Iridium Site Survey Tool – Operating Instructions

Iridium Communications Inc.
1750 Tysons Boulevard, Suite 1400
McLean, VA 22102
USA

Introduction

The Iridium Site Survey Tool is used to detect potential interfering signals which may affect the performance of an IBSU. The Survey Tool measures all signals that can be seen by each of the 7 antennas and displays the results graphically in real time.

The tool takes about 3 hours to run a full survey of the maximum and mean signal strengths of each antenna, but provides options to shorten the scan time.

Survey data can be saved to a file and reloaded by the Survey Tool. The files saved are in comma-separated variable (.csv) format to allow further processing using other software, such as a spreadsheet.

Requirements

The Survey Tool runs on a PC running Microsoft® Windows 7, Vista or XP.

An Ethernet connection to an IBSU is required to capture data, but this is not required to view previously captured data files.

Installing the Survey Tool

The tool is supplied as two files contained in a .zip archive file. To install, simply extract the two files to a directory on the PC's hard disk. The two files are: 'SurveyTool.exe' and 'DPLPort.dll'.

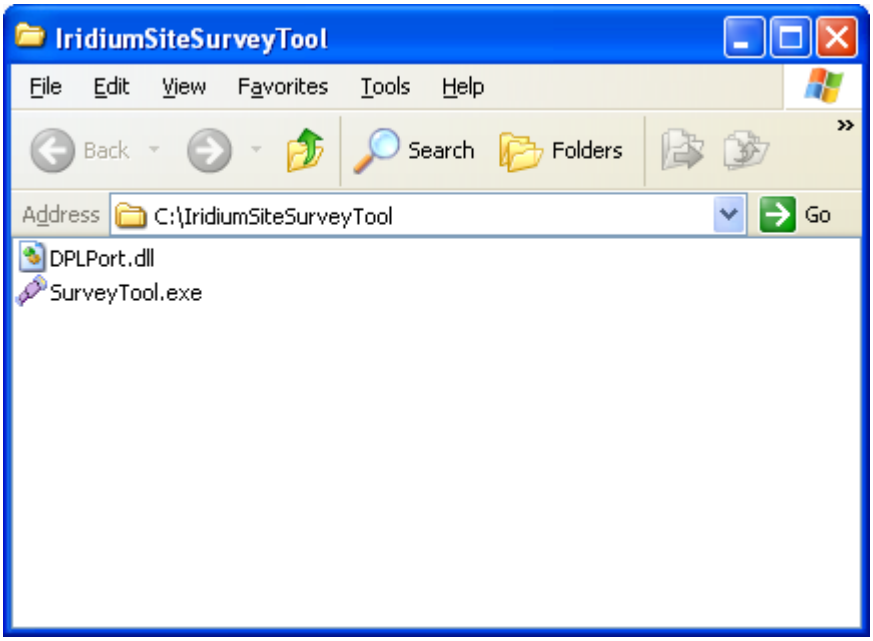

Figure 1 : Survey Tool files

Using the Survey Tool

1. Once the IBSU has been fully installed, connect the Ethernet port of the PC to the data port on the Below Decks Equipment. (Note that the TCP/IP settings of the PC need to be such that the PC is in the same subnet as the OpenPort terminal).

2. Open an Explorer window in the directory where the Survey Tool files were extracted.
3. Double-click 'SurveyTool.exe' to run the program. The survey tool will then open a window, as shown in Figure 2.

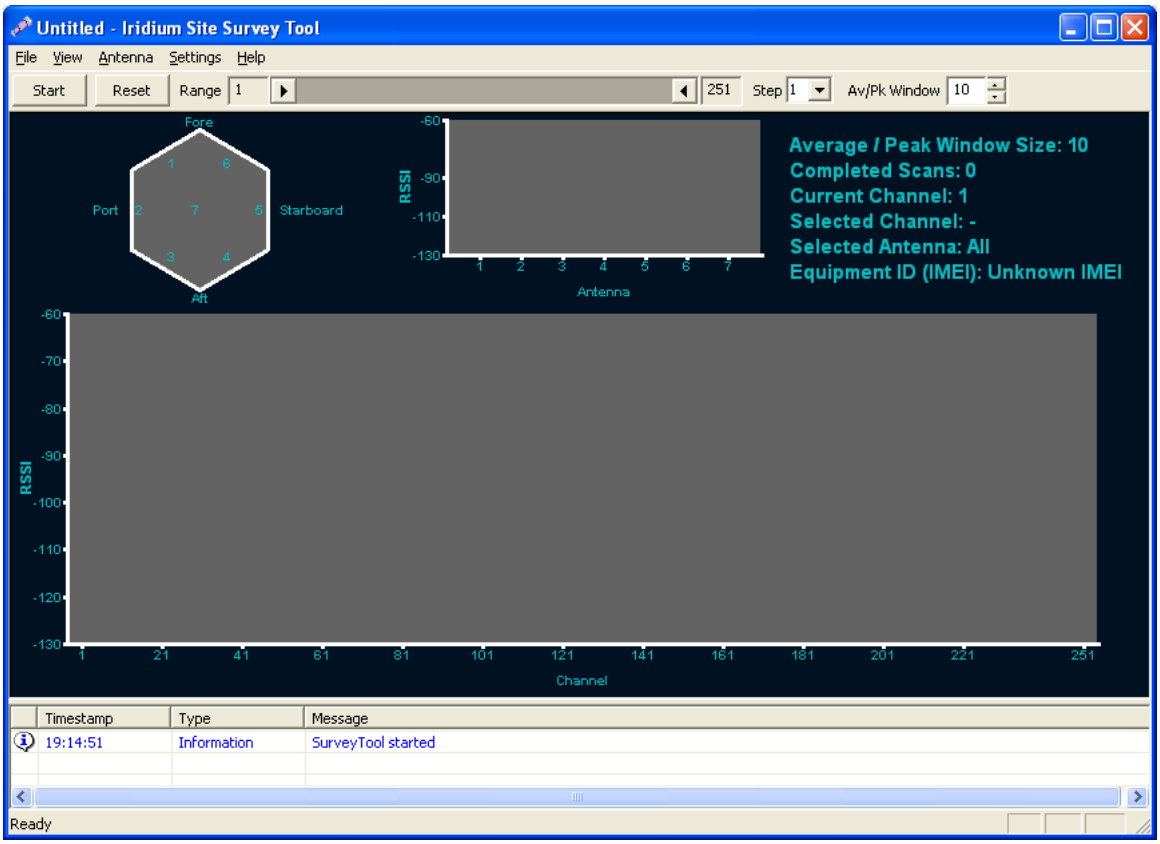

Figure 2 : Iridium Site Survey tool - Main Screen

4. To set up the Survey Tool to be able to connect to the IBSU, select **IP address …** from the **Settings** menu. In the dialogue box, enter the IP address of the IBSU. This will usually be the default setting of 192.168.0.1.

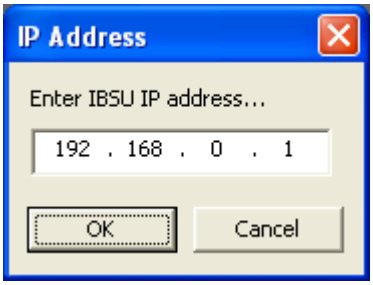

Figure 3 : Entering the IBSU IP address

5. To start scanning, click on the 'Start' button. The software will attempt to connect to the ISBU and start the scanning process. The software will store up to 100 completed scans. By default, peak and mean data from the last 10 scans will be displayed.

6. The range of channels scanned, the scan step size and data window size can either be set before starting a scan, or adjusted whilst the scan is in progress. These features are explained in more detail below.
7. Scanning can be stopped at any time by pressing the 'Stop' button.
8. To save the data, go to **Save As…** in the **File** menu.
9. It is possible to reopen previously saved data using **Open** in the **File** menu.

The User Interface

The following table describes the features of the Survey Tool, as shown in Figure 4:

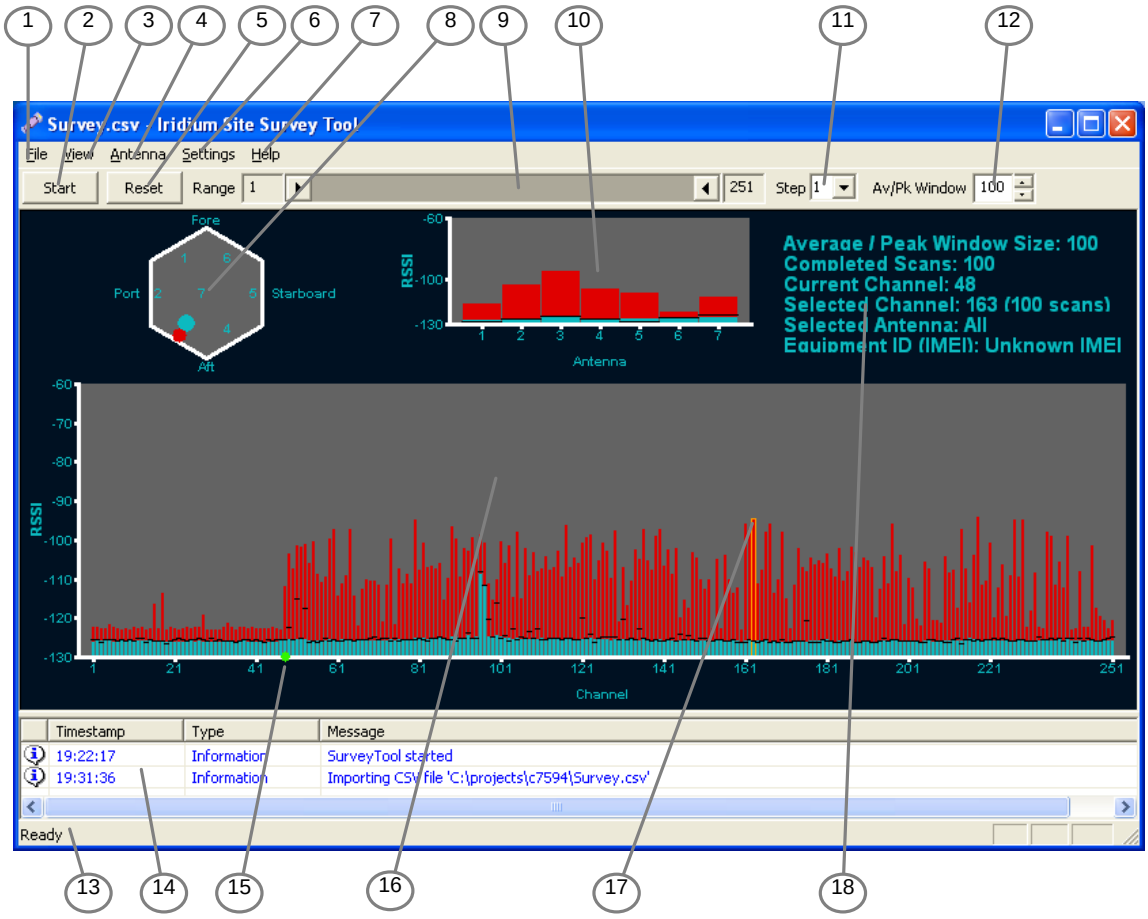

Figure 4 : User Interface

Item		Description
1	File menu	Allows survey data to be both saved to a file, and also opened so that previously surveyed data can be viewed.
2	Start / Stop button	Starts or stops a survey.

Item		Description
3	View menu	Allows the Message Window (14) and Status Bar (13) to be hidden.
4	Antenna menu	By default, data from all seven antennas are displayed in the Channel View (16). This menu allows the data from each antenna to be viewed individually. (Each scan still stores data from all seven antennas, even if only one is selected for display.)
5	Reset button	Clears any stored data.
6	Settings menu	Used to configure the IBSU IP address.
7	Help menu	Used to display 'About' information for the Site Survey Tool.
8	'Compass' view	Shows a representation of which direction the signal received on the selected channel (17) was from. Blue indicates the estimated direction from which signals were received, on average over a window period (12). Red indicates the estimated direction from which the peak signal was received during the window period (12). When the indicators are in the centre of the view, this indicates the signal was most strongly received from above the unit (antenna 7).
9	Scan range	The sliders can be dragged to set the minimum and maximum channel number to scan. This can be configured whilst a scan is in progress. Narrowing the scan range may be useful to quickly check if interference in a small range of channels has changed.
10	Antenna view	The antenna view shows the RSSI measured on each of the antennas for the selected channel. Red shows the peak RSSI measured over the window period. Blue shows the mean RSSI measured over the window period. The black line shows the most recent RSSI measurement.
11	Scan step size	The default step size is one, causing the Survey Tool to scan every channel. This setting can be changes whilst a scan is in progress. To reduce the time taken to sweep the entire channel range, it is possible to specify a larger step size.

Item		Description
12	Av/Pk Window	This setting determines the window period used to determine average and peak RSSI measurements. The average and mean RSSI values are displayed on the 'Compass' view (8), Antenna view (10) and Channel view (16). Data from up to 100 scans is stored in memory, so the window size can be set up to 100. The default is set to 10, so only average and peak RSSI values from the last 10 scans are shown, and the display will not take too long to respond to changes.
13	Status bar	Displays status of the tool and help on menu options.
14	Message Window	Shows progress information, such as the state of communications with the IBSU and error messages.
15	Current channel indicator	The green diamond shows the last channel to be scanned.
16	Channel View	The Channel View shows RSSI measurements for each channel. By default, the measurements for all antennas are combined, but an individual antenna can be selected using the Antenna menu (4). Red shows the peak RSSI measured over the window period. Blue shows the mean RSSI measured over the window period. The black line shows the most recent RSSI measurement.
17	Selected Channel	The currently selected channel is shown with a yellow highlight in the Channel View (16). A new channel can be selected by clicking at that position in the Channel View. The selected channel is used to choose which channel to display in the 'Compass' View (8) and the Antenna View (10).
18	Information View	The information view is used to display information about the current survey: **Average / Peak Window** size – the number of most recent measurements included in the Average and Peak calculation window (12) **Completed Scans** – the number of complete scans that have been made (data is stored for the last 100) **Current Channel** – the channel currently being scanned **Selected Antenna** – the antenna for which data is being displayed (4) **Equipment ID (IMEI)** – the IMEI of the connected IBSU (if known)

Analysing the results

The following example surveys show some example results from the Site Survey Tool.

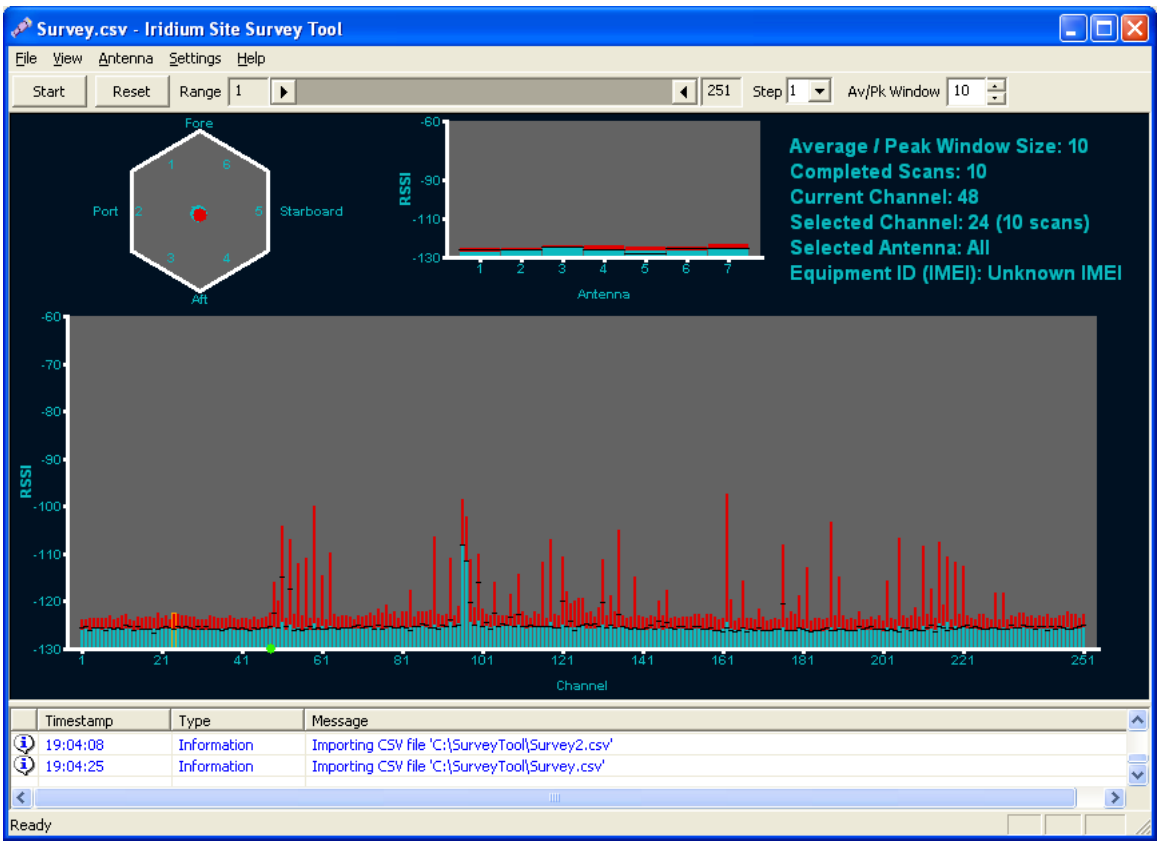

Figure 5 : Example Results

Figure 5 shows a survey from an environment generally free of interference. The fairly flat average signal shown by the blue bars in the Channel View at around -125dB indicates the noise floor.

There are many maximum RSSI spikes, coloured red, approximately 20dB above the noise floor. As they are stronger than the average signal (shown in blue) they are from an intermittent rather than continuous source. These spikes are probably transmissions from Iridium satellites and unlikely to be a cause of interference. (Even if there are a large number of spikes, the Iridium system should manage the channels so that users do not interfere with each other).

Red peak signals that are much greater than 20dB above the noise floor may be caused by local transmitters, either other Iridium equipment, or other devices causing intermittent interference.

There is increased RSSI (both mean and peak) measured around channel 100. This is probably interference due to PC's in the local area. Performance may be affected around these channels.

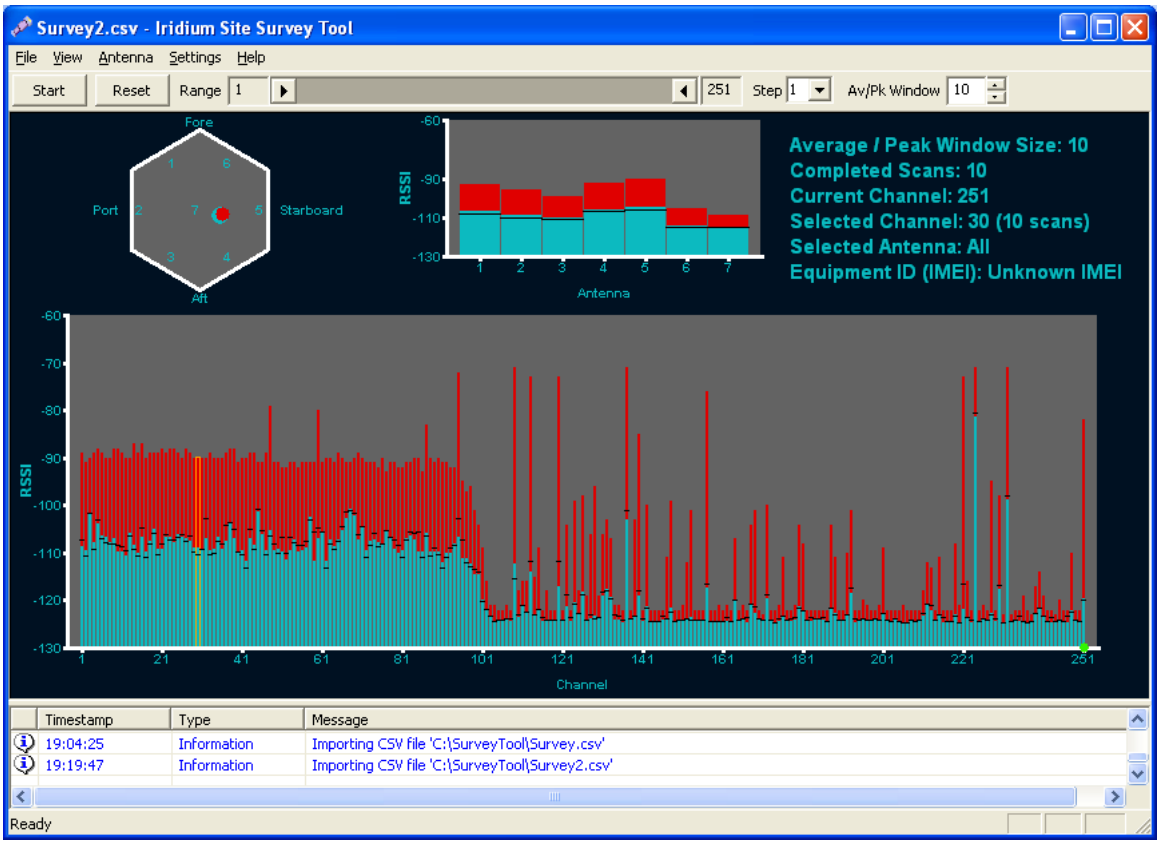

Figure 6 : Broadband interference

Figure 6 shows a band of channels with high peak and average RSSI measurements between channel 1 and channel 100. This is probably due to some source of interference which is likely to block Iridium traffic in the these channels.

Channel 30 has been selected (as shown by the yellow highlight in the Channel View). The Antenna View shows that the strongest signal has been received by Antenna 4 and Antenna 5. The 'Compass' View shows the markers positioned towards Antenna 5 (starboard). Many of the other channels suffering from the interference also indicate the signal is strongest on these antennas. Knowing the direction from which the interference is strongest may be helpful in tracking down its source.