MicroPLB™

MINIATURE SARSAT PERSONAL
LOCATOR BEACON (PLB)

MODEL
MBT-040600

OWNERS MANUAL

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You Must REGISTER YOUR PLB -- See Section 8

Use the MicroPLB™ only during situations of grave and imminent danger. Operation under any other circumstances may lead to sanctions and/or penalties.

Under federal law, 14USC88, knowingly and willfully transmitting a hoax distress call is a felony. It is punishable by up to six years in prison, a $250,000 fine, and restitution to the rescue agency for all costs incurred responding to the distress.

1) Introduction

Congratulations on your purchase of a MicroPLB™, the most advanced Personal Locator Beacon available. The MicroPLB™ is a COSPAS/SARSAT* transmitter which, when activated, transmits an internationally recognized 406 MHz distress signal containing your unique ID code to a constellation of internationally funded and operated satellite receivers which monitor this emergency frequency band. Your need for assistance, your location anywhere on earth (often accurate to within one kilometer over all terrain as well as at sea), and your PLB's unique ID code are automatically deciphered and forwarded to appropriate rescue organizations via well established international procedures. This proven, fully operational, all weather SARSAT system operates world wide 24 hours a day. It is operated and maintained by an international consortium, and the ground stations and notification network are Government funded and operated without the assessment of user fees. Rescue personnel are guided directly to the emergency location by the specified position and, optionally, by a separate 121.5 MHz homing signal transmitted by the beacon. With a MicroPLB™ equipped with a GPS option, a single half second burst provides nearly exact position information (accurate to about a few meters) to rescue personnel, and if you are moving or drifting at sea, your transmitted position information is updated every 20 minutes as documented by the COSPAS/SARSAT specifications.

The MicroPLB™ could thus be a life-saver for individuals engaged in activities such as hiking, hunting, mountain climbing, boating, flying, cross country skiing, etc., where even a simple accident may rapidly lead to dangerous and/or life threatening situations unless help is provided in a timely fashion.

The MicroPLB™ is truly a pocket sized unit. Due to its advanced NASA supported transmitter technology, it is the ONLY PLB to use a safe lithium battery approved by the U.S. Department of Transportation for carriage via all commercial transportation, including commercial passenger aircraft.

The MicroPLB™ is safe, easy to carry, and can go with you wherever you go. In the unfortunate event that rescue help is needed, it is easily activated and could save your life. Simply remove the cover, which automatically deploys the antenna, and pull out the activator plug. These actions can even be performed by injured individuals wearing gloves in the dark.

The COSPAS/SARSAT system is described in more detail in Appendix A, and detailed Specifications for the MicroPLB™ are provided in Appendix B.

This manual describes operation and maintenance of the MicroPLB™. Section 2 describes emergency operation procedures for the MicroPLB™, Sections 3 and 4 describe deactivation and self-test respectively, while storage, maintenance, and repair, warranty, and **Mandatory Registration** are discussed thereafter.

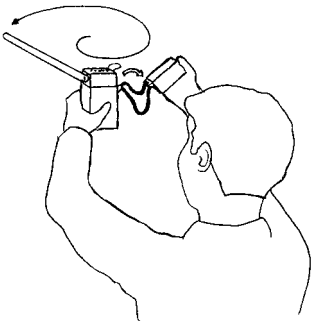
*SARSAT: Search and Rescue Satellite-Aided Tracking
COSPAS: Space System for Search of Vessels in Distress
(acronym from the Russian language)

2) Emergency Operating Instructions (Activation)

2.1) To activate the MicroPLB™ without GPS receiver:

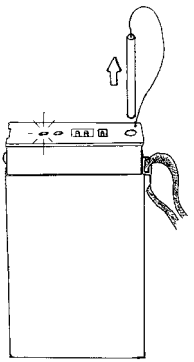
1) Remove cover
Hold away from Face

Antenna will automatically deploy



2) Pull activator pin completely out.

Blinking Green = Transmission
Single Red Blink prior to each 406 MHz Pulse.



3) Place beacon in a clear area.

antenna pointing up

Use the MicroPLB™ only during situations of grave and imminent danger. Operation under any other circumstances may lead to sanctions and/or penalties.

When activated (step 2 above):

Following automatic self-test and a pass/fail indication
green = pass,
red = fail
the distress transmissions will always automatically begin.
The Beacon will attempt transmission even if it failed self-test.

A slowly blinking green LED indicates transmission.

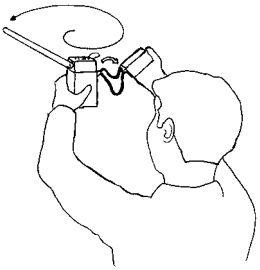
A single red flash will be emitted about 1 second prior to each 406 MHz transmission.

While operating, the MicroPLB™ should be placed on its side on a flat surface, away from obstructions, with the antenna pointing up towards the sky.

2.2) To activate the MicroPLB™ with External GPS receiver:

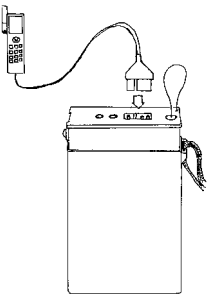
1) Remove cover
Hold away from Face

Antenna will automatically deploy



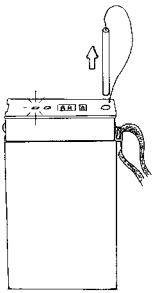
2) Activate GPS receiver
connect to MicroPLB™
use supplied cable.

Beacon will also operate without GPS receiver if necessary.
(with reduced functionality)



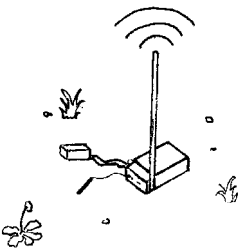
3) Pull activator pin completely out.

Blinking Green = Transmission
Single Blink = GPS NOT Acquired
Double Blink = GPS Acquired
Single Red Blink prior to each 406 MHz Pulse.



4) Place beacon in a clear area.

antenna pointing up



Use the MicroPLB™ only during situations of grave and imminent danger. Operation under any other circumstances may lead to sanctions and/or penalties.

When activated (step 3 above):

Following automatic self-test and a pass/fail indication
green = pass,
red = fail
the distress transmissions will always automatically begin.
The Beacon will attempt transmission even if it failed self-test.

A slow series of green "double blinks" indicates a valid GPS position has been acquired and is being transmitted by the MicroPLB™. If the GPS receiver remains connected to the MicroPLB™, position information will be updated every 20 minutes as documented by the COSPAS/SARSAT specifications. If the GPS receiver is disconnected or loses acquisition, your last valid GPS position will continue to be transmitted.

A slow "single" blinking green LED indicates that a valid GPS position has not yet been acquired, and that the default message is being transmitted. The MicroPLB™ will continue to monitor the GPS receiver for a valid position, and will begin transmitting the GPS data when valid position information becomes available.

A single red flash will be emitted about 1 second prior to each 406 MHz transmission.

While operating, the MicroPLB™ should be placed on its side on a flat surface, away from obstructions, with the antenna pointing up towards the sky.

External GPS Receiver Requirements

The MicroPLB™ models with external GPS capability are designed to accept data from GPS receivers with data output conforming to the electrical characteristics and data format specified by the NMEA (National Marine Electronics Association) 0183 standard, version 2. Standard NMEA sentences accepted by the MicroPLB™ include "GGA": "Global Positioning System Fix Data", "GLL": "Geographic Position, Latitude and Longitude", and "RMC": "Recommended Minimum Specific GPS/Transit Data". Most GPS receivers can be programmed to emit a variety of data. Please consult the appropriate owner's manual to select the output data set which include at least one of these sentences. The MicroPLB™ is also designed to accept data at the (standard NMEA 0183 v.2) rate of 4800 baud (8 data bits, no parity). The GPS receiver must be set to this data rate even though some GPS receivers allow the user to deviate from the standard. Note that these settings might not be the default setting for your GPS receiver.

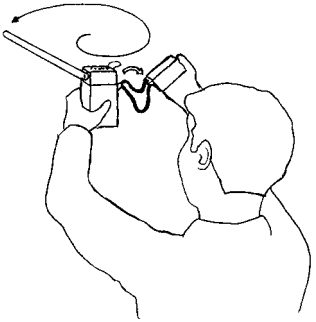
If you do not have a GPS receiver, or if the GPS receiver is not functioning properly, the MicroPLB™ will still operate, but will transmit the default message instead of location information. The LEO (low earth orbiting) satellites can still calculate your position and report your unique ID code.

2.3) To activate the MicroPLB™ with Attached/Internal GPS receiver:

1) Remove cover

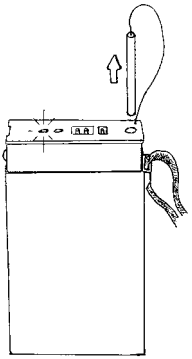
Hold away from Face

Antenna will automatically deploy



2) Pull activator pin completely out.

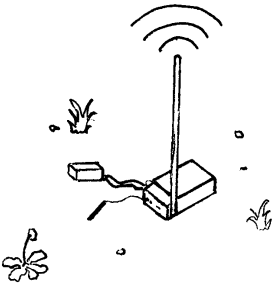
Blinking Green = Transmission
Single Blink = GPS NOT Acquired
Double Blink = GPS Acquired
Single Red Blink prior to each 406 MHz Pulse.



3) Place beacon in a clear area.

Both antennas pointing up (GPS "Bulls-eye" and spring)

For best GPS operation, keep beacon away from obstructions such as tall buildings, trees, etc.



Use the MicroPLB™ only during situations of grave and imminent danger. Operation under any other circumstances may lead to sanctions and/or penalties.

When activated (step 2 above):

Following a system self test, which can take up to 10 seconds, and a pass/fail indication

green = pass
red = fail

the distress transmissions and GPS functions will always begin, even if the beacon fails the self test.

A repeating green “Single Blink” indicates the beacon is transmitting, and that the GPS receiver is attempting to acquire a valid fix, or attempting to update its position.

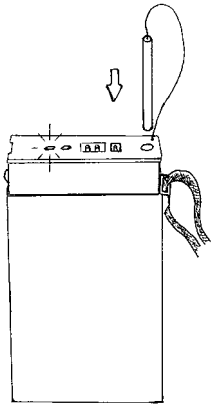
A repeating green “Double Blink” indicates the beacon is transmitting, and that a valid GPS location is included in the transmission.

A simultaneous red and green flash will be emitted just prior to each 406 MHz transmission.

Re-insert activator pin at any time to stop transmissions.

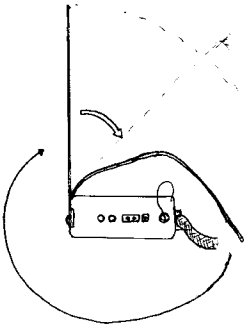
3) Deactivation

To deactivate the MicroPLB™ :

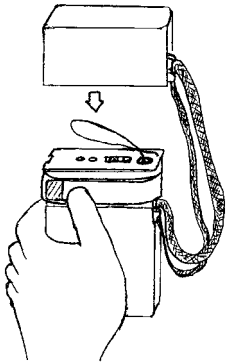


1) Insert the activator pin.

Remove GPS connector if present



2) Wind the antenna around beacon body



3) Replace Cover.

The MicroPLB™ can be deactivated at any time by re-inserting the activator pin. The antenna should then be wound onto the PLB and secured by the protective cover as shown above. Avoid "reverse-winding" of the antenna, which could damage the MicroPLB™.

Once the MicroPLB ™ is activated for any reason, the battery pack MUST BE REPLACED before it can be used again. A MicroPLB™ with a partially depleted battery pack could pass all of the self-test functions, and still not have sufficient energy to operate correctly in an emergency situation.

See "Service and Repair" for battery pack replacement.

If for any reason the activator **pin is unavailable** or the **hole is obstructed**, emergency transmissions can be halted by **BREAKING OFF THE ANTENNA**. The beacon will continue to function until the battery is depleted, but the beacon transmissions will be too weak to interfere with the satellite system.

The beacon must then be sent back to the factory for refurbishment.

4) Self-Test Instructions

To initiate the self-test function of the MicroPLB, remove the protective cover (which automatically deploys the antenna), and use the stiffened end of the lanyard to push the spring loaded activator pin completely down (approximately ¼-inch) into the beacon. Continue holding the activator pin down.

Both the red and green LEDs will blink rapidly for a few seconds. After up to 10 seconds of testing, the beacon will indicate either

green = pass
red = fail

The green light will continue to blink, indicating that the self test function is still activated.

After 50 seconds, a single 406 MHz transmission with inverted frame sync will be transmitted to assist advanced testing. Thereafter, the green blinking will continue, but there will be no more 406 MHz transmissions.

If you have a MicroPLB with **Attached/Internal GPS receiver**, the GPS receiver will be automatically activated during the self test. A repeating green "Single Blink" indicates that the GPS receiver is attempting to acquire a valid fix. After a fix is acquired, a repeating green "Double Blink" will be displayed.

Release the activator pin at any time to stop the test and completely turn off the beacon. If for any reason the activator pin becomes jammed during self test, the pull string can be used to help return the activator to the off position.

Self testing should not be performed more often than once a month, otherwise the battery pack could become excessively depleted by the testing. Excessive testing will also lead to self-test failures.

If the MicroPLB fails its self-test, it should be returned to an authorized factory representative for repair.

5) Storage and Maintenance

The MicroPLB™ requires no maintenance other than periodic battery pack replacement. It should be kept in a cool, dry environment. When stored at room temperature (25°C), the battery pack will provide sufficient energy for proper operation after five (5) years of storage. At higher temperatures, the shelf life of the battery pack could be degraded, and the following battery replacement schedule is recommended.

Storage Temperature	Replace Battery Pack After:
-40°C to 35°C	5 Years
35°C to 40°C	4 Years
40°C to 45°C	3 Years
45°C to 50°C	2 Years
50°C to 60°C	1 Year

The battery pack must also be replaced after every emergency use of the PLB, no matter how soon rescue and PLB deactivation occurs.

See "Service and Repair" for instructions on battery pack replacement.

If desired, the PLB may be tested up to once a month as described under "Self-Test Instructions". Excessive self-testing will deplete the battery pack, will lead to self-test failure indications, and could possibly result in premature battery pack depletion in an emergency situation.

6) Service and Repair

The MicroPLB™ contains **NO USER SERVICEABLE PARTS**. It must be returned to an authorized service facility for repair or battery pack replacement (RMA number required). Only special battery packs installed by an authorized dealer should be used in the MicroPLB™. Any other battery pack could cause the PLB to malfunction, deplete the battery pack prematurely, cause permanent damage to the PLB, and will void the warranty.

See "Storage and Maintenance" for the battery pack replacement schedule.

7) Warranty

The MicroPLB™ is warranted against factory defects in materials and workmanship for a period of 3 years from the date of original purchase. This warranty is extended only to the original purchaser of the unit.

During the warranty period, the manufacturer will repair or, at its option, replace a defective unit at no cost to the owner of the PLB for materials and labor. Transportation charges are the responsibility of the owner of the PLB, and a Return Merchandise Authorization Number (RMA) must be obtained prior to shipment. The unit must be packaged properly and shipped prepaid to an authorized service center.

This warranty is void if the PLB has been damaged through accident, misuse, or during transportation. The warranty is also void if the unit has been opened by persons other than by service personnel authorized by the manufacturer.

This is the entire warranty offered. In no event will the manufacturer or its representatives be liable for any other damages, either direct, consequential, incidental, or punitive, however caused and regardless of theory of liability arising out of the use, failure, or misuse of the PLB, even if the manufacturer has been advised of the possibility of such damages. In no event will the manufacturer's liability exceed the original purchase price of the MicroPLB™.

To validate this warranty, the enclosed warranty card must be completed and mailed before putting the PLB into service. Please also read the information in this manual concerning mandatory 406 MHz beacon registration.

8) Mandatory 406 MHz PLB Registration

You **must register your 406 MHz beacon** with the responsible COSPAS-SARSAT authority for your country, prior to using it. The following, abstracted from the NOAA beacon registration website (http://www.sarsat.noaa.gov/beacon.html), is applicable only to the USA.

If you purchase a new or a used 406 MHz beacon you **MUST** register it with NOAA. If you change any information on your registration (such as phone number, address, bought a new boat, etc.) you **MUST** update your 406 MHz beacon with NOAA. Also, if you sell your 406 MHz beacon, make sure the purchaser re-registers the beacon, or you may be contacted by rescue authorities if it is activated. Please provide the new owner our phone number or this web page so they can register the beacon.

If the registration form provided with the MicroPLB is no longer available, you may print a beacon registration form from: (http://www.sarsat.noaa.gov/plb-form.pdf). Mail the original, signed form to NOAA at:

NOAA SARSAT Beacon Registration
E/SP3, RM 3320, FB-4
5200 Auth Road
Suitland MD 20746-4304

You may expedite beacon registration by faxing a copy of the completed form to NOAA at **301-568-8649** as long as the original, signed form is then mailed to the address above. On line beacon registration is available at: http://www.beaconregistration.noaa.gov.

If you have any questions or comments pertaining to beacon registration in the U.S., call 301.457.5678, (or toll free 888.212.7283), or e-mail your question to the Sarsat Webmaster at NOAA (sarsat@noaa.gov).

MicroPLB™ personal locator beacons sold in the USA include COSPAS-SARSAT designations MBT-040600, MBT-040600-48, MBT-040600A, and MBT-040600A-48. Please consult Appendix-B for more details.

For other countries, please consult the COSPAS-SARSAT home page at http://www.cospas-sarsat.org, or contact COSPAS-SARSAT by mail at the following address for registration details. Registration is always required.

Cospas-Sarsat Secretariat
99 City Road
London EC1Y 1AX
United Kingdom
Telephone: +44 20-7728 1391
Facsimile: +44 20-7728 1170

Appendix A) COSPAS-SARSAT* System**

The beginnings of SARSAT date back to 1970 when a plane carrying two U.S. congressmen crashed in a remote region of Alaska. A massive search and rescue effort was mounted, but to this day, no trace of them or their aircraft has ever been found. In reaction to this tragedy, Congress mandated that all aircraft in the United States carry an Emergency Locator Transmitter (ELT). This device was designed to automatically activate after a crash and transmit a homing signal. Since satellite technology was still in its infancy, the frequency selected for ELT transmissions was 121.5 MHz, the international aircraft distress frequency. This system worked, but had many limitations. The frequency was cluttered, there was no way to verify who the signal was originating from, and most importantly, another aircraft had to be within range to receive the signal.

After several years, the limitations of ELTs began to outweigh their benefits. At that time, a satellite based system was conceived. It would operate on a frequency reserved only for emergency beacons (406 MHz), it would have a digital signal that uniquely identified each beacon, and it would provide global coverage.

The SARSAT system was developed in a joint effort by the United States, Canada, and France. In the United States, the SARSAT system was developed by NASA. Once the system was functional, its operation was turned over to NOAA where it remains today.

As the system began to take hold, more and more emergency beacons found their way onto the market. ELTs continued to operate exclusively on 121.5 MHz, but maritime beacons (EPIRBs) were being built that operated on 406 MHz. The U.S. Coast Guard in their role as maritime search and rescue specialists immediately began to see the benefits of 406 MHz, and in 1990, took proactive steps to bring it into widespread usage. As a result, today there are over 33,000 EPIRBs in the NOAA 406 MHz Registration Database.

A similar system, COSPAS, was developed by the Soviet Union. The four nations, United States, Canada, France and the Soviet Union banded together in 1979 to form COSPAS-SARSAT. In 1982, the first satellite was launched, and by 1984 the system was declared fully operational. A overview of this system is shown in the figure on the following page.

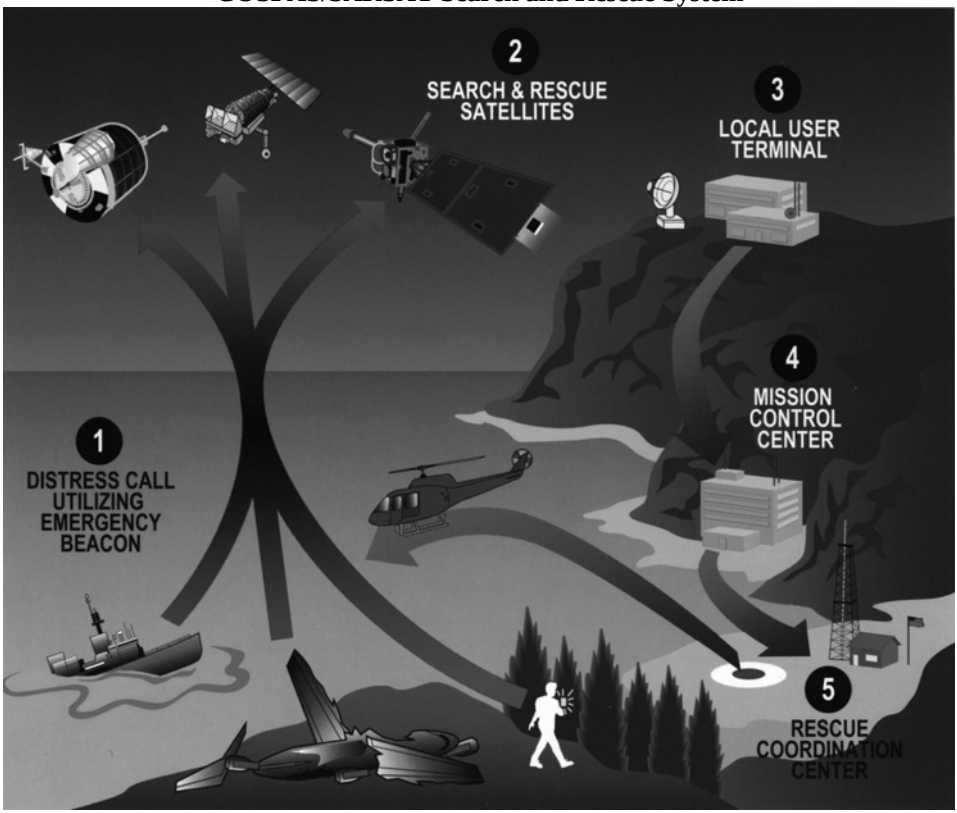
The COSPAS-SARSAT organization also continued to grow. As of March, 2001, the four original member nations have now been joined by 34 other nations that operate 38 ground stations and 15 mission control centers worldwide or serve as Search and Rescue Points of Contact (SPOCs). COSPAS-SARSAT continues to be a model of international cooperation. During the eighties, the Soviet Union and the United States were able to put aside their Cold War differences and tackle some tough technical questions.

Today, new technology continues to evolve and the member nations are actively incorporating that technology into the COSPAS-SARSAT system of tomorrow. The MicroPLB™ is at the forefront of this new technology revolution.

*SARSAT: Search and Rescue Satellite-Aided Tracking
COSPAS: Space System for Search of Vessels in Distress
(acronym from the Russian language)

**Parts abstracted from the NOAA SARSAT home page (http://www.sarsat.noaa.gov) with thanks.

COSPAS/SARSAT Search and Rescue System



1) In situations of "grave and imminent danger" when lives are at risk, emergency beacons are activated.
2) Emergency alerts received by the satellites are retransmited to automatic (unstaffed) ground stations worldwide. These stations are called Local User Terminals (LUTs).
3) Alerts are routed to a Mission Control Center (MCC) in the country that operates the LUT. Routed alerts include beacon location computed at the LUT if the alert is received by one of the system's low-Earth-orbiting satellites. Alerts received by system satellites in geosynchronous orbit provide instantaneous alerting and can include location information if the beacon is a self-locating type.
4) After validation processing, alerts are relayed depending on beacon location or country of registration to either another MCC or to the appropriate Rescue Coordination Center (RCC).
5) U.S. RCCs are operated by the Coast Guard and the Air Force. The Air Force Rescue Coordination Center (AFRCC) at Langley AFB, Virginia, coordinates all inland SAR activities in the lower 48 states. In most situations, the actual search and rescue is carried out by the Civil Air Patrol or local rescue services. The U.S. Coast Guard coordinates and conducts most maritime SAR missions from RCCs located in nine Command Districts around the Unites States and two Rescue Sub-Centers (RSCs) in SanJuan, Puerto Rico, and in Guam.

GROUND STATIONS

LUTs are the ground stations that track COSPAS-SARSAT satellites in their paths across the sky and receive the distress signals relayed by them. A LUT consists of a parabolic antenna, a processor, and communications equipment. The LUTs are fully automated, completely unmanned at all times and operate on inexpensive micro computers. Once a signal is received and processed at the LUT it is transmitted to the mission control center (MCC) that operates that particular LUT. In the U.S., NOAA operates fourteen LUTs in seven locations. This provides total system redundancy and allows for a maximization of satellite tracking.

SATELLITES

The keystone to the COSPAS-SARSAT System are the polar orbiting satellites from which the system takes its name. These satellites provide the ability to detect and locate (via Doppler Shift calculations) 406 MHz alerts worldwide and 121.5 MHz alerts for about sixty percent of the world.

SARSAT is an instrument package flown aboard the NOAA Series of environmental satellites operated by NOAA's National Environmental Satellite, Data and Information Service (NESDIS). These satellites orbit at an altitude of 528 miles and complete an orbit every 100 minutes. Their orbits are inclined 99 degrees from the equator. Each satellite carries a Search and Rescue Repeater (SARR) which receives and retransmits 121.5 MHz and 243 MHz signals anytime the satellite is in view of a ground station. Also carried is a Search and Rescue Processor (SARP) which receives 406 MHz transmissions, provides measurements of the frequency and time, then retransmits this data in real-time and stores it aboard for later transmission. If the satellite is in view of a ground station when a 406 MHz signal is received the data is received in real-time. The satellite also stores each signal it receives and continuously downloads this data. The ground stations (LUT's) use the data to calculate the position of the beacon via Doppler Shift. If the satellite was not in view of a ground station when it received a beacon signal, the next ground station that sees that satellite will receive the data. This provides global coverage for 406 MHz distress signals. The SARR is provided by the Canadian Department of National Defence and the SARP is provided by the French Center National D'Etudes Spatiales (CNES).

The COSPAS instrument is carried aboard the NADEZHDA navigation satellite orbiting the Earth every 105 minutes at an altitude of 620 miles and an orbital inclination of 83 degrees. The COSPAS instrument was built by the former Soviet Union and continues to be operated by the Russian Federation. The major difference between COSPAS and SARSAT is that the Russian satellites do not receive 243 MHz distress signals and they do not have data storage and forward capabilities.

In addition to the polar orbiting satellites, there are several geostationary earth orbiting (GEO) satellites. Geostationary satellites continuously view large areas of the Earth, and thus can provide immediate alerting and identification of 406 MHz beacons. The GEO satellites are not able to use Doppler location processing since they have no relative motion between them and the emergency beacons.

Specially made emergency beacons, such as some models of the MicroPLB™, can encode GPS position information into their transmission. When this signal is received by the GEO's and relayed to the USMCC it is treated much the same way as one received from the SARSAT and COSPAS satellites. The USMCC determines which RCC should respond and immediately transmits a message to that RCC. This means that a distress message, including location of the PLB, will reach rescue personnel immediately. Since they will know exactly where you are and who you are, the response can be extremely quick.

Appendix B) MicroPLB™ Specifications

C/S Designation Summary for the MicroPLB™, Model No. MBT-040600

Cospas/Sarsat Designation	National Location Protocol	Serial User Protocol	Standard Location Protocol	121.5 MHz Homing Transmitter	Accepts GPS Data[1]	Operating Time (Hours)
MBT-040600	√			√	√	24
MBT-040600-48	√			√	√	48
MBT-040600A		√		√		24
MBT-040600A-48		√		√		48
MBT-040600B	√				√	24
MBT-040600B-48	√				√	48
MBT-040600C		√				24
MBT-040600C-48		√				48
MBT-040600D			√	√	√	24
MBT-040600D-48			√	√	√	48
MBT-040600E			√		√	24
MBT-040600E-48			√		√	48

Notes: 1) Types AA and XL accept data from an external GPS receiver
Types GP and GX accept data from an Attached/Internal GPS receiver

Type Summary for the MicroPLB™

Type	External GPS	Attached/Internal GPS	Extended 48 Hr. Battery
AA	√		
GP		√	
XL	√		√
GX		√	√
BB			
BX			√

This document contains information on a new product. Specifications and information herein are subject to change without notice.

MINIATURE SARSAT PERSONAL LOCATOR BEACON (PLB)
MicroPLB™

MODEL No. MBT-040600
C/S Designations MBT-040600, MBT-040600-48

FREQUENCY	406.025 MHz
POWER	5 Watts ± 2dB
PROTOCOL	National Location Protocol
MODULATION	Phase Modulation: ± 1.1 Radians
SHORT TERM STABILITY	2 x 10-9
MEDIUM TERM STABILITY	1 x 10-9
HOMING SIGNAL	121.5 MHz, 25 mW min.
GPS	
Types AA and XL	Polarized NMEA Connector
Types GP and GX	Attached/Internal GPS Receiver
CASE	High Impact Resistant Plastic
SIZE	1.1" X 2.4" X 4.8" (Types AA and XL) 1.1" X 2.4" X 5.9" (Types GP and GX)
WEIGHT	~8 Oz. (Types AA and XL) ~9.5 Oz. (Types GP and GX)
ANTENNA	Protected By Case, Easily Deployed Antenna Vertical With Largest Face of Case Horizontal. Internal GPS antenna (Types GP and GX)
BATTERY PACK	Lithium Battery, Approved By U.S. DOT For Transportation By All Common Carriers
OPERATING MODES	Off, Transmit, and Test
ACTIVATION	Two Conscious Actions Required
INDICATORS	Flashing LEDs
OPERATING LIFE	24 Hrs. Minimum (Types AA and GP) 48 Hrs. Minimum (Types XL and GX)
OPERATING TEMPERATURE	-20^{o} to $+55^{o}$C (Class 2)
DUSTPROOF	Sealed Against Dust Penetration
WATER RESISTANT	No Leakage at 1 Meter Depth For 1 Hr.
COSPAS/SARSAT APPROVAL	Certificate No: 110

This document contains information on a new product. Specifications and information herein are subject to change without notice.

MINIATURE SARSAT PERSONAL LOCATOR BEACON (PLB)
MicroPLB™

MODEL No. MBT-040600
C/S Designations MBT-040600A, MBT-040600A-48

FREQUENCY	406.025 MHz
POWER	5 Watts ± 2dB
PROTOCOL	Serial User Protocol
MODULATION	Phase Modulation: ± 1.1 Radians
SHORT TERM STABILITY	2 x 10-9
MEDIUM TERM STABILITY	1 x 10-9
HOMING SIGNAL	121.5 MHz, 25 mW min.
GPS	Not Provided
CASE	High Impact Resistant Plastic
SIZE	1.1" X 2.4" X 4.8"
WEIGHT	~8 Oz.
ANTENNA	Protected By Case, Easily Deployed Antenna Vertical With Largest Face of Case Horizontal.
BATTERY PACK	Lithium Battery, Approved By U.S. DOT For Transportation By All Common Carriers
OPERATING MODES	Off, Transmit, and Test
ACTIVATION	Two Conscious Actions Required
INDICATORS	Flashing LEDs
OPERATING LIFE	24 Hrs. Minimum (Type BB) 48 Hrs. Minimum (Type BX)
OPERATING TEMPERATURE	-20^{o} to $+55^{o}$C (Class 2)
DUSTPROOF	Sealed Against Dust Penetration
WATER RESISTANT	No Leakage at 1 Meter Depth For 1 Hr.
COSPAS/SARSAT APPROVAL	Certificate No: 113

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MINIATURE SARSAT PERSONAL LOCATOR BEACON (PLB)
MicroPLB™

MODEL No. MBT-040600
C/S Designations MBT-040600B, MBT-040600B-48

FREQUENCY	406.025 MHz
POWER	5 Watts ± 2dB
PROTOCOL	National Location Protocol
MODULATION	Phase Modulation: ± 1.1 Radians
SHORT TERM STABILITY	2 x 10-9
MEDIUM TERM STABILITY	1 x 10-9
HOMING SIGNAL	Not Provided
GPS	
Types AA and XL	Polarized NMEA Connector
Types GP and GX	Attached/Internal GPS Receiver
CASE	High Impact Resistant Plastic
SIZE	1.1" X 2.4" X 4.8" (Types AA and XL) 1.1" X 2.4" X 5.9" (Types GP and GX)
WEIGHT	~8 Oz. (Types AA and XL) ~9.5 Oz. (Types GP and GX)
ANTENNA	Protected By Case, Easily Deployed Antenna Vertical With Largest Face of Case Horizontal. Internal GPS antenna (Types GP and GX)
BATTERY PACK	Lithium Battery, Approved By U.S. DOT For Transportation By All Common Carriers
OPERATING MODES	Off, Transmit, and Test
ACTIVATION	Two Conscious Actions Required
INDICATORS	Flashing LEDs
OPERATING LIFE	24 Hrs. Minimum (Types AA and GP) 48 Hrs. Minimum (Types XL and GX)
OPERATING TEMPERATURE	-20^{o} to $+55^{o}$C (Class 2)
DUSTPROOF	Sealed Against Dust Penetration
WATER RESISTANT	No Leakage at 1 Meter Depth For 1 Hr.
COSPAS/SARSAT APPROVAL	Certificate No: 114

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MINIATURE SARSAT PERSONAL LOCATOR BEACON (PLB)
MicroPLB™

MODEL No. MBT-040600
C/S Designations MBT-040600C, MBT-040600C-48

FREQUENCY	406.025 MHz
POWER	5 Watts ± 2dB
PROTOCOL	Serial User Protocol
MODULATION	Phase Modulation: ± 1.1 Radians
SHORT TERM STABILITY	2 x 10-9
MEDIUM TERM STABILITY	1 x 10-9
HOMING SIGNAL	Not Provided
GPS	Not Provided
CASE	High Impact Resistant Plastic
SIZE	1.1" X 2.4" X 4.8"
WEIGHT	~8 Oz.
ANTENNA	Protected By Case, Easily Deployed Antenna Vertical With Largest Face of Case Horizontal.
BATTERY PACK	Lithium Battery, Approved By U.S. DOT For Transportation By All Common Carriers
OPERATING MODES	Off, Transmit, and Test
ACTIVATION	Two Conscious Actions Required
INDICATORS	Flashing LEDs
OPERATING LIFE	24 Hrs. Minimum (Type BB) 48 Hrs. Minimum (Type BX)
OPERATING TEMPERATURE	-20^{o} to $+55^{o}$C (Class 2)
DUSTPROOF	Sealed Against Dust Penetration
WATER RESISTANT	No Leakage at 1 Meter Depth For 1 Hr.
COSPAS/SARSAT APPROVAL	Certificate No: 115

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MINIATURE SARSAT PERSONAL LOCATOR BEACON (PLB)
MicroPLB™

MODEL No. MBT-040600
C/S Designations MBT-040600D, MBT-040600D-48

FREQUENCY	406.025 MHz
POWER	5 Watts ± 2dB
PROTOCOL	Standard Location Protocol
MODULATION	Phase Modulation: ± 1.1 Radians
SHORT TERM STABILITY	2 x 10-9
MEDIUM TERM STABILITY	1 x 10-9
HOMING SIGNAL	121.5 MHz, 25 mW min.
GPS	
Types AA and XL	Polarized NMEA Connector
Types GP and GX	Attached/Internal GPS Receiver
CASE	High Impact Resistant Plastic
SIZE	1.1" X 2.4" X 4.8" (Types AA and XL) 1.1" X 2.4" X 5.9" (Types GP and GX)
WEIGHT	~8 Oz. (Types AA and XL) ~9.5 Oz. (Types GP and GX)
ANTENNA	Protected By Case, Easily Deployed Antenna Vertical With Largest Face of Case Horizontal. Internal GPS antenna (Types GP and GX)
BATTERY PACK	Lithium Battery, Approved By U.S. DOT For Transportation By All Common Carriers
OPERATING MODES	Off, Transmit, and Test
ACTIVATION	Two Conscious Actions Required
INDICATORS	Flashing LEDs
OPERATING LIFE	24 Hrs. Minimum (Types AA and GP) 48 Hrs. Minimum (Types XL and GX)
OPERATING TEMPERATURE	-20^{o} to $+55^{o}$C (Class 2)
DUSTPROOF	Sealed Against Dust Penetration
WATER RESISTANT	No Leakage at 1 Meter Depth For 1 Hr.
COSPAS/SARSAT APPROVAL	Certificate No: 110

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MINIATURE SARSAT PERSONAL LOCATOR BEACON (PLB)
MicroPLB™

MODEL No. MBT-040600
C/S Designations MBT-040600E, MBT-040600E-48

FREQUENCY	406.025 MHz
POWER	5 Watts ± 2dB
PROTOCOL	Standard Location Protocol
MODULATION	Phase Modulation: ± 1.1 Radians
SHORT TERM STABILITY	2 x 10-9
MEDIUM TERM STABILITY	1 x 10-9
HOMING SIGNAL	Not Provided
GPS	
Types AA and XL	Polarized NMEA Connector
Types GP and GX	Attached/Internal GPS Receiver
CASE	High Impact Resistant Plastic
SIZE	1.1" X 2.4" X 4.8" (Types AA and XL) 1.1" X 2.4" X 5.9" (Types GP and GX)
WEIGHT	~8 Oz. (Types AA and XL) ~9.5 Oz. (Types GP and GX)
ANTENNA	Protected By Case, Easily Deployed Antenna Vertical With Largest Face of Case Horizontal. Internal GPS antenna (Types GP and GX)
BATTERY PACK	Lithium Battery, Approved By U.S. DOT For Transportation By All Common Carriers
OPERATING MODES	Off, Transmit, and Test
ACTIVATION	Two Conscious Actions Required
INDICATORS	Flashing LEDs
OPERATING LIFE	24 Hrs. Minimum (Types AA and GP) 48 Hrs. Minimum (Types XL and GX)
OPERATING TEMPERATURE	-20^{o} to $+55^{o}$C (Class 2)
DUSTPROOF	Sealed Against Dust Penetration
WATER RESISTANT	No Leakage at 1 Meter Depth For 1 Hr.
COSPAS/SARSAT APPROVAL	Certificate No: 114

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