

STS Mocness Deployment/Recovery Procedure

Rev 1.02 21-June-2017

Mocness: Multiple Opening/Closing Net and Environmental Sensing System

Main Target: macrozooplankton

Specifications for the standard STS 1M Mocness frame:

FRAME:

Frame Dimensions (Meters): 2.87L x 1.24W x 1.0H

Frame Dimensions (Feet): 9.5'L x 4.1'W x 3.3'H

Bridle Length (Feet): 2.2'

Total Frame Length including Bridle (Feet): 11.7' (3.6M)

Weight in Air: 330lbs

NETS:

Number of Nets: 10

Length of each Net (Feet): 19.7' (6M)

Net Mouth Area: 1M²

Net Mesh Sizes: 120um, 202um, 220um and 335 um

(Availability for 10 nets with a particular mesh size needs to be arranged well in advance of the cruise)

Tow Speed: 2 Knots +/- ½ Knot through the water

NET Angle indications:

Resting in Frame: Approx 63 Degrees

Hanging Vertical: 0 Degrees

Laying flat horizontal: 90 Degrees

Normal deployed angle (in-water): 45 Degrees nominal (40-50 Deg depending on conditions)

At least one hour before reaching the Mocness deployment site the Mocness deployment team prepares the Mocness. The nets should be cleaned and checked. The nets are then made ready and cocked into position for deployment.



When the trip net button on the acquisition PC has been activated the system sends a trip signal to the underwater unit. This unit then causes the Mocness stepper motor to step 3 times. The motor rotates the spindle which is keyed to release the net cable in proper sequence. The net bar slides down the rail closing the net and activates the net response switch causing a confirmation signal to be sent back to the acquisition system. The first trip will cause net#0 to close and open net#1. The next trip will close net#1 and open net#2. Continue on until the ninth trip where it will close net#8 and open net#9.

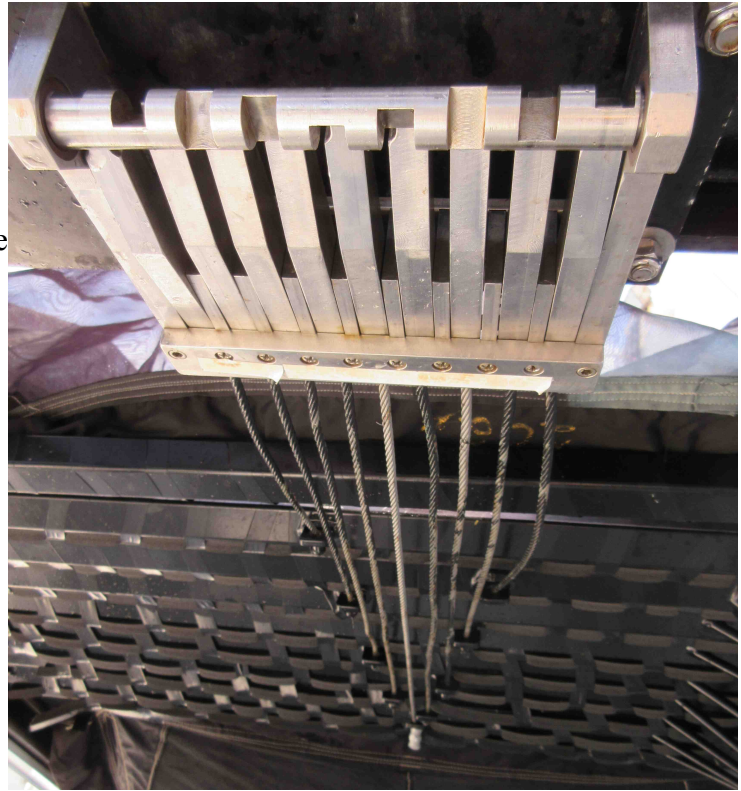


Illustration 1: All nets fully cocked

Cocking the nets:

The nets are numbered from 0 to 9. The cod-ends are also numbered 0 to 9 and are installed onto the nets with the same number. The nets are laid out so as to allow access to the net bars. The clear plastic half-pipe covers are placed over the net bar keepers on each side of the frame to allow the net bars to be moved up on the frame to be cocked into position. The net release motor will now need to be positioned. As you are standing at the front of the frame facing the frame so that the motor is on your left and the net release latches are on your right, rotate the spindle cam until the left-most release latch fits into the left-most groove and allows it to move freely up and down. Looking at the motor from the spindle/cam side rotate the cam one step at a time clockwise until the latch cannot move all the way up then rotate it back again one step. At this position, the latch should move freely up and down. This is the starting position for the motor.



Illustration 2: Installing cod-ends on the nets

STS Mocness Deployment/Recovery Procedure

Rev 1.02 21-June-2017

Starting with the first net bar to be cocked (net #8) move the net bar up as far as it will go. Hold the left-most latch all the way up and at the same time place the small ball that is swaged onto the steel cable into this slot. Keep holding it in place and then rotate the spindle clockwise 3 steps. Release the left-most latch and it should stay in place. Place net#8 over the frame out of the way of the next net to be cocked. Next go to the right-most net release latch and push it all the way up.

Take the next net bar (net#7) and move it up on the frame. Hold the right-most latch all the way up and place the swaged ball and place it into the right-most position. Rotate the spindle clockwise 3 steps. Release the latch. Place net#7 over the frame and out of the way of the next net. Continue this process with net#6 and place it's swaged ball onto the net release latch that is the 2nd from the left. Next net#5 will need its swaged ball placed into the net release latch that is 2nd from the right. Continue on until the last net to be cocked (net#0) where its swaged ball will go into the middle position. Note that net#9 is not cocked and is the last net opened at the end of the tow. After nets 0-8 are cocked, remove the half-pipe covers from the net bar keepers and then position the nets and cod-ends past the aft part of the frame and set them in place for deployment.

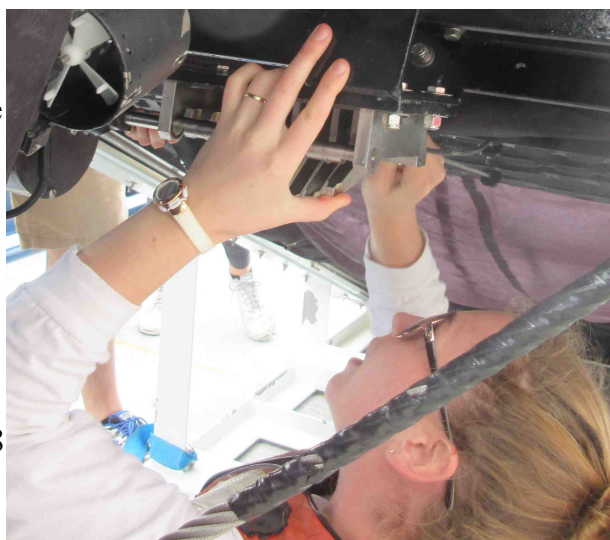


Illustration 3: Cocking net#7

Net Number	Cam position Viewed from front facing aft
8	Left-Most
7	Right-Most
6	2 nd from left
5	2 nd from right
4	3 rd from left
3	3 rd from right
2	4 th from left
1	4 th from right
0	Center

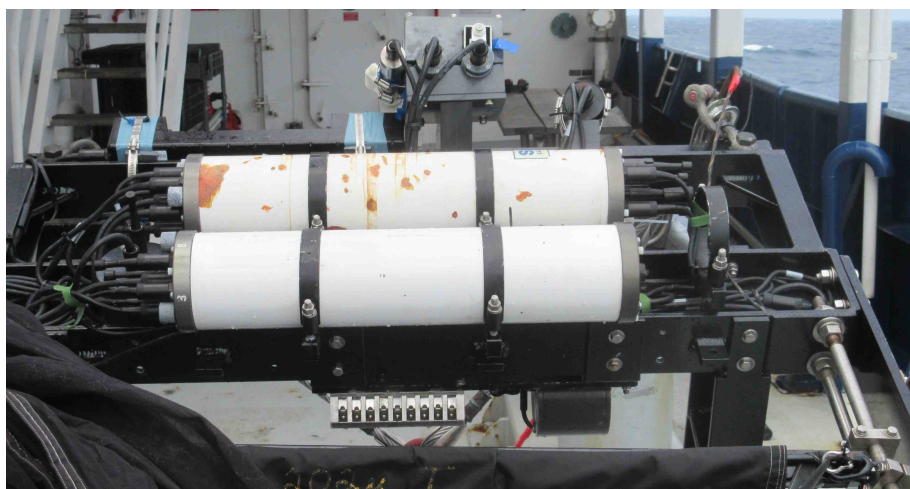
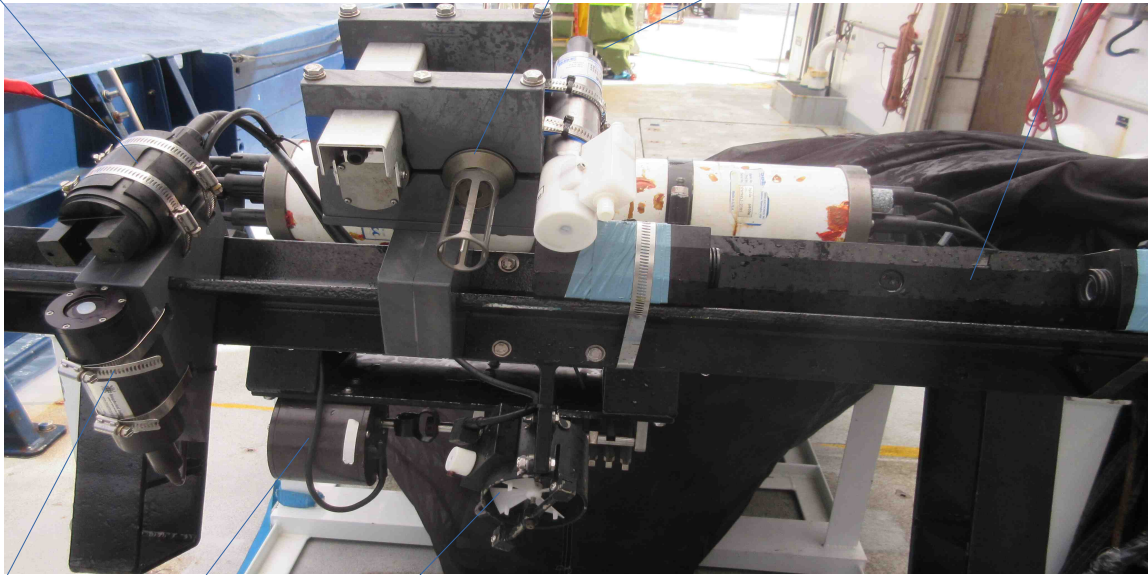


Illustration 4: Aft view of motor and sensors

STS Mocness Deployment/Recovery Procedure

Rev 1.02 21-June-2017

Seapoint Fluorometer Conductivity sensor Temperature Sensor Oxygen sensor Transmissometer



PAR Sensor NET Motor Flowmeter

Seabird SBE9+ CTD

SIO Mocness interface unit

NET Angle sensor

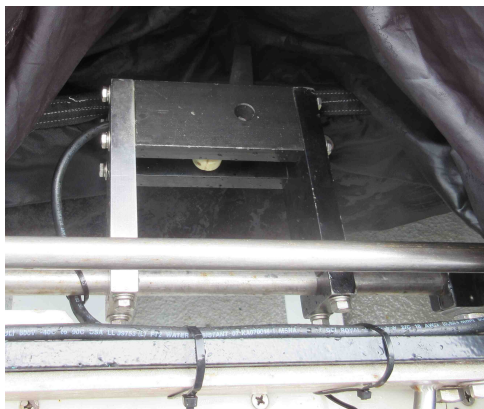


Illustration 5: NET Response Sensor

Deploying the Mocness

Upon reaching the deployment site the bridge watch positions the ship so that the forward side of the bow (on the same side of the ship that the Mocness is being deployed from) is pointed into the prevailing wind and sea currents. The water depth should be monitored and should be at least 100M deeper than the intended maximum deployment depth (as measured by the CTD pressure sensor). Once the ship is safely in position for the deployment the weather conditions and all other safety concerns are evaluated to determine if it is safe to deploy the instrument. If all looks good then the ship's bridge officer gives permission to proceed with the launch. At this point the ship's speed should be about 1.5 knots as measured from the speed log.

During the time when the bridge is positioning the ship, the Mocness deployment team performs operational deck checks on the Mocness sensors to ensure that all sensors on the Mocness are operational. One technician in the lab turns on the equipment and monitors the sensors. The lab tech communicates by radio to the deck tech to do the following while monitoring each response:

- Check CTD Pressure, Temperature and Oxygen sensors for normal values.

- Check Net Angle sensor for normal values (Approx 63 Degrees when sitting in the rack on deck).

- Blow into the flow-meter to get it spinning while monitoring flow counts (Do not use finger to spin the prop).

- Perform block/unblock checks on the transmissometer.

- Perform operational check on the fluorometer.

- Perform operational check on the Net Release Motor.

- Perform operational check on the Response switch.

- All checks are recorded in the console log.

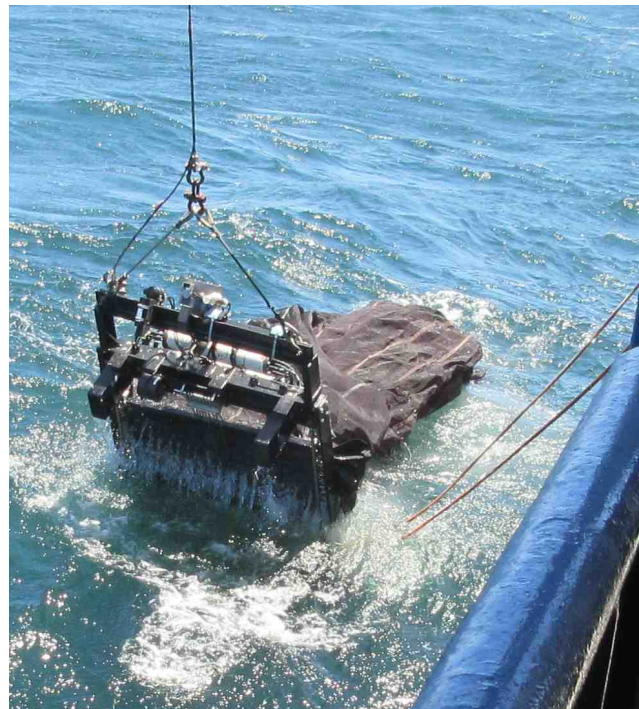
After deck checks are complete be sure to reset the motor to the proper position and re-cock the net if it was test tripped.

STS Mocness Deployment/Recovery Procedure

Rev 1.02 21-June-2017

After the bridge gives permission to launch, the Lab tech starts up the Mocness acquisition and indicates lab readiness to the deck team. The deck team rigs tag lines to each side of the Mocness frame and assigns a tag line tender to each line. Once the tag lines are rigged and manned then the securing ratchet straps are released. The deck leader signals the winch operator to slowly raise the frame to the vertical position so that the bottom of the frame is off the deck. The deck leader then signals the A-frame or boom operator to move the frame outboard. Adjustments to the winch operator is made to ensure the frame clears the bulwark or deck. Once the frame is hanging at a point above just above the edge of the ship the boom or A-frame is stopped and tag lines are held fast keeping the frame secure in place.

At this point the net handlers start deploying each net one by one over the side starting with the first NET to be tripped and continuing in sequence until the last net to be tripped is deployed. Once the Nets are deployed the deck leader signals to the boom or A-frame operator to extend the frame outward over the water. Once the boom is extended the deck leader signals to the Winch operator to lower the frame into the water so that the sensors are just below the surface. The deck leader then hands control of the winch operation over to the lab operator but continues to monitor the wire angle to ensure that the wire doesn't pay out under the ship.



Towing the Mocness

The Mocness lab operator communicates to the winch operator to descend at 10 meters/minute. The lab tech will ask the bridge to re-adjust ships speed to 2 knots through the water according to the speed log. During this time the wire tension is monitored. The tension during the tow should be at about 200lbs or higher. If the tension dips less than 200 then slow the winch speed accordingly. After about 30-50 meters of wire is paid out then the winch speed can be increased to 20MPM as long as cable tensions indicate it is OK to do so. The NET angle also needs to be monitored and should be at 45 (+/- 5) degrees throughout the tow. Maintaining the net angle at 45 degrees is more important on the upcast than on the downcast. Adjusting ship's speed can change the angle but it should be kept at 2 (+/- 0.5) knots through the water. In addition, changing the winch speed can also change the net angle. When the wire out is at about 100M the lab can tell the winch operator to increase winch speed to 30-40MPM depending on sea conditions and cable tensions. Since the Mocness is under tow the winch wire out measurement does not indicate the actual depth of the Mocness so the Lab operator needs to closely monitor the Mocness depth and ensure that it does not get any closer than 100M off the bottom. If the Mocness has an altimeter then a closer bottom approach can be accommodated.

When the Mocness nears the target depth have the winch slow down to about 10MPM. Some Mocness operators will continue lowering the Mocness to about 20M past the target depth before they stop the winch. Keep in mind that when the winch is stopped the Mocness depth may change depending on the currents and how much wire is paid out. Start the winch to bring the Mocness upward at 10MPM while keeping an eye on maintaining the net angle at 45. To increase the angle slow the winch speed or if necessary speed up the ship by 1/2 knot. The lab operator then trips each net during the up-cast at the desired depth. When the Mocness has come up past 100M then the deck watch should already be out on deck monitoring the up-cast. After all the nets have been tripped the lab operator tells the winch to bring the Mocness up so that the top of the frame just breaks the surface (about 20 Meters of wire out) and passes control back to the deck watch.

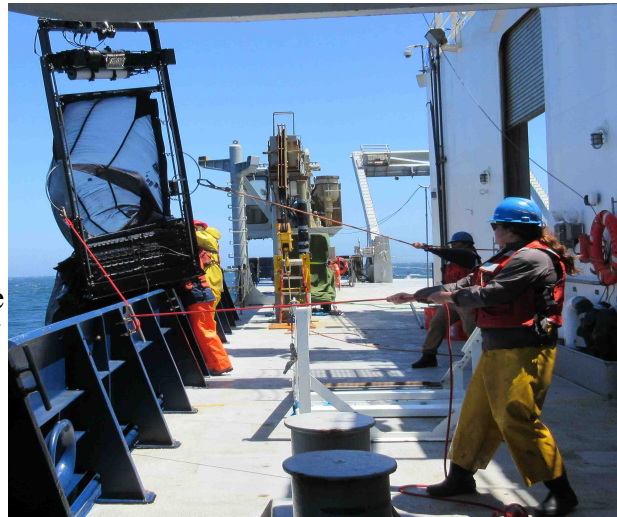
Recovering the Mocness



Once the ship is in position and the bridge watch indicates it is OK to recover, the deck watch directs the winch operator to bring the Mocness up to a point where the deck team can start recovering.

By this time, the deck team has rigged the recovery poles and hooks and made preparations for recovery. The deck leader directs the winch and boom to bring the Mocness close enough to the ship to allow the pole tenders to be able to hook the Mocness. Once the Mocness is hooked and lines ran around the cleats the deck leader booms the Mocness back out away from the ship. The deck leader then directs the winch to bring the Mocness frame up out of the water.

The boom or A-frame operator then brings the Mocness in to a point just inboard of the edge of the ship. The tag lines hold the frame in place so that the NET handlers can haul in the nets. Once all of the nets are on-board, the deck leader directs the boom or A-frame operator to boom the rest of the way in to a point just above the foot of the deck cradle. The winch operator then lowers the Mocness into the cradle. Once it is in the cradle then the frame is secured in place with ratchet straps. Slack cable is then pulled off the winch and tag lines, deck poles and hooks are stowed away.



STS Mocness Deployment/Recovery Procedure

Rev 1.02 21-June-2017

