

# SPOT5 User Guide



# Table of Contents

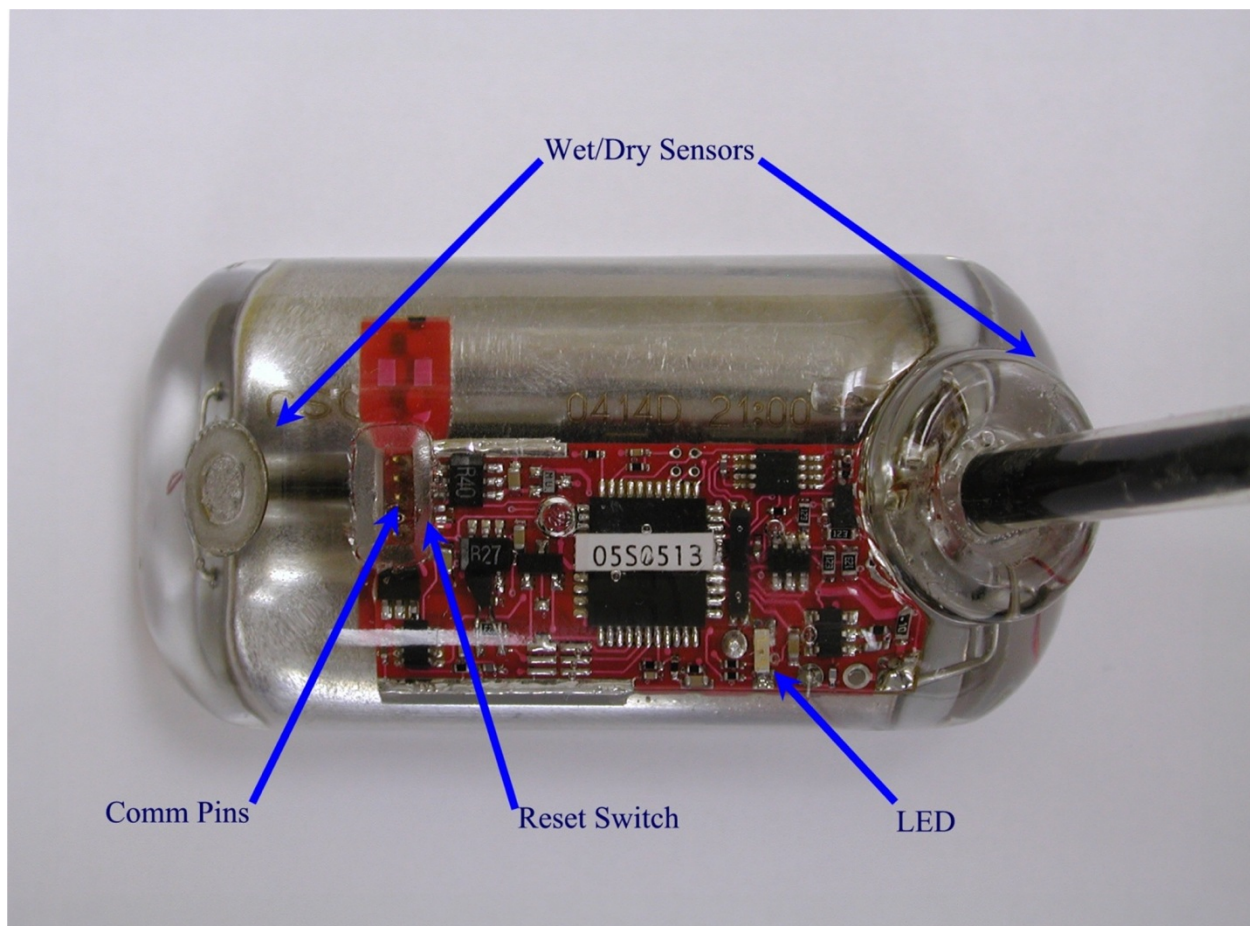
|  |           |
|--|-----------|
| <b>OVERVIEW OF SPOT5 FUNCTIONALITY .....</b>   | <b>4</b>  |
| TAG DIAGRAM.....   | 4         |
| WHAT IT DOES .....   | 5         |
| WHAT DATA ARE COLLECTED .....  | 5         |
| <i>Histogram messages</i> .....  | 5         |
| <i>Percentage Dry Timelines</i> .....  | 5         |
| <i>Status messages</i> .....   | 6         |
| <i>Decoding the messages</i> .....   | 6         |
| A WORD ON VERSION NUMBERS.....   | 6         |
| CONFIGURING SPOT5HOST TO YOUR PC .....   | 8         |
| CONNECTING THE SPOT5 TO YOUR PC .....  | 9         |
| INITIATE COMMUNICATIONS WITH THE SPOT5 .....   | 9         |
| <b>NAVIGATING THROUGH THE TABS .....</b>   | <b>10</b> |
| GENERAL TAB - PARAMETERS AND FUNCTIONS .....   | 10        |
| <i>Maximum number of transmissions per day</i> .....   | 10        |
| <i>Add any unused transmissions to the next day's allowance</i> .....                                | 10        |
| <i>Wet/Dry threshold</i> .....   | 10        |
| <i>Set SPOT5 Time and Date</i> .....   | 11        |
| <i>Generate Test Transmission</i> .....  | 12        |
| <i>Test Sensors</i> .....  | 12        |
| TRANSMISSION HOURS TAB: SET THE HOURS TO TRANSMIT .....  | 13        |
| <i>How to determine when a satellite is in view</i> .....  | 13        |
| TRANSMISSION DAYS TAB: SET WHICH DAYS TO TRANSMIT .....  | 14        |
| <i>Absolute vs. Relative Calendar</i> .....  | 14        |
| TRANSMISSION INTERVALS TAB: SET UP HOW OFTEN TO TRANSMIT.....  | 15        |
| <i>Fast and slow repetition rates</i> .....  | 15        |
| <i>Delaying transmission upon surfacing</i> .....  | 15        |
| <i>Change from Fast to Slow repetition rate after being dry for N successive transmissions</i> ..... | 15        |
| <i>Pause transmissions after being dry for N hours</i> .....   | 15        |
| <i>Restart transmissions after being continuously wet for N seconds</i> .....                        | 16        |
| <i>Homing pinger setup and function</i> .....  | 16        |
| TIME-AT-TEMPERATURE TAB: .....   | 17        |
| PERCENTAGE DRY TIMELINES TAB: .....  | 18        |
| <b>CONTROL BUTTONS COMMON ON ALL SCREENS .....</b>   | <b>19</b> |
| RELOAD FROM TAG .....  | 19        |
| STANDBY .....  | 19        |
| DEPLOY .....   | 19        |
| SHUTDOWN .....   | 19        |
| UPDATE TAG .....   | 19        |
| SAVE THIS SETUP .....  | 19        |
| RECALL PREVIOUS SETUP.....   | 19        |
| GENERATE REPORT .....  | 19        |
| <b>DEPLOYING THE SPOT5 .....</b>   | <b>21</b> |
| SPOT5 MODES.....   | 21        |
| <i>Standby mode</i> .....  | 21        |
| <i>Deployed mode</i> .....   | 21        |
| <i>Shutdown mode</i> .....   | 21        |
| <i>Changing mode with a magnet</i> .....   | 21        |
| <b>STORING SPOT5S .....</b>  | <b>23</b> |
| <b>OTHER ADVICE .....</b>  | <b>24</b> |

## *Overview of SPOT5 functionality*

The Wildlife Computers SPOT5 tag is a small-sized, real-time Argos transmitter that includes temperature and wet/dry sensors.

The SPOT5Host program, on the Wildlife Computers website, is used to communicate with the SPOT5 tag.

### *Tag Diagram*



### ***What it does***

The SPOT5 transmits to the Argos satellite system. These transmissions are relayed to the Argos ground systems, where they are used to calculate the location of the tag. Data can be encoded in the transmissions. See [www.argos-system.org](http://www.argos-system.org) for more information on the Argos system.

The SPOT5 has an on-board clock that helps it keep track of when a transmission should be made. When it is time to make a transmission, the SPOT5 monitors the wet/dry sensor. As soon as the sensor indicates a dry condition, the transmission is initiated.

### ***What data are collected***

In addition to Argos locations, the SPOT5 can optionally transmit the time an animal spends within user-defined temperature ranges in the form of “time-at-temperature” histograms. The SPOT5 can also be set to transmit “Percentage Dry Timelines.” These timelines show the percentage of each hour the animal is “dry.”

### ***Histogram messages***

The time-at-temperature histograms are built by counting the number of temperature readings (taken at 10 second intervals) which fall inside 12 user-specified temperature ranges. The user sets these temperature ranges, and also the time over which these histograms are built (from 1 per hour to 1 per 24 hours).

### ***Percentage Dry Timelines***

The percentage dry timelines show what percentage of the hour the tag’s wet/dry sensor indicated “dry.” The percentages are as follows:

| <b>% reported in DAP spreadsheet</b> | <b>Amount of time during hour</b> |
|--------------------------------------|-----------------------------------|
| 0                                    | 0% (no readings were dry)         |
| 3                                    | 0% < dry < 5%                     |
| 10                                   | 5% <= dry < 15%                   |
| 20                                   | 15% <= dry < 25%                  |
| 30                                   | 25% <= dry < 35%                  |
| 40                                   | 35% <= dry < 45%                  |
| 50                                   | 45% <= dry < 55%                  |
| 60                                   | 55% <= dry < 65%                  |
| 70                                   | 65% <= dry < 75%                  |
| 80                                   | 75% <= dry < 85%                  |
| 90                                   | 85% <= dry < 95%                  |
| 98                                   | 95% <= dry < 100%                 |
| 100                                  | 100% (every sample was dry)       |

***Status messages***

These messages contain diagnostics regarding the SPOT5's performance (e.g., number of messages transmitted and battery voltage).

***Decoding the messages***

Wildlife Computers provides an analysis program, WC-DAP, that decodes and displays the messages relayed by Argos.

***A word on version numbers***

The SPOT5's on-board software can be upgraded. The SPOT5 needs to be returned to Wildlife Computers to perform the upgrade. SPOT5Host will be upgraded in parallel. In order to keep the version of on-board software (SPOT5Ware) and SPOT5Host working seamlessly together, please note the following:

- The SPOT5Ware version numbers are in this format: ***x.yy***
- SPOT5Host has version numbers in this format ***a.bb.cccc***
- When attempting to communicate with a SPOT5 tag use the following rules:
  - ***a*** must be the same as ***x***
  - ***bb*** must be greater than or equal to ***yy***
- It is best to use highest ***cccc*** available – see our web site [www.wildlifecomputers.com](http://www.wildlifecomputers.com) for the most up-to-date SPOT5Host

Special care must be taken when communicating with SPOTs with different versions of SPOTWare. If you have some SPOT4s and some SPOT5s, you will need to use two versions of SPOTHost. All versions of SPOTHost will refuse to communicate with an inappropriate SPOT tag, and tell you why.

## ***Communication with the SPOT5***

User parameters are programmed into the SPOT5 via a Windows-based program provided by Wildlife Computers called SPOT5Host. SPOT5Host must be installed on your PC. Early versions of Windows may or may not work, depending on the configuration of your PC. We do not support other operating systems (e.g., UNIX) or Windows emulators.

Install SPOT5Host on your PC from [www.wildlifecomputers.com](http://www.wildlifecomputers.com), following the prompts. Next also install the Wildlife Computers USB-Blue driver software.

SPOT5Host synchronizes communications with the SPOT5's on-board software. Parameters are downloaded from the SPOT5 to your PC. SPOT5Host allows you to modify those parameters. Once the parameters are set, they can be uploaded to the SPOT5.

The SPOT5 is connected to your PC via a USB-Blue, available from Wildlife Computers only. The USB-Blue connects to a USB port on your PC.

Word of warning: make sure you install the USB-Blue driver before plugging in the USB-Blue.

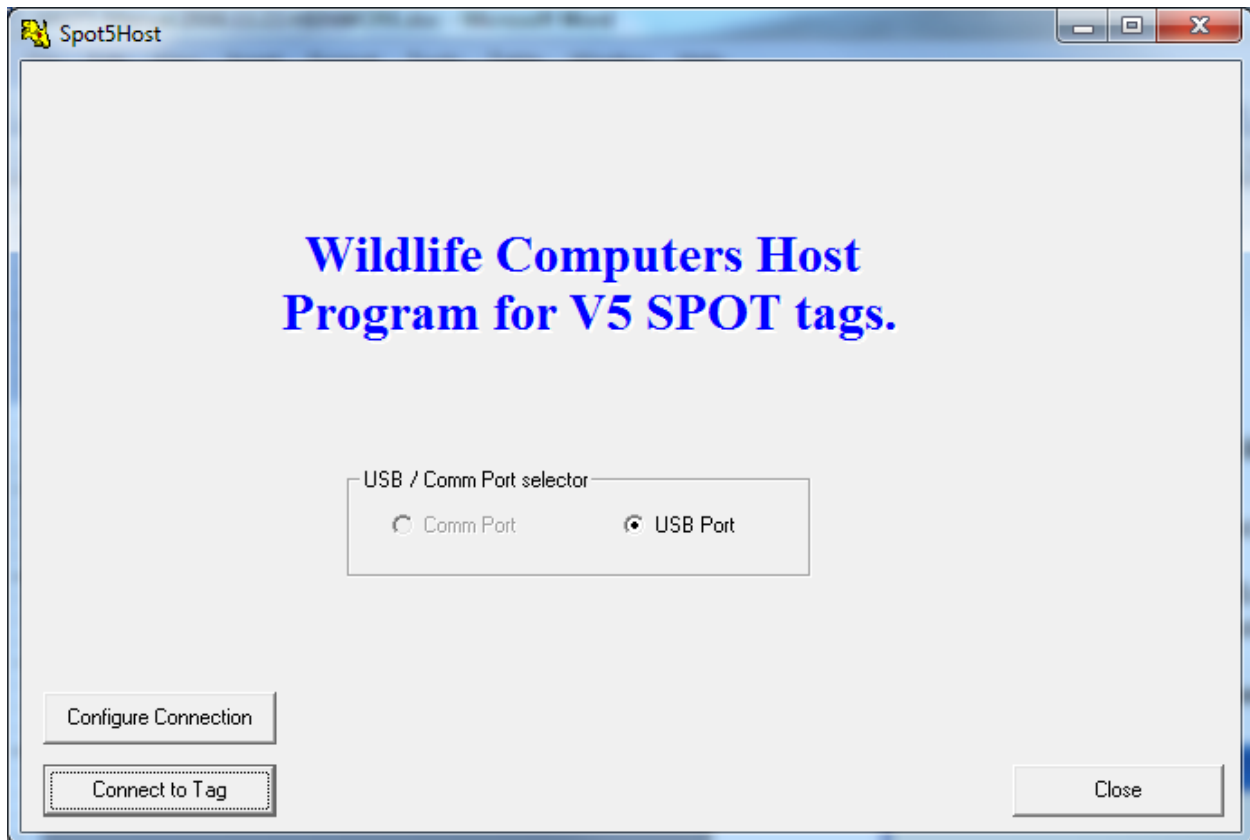
For laptop users, we suggest you set everything up on your new laptop before heading out to the field.

Note: If you have inherited a Blue Box or a Cable Comm see Appendix A for instructions on how to configure SPOT5Host.

## ***Configuring SPOT5Host to Your PC***

Each time you start SPOT5Host, you will be greeted with a Welcome screen.

If you are using a USB-Blue, be sure that the driver is installed prior to opening SPOT5Host. If the driver is installed and the USB-Blue is plugged in, the USB Port button should be selected on your Welcome screen.





## ***Connecting the SPOT5 to your PC***

Carefully insert the flat plug from the USB-Blue into the SPOT5's communications port. Note the orientation of the pins in the communications port. There are three pins in sequence, a "missing pin," and a single pin. Note the orientation of the sockets in the flat plug. One of the sockets is blocked. *It is critically important to ensure the flat plug is correctly oriented to the pins in the communications port before inserting the plug.*

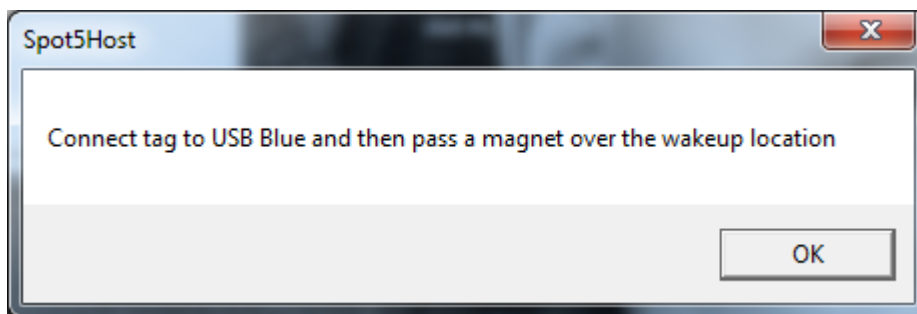
## ***Initiate Communications with the SPOT5***

Click "Connect to SPOT Tag."

Follow the instructions displayed on the Connection screen.

An LED on the SPOT5 will glow when the cables between the PC, USB-Blue, and SPOT5 are connected correctly and the magnet was passed over the reset location of the SPOT5. SPOT5Host may display additional prompts if there are difficulties in establishing communications.

***CAUTION:*** Do not leave the SPOT5 tag hooked up to the communications hardware any longer than necessary to set up or download the tag. Leaving the tag hooked up to the communications hardware for extended periods of time will eventually drain the battery.



Please note that the SPOT5 does not require a password to login.

## *Navigating through the Tabs*

### *General Tab - Parameters and Functions*

This screen displays and allows the update of basic parameters and the testing of the sensors and transmitter.

The screenshot shows the Spot5Host software window with the following details:

- Serial number:** 1150488
- Total Transmits since 20-Oct-2005:** 3937
- Tagware:** 5.03d
- Extended Argos PTT number:** 91983 or 0979D6F2 Hex. Uplink/LUT number: 9703/242
- Maximum number of transmissions per day:** 250
- Add any unused transmissions to next day's allowance:**
- Wet / Dry threshold:** 150
- Owner:** Wildlife Computers, 8345 154th Ave NE, Redmond, WA 98052
- Tag's Time & Date:** Date is 02/07/2013, Time is 17:15:39
- Results (Volts):** 3.89 V
- Results (Temp):** 3.66V
- Results (Cond):** 26.4C
- Results (Cond):** 255

#### *Maximum number of transmissions per day*

Generally 250 transmissions per day is sufficient for one location calculation a day in mid-latitudes.

#### *Add any unused transmissions to the next day's allowance*

Select this option if your study animal does not surface frequently, and you wish to maximize the probability of a location when it does surface. Do not select this option if you are limiting the number of transmissions per day in order to extend the deployment duration.

#### *Wet/Dry threshold*

This is the threshold value that the SPOT5 uses to determine “wet” vs. “dry.” The default value is appropriate for most marine applications. This threshold may need to be changed if the SPOT5 is being deployed in an area of low salinity (e.g., an estuary, the Baltic Sea). In such instances you will need to check what the SPOT5’s wet/dry sensor reads when immersed in that water. Click the **Test Sensors** (see below) and *carefully* dip the SPOT5 in a bucket of water from the

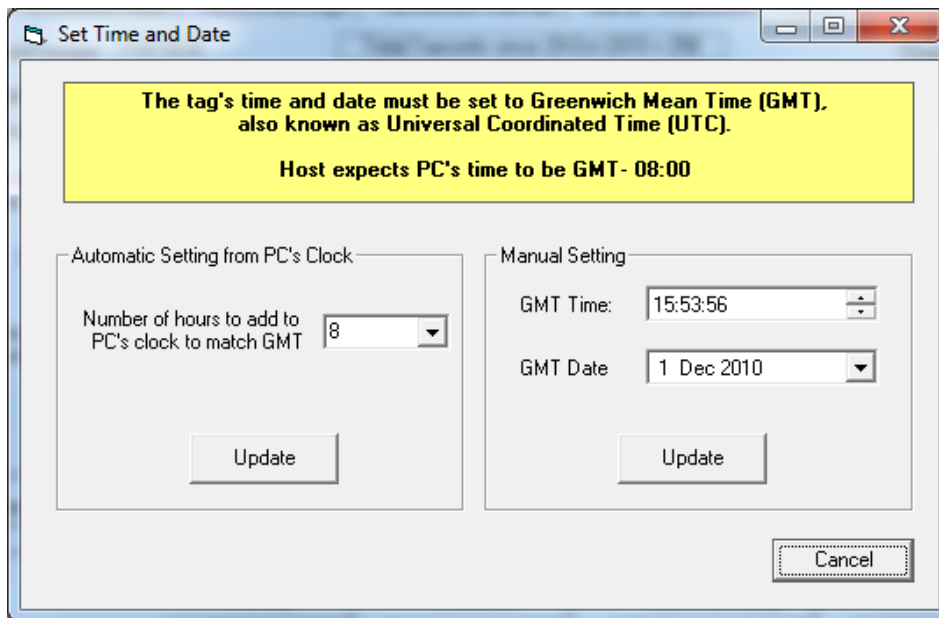
study area, taking care not to allow water to reach the communications port. Note the wet/dry sensor reading. The threshold should be set to double the value, but to no less than 40. The SPOT5Host program limits the minimum and maximum values you may set.

### ***Set SPOT5 Time and Date***

It is important to accurately set the SPOT5's time to GMT. The date and time are used to control when the SPOT5 makes transmissions, as well as controls how data are collected. The time displayed on the General Tab screen is from the SPOT5's clock at the time communications was established.

There are two ways to set the SPOT5's clock. The best and most accurate way is to use the clock on your PC. First ensure the clock on your PC is accurate and set to the correct time zone for your current location.

Click the ***Set Tag's Time*** button on the General Tab screen to bring up the window to set the SPOT5's clock.



***Automatic Settings from PC's Clock:*** If your PC clock is not set to GMT, select the number of hours that need to be **added** to the time on your PC's clock to match GMT. For example, if your PC is set to GMT -8, select "8" in the drop-down box. There are also negative values for countries ahead of GMT.

Click the ***Update*** button.

***Manual Setting:*** Alternately, enter the appropriate GMT date and time using an accurate time source, clicking the ***Update*** button to send the values to the SPOT5 tag.

Note: Following an update, correct GMT time can be verified via an internet search and compared with the tags time on the General Tab screen.

### ***Generate Test Transmission***

The voltage demand on a battery is greatest during transmissions. Generating a test transmission allows you to confirm the transmitter is functioning and the voltage is adequate. Clicking this button immediately initiates a transmission. You can detect the transmission with a Wildlife Computers TV1 transmission verifier, an Argos uplink receiver or any 401.65 MHz receiver. The battery voltage during the transmission will be displayed in the “Generate Test Transmission” results field and should be 3.0V or higher.

### ***Test Sensors***

This displays the temperature and the battery voltage under a low voltage draw. Verify that they are reasonable values.

Volts: greater than 3.0V

Temp: current temperature

Cond (wet/dry from wet/dry sensor): At least 200 in air

### ***Transmission Hours tab: Set the hours to transmit***

The Transmission Hours tab allows you to set the hours the SPOT5 should transmit. Utilities exist that will calculate the hours an Argos satellite will likely be in view. If you know the general location of your study animal, you can maximize the battery life by limiting transmissions to when an Argos satellite is likely to be in view.

Spot5Host

General | **Transmission Hours** | Transmission Days | Transmission Intervals | Time-at-Temperature | % Dry Timelines

Select the hours (UTC time) during which the tag should transmit. Remember to clear hour 00 and 23 if you are not transmitting every day to avoid unintentional Argos charges.

All On All Off

Transmit during all of the hours before midnight on the first day of deployment before resuming those on the right

|  |  |
|--|--|
| <input type="checkbox"/> 00            | <input type="checkbox"/> 12            |
| <input type="checkbox"/> 01            | <input type="checkbox"/> 13            |
| <input type="checkbox"/> 02            | <input checked="" type="checkbox"/> 14 |
| <input checked="" type="checkbox"/> 03 | <input checked="" type="checkbox"/> 15 |
| <input checked="" type="checkbox"/> 04 | <input checked="" type="checkbox"/> 16 |
| <input checked="" type="checkbox"/> 05 | <input checked="" type="checkbox"/> 17 |
| <input checked="" type="checkbox"/> 06 | <input checked="" type="checkbox"/> 18 |
| <input type="checkbox"/> 07            | <input checked="" type="checkbox"/> 19 |
| <input type="checkbox"/> 08            | <input type="checkbox"/> 20            |
| <input type="checkbox"/> 09            | <input type="checkbox"/> 21            |
| <input type="checkbox"/> 10            | <input type="checkbox"/> 22            |
| <input type="checkbox"/> 11            | <input type="checkbox"/> 23            |

Standby ShutDown Save this Setup Generate Report

Reload from Tag Deploy Update Tag Recall previous Setup

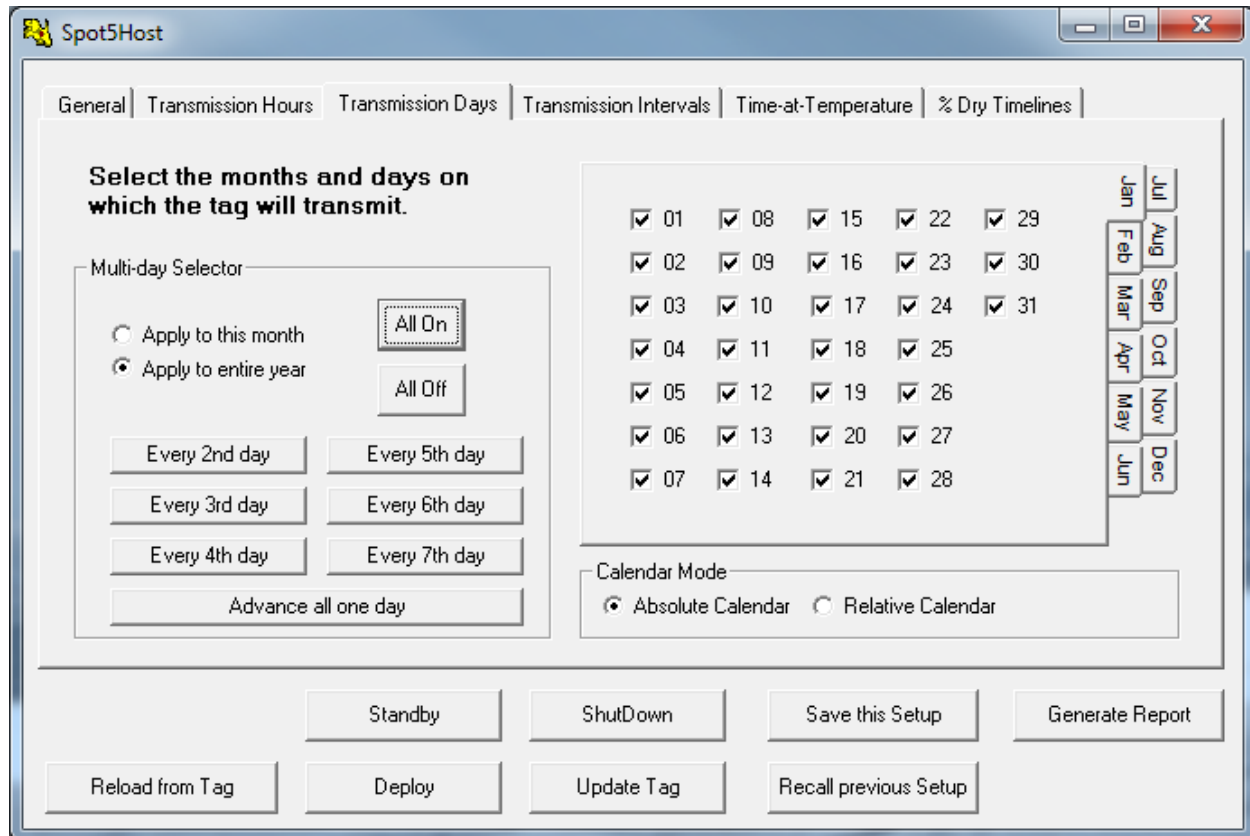
### ***How to determine when a satellite is in view***

To determine when the satellites will pass overhead, Argos offers a Satellite Prediction tool.

- Go to: <https://argos-system.clsamerica.com/cwi/Prediction.do>
- Enter your Argos Username and Password, and select your Time Zone and Language preference and click *Enter*.
- Select *Satellite Pass Predictions* from the left side bar.
- Enter Simulation period and Location data.
- Leave all satellites selected and click *Simulate* to get a list of satellite passes.

### ***Transmission Days tab: Set which days to transmit***

You can extend the battery life by controlling which days of the year the SPOT5 will transmit.



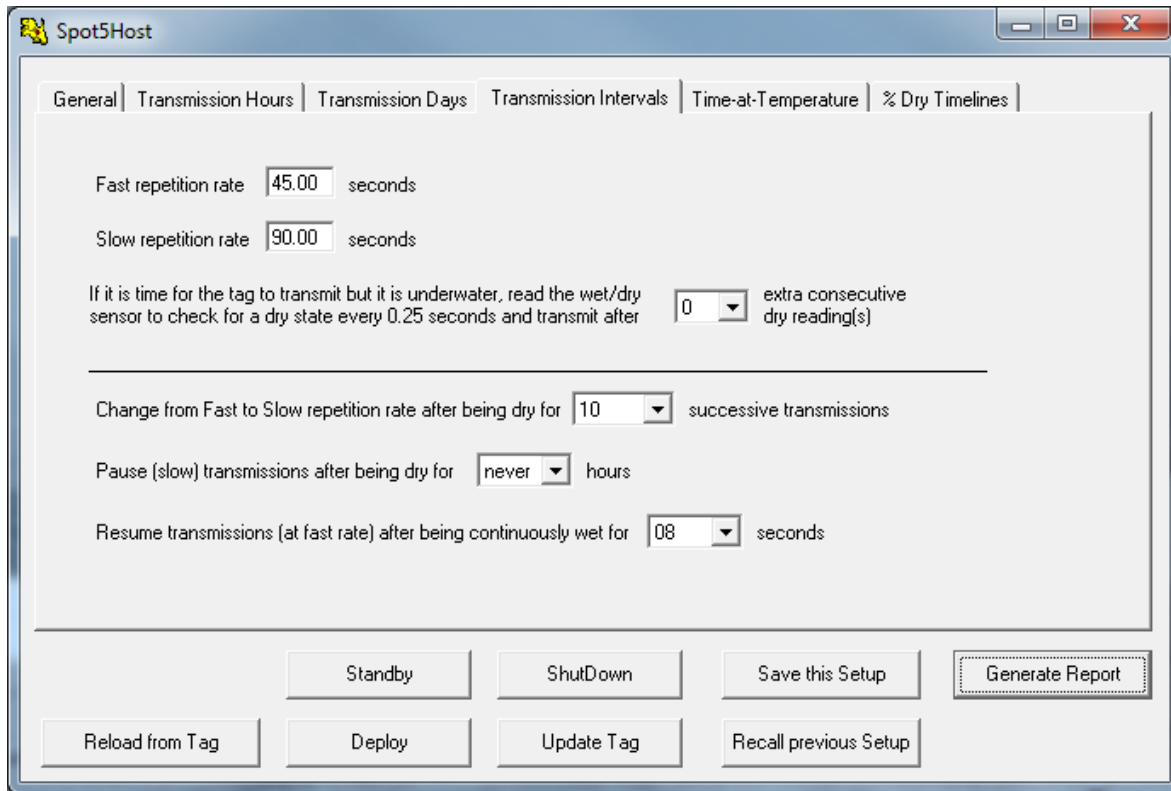
Note each day of the year can be set as “on” or “off.” This can be useful if you are more interested in locations during certain times of the year. For example, if you know your animal will be hauled out during March and April and begins its migration in May, you may want to set the SPOT5 to transmit every third day for March and April, and then transmit daily for the months following while the animal is at sea.

#### ***Absolute vs. Relative Calendar***

The *Absolute Calendar* uses the standard calendar year, starting with the present day's date.

If you choose to use the *Relative Calendar*, the SPOT5 will automatically change the date of the tag to 1 January upon deployment, keeping the year and time unchanged. Example: You want the SPOT5 to transmit every day for the first month of deployment, and then switch to every other day for the remainder of the year, but you do not know exactly what day you will deploy the tag.

### ***Transmission Intervals tab: set up how often to transmit***



#### ***Fast and slow repetition rates***

These rates are set by the manufacturer. It is easier for transmissions to reach the satellite when the animal is hauled-out, thus the rate of transmissions is slowed to extend battery life. The rate is increased when the animal is at sea to increase the probability of a good transmission reaching the satellite. The maximum (fastest) rate is imposed by Service Argos.

#### ***Delaying transmission upon surfacing***

The recommended setting is to transmit after 0 successive dry readings. This ensures the tag will attempt to transmit as soon as possible after the animal surfaces. However, some users may want to delay slightly the initial attempt to transmit to allow water to sheet away from the tag. This is recommended only if you know that your study animal is a longer surfacing species. Note that the dry readings are attempted at 0.25 second intervals, so a setting of 4 equals a 1-second delay.

#### ***Change from Fast to Slow repetition rate after being dry for N successive transmissions***

Determine how long in seconds the tag should be dry to indicate the animal has hauled-out. Divide that number by the fast transmission rate for this value. Set to NEVER to disable haul-out and ensure transmissions will always be at the fast repetition rate.

#### ***Pause transmissions after being dry for N hours***

You may wish the tag to suspend transmissions after the animal has been hauled-out for *N* hours to conserve battery life. Selecting “Never” hours will never pause transmissions.

***Restart transmissions after being continuously wet for N seconds.***

Ensure *N* is less than a typical dive duration, or else transmissions will never resume.

***Homing pinger setup and function***

If the tag has a tracking pinger, the pinger is enabled with 2 checkboxes on the ‘Transmission Intervals’ page in SPOT host.

General | Transmission Hours | Transmission Days | **Transmission Intervals** | Time-at-Temperature | Haul

Fast repetition rate  seconds  Enable Homing Pinger between transmissions

Slow repetition rate  seconds  Enable Homing Pinger between transmissions

If it is time for the tag to transmit but it is underwater, read the wet/dry sensor to check for a dry state every 0.25 seconds and transmit after  extra consecutive dry reading(s)

The pinger is enabled for use while the tag is at-sea by checking the box associated with ‘Fast repetition rate.’ This would be appropriate for a cetacean or shark deployment. Note that this repetition rate is for regular Argos transmissions, not the pinger.

The pinger can be enabled or disabled separately for haul outs by enabling the change to a slow repetition rate and checking the box associated with ‘Slow repetition rate.’ This would be appropriate for locating a pinniped or turtle on shore. Transition between Argos transmission rates is controlled in the bottom half of the page.

The pinger will transmit at a two second interval (factory setting) if allowed by the wet/dry sensor, transmission schedule, and repetition rate settings. Pinger transmissions will not be sent when the tag is underwater. Also note that the pinger will not be picked up by the Wildlife Computers TV1 (Argos transmission detector).

Contact Wildlife Computers for additional instructions and receiver recommendations.



***Time-at-Temperature tab:***

Spot5Host

General | Transmission Hours | Transmission Days | Transmission Intervals | **Time-at-Temperature** | % Dry Timelines

**Time-at-Temperature Histogram Bin Limits**

The tag measures temperature from -40C to 60C in approximate 0.1C steps. Enter the high limits for the first 11 time-at-temperature bins, the low bins will be updated automatically. The 12th bin limit is always 60C - the limit of the sensor. Numbers entered may be slightly modified to match the actual ability of the tag to measure temperature.

| Low   | High  |
|-------|-------|
| -40   | -20.0 |
| -19.9 | -10.0 |
| -9.9  | -5.0  |
| -4.9  | 0.0   |
| 0.1   | 5.0   |
| 5.1   | 10.0  |
| 10.1  | 15.0  |
| 15.1  | 25.0  |
| 25.1  | 35.0  |
| 35.1  | 45.1  |
| 45.2  | 55.0  |
| 55.1  | 60.0  |

Save to File    Read from File

**Hours at which to start new Histograms**

Check the start hours for creating a new time-at-temperature histogram. Only the last 12 collected histograms will be transmitted at any time. The start hours are measured in GMT. We do not generally recommend more than 6 histograms per day.

none    2 per day    3 per day    4 per day    6 per day    Advance all one Hour

|                                     |    |                                     |    |
|-------------------------------------|----|-------------------------------------|----|
| <input checked="" type="checkbox"/> | 00 | <input checked="" type="checkbox"/> | 12 |
| <input type="checkbox"/>            | 01 | <input type="checkbox"/>            | 13 |
| <input type="checkbox"/>            | 02 | <input type="checkbox"/>            | 14 |
| <input type="checkbox"/>            | 03 | <input type="checkbox"/>            | 15 |
| <input checked="" type="checkbox"/> | 04 | <input checked="" type="checkbox"/> | 16 |
| <input type="checkbox"/>            | 05 | <input type="checkbox"/>            | 17 |
| <input type="checkbox"/>            | 06 | <input type="checkbox"/>            | 18 |
| <input type="checkbox"/>            | 07 | <input type="checkbox"/>            | 19 |
| <input checked="" type="checkbox"/> | 08 | <input checked="" type="checkbox"/> | 20 |
| <input type="checkbox"/>            | 09 | <input type="checkbox"/>            | 21 |
| <input type="checkbox"/>            | 10 | <input type="checkbox"/>            | 22 |
| <input type="checkbox"/>            | 11 | <input type="checkbox"/>            | 23 |

Standby    ShutDown    Save this Setup    Generate Report

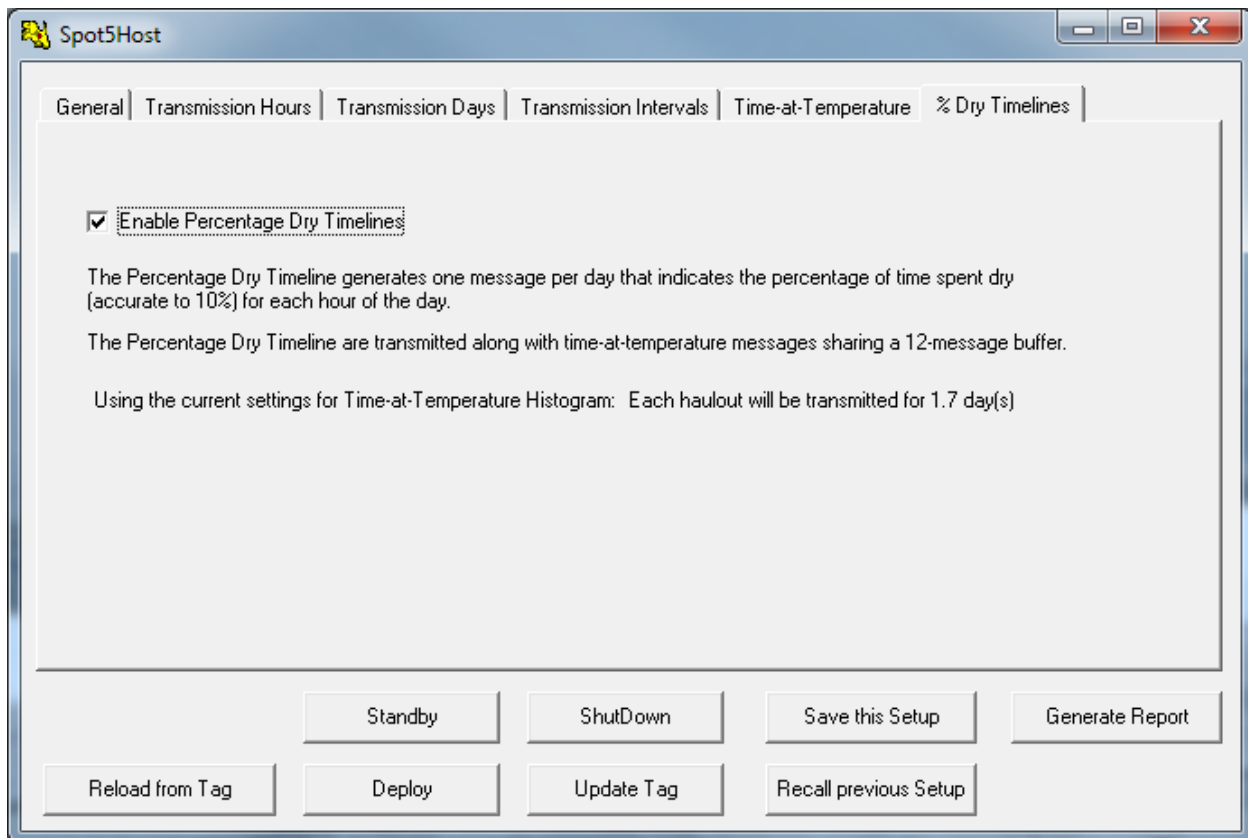
Reload from Tag    Deploy    Update Tag    Recall previous Setup

Each bin will contain the fraction of the histogram period the animal spent within that bin's temperature range.

The number of histograms per day can be selected. This defines the histogram duration (12, 8, 6, or 4 hours). Select "none" if you do not want the SPOT5 to collect and transmit histograms. Be aware that it takes approximately 1/3 more battery capacity to transmit Temperature Histograms and/or Percentage Dry Timelines.

The hour each histogram starts is in GMT. The start hour of the histograms can be changed to reflect diurnal behavior.

\*If you enable Time-at-Temperature histograms, be sure to generate and save a report file prior to deploying the tag. The SPOT tag does not transmit the TAT bin limits; it only transmits the amount of time spent in each bin. The report can be loaded into the Wildlife Computers decoding software (WC-DAP) along with your transmitted data, so the bins limits will be automatically associated with your decoded data.

***Percentage Dry Timelines tab:***

This screen allows you to enable Percentage Dry Timelines.

Be aware that it takes approximately 1/3 more battery capacity to transmit Temperature Histograms and/or Percentage Dry Timelines.

## ***Control buttons common on all screens***

### ***Reload from Tag***

The parameters displayed on the screen reside on the PC. This button reloads the parameters on the PC with the ones that are in the SPOT.

### ***Standby***

This button puts the SPOT in Standby mode and exits communications. This should be used if the SPOT is not going to be immediately deployed on an animal. A tag will auto-deploy in standby mode.

### ***Deploy***

This button puts the SPOT in “Deploy” mode, ready for attachment, and then exits communications. See below for further details.

### ***ShutDown***

This button puts the SPOT in “Shutdown” mode for long term storage and exits communications. Note that a tag in Shutdown mode will not respond to a magnet and must be connected to a PC for further communications. A tag in Shutdown mode will **not** auto-deploy.

### ***Update Tag***

This button uploads the parameters from the PC to the SPOT.

### ***Save This Setup***

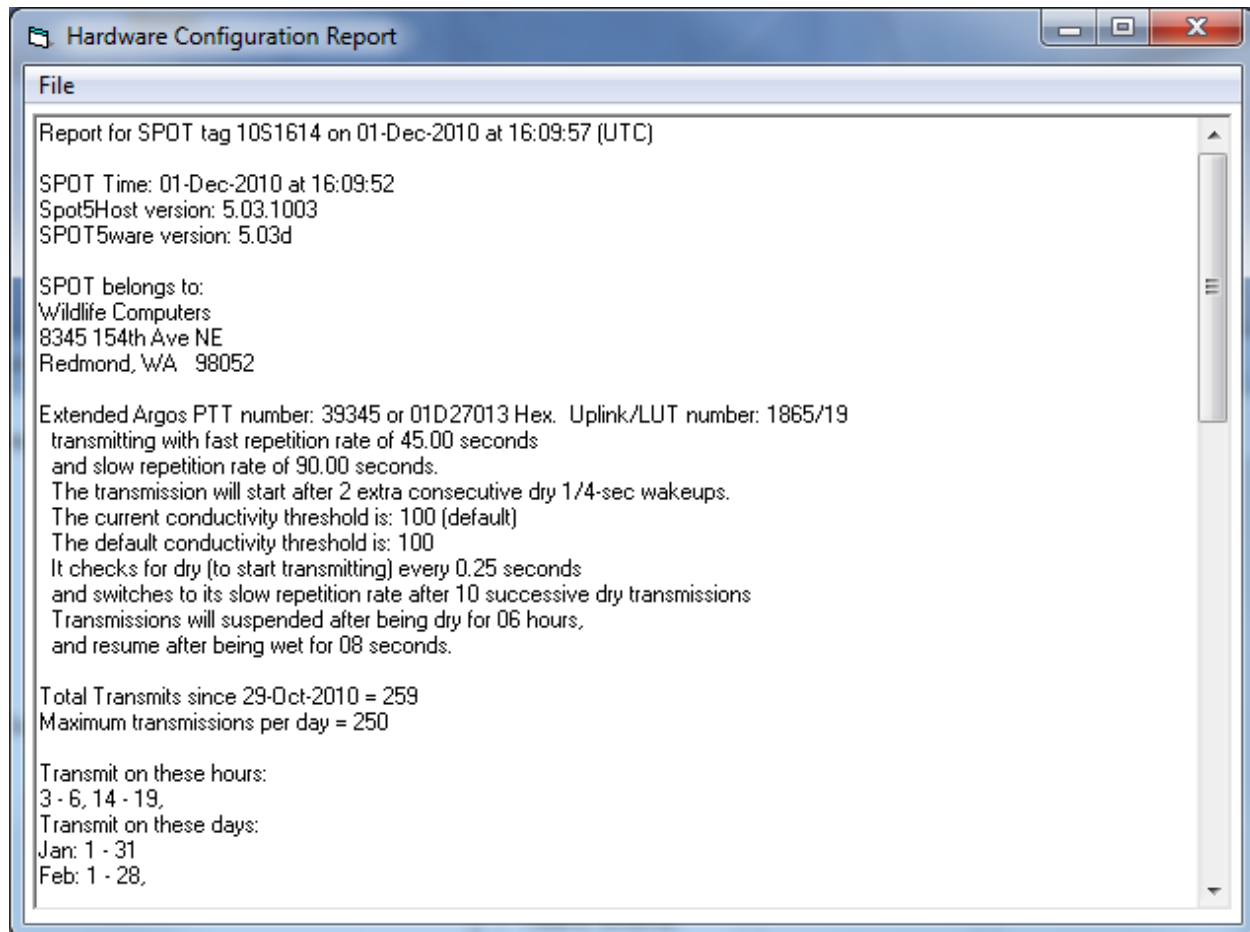
This is useful if you are setting up a series of SPOT5 tags and wish them all to have the same (or very similar) setup. Setup the first SPOT5 tag and then click this button. As long as you don't leave SPOT5Host, you can use the ***Recall Previous Setup*** button on subsequent SPOT5 tags to set all of the user-configurable parameters to be the same.

### ***Recall Previous Setup***

This loads a previously saved setup into the SPOT5 that is currently connected. This is to minimize the data entry. *It is important to always verify the parameters are correct, even when using the Recall Previous Setup.*

### ***Generate Report***

It is important to archive the configuration of the SPOT5 (versions, parameters) prior to deployment so that they can be used to correctly analyze the data. Click the ***Generate Report*** button. The following screen will display the configuration of the SPOT5 that is held by SPOT5Host.



The *File* menu item allows you to save and/or print this report.

*You should always save a copy of the report and review all parameters before deployment. The success of your experiment depends upon the correct setup of all parameters.*

Note that selecting this configuration report function only displays the SPOT5 parameters stored on the PC, not necessarily on the SPOT5, and does not perform any upload function. When running the report, the SPOT5Host will indicate if the report shows a change from what is on the SPOT5. If so, be sure to save the changes when you exit or deploy.

## *Deploying the SPOT5*

### *SPOT5 modes*

The SPOT5 is never entirely “turned off.” It is either deployed (transmitting according to schedule), in Standby mode monitoring for a signal to go into deployed mode, or in Shutdown mode. When you exit communications by clicking the *Standby* button in SPOT5Host, the tag goes into Standby mode. Clicking the *Deploy* button puts the tag into Deployed mode.

#### *Standby mode*

When in Standby mode, the SPOT5 will auto-deploy when submerged in seawater for at least 15 seconds. Just prior to deploying, the tag will blink once per second for five seconds. This mode allows the tag to be attached to an animal but conserve power until the animal enters the water. This mode also prevents deploying a deactivated tag that will never transmit.

#### *Deployed mode*

When first deployed, SPOT5 dimly lights its LED waiting for the top of the next minute. SPOT5 is not recording data or transmitting messages during this phase.

If collecting Time-at-Temperature histograms or Percentage Dry Timelines, the SPOT5 will blink its LED every 10 seconds when it wakes up and archives data. The LED will stop blinking after 31 hours.

The LED will always blink when the SPOT5 transmits data.

#### *Shutdown mode*

When a SPOT is in Shutdown mode, you cannot change the mode with a magnet, and the tag will not auto-deploy. This mode should be used *only* for storing and shipping tags. You *must* connect the SPOT to Host to turn it back on.

If the tag is in Shutdown mode, a swipe of the magnet will give one quick blink.

#### *Changing mode with a magnet*

You can display and change the mode of the SPOT5 after exiting communications by using a magnet.

Swipe a magnet once across the center of the SPOT5’s controller board. The LED will flash in a sequence that displays the mode of the SPOT5 tag.

- Standby mode LED pattern: **2 blinks, a 3 second pause, and 2 more blinks**
- Deployed mode LED pattern: **10 blinks**

Once the mode is displayed, the **LED will stay on for 2 seconds.**

- If you keep the magnet away from the SPOT5 while the LED is on, the SPOT5 will stay in its current mode.
- *If you swipe a magnet across the board while the LED is on, you will toggle the mode.* If the SPOT5 was toggled to the Standby mode, the LED will blink as described in

“Standby mode” above. If the SPOT5 was toggled to the Deployed mode, the LED will blink as described in “Deployed mode” above.

In summary, a single swipe of the magnet displays the mode of the SPOT5. It takes two specifically timed swipes of the magnet to change the mode.

## ***Storing SPOT5s***

Lithium batteries develop an oxide layer over their anodes to minimize self-discharging. This is called passivation. This process is exacerbated at high (30C+) temperatures. The passivation layer is “burned off” when current is drawn from the battery. Very little current is drawn from the SPOT5 when it is in Shutdown or Standby mode, so a passivation layer can form.

If the passivation layer is too thick, the battery voltage drops so low that the SPOT5 cannot function.

SPOT5s that will not be deployed for an extended period of time (more than one month) should be put into Shutdown mode and stored in a refrigerator or freezer (5 to -20C). This minimizes the battery passivation.

The SPOT5 should be tested after storage, prior to deployment. It is not necessary to warm up the tag prior to proceeding with the test.

- Establish communications with the tag.
- Go to the General tab in SPOT5Host
- Click ***Test Sensors*** to verify the sensors read appropriately and the battery voltage is appropriate under a low load (>2.9V).
- Click ***Generate Test Transmission*** to check the battery voltage under load (> 3.0V). The battery voltage may be a little low initially, but should increase after several transmissions.

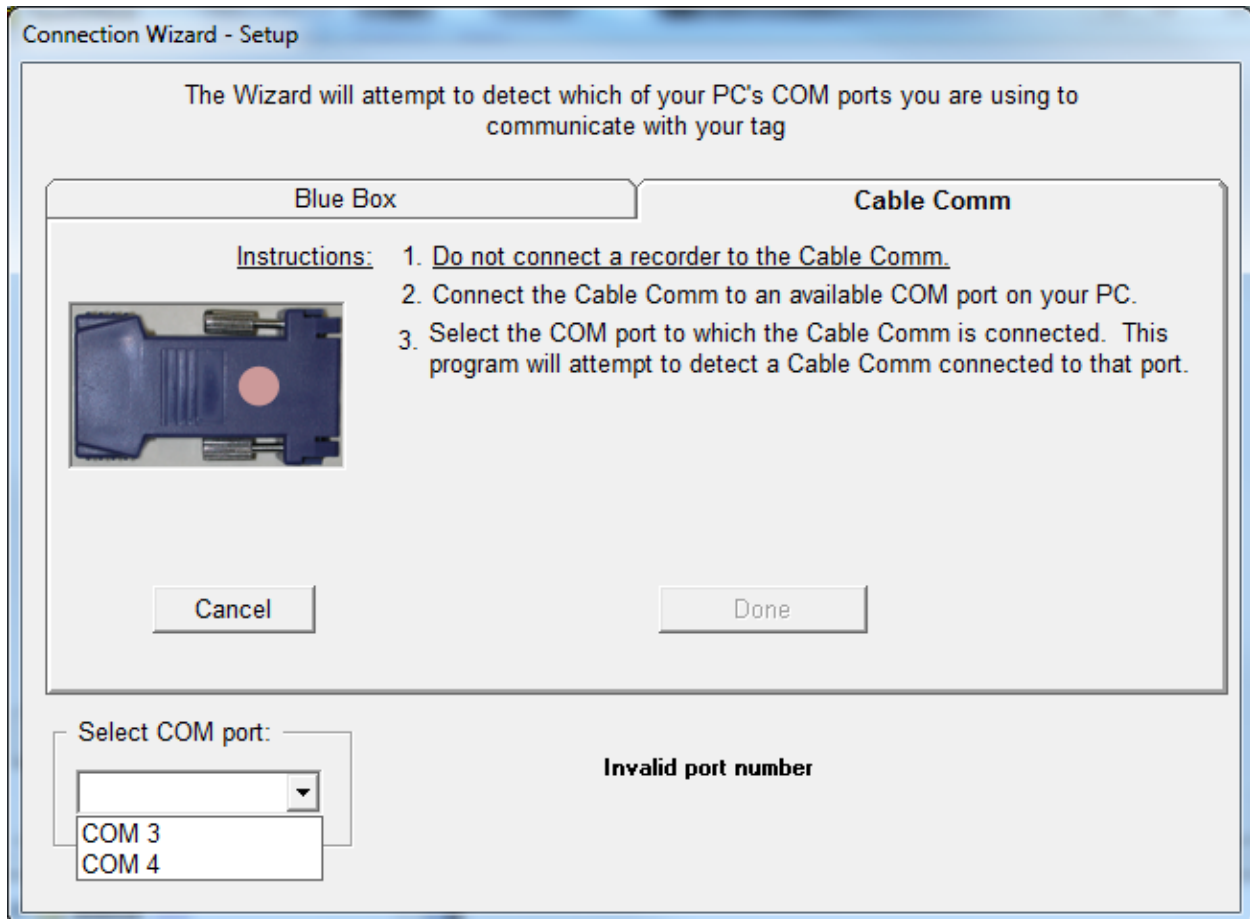
## *Other Advice*

1. Once a SPOT5 is deployed, keep all magnets away from the reset position. Even though it takes two specifically timed swipes of the magnet to change modes, it still is a good idea to keep magnets away just in case.
2. Do not use any metallic-based anti-fouling paint on the antenna. Metals near the antenna may seriously compromise the transmissions. PropSpeed anti-fouling paint is recommended for all antennas.
3. If your SPOT tag wet/dry sensors have not been coated with conductive polymer, use fine-grade sandpaper to ensure the wet/dry sensors are clean and free of any residual epoxy or other contaminants. Failure to do so may reduce the SPOT5's ability to determine "wet" and "dry."
4. If you will be traveling on a commercial carrier with your SPOT5 tags
  - a. We recommend that you have them in "Shutdown" mode so they are not transmitting.
  - b. If you hand-carry a tag, you may wish to carry a copy of your invoice or our product literature identifying the tag as a scientific research instrument.
5. We recommend that the user always take a laptop or other computer to the field location, even if the tags have been set up in advance, so that communication with the tag is possible on site if necessary.
6. We strongly recommend that the user ALWAYS re-verify that the tag is still in the proper mode following travel to the field site.



## ***Appendix A. Configuring COM Ports using a Blue Box or a Cable Comm.***

When using a Cable Comm, follow the prompts on this tab.



When using a Blue Box, follow the prompts on this tab.

