



Xeos
Technologies Inc.

MELO User Manual

SURFACE IRIIDIUM TRANSCEIVER



Shipped From



Contact Us

Email: support@xeostech.com
Phone: (902) 444 7650
Fax: (902) 444 7651
Website: www.xeostech.com

Version History

Version No.	Date	Description
1.0	November 2015	Base document
2.0	October 2017	Format overhaul

Table of Contents

Shipped From	2
Contact Us	2
Version History.....	2
General Description	5
Theory of Operation.....	5
Operating Instructions	5
Quickstart	5
Setting up Your Iridium Account	6
On/Off Modes	6
Installation and Maintenance	7
Pre-deployment Storage	7
Power Consumption and Battery Life	7
Current Draw	7
Communicating with the Melo	7
Using Xeos Online.....	7
Logging In.....	7
Adding Your Device to Xeos Online	8
Tracking Your Melo.....	8
Sending Commands	10
Using Email	10
Creating Email Commands	10
Attaching Email Command Files	11
Received Messages.....	12
Understanding Position Information	12
Iridium Doppler Position	12
Global Positioning System (GPS) Position	12
Commands	13
\$getpos: Acquiring GPS Information.....	13
\$scm: Status Change Message	13
\$settimings: Changing Iridium/GPS Intervals	13
\$alltimings: Show all Timers.....	14

\$wcenable: Enabling Watch Circle Functionality	14
\$setcircle: Watch Circle Information	14
\$resetnow: Resetting the Device	14
Field Installation.....	14
Opening the Housing	15
Replacement of the Battery Pack.....	15
Appendix A: Technical Specification	15
Mechanical	15
Electrical	16
Power Supply	16
Electronics.....	16
Environmental	16
Appendix B: Engineering Diagrams.....	17
Warranty, Support and Limited Liability.....	18

General Description

Melo is an independently powered, self-contained satellite transceiver packaged in a ruggedized, UV protected marine grade housing suitable for attachment to various surface buoys and navigational markers. Melo makes use of the low power, real time Iridium satellite constellation and GPS to reliably transmit the buoy location automatically or on demand at any time.

Melo's one piece, user replaceable battery pack is designed to provide three years of normal reporting or over 3000 bi-directional messages. Melo data is delivered via the email-based Short Burst Message (SBD) Iridium service making Melo easy to use and less expensive than traditional one-way satellite watch circle services.

Inside Melo is an aluminum chassis, 9602 Iridium satellite Short Burst Data core radio transceiver, a specialized low power Xeos digital controller with GPS, Iridium antenna, GPS antenna and an alkaline battery package.

Melo is intended for surface deployments. Xeos Technologies Inc. (Xeos) manufactures other specific products for subsurface applications.

See www.xeostech.com for details or call (902) 444-7650.

Theory of Operation

The Melo is intended for instantly and accurately locating and recovering high value, assets at sea. Melo will transmit a current GPS position based up on the setup of its interval timer. The Mail Message Check interval is also user configurable.

Operators can communicate with Melo via Iridium with the use of email commands. Status information can be obtained, including the health of the GPS system and battery voltage. At any time during deployment the configuration of the interval timers can be changed via Iridium.

Melo will continue to send GPS location messages until it is manually turned off, or the battery pack drops below the minimum voltage requirement of 7V.

Operating Instructions

Quickstart

There are only a few steps required to begin using the Melo:

1. Contact Xeos Technologies to provision your Melo and set-up a Xeos Online account.
Make sure to have your Melo's IMEI number on hand.
2. Add your Melo to Xeos Online
3. Turn the Melo on using the top push-button
4. Deploy the Melo in a location with a clear view of the sky

Setting up Your Iridium Account

Melo makes use of the [Iridium Satellite Systems](#) Short Burst Data (SBD) service for the 9602 transceiver. This service is a global (including the Polar Regions), two-way, real-time and email-based data delivery service with a maximum outbound (from beacon) message size of 340 bytes and a maximum inbound (to beacon) message size of 270 bytes.

Melo end users must set up an approved data delivery account with their preferred service provider. This can only be done once Xeos has provided the user with an International Mobile Equipment Identity (IMEI) number. Each 9602 modem has a unique IMEI number that must be registered with the preferred service provider. For a list of service providers in your area please contact [Iridium](#) for recommendations. Xeos Technologies is also able to provide Iridium SBD data service and accounts. Please contact activations@xeostech.com for more information.

Each IMEI number is capable of being associated with up to five (5) unique email addresses (this may vary between service providers). When registering your IMEI number, please provide the service provider with a temporary Xeos testing account email address. This temporary email testing account can be deleted or replaced at any time after delivery of the Melo. Once the SBD account has been activated, please contact your Xeos representative and confirm this.

Melo makes use of a simple and robust, text-based email protocol. Any email application can be used to send and receive messages to the Melo in the form of “.sbd” files. Sending messages and changing configuration can also be done through Xeos Online. See www.xeostech.com or your account manager for more information.

On/Off Modes

The Melo beacon is turned ON and OFF through the use of an internal push-button, and operation can be identified by viewing the internal LEDs.

To turn the Melo ON, unscrew the top cap and repeatedly press the top push-button. The Melo chassis can also be pulled partially out of the case for this. Watch the LEDs at the top of the Melo; the first press will illuminate the red LED. This indicates the Melo is currently OFF. Repeated pressings causes the green LED to flash. When the green LED goes solid, this indicates the Melo is now ON.

To turn the Melo OFF, simply repeat the above procedure until the red LED goes solid.

NOTE: It is important to let all LEDs stop illuminating before initiating another action.

NOTE: Cycling power for any reason, for example, by using the switch to turn OFF/ON or by removing battery power will cause the beacon to lose its existing configuration, and will return to the default configuration.



Installation and Maintenance

Pre-deployment Storage

The Melo is shipped in an off state to preserve battery power. The unit's batteries cannot be changed without total removal of the Melo from its enclosure, so turning it off after any test is necessary to preserve battery life.

Power Consumption and Battery Life

The Melo has an internal battery pack consisting of two independent strings of 9 alkaline D-cells, for a total of 18 cells. The nominal voltage of each of these strings is 13.V. The internal battery pack is not rechargeable and should be replaced whenever the Melo is recovered.

The Melo incorporates a power supply that uses steering diodes. It will draw power from the stronger of the 2 independent strings until they both fall below 7V. The battery voltage can be monitored by the Status command.

Current Draw

Typical Off Current	~ 75 μ A
Typical Idle Current	~ 100 μ A
GPS Acquisition Current	~ 15 mA (max. 1 min duration)
Iridium Transmission Current	~ 36 mA (approx. 30 sec duration)

This is the amount of current the device will draw between GPS checks and Iridium transmissions. The device has a life time of up to 3 years deployment, or 3000 up/down messages.

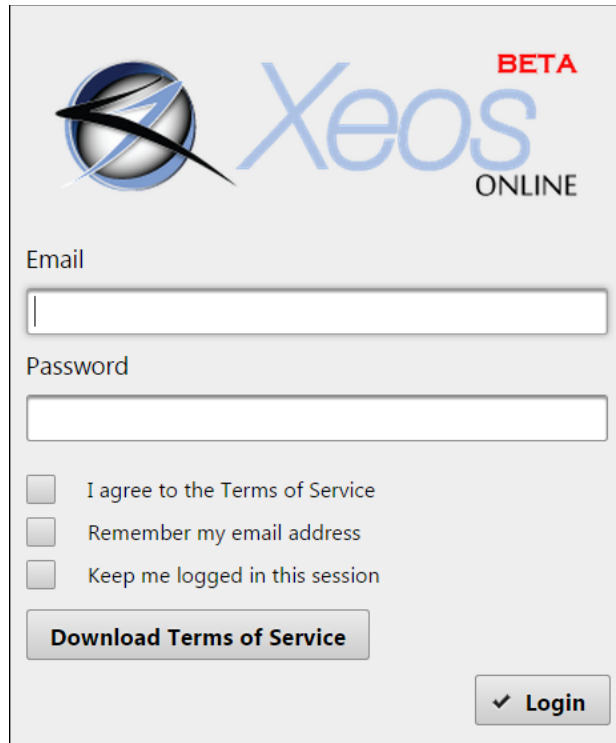
Communicating with the Melo

Using Xeos Online

Logging In

Before using Xeos Online make sure that your account has been setup and your Melo added to your organization. Contact support@xeostech.com for more information.

In a web browser, navigate to Xeos Online (online.xeostech.com) and login with your username and password.



The image shows a login form for 'Xeos ONLINE BETA'. At the top left is a logo consisting of a blue sphere with a black and white swoosh. To its right is the word 'Xeos' in a large, light blue font, with 'ONLINE' in a smaller black font below it, and 'BETA' in red above it. Below the logo, there are two input fields: 'Email' and 'Password'. Under the password field, there are three checkboxes with labels: 'I agree to the Terms of Service', 'Remember my email address', and 'Keep me logged in this session'. Below these checkboxes is a button labeled 'Download Terms of Service'. At the bottom right is a button labeled 'Login' with a checkmark icon.

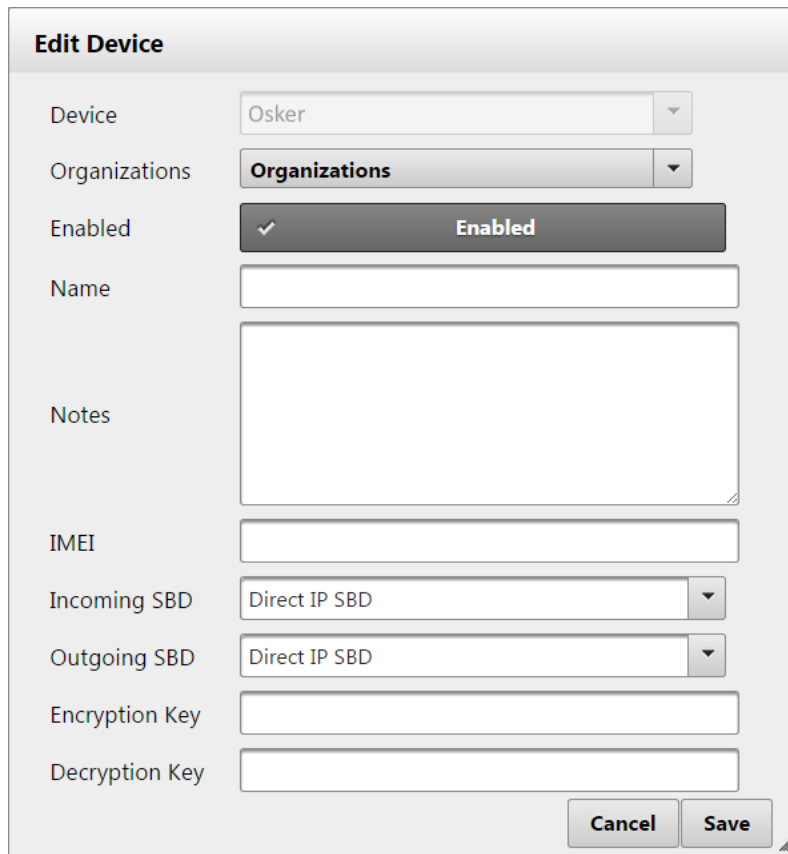
Adding Your Device to Xeos Online

If you have not already added your Melo as a device in Xeos Online, click on the **Admin button** and then the **Devices** to proceed. Select the **New Device** button and choose Melo from the device list.

Name	Description
Device	Device type
Organization	Select any available organizations
Enabled	Enable or disable the device
Name	Give your Melo a descriptive name
Notes	Additional details related to the Melo
IMEI	Copy and paste your Melo's IMEI
Other	Leave all other options as is

Tracking Your Melo

Now that the Melo has been added to Xeos Online, the user can send commands and track location and event data. First, make sure you have the right organization selected from the menu at the top-right of the screen. Click the **Home** button at the top of the screen to get back to the main page of Xeos Online. Select your device from the left-hand device area. Multiple devices may be selected.



Edit Device

Device: Osker

Organizations: Organizations

Enabled: ☒ Enabled

Name:

Notes:

IMEI:

Incoming SBD: Direct IP SBD

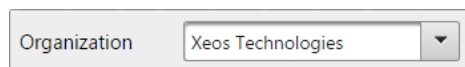
Outgoing SBD: Direct IP SBD

Encryption Key:

Decryption Key:

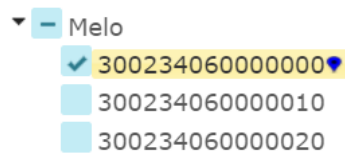
Cancel Save

Melo Device Dialog



Organization: Xeos Technologies

Organization Menu



▼ Melo

- ☒ 300234060000000
- ☐ 300234060000010
- ☐ 300234060000020

Device Selection

Select **Map** to view the current location of your Melo; past GPS fixes and messages can be viewed at the **Location Log**, and **Message Log** tabs. Xeos Online does not refresh new messages and locations automatically; an indicator will appear on the refresh button when new messages are available.



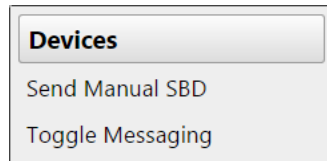
Home Map Media Event Log **Location Log** Message Log

Refresh

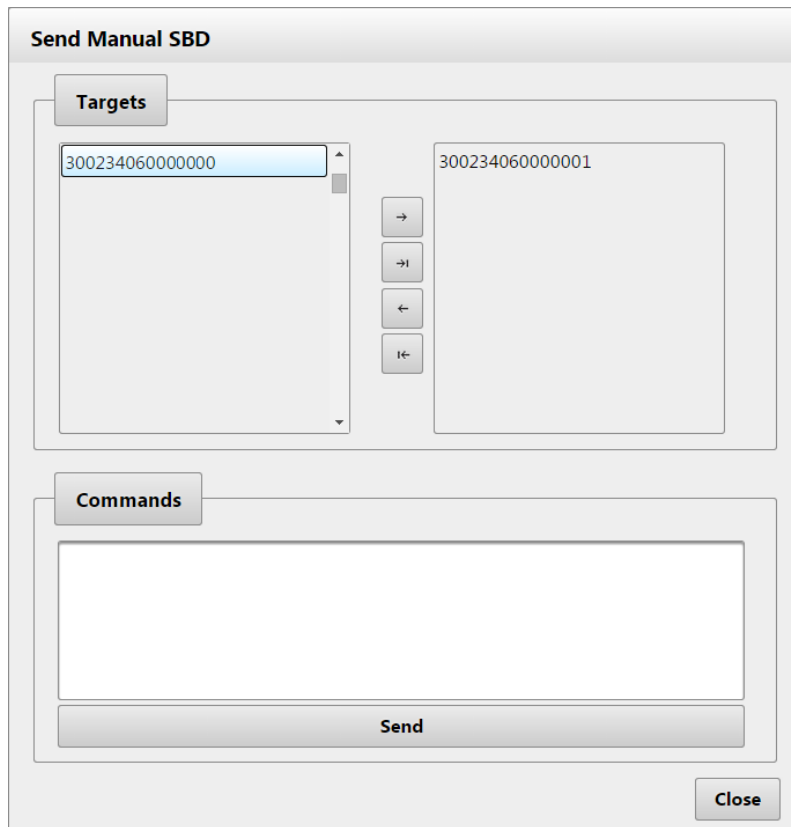
Home Tabs

Sending Commands

To send commands through [Xeos Online](#), click on the **Options** button and select **Send Manual SBD**.



The **Send SBD Dialog** will appear. Select the units you wish to target with commands and move them over to the right-hand target list. Type your command(s) into the command box and press send.



For more information on available commands, see **Commands**

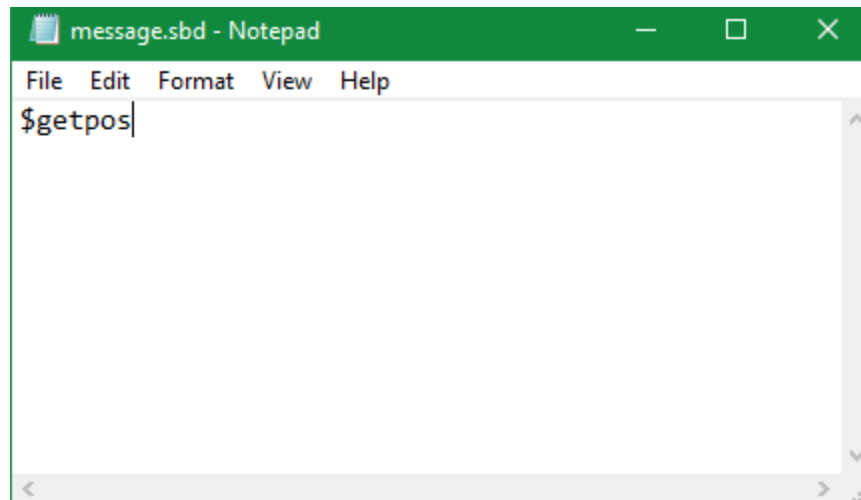
Using Email

Email commands can also be used to communicate with the Melo. These commands are sent as .sbd email attachments. Commands can configure the Melo remotely in the same way as commands sent by Xeos Online

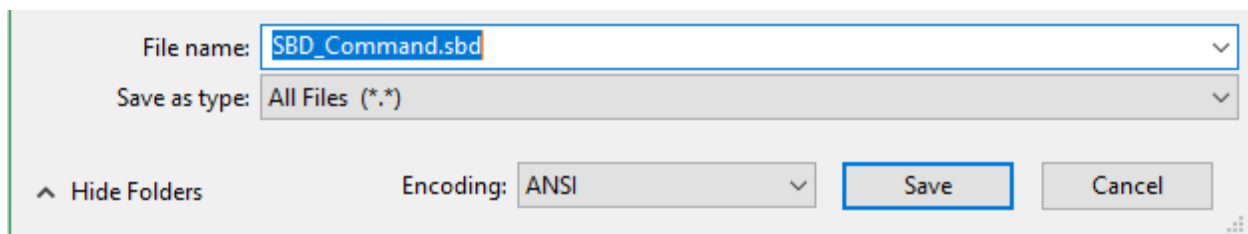
Creating Email Commands

Commands sent over email must be formatted in the correct way, or they will be ignored. Any number of commands can be included in an SBD file, but each command must be on a separate line.

When creating an SBD command file, the file **must be saved with an .sbd file extension**.



Sample SBD File



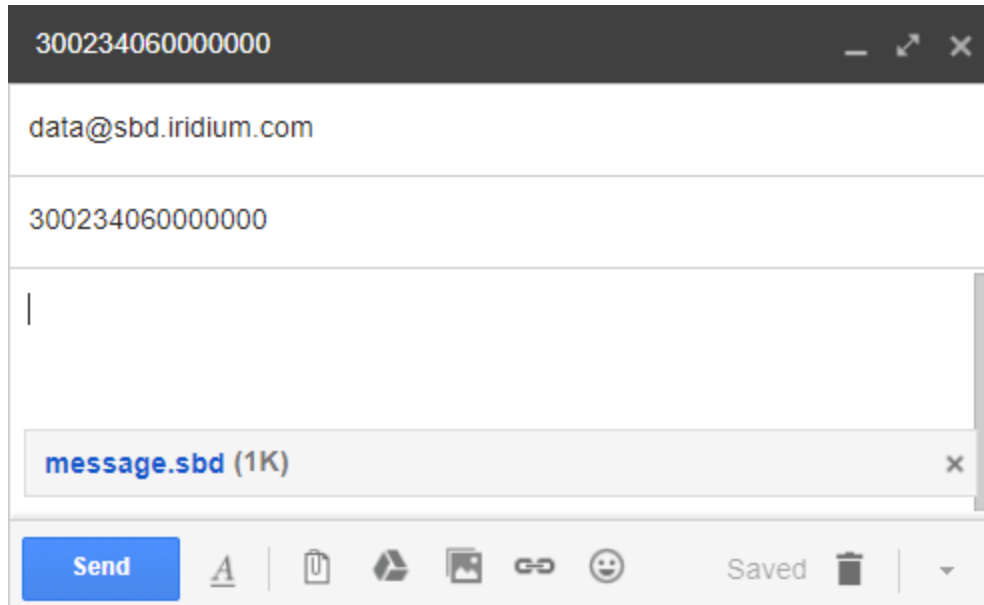
Saving an SBD file

Attaching Email Command Files

All command messages must be sent to the following email address:
data@sbd.iridium.com

- Messages must have only the unique 15-digit IMEI number of the Melo in the subject line
- Command files must be sent to the Melo as an attachment to a regular email message
- No text can be present in the body of the email.

Your message is sent to the Iridium Gateway in Arizona, USA



Sample SBD Email

A confirmation email is immediately returned from the Gateway to let you know that your message has been received and is in the queue. This message is received from the address: sbdservice@sbd.iridium.com

Note that the Iridium gateway uses separate email addresses for commands and responses.

Received Messages

Messages received from the Melo, such as GPS messages or responses to Status requests, arrive as email attachments to all of the destinations that the Melo was provisioned with from sbdservice@sbd.iridium.com

Understanding Position Information

There are two types of position information which will be sent via the Iridium Gateway.

Iridium Doppler Position

The Iridium Gateway calculates the Iridium transceiver's position on Earth when it receives transmissions, using Doppler technology. As a result, it is often very inaccurate. This location is only visible to users getting emails directly from the Melo, as opposed to emails forwarded by Xeos Online.

Global Positioning System (GPS) Position

The location information generated from the Melo's GPS antenna is embedded in the SBD attachment sent via the Iridium Gateway. Users of the Xeos Online system will also be able to

view this location. The GPS fix is much more accurate than the Doppler position provided by Iridium.

Commands

The Melo is receptive to multiple commands used to acquire information about the device:

- \$getpos
- \$scm
- \$settiming
- \$alltimings
- \$wcenable
- \$setcircle
- \$resetnow

\$getpos: Acquiring GPS Information

The \$getpos command returns the standard position reporting message which is automatically included with each Iridium transmission. This is especially useful when the GPS timing interval is longer than the Iridium interval, and an up to date position is required sooner than usual.

Response: Time (of last GPS fix) Mode Latitude Longitude Distance(meters) durationInMode
snrMax BatteryVoltage(V*100)

Example: 05281905 OK 44.61901 -63.93243 125 877 33 1103

Time = MMDDHHMM, distance in meters, duration in current mode in minutes

\$scm: Status Change Message

The \$scm command returns the standard message that is sent whenever the system mode changes or a parameter changes.

Response: Status/Value Change: Mode=OK Ird=21Mns gps=12Mns ctr=44.61919/-
63.93236 rad=400m

\$settiming: Changing Iridium/GPS Intervals

The \$settiming command is used to change the GPS and/or Iridium timing values. These values must be input in minutes.

Syntax: \$settiming GPSn IRDn GPSa IRDa

GPSn: Minutes between GPS acquisitions in '**OK**' mode. Range: 15 to 360 (6 hrs)

IRDn: Minutes between Iridium transmits in '**OK**' mode. Range: 15 to 42300 (30 days)

GPSa; Minutes between GPS acquisitions in '**Alarm**' mode. Range: 15 to 360 (6 hrs)

IRDn: Minutes between Iridium transmits in '**Alarm**' mode. Range: 10 to 5760 (7 days)

Response: Identical to the \$scm command response.

\$alltimings: Show all Timers

The \$alltimings command returns the current timer intervals for both GPS and Iridium in both Normal (OK) and Alarm modes.

Response: Time/ Startup Timers/ Normal Timers/ Alarm Timers

Example: 07201257; STARTUP:gps=10Mns/ ird=10Mns; OK:gps=60Mns/ ird=24Hrs; ALARM: gps=60Mns/ ird=60Mns

\$wcenable: Enabling Watch Circle Functionality

The watch circle enable command is used to enable or disable the watch circle.

Syntax: \$wcenable State

\$wcenable: Command

State: New watch circle state (1 =ON, 0 = OFF)

\$setcircle: Watch Circle Information

This command is used to change the center of the watch circle and / or its radius. Unlike other settings, the watch circle resets at each power-up.

Syntax: \$setcircle Latitude Longitude Radius

\$setcircle: The command.

Latitude: New latitude for the circle center.

Longitude: New longitude for the circle center

Radius: New circle radius in meters. Range 50 to 15000 meters

Note: You can adjust the Watch Circle's radius alone by setting the latitude and longitude parameters to 0.

Note: If the Watch Circle is turned on, but no circle is set, the Melo will average its locations over the next 48 hours and create a Watch Circle of 100 meters with the result as its center.

Note: The radius of the circle should be set within the first hour of deployment using the command.

\$resetnow: Resetting the Device

This command restarts the beacon's firmware, which has the same effect as cycling the power. All system parameters are set to defaults and the beacon operates in Start-up Mode.

Field Installation

The Melo is intended for use on above-water marine flotation devices. It is important that the top of the Melo is located as high above the surface of the water as possible. Both the Iridium and GPS antennae are located at the top of the unit. It is recommended that users install the Melo on a mast or superstructure at the top of their surface buoy or flotation device.

Care should also be taken during installation to avoid putting metal bands close to the top of the unit where the antennae are located.

Opening the Housing

Unscrew the Melo's top cap and carefully pull the chassis straight out of the casing. It is important when doing this to pull the internal chassis out in a straight line to avoid any damage to the chassis.

When originally packaged at the factory, the chassis is stabilized in place through the use of foam strips placed vertically along the battery pack that grip the inside wall of the housing. It may require some force to pull the chassis out of its housing.

Replacement of the Battery Pack

Disconnect the battery connector.

Remove the nuts and bottom plate from the bottom of the battery pack, and carefully slide the battery pack away from the chassis.

Slide the new battery pack between the support rods, and carefully thread the connector through the slot near the electronics, but don't plug it in yet.

Re-install the bottom plate and nuts. This is a good opportunity to replace the O-ring on the screw-cap. It's also best to clean away the old lube, and install fresh O-ring lube.

At this point (with the new battery disconnected), you can slide the chassis back into the case for storage, or re-connect it right away. Watch the red & green LEDs at the top to see what state it wakes up in. Push the On/Off Button multiple times to turn the Melo OFF or ON. Slide the chassis back into the case and re-install the top screw cap.

Appendix A: Technical Specification

Mechanical

Material

Outside housing: UV-protected ABS painted white

Inside pull-out chassis: Aluminum

Dimensions

8.9 cm (3.50") - Diameter - Main Tube

10.5 cm (3.96") - Diameter - Bottom

65 cm (25.58") - Height

Weight	4.5 Kg (10 lbs)
O-ring	568-337 70A Duro Buna
O-ring Lube	Parker Super 'O'
Electrical	
Power Supply	
Supply	9 x 2 (18) D-cell (Alkaline)
Sleep Current	100uA (avg.)
Iridium Transmit	36mA (30s avg.)
GPS Acquisition	15 mA (30s avg.)
Voltage	+13.5 Volts nominal
Capacity	24 Amp Hours
Life Expectancy	2 Years Surface Deployment, or 10,000 inbound/outbound messages
Electronics	
Digital Controller	Xeos IRDC-2B
GPS Receiver	AA003252-G-BLK Jupiter GPS
Iridium Modem	Iridium 9602 modem
Environmental	
Operating Temperature	-30°C to +60°C (-22°F to +140°F)
Storage Temperature	-40°C to +80°C (-40°F to +176°F)

Melo User Manual Version 2.0



Warranty, Support and Limited Liability

Xeos Technologies Inc. warrants the Melo Beacon to be free of defects in material or manufacturing for a period of one year following delivery. Liability is limited to repair or replacement of the defective part and will be done free of charge.

LIMITED WARRANTY: Xeos Technologies Inc. warrants that the product will perform substantially in accordance with the accompanying written materials for a period of one year from the date of receipt.

CUSTOMER REMEDIES: Xeos Technologies Inc. entire liability and your exclusive remedy shall be at Xeos Technologies Inc. option, either (a) return of the price paid or (b) repair or replacement of the product that does not meet Xeos Technologies Inc. Limited Warranty and that is returned to Xeos Technologies Inc. with a copy of your receipt. This Limited Warranty is void if failure of the product has resulted from accident, abuse, or misapplication. Any replacement product will be warranted for the remainder of the original warranty period or ninety (90) days, whichever is longer.

NO OTHER WARRANTIES: Xeos Technologies Inc. disclaims all other warranties, either express or implied, including but not limited to implied warranties of merchantability and fitness for a purpose, with respect to the product or the accompanying written materials. This limited warranty gives you specific legal rights. You may have others, which vary from state to state.

NO LIABILITY FOR CONSEQUENTIAL DAMAGES: In no event shall Xeos Technologies Inc. or its suppliers be liable for any damages whatsoever (including, without limitation, damages for loss of equipment, for loss of business profits, business interruption, loss of business information, or other pecuniary loss) arising out of the use of or inability to use this Xeos Technologies Inc. product, even if Xeos Technologies Inc. has been advised of the possibility of such damages.