- Is the Launcher Detecting probes? Is the failure in one tube or all? Was the pin pulled on the XBT?
- Are there wires from a previous drop that might be interfering with current drops?
- Is there any unusual weather or extreme weather?

Mk 21:

- Can you hear the MK21 click as it tests the probe?
- Does AmverSeas freeze when a profile starts?
 - The MK21 would need to be power-cycled and the xbt program might need to be restarted.

Remember to check the easy things first, such as:

- Check the software settings
- Power everything off, then back on
- Check connections
- Re-Terminate connections if there is issue
- Check that the pin retracted on the autolauncher
- Make sure that the pin was pulled on the XBT
- Make sure there is an XBT in the corresponding tube to the one that was tried.

If the result is the same issue, begin hand launching. The priority is to get the data. The hand launcher can assist with troubleshooting. For instance, if the hand launcher and the autolauncher are giving the same type of error, the problem could be in the cable, or with the computer or MK21.

Some Common Error Methods:

1) Seas has performed normally, and the XBT was detected, but there was no data collected. (No Splash)

- Make sure that the XBT pin was pulled
- After AmverSeas times out, try the next tube. (It could be that the probe itself malfunctioned.)
- See if the XBT left the launcher. (It could be either a pin not dropping or not a large enough angle on the autolauncher.)

- An empty canister with a wire still attached can show a probe where there is none. Check for trailing wires.

2) The Hand launcher or Autolauncher will not detect probes or collect data.

- Check the USB connection, and check in the device manager to make sure that the computer is recognizing the MK21.
- Check the hardware version for the MK21 in the seas software. Seas>XBT Hardware Versions
- Try swapping the MK21. The first one may have intermittent problems, or may not be working correctly.

3) Seas seems to be working properly, but the Autolauncher does not recognize the XBTs.

- Try a different tube. If the tube is not recognizing any probe, the tube may be faulty at some point. Discontinue use of that tube and do not fill that one with XBTs
- If no XBTs are detected, perform a hand launch with the test canister.

4) The Hand Launcher recognizes probes, but the Autolauncher doesn't.

- This points to a problem with the autolauncher or connections. The MK21 should be working properly.
- Check the connections to the autolauncher again, looking for corrosion and places where wires might not be making connections.
- Check communications with autolauncher. (Use the Setup>Autolauncher>Diagnostics menu to test communication.)
- Check Software configuration again, just to be sure.
- Check the ground for the autolauncher. Try cleaning it and the surface it attaches to again, just to make sure that there is a clean surface and good connection.
- Try the spare autolauncher. Swap them out, performing hand launches if any drops occur as you replace it.

5) The hand launcher works with the secondary cable, but not with the primary.

- This points to either a bad cable, or bad terminations (cat5 only) at either end of the cable.
- Try re-connecting everything first.
- Use the CAT5 Checker, if supplied. This consists of two ends, one to be placed on either side of the cable, and sends a signal to all wires and looks for bad connections or losses, giving indications of issues with lights. **This is not a perfect tester. It can give good status when something is bad.**
- If that doesn't work, or there are still issues, try re-terminating the original cable first. With the CAT5, Make sure you use the "B" termination style, which is as follows for the pairs: Pins 1-8 correspond to these wires – orange/white, orange, green/white, blue, blue/white, green, brown/white brown.
- If that does not work, begin running the secondary cable, hand launching for each drop in between. The easiest way to do this is to bring the hand launcher with you as you run the cable. Disconnect it when you run the cable, and reconnect it before you go to start the drop.
- To perform a hand launch away from the computer, stop the Autolauncher cycle, click "perform manual hand launch" and make sure it gets to the "load probe" stage. Head

down to the launcher, load the probe, wait 30 seconds, then drop the probe. Allow the probe to deploy for 3 minutes, or until the wire breaks. Head back to the cabin to make sure that the drop went well.

6) The seas program freezes in the middle of a drop.

- This points to a MK21 power issue.
- Restart the XBT program and see if that fixes it. If not, restart the XBT program and perform a drop again.
- Try to find the place with the cleanest power as this is usually caused by a power source that is fluctuating enough for the MK21 to brown out and not be detected by the computer.
- If you have a UPS, ensure that the MK21 is plugged into the section that provides battery backup for the power.