



Rx-LIVE Receiver User Manual

DOC-7252-01

Table of Contents

1. Introduction	1
1.1 System Overview.....	1
1.2 Rx-LIVE Case.....	1
1.2.1 Case Dimensions.....	2
1.2.2 External Connector.....	2
1.3 Cable and Power Specifications	4
1.3.1 External Cable.....	4
1.3.2 External Power.....	5
2. ASCII Communication.....	6
2.1 Setting Up ASCII Communication	6
2.2 ASCII Command Set List	11
2.3 ASCII Command/Response Format.....	12
2.3.1 Rx-LIVE ASCII Command Format.....	12
2.3.2 Rx-LIVE ASCII Response Format.....	12
2.4 Enabling/Disabling Serial Transceivers.....	13
2.5 ASCII Commands.....	13
2.5.1 Serial Communication Port Control	13
2.5.1.1 BAUDRATE=x.....	13
2.5.1.2 QUIT	14
2.5.2 Basic Receiver Control/Status.....	14
2.5.2.1 INFO.....	14
2.5.2.2 STATUS.....	14
2.5.2.3 START.....	15
2.5.2.4 STOP	15
2.5.2.5 TIME=x.....	16
2.5.2.6 ERASE.....	16
2.5.2.7 STORAGE	16
2.6 ASCII Output Control	17

2.6.1 RTM485.....	17
2.6.1.1 RTMNOW	17
2.6.1.2 RTMPROFILE=x	17
2.6.1.2.1 Profile 0 - Immediate Output	17
2.6.1.2.2 Profile 1 - Status Interval Block Output.....	18
2.6.1.2.3 Profile 2 Polled Block Output.....	19
2.6.1.3 RTMINFO.....	20
2.6.1.4 RTMOFF	21
2.6.1.5 RTMAUTOERASE=x.....	21
2.7 Detection Log Manual Retrieval (Advanced User Feature).....	22
2.7.1 READBEG.....	22
2.7.2 READEND	22
2.7.2.1 READREC	22
2.7.2.2 READACK	23
2.8 ASCII Output Format.....	23
2.8.1 Scheduled Status Information.....	23
2.8.2 Tag Detection Information.....	24
2.8.2.1 Sensor tag detection.....	24
2.8.2.2 Pinger (non-sensor) tag detections	24
2.9 ASCII Usage Case Examples	24
2.9.1 Example 1: Starting a Study.....	25
2.9.2 Example 2: Enabling ASCII Output.....	25
2.9.3 Example 3: Updating the Rx-LIVE Clock	26
2.9.4 Example 4: Erasing Data Logs	26
2.9.5 Example 5: Placing Rx-LIVE in Suspend Mode.....	27
3. Appendix A - Terms and Conditions.....	28
4. Appendix B – Contact Information	34

1. Introduction

1.1 System Overview

The Rx-LIVE cabled receiver provides up-to-date insight into animal movements by allowing received data from Innovasea coded tags to be sent in real time to third-party equipment. That equipment could be a PC, a serial terminal, a third-party datalogger, or any other RS485 serial-compatible device.

The Rx-LIVE retains the submersible plastic corrosion-resistant high-pressure case of other Innovasea receivers while adding an external RS485 connector. This connector is used for real-time communication and to provide power to the Rx-LIVE. Please note that the Rx-LIVE does not have an internal battery.

1.2 Rx-LIVE Case

The Rx-LIVE hydrophone, located at the end opposite the RS485 connector, is similar to a microphone – it “listens” for sounds and transfers them to the electronics inside the receiver. Be very careful not to bump the hydrophone against hard surfaces or damage may occur that could compromise the receiver’s ability to detect tags.



Do not bump the hydrophone or the receiver may be damaged and unable to detect transmitters.

The Rx-LIVE must be powered externally from a 10 – 24 V DC power source; it does not have an internal battery. Do not open the Rx-LIVE case as there are no user-serviceable parts inside. Opening the case will void the manufacturer’s warranty.



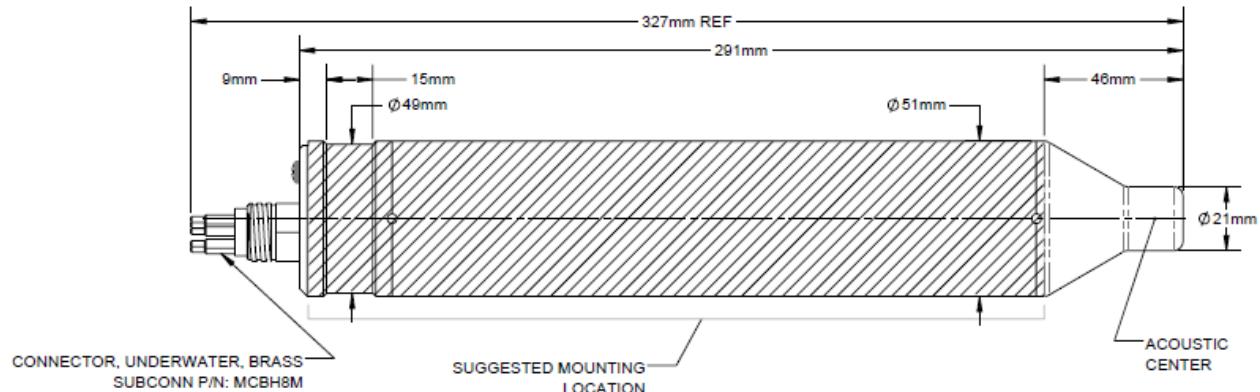
Do not open the Rx-LIVE case. There are no user serviceable parts inside.



WARNING

The Rx-LIVE pressure case and seal have a static depth rating of **500 meters** (730 psi). Physical shocks to the receiver at any depth can result in a considerably higher pressure on the casing than pressure due to depth, risking water entry into the receiver. Please use caution when deploying, retrieving, and storing receivers to avoid hard impacts to the case.

1.2.1 Case Dimensions

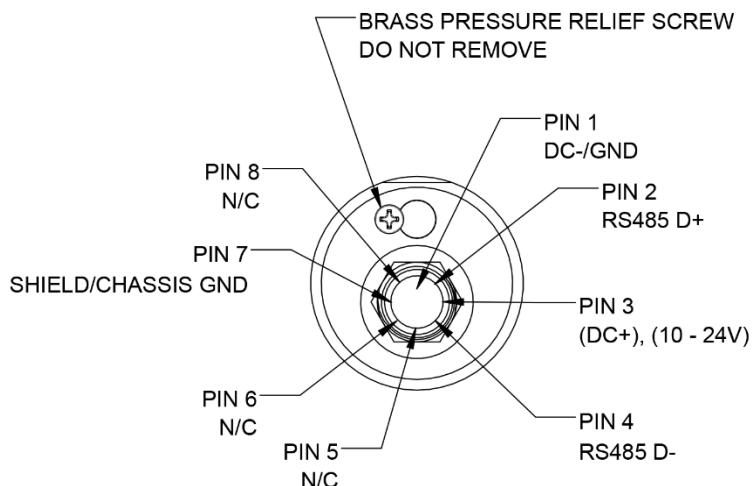


1.2.2 External Connector

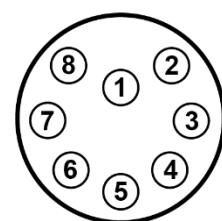
The Rx-LIVE uses a submersible connector (SubConn PN: MCBH8M) to allow for cabled connection to a PC, third-party data logger, modem, or other RS485 serial-compatible host device.

The Rx-LIVE connector pin-out, as shown from the external view, is detailed below.

Rx-LIVE external connector pin-out	
Pin #	Function
1	GND / External DC POWER -
2	RS485 D+
3	External DC POWER +
4	RS485 D-
5	No connection
6	No connection
7	Shield
8	No connection



Connector Pin View



Face-on View
(looking into pins)



Never deploy the Rx-LIVE with the connector exposed. It must be connected to a cable before submerging.

1.3 Cable and Power Specifications

1.3.1 External Cable

The Rx-LIVE uses an external cable for power and to connect to other devices. Cable specifications tested by Innovasea are listed below. There may be other suitable specifications based on individual applications.

Please contact Innovasea Support (support.fishtracking.innovasea.com) for assistance when designing specific cabling solutions.

Recommended cable specifications for typical applications:

- « Shielded Twisted Pair (STP):
 - Individual foil shield, with drain wire
 - One twisted pair for RS485 and other pair for Power/GND
- « Conductor material:
 - Stranded tinned copper (STC)
 - 0.070" diameter
- « Wire size:
 - Single receiver with 12 V supply: 18 AWG.
 - Multi-receiver setups required lower wire gauge or increased supply voltage.
Please contact support.fishtracking.innovasea.com for assistance.
- « Insulation material: polypropylene (PP)
- « Overall Copper Braided Shield (80% coverage)
- « Jacket material:
 - Black polyurethane
 - Overall outer diameter approximately 0.290"
- « Two jacketed Kevlar 49 strength members with breaking strength of 350lb each
- « UV stabilized
- « SubConn MCIL8F connector on Rx-LIVE end

RS485 cabling supports ASCII communication with multiple receivers with cable length up to 1200 m (4000 feet). The RX-LIVE supports ASCII baud rates of 9600, 19200, 38400, 57600, and 115200 bps. Achievable baud rate depends on cable length and number of receivers per cable.

1.3.2 External Power

The Rx-LIVE's external power specifications are as follows:

- « External DC Voltage: +10 volts to +24 volts
- « Typical Power Consumption (@12V):
 - Record mode: 10-15 mA
 - Serial Communication: 15-25 mA

2. ASCII Communication

The Rx-LIVE ASCII communication command set allows for basic configuration of and data retrieval from the Rx-LIVE receiver using any host with RS485 serial IO capability (e.g. PC with serial terminal program or third-party datalogger). The Rx-LIVE may be configured either through the [Fathom Connect software](#) (version 3.1 or later) or by serial communication using the ASCII command set shown in section 2.2.

Sections 2.1 through 2.8.2.2 below outline how to establish ASCII communication, configure the Rx-LIVE, and retrieve data using the ASCII command set.

2.1 Setting Up ASCII Communication

There are several available PC serial terminal programs that can be used to successfully communicate with the Rx-LIVE using the ASCII command set. Instructions for PuTTY and HyperTerminal are provided below.

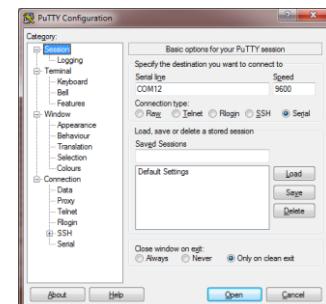
STEP 1

Connect the Rx-LIVE to your PC or device using the RS485 cable.



STEP 2

Open your preferred text terminal program (PuTTY shown here).

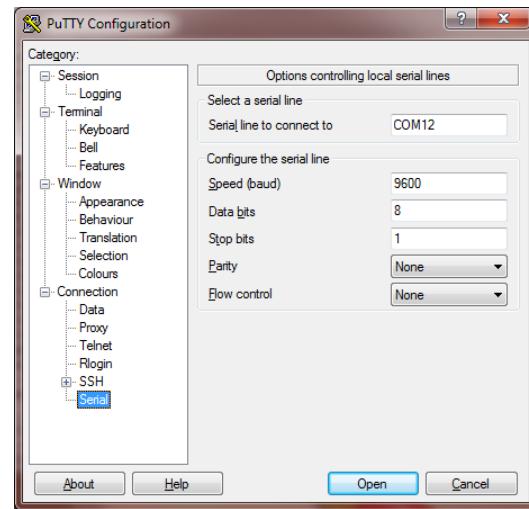


STEP 3

In the “Category” list on the left of the PuTTY configuration screen, go to the “Connection” heading and select “Serial”.

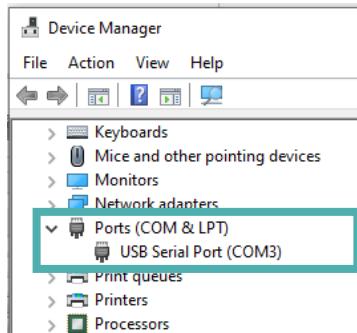
Enter the settings listed below:

- « COM port number. If you don't know which COM port the Rx-LIVE is connected to, follow the instructions below to determine the correct COM port.
- « Port baud rate matching the Rx-LIVE's configured baud rate. The default factory baud rate is 9600 baud).
- « Data bits = 8
- « Stop bits = 1
- « Parity = None
- « Flow Control = None



Determining which COM port your Rx-LIVE is connected to:

- « Search “Device Manager” in the Windows search bar and open Device Manager.
- « Expand the Ports (COM & LPT) section.

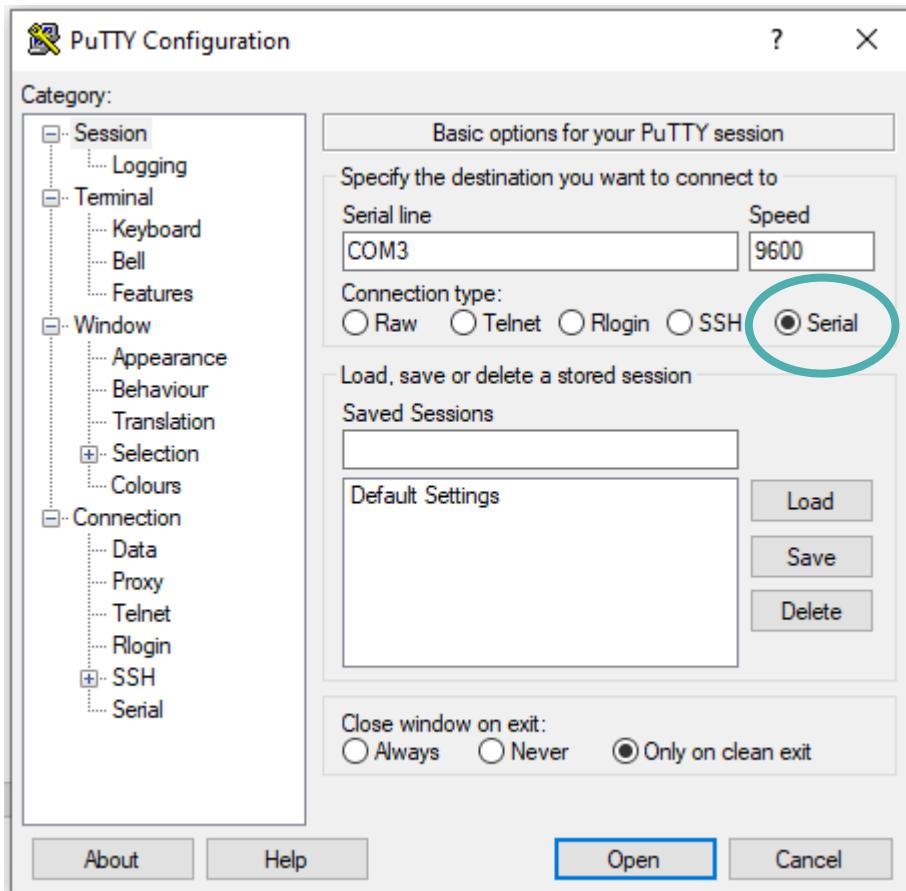


- « Unplug the Rx-LIVE from your computer and observe which USB Serial Port disappears then plug the Rx-LIVE back in.

STEP 4

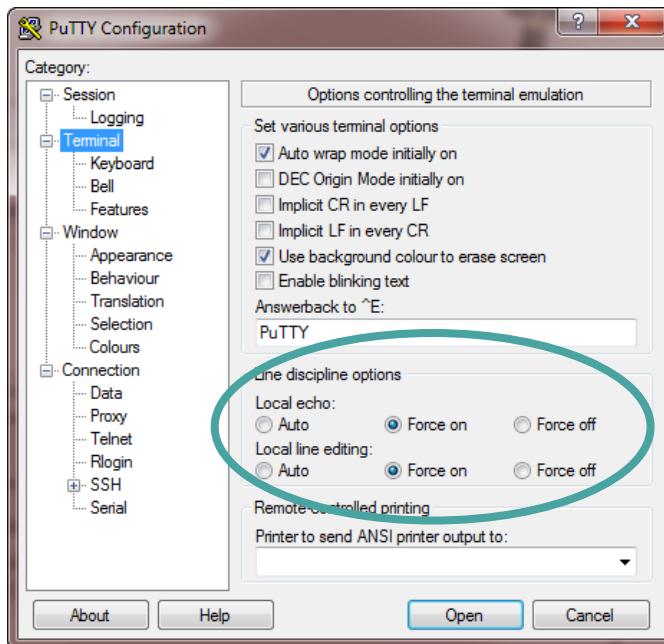
Select "Session" In the "Category" list on the left of the PuTTY configuration screen. On the right of the screen under "Specify the destination you want to connect to" choose the "Serial" radio button under Connection Type.

You should see the COM port and baud rate you chose in Step 3 auto-populate the Serial line and Speed information.



STEP 5

Enable the following in your terminal program. Specifics are given for PuTTY (left image) and HyperTerminal (right image).



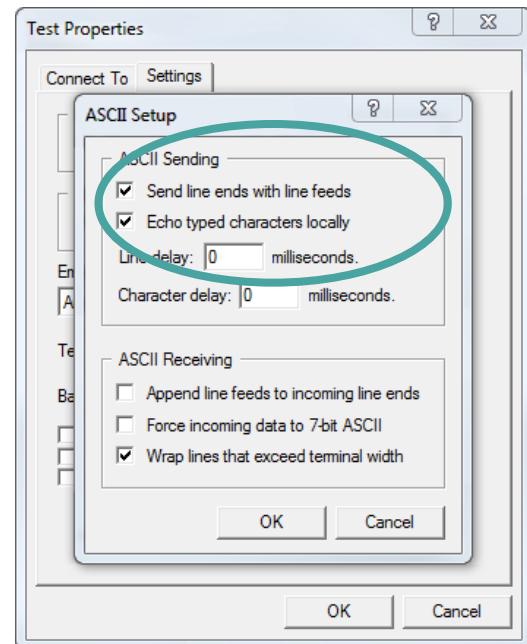
PuTTY

In the "Category" list on the left of the PuTTY configuration screen, select the "Terminal" heading.

On the right side of the screen:

Local Echo: Select the "Force on" radio button in the Local echo section

Local Line Editing: Select the "Force on" radio button under "Local line editing" to enable backspacing for corrections



HyperTerminal

Under ASCII Setup:

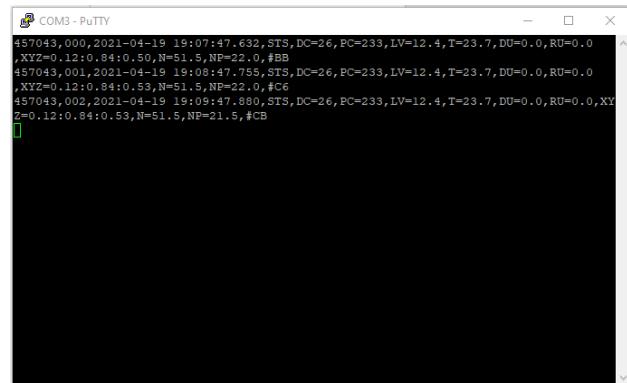
Local Echo: Check "Echo typed characters locally" to enable

Local Line Editing: not available so no backspacing for corrections

Carriage Return / Line Feed:
Check the "Send line ends with line feeds" box

STEP 6

Verify that status updates are being received. The default ASCII configuration is to receive status updates every 60 seconds.



```
COM3 - PuTTY
457043,000,2021-04-19 19:07:47.632,STS,DC=26,PC=233,LV=12.4,T=23.7,DU=0.0,RU=0.0
,XYZ=0.12:0.84:0.50,N=51.5,NP=22.0,#8B
457043,001,2021-04-19 19:08:47.755,STS,DC=26,PC=233,LV=12.4,T=23.7,DU=0.0,RU=0.0
,XYZ=0.12:0.84:0.53,N=51.5,NP=22.0,#C6
457043,002,2021-04-19 19:09:47.880,STS,DC=26,PC=233,LV=12.4,T=23.7,DU=0.0,RU=0.0,XY
Z=0.12:0.84:0.53,N=51.5,NP=21.5,#CB
```

STEP 7

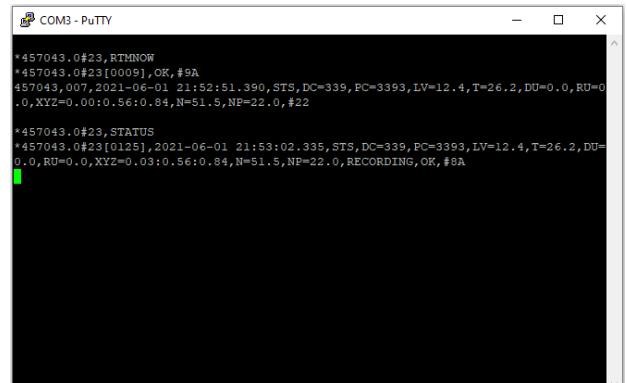
Check the Rx-LIVE's internal clock. Confirm that incoming status updates are showing the correct date and time. Datetimes are displayed in UTC.

When connecting to the Rx-LIVE for the first time or after any period of disconnection from power, the Rx-LIVE clock will need to be set. The Rx-LIVE does not have an internal battery and will not keep time when unpowered.

To set the Rx-LIVE clock, please refer to section 2.5.2.5, "TIME=x" command, below.

STEP 8

Prior to deployment, verify the Rx-LIVE is in RECORDING mode. To view the Rx-LIVE's current mode, use the STATUS command detailed in section 2.5.2.2.



```
COM3 - PuTTY
*457043.0#23,RTMNOW
*457043.0#23[0009],OK,#9A
457043,007,2021-06-01 21:52:51.390,STS,DC=339,PC=3393,LV=12.4,T=26.2,DU=0.0,RU=0
.0,XYZ=0.00:0.56:0.84,N=51.5,NP=22.0,#22
*457043.0#23,STATUS
*457043.0#23[0125],2021-06-01 21:53:02.335,STS,DC=339,PC=3393,LV=12.4,T=26.2,DU=
0.0,RU=0.0,XYZ=0.03:0.56:0.84,N=51.5,NP=22.0,RECORDING,OK,#8A
```

2.2 ASCII Command Set List

The Rx-LIVE ASCII command list can be categorized according to each command's purpose as presented in the following table.

Purpose	Command	High Level Description
Serial Communication Port Control	BAUDRATE=x QUIT	Set the serial port ASCII baud rate Disable serial transceivers (end current ASCII command session)
Basic Receiver Control/Status	INFO STATUS START STOP TIME=x ERASE STORAGE	Retrieve Rx-LIVE information Retrieve Rx-LIVE current status Enter 'Record' mode Enter 'Pause' mode Set the Rx-LIVE's internal clock Erase the Rx-LIVE's detection log Enter 'Suspend' mode
ASCII Control	RTMPROFILE=x RTM485 RTMNOW RTMINFO RTMOFF RTMAUTOERASE=x	Set ASCII communication profile Enable ASCII output Enable ASCII output Retrieve ASCII configuration Disable ASCII output Set ASCII auto erase threshold
Detection Log Manual Retrieval (Advanced User Feature)	READBEG READEND READREC READACK	Set read pointer to the beginning of data Set read pointer to the end of data Read detection log record at read pointer address Increment read pointer to next detection log record

2.3 ASCII Command/Response Format

2.3.1 Rx-LIVE ASCII Command Format

Rx-LIVE ASCII commands are formatted as follows:

*SSSSS.P#CC,command\r

Where

SSSSS = serial number of Rx-LIVE
P = port to address (0 for commands, 1-X reserved for future use)
CC = decimal summation of preceding S and P digits (e.g. *450088.0# would require CC to be 25 because 4+5+0+0+8+8+0=25)
command = one of the ASCII commands listed above in section 2.2
\r = carriage return (0x0D)

2.3.2 Rx-LIVE ASCII Response Format

The Rx-LIVE responds to every ASCII command with a response packet. Response packets are structured as follows:

*SSSSS.P#CC[LLLL],response,status,#HH\r\n

Where

SSSSS = serial number of device
P = 0
CC = simple decimal summation of preceding S and P digits
LLLL = number of bytes to follow "]" including "\r\n"
response = response data (optional)
status = response status (OK, FAILURE, INVALID)
HH = 8-bit hex sum of characters between leading "]" and "#"
\r\n = carriage return, line feed (0x0D, 0x0A)

2.4 Enabling/Disabling Serial Transceivers

To conserve power, the Rx-LIVE disables its serial RS485 transceivers after either 30 seconds of inactivity on the communication lines or issuance of the ASCII QUIT command. Once disabled, the serial transceivers need to be enabled again prior to sending any additional serial commands to the Rx-LIVE. The transceivers can be enabled by sending the receiver any ASCII character followed by a short delay of at least 100ms.

2.5 ASCII Commands

This section describes the Rx-LIVE's ASCII commands in detail. Note the following:

- « When showing command examples, a Rx-LIVE with serial number 667057 is used.
- « When showing command examples, it is assumed that the receiver's serial transceivers have already been enabled (refer to section 2.4).
- « '\r' and '\n' refer to carriage return and line feed (0x0D, 0x0A). When typing commands in a serial terminal program, you do not actually type the slash-r or slash-n characters.
- « The Rx-LIVE incoming command processor looks for the carriage return ('\r') to know when the incoming command is complete. The Rx-LIVE will not interpret incoming ASCII commands properly if a line feed ('\n') precedes the carriage return. Ensure that your serial terminal program:
 - is set to carriage return ('\r') line termination
 - does not automatically insert a line feed before a carriage return when the 'Enter' button is typed on the keyboard.

2.5.1 Serial Communication Port Control

2.5.1.1 BAUDRATE=x

The BAUDRATE command sets the ASCII baud rate of the Rx-LIVE's serial port. The host's serial port must use the same baud rate as the Rx-LIVE for successful communication. The Rx-LIVE supports a variety of baud rates: 9600, 19200, 38400, 57600 and 115200.

Command: *667057.0#31,BAUDRATE=38400\r
Response: *667057.0#31[0009],OK,#9A\r\n

The Rx-LIVE ASCII baud rate will update to the requested rate after the Rx-LIVE sends the BAUDRATE response.

2.5.1.2 QUIT

The QUIT command immediately disables the Rx-LIVE's serial transceivers after the response. This ends the current command session and allows the Rx-LIVE to immediately transmit tag detection records via the serial port.

Command: *667057.0#31,QUIT\r
Response: *667057.0#31[0009],OK,#9A\r\n

2.5.2 Basic Receiver Control/Status

2.5.2.1 INFO

The INFO command is used to retrieve Rx-LIVE hardware and configuration information:

- « Rx-LIVE model (ex: RXLIVE-BLU)
- « Serial number (ex: 667057)
- « Study description (ex: Possum Lake Fish Study #2)
- « Active receiver code map (ex: MAP-115)
- « Rx-LIVE firmware version (ex : FW=1.1.6)
- « Rx-LIVE hardware version (ex : HW=0)

Command: *667057.0#31,INFO\r
Response: *667057.0#31[0048],RXLIVE-BLU:667057,'Possum Lake Fish Study #2',MAP-115,FW=1.1.6,HW=0,OK,#8A\r\n

2.5.2.2 STATUS

The STATUS command is used to retrieve the current status of the Rx-LIVE. Among other things, it can be issued to determine if there are outstanding tag detection records that need to be retrieved from the receiver.

Command: *667057.0#31,STATUS\r
Response: *667057.0#31[0141],2019-09-03 13:29:43.421,STS,DC=0,PC=2,LV=12.4,T=22.2,DU=0.0,RU=0.0,XYZ=0.00:0.62:0.78,N=67.0,NP=39.5,RECORDING,OK,#58\r\n

Status information is displayed following an STS identifier as a list of XX=Value pairs. For example, in the above STATUS command and response example, the XX=Value pairs are as follows:

DC	=	Detection count
PC	=	Ping count
LV	=	Line Voltage (volts)
T	=	Internal receiver temperature (Celsius)
DU	=	Detection memory used (percent)
RU	=	Raw memory used (percent)
XYZ	=	Tilt information in G's as X.XX:Y.YY:Z.ZZ. Note: +1 on the X axis with 0 on the Y and Z axis indicates that the receiver is vertical with the hydrophone pointing upward
N	=	Output noise (dB)
NP	=	Output PPM noise (dB)
MODE	=	The receiver mode will be reported as either RECORDING, STOPPED or STORAGE (RECORDING in above example)

2.5.2.3 START

The START command is used to place the Rx-LIVE into RECORD mode. This command is issued to begin a study.

Command: *667057.0#31,START\r
Response: *667057.0#31[0009],OK,#9A\r\n

2.5.2.4 STOP

The STOP command is used to temporarily stop (pause) the current study. It places the Rx-LIVE into PAUSE mode during which time the receiver will not detect and store tag information. The Rx-LIVE automatically returns from PAUSE to RECORD mode after 1 hour.

The STOP command can also be used to bring the receiver out of SUSPEND (Storage) mode. Again, after 1 hour the Rx-LIVE will automatically enter RECORD mode.

Command: *667057.0#31,STOP\r
Response: *667057.0#31[0009],OK,#9A\r\n

2.5.2.5 TIME=x

The TIME command is used to set the internal clock within the Rx-LIVE. Time can be entered as either UTC or local time. If using local time, the time zone offset parameter (number of hours that local time differs from UTC) must be specified after the time field. In the following local format example, the local time is 4 hours behind UTC (-0400).

UTC Format:

Command: *667057.0#31,TIME=2019-08-28 12:17:11\r
Response: *667057.0#31[0009],OK,#9A\r\n

Local Format:

Command: *667057.0#31,TIME=2019-08-28 12:17:11 -0400\r
Response: *667057.0#31[0009],OK,#9A\r\n

2.5.2.6 ERASE

If the detection log fills up (DU=100.0 in the status line), the Rx-LIVE will stop recording new tag detections to memory and the ASCII output will also stop showing new detections. To avoid this, the detection log will need to be erased periodically. The ERASE command erases the Rx-LIVE's detection and raw log.

The Rx-LIVE must not be in RECORD mode when issuing the ERASE command.

Note: Care must be taken to ensure that all desired data has been offloaded from the Rx-LIVE (both the detection log and raw log) before the ERASE command is issued.

Command: *667057.0#31,ERASE\r
Response: *667057.0#31[0009],OK,#9A\r\n

2.5.2.7 STORAGE

The STORAGE command places the Rx-LIVE into low power SUSPEND mode.

The Rx-LIVE must not be in RECORD mode when issuing the STORAGE command.

Command: *667057.0#31,STORAGE\r
Response: *667057.0#31[0009],OK,#9A\r\n

2.6 ASCII Output Control

The Rx-LIVE can transmit tag detection information in ASCII format on a user specified schedule over the RS485 serial port with or without user interaction. Once enabled, ASCII output allows a host (e.g. third-party datalogger, PC, serial terminal) to simply listen to the Rx-LIVE serial port and pipe the Rx-LIVE's ASCII data stream to a file or to a terminal where it can be easily read without complicated interpretation. Alternatively, a polled output configuration can be used whereby the Rx-LIVE outputs ASCII tag detection information only when explicitly instructed rather than on an automatic schedule. The Rx-LIVE's ASCII output schedule is configurable by selecting one of three RTM Profiles. These profiles are described in detail under the RTMPROFILE=x command description in section 2.6.1.2

The Rx-LIVE supports several ASCII Control commands.

2.6.1 RTM485

The RTM485 command enables Rx-LIVE ASCII output, causing the receiver to transmit ASCII output on the RS485 communication line.

Command: *667057.0#31,RTM485\r
Response: *667057.0#31[0009],OK,#9A\r\n

2.6.1.1 RTMNOW

This command is functionally equivalent to the "RTM485" command. The RTMNOW command enables Rx-LIVE ASCII output, causing the receiver to transmit ASCII output on the RS485 communication line.

Command: *667057.0#31,RTMNOW\r
Response: *667057.0#31[0009],OK,#9A\r\n

2.6.1.2 RTMPROFILE=x

The RTMPROFILE=x command allows control of the timing of the Rx-LIVE's ASCII output by selecting one of three possible profiles: Profile 0, Profile 1 and Profile 2. Each profile is described in detail below.

2.6.1.2.1 Profile 0 - Immediate Output

This profile outputs tag detection records as soon as they occur. Additionally, an Rx-LIVE status line is output according to the configured schedule. The default status line interval is 60 seconds. The status line interval can be configured to any value between 1 and 65535 seconds

by adding **SI=x** to the command as shown in the example below (which specifies a status line interval of 120 seconds). Specifying a status line interval of '0' will disable the status line output altogether for Profile 0.

Command: *450088.0#25,RTMPROFILE=0,SI=120\r
 Response: *450088.0#25[0009],OK,#9A\r\n

Profile 0 will not commence until an RTMNOW or RTM485 command has been issued.

An example of an RTM Profile 0 session is shown below. Details on the comma-separated fields contained within each line of ASCII output can be found in section 2.8, "ASCII Output Format".

```
*667057.0#31,RTMPROFILE=0\r
*667057.0#31[0009],OK,#9A\r\n

*667057.0#31,RTMNOW\r
*667057.0#31[0009],OK,#9A\r\n

667057,000,2019-09-04 16:33:28.456,STS,DC=38,PC=413,LV=12.6,T=22.0,DU=0.0,
RU=0.0,XYZ=0.00:0.94:0.25,N=65.5,np=37.5,#0D\r\n
Status Line
667057,001,2019-09-04 16:33:29.567,A69-9006,129,171,S=56.0,N=37.5,C=0,
#36\r\n
667057,002,2019-09-04 16:34:29.289,STS,DC=39,PC=414,LV=12.6,T=22.0,DU=0.0,
RU=0.0,XYZ=-0.06:0.97:-0.09,N=67.0,np=39.0,#72\r\n
667057,003,2019-09-04 16:34:49.945,A69-1601,999,S=78.0,N=39.5,C=0,
#84\r\n
Detection Line
667057,004,2019-09-04 16:35:05.491,A69-1601,999,S=77.5,N=39.5,C=0,
#82\r\n
667057,005,2019-09-04 16:35:22.361,A69-9006,1025,123,S=78.5,N=39.5,C=0,
#60\r\n
667057,006,2019-09-04 16:35:28.963,STS,DC=42,PC=449,LV=12.6,T=22.0,DU=0.0,
RU=0.0,XYZ=-0.06:0.94:-0.16,N=67.0,np=39.0,#6A\r\nc
667057,007,2019-09-04 16:35:52.437,A69-9006,1025,123,S=78.5,N=39.5,C=0,
#65\r\n
```

2.6.1.2.2 Profile 1 - Status Interval Block Output

This profile outputs tag detection records on a schedule based on the status line interval. The Rx-LIVE will output the status line followed by all the tag detection records received since the last status line transmission. The default status line interval is 60 seconds, but it can be user configured to any value between 1 and 65535 according to the instructions in section 2.6.1.2.1, "Profile 0 – Immediate Output" above.

In this profile, the Rx-LIVE transmits a “<” character before the output block and a “>” character after the output block. The Rx-LIVE delays 100ms after transmitting the leading “<” to give the monitoring device a chance to wake up the serial port if necessary.

Profile 1 will not commence until an RTMNOW or RTM485 command has been issued.

An example of a Profile 1 session is shown below. Details on the comma-separated fields contained within each line of ASCII output can be found in section 2.8, “ASCII Output Format”.

```
*667057.0#31,RTMPROFILE=1\r
*667057.0#31[0009],OK,#9A\r\n

*667057.0#31,RTMNOW\r
*667057.0#31[0009],OK,#9A\r\n
<
667057,000,2019-09-05 09:40:07.293,STS,DC=54,PC=576,LV=12.6,
T=21.5,DU=0.0,RU=0.0,XYZ=-0.06:0.94:-0.22,N=68.0,np=40.0,#62\r\n
>
<
667057,001,2019-09-05 09:41:06.026,STS,DC=57,PC=600,LV=12.6,
T=21.3,DU=0.0,RU=0.0,XYZ=-0.06:0.94:-0.22,N=67.0,np=39.0, #5F\r\n
667057,002,2019-09-05 09:40:20.205,A69-1601,999,S=66.5,N=39.5,C=0, #75\r\n
667057,003,2019-09-05 09:40:35.532,A69-1601,999,S=66.5,N=39.5,C=0, #7C\r\n
667057,004,2019-09-05 09:40:51.932,A69-1601,999,S=66.5,N=39.5,C=0, #7B\r\n
>
<
667057,005,2019-09-05 09:42:06.834,STS,DC=60,PC=624,LV=12.6,
T=21.5,DU=0.0,RU=0.0,XYZ=-0.06:0.94:-0.22,N=67.0,np=39.0,#66\r\n
667057,006,2019-09-05 09:41:12.623,A69-1601,999,S=66.5,N=39.5,C=0, #7B\r\n
667057,007,2019-09-05 09:41:39.901,A69-1601,999,S=66.5,N=39.5,C=0, #85\r\n
667057,008,2019-09-05 09:42:00.231,A69-1601,999,S=66.0,N=39.5,C=0, #76\r\n
>
```

Status Line

Detection Line

2.6.1.2.3 Profile 2 Polled Block Output

This profile outputs tag detection records only when explicitly triggered by enabling the Rx-LIVE serial transceiver (refer to section 2.4) and sending the RTMNOW or RTM485 command. The Rx-LIVE will output a status line followed by all the tag detection records received since last triggered.

In this profile, the Rx-LIVE transmits a “>” character to terminate the output block.

An example of a Profile 2 session is shown below. Details on the comma-separated fields contained within each line of ASCII output can be found in section 2.8, “ASCII Output Format”.

```
*667057.0#31,RTMPROFILE=2\r
*667057.0#31[0009],OK,#9A\r\n
```

Sometime later (when host wants to interrogate receiver) ...

```
\r                                     ← enable serial transceivers + short delay (>100ms)
*667057.0#31,RTMNOW\r           ← command
*667057.0#31[0009],OK,#9A\r\n      ← command acknowledge
667057,000,2021-06-01 19:36:21.024,STS,DC=23,PC=190,LV=12.0,T=25.1,
    DU=0.0,RU=0.0,XYZ=-0.06:0.94:-0.22,N=67.0,np=39.0,#A9\r\n
>
```

```
\r                                     ← enable serial transceivers + short delay (>100ms)
667057.0#31,RTMNOW\r           ← command
*667057.0#31[0009],OK,#9A\r\n      ← command acknowledge
667057,005,2019-09-05 09:42:06.834,STS,DC=60,PC=624,LV=12.6,   ← status line
    T=21.5,DU=0.0,RU=0.0,XYZ=-0.06:0.94:-0.22,N=67.0,np=39.0,#66\r\n
667057,006,2019-09-05 09:41:12.623,A69-1601,999,S=66.5,N=39.5,C=0, ← detection line
    #7B\r\n
667057,007,2019-09-05 09:41:39.901,A69-1601,999,S=66.5,N=39.5,C=0, #85\r\n
667057,008,2019-09-05 09:42:00.231,A69-1601,999,S=66.0,N=39.5,C=0, #76\r\n
>
```

2.6.1.3 RTMINFO

The RTMINFO command is used to retrieve information regarding the Rx-LIVE's ASCII configuration. This information includes whether ASCII output is enabled and ASCII configuration settings related to output timing and data format.

Command: *667057.0#31,RTMINFO\r
 Response: *667057.0#31[0053],485,SI=60,BL=U,BI=1,MA=U,FMT=SER SEQ UTC
 CS,OK,#94\r\n

485	= Real Time Mode
	Possible values include 485 and OFF
SI	= Status Interval (in seconds)
	Profile 0, Profile 1: interval reported in seconds
	Profile 2: returns POLL in this field (SI=POLL) as there is no set interval in this profile
BL	= Block Length in number of lines (U = unlimited number of lines)
BI	= Block Interval in seconds (WFS = wait for status)
MA	= Max Age filter in seconds (U = unfiltered)
FMT	= RTM Output Data Format Options (Determines format of RTM output data)

Possible values include:

SER = Serial Number
SEQ = Rx-LIVE Sequence Number
UTC = ASCII Universal Time
LCL = ASCII Local Time
DEC_UTC = Decimal Universal Time
DEC_LCL = Decimal Local Time
CS = Checksum

Note: Block length, block interval, max age filter and output format options are pre-determined for each Profile. The settings for each of these profiles are shown below:

```
RTMPROFILE=0: *667057.0#31[0053],485,SI=60,BL=U,BI=1,MA=U,FMT=SER SEQ UTC
               CS,OK,#94\r
RTMPROFILE=1: *667057.0#31[0055],485,SI=60,BL=U,BI=WFS,MA=U,FMT=SER SEQ UTC
               CS,OK,#53\r
RTMPROFILE=2: *667057.0#31[0057],485,SI=POLL,BL=U,BI=WFS,MA=U,FMT=SER SEQ UTC
               CS,OK,#24\r
```

2.6.1.4 RTMOFF

The RTMOFF command disables ASCII output from the Rx-LIVE.

Command: *667057.0#31,RTMOFF\r
Response: *667057.0#31[0009],OK,#9A\r\n

2.6.1.5 RTMAUTOERASE=x

The RTMAUTOERASE=x command is used to force the Rx-LIVE to automatically erase detection log data to ensure that the detection log never fills up.

When the auto erase threshold is set to a non-zero value, the receiver will automatically keep the specified percentage of the detection log free after each ASCII output, erasing the oldest data in the log in order to do so.

IMPORTANT: Data erased by the auto erase function are NOT recoverable. These data are assumed to have been captured by a device monitoring the ASCII output.

Note: To enable auto erase, the RTMAUTOERASE=x command must be sent after the RTMPROFILE=x command (because the RTMPROFILE command sets the auto erase threshold to 0).

Command: *667057.0#31,RTMAUTOERASE=10\r
Response: *667057.0#31[0009],OK,#9A\r\n

The above command example causes the Rx-LIVE to keep 10% of the detection log free.

2.7 Detection Log Manual Retrieval (Advanced User Feature)

The Rx-LIVE supports several ASCII commands that allow the host to manually retrieve detection log entries in ASCII format.

IMPORTANT: It is strongly recommended that the host not use these manual log retrieval commands while in ASCII output is enabled as these commands manipulate the Rx-LIVE's internal detection log read pointers.

2.7.1 READBEG

The READBEG command sets the Rx-LIVE's internal detection log read pointer to the first tag detection record in memory (i.e. the first tag detection record since the last erase occurred).

Command: *667057.0#31,READBEG\r
Response: *667057.0#31[0009],OK,#9A\r\n

2.7.2 READEND

The READEND command sets the Rx-LIVE's internal detection log read pointer to the end of the detection log.

Command: *667057.0#31,READEND\r
Response: *667057.0#31[0009],OK,#9A\r\n

2.7.2.1 READREC

The READREC command causes the Rx-LIVE to transmit the detection record referenced by the internal detection log read pointer. This command does not move the pointer to the next record automatically (in case the host does not properly receive the detection record).

Command: *667057.0#31,READREC\r
Response: *667057.0#31[0060],2019-08-28 17:13:03,A69-
1601,999,S=67.0,N=41.5,C=0,OK,#0B\r\n

2.7.2.2 READACK

The READACK command advances the Rx-LIVE's internal detection log read pointer to the next detection record in the log. Use this command in conjunction with READREC to pull out the Rx-LIVE's detection records manually.

Command: *667057.0#31,READACK\r
Response: *667057.0#31[0009],OK,#9A\r\n

2.8 ASCII Output Format

The Rx-LIVE outputs ASCII data records as follows:

serial_no,sequence,datetime,info,#HH\r\n

where

serial_no = receiver serial number
sequence = 3 digit line counter (000-999)
datetime = event time as 24 hour UTC time as YYYY-MM-DD HH:MM:SS.mmm
info = either Rx-LIVE status information or tag detection information
HH = 8-bit hex sum of all characters preceding the trailing ",#"
\r\n = carriage return, line feed (0x0D, 0x0A)

2.8.1 Scheduled Status Information

Rx-LIVE status information is displayed according to the schedule indicated for the selected RTMPROFILE (see section 2.6.1.2).

The data are displayed following an STS identifier as a list of XX=Value pairs. An example of status line output is shown below:

667057,000,2019-08-28 17:13:18.324,STS,DC=1,PC=8,LV=12.6,T=22.2,DU=0.0,RU=0.0,
XYZ=0.00:0.88:-0.44,N=68.5,np=40.5,#A1\r\n

DC = Detection count
PC = Ping count
LV = Line Voltage (volts)
T = Internal receiver temperature (Celsius)
DU = Detection memory used (percent)
RU = Raw memory used (percent)
XYZ = Tilt information in G's as X.XX:Y.YY:Z.ZZ.

Note: +1 on the X axis with 0 on the Y and Z axis indicates that the VR2C is vertical with the hydrophone pointing upward

N = Output noise
NP = Output PPM noise

Note that this format differs slightly from the response to an explicit STATUS command (detailed in section 2.5.2.2)

2.8.2 Tag Detection Information

Rx-LIVE tag detections are output with the following info fields.

2.8.2.1 Sensor tag detection

667057,004,2019-09-05 10:21:24.106,A69-9006,1025,123,S=63.0,N=39.0,C=0,#4B\r\n

A69-9006 = Transmitter code space
1025 = Transmitter ID
123 = Sensor ADC value*
S = Signal level (dB)
N = Noise level (dB)
C = Channel

*Note: Sensor data are output as ADC values only. Refer to the sensor tag specification sheet for the appropriate slope and intercept to convert the ADC units to SI units.

2.8.2.2 Pinger (non-sensor) tag detections

667057,001,2019-08-28 17:14:25.768,A69-1601,999,S=66.5,N=41.0,C=0,#71\r\n

A69-1601 = Transmitter code space
999 = Transmitter ID
S = Signal level (dB)
N = Noise level (dB)
C = Channel

2.9 ASCII Usage Case Examples

The following sections present several examples of common Rx-LIVE operations that can be performed using the ASCII command interface.

2.9.1 Example 1: Starting a Study

1. Enable the Rx-LIVE serial transceivers / start ASCII command session:

Command: \r ← enable serial transceivers + short delay (>100ms)

2. Stop the current study (or exit Suspend Mode):

Command: *667057.0#31,STOP\r

Response: *667057.0#31[0009],OK,#9A\r\n

3. Erase any old data: ← assumes old data has been previously offloaded

Command: *667057.0#31,ERASE\r

Response: *667057.0#31[0009],OK,#9A\r\n

4. Set the Rx-LIVE clock:

Command: *667057.0#31,TIME=2019-11-19 06:30:30 -0400\r

Response: *667057.0#31[0009],OK,#9A\r\n

5. Start recording (log detections to memory):

Command: *667057.0#31,START\r

Response: *667057.0#31[0009],OK,#9A\r\n

6. Disable the Rx-LIVE serial transceivers (end current ASCII command session)

Command: *667057.0#31,QUIT\r

Response: *667057.0#31[0009],OK,#9A\r\n

2.9.2 Example 2: Enabling ASCII Output

This example assumes that a study has already been started (as shown in Example 1).

1. Enable the Rx-LIVE serial transceivers / start ASCII command session:

Command: \r ← enable serial transceivers + short delay (>100ms)

2. Select the desired ASCII output schedule and status update interval:

Command: *667057.0#31,RTMPROFILE=0,SI=600\r ← 10 minute status interval

Response: *667057.0#31[0009],OK,#9A\r\n

3. Enable ASCII output:

Command: *667057.0#31,RTMNOW\r

4. Alternate

Command: *667057.0#31,RTM485\r

Response: *667057.0#31[0009],OK,#9A\r\n

5. Disable the Rx-LIVE serial transceivers / end current ASCII command session:
Command: *667057.0#31,QUIT\r
Response: *667057.0#31[0009],OK,#9A\r\n

2.9.3 Example 3: Updating the Rx-LIVE Clock

To periodically make corrections to the Rx-LIVE internal clock, send the **TIME=** command. The clock can be set at any time and does not require the study to be stopped or the data logs to be erased.

1. Enable the Rx-LIVE serial transceivers / start ASCII command session:
Command: \r ← enable serial transceivers + short delay (>100ms)
2. Set the Rx-LIVE clock:
Command: *667057.0#31,TIME=2019-11-19 06:30:30 -0400\r
Response: *667057.0#31[0009],OK,#9A\r\n
3. Disable the Rx-LIVE serial transceivers / end current ASCII command session:
Command: *667057.0#31,QUIT\r
Response: *667057.0#31[0009],OK,#9A\r\n

2.9.4 Example 4: Erasing Data Logs

Erasing the log is accomplished by following the steps listed below.

1. Enable the Rx-LIVE serial transceivers / start ASCII command session:
Command: \r ← enable serial transceivers + short delay (>100ms)
2. Stop the current study:
Command: *667057.0#31,STOP\r
Response: *667057.0#31[0009],OK,#9A\r\n
3. Erase the data: ← ensure old data has been previously offloaded
Command: *667057.0#31,ERASE\r
Response: *667057.0#31[0009],OK,#9A\r\n
4. Restart the study:
Command: *667057.0#31,START\r
Response: *667057.0#31[0009],OK,#9A\r\n
5. Disable the receiver's serial transceivers / end current ASCII command session:
Command: *667057.0#31,QUIT\r
Response: *667057.0#31[0009],OK,#9A\r\n

2.9.5 Example 5: Placing Rx-LIVE in Suspend Mode

1. Enable the Rx-LIVE serial transceivers / start ASCII command session:

Command: \r ← enable serial transceivers + short delay (>100ms)

2. Stop the current study:

Command: *667057.0#31,STOP\r

Response: *667057.0#31[0009],OK,#9A\r\n

3. Put the receiver in Suspend (Storage) Mode:

Command: *667057.0#31,STORAGE\r

Response: *667057.0#31[0009],OK,#9A\r\n

4. Disable the receiver's serial transceivers / end current ASCII command session:

Command: *667057.0#31,QUIT\r

Response: *667057.0#31[0009],OK,#9A\r\n

3. Appendix A - Terms and Conditions

1. SCOPE

These Master Terms and Conditions ("Master Terms") shall apply to the purchase of all Equipment and Services and the licensing of any Software Solutions by any original purchaser thereof ("Purchaser").

2. DEFINITIONS

"Confidential Information" shall have the meaning set forth in Section 15.

"Documentation" which may be included with the Equipment and Software Solutions in print and/or electronic media, means the technical and user documentation made available to Purchaser by Seller describing the use and operation of the Equipment and Software Solutions, any minimum hardware and software requirements necessary for recommended operational performance, and other information.

"Downloadable Software" means any firmware, software or desktop or mobile applications delivered by Seller in object code form by electronic download or on a physical medium, such as a compact disk, for loading on any Equipment or the servers, desktops or devices of Purchaser and its authorized users.

"Equipment" means any products manufactured by Seller or any of the products of a Third Party Manufacturer.

"Non-Infringement Warranty" shall have the meaning described in Seller's warranty with respect to Software Solutions, and the limitations thereof, which are set forth in Schedule B.

"Online Services" means any data storage, software, applications or other functionality delivered to Purchaser by allowing its authorized users remote access to Seller's servers which host the object code.

"Order" means Seller's offer of quotation, proposal or statement of work which has been accepted by the Purchaser, whether by purchase order, subcontract or performance.

"Purchaser Data" means all data and other information uploaded to, or created in, the Software Solutions by or on behalf of Purchaser in connection with its use of the Equipment and Software Solutions, including but not limited to detections, study metadata, environmental monitoring information, GPS coordinates and Equipment diagnostics.

"Seller" means Innovasea Systems, Inc., or its affiliates.

"Services" means any engineering, service and/or field technical support and/or supervision associated with the Equipment or design or other professional services agreed to by the parties in writing or otherwise provided by Seller.

"Software Solutions" means any Downloadable Software, Online Services and Documentation made available by Seller for use by the Purchaser.

"Third Party Manufacturer" means a third party manufacturing principal for whom Seller acts as a sales representative or distributor.

"Usage Data" means, other than Purchaser Data, all data collected about how Purchaser uses the Equipment, Services and Software Solutions. Usage Data is used by Seller in the investigation and diagnosis of Software Solutions' performance issues and to identify features and applications that are most used by Seller's customers and how Seller can improve its products to better serve its customers.

3. TERMS OF PAYMENT

Upon proper credit approval, all Equipment and Services sold to Purchaser and all Software Solutions licensed to Purchaser are subject to the payment terms listed on the Order. If payment terms are not listed on the Order, all invoices shall be due and payable within thirty (30) days of the invoice date.

All overdue balances will be subject to an interest charge, based on the total balance due, of the maximum legal limit.

4. TAXES

It is Purchaser's obligation to provide Seller with a valid tax exemption certificate; Purchaser shall be solely responsible for, and shall indemnify Seller for, and hold Seller harmless from, the payment of any excise, privilege, sales, use and/or any other taxes applicable to the sale, delivery, importation, installation and/or use of the Equipment, Services or Software Solutions.

5. DELIVERY

Delivery dates are good faith estimates only. Unless otherwise provided in the Order, deliveries of Equipment shall be FCA (Free Carrier) Seller's or Seller's principal's facility. Risk of loss of the Equipment shall pass to the Purchaser upon the earlier of delivery to Purchaser, Purchaser's agent or to any common carrier. Purchaser shall inspect all Equipment upon receipt and shall be responsible for reporting damage and negotiating with the carrier.

6. CANCELLATION/CHANGES

Orders are subject to cancellation or change by Purchaser only with the prior, written consent of Seller and upon terms that will fully indemnify and compensate Seller for all loss, cost and expense, including loss of profit, resulting from the cancellation or change.

7. RETURNS FOR CREDIT

Returns of Equipment by Purchaser for credit will be accepted only with the prior, written approval of Seller and shipment to the factory prepaid, utilizing the original shipping containers or equivalent replacement containers. Returns will be subject to a 20% restocking charge (minimum of \$100.00) plus any additional expenses incurred by Seller in restoring the Equipment to salable condition.

8. WARRANTIES AND LIMITATIONS

Seller warrants to Purchaser that the Services shall be performed in a professional, workmanlike manner. Purchaser's sole remedy and Seller's only liability for material breach of the foregoing warranty shall be to re-perform the Services to bring them into compliance with the applicable warranty. The foregoing warranty is subject to Purchaser giving written notice to Seller of such breach within thirty (30) days after receipt of the Services.

Purchaser acknowledges and agrees that (i) all key design inputs used to design and estimate a system's performance under appropriate management and care were generated in agreement with the Purchaser; (ii) Purchaser is solely responsible to maintain and operate its systems under proper management protocols to achieve the expected design conditions; (iii) operating a system outside of the design parameters may detrimentally affect the overall performance of the system; and (iv) estimated system performance does not guarantee or define biomass production from a system over any unit of time and to the system production rate with respect to business goals or projections. Seller does not guarantee any performance or survival of biomass within the operation of any system.

Seller's warranty with respect to Equipment, and the limitations thereof, are set forth in Schedule A. Seller's warranty with respect to Software Solutions, and the limitations thereof, are set forth in Schedule B.

DISCLAIMER. EXCEPT AS EXPLICITLY PROVIDED IN THIS SECTION 8, SELLER MAKES NO WARRANTIES, REPRESENTATIONS, OR GUARANTEES IN CONNECTION WITH THE EQUIPMENT, SOFTWARE SOLUTIONS, AND/OR THE SERVICES, WHETHER EXPRESS OR IMPLIED, ARISING BY LAW OR OTHERWISE, INCLUDING WITHOUT LIMITATION

ANY IMPLIED WARRANTY OF DESIGN, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT OR ANY IMPLIED WARRANTY ARISING FROM COURSE OF PERFORMANCE, COURSE OF DEALING, OR USAGE OF TRADE. SELLER AND ITS SUPPLIERS DO NOT WARRANT OR REPRESENT THAT THE EQUIPMENT, SOFTWARE SOLUTIONS AND/OR THE SERVICES PROVIDED HEREUNDER SHALL BE UNINTERRUPTED OR ERROR-FREE.

9. SOFTWARE SOLUTIONS

- a) **License Grant.** Subject to Purchaser's compliance with the terms and conditions of these Master Terms, including any usage metrics such as the number of sites or authorized users set forth in the applicable Order and payment of all fees due hereunder, Seller grants to Purchaser during the Term a revocable, limited, non-exclusive, non-transferable license to use the Software Solutions set forth in the applicable Order (each a "License") solely in connection with Purchaser's internal business operations. In the case of Online Services, Purchaser may have the number of authorized users set forth on the Order access the Online Services and display and reproduce the Documentation (including by printing the electronic version) as reasonably required to permit the authorized users to exercise the rights expressly granted in this Section. In the case of Downloadable Software, the license shall permit Purchaser to (i) install and use the Downloadable Software solely on the Equipment with which it is associated and the workstations or devices set forth in an Order for access by the number of authorized users; (ii) reproduce a single copy of the Downloadable Software solely as reasonably necessary for customary back-up and disaster recovery purposes; and (iii) permit the authorized users to display and reproduce the Documentation (including by printing the electronic version) as reasonably required to permit the authorized users to exercise the rights expressly granted in this Section. Software Solutions may include additional license terms in an end user agreement or other agreement, including click to agree licenses provided with the Software Solution. Purchaser shall be solely responsible and liable for the acts or omissions of its employees, agents, and contractors, including its authorized users. Where updates, upgrades or product enhancements are provided from time to time for a Software Solution, they are provided subject to the license terms applicable to such Software Solution and any additional license terms included with such updates, upgrades or enhancements.

- b) **License Restrictions.** Purchaser shall not, and shall ensure that its employees, agents, contractors and authorized users do not: (a) copy, modify, display, transfer, transmit or otherwise distribute or provide the Software Solutions to any third party; (b) create derivative works from any Software Solutions; (c) reverse engineer, decompile or otherwise attempt to create human readable materials from the object code of the Software Solutions; (d) allow use of the Software Solutions for any purpose not expressly permitted in these Master Terms or an applicable Order hereunder; (e) use or exploit the Software Solutions to provide application hosting, business process outsourcing, service bureau, application service provider or any other similar or related services to any individual or entity; (f) remove proprietary rights notices, asset tags, brand labels or marks placed on the Software Solutions or any Equipment; or (g) attempt to circumvent or compromise the security features of the Software Solutions or introduce any viruses, worms or other disabling code into any Online Services. Purchaser is solely responsible for obtaining the proper hardware and software necessary to operate the Software Solutions as further described in the Documentation.

- c) **Ownership Rights.** As between Seller and Purchaser, Seller exclusively owns all right, title and interest in and to the Software Solutions, all improvements or modifications made thereto and works based thereon, and all deliverables, software, materials, ideas, processes, methods and other works made or conceived by Seller in connection with performance of Services, including all intellectual property rights (including patents, trademarks and copyrights), proprietary rights (including trade secrets) and moral rights (including, rights of attribution and authorship) embodied in or relating to any of the foregoing throughout the world (collectively, the "Seller Materials"). Except for the limited license rights explicitly set forth herein and any Order, no right, title or interest in or to the Seller Materials is granted or otherwise transferred to Purchaser.

10. CUSTOMER SUPPORT/SERVICES

Seller shall provide Purchaser with its standard support services as described in Schedule C. Additional Services may be provided by Seller for an additional fee upon mutual agreement of the parties in an Order or statement of work.

Services performed by Seller may be performed by its own employees and/or by Seller approved subcontractors. The successful and timely rendering of the Services requires the good faith cooperation of Purchaser. Purchaser shall provide reasonable cooperation to Seller, including, without limitation, making available, as may be reasonably required or requested: (a) information concerning Purchaser's business as it relates to the Services; (b) qualified personnel of Purchaser; and (c) sufficient access to Purchaser's facilities and systems; provided that the foregoing shall be provided so as not to unreasonably disrupt Purchaser's business.

Unless otherwise stated in an Order or statement of work, the Services and all resulting deliverables shall be deemed accepted by Purchaser on payment or within ten (10) business days after performance, whichever occurs first. In no event will acceptance or payment be unreasonably withheld, conditioned or delayed.

11. FORCE MAJEURE

Seller shall not be liable to Purchaser or deemed in breach of these Master Terms for its failure or delay in performing any of its obligations under these Master Terms during any period in which such performance is rendered impracticable or impossible due to circumstances beyond Seller's reasonable control, including, but not limited to, acts of God, fire, explosion, flood, drought, riot, disease outbreaks, sabotage, terrorism, war, invasion, embargo, strikes or other labor trouble, failure in whole or in part of suppliers to deliver materials, equipment or machinery, interruption of or delay in transportation or telecommunications or compliance with any order or regulation of any government entity acting with color of right.

12. PROPRIETARY RIGHTS

Purchaser agrees that Seller and/or Seller's principals retain exclusive proprietary rights in and to all product data, systems, designs (including design of the RAS system), engineering details, discoveries, patents and trade secrets relating to the Services or Equipment and any associated firmware and software, including those resulting from the application of the Services or Equipment for Purchaser's use. The Equipment is offered for sale, and is sold by Seller in every case, on the condition that such sale does not convey any license, expressly or by implication, estoppel, or otherwise, to manufacture, duplicate, copy or reproduce any of the Equipment or related firmware and software.

13. REPRESENTATIONS BY PURCHASER

Purchaser acknowledges that Seller has based all quotations, system specifications, engineering designs, models and other plans on the data and information provided by the Purchaser. The Purchaser certifies that all information and data provided to Seller is true and accurate to the best of its knowledge. Purchaser acknowledges that Seller is not responsible for any error, mistake, miscalculation or misrepresentation, whether intentional or unintentional, made by Purchaser in the dissemination of information to Seller that materially affects the suitability or performance of the Equipment.

14. ULTIMATE END USERS

If Purchaser is an authorized distributor that resells Equipment or Software Solutions directly to end user customers, or otherwise is not the ultimate end user of the Equipment or Software Solutions, Purchaser shall ensure that the end user (i) complies with all applicable provisions of these Master Terms, including any restrictions on use with respect to the Software Solutions, and (ii) understands and agrees that (a) it shall have no claim against Seller for any actual or alleged damages arising out of, based on or relating to these Master Terms whether based on contract, tort (including negligence), warranty or any other legal theory; and (b) its sole recourse shall lie against the Purchaser.

15. CONFIDENTIALITY

"Confidential Information" means all information and materials furnished by one party to the other in connection with these Master Terms and any Order. Without limiting the generality of the foregoing, the parties agree that Purchaser Data constitutes Confidential Information of Purchaser and that the Software Solutions and Usage Data constitute Confidential

Information of Seller. A party's failure to mark any Confidential Information as confidential, protected or proprietary will not affect its status as Confidential Information under these Master Terms.

Confidential Information does not include information which: (i) may be publicly disclosed by the party disclosing the information either prior to or subsequent to the receipt of such information by the receiving party; (ii) or becomes generally known in the trade through no fault of the receiving party; (iii) may be lawfully disclosed to the receiving party by a third person to these Master Terms who has lawfully acquired the Confidential Information; or (iv) was independently developed by the receiving party; provided, however, that the receiving party hereby stipulates and agrees that, if it seeks to disclose, display, divulge, reveal, report, publish or transfer, for any purpose whatsoever, any Confidential Information, such receiving party will bear the burden of proving that any such information was independently developed or is or became publicly available without any such breach.

Each party agrees that it will not at any time directly by itself or indirectly through any agent or employee, except with the prior written consent of the other party (i) reproduce, distribute, transmit, publicly display, modify, create derivative works based upon, or disclose, deliver, display, divulge, reveal, report, publish or transfer to any person or entity, for any purpose whatsoever, any Confidential Information of the other party or (ii) use Confidential Information of the other party for any purpose other than in connection with the performance of its obligations or the exercise of its rights pursuant to these Master Terms. Each party further agrees to handle the Confidential Information of the other party in the same manner that the party handles its own most confidential information and, in any event, to take all steps reasonably necessary to preserve the confidentiality of Confidential Information.

Notwithstanding any other provision herein, Seller shall have the right to compile, aggregate and otherwise use the Purchaser Data to create de-identified data, provided such de-identified data is compiled and presented in aggregate form only, without identifying or being capable of identifying (a) the source of the Purchaser Data; or (b) any employee or other individual ("De-identified Aggregate Data"). Such De-Identified Aggregate Data shall be owned solely by Seller and may be used by Seller solely for the purposes of improving its products and services or developing and offering new products and services for its customers.

A party will promptly notify the other party if it becomes aware of any unauthorized use or disclosure of any Confidential Information of the other party and, at the other party's request, will take such action as may be reasonably necessary and legally permissible to terminate or remedy any unauthorized use or disclosure that results from any act or omission of the party or any of its employees, subcontractors or agents. If a receiving party is compelled by a court or other body of competent jurisdiction to disclose the Confidential Information, to the extent legally permissible the receiving party shall inform the disclosing party by written notice and shall provide reasonable assistance in obtaining and enforcing a protective order or other appropriate means of safeguarding the Confidential Information required to be disclosed. The receiving party may then disclose only so much of the Confidential Information as is legally required to be disclosed.

If these Master Terms are terminated by either party or expire pursuant to their terms, then all Confidential Information of each party shall be returned to the disclosing party.

16. INDEMNIFICATION

By Seller. Seller shall defend, indemnify, and hold harmless Purchaser and its permitted assigns from and against any and all losses, liabilities, claims, damages, actions, suits, proceedings, settlements, judgments, costs and expenses (including without limitation reasonable attorney's fees) arising out of or in connection with any third party claim for a breach by Seller of the Non-Infringement Warranty.

By Purchaser. Purchaser shall defend, indemnify, and hold harmless Seller, and its permitted assigns, from and against any and all losses, liabilities, claims, damages, actions, suits, proceedings, settlements, judgments, losses, costs and expenses (including without limitation reasonable attorney's fees) arising out of or in connection with use of the Equipment, Services or Software Solutions or the results thereof by Purchaser, its employees, agents and contractors.

Indemnification Procedure. Upon the assertion of any claim or the commencement of any suit or proceeding against one party (the "Indemnified Party") by any third party that may give rise to an indemnification obligation or other liability of the other, indemnifying party under this Section (the "Indemnifying Party"), the Indemnified Party shall promptly notify the Indemnifying Party of the existence of such claim and shall give the Indemnifying Party the option, determined in the Indemnifying Party's sole reasonable discretion, of defending and/or negotiating settlement of the claim or suit with counsel of its own selection in accordance with this Section. The Indemnified Party shall provide, at the Indemnifying Party's cost, all reasonable cooperation requested by the Indemnifying Party in connection with such claim and its defense or settlement.

17. LIMITATION OF LIABILITY

EXCEPT WITH RESPECT TO SELLER'S INDEMNIFICATION OBLIGATION IN SECTION 16, SELLER'S AGGREGATE, CUMULATIVE LIABILITY IN CONNECTION WITH THE EQUIPMENT, SOFTWARE SOLUTIONS AND ALL SERVICES SHALL BE CAPPED AT THE AMOUNT EQUAL TO THE FEES ACTUALLY RECEIVED BY SELLER FROM PURCHASER UNDER THE ORDER FROM WHICH THE EVENT CAUSING LIABILITY ARISES IN THE TWELVE (12) MONTHS PRECEDING THE CLAIM. IN NO EVENT SHALL SELLER BE LIABLE TO PURCHASER FOR ANY INDIRECT, INCIDENTAL, CONSEQUENTIAL, RELIANCE OR PUNITIVE DAMAGES OR LOST OR IMPUTED PROFITS OR LOST DATA. THE LIMITATIONS AND EXCLUSIONS SET FORTH IN THIS SECTION 17 APPLY TO ALL CLAIMS OR CAUSES OF ACTION ON WHATEVER BASIS AND UNDER WHATEVER THEORY BROUGHT AND IRRESPECTIVE OF WHETHER THE PARTY HAS ADVISED OR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH CLAIM. ALL CLAIMS AND CAUSES OF ACTION BROUGHT BY PURCHASER HEREUNDER SHALL BE BROUGHT WITHIN ONE (1) YEAR OF THE TERMINATION OR EXPIRATION HEREOF OR WITHIN SIX MONTHS OF THE DATE THE HARM IS ACTUALLY DISCOVERED, WHICHEVER OCCURS FIRST.

18. TERM AND TERMINATION

Master Terms. These Master Terms shall continue hereunder for so long as there is an Order continuously in effect without dispute (the "Term"), unless earlier terminated as provided herein.

Licenses. An Order may specify a term for a License. Unless otherwise specified in an Order, Licenses shall be for an initial term of one (1) year from the date of delivery of the Software Solutions Order. After the initial one (1) year term, the License shall renew for one (1) year terms unless terminated by either party upon sixty (60) days prior written notice.

Termination for Breach. If either party materially breaches any obligation hereunder or, in the case of Purchaser, its scope of licensed use, the non-breaching party may provide a written notice specifying the nature of the breach and demand that the breaching party cure the breach. The breaching party shall have fifteen (15) business days from receipt of such notice to cure the breach. If the breach is not cured within such period, the non-breaching party may terminate these Master Terms by providing written notice of termination. Any attempt to liquidate operations or seek or obtain protection from creditors shall be a material breach subject to the foregoing provisions. Upon termination for breach, all Orders shall automatically terminate.

Effect of Termination. Upon termination of these Master Terms for any reason, (a) Purchaser shall promptly discontinue use of all Software Solutions licensed to Purchaser by Seller, return all copies of such Software Solutions to Seller or destroy all copies and certify such destruction to Seller and immediately pay all amounts then due and payable to Seller; (b) Seller may immediately deactivate Purchaser's Online Services account; and (c) following sixty (60) days after the termination date, Seller may destroy all Purchaser Data; provided that upon Purchaser's written request to Seller received by Seller no later than thirty (30) days from the termination date, Seller shall permit Purchaser temporary access to the Online Services for a period not to exceed five (5) days and for the sole purpose of permitting Purchaser to retrieve any Purchaser Data accessible through the Online Services.

Survival. Sections 3, 4, 9(c), 11, 12, 15, 16, 17, 18, 20, 21, 22, 24 and 25, as well as any obligations to make payments of fees and other amounts accrued prior to termination, shall survive the termination or expiration of these Master Terms for any reason.

19. NO ASSIGNMENT

Purchaser shall not assign these Master Terms (including any Order) or any of its rights, interests or obligations hereunder whether voluntarily, by operation of law, or otherwise without the prior written consent of Seller in its sole discretion, and any attempt to do so without such consent shall be void. Subject to the foregoing, these Master Terms shall be binding upon the parties and their respective successors and permitted assigns.

20. ARBITRATION

All disputes arising out of or relating to this Agreement shall be finally resolved by arbitration conducted in the English language under the commercial arbitration rules of the United Nations Commission on International Trade Law. For Equipment, Services and the licensing of Software Solutions sold by Seller from a location in the U.S., the arbitration shall take place in Boston, MA. For Equipment, Services and the licensing of Software Solutions sold by Seller from a location in Canada, the arbitration shall take place in Halifax Nova Scotia,

Canada. Each party shall appoint an arbitrator and the two arbitrators so appointed shall jointly appoint a third arbitrator. Both parties shall bear equally the cost of the arbitration. All decisions of the arbitrator(s) shall be final and binding on both parties and enforceable in any court of competent jurisdiction. Notwithstanding anything contained in this Section to the contrary, Seller shall have the right to institute judicial proceedings against Purchaser or anyone acting by, through or under Purchaser, in order to enforce Seller's rights hereunder through reformation of contract, specific performance, injunction or similar equitable relief, and Purchaser consents to the exclusive jurisdiction of the courts sitting in the designated location for the arbitration for any such proceeding.

21. COMPLIANCE WITH EXPORT AND IMPORT LAWS

(a) Purchaser hereby agrees: (i) to assist Seller in obtaining any required export or import licenses or permits by supplying such documentation or information as may be requested by Seller; (ii) to comply with all applicable decrees, statutes, rules and regulations of the government of the United States and other countries and agencies or instrumentalities thereof; (iii) to maintain the necessary records to comply with such decrees, statutes, rules and regulations; (iv) not to re-export any Equipment or Software Solutions except in compliance with such decrees, statutes, rules and regulations; (v) to obtain all governmental approvals and licenses necessary to import the Equipment and Software Solutions into the ultimate country of destination; (vi) not to sell, transfer or otherwise dispose of the Equipment or Software Solutions in violation of the export laws of the United States and other countries; and (vii) to indemnify, defend and hold harmless Seller from any and all fines, damages, losses, costs and expenses (including reasonable attorneys' fees) incurred by Seller as a result of any breach of this Section 21 by Purchaser or any third party.

(b) Purchaser hereby expressly acknowledges that the technical data and the direct product thereof contained in the Equipment and/or Software Solutions may be subject to export controls of the United States and agrees that neither such technical data nor the direct product thereof will be transferred, directly or indirectly, to any destination contrary to the requirements of the law of the United States, including but not limited to the terms of any export license and the terms of Part 774 (re-exports) of the U.S. Export Administration Regulations. Further, Purchaser hereby provides its assurance that it will not participate in any transaction which may involve any commodity or technical data, or the direct product thereof, exported or to be exported from the United States, or in any re-export thereof, or in any other transaction that is subject to export controls of the United States, if a person denied export privileges from the United States may obtain any benefit from or have any interest in, directly or indirectly, these transactions.

22. SAFETY NOTICE

Purchaser acknowledges that PROCESS/MANUFACTURING SYSTEMS IMPROPERLY INSTALLED, MAINTAINED OR OPERATED CAN POSE SERIOUS AND DANGEROUS THREATS TO WORKER SAFETY, ENVIRONMENTAL INTEGRITY AND PRODUCT/PROCESS QUALITY. Seller's Equipment is provided with various safety, performance and operating limits, designs and devices which, if disconnected, altered, tampered with or changed by Purchaser, Purchaser's agents or other acting on Purchaser's behalf, with or without Purchaser's knowledge, will become

Purchaser's sole risk and responsibility and such actions will absolve Seller of any obligations and liabilities with respect to the function of such limits, designs and devices. Purchaser shall, at its own cost and expense, indemnify and hold harmless Seller, its directors, officers, employees, and agents, from and against any and all losses, damages, liabilities, penalties, claims, demands, suits or actions, and related costs and expenses of any kind, including, without limitation, expenses of investigation and recall, counsel fees, judgments and settlements, for injury to or death of any person, property damage or any other loss suffered or allegedly suffered by any person or entity and arising out of or otherwise in connection with any defect of any product or system of Purchaser or any third party that incorporates the Equipment delivered by Seller to Purchaser or any third party hereunder (except for non-conformities with the warranties set forth herein solely attributable to the Equipment).

23. INSURANCE

Purchaser shall carry and maintain during the Term, at its own cost and expense, a policy or policies of commercial casualty and general liability insurance, which policy or policies shall insure Purchaser against all hazards and risks customarily insured against by persons engaging in open, ocean and land-based aquaculture and fish tracking. The coverage required herein may be obtained through any combination of primary and excess or umbrella liability insurance. Such policies of insurance shall include clauses providing that each underwriter shall waive its rights of recovery, under subrogation or otherwise, against Seller and Seller's officers, directors, employees, contractors and agents. Purchaser will provide Seller with certificate(s) of insurance which evidence such coverage upon request and provide at least 30 days prior written notice of policy cancellation.

24. COMMERCIAL SOFTWARE

If Purchaser is an agency, department, or other entity of the United States Government, or funded in whole or in part by the United States Government, Purchaser agrees that the Software Solutions were developed exclusively at private expense by Purchaser and/or its licensors and constitute "commercial computer software" or "commercial computer software documentation" and that, absent a written agreement to the contrary, Purchaser's rights with respect to such Software Solutions, including the use, duplication, reproduction, release, modification, disclosure, or transfer of the Software Solutions and Documentation, is limited by the terms of this Agreement, pursuant to FAR § 12.212 and/or DFARS § 227.7202, as applicable.

25. MISCELLANEOUS

These Master Terms, together with any Orders entered into hereunder, are the complete agreement of the parties with respect to its subject matter and supersede all prior discussions, negotiations and agreements and any earlier proposals whether verbal or written. For the avoidance of doubt, any contrary terms in any request for quotation, purchase order or other like form issued by Purchaser are hereby expressly rejected and/or superseded by these Master Terms.

For Equipment, Services and the licensing of Software Solutions sold by Seller from a location in the U.S., these Master Terms shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts without regard to principles of conflicts of laws and all claims and actions related hereto shall be brought in the appropriate state or federal court located in Boston, Massachusetts

For Equipment, Services and the licensing of Software Solutions sold by Seller from a location outside the U.S., these Master Terms shall be governed by and construed in accordance with the laws of the Province of Nova Scotia, Canada without regard to principles of conflicts of laws and all claims and actions related hereto shall be brought in the appropriate court located in Halifax, Nova Scotia, Canada.

Notices to Purchaser shall be delivered by certified or overnight mail to its invoicing address specified by Purchaser in the Order or its current address in Seller's invoicing records; by means of a notice, which may be a general notice, on the Online Services; or by electronic mail to Purchaser's administrator e-mail address on record in Seller's account information. Notices to Seller shall be sent by overnight or certified mail to Seller as follows to the Attention of General Manager at the address set forth on the Order:

For Equipment, Services and the licensing of Software Solutions sold by Innovasea:

Contact: support.team@innovasea.com

Mail: 20 Angus Morton Drive; Bedford, Nova Scotia, Canada

The relationship of the parties hereto shall be that of independent contractors. Nothing herein shall be construed to create any partnership, joint venture, or similar relationship, or to subject the parties to any implied duties or obligations respecting the conduct of their affairs which are not expressly stated herein.

If any provision of these Master Terms is held unenforceable the enforceability of the remaining provisions shall not be affected. Waiver by either party of any breach shall not constitute waiver of any other breach. The headings in these Master Terms are used for convenience of reference only.

These Master Terms and each Order may be executed in separate original or facsimile counterparts, each of which shall be deemed an original, and all of which shall be deemed one and the same instrument. A PDF (Portable Document Format file) copy of these Master Terms shall be deemed to be an original.

These Master Terms shall not be amended except in a writing signed by both parties.

Schedule A: Equipment Warranty and Limitations

- a) Equipment Warranty Period. Seller warrants that all Equipment provided hereunder, with the exception of Third Party Manufacturer commercial-off-the-shelf products (e.g., generators), will be free from defects in material and workmanship and will perform substantially in accordance with Seller's Documentation under normal use and service for a period of twelve (12) months from date of shipment by Seller ("Warranty Period"). The warranty of the Third Party Manufacturer commercial-off-the-shelf products shall be that of the original manufacturer.
- b) Equipment Warranty Exclusions. This Equipment warranty does not apply to: a) any Third Party Manufacturer commercial-off-the-shelf products or any other equipment, materials or design supplied by Purchaser or a third party; b) re-battery services provided by Seller; c) Equipment for which Seller has not received payment; d) problems that results from: external causes such as accident, abuse, misuse; servicing not authorized by Seller; usage not in accordance with Equipment instructions; failure to follow the Equipment instructions or failure to perform preventative maintenance; usage of accessories, parts or components not supplied by Seller; and e) normal wear and tear and the need for regular maintenance.
- c) Equipment Warranty and Notice Periods. To receive a warranty remedy for Equipment, Purchaser must contact Seller's Customer Support Department during the Warranty Period to receive the Return Material Authorization ("RMA") instructions. Each defective Equipment returned for warranty remedy must be shipped at the Purchaser's expense according to the RMA instructions and must include reasonable proof that the claimed defect is due to a matter embraced within the warranty set forth above and that such defect did not result from any act or omission of Purchaser, including but not limited to any failure to operate and maintain the Equipment in accordance with Seller's applicable written instructions.
- d) Equipment Warranty Remedy. Seller's liability, and the Purchaser's exclusive remedy under this warranty, as to a defect in material or workmanship, is limited to the repair of such defect in the accessory, equipment or part in which the defect appears or, at Seller's option, to the replacement of such accessory, equipment or part with a similar item free from defect. As to any item repaired by Seller or furnished as a replacement by Seller, Seller's liability and the Purchaser's exclusive remedy to the repair or replacement of such item for any further defect in material or workmanship, provided Seller receives written notice at productreturns-ft@innovasea.com, of such further defect from Purchaser within ninety (90) days after the repaired or replaced item is shipped to Purchaser and provided that Purchaser returns same to Seller as provided under "Warranty and Notice Periods".
- e) Equipment Returned Items. All repairs, replacements and corrections described above shall be performed by Seller at its plant at Halifax, Nova Scotia, or at such other place as may be mutually agreeable, and with reasonable care and dispatch in order that the Equipment, accessory,

equipment or part will not be kept out of service longer than necessary. Return to Purchaser of a repaired, replacement, or corrected accessory, equipment, part or Equipment shall be at Seller's expense. Title to and risk of loss of the Equipment, accessory, equipment, or part returned to Seller pursuant hereto shall at all times remain with the Purchaser, except that title to a returned accessory, equipment, part, or Equipment shall pass to Seller concurrently with shipment to Purchaser of any item furnished by Seller to Purchaser as a replacement therefor. Seller shall have only such responsibility for any Equipment, accessory, equipment, or part owned by the Purchaser and in the possession of Seller as is chargeable by law to a bailee for hire, but shall not be chargeable for loss of use thereof.

Schedule B: Software Solutions Warranty and Limitations

Performance Warranty. Seller warrants to Purchaser that: (a) the material functions of the Downloadable Software licensed under an Order shall perform substantially as described in the Documentation for such Downloadable Software; and (b) the Online Services shall operate and be available as described in the applicable Documentation for such Online Services. Purchaser's sole remedy and Seller's only liability with respect to a warranty contained in this Section shall be, with respect to the Software Solutions, to repair or replace the Software Solutions to bring it into compliance with its applicable warranty; provided, however, that Purchaser shall give notice to Seller within thirty (30) days after discovering any warranty breach and during normal business hours.

Non-Infringement Warranty. Seller warrants to Purchaser that the Software Solutions in the form delivered hereunder and when used by Purchaser in the manner authorized hereunder and as described in the applicable Documentation, do not and shall not infringe or violate under the laws of any Berne Convention signatory-nation either the copyrights, trademark rights or trade secret rights of any third party or the rights of any third party under any valid, applicable, United States patent (the "Non-Infringement Warranty"). If Seller reasonably believes that any portion of the Software Solutions is or could be subject to a claim that would breach the Non-Infringement Warranty, then Seller may at its own expense: (a) modify the applicable portions of the Software Solutions to be non-infringing without material alteration to its material functions; or (b) obtain for Purchaser a license to continue using the infringing portions of the Software Solutions without material change in its critical functionality. If neither of the foregoing is reasonably feasible in Seller's sole discretion, Seller may terminate the Purchaser's license under these Master Terms to any infringing Software Solution upon written notice to Purchaser, in which event Purchaser shall immediately cease using such infringing Software Solutions. Seller's indemnification obligations in Section 16 of the Master Terms and the obligations in this Section set forth Purchaser's sole remedy for breach of the Non-Infringement Warranty.

Software Solutions Warranty Limitations. Seller shall not be responsible in any manner under the warranties described herein or in any Order for actual or alleged breaches arising out of: (a) causes external to the Software Solutions including Third Party Manufacturer commercial-off-the-shelf products, third party software, and third party telecommunications or data lines; (b) Purchaser's use of the Software Solutions in a manner or on Equipment that does not conform to Seller's specifications; (c) any defect, infringement or non-conformity not reported by Purchaser in accordance with these Master Terms; (d) any use of the Software Solutions in combination with or as part of any products, software or equipment of any third party; (e) any modifications to the Software Solution made by any party other than Seller; or (f) Purchaser's breach of the Master Terms. Seller does not warrant that the Software Solutions will meet Purchaser's requirements or will achieve any particular result. Without limiting the generality of the exclusions set forth herein, and except as otherwise provided in the Master Terms, Purchaser shall be exclusively responsible for, and Seller makes no warranty or representation with respect to: (i) determining whether the Software Solutions or the Equipment will achieve the results desired by Purchaser; (ii) selecting, procuring, installing, operating, and maintaining Equipment or third party software required to satisfy Purchaser's requirements; (iii) training Purchaser's personnel in computer operations, other than such Seller-provided training as may be expressly set forth in an Order; (iv) ensuring the accuracy of any input data used with the Software Solutions; (v) establishing adequate data backup provisions for backing up Purchaser's data with respect to the Software Solutions; (vi) establishing adequate operational backup provisions (e.g., alternate manual operation plans) in the event of a defect or malfunction that impedes the anticipated operation of the Software Solutions or the Equipment; or (vii) whether Purchaser's access in the case of Online Services will at all times be uninterrupted or error-free or secure.

Schedule C: Support Services

Seller shall provide maintenance and support services (collectively, "Support Services") for the Software Solutions in accordance with the terms set forth below.

Seller will make commercially reasonable efforts to release Updates to the Software Solutions as necessary to ensure that throughout the term of the applicable Order, the Software Solutions operate in material compliance with the Documentation, provided that Purchaser has paid all fees that are due under the Master Terms and such Order. Purchaser acknowledges that Seller is not required or obligated to provide any Updates or any Upgrades to, or new versions of, the Software Solutions other than those which are necessary for the Software Solutions to continue to operate in material compliance with the Documentation. Any Updates, Upgrades or new versions that are not necessary for the Software Solutions to continue to operate in material compliance with the Documentation may be offered separately with different pricing. Purchaser agrees that its purchase of the licensing of any Software Solutions is not contingent on the delivery of any future functionality or features or dependent on any oral or written public comments made by Seller regarding future functionality or features.

Capitalized terms not defined herein shall have the meanings ascribed to such terms in the Master Terms.

Definitions.

"Service Error" means any failure of Software Solutions to be available or otherwise perform in accordance with the Documentation, or any other error, flaw, failure or fault in the Online Services that causes it to produce an incorrect result, or to behave in unintended ways.

"Update" means a modification to the Software Solutions or workaround to fix bugs, correct errors, maintain material compliance with the Documentation.

"Upgrade" means a new version or release of the Software Solutions that adds new features, functional capabilities or other improvements to the Software Solutions, other than Updates.

Support Services for Software Solutions.

Seller shall:

- a. use commercially reasonable efforts to correct all Service Errors; and
- b. provide online access to technical support bulletins and other user support information and forums, to the full extent Seller makes such resources available to its other customers.

4. Appendix B – Contact Information

Innovasea

20 Angus Morton Drive
Bedford, Nova Scotia
Canada B4B 0L9

Phone: +1-902-450-1700

Fax: +1-902-450-1704

Email: support.team@innovasea.com

Support Website: support.fishtracking.innovasea.com