



Q&A

Questions & Answers for Mag Guard Monitoring System

(Rev. 4 – 23/10/08 Form # 9-0101)



TollFree: 1-888-61-GUARD (48273)

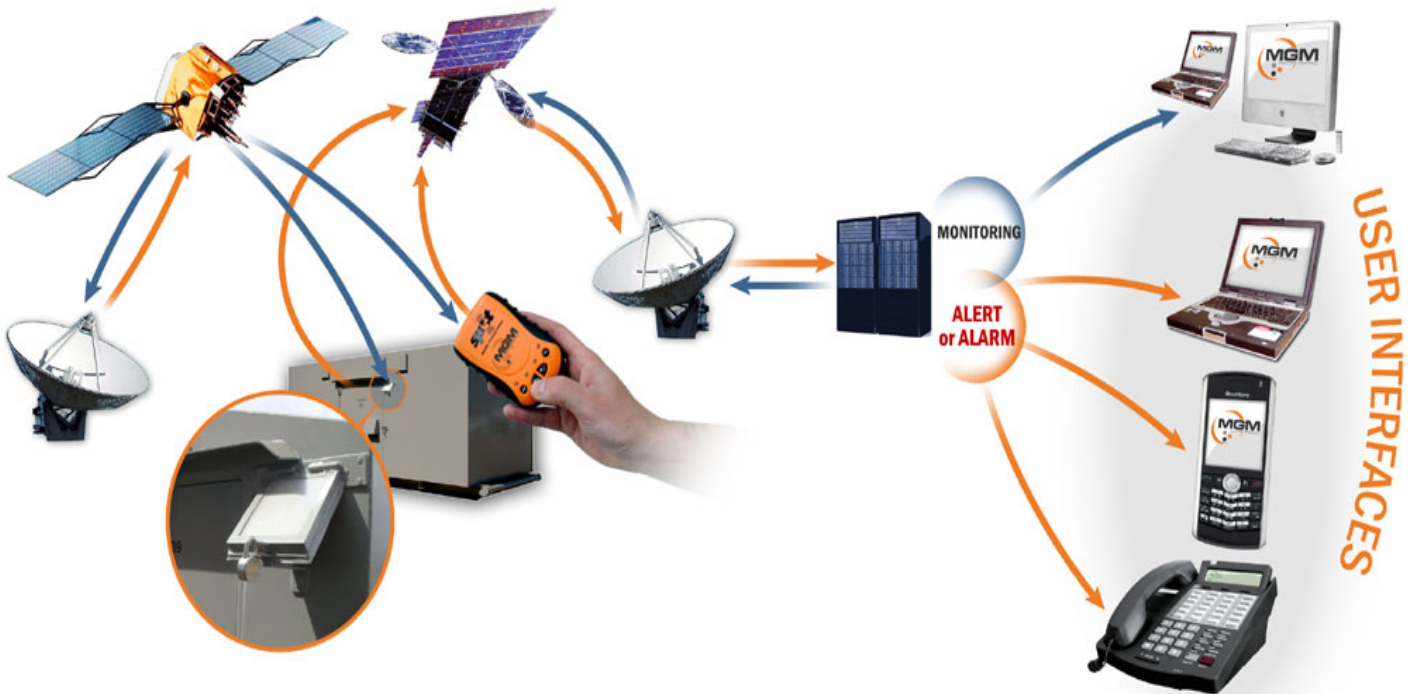
Email: info@magguardmonitoring.com Web: www.magguardmonitoring.com

Q&A – Questions & Answers for Mag Guard Monitoring System

(Rev. 4 – 23/10/08 Form # 9-0101)

Q. What parts or components make up the Mag Guard Monitoring system?

A. The Mag Guard Monitoring system consists of two primary physical parts: 1.) A Class 1 Division 2 STU (satellite transmission unit) is fastened to the explosives storage magazine or facility in a locked security housing. The STU is supplied with a Class 1 Division 2 magnetic door sensor and has inputs for up to 3 other sensors, as well, it has vibration/motion sensing capabilities and GPS capabilities (discussed below); 2.) A SPOT unit (hand held satellite transmitter) is carried with the individual wishing to make an “authorized access”. The signal from the SPOT unit provides a match to the STU signal, thereby providing the security that the person entering the controlled area is permitted to do so at that time and at that location. Other non-direct components of the system include the GPS constellation of navigation and positioning satellites, the Globalstar constellation of communications satellites, secure socket layers within the internet, file servers housed in level 4 secured facilities, hardware and software firewalls, extensive software with user GUI (graphic user interface), outgoing messaging in the forms of txt msg., SMS, and/or email, and telephony in the form of automated voice messaging available to cellular phones, land lines, satellite phones and soon VoIP. Data logging, information integrity, and security are paramount by design.



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Q. What is an STU?

A. An STU is a Satellite Transmission Unit, and may also be referred to as a form of RTU (Remote Transmission Unit). In Mag Guard’s magazine monitoring application, the STU is mounted on the explosives magazine or storage facility where it will transmit signals as required. The STU has a built in GPS locator, a vibration/motion monitor, and 4 I/O (in/out) ports to accept a variety of sensors for various applications. Each STU has a unique ESN (electronic serial number) which the file servers and software programs use to tell which unit is sending a particular data package (message). This STU and the magnetic door sensor are rated for Class 1 Division 2 (use in hazardous environments).



Q. What is the security housing?

A. The security housing is a metal lockable box with a lexan “window” that the STU is secured inside of (radio signals will pass through the lexan window). The security housing is mounted on the magazine being monitored, in this way there are no exposed wires or cables. The security housing provides a tamperproof mounting area for protecting the STU and associated wiring harness. Currently there are two versions of security housings: the first is intended for high snow load areas and mounts the STU on a 45° angle to the side wall of the magazine up near the roof line; the other is about the size of a pizza box and is mounted on the roof of the magazine.



Q. Are phone lines or power lines required at the storage facility or magazine?

A. Phone lines are not required as the STU transmits radio signals to a constellation of satellites for its communications needs. Power lines are not required as the STU is battery powered. The battery will run for at least three years under normal conditions and normal rates of usage (number of signals sent). Normal usage is 2 “check in” signals + one door open and one door close per day.

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Q. How is the system armed?

A. As soon as the door on a facility or magazine is closed the STU on the structure will transmit its electronic serial number, a “door closed status” message, and the GPS location of the STU – this series of signals advises the software to re-arm that magazine.

Q. What are the various status levels of the system?

A. The system has four levels of status:

1. “Normal status” – is displayed on the GUI (graphic user interface) when the STU check in signals are being received by our file servers and the STU reports that all onboard functions are within normal specifications.

2. “Activated” – is displayed on the GUI when an authorized access is being made at an STU monitored magazine/facility.

3. “Alert status” – is displayed on the GUI when something out of the ordinary has occurred but it has not escalated to an immediate action requirement. Examples of “Alerts” would include an STU “check in” message not being received when it was due, or that the battery is below 20% of its total power, or other onboard system is not functioning as normal. An alert status can be automatically escalated to an alarm status, for instance if an STU check in message is not received for a second time in a row, the system will change from an alert status to an alarm status and conversely, if the system is in alert mode because a check in message was not received at one of the specified times but the next check in message is received the system will log these events and will then move back to a normal status. An alert status is intended as an advisory message to the user(s) that although immediate action is not required, something is not normal with the system and is being monitored and logged.

4. “Alarm status” – is displayed on the GUI when something abnormal has occurred at the STU (magazine), and that this status change requires an immediate action to be carried out by the user(s). An alarm may be triggered by the detection of a door being opened without the associated SPOT signal being received within the required period of time (and/or the SPOT signal received was not within the correct GPS match to the magazine). An alarm can also be triggered by vibration and/or motion of the STU, and also if the reported GPS location of the STU does not match the last known location of the STU (this is programmable for mags intended to move (e.g. seismic magazines).

Logging – all status levels and associated messages are permanently logged with a date and time stamp. These logs are user accessible up to two years back in time and can be copied and pasted out of the log file, exported in electronic format, or printed as required.

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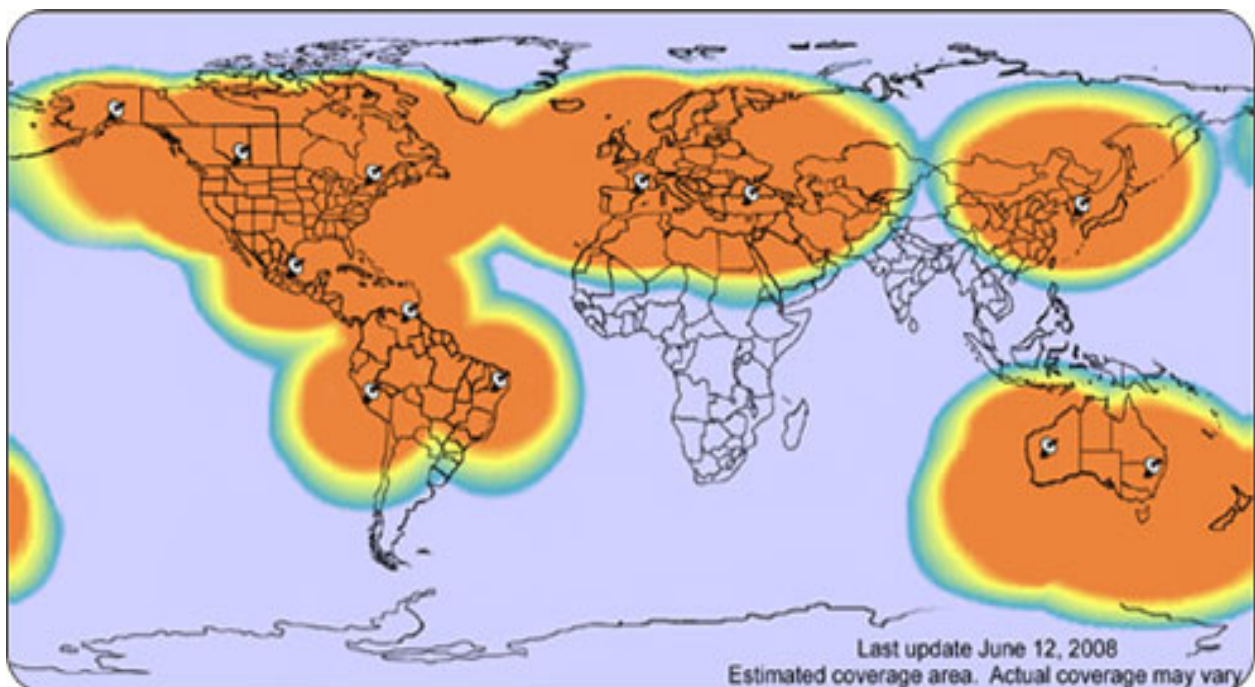
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Q. What is an STU “check in” message?

A. Each STU is pre-programmed to check in a specified number of times every day on a particular schedule. MGM file servers “look” for these “check in” messages from each STU to be sure each device is communicating and that all on board systems are functioning normally. The GPS location is also transmitted with this “check in” data package and the servers check this transmitted GPS location against the last five stored GPS locations previously sent by the STU to assure the storage facility has not been moved. If a check in signal is not received at its scheduled time, the system status will escalate from a “normal status” to an “alert status”. If the next check in signal is received on schedule and all on board systems are functioning normally, the system will revert back to “normal status”. However, if the next consecutive check in message is not received (and/or an on board system is not functioning normally) then the system will escalate further from an “alert status” to an “alarm status”

Q. Where will the Mag Guard Monitoring system operate in the world?

A. The Mag Guard Monitoring system will work almost anywhere in the world. The map below outlines the satellite coverage areas around the planet. If you want to find out about the systems viability in a specific location, call or email our office with the latitude and longitude and we will be able to provide you with an answer very quickly.



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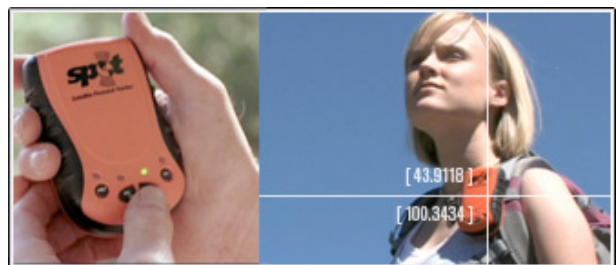
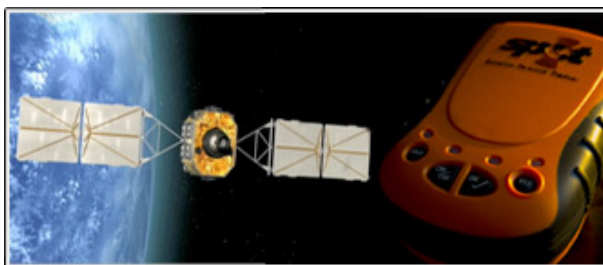
Q. Can terrain make a difference of how reliable the monitoring system will function?

A. Yes, the STU must “see” the sky in order to receive GPS information from the GPS constellation of satellites, and send information to the communications constellation of satellites. Nearby buildings, steep terrain, or high trees can block these radio transmissions. The easiest check is to do a cold start (turn from off to on) with a hand held GPS receiver at the location you think you would like to locate the STU – if you get a latitude and longitude reading and can “see” at least 4 satellites on the GPS receiver you are most likely in a place the STU should function normally. When placing the STU it is ideal if it can face in a southerly direction if at all possible if not aim the unit directly overhead (this is for placements in the northern hemisphere – aim the STU to the north in the southern hemisphere).

Q. Can weather make a difference to how reliable the monitoring system will function?

A. Yes, to a limited degree weather can affect system performance. Very heavy cloud cover, heavy rain fall or heavy snow fall can reduce the signal strength of extraterrestrial radio signals temporarily while the conditions persist (this does not mean the system will fail, but it may not report in on time during a designated check in (see below). During recent testing it was established that signals may not penetrate snow buildup on the STU when it exceeds about 6 feet (2 meters). Space weather (affects caused by the interaction of discharged particles from sun spots interacting with the outer layers of earth’s atmosphere) can cause temporary disruptions of extraterrestrial radio signals (and the accuracy of GPS readings). Overall, the history of extraterrestrial signals have proven to be at least 99.9% reliable, this is considerably higher than the reliability of most forms of terrestrial radio signals.

Q. What is a SPOT unit, and how does it work in the Mag Guard Monitoring system?



A. A SPOT unit is a hand held portable satellite transmitter. It has the ability to send its ESN (electronic serial number), pre-programmed messages, and its GPS coordinates at the time of transmission. At this time, only the On/Off and OK buttons will be active. The On/Off button is used to turn the power on and off within the SPOT unit. A momentary press of the OK button sends the required signal to the MGM file servers, this is processed and provides an “authorized entry” (if the correct SPOT-STU association, the GPS location, and the user accessible time parameters are verified). At a later date we hope to make available the “tracking” function, the “HELP” function, and the “911” function capabilities as optional services.

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Q. What is the term “associated” as it pertains to the SPOT and STU signals?

A. Each SPOT and each STU have their own unique ESN’s (electronic serial numbers). MGM software is programmed to make association matches for confirmation that an access to a magazine is in fact an “authorized access”. For example if three persons (each assigned their own SPOT units) are permitted to access six magazines (each with their own STUs) in a geographic area, each of the three SPOT unit ESN’s are software associated to provide a precursor signal to the system which it then determines can make an authorized entry on any of the six magazines their SPOTs are associated with. At a later date if required, more STU’s can be added to each SPOT units “associated list” as required. Also if required, more SPOT units can be added to the associated list for each STU located on each magazine.

Q. How can I utilize this system to log access control?

A. By assigning a SPOT to each person capable of accessing a particular magazine or group of magazines, access control of “who” (which SPOT) made the entry an “authorized entry” to a particular magazine, the date and time the door was initially opened, duration the mag door was opened, and when the door was closed again, is monitored, tracked and logged. This information log is held on file for instant access for up to two years (NRCan requirement is one year). In this way SPOT user access control can be monitored. Days of the week and times for each day for authorized accesses can be set for each individual SPOT unit (user), for instance you may not want any SPOT (any user) accessing the magazines from 2230 hrs to 0530 hrs any day of the week.

Q. How do I prepare my SPOT unit(s) for initial deployment?

A. Upon placing your initial order with MGM or one of its agents, you will be required to fill out an information form for each magazine location and on this form you are asked how many and which SPOT units are to be associated to each magazine (also if there are any days of the week or times of the day that you do not want any of the SPOT units to be able to disarm each or any of the magazines. When you receive your order you should call the MGM office during business hours at 1-888-614-8273 to activate your SPOT unit(s), ideally this should be done at least two business days before the STU’s are installed onto the magazines (to allow for administrative flow through). On the front of each SPOT unit is a serial number, you will need to provide this number during your setup phone call – this procedure is only required once. After your call is made, open the back battery compartment using a screw driver or the built in rings and swing the belt clip to the side, then loosen the 2 screws holding the cover in place and install the two AA batteries that are provided with each SPOT (see the back of the battery compartment for correct battery orientation – as the unit will not function if the batteries are installed incorrectly). NOTE: use only lithium batteries with the SPOT. After the batteries are installed replace the cover and clip, then tighten the screws.

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Q. How do I turn on/off the SPOT unit?

A. SPOT has a separate power button to ensure long battery life and to help avoid sending messages accidentally. To turn SPOT on, press the ON/OFF button. You must then wait an additional 2 seconds before activating any SPOT function. When power is on, the indicator light will blink once every 3 seconds. This is also helpful for making SPOT more visible in the dark. To turn SPOT off, press and hold the ON/OFF button for 3 seconds. The SPOT must “see” a clear view of the sky in order to receive the required GPS data it needs from the GPS satellite constellation, and it must also see the Globalstar communications constellation of satellites to effectively send the signals to the file servers.

Q. How do I send a signal when I want to make an authorized access to a particular magazine the SPOT has been associated with?

A. The OKV button on the SPOT unit should be pressed to transmit a signal to the satellite constellation. In order to provide an “authorized access” signal for entry into a magazine you should be within 10 meters (30 feet) of the STU on the magazine (gate or structure) as the GPS signal received from the SPOT transmission location is compared to the GPS location of the STU on the magazine you are about to access (if you are greater than a 10 meter (30 feet) distance from the STU the signal will be disregarded as an “authorized access signal, and only be considered a “SPOT check in” signal). By using this cross check of GPS locations one SPOT can be used to present the precursor signal for “authorized entry” on any number of magazines each with a different STU – as only the STU within 10 meters (30 feet) of the SPOT is matched to the signal for authorized access – no other STU at a distance greater than 10 meters (30 feet) from the STU is “disarmed”. Further to this, once the OKV button is pushed and the signal is received by the file servers a 35 minute stale date time is set for the signal – if the associated door is not opened within that time the system will automatically rearm the door and the signal is logged then disregarded by the system. If entry is to be made into that magazine after the 35 minute time window the SPOT must be activated again. Once the OKV button has been activated, the indicator light will blink green every three seconds, and turn solid green for 5 seconds when a SPOT OKV message is being sent. For maximum performance, leave the SPOT on and with a clear view of the sky for at least 20 minutes. You cannot cancel an OKV message, but you can stop any unsent SPOT messages by turning the unit off.

NOTE: Unsent SPOT messages are automatically disabled when you activate the 911 or HELP features (which will be offered as optional services for an additional fee when Version 2 software is running before the end of Q1 2009).

NOTE: GPS Coordinate Acquisition - The first time you turn on SPOT, or after moving more than 1000 kilometers (600 miles) since its last use, SPOT will normally determine your coordinates within 4 minutes. In rare instances, this could take longer. After that, SPOT will normally determine your GPS coordinates in less than one minute. If SPOT is unable to acquire its GPS coordinates, it will still attempt to send a satellite message, without coordinates, when either the 9-1-1 or HELP functions are activated. In the rare case that SPOT cannot obtain your GPS coordinates, but sends a 9-1-1 message, the Emergency Response Center will contact the primary and secondary contacts on your account to notify them of the distress message. The Emergency Response Center will then continually monitor the SPOT network for further messages.

NOTE: SPOT Message Schedule - The SPOT network, both hardware and software, are designed to work together to provide outstanding quality and reliability. With a perfect view of the entire sky, the SPOT network is designed to successfully send virtually every message. In everyday conditions, the view to the

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sky is often blocked due to hills, buildings, or other obstructions. It's normal for some messages to be blocked by your environment. That's why the SPOT Messenger is scheduled to automatically send multiple messages in every mode – giving you excellent overall reliability.

NOTE: Message Indicators - For all functions, SPOT lets you know what it's doing. While preparing to send a message, the function indicator and on/of lights will blink green every 3 seconds, in unison. Once SPOT has determined your GPS coordinates and sent your message, the indicator lights will turn solid green for 5 seconds and then continue flashing in unison. If the lights blink out of unison, this indicates that the messenger was not able to determine GPS coordinates, usually due to a blocked view of the sky. To correct, move the SPOT messenger to an area with a clearer view of the sky, where SPOT will automatically continue searching for a GPS signal. The lights will blink in unison once it is successful.

NOTE: Coverage - SPOT works around the world, including virtually all of North America, Europe and Australia, portions of South America, Northern Africa and Northeastern Asia, and hundreds or thousands of miles off-shore of these areas. It is important that you check coverage for your destination before traveling.

For the latest coverage information, visit www.MagGuardMonitoring.com

NOTE: Belt Clip Usage - For maximum GPS performance with sending any SPOT signals, hold the SPOT unit away from the body with a clear view of the sky until the lights turn solid for 5 seconds (after approximately 4 minutes) before attaching the device to your belt.

Q. Can I use the SPOT “OKV” button for other purposes?

A. Yes, the OKV button can be used for a variety of other functions, (however keep in mind that if the OKV button is activated within 10 meters (30 feet) of an associated magazine, it will disarm that mag for 35 minutes (unless the mag door is then opened and closed again – which automatically rearms the mag). The OKV button can be used at any time as a “check in” function of the SPOT unit for work alone procedures if required. It can also be used to send a message that you are at a particular place at a certain time (e.g. making a delivery, or arriving at a job site). It can also be used to mark a specific way point, or for route monitoring, as when-ever the OKV button is pushed a log of the SPOT location, date, and time is created. In version 2 of the MGM software, this data will be available as an overlay on Google maps (Version 2 will be on line before the end of Q1 2009).

Q. How do I use the “tracking” mode on SPOT?

A. Once the Version 2 software is up and running, the “tracking” function will also be available. Use this feature to send your location to your account every 10 minutes so your team can follow your progress in real time, or to save waypoints so you can view your full route at a later date. (NOTE: Additional fees will apply for this optional service when it is available.)

To Activate: Press and hold the OKV button for more than 5 seconds. The green indicator will begin blinking every 3 seconds, and the team members you have given access to your online account can view your progress. Your exact location is updated every 10 minutes for 24 hours. To continue tracking after 24 hours, you must activate the unit again. Once activated, the OKV indicator light will blink green every 3 seconds, and turn solid green for 5 seconds when a message is being sent. SPOT “check in” must be inactive for “tracking” to be activated.

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To Cancel: Turn unit off by pressing and holding the ON/OFF button for 3 seconds, or press and hold the OKV button for 5 seconds to terminate the “tracking” function. Any OKV functions (“check in” or “tracking”) are automatically disabled when you activate either 9-1-1 or HELP.

Q. How do I use the “HELP” mode on SPOT?

A. Use this option in the event of a non-life-threatening situation to notify your team – the business associates or family you have chosen to notify – that you need assistance. Or, in the event of a life-threatening emergency, 9-1-1 and HELP can be activated simultaneously to notify both the Emergency Response Center and your team that you are in distress. Even if SPOT cannot acquire its location from the GPS network, it will still attempt to send a distress signal – without exact location – to your selected contacts. (NOTE: Additional fees will apply for this optional service when it is available.)

To Activate: Press and hold the HELP button for 2 seconds. The team members you have specified in your online account will receive a pre-programmed distress message via text message and/or email with a link to Google Maps™ with your exact location. Once activated, the indicator light will blink green every 3 seconds, and turn solid green for 5 seconds when a message is being sent. SPOT will automatically determine your coordinates and send your message every 5 minutes for 1 hour in this mode.

To Cancel: Press and hold the HELP button for 3 seconds. The indicator light will change from green to red to indicate that it is preparing to send a “Cancel” message, and will then turn solid red for 5 seconds to indicate that the message has been sent.

Q. How do I use the “911” mode on SPOT?

A. Use this option in the event of a life-threatening or other critical emergency. The Emergency Response Center notifies the appropriate emergency responders based on your location and personal information – which may include local police, highway patrol, the Coast Guard, your country’s embassy or consulate, or other emergency response or search & rescue teams – as well as notifying your emergency contact person(s) about the receipt of a distress signal. Even if SPOT cannot acquire its location from the GPS network, it will still attempt to send a distress signal – without exact location – to the Emergency Response Center. (NOTE: Additional fees will apply for this optional service when it is available.)

To Activate: Press and hold the 9-1-1 button for at least 2 seconds. A distress signal and your exact location will be sent to an Emergency Response Center every 5 minutes until cancelled. Once activated, the indicator light will blink green every 3 seconds, and turn solid green for 5 seconds when a message is being sent.

To Cancel: Press and hold the 9-1-1 button for at least 3 seconds. The blinking green light will blink red to indicate that it is preparing to send a “Cancel” message, and will then turn solid red for 5 seconds to indicate that the message has been sent.

Q. Where should I put the SPOT unit if I am in a truck?

A. It is a good idea to place the SPOT unit face up on the dashboard of your truck (so the antenna within the SPOT can “see” the sky). After activating the OK button to send a signal, leave the SPOT unit on the

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dash board – *do not* take it into the magazine. The SPOT unit will send a signal when you press the OK button, it will then send the same signal again one or more times within the next 20 minutes. It does this to insure the signal is received by the file servers which make the association between the SPOT and the magazine STU's ESN (electronic serial number). The SPOT is not Class 1 Division 2 and therefore should not be taken into the magazine. Also the SPOT signals will not transmit through the walls or roof of most explosives magazines.

Q. Are the STU and the SPOT units safe for use around electric and electronic detonators?

A. Yes, both the STU and the SPOT units have undergone extensive testing and certification by the Franklin Institute for use in near proximity to detonators and energetic materials.

Q. What care and support should I know for my SPOT unit?

A. The following points should be read and understood before using the SPOT unit:

Battery Life and Usage

- Use only AA lithium batteries in your SPOT messenger. Alkaline or other battery technologies are not compatible and may damage or cause malfunction of the device.
- Lithium batteries properly installed in the SPOT messenger should last for several years stored. The ON/OFF light will flash red when lithium batteries have approximately 30% of their life or less left. If the ON/OFF light flashes red, or if you are unsure as to the battery life remaining, replace the batteries. Always test and verify your SPOT device before any trip.
- Under normal usage a full battery charge should meet or exceed the following:
 - Power ON, unused: Approx. 1 year
 - SPOT “tracking” mode: Approx. 14 days
 - 9-1-1 mode: Up to 7 consecutive days
 - SPOT “check in” OK/V: 1900 messages

Operating Conditions and Climate

Your SPOT Satellite Messenger unit is designed to go anywhere. However, like all electronic devices, it has its limits. SPOT relies upon GPS and low earth orbit satellites to fix your location and send your messages. To work, the SPOT logo (which is directly above the transmitter) needs to have an unobstructed view of the sky, either outdoors or in a glass enclosed area such as in a vehicle. For safety, keep the following in mind regarding the care and usage of SPOT:

- SPOT floats, but the SPOT logo needs to be facing the sky for the unit to work
- Waterproof to a depth of 1 meter for up to 30 minutes
- Operating Temperatures: -40°F to +185°F
- Operating Altitude: -300 ft to +21,300 ft
- Humidity and Salt Fog Rated
- OSHA Certified Intrinsically Safe to Class 1, Division 1, Group A-D standards

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Cleaning

Follow these general rules when cleaning the outside of your SPOT messenger:

- Make sure power is OFF.
- Use a damp, soft, lint-free cloth. Avoid excess moisture near buttons or openings.
- Don't use aerosol sprays, solvents, alcohol or abrasives.
- Do not attempt to open the SPOT unit case.

Troubleshooting

Spot performs a self-diagnostic test each time it is powered on. Additionally, for maximum security, Spot strongly recommends that you send and verify an OK/Check message each time before use. This allows you to evaluate your entire messaging system, from the operational condition of the messenger to the readiness of those you've chosen to notify of your messages.

- OK/V indicator light blinks RED every second immediately after ON/OFF button is pressed:
 - Unit Self-Test failed. Contact manufacturer.
- ON/OFF indicator light blinks RED every second:
 - Low batteries. Replace with new AA lithium type batteries. The ON/OFF light will flash red when lithium batteries have approximately 30% of their life or less left. If the ON/OFF light flashes red, or if you are unsure as to the battery life remaining, replace the batteries.
 - Improper battery type. SPOT is designed to use AA lithium batteries. Alkaline or other battery technologies are not compatible and may cause malfunction of the device. However, in a critical situation, non-lithium batteries may allow the unit to operate for a limited period of time if no lithium batteries are available. • Not all scheduled messages are received:
 - The SPOT network, both hardware and software, are designed to work together to provide outstanding quality and reliability. With a perfect view of the entire sky, the SPOT network is designed to successfully send virtually every message. In everyday conditions, the view to the sky is often blocked due to hills, buildings, or other obstructions. It's normal for some messages to be blocked by your environment. Therefore, SPOT automatically sends repeat messages, resulting in excellent overall reliability.

For additional questions or support:

Call Mag Guard Monitoring 1-888-614-8273.

Warranty:

SPOT is warranted for 12 months from the date of purchase against manufacturing defects. For warranty details and procedures call Mag Guard Monitoring Inc. or see the website www.MagGuardMonitoring.com .

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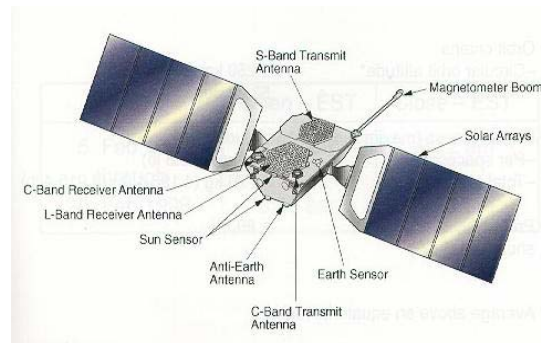
Q. What ratings and/or certifications does SPOT have?

A. SPOT carries the following:

- ROHS and WEEE compliant
- OSHA certified Intrinsically. Safe to Class 1, Division 1, Group A-D standards
- Certified to FCC and CE emissions, immunity and safety regulations. .
- Meets FCC part 25 regulations, Canada type approval, CISPR Publication 22 (1985 1st Edition), RTTE Directive (1999/EC) and IEC 60950 safety standard.

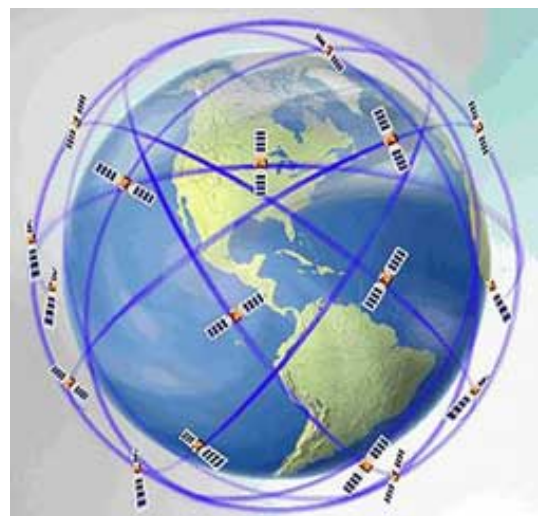
Q. What types of radio signals are utilized by this monitoring system?

A. Both the STU (satellite transmitter unit) mounted on the magazine or storage facility and the SPOT device emit a simplex (one way) transmission to the communications satellite constellation in the L-Band (1610 to 1621.35 MHz). As well, the signals received from the GPS constellation of satellites are also within the L Band (L1 – 1575.42 MHz)



Q. Where are the communications satellites?

A. Most communications satellites are in a Low Earth Orbit (LEO) which is generally defined as an orbit within the locus extending from the Earth's surface up to an altitude of 2,000 km. Most satellites placed in LEO travel at about 27,400 km/h (8 km/s). The Globalstar constellation of communications satellites consists of 48 satellites on 8 planes (with 8 spares in orbit). The inclination of these planes is 52° w.r.t. the equator. These satellites orbit approximately 1414 km above the earth's surface, in an approximate orbital radius of 7792 km. This provides each satellite "visibility" time of approximately 16.4 minutes, and an orbital period of 114 minutes. The transmission power of each satellite can run as high as 1000-1100 watts.

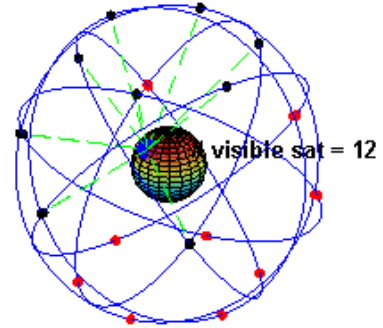


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Q. Where are the GPS satellites?

A. The GPS satellites are in a Medium Earth Orbit (MEO), sometimes called Intermediate Circular Orbit (ICO). This is the region of space around the earth above low earth orbit (2,000 kilometers (1,243 mi)) and below geostationary orbit (35,786 kilometers (22,236 mi)). The most common use for satellites in this region is for navigation, such as the GPS (20,200 kilometers (12,552 mi)), Glonass (19,100 kilometers (11,868 mi)) and Galileo (23,222 kilometers (14,429 mi)) constellations. The orbital periods of MEO satellites range from about 2 to 24 hours, the GPS satellites orbit the earth two times every sidereal day (a sidereal day is 3 minutes and 56 seconds shorter than a solar day). The GPS constellation was originally conceived as 6 planes of 4 satellites each with an inclination of 55° w.r.t. the equator and a separation of 60° right ascension. The orbits are arranged so that at least six satellites are always within line of sight from almost everywhere on Earth's surface. As of March 2008 there were 31 active satellites in the constellation. The additional satellites improve the precision of GPS receiver calculations by providing redundant measurements. With the increased number of satellites, the constellation was changed to a non-uniform arrangement. Such an arrangement was shown to improve reliability and availability of the system, relative to a uniform system, when multiple satellites fail. **L1** (1575.42 MHz): Mix of Navigation Message, coarse-acquisition (C/A) code and encrypted precision P(Y) code, plus the new L1C on future Block III satellites.



- **L2** (1227.60 MHz): P(Y) code, plus the new L2C code on the Block IIR-M and newer satellites.
- **L3** (1381.05 MHz): Used by the Nuclear Detonation (NUDET) Detection System Payload (NDS) to signal detection of nuclear detonations and other high-energy infrared events. Used to enforce nuclear test ban treaties.
- **L4** (1379.913 MHz): Being studied for additional ionospheric correction.
- **L5** (1176.45 MHz): Proposed for use as a civilian safety-of-life (SoL) signal (see GPS modernization). This frequency falls into an internationally protected range for aeronautical navigation, promising little or no interference under all circumstances. The first Block IIF satellite that would provide this signal is set to be launched in 2009.

Q. Do I need two units for Type 9 magazines?

A. Recently we received guidelines from NRCan Explosive Regulatory Division for installations on Canadian Type 9 (dual compartmented magazine) installations and shortly we will be able to utilize one STU to monitor both compartments on Type 9 magazines. The same wiring modifications (on a larger scale) will also be viable for both doors on Gun Loading Facilities (utilized by wire line companies to load guns for the petrochemical industry). These specialty installations are quoted specifically for the dimensions of the magazine/facility as custom cabling and installations are required.

Q&A – Questions & Answers for Mag Guard Monitoring System

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Q. Can gates be monitored?

A. Yes a gate can be monitored as can any type of door using a magnetic or contact type sensor. We lean toward the magnetic sensors as they are more reliable, there are no moving parts, and these are Class 1 Division 2 rated.

Q. Can other sensors be integrated into the system now or at some time in the future?

A. Yes, the STU we utilize for magazine monitoring has 4 I/O (in/out) contacts. One contact is used for each door sensor, the remaining “dry” contacts can be used for any sensor capable of providing a “change of state” (e.g. moves from NC – normally closed to open, or from NO – normally open to closed). Digital sensors (e.g. PIR – passive infrared sensors) can be utilized if there digital threshold output is provided as a “trigger” signal.

Q. Can I add / remove SPOTS from my overall magazine monitoring plan?

A. Yes, at this time a phone call and/or email to the MGM office during regular business hours will resolve any programming issues within two business days. By February 2009 the next generation of user interface will be available, at which time the user will be able to log into the system and change their parameters themselves.

Q. Can I add / remove STUs from my overall magazine monitoring plan?

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Q. How do I get a quotation from Mag Guard Monitoring Inc.?

A. You can access our website at <http://www.magguardmonitoring.com> and review equipment and monitoring plans. You can email a request for quotation to info@magguardmonitoring.com or you can call toll free to 1-888-61GUARD (1-888-614-8273). You will receive a Page 1 of Form #1-0001 which must be filled out for each magazine location, a credit application (if required for equipment purchase), a copy of the monitoring contract (Form #1-0002), and a credit card/electronic funds transfer authorization for monitoring fees (Form #1-0003).