



Field Evaluation of the Magellan GSC-100 Global Communication Device

Bob Beckley, Project Leader

The Magellan GSC-100 is a hand-held communication device that uses the ORBCOMM network of satellites to send and receive short text-based messages called Global Grams.

The GSC-100 has the potential to be a valuable communication tool for the Forest Service. The Missoula Technology and Development Center (MTDC) researched the usefulness and reliability of the Magellan GSC-100 with the help of employees on the Wallowa-Whitman National Forest during the 2000 fire season.

This communication system has two parts. The GSC-100 is the hand-held communication device. A GSC-100 user subscribes to the ORBCOMM satellite system to send and receive messages (figure 1). Costs for this service are based on use and service fees.



Figure 1—The Magellan GSC-100 communication device can send and receive messages when users are beyond the range of other communication devices.

The ORBCOMM System

The ORBCOMM network includes constellations of low-Earth satellites. Currently 35 satellites are in orbit, but ORBCOMM is licensed by the FCC to launch and operate up to 48 satellites. The satellites are placed in constellations with overlapping

coverage, allowing global coverage. Low-Earth satellites orbit between 500 to 600 miles above the Earth. Users communicating with these satellites can use less powerful transmitters and a simpler antenna system than

users relying on satellites in higher orbits. Communication devices used with systems based on low-Earth satellites, such as the GSC-100, can be relatively small, lightweight, and inexpensive.



Key Features of the Magellan GSC-100

- * Lightweight (32 ounces)
- * Small (8 by 3.5 by 1.75 inches)
- * Wireless two-way, text-based messaging system
- * Menu-driven interface
- * Fully integrated global positioning system (GPS) receiver

Messaging Features of the Magellan GSC-100

- * Send and receive e-mail messages
- * Send and receive messages at preselected intervals
- * Store up to 100 messages in mailbox
- * Store up to 150 e-mail addresses
- * Insert current GPS position into message
- * Full keyboard and special function keys

GPS Features of the Magellan GSC-100

- * Six graphic navigation displays
- * Full-featured track plotter
- * Stores 200 user-defined waypoints
- * Five reversible routes with up to 15 legs

- * Six coordinate systems including latitude and longitude, UTM (Universal Transverse Mercator), and OSGB (Ordnance Survey Great Britain 1936)
- * NMEA (National Marine Electronics Association) outputs (0180/0183)
- * Differential ready
- * Sunrise, sunset, and lunar calculations

Using the Magellan GSC-100

With minimal training an operator can become proficient in the basic use of the GSC-100. The manufacturer provides a detailed user's manual, which should be kept with the device.

Each GSC-100 has its own unique Internet e-mail address. Anyone with an Internet e-mail account can send a message to your GSC-100 and you can send Global Gram messages to anyone with an Internet e-mail address. A GSC-100 can also send messages to alphanumeric pagers.

A service called *ORB2You* allows an operator to send a message to a call center. The operator can call any telephone number in the United States and read the message to the intended recipient. A GSC-100 user sends this type of message to *ORB2You@us.orbcomm.net*. Anyone can call 1-877-ORB2YOU to leave a message that will be transcribed by an ORBCOMM representative and sent by e-mail to a GSC-100 user.

Global Gram messages cannot be printed from the GSC-100, but they can be forwarded to another e-mail address for printing.

The GSC-100 also allows the user to get up-to-date weather reports for the

United States and up to 200 miles offshore through ORBWeather. To receive position-specific weather reports, send your GPS position to *orbweather@us.orbcomm.net*. You will receive local conditions for the current day and the following day and evening.

Performance Tips for the GSC-100

You can improve the performance of the GSC-100 with the following procedures:

- * The GSC-100 should only be used outside with a clear view of the sky. It will not work indoors. A closed tree canopy may also inhibit its use. Cloud cover does not affect performance.
- * The GSC-100 can be used with external GPS and VHF antennas. The VHF antenna is used with the ORBCOMM system. Antennas should be pointed in a southwesterly direction to follow the satellites' direction of travel.
- * Update the software for your GSC-100 (figures 2 and 3). The latest software for the GSC-100 is available free from Magellan. Use an IBM-compatible computer to download this software. Contact Magellan customer technical support at *gsc100@mgl.com* or call Magellan at 1-800-707-9971 for instructions on downloading the current version.
- * Periodically run the GSC-100 for a 24-hour cycle, especially if the instrument is not used frequently. Satellites shift their position. You need to run the GSC-100 for a 24-hour cycle to allow all the satellite elements in the GSC-100 to be updated. If this is not done, the GSC-100 may tell you a satellite is overhead when it is not.



Figure 2—Updating the GSC-100 software using an IBM-compatible computer.

- * Ensure that the GSC-100 is updated to its correct location. To do so, go through the GPS setup and verify that the run cycle is correct.
- * Ensure that the UTC (universal time coordinates) in the GSC-100 are correct.
- * Ensure that the battery pack is fully charged. Carry a spare fully charged battery. Recharge batteries when you return to your office.
- * Upgrade your antenna to boost signal strength. Titan Strategic Services offers antenna upgrades and other services for the GSC-100. Titan can be contacted at: Titan Strategic Services; 337 Fifth Ave.; Quantico, VA 22131; Phone: 703-590-5995; Fax: 208-361-1492
- * Satellite subscription fees vary, depending on the amount of time used, the number of machines in use, and the length of messages. Contact service providers listed under *Additional Resources* for current rates.

Conclusions

The GSC-100 communication device was field tested on the Wallowa-Whitman National Forest. It performed well in very steep canyons and in open locations.

Messages sent to and from the GSC-100 took from several minutes to several hours to be delivered. Updated software is available free from Magellan that will speed up delivery. The GPS function of the GSC-100 worked well and appeared to be accurate in all locations.

At this time MTDC feels the GSC-100 has potential as a field communication device in areas with poor or no radio or cell phone coverage, or for persons with

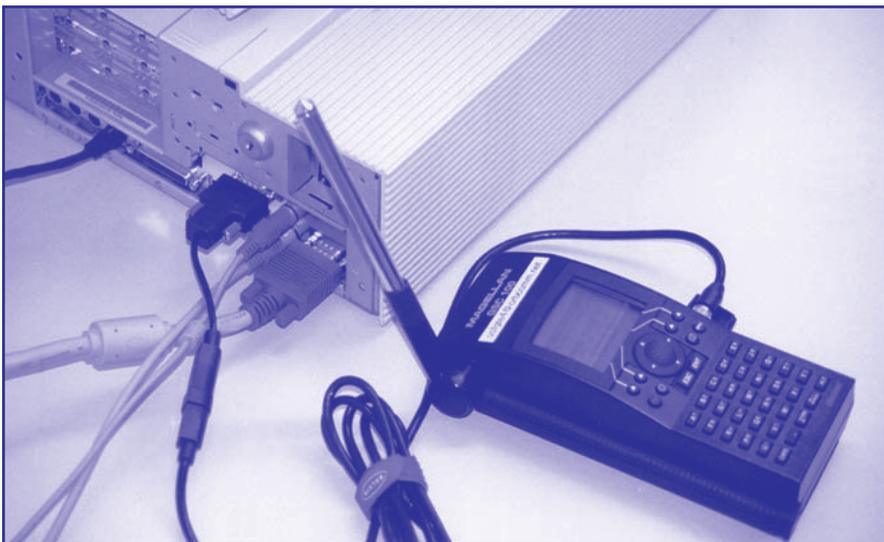


Figure 3—The GSC-100 kit has the connections for updating software.

hearing impairments. The GSC-100 should not be relied on for emergency use, nor as the sole means of communication, because of possible delays in message delivery. It can be used as a supplemental form of field communication where standard Forest Service radios experience dead zones in coverage.

Use of the GSC-100 and the ORB-COMM system is considered an extension of the Forest Service radio communication network. Use of this system requires technical approval from the Washington Office. Forest Service employees who would like to use this system should contact their regional office telecommunications personnel to request technical approval.

Additional Resources

Additional information about the GSC-100 can be obtained by contacting:

- * Magellan Customer Support
Phone: 800-707-9971
- * Magellan Consumer Products
960 Overland Ct.
San Dimas, CA 91773
Phone: 909-394-5000
Fax: 909-394-7050
Web site: <http://www.magellangps.com>
- * Titan Strategic Services
GSA Contract: GS06T00BND0042
337 Fifth Ave.
Quantico, VA 22134

Phone: 703-590-5995 or
703-630-1800
Fax: 208-361-1492
E-mail: wilamowski@aol.com

GSC-100 Sales and Service:

- * High-Tech Direct GPS and Communications Product Group
Headquarters
1 Terence Matthews Cres.
Kanata, ON K2M 2G3 CANADA
Phone: 613-599-5095
Fax: 613-599-5064
E-mail: InfoGPS@HTD.com
Technical support e-mail: TechGPS@HTD.com
Web site: <http://www.mysatmail.com>

About the Author

Bob Beckley received a bachelor's degree in political science from the University of Montana in 1982. He began his Forest Service career as a timber technician on the Nez Perce National Forest. Bob was a smokejumper when he came to the Missoula Technology and Development Center in 1990 to work as a videographer, photographer, and project leader.

Library Card

Beckley, Bob. 2001. Field evaluation of the Magellan GSC-100 global communication device. Tech Tip 0167-2337-MTDC. Missoula, MT: U.S. Department of Agriculture, Forest Service, Missoula Technology and Development Center. 4 p.

Describes the field evaluation of the Magellan GSC-100 hand-held, text-based global communication device.

The device uses the ORBCOMM low-Earth satellite constellation to relay text messages called Global Grams. It also allows users to receive up-to-date weather reports for the United States and for up to 200 miles offshore. Employees on the Wallowa-Whitman National Forest evaluated the Magellan GSC-100 during the 2000 fire season. Messages took from several minutes to several hours to be delivered. At this time, the Missoula Technology and Development Center feels the GSC-100 has potential as a field communication device in areas with poor or no radio or cell phone coverage, or for persons with hearing impairments. The GSC-100 should not be relied on for emergency use, or as the sole means of communication, because of possible delays in the delivery of messages.

Keywords: e-mail, messaging, satellites, telecommunications

Additional single copies of this document may be ordered from:

USDA Forest Service, MTDC
5785 Hwy. 10 West
Missoula, MT 59808-9361
Phone: 406-329-3978
Fax: 406-329-3719
E-mail: wo_mtdc_pubs@fs.fed.us

For further technical information, contact Bob Beckley at MTDC.

Phone: 406-329-3996
Fax: 406-329-3719
E-mail: rbeckley@fs.fed.us

An electronic copy of this report is available on the Internet at:

<http://fsweb.mtdc.wo.fs.fed.us/cgi-bin/enter.pl?link=pubs/htmlpubs/htm01672337/>



The Forest Service, United States Department of Agriculture (USDA), has developed this information for the guidance of its employees, its contractors, and its cooperating Federal and State agencies, and is not responsible for the interpretation or use of this information by anyone except its own employees. The use of trade, firm, or corporation names in this document is for the information and convenience of the reader, and does not constitute

an endorsement by the Department of any product or service to the exclusion of others that may be suitable. The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue SW., Washington, D.C. 20250-9410, or call 202-720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.