WeatherCat User Manual.

www: http://www.trixology.com
Email: weathercat_support@trixology.com

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About WeatherCat

WeatherCat is weather station software for Macintosh computers.

WeatherCat is designed to work with hardware-based weather stations and at the time of writing works with the following stations:

- Davis Vantage, Vue, Envoy, Monitor and Wizard stations. WeatherCat also supports the WeatherLinkIP data-logger.
- La Crosse WS23xx range of stations.
- Oregon Scientific WMR 928/968 stations.
- WeatherHawk stations equipped with an IP server module.

As data is gathered and stored in its database, WeatherCat allows you to view weather statistics such as the lowest temperature, or the highest wind speed over any time period stored in the database. In addition WeatherCat can generate and upload simple web pages which are quick to get going but lack customisation, as well as more complex 'custom' web pages containing current conditions, graphs, gauges, statistics, webcam image and time-lapse movies; these web pages can be uploaded to your server by WeatherCat for display via a web browser anywhere in the world.

WeatherCat can also send your weather data to the Weather Underground (Wunderground), the Citizens Weather Observer Program (C.W.O.P.) and provides close to real time Custom C.G.I. upload to a web-server for your own web-based applications.

WeatherCat monitors the weather and can run a set of pre-defined and user programmed alerts that can trigger emails and/or run scripts should an alert trigger; for example to switch on your sprinklers, heating or cooling. In addition WeatherCat can integrate with other systems via its AppleScript interface.

WeatherCat is designed to run 24/7/365 and doesn't normally require user interaction or maintenance. Important events are notified via email – for example WeatherCat may detect a problem uploading weather data to Wunderground – it will typically be able to resolve the issue, but if it can't, will send you an email.

Finally, daily and monthly reports are generated and saved to disk (as PDF's) and a small client application is supplied which can display real-time weather gauges on one or more Macintosh computers connected either to the local network or over the Internet.

Requirements

Whilst WeatherCat works best on a computer that is always running and which is permanently connected to the Internet, it will work on any Macintosh running OS X 10.5 (or later) that has Internet access.

Please note that PowerPC support will be dropped in version 1.1 of WeatherCat.

Support

If you have a problem or question with regards to WeatherCat, please check this manual first – it may contain what you are looking for.

If this manual doesn't help, there are active support forums at the following U.R.L.:
http://athena.trixology.com
Please post any comments, bugs, questions etc. on the forum.

Finally, if you can't find the answer to your question on the forum, you can email us at weathercat_support@trixology.com

Terms & Conventions Used In This Manual

Database – The collection of files WeatherCat maintains on disk to hold weather data. WeatherCat stores and retrieves samples from a simple database held in the users Library folder. The database is organised by year and month. Each month has a text file, (given a .cat extension), which stores the samples for that month along with a statistics file (given a .hrs extension).

Interpolation – The calculation of additional data between 2 known values. For example if WeatherCat has data for 1P.M. and 2P.M. and it isn't available for download from your data-logger then WeatherCat calculates the missing data in-between by calculating the incremental difference in the sample data between these two times and then applying and accumulating that difference to the missing samples between 1 and 2 P.M.

Path Syntax – This manual occasionally uses a path to show the location of a file or folder. A path is the location of a particular item within your file system. We will use two types of path; the first is an absolute path, indicated by a slash at the start of the path. For example, in OS X 10.7 you can find the Console utility at the following path:
/Applications/Utilities/Console
The slash indicates the path starts at the root of the file system; your hard drive.

The second type of path begins with a ~ (tilde). The tilde is a shortcut to your home directory, so the path to your documents directory (i.e. documents available only to you) is:
~/Documents
If your name is Mary, then the absolute path to your documents is:
/Users/Mary/Documents

Sample – A set of data representing the weather at a given date. The sample consists of primary, calculated and secondary data. *Primary* data includes the temperature, humidity, barometric pressure, wind speed, wind direction, precipitation and current conditions – i.e. data available from the hardware weather station. *Calculated* data is data WeatherCat did not receive from a weather source but was able to calculate – an example might be the wind chill. *Secondary* data includes the date of the sample and the validation – i.e. if the data is real or synthesised (interpolated because no data was available at the time the sample was collected).

Introduction And Concepts

WeatherCat can be thought of as a multi-track recorder; it captures the data from your weather station and records it to disk.

WeatherCat works with 'channels' – each variable available from your station is assigned a channel; as an example, the external temperature is always assigned to channel 1.[1]

Periodically WeatherCat records all channels available from your station to disk. These periods can range from 1 minute up to 30 minutes and we call the act of recording the data to disk 'taking a sample'. The faster the recording rate, the higher the resolution of your database but the more storage your database requires. Ideally we'd always record as fast as we can to maintain the highest resolution possible, but in reality the weather doesn't change all that much one minute to the next and recording the data every minute can waste disk space.

To avoid this problem, WeatherCat provides what we call 'Adaptive Sampling'. In this mode, WeatherCat monitors important weather variables and only takes a sample if a variable changes; this way we maximise the resolution of the data whilst not wasting storage space (which over many years can amount to a lot of wasted space). If the weather is changing a lot, WeatherCat will record as frequently as once per minute; conversely, if the weather is essentially stagnant, WeatherCat will record less often as the data is changing less frequently. Thus WeatherCat adapts to how active the weather is.

The database on disk is made up of text files that can be viewed or edited in a text editor. These text files are given a '.cat' extension, for example '2_WeatherCatData.cat', each file holds the data for a month – in this example February. WeatherCat also maintains hourly statistics files – these are maintained by WeatherCat as each sample is taken and are given a '.hrs' extension, for example '2_WeatherCatData.cat.hrs'. The database is organised by year and month making it easy to find a given file for a given date.

WeatherCat knows what channels are available from your station – for example a Vantage can provide more than 50 channels, but typically many are not actually active as they don't have any sensors attached. WeatherCat knows which channels are actually valid and only records those channels. For example, if you have an extra temperature sensor fitted and your station supports up to 3 additional temperature sensors, WeatherCat will only record the channel with the sensor actually fitted.

WeatherCat provides a plug-in architecture for weather stations – at the heart of WeatherCat is the 'Station Driver' – this is a plug-in, loaded into WeatherCat when it launches. Typically a station driver updates the data to WeatherCat about once every two or three seconds. Some stations can provide all of their data within this time and some stations can take up to a minute or longer for all of their data to be made available. The

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[1] For a list of all currently available channels, please see Appendix 1, page 138

station driver manages this and makes a consistent set of data channels available to WeatherCat.

These channels are made available to the systems in WeatherCat that require access to the weather data; things like the AppleScript interface, web pages, emails (new weather record for example), statistics, on-line services, video overlay, clients, plug-ins and so on.

As WeatherCat is channel based, it allows easy access to the data for external applications via AppleScript. Irrespective of the actual hardware WeatherCat is working with, the AppleScript interface always provides a consistent interface.

With regards to design, there are a couple of decisions and philosophies at work within WeatherCat. The thinking behind the User Interface is to not provide a confusing jumble of options – wherever possible we try to choose a sensible default for operation. Unfortunately, there are more options than we would like, but we've tried to categorise them into logical groups and hide them when they aren't frequently used – for example the C.W.O.P advanced preferences.

Another line of thinking runs through the fault tolerance within WeatherCat. When a problem occurs, WeatherCat will try to correct the problem automatically. You may receive an email saying some system is having problems followed very shortly by another email indicating whether the problem has been cleared or not. Unfortunately it is not possible to guarantee bug-free operation 24/7/365 but WeatherCat is designed to run for these kinds of periods and thus has multiple checks in place to ensure it can run as trouble free as possible.

Weather software can be complex and difficult to understand, so another philosophy at play in WeatherCat is that it should be easy to get going without having to worry about more complex issues. WeatherCat provides simple web pages that require just a few clicks to get on-line, basic graphs that immediately begin to show useful data, and easy to use but reliable Wunderground and CWOP uploads.

Beyond these initial facilities, it is possible to create and generate beautiful web pages via WeatherCat's Custom Web pages feature, control your home automation system either via simple rules that can trigger scripts or more complex programming in conjunction with WeatherCat's AppleScript interface. In addition you can create stunning graphs that compare weather variables, set up custom alerts to be informed of weather events you care about, be informed of new weather records as they happen, access real time data remotely via the client, create and upload time-lapse movies and images from your webcam in addition to browsing comprehensive statistics and reports.

Going back to the complexity issue of weather software, when launched for the very first time, WeatherCat will display just a few windows – the first being the 'Daily View', which shortly after WeatherCat is launched will be updated with the current weather. The others being the gauges, the log window and release notes. This is deliberate – it is quite possible

to completely cover multiple monitors with WeatherCat windows but we believe it's better to just display these few, and let you discover what's available for yourself by clicking about (and maybe reading this manual sometime later ☺).

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Getting Started

Installation

Please drag the WeatherCat folder from the disk image to a convenient location on your hard disk (we would suggest your Applications folder).

If you wish WeatherCat's icon to stay in the dock, either drag the application to the dock before running it, or right click on its icon in the dock when running and use the pop-up menu to select 'Keep In Dock'.

You may also wish to add WeatherCat to your 'Login Items' via the 'Accounts' pane of the System Preferences so that WeatherCat starts-up whenever you log-in to your computer. If you have automatic login enabled for the account then WeatherCat will start whenever the computer starts or restarts.

Before running WeatherCat, please ensure you have the correct driver installed for your station or USB to serial converter. Without the correct driver installed, WeatherCat will not be able to communicate with your hardware.

Please see the next page for more details on USB drivers.

Hardware Support

WeatherCat currently supports the La Crosse/Technoline 23xx series (2300, 08, 10, 15, 50 and others), Oregon Scientific WMR 928/968 stations (it may also work with 918's), the Davis Vantage range (Vantage, Vantage Pro, Vantage Pro 2, Vue & Weather Envoy – wired and wireless), the WeatherLinkIP data-logger, Davis Monitor and Wizard weather stations and Weather Hawk stations equipped with an IP server.

WeatherCat has been tested with a La Crosse WS-2300, Davis Vantage Pro2 with USB and IP data loggers, Davis Envoy, Davis Wizard & Monitor stations and the Oregon Scientific WMR 968.

Serial To USB converters

Most weather stations are serial devices and come equipped with a serial connection. Most Macintosh's do not have serial ports but do have USB ports. If your weather station is not USB based, you will need to obtain a serial to USB converter. These little dongles convert from the weather station's RS232 interface to USB so you can use the station with your Macintosh.

Figure 1 - Typical serial to USB converter

Serial to USB converters are not generally expensive and are available to buy on-line or at electronics retailers. Prices range from about 15 UK Pounds (as per the converter in the image above) to about 40 UK Pounds for a branded item.

Most serial to USB converters require a driver to work with the Operating System. Before running WeatherCat, check you have the right drivers installed for your converter. A list of common driver software and download links can be found in Appendix 3 (Page 151).

If running a USB Davis station, be aware that the latest Davis drivers rarely install correctly on OS X 10.6 or later. In this case you can download the Silicon Labs drivers directly from
http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx
(download and install the VCP Driver Kit before running WeatherCat (V2.9 is current at time of writing)).

If you need more advice on suitable RS232 to USB converters and their drivers, search and/or post on the WeatherCat forum for up-to-date help, or email us at weathercat_support@trixology.com

Running WeatherCat For The First Time

Please ensure your weather station is installed and set up as per the manufacturers instructions.

In particular, check the following:
1. The time and date is correct on your station and matches the time on your computer (check with your station manual as to how to do this).
2. Your station is plugged into your Macintosh with a suitable serial to USB converter (if necessary).
3. You have installed the driver for your serial to USB converter or USB based Davis station (see Appendix 3 on page 151)).
4. If your weather station is wireless, check that all sensors are being received reliably and consistently.

Finally, make sure you have quit any other weather software that may be accessing the station. If you own a Davis weather station, make sure it is not in 'Setup' mode or that the forecast ticker is not running (both of these prevent communications with the weather station).

When you run WeatherCat for the first time, you will be asked to select your station and the relevant communications port as shown in the following picture:

Figure 2 - Communications Set-up

When you have selected your station type and the communications port it is attached to, press the 'Done' button whereupon the software will try to connect to your station and continue to launch.

If the weather station hardware is not found, please check all your connections. Unplug your RS232 to USB converter, (or if a Davis USB data logger, unplug the USB lead from the computer), count to ten and plug it back in, then re-launch WeatherCat and try again.

If your station is I.P. based (WeatherLink IP or WeatherHawk), after selecting the station type, enter its I.P. address into the I.P. address field. If necessary specify the port with a colon – for example 192.168.1.110:22223 specifies the station can be found at I.P. address 192.168.1.110 on port 22223.

If your station still isn't found and is one of the supported stations, search and/or post on the support forum for advice or send us an email as indicated in the support section found on page 11.

Once your station is found by WeatherCat, it will continue to launch and will look something like the picture below:
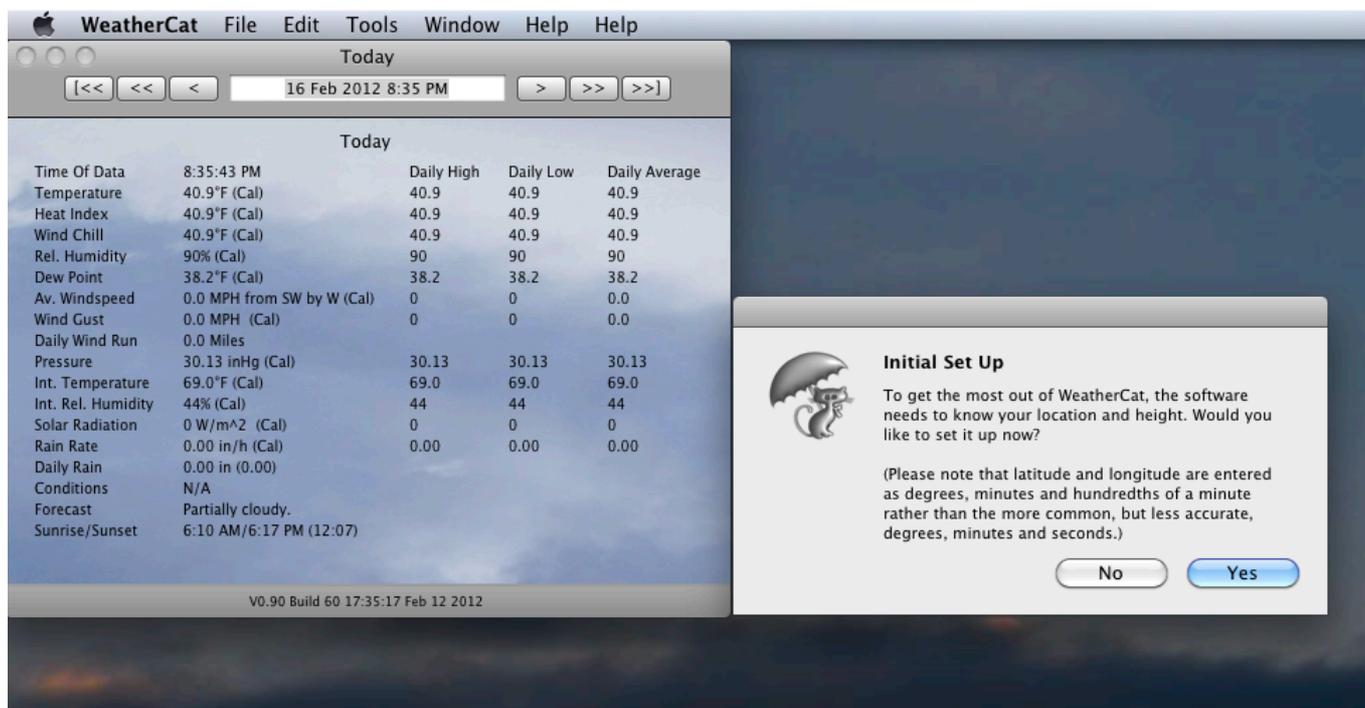
Figure 3 - Initial Launch

At this point WeatherCat is asking for your location and height – if you don't have this information to hand, just click the 'No' button. Otherwise click 'Yes' and enter the details into WeatherCat's preferences (see the following section 'Basic Setup' for more details).

WeatherCat is now running and logging the weather; the next section will detail some of WeatherCat's major user interface elements, but as a quick start, nearly all of WeatherCat's set-up is performed via its Preferences available from the 'WeatherCat' menu [APPLE ,] and most of the data windows, graphs and gauges are accessed from the 'Tools' menu.

Have a little look around, then come back to learn more about WeatherCat.

Basic Set-up

Now we need to tell WeatherCat the name of your station, the location and altitude. The name is used in your web pages, the location and altitude is used when sending your data to C.W.O.P and when calculating things like cloud-base or sun-rise and sun-set times.

Setting Your Location

Open WeatherCat's preferences from the WeatherCat menu:
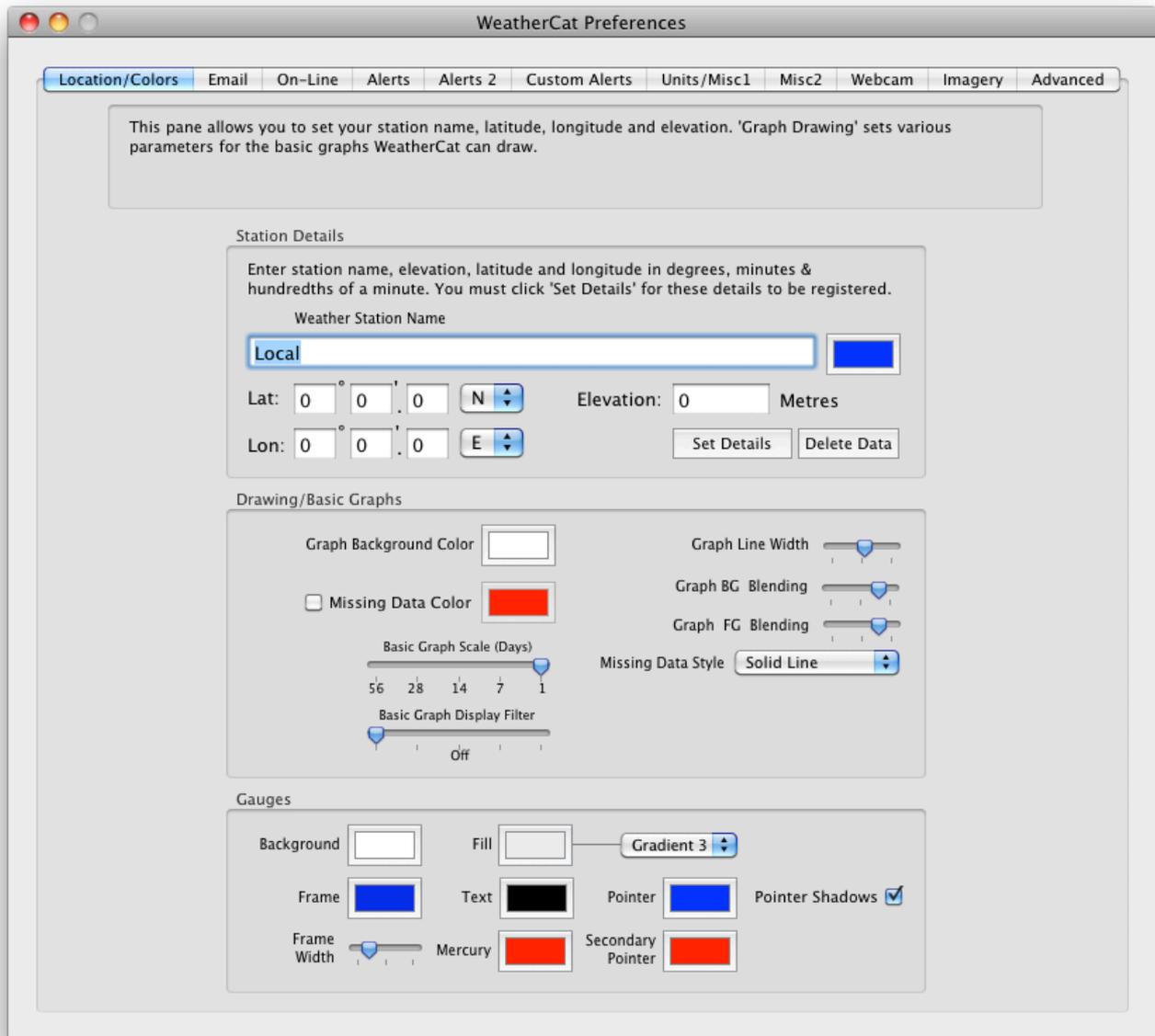
Figure 4 - Setting The Location

1. Enter a name for your station in the 'Location 1' field.

2. Enter your Latitude and Longitude; please note that the format is **Loran** – i.e. Degrees, Minutes and Hundredths of a minute. [2]

If you don't have your altitude and longitude in Loran format, you can convert Degrees, Minutes and Seconds to Degrees, Minutes and Hundredths with the following formula:

Hundredths=Seconds / 60 * 100

(Where '/' means divide).

3. Enter the station elevation in metres. Feet can be converted to metres by multiplying the height in feet by 0.3048.

4. After entering your data it is important you press the 'Set Details' button – if you do not, your details will not be registered and every time you start WeatherCat it will ask you if you want to set your location! (The 'Set Location' button prevents accidental editing of the location data.)

Email Setup

Next switch to the Email tab of the preferences and enter your mail server details.

For some common email settings, please see Appendix 2 on page 150, but at the very least you will need to enter the SMTP server address, an address in the 'From' field and at least one 'Admin' email address.

The 'Admin' addresses receive all emails from WeatherCat whereas the 'User' addresses receive only weather alerts and records. You can enter more than one address by separating the addresses with commas.

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[2]WeatherCat uses degrees, minutes, hundredths as it is more accurate than degrees, minutes and seconds. It is also the format sent to C.W.O.P.

Figure 5 - Email Set-up

You can test whether WeatherCat can send email by pressing one of the 'Test Now' buttons; this will send a test email to either the Admin or User addresses.

If the test succeeds you'll see a confirmation sheet as shown in the picture below:
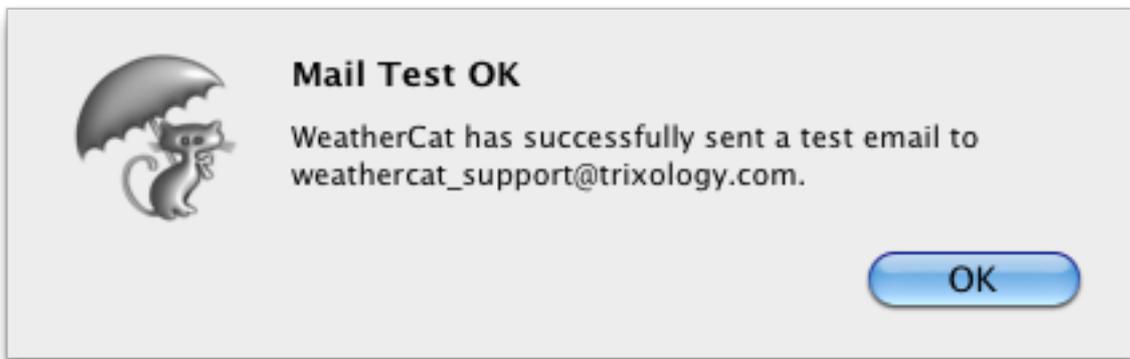
Figure 6 - Successful Email Test

If the test fails, then the specific error will be reported as shown below:

Figure 7 - Failed Email Test

In this particular case the mail server address had been entered incorrectly.

WeatherCat now knows the name of your station, your location, height, email server details and email addresses so it can send you weather and administration alerts.

We will cover setting up WeatherCat to perform more tasks, such as reporting to on-line weather services and generating and uploading web pages in the 'How Do I…' section of this manual a little later (page 60), but for now we should take a look at WeatherCat's user interface.

User Interface

Graph Types

Before we get to deep into a description of WeatherCat's user interface, we need to introduce the two types of graphs in WeatherCat; **basic graphs** and **custom graphs**.

Basic graphs plot a single weather variable in a scrolling manner – as time progresses the data scrolls to the left.
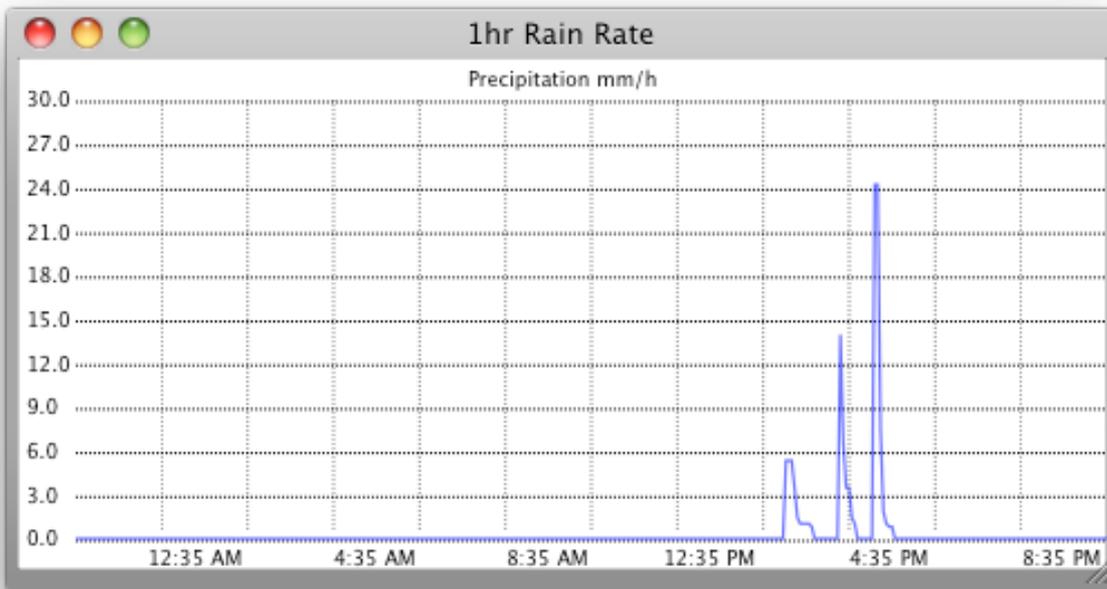
Figure 8 - Example Basic Graph

Custom graphs can graph up to three variables in either scrolling or anchored format. *Anchored* custom graphs are graphs that start at a specific historical point in time on the left-hand side; for example midnight or the start of the week[3], month or year.

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[3] The week in WeatherCat starts on Sunday
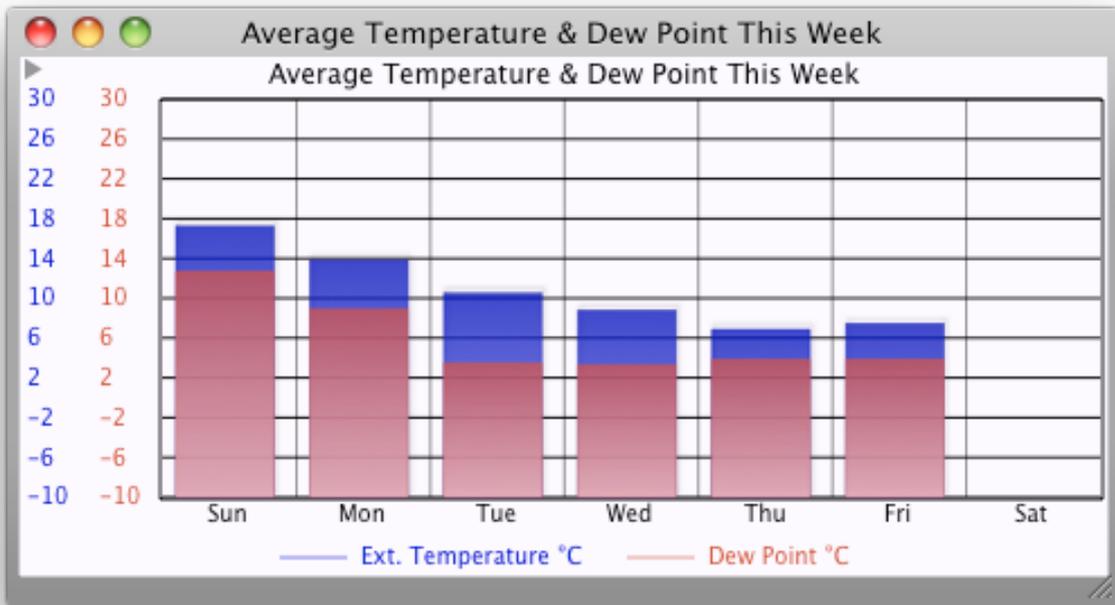
Figure 9 - Example Custom Graph

Daily View

When you first launch WeatherCat, the Daily View window will be displayed as shown below:
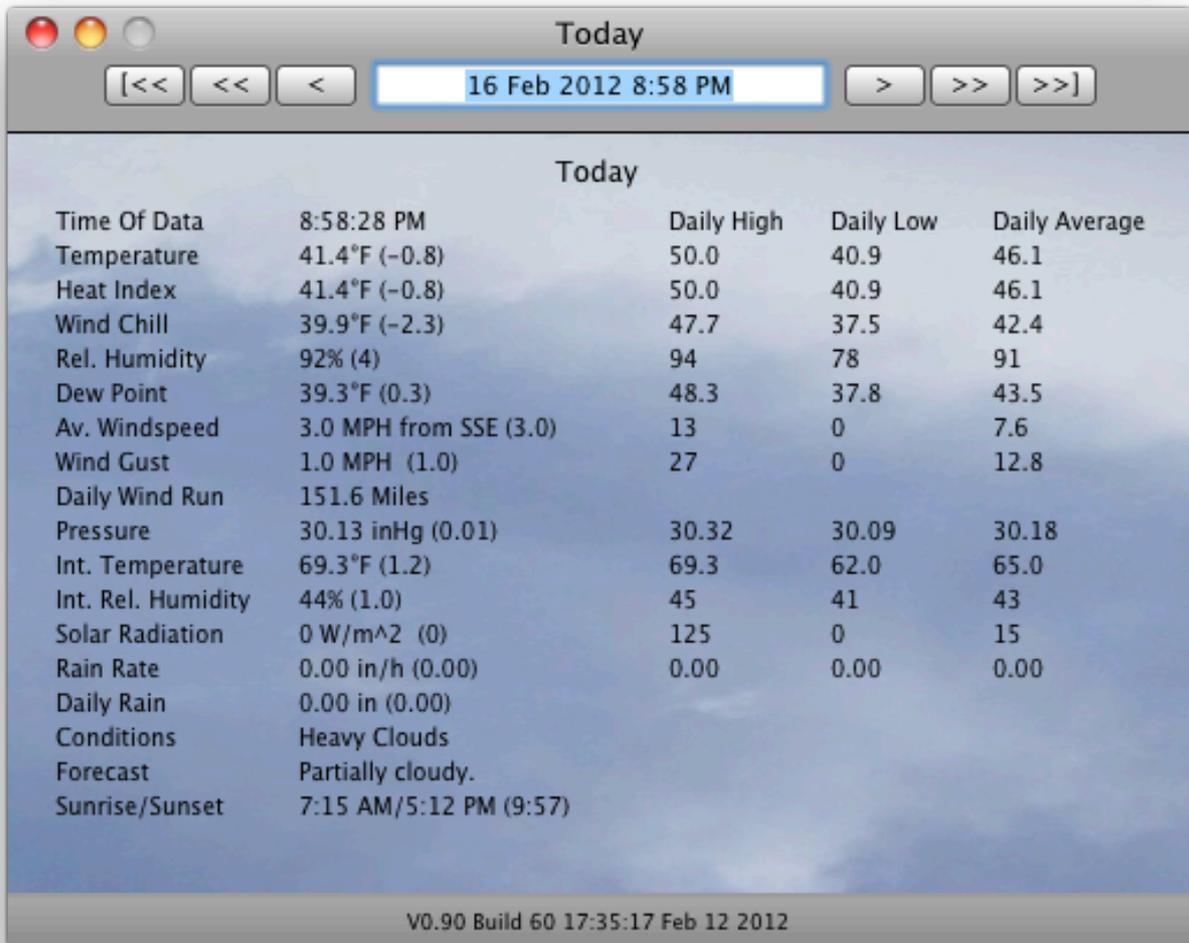
Figure 10 – Daily View

At the top of the window is the date and time of the last known sample. You can enter dates here, for example, '1 June', and the data, any open graphs (apart from anchored custom graphs) and satellite imagery will display the data for that day (assuming the data exists in your database).

The buttons to the left and right of the date entry box allow you to scroll backwards and forwards in time – any open graphs (apart from anchored custom graphs) and the satellite imagery window, if open, will also update to reflect the historical data/imagery.

The main view of the window shows various data as collected from your hardware. Items in parentheses indicate the 1 hour delta, the exception being the Pressure which displays the 3 hour delta. (These delta's will read as 'Cal' during the first hour of data collecting). Note that the items displayed in this window will depend on the capabilities of your hardware. For example, if your hardware does not support or have fitted a solar radiation sensor, then solar radiation will not be displayed.

When WeatherCat launches for the very first time, there may be a delay (how long depends on your type of weather station) before this data appears.

Tools

Most of WeatherCat's windows are available from the 'Tools' menu. In this section we will examine each of them in turn.

Basic Graphs

All of WeatherCat's simple graphs are available from the 'Tools' menu. Basic graphs are provided for all the main weather variables. To plot extra sensors available on your hardware, please see custom graphs on the next page.
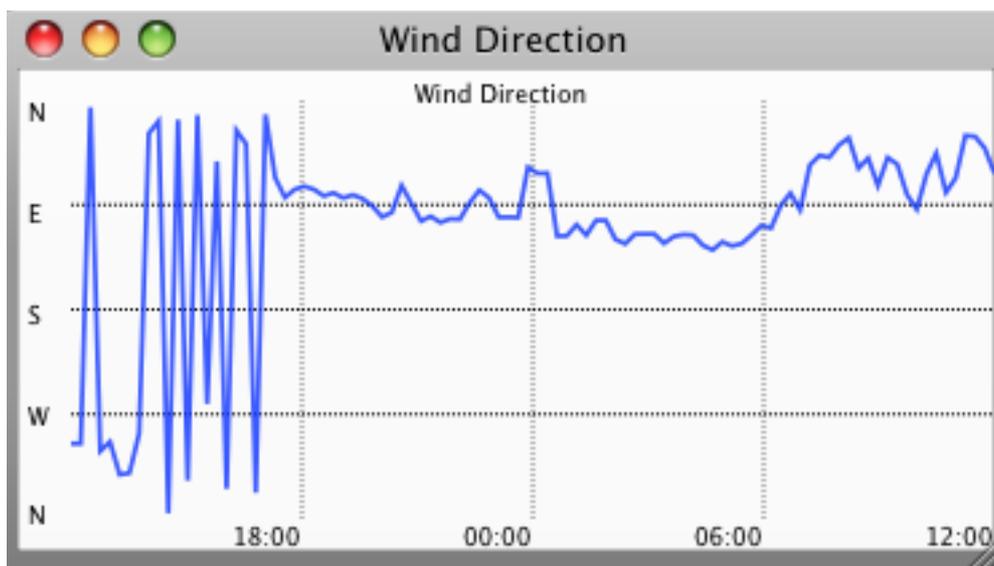
Figure 11 - Basic Graph

Here we can see the wind direction graph for the last twenty-four hours. In general, WeatherCat's graphs auto-scale the vertical axis to provide the required range.

WeatherCat's Location/Colours preferences contain a 'Display Filter' for basic graphs; here is the same graph with some filtering applied:
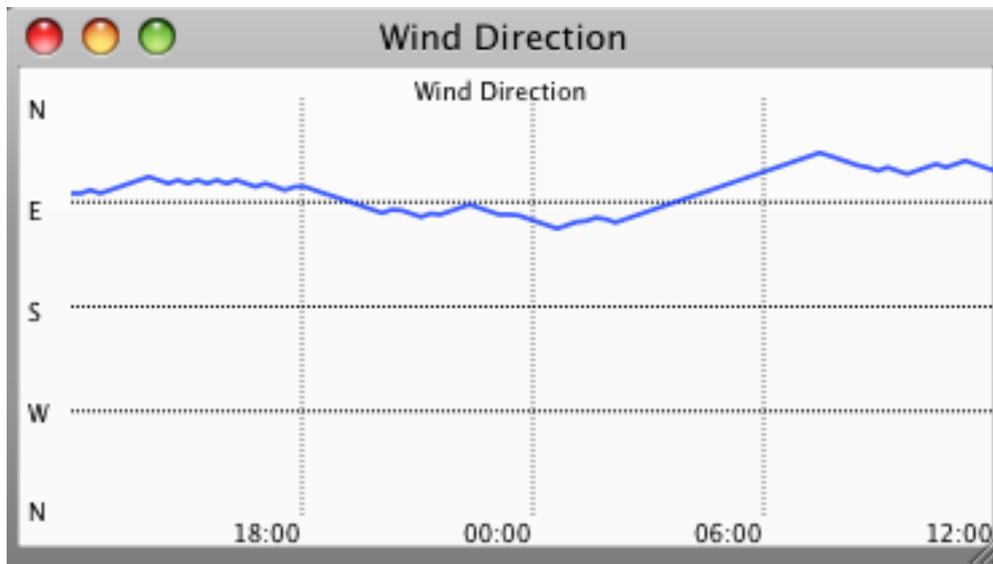
Figure 12 - Basic Graph - Filtered

Basic graph window positions can be saved in user definable sets using the 'Save Graph Window Positions' command available from the 'Windows' menu. The 'Load Graph Window Positions' command can also be found there. Basic graphs are used in the simple web pages and can also be used in custom web pages.

Custom Graphs

Custom graphs are available from WeatherCat's 'Tools' menu. WeatherCat can manage an unlimited number of custom graphs and, like WeatherCat's simple graphs, custom graphs can be displayed in custom-web pages.

Each custom graph is fully independent of any other graph and can plot any channel available on your hardware including all extra channels with the exception that hourly type graphs are not available for extra channels (as WeatherCat currently does not keep hourly data for extra channels).

As mentioned above, WeatherCat supports two basic types of custom graphs – *scrolling* and *anchored*.

Scrolling graphs can display data with a time range between 28 days and 1 hour and as time progresses the data scrolls to the left – (the same behaviour as basic graphs).

Anchored graphs start at a specific point in time on the left and progress from there until the period is over – for example the start of a day, week, month or year. Figure 17 shows

an anchored weekly graph. In this case it is *anchored* at the start of the week. As you can see this image was captured on a Friday.
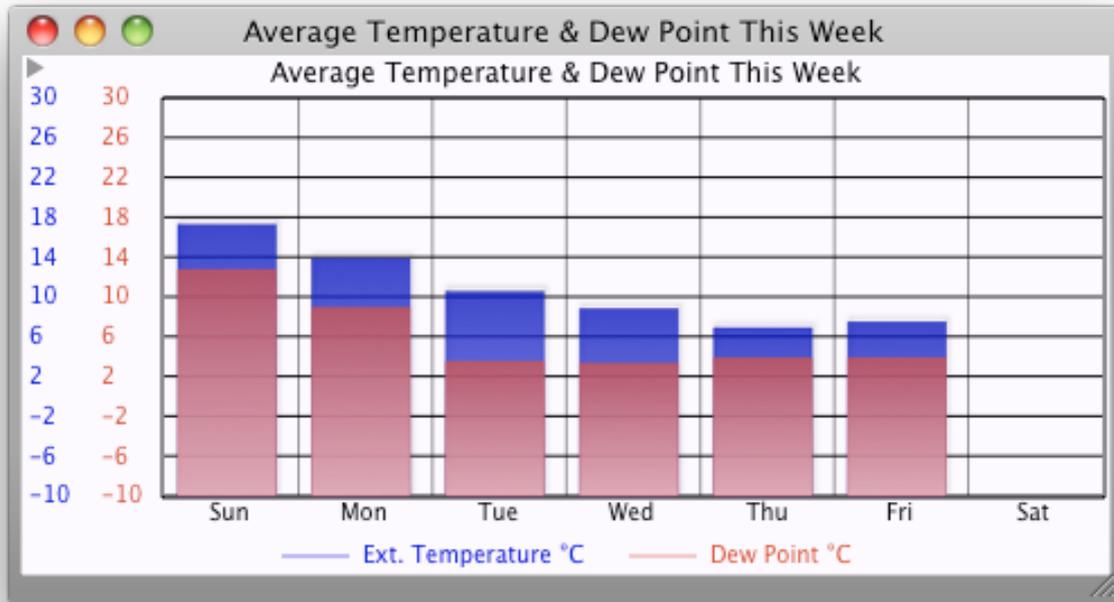
Figure 13 - Custom Graph - Controls Hidden

Clicking the small disclosure triangle located at the top-left of the window allows custom graphs to be configured.

Figure 14 - Custom Graph - Controls Shown

A custom graph can display up to 3 variables in a variety of graph types. Each variable can be drawn in a number of styles and the size of the graph displayed on the web can be set independently of the size as displayed on screen.

We won't describe each option here – the best approach is to create a new custom graph and examine the various options for your self.

To use the graph in a web page, simply use the WebTag as shown in the graphs' controls – in this case it would be CUSTOMGRAPH1

(Please see page 70 for details of custom web pages).

Gauges
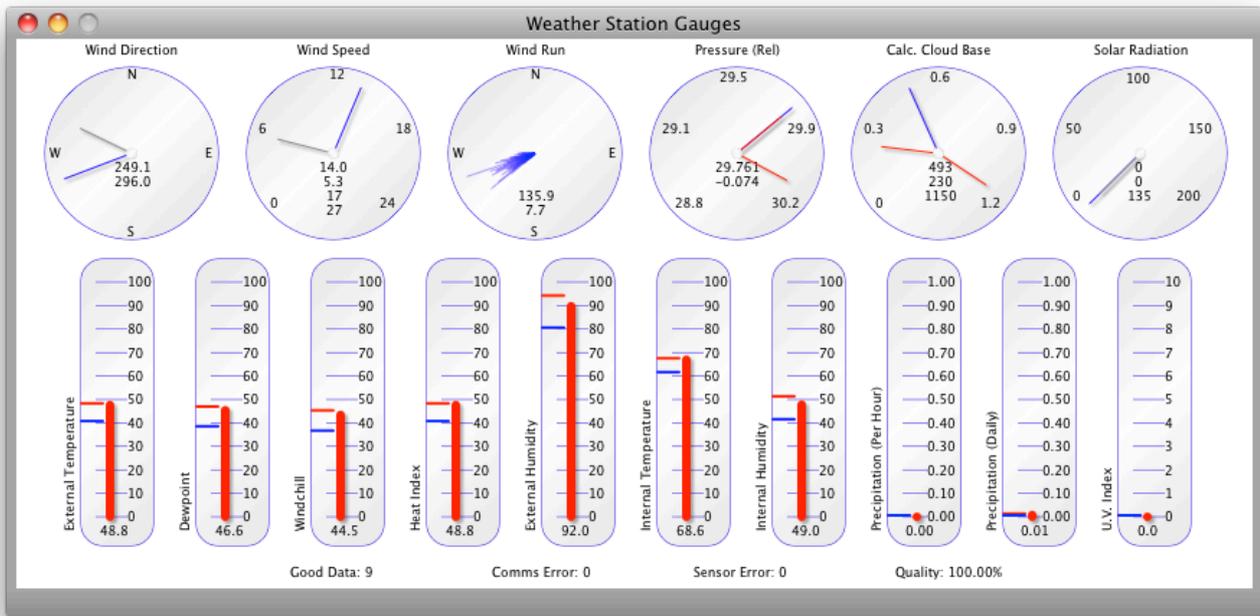
The gauges window displays real time conditions as received by your station. Along the top of the window are dial-type instruments and along the bottom are thermometer-type instruments. At the very bottom are some figures indicating communications counts and quality. This display is replicated in the WeatherCat Client application.

The Wind Direction dial indicates the current immediate wind direction via the long pointer and the 10-minute average wind direction with the short pointer. If the short pointer is gray, then WeatherCat hasn't had time to finish calculating the average wind direction; when it has, the pointer turns red. The figures in the centre of the dial are the current wind direction on top and the average wind direction on bottom.

The Wind Speed dial indicates the current wind speed via the longer of the two pointers and the 10-minute average via the shorter pointer. Again, the average pointer will be gray until WeatherCat has had time to calculate the correct value. The figures in the centre of the dial are, from the top, the instantaneous wind speed, the 10-minute average speed, the 10-minute wind gust and the daily high.

The Wind Rose gauge indicates all known wind vectors since midnight. Wind run is the amount of wind that has passed your location in a given time. For example if the wind was blowing at a constant 1 mile per hour for 1 hour, then the wind run would be 1 mile for that hour. If the wind velocity increased to 5 miles per hour then it would be 5 miles, or 120 miles in 24 hours. The wind run gauge goes one step further and displays the wind run for each degree of the compass – this gives a visual representation of where the wind has been blowing from over the last 24 hours.

The numbers at the bottom of the wind run gauge shows the total daily wind run and the current scale of the gauge – i.e. the length of the longest wind run vector being displayed. An option in WeatherCat's preferences can overlay the current wind-run vector if required.

The Pressure dial indicates the current reading and the daily low and high values via the red pointers. The numbers in the centre show the current pressure and the three-hour pressure change. The three-hour pressure change is a good indicator of what the weather is going to do. If the pressure is rising, then it is likely the weather is improving and if falling, the weather is likely to deteriorate. If the pressure is falling quickly, then it is possible a storm is on its way.

The Calculated Cloud Base dial indicates the current calculated cloud base along with the daily low and high via the red pointers. The figures on the dials are in 1000's of units; thus 1.5 reads as 1500. Calculated cloud base is derived from the air temperature and dew point and gives an approximate indication of the base of cumulus clouds.

The Solar and U.V. gauges are not displayed by default; they can be enabled from the Misc 2 pane of WeatherCat's preferences. The smaller pointer on the 'Solar' dial is the 10-minute average, the larger pointer is the instantaneous reading. The top figure is the current value, the middle figure is the 10-minute average and the bottom figure is the daily high.

The thermometer type gauges indicate the current values of various weather variables along with the daily high (red) and daily low (blue) values as horizontal bars.

Communications Counts And Quality
At the bottom of the Gauges window are counts for 'Good Data', 'Comms Error', 'Sensor Error' and 'Quality'.

Every time WeatherCat requests data from the weather station it checks it for validity – if it is all valid then the Good Data count is incremented. If the station fails to respond (a time out) or responds with data that fails a simple error check then the 'Comms Error' count is incremented. If there is an error in the data - primarily a sensor value that is out of bounds with regards to the manufacturers specification, then for each error the 'Sensor Error' count is incremented. The Quality figure is simply the ratio between the Good Data and combined errors and can be used as a quick check that communications to the station are satisfactory. See also the Status window available from WeatherCat's "Tools" menu.

If you are receiving a lot of 'Comms Errors' then the problem lies with the connection between the computer and the weather station – check your USB dongle and/or driver along with any USB cables; in particular do not use USB extension cables between the weather station and your computer and make sure the station is connected to the computer, not any hubs or keyboards.

If there are a lot of sensor errors then the problem lies between the weather station and its sensors – if wireless try repositioning the station, if wired, check the connections. In all

cases it's worth checking any batteries. (Note, for Davis Vantage owners, WeatherCat can warn you when batteries and or power supplies are out of specification – see 'Hardware Options' from the 'Tools' menu, described on page 50.)

The Live Data View tool (see page 57), available from WeatherCat's "Tools" menu gives more information about the status of each channel available from your hardware and breaks down the comms errors into timeouts (your station did not respond to WeatherCat) and corruption (when WeatherCat checked the data from your station, an error was found).

Satellite Imagery

WeatherCat can record and play back up to 3 channels of satellite imagery.
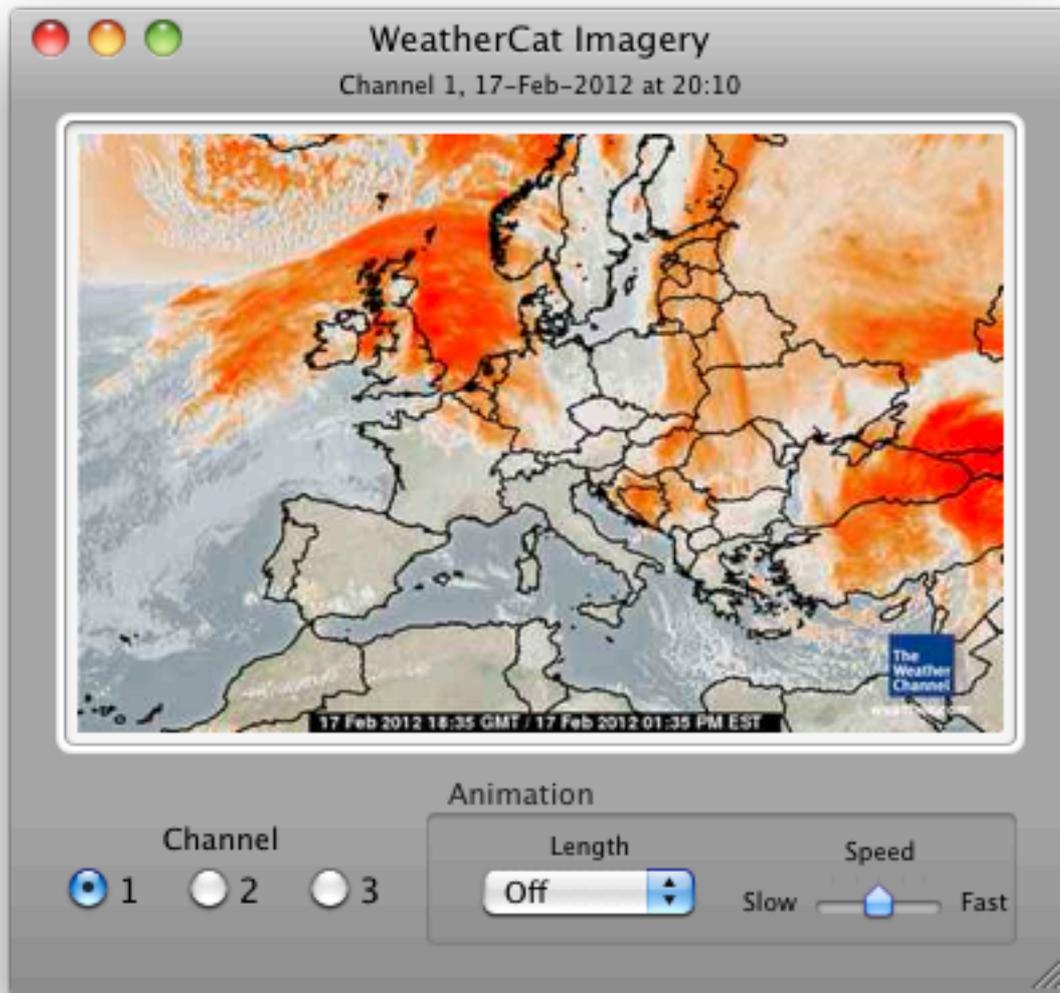
Figure 15 - Satellite Imagery Viewer

There are two modes of operation for the imagery viewer: the first is to play back the imagery as a movie by setting the animation length and speed from the controls at the bottom of the window.

The second is in conjunction with WeatherCat's daily view window. As you scroll through time with the scroll buttons, if the imagery window is open, the imagery will update in synchronisation with the data – this allows you to scroll backwards and forwards through the imagery animation (this also works for direct date entry).

The rate of capture and source for the imagery is set up in the 'Imagery' tab of WeatherCat's preferences (page 132).

The imagery is stored in WeatherCat's database on disk at: ~/Library/WeatherCatData/Imagery as jpeg files. Each file is named 'Imagery_hh_mm_dd_mm_yy,jpg' to aid identifying each file by date.

It is important to note that the update rate of the imagery (how often WeatherCat captures an image) has a direct effect on how large your database on disk will be. We would recommend setting the imagery update rate to no less than 2 hours and ideally, for the best animation and most efficient usage of space on disk, it should update at the same rate as the source image is updated. For example, if your source image is updated every 3 hours, and you set the update rate to every 2 hours then WeatherCat is going to be capturing some images twice. For example (assuming the source updates every 3 hours and WeatherCat is capturing every 2 hours): The source updates at 00:00 and WeatherCat captures it at that time. The next WeatherCat capture will be at 02:00 – the same image. The image changes at 03:00, WeatherCat captures it at 04:00. The image changes at 06:00, WeatherCat captures the new image. WeatherCat captures the same image at 08:00 and so it repeats. In this case, WeatherCat has captured the 00:00 image twice and the 06:00 twice, setting WeatherCat's capture rate to 3 hours will ensure each image is only captured once.

Over the months and years, a large number of files can accumulate on disk; you may want to prune or archive them periodically. As an example, an imagery file of average size 30KB, captured every 2 hours results in more than 4300 files totalling over 130 megabytes on disk each year.

Statistics/Reports

The Statistics tool displays a range of statistics and reports. Select the report you'd like to see from the buttons at the top of the window.

```
WeatherCat Statistics

    Records    Recent    Daily    Monthly    Year Over Year

Statistics as of 8:15 PM 17-Feb-2012

Local

Hour       TempHi TempLo   HeatHi HeatLo   ChillHi ChillLo   DewPHi DewPLo   HumHi HumLo   PresHi PresLo   R/hHi R/hLo   Rain
0           43.1   42.7      43.1   42.7      41.8   38.1      39.5   38.9      88   85      30.11  30.11     0.00  0.00   0.00
1           43.1   42.9      43.1   42.9      41.7   37.6      39.6   39.0      88   86      30.11  30.10     0.00  0.00   0.00
2           42.9   42.2      42.9   42.2      38.9   37.8      39.9   39.0      90   88      30.11  30.09     0.00  0.00   0.00
3           42.5   41.7      42.5   41.7      40.2   37.8      40.2   39.5      92   90      30.09  30.08     0.00  0.00   0.00
4           41.7   41.4      41.7   41.4      38.3   37.5      39.7   39.3      93   92      30.09  30.08     0.00  0.00   0.00
5           41.7   41.2      41.7   41.2      41.2   37.0      39.8   39.1      93   92      30.08  30.06     0.00  0.00   0.00
6           42.4   41.7      42.4   41.7      38.6   37.5      40.5   39.8      93   93      30.07  30.06     0.00  0.00   0.00
7           42.4   42.2      42.4   42.2      39.3   37.5      40.5   40.3      93   93      30.07  30.05     0.00  0.00   0.00
8           42.9   42.1      42.9   42.1      39.5   37.2      41.0   39.9      93   92      30.05  30.04     0.00  0.00   0.00
9           43.6   43.0      43.6   43.0      39.5   38.0      42.0   41.1      94   92      30.05  30.03     0.00  0.00   0.01
10          44.9   43.7      44.9   43.7      41.0   38.1      42.1   41.6      94   89      30.03  30.03     0.00  0.00   0.00
11          45.1   44.6      45.1   44.6      41.8   39.8      42.3   42.0      91   89      30.03  30.02     0.00  0.00   0.00
12          45.9   45.0      45.9   45.0      42.3   40.2      42.1   41.6      89   85      30.02  29.99     0.00  0.00   0.00
13          46.4   46.0      46.4   46.0      42.2   40.5      41.8   40.9      85   82      30.00  29.97     0.00  0.00   0.00
14          46.0   45.6      46.0   45.6      43.1   41.3      42.2   41.6      87   85      29.97  29.92     0.00  0.00   0.00
15          45.8   45.5      45.8   45.5      44.9   41.3      43.6   41.9      92   87      29.92  29.88     0.00  0.00   0.00
16          47.6   45.8      47.6   45.8      45.8   43.3      46.5   43.9      96   93      29.88  29.83     0.00  0.00   0.00
17          48.6   47.6      48.6   47.6      45.1   43.3      47.5   46.5      96   96      29.83  29.81     0.00  0.00   0.00
18          48.6   48.5      48.6   48.5      45.9   43.3      47.5   46.8      96   94      29.82  29.79     0.00  0.00   0.00
19          48.9   48.5      48.9   48.5      45.9   44.1      47.0   46.6      94   92      29.79  29.76     0.00  0.00   0.00
20          48.9   48.8      48.9   48.8      45.0   44.2      46.7   46.6      92   92      29.76  29.75     0.00  0.00   0.00

Daily High  48.9   48.8      48.9   48.8      45.9   44.2      47.5   46.8      96   96      30.11  30.11     0.00  0.00   0.01
Daily Low   41.7   41.2      41.7   41.2      38.3   37.0      39.5   38.9      85   82      29.76  29.75     0.00  0.00
Daily Average 44.9 44.3      44.9   44.3      42.0   39.8      42.5   41.7      92   90      29.99  29.97     0.00  0.00
Daily Total                                                                                                                0.0

                                  Query
```

Figure 16 - Statistics – Daily

The statistics are updated every time WeatherCat takes a sample.

At midnight every day, the Daily report is saved to disk at ~/Documents/WeatherCatReports as a PDF file.

At the end of the month, the monthly report is also saved to the same location on disk. (Note that if WeatherCat isn't running at midnight, then no report will be saved).

From the Statistics window you can also query the database via the 'Query' button. A sheet will appear as shown in the image below:
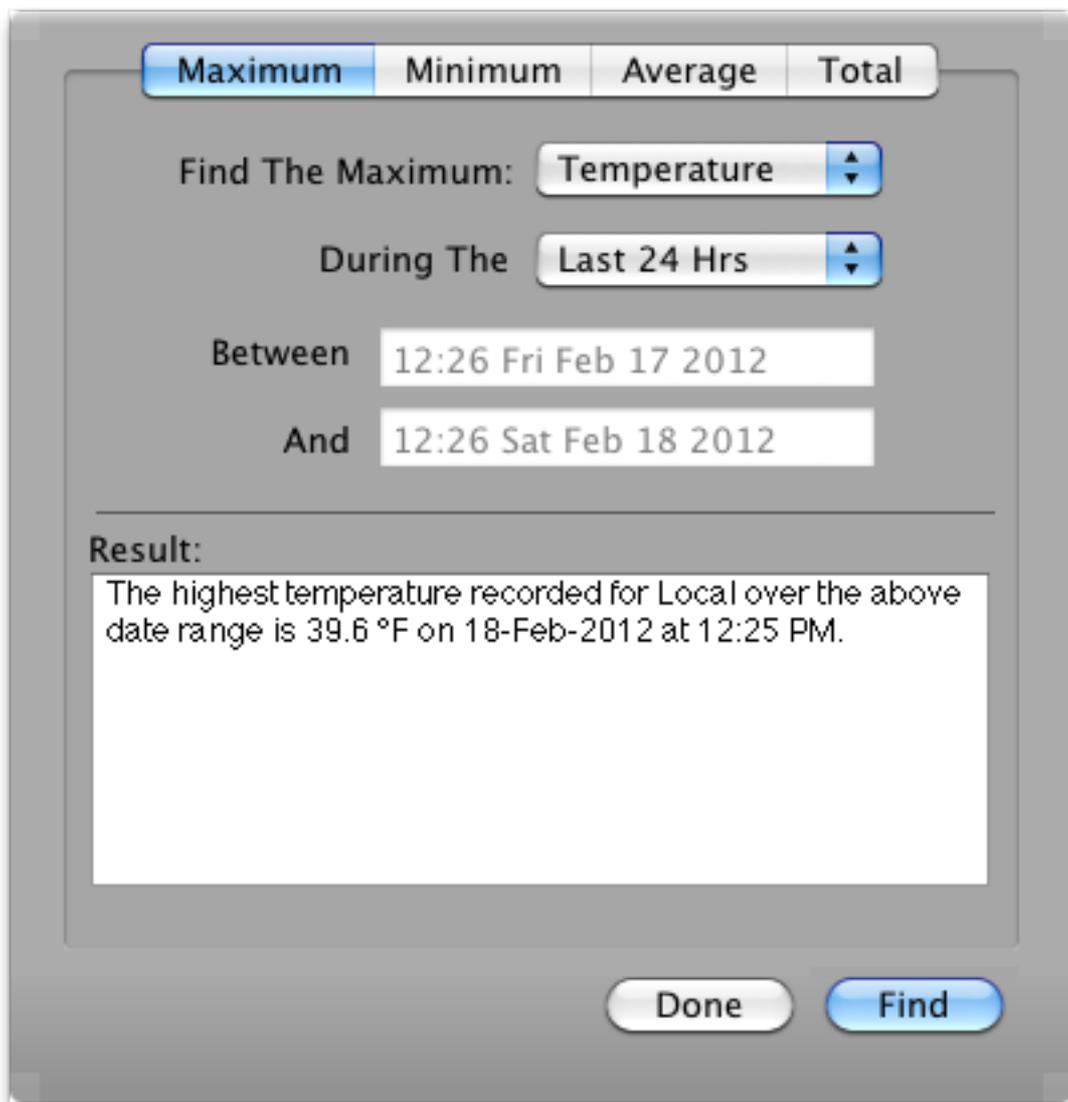
Figure 17 - Statistics Query

When processing a query, the database only considers valid samples; interpolated and invalid samples are not considered.

Live Video Preview

WeatherCat can utilise a webcam to provide images and movies both locally and for your website. This tool displays the current picture, which is useful for checking the camera set-up.
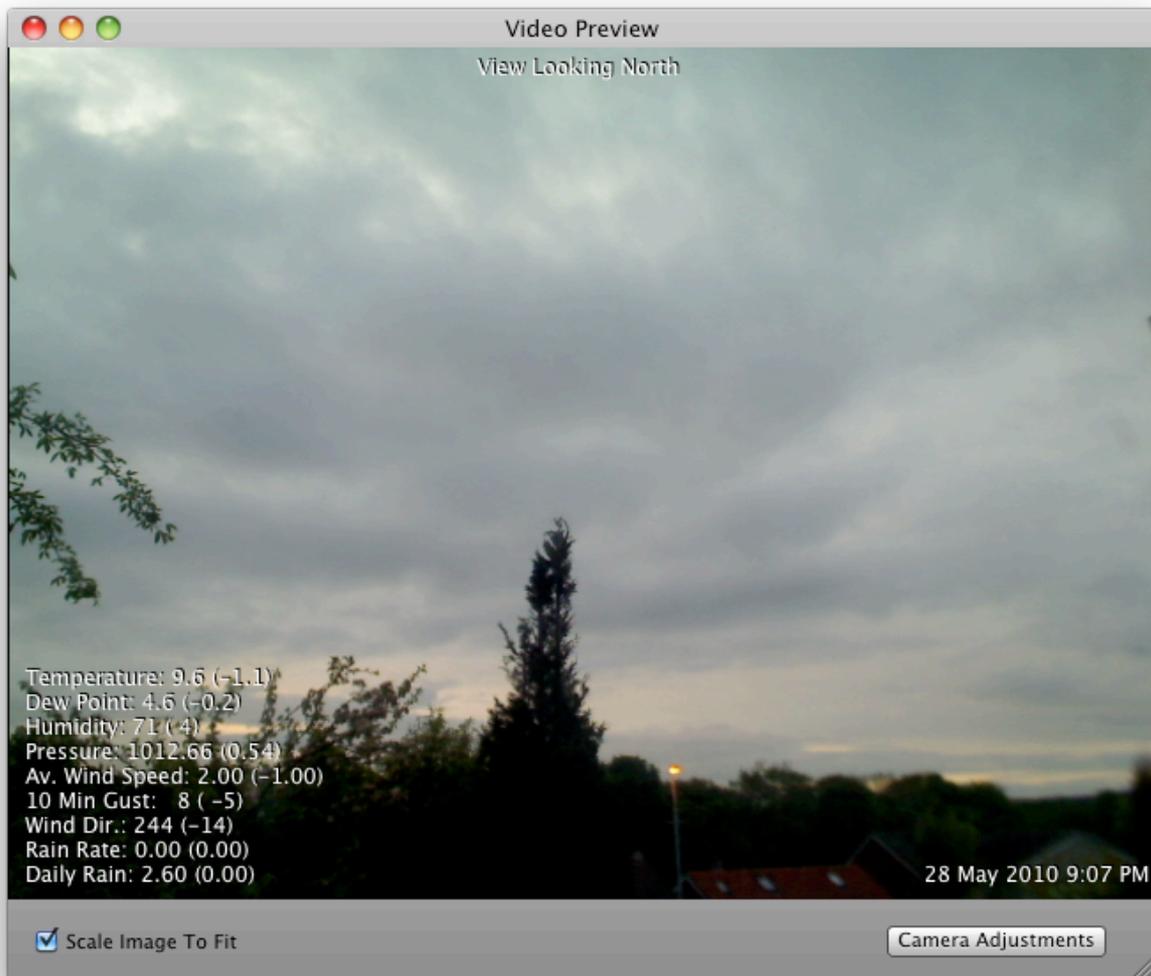
Figure 18 - Video Preview

The 'Camera Adjustments' button will open a window where various parameters can be adjusted – the parameters available will depend on your camera and how WeatherCat is obtaining the image.

WeatherCat can take an image from a locally connected camera, from a file on disk (useful if you are using third party camera software) or via http, which is useful if you have an IP based camera with an in-built web-server that can make the image available.

If updating from a local file, the image will update once every 2 seconds. If updating from an image served over http, the image will update once every 2 seconds if the preview

window is open, otherwise at the capture rate set in the Webcam preferences (or 5 minutes, whichever is the shorter). From a locally connected camera, the image will update approximately 10 times per second.

For more information on the camera set-up and usage, please see "How Do I Use A Webcam With WeatherCat' on page 65 and the webcam preferences section on page 129.

Data Viewer/Editor

This tool, as its name suggests, allows you to view your data by date in tabular form. You can also apply quick edits to the data – WeatherCat allows you to edit most of the channels it records, the exception being calculated channels such as wind chill. To edit other data or make more than simple changes we would suggest using a good text editor[4] – please see 'WeatherCat And Data' on page 136 for more details.

Figure 19 - Data Viewer

Daily Rain Editor

WeatherCat has an easy-to-use daily rain editor available from the 'Tools' menu - this is useful for those occasions where you know the daily rain for a given date is wrong or isn't available until after the event (i.e. melting snow). Note: It is not possible to edit the daily rain for the current day (as the day is not yet over); wait until the next day to edit it. The

---

[4] Do not use a word processor or web editor – use a good text editor designed for editing raw text – something like TextWrangler. (Free from Bare Bones: http://www.barebones.com/products/textwrangler/)

editor affects all statistics queries (reports, tags etc) that output accumulated rain where the edited day is included in the date range of the query. When this tool is selected, a list of existing edits is displayed, sorted by date:
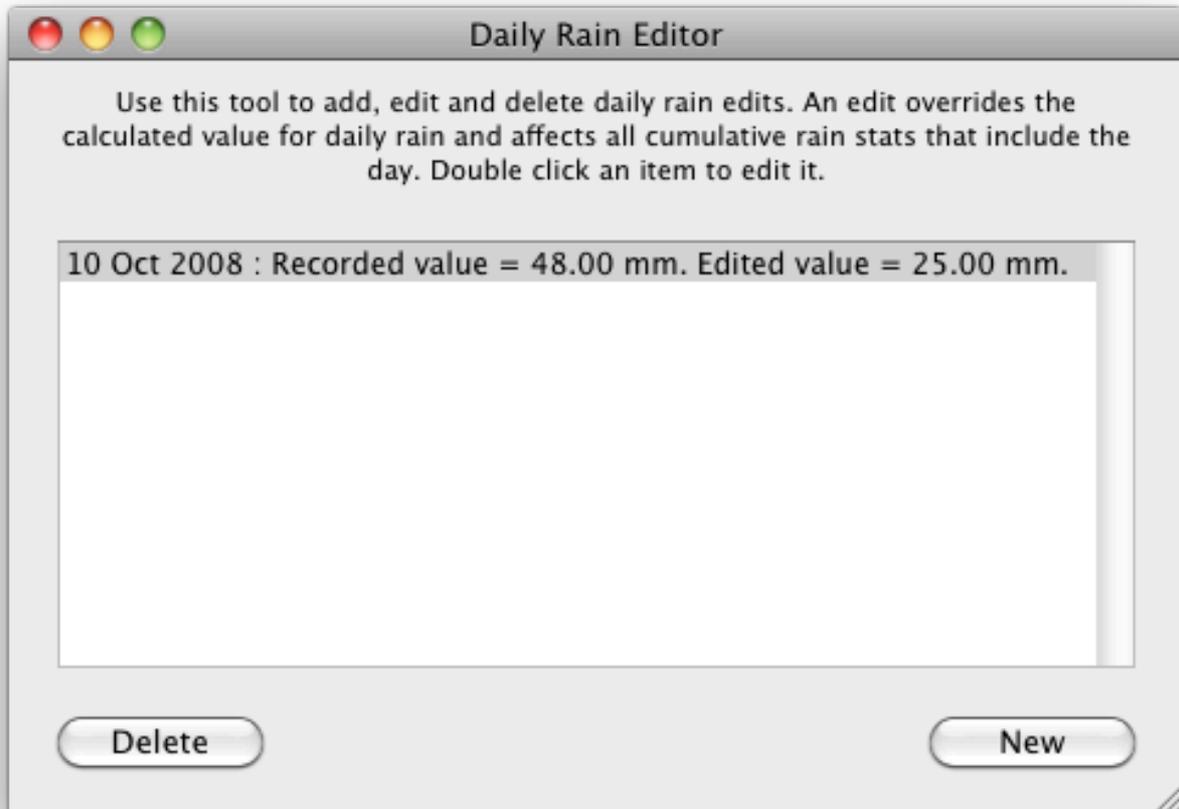
Figure 20 - Daily Rain Editor

Pressing the 'New' button will display the following sheet:
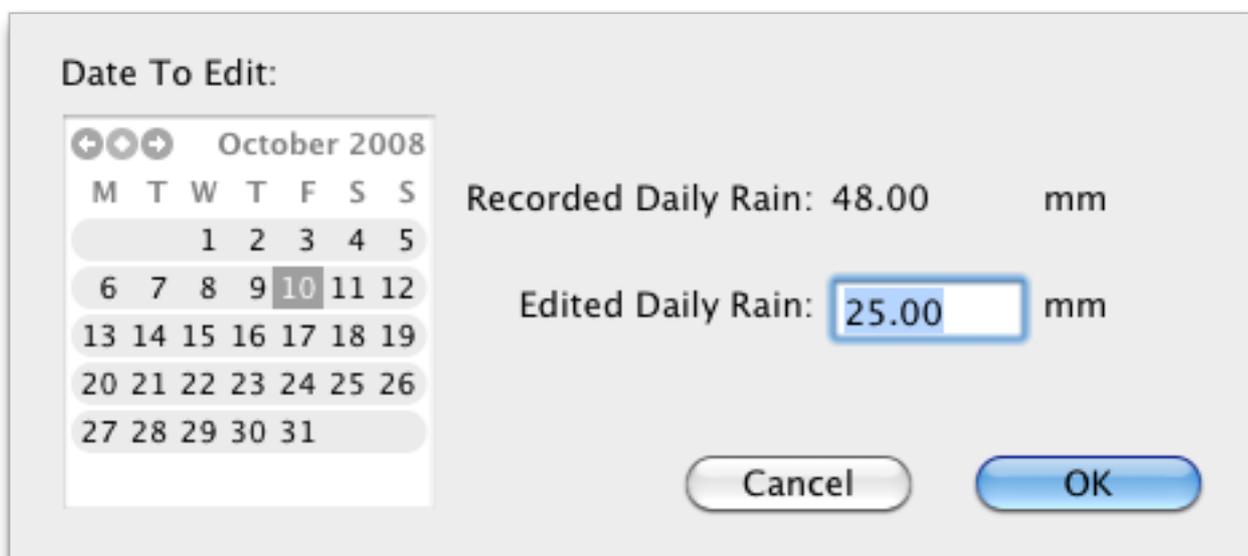
Figure 21 - Daily Rain Editor Sheet

Use the calendar to select the day you wish to edit – the current daily rain value will be displayed. Enter the new value and press the OK button.

Update Weather Now

This menu item forces WeatherCat to take a sample now.

The Journal
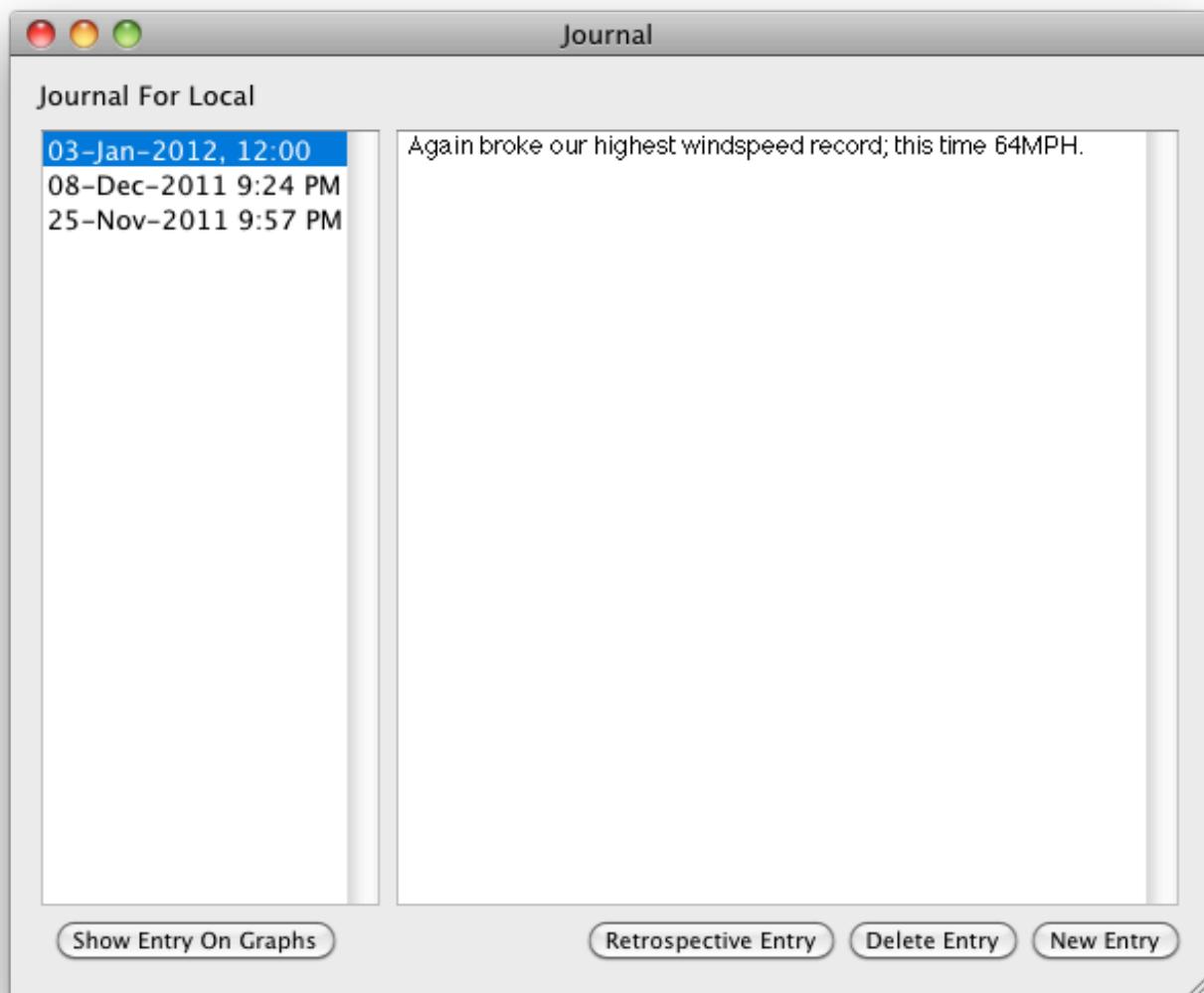
Figure 22 - Journal

WeatherCat provides a journal in which you can record notes about the weather. The journal automatically time-stamps each entry and can be uploaded to your web pages as a simple weather blog.

The layout of the journal is as two panes; the left pane shows journal entries, with newest at the top. The right pane shows the actual journal entry.

To Create A New Entry
To create a new entry either click the 'New Entry' button at the bottom right of the journal or simply start typing in the right hand text field.

Links and in-line images can be inserted via the following html:
Link: `<A HREF="http://some.link.com" target="_blank">A cool link</A>`
Image: `<img src="url" alt="descriptive text"/>`
(Note: The double quotes in the code are needed).

Examples:
    Link Test:
    <A HREF="http://www.trixology.com/" target="_blank"> Trixology</A>

    Image Test:

Links and images will not be displayed in the Journal window within WeatherCat, but will be displayed once uploaded to your web-site.

To View An Entry
To view a journal entry, double click it in the left hand pane.

To Edit An Entry
To edit a journal entry, first double click it then edit the text in the right hand pane.

To Delete An Entry
To delete a journal entry, select an entry in the right hand pane then hit the 'Delete Entry' button.

To View The Data For An Entry
To view the data for a journal entry, first select the entry in the right hand pane, and then hit the 'Show Entry On Graphs' button.

Status

This shows the state of various internal systems and can help quickly diagnose problems. Please note: Weathercat is designed to automatically recover from failures where-ever possible - sometimes this can take up to an hour. Your first course of action when noticing a problem is to just leave WeatherCat alone for an hour to see if the problem clears up.

The FTP section shows the state of WeatherCat's 3 FTP queues – the longer the bar, the more files are queued for upload. If the FTP queues become full, you'll receive an admin

email – typically this indicates a problem either with your local Internet connection (commonly the cause), or the FTP server (rare).

The On-Line Services section shows the state of various on-line services WeatherCat can send data to. Figures separated by a '/' character indicate the number of transmissions versus the number of acknowledgements for that service.

WeatherCat Core shows the current communications quality to your hardware, the status of the webcam and the watchdog. The Watchdog is a separate task within WeatherCat that monitors WeatherCat for hangs – it will reboot WeatherCat if it detects a problem (if enabled in the preferences).

Figure 23 - Status Window

Data Export

You can export data from WeatherCat using the Export tool. The data is exported as a comma delimited text file. Export can take a long time – we would recommend exporting data in no more than month-sized chunks.
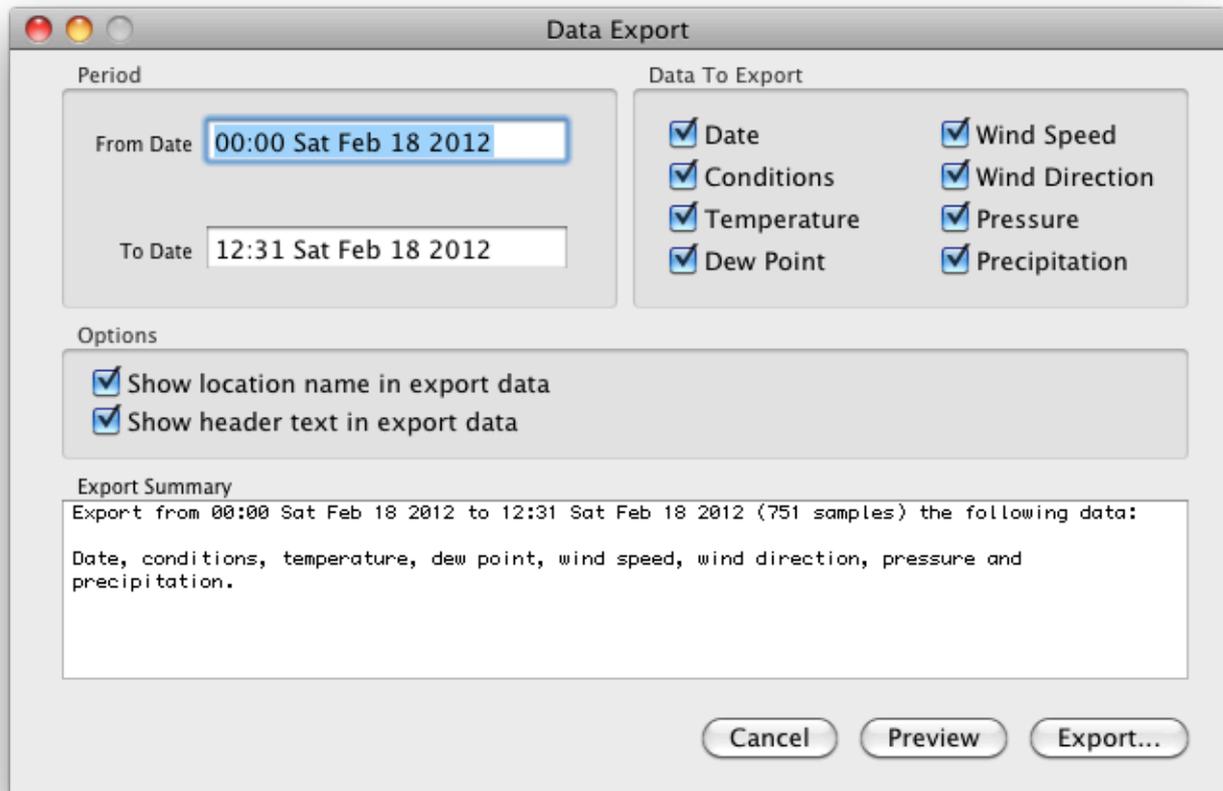
Figure 24 - Data Export

Switching the 'Show Location Name' and 'Show Header Text' options off are useful if you wish to import the data into a spreadsheet.

Station Hardware Options

The facilities available here depend on your weather station hardware.

WS23xx Hardware Options
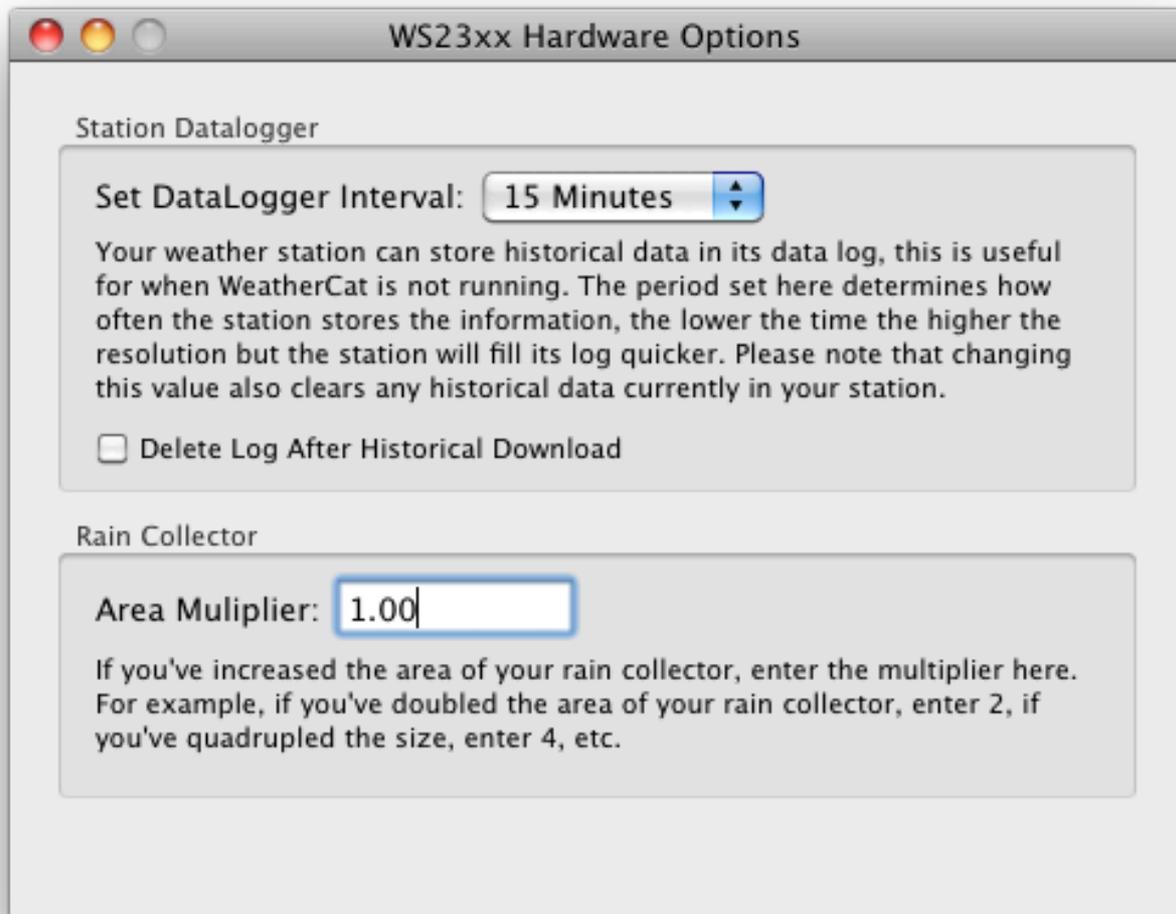
Figure 25 - WS23xx Hardware Options

Here you can set your data-logger's logging interval from 1 minute to 2 hours. The WS23xx series of stations can store 170 samples thus at 15 minute intervals it can store 42.5 hours and at 2 hour intervals, 240 hours (10 days) can be saved.

Note that when setting the archive interval, WeatherCat also clears the data logger.

You also have the option of clearing the data-logger after WeatherCat downloads historical weather from the station. This can lead to faster down-loads in future.

WeatherCat also allows you increase the area of your rain collector – this is a common modification to increase the sensitivity of the rain bucket supplied with the 23xx range.

Davis Monitor/Wizard Options

Figure 26 - Monitor/Wizard Hardware Options

Here you can set your data-logger's logging interval from 1 minute to 2 hours. The Davis Monitor and Wizard series of stations can store 1560 samples, so at 15-minute intervals it can store 390 hours (16.25 days) and at 2 hours it can store 3120 hours (130 days).

Note that when setting the archive interval, WeatherCat also clears the data logger.

The other options can set the station's clock shortly after midnight to the time on your computer and clear the daily rain held in the console.

Davis Vantage/Vue Range
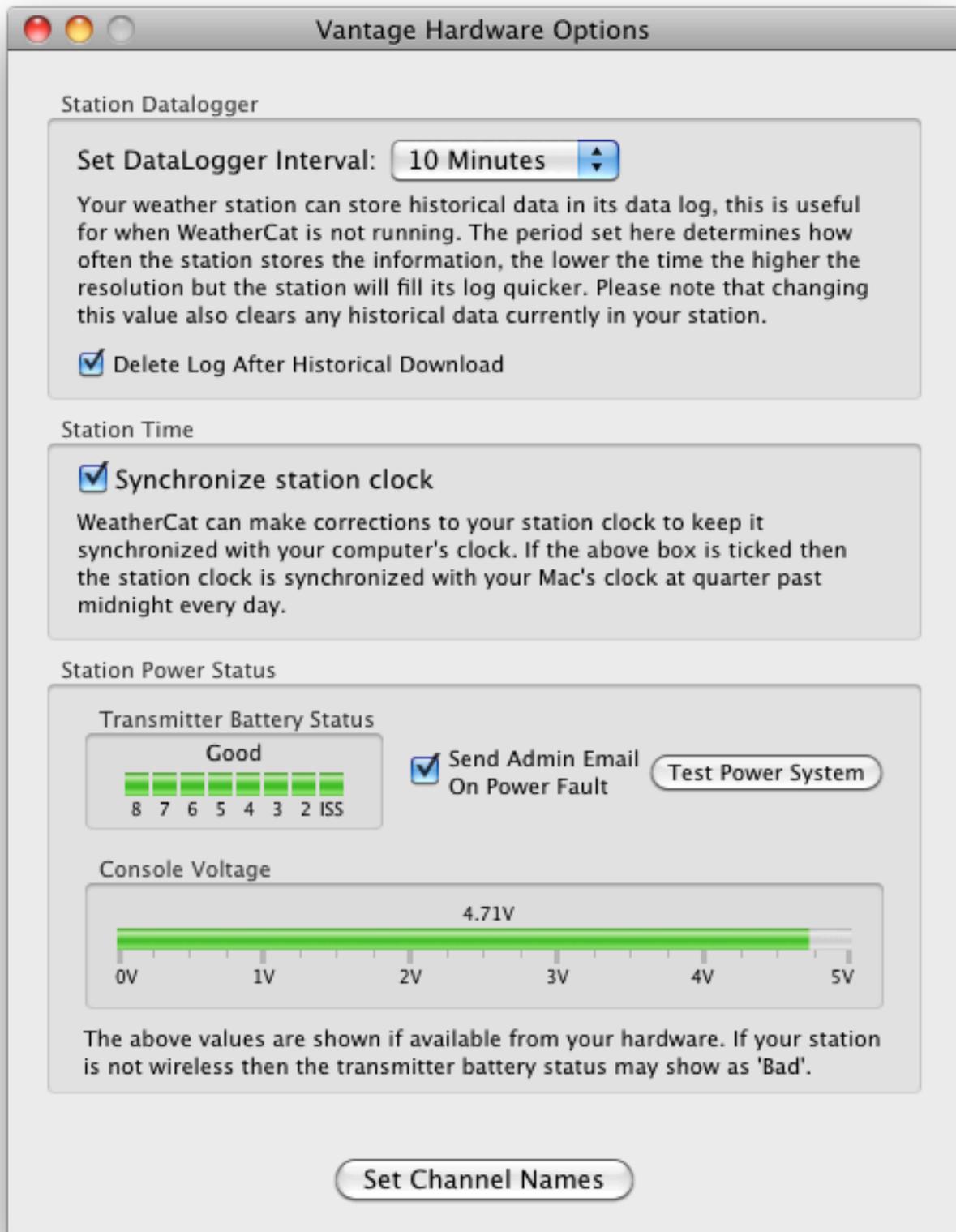
Figure 27 – Vantage/Vue Hardware Options

Here you can set your data-logger's logging interval from 1 minute to 2 hours. The Davis Vantage range can store 2560 samples, thus at 15-minute intervals it can store 640 hours (26 days) and at 2 hours it can store 5120 hours (213 days).

Note that when setting the archive interval, WeatherCat also clears the data logger.

You also have the option of clearing the data-logger after WeatherCat downloads historical weather from the station. This can lead to faster down-loads in future.

If 'Synchronize station clock' is ticked, WeatherCat will set your station's clock shortly after midnight every day.

WeatherCat monitors the Vantage power system including that of remote transmitters. By default, it will send you an email when it detects either a problem with the station power supply or a transmitter battery. The 'Test Power System' button causes WeatherCat to simulate various power failures – the display will update, and power fail and power restore emails will be sent if enabled.

The 'Set Channel Names' button brings up a sheet where you can alter the default channel names as assigned by WeatherCat. These names are used in the Live Data View tool and custom graphs. Name changes made here will not take affect until WeatherCat is restarted.
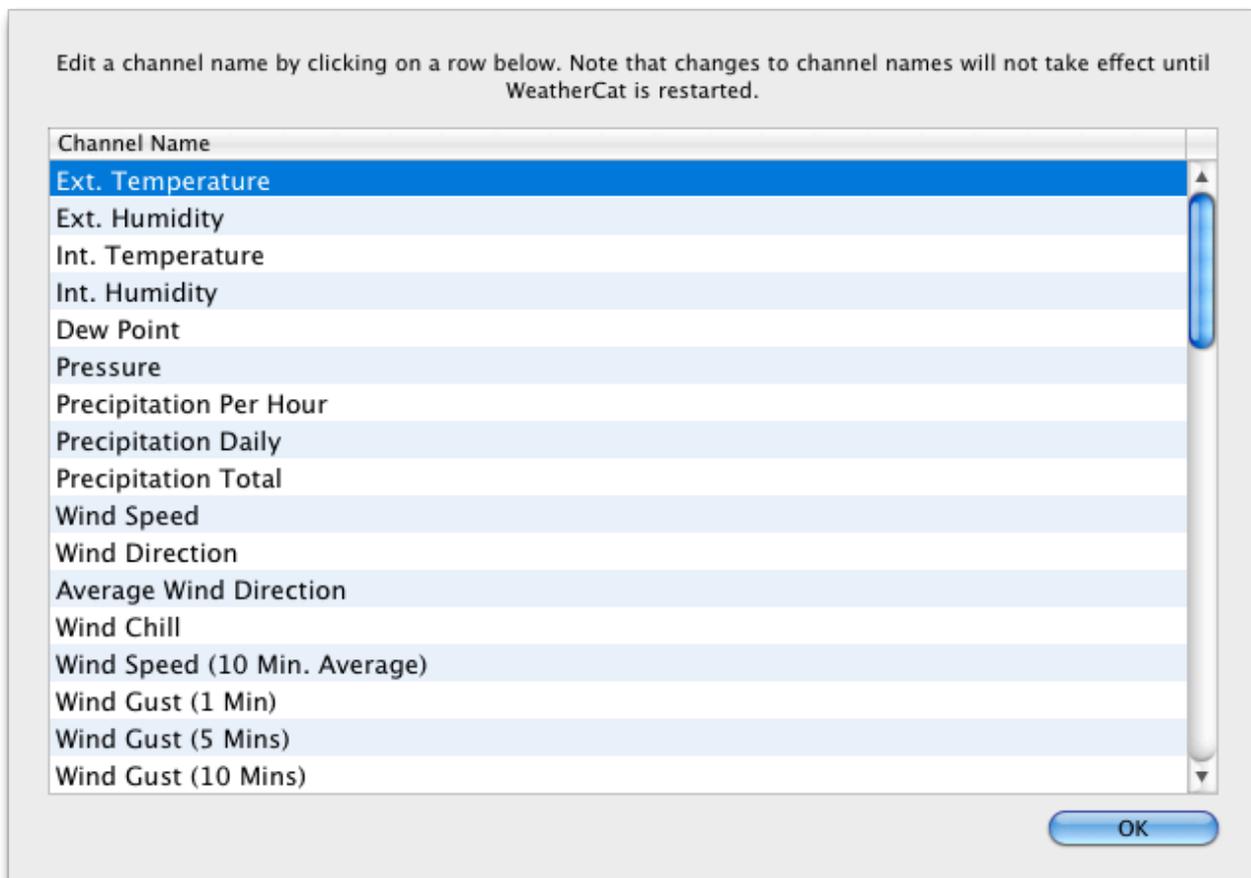
Figure 28 - Vantage Channel Names
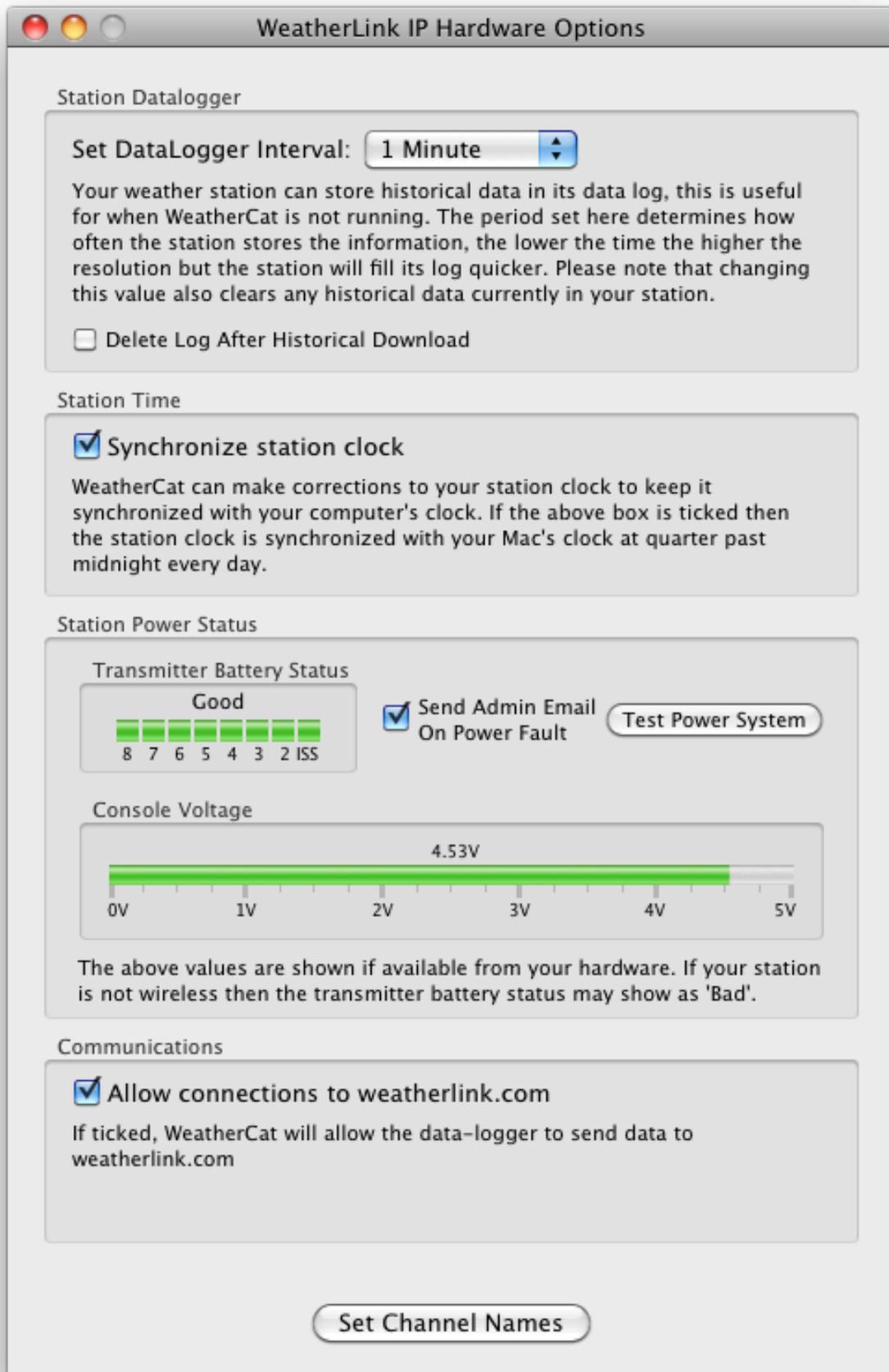
Figure 29 - WeatherLinkIP Hardware Options

The WeatherLinkIP driver can be used with any Davis hardware that supports the WeatherLinkIP data-logger. This driver offers all the facilities of the normal Vantage/Vue driver; the only difference is the option to allow the logger to send data to weatherlink.com - this is enabled by default.

To connect, select WeatherLinkIP in WeatherCat's communications connection window. Enter the I.P. address of the data-logger and hit the 'Done' button. By default WeatherCat uses the default port of 22222; if your logger is set to use another port, use a colon after the IP address followed by the port - for example 192.168.1.110:22222

If you do not know the I.P. address of your data-logger, a network scanning utility such as AutoScan-Network (free, available from: http://autoscan-network.com/download/) will scan your network and display all available devices and their I.P. addresses. We suggest setting the data-logger to a fixed I.P. address via its web browser interface.

For the greatest reliability it is suggested you turn off the upload to weatherlink.com via the loggers' configuration web page and turn the upload option off in WeatherCat. The reason for this is when uploading to weatherlink.com, the logger may lock-up if it can't resolve the weatherlink.com domain name and communications to WeatherCat will be lost.

Virtual VP
The WeatherLink IP driver can be used with Virtual VP.

Normally WeatherCat reads the rain bucket resolution direct from the hardware, but it appears Virtual VP does not pass this information through (WeatherCat defaults to 0.2mm). However, it's possible to force the rain bucket resolution to 0.01" via a hidden preference as follows:

Open a terminal window and enter the following command and hit the return key:
```
        defaults write com.trixology.weathercat VantageRainCollectorOverrideToInches
YES
```
This will force the WLIP to set the rain collector to 0.01" resolution. To revert back to auto-detect enter:
```
        defaults write com.trixology.weathercat VantageRainCollectorOverrideToInches NO
```

This command only needs to be entered once - it isn't necessary to enter it every time WeatherCat is launched.

If using Virtual VP, please turn off the 'Allow connections to weatherlink.com' option.

WMR928/968 Options

Figure 30 - WMR 928/968 Hardware Options

The Area Multiplier is useful if you have increased the capture area of your rain bucket.

You can edit the extra channel names available on your station - these names are displayed in the live data view and custom graphs.

You can also pipe channel 3 to be the external temperature and humidity readings, which is useful if your main thermo/hygro unit is not serviceable.

Supplied Plug-ins

Live Data View

Figure 31 - Live Data View

The Live Data View tool shows the raw data coming from your station (converted to your units). It is most useful for checking channel status and errors.

In addition, at the bottom of the list of channels it maintains a count of communications errors – these errors are split up into time-outs and checksum/CRC errors. These values can aid fault finding spurious communication issues.

Current Conditions Calculator
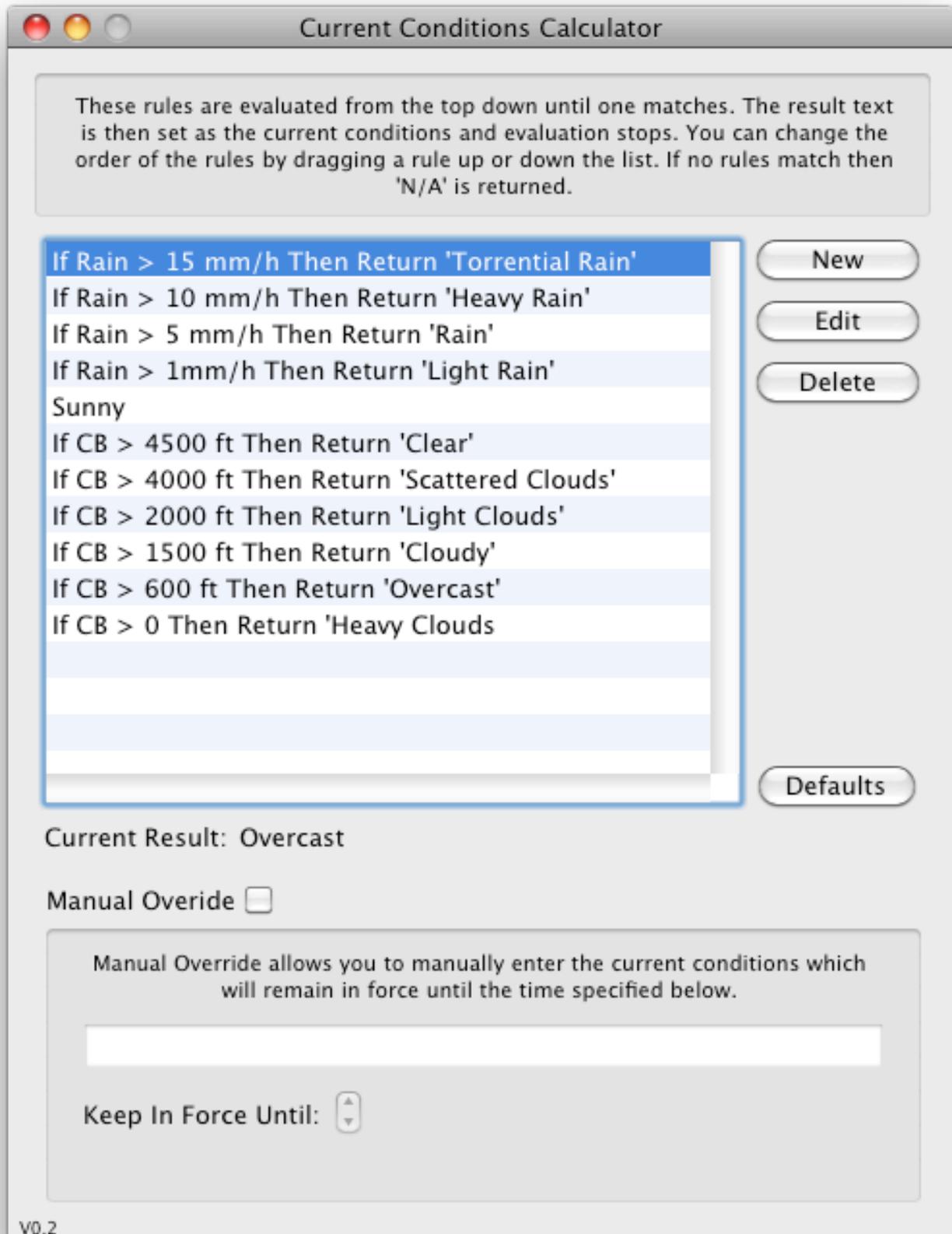
Figure 32 - Current Conditions Calculator

This tool allows you to select various channels, take their values, compare them to a given value and if the result is true then set the current conditions string to a user specified value.

For example, if the current rain rate is greater than 0.5 inches per hour then set the current conditions to 'Torrential Rain'. When calculating the current conditions the plug-in runs through the rules from top to bottom until it finds one that is true. If none are true then the default result is 'N/A'.

NOTE: The channels available are determined by your hardware and a consequence of this becomes apparent if you change your station hardware. In this case WeatherCat will tell you the hardware has changed and that you need to check the current conditions rules to make sure the channels you previously were using are available with your new hardware (and conversely to check for new channels you can now use). The same applies to custom alerts and graphs.

Because it is not possible to determine rules for all weather conditions, the tool provides a feature to override the calculated current conditions with a user provided description of the current conditions (manual override). This override will stay in force for a user settable time period via an expiry timer. As a convenience, the expiry timer is set to two hours in the future when the user conditions are enabled.

When the expiry time is reached, the tool will revert to using the rules to calculate the current conditions automatically.

This feature is useful for weather conditions such as 'snow' or 'haze', which are difficult to correctly detect.

NOTE: Manual conditions and their expiry times are not saved; if WeatherCat is quit and re-launched the manual override conditions will be lost.

Also note that via WeatherCat's AppleScript interface it is possible to set the current conditions, see page 145 for more details.

Banner Generator

The banner generator can generate an image overlaid with current weather data and upload it to your Custom Web pages server on a regular basis. The banner can be linked to from web-pages, forum signatures and so on – instructions are included in the window as per the image below. Note that items can be nudged into position by first selecting the item to be moved, then holding down the ALT key whilst using the arrow keys.
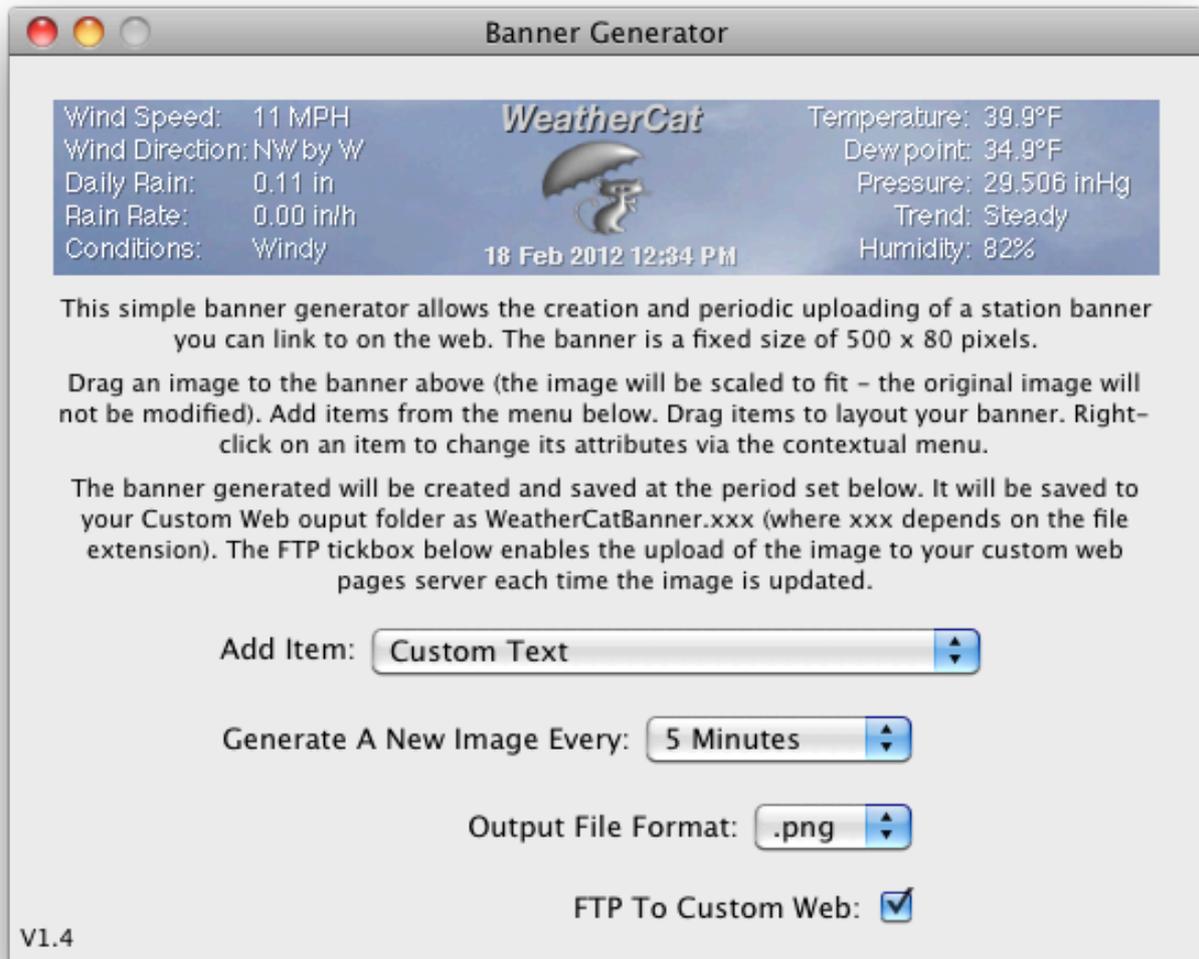
Figure 33 - Banner Generator

How Do I…

This section details step-by-step instructions to perform common tasks with WeatherCat.

How Do I Change The Units Used By WeatherCat?

Open WeatherCat's preferences from the File menu then go to the Misc1/Units pane.

How Do I Send Data To Wunderground?

WeatherCat can send real-time data to Wunderground. You will need a Wunderground ID; if you are not yet a Wunderground member you can get a Wunderground login ID from within WeatherCat.

1. Open WeatherCat's Preferences and select the 'On-Line' tab.
2. Open the Wunderground PWS tab – it will look like the picture below (PWS is the abbreviation for 'Personal Weather Stations')
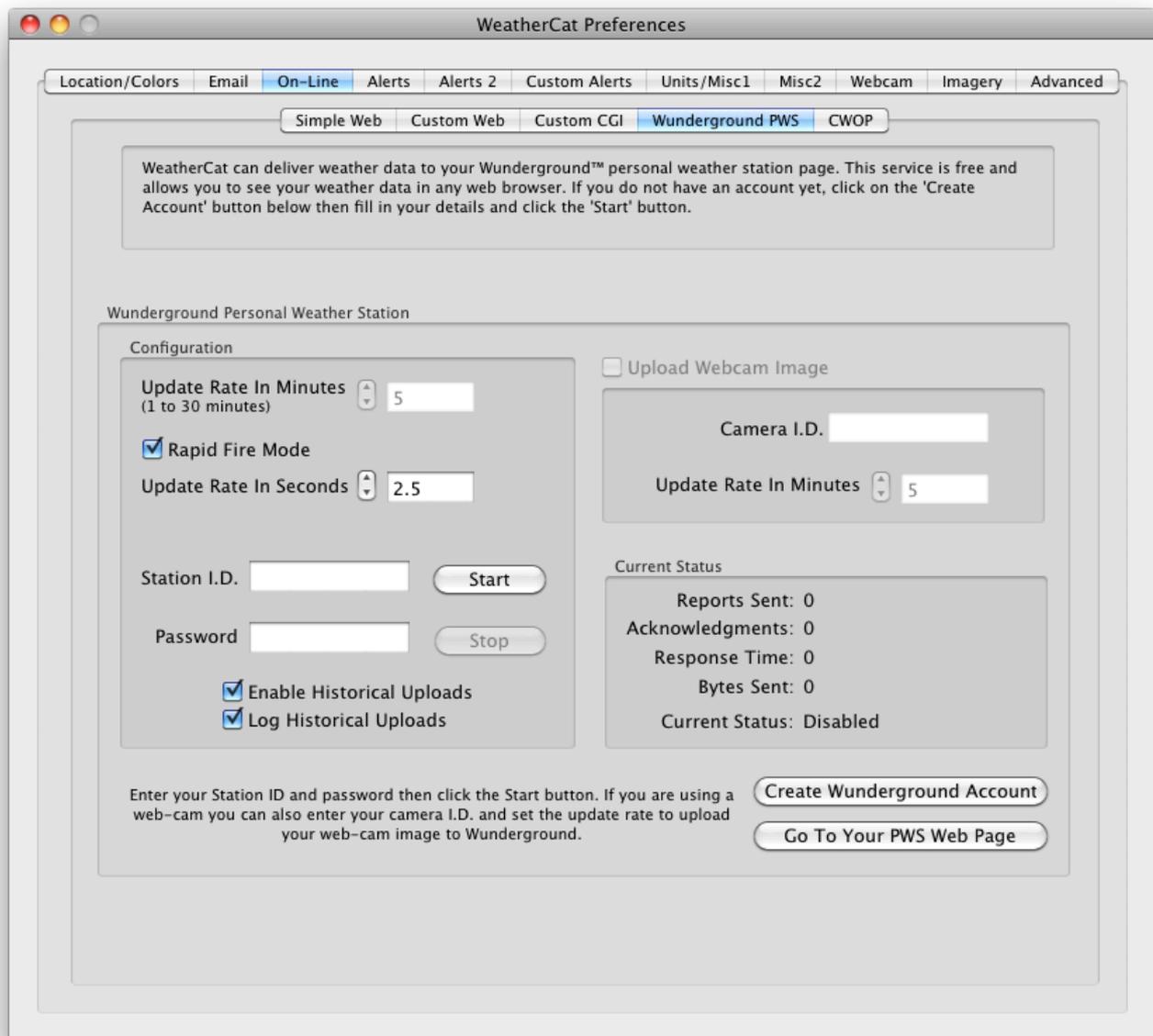
Figure 34 - Wunderground Set-up

3. If you don't have a Wunderground member I.D. click on the 'Create Wunderground Account' button. You web-browser will open and take you to the correct page to register with Wunderground.

4. Once you have a station I.D. and password, enter them into the 'Station I.D.' and 'Password' fields.

5. Click the 'Start' button and the 'Current Status' pane will start updating. If there is a problem with your login details or the connection to the Wunderground servers, this will be indicated in the 'Current Status' area.

Clicking on the 'Go To Your PWS Web Page' button your web browser will open your Wunderground station page.

How Do I Send Data To The Citizen's Weather Observer Program (CWOP)?

WeatherCat can send data to CWOP – the procedure is similar to setting up for Wunderground. You will need a CWOP ID; if you are not yet a CWOP member you can create a login ID from within WeatherCat.

1. Open WeatherCat's Preferences and select the 'On-Line' tab.

2. Open the CWOP tab – it will look like the picture below.
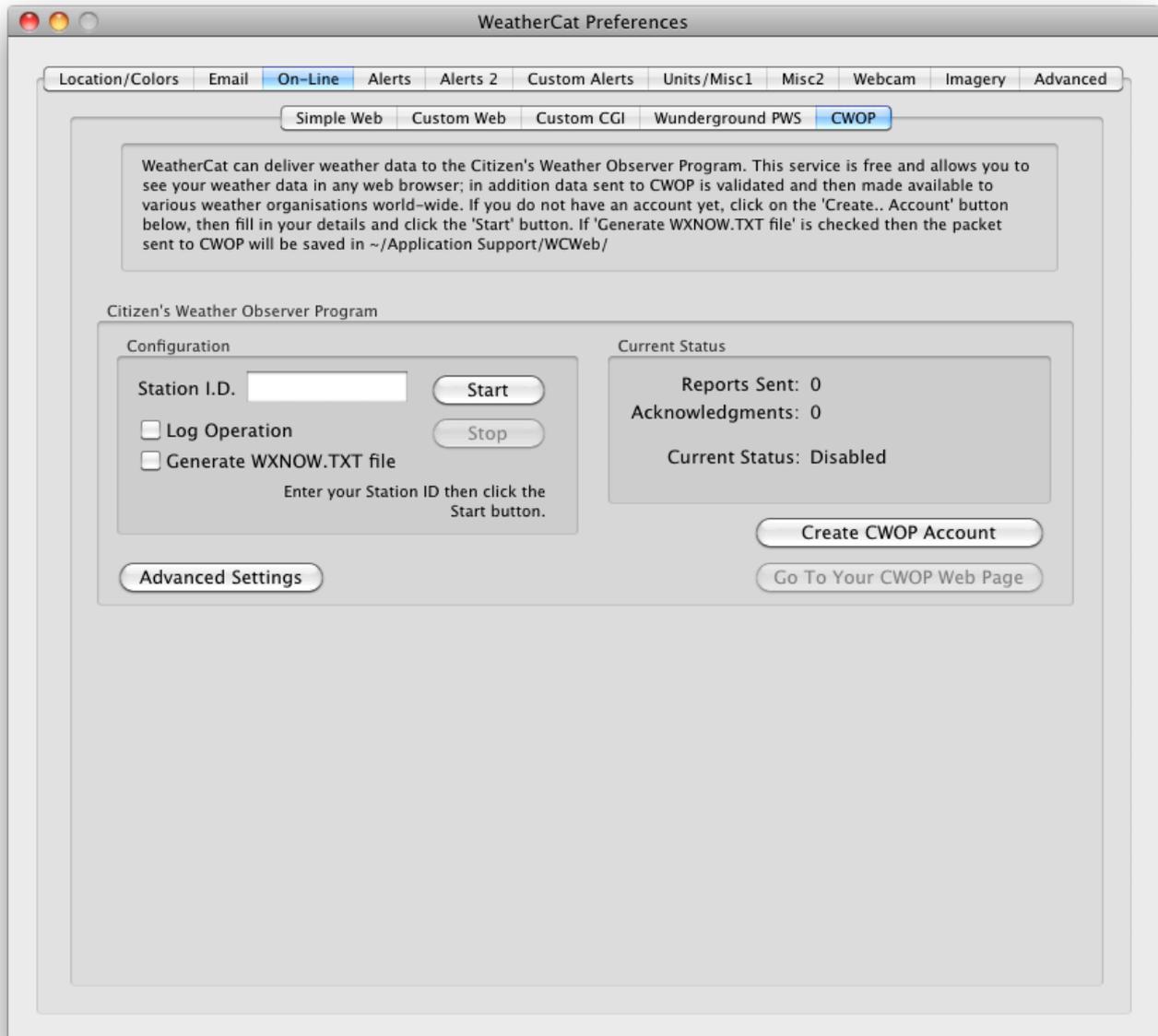
Figure 35 - CWOP Settings

3. If you don't have a CWOP Station I.D. click on the 'Create CWOP Account' button. Your web-browser will open and take you to the correct page to register with CWOP.

4. Once you have a station I.D. enter it into the 'Station I.D.' field.

5. Click the 'Start' button.

The 'Current Status' pane will start updating.

If you get the message in the 'Current Status' that your 'Lat/Long is not set', then follow the 'Basic Setup' section at the start of this manual to enter your location and height into WeatherCat.

Finally, if you click on the 'Go To Your CWOP Web Page' button your web browser will open your CWOP station page.

How Do I Use A Webcam With WeatherCat?

WeatherCat can work with any QuickTime compatible camera. It can also work with third party webcam software via its local file option and with IP based webcams if they make the image available via http.

To use your camera with WeatherCat:
1. Ensure your camera is plugged in and no other program is using it.
2. Go to WeatherCat's preferences and open the 'Webcam' tab.
3. Click on the 'Web-cam Enabled' check box.
4. Your camera may appear in the camera selector menu, if it does not…
5. Click on any other pane of the preferences then back on the Webcam pane – this causes WeatherCat to refresh the list of cameras. If still not there, unplug the camera, count to 10, plug it back in and repeat.
6. Check the webcam is working by opening the 'Live Video Preview' from the 'Tools' menu.

You can now use the webcam image in web pages as described next. The webcam options will be described in the 'Preferences' section later in this manual (page 129).
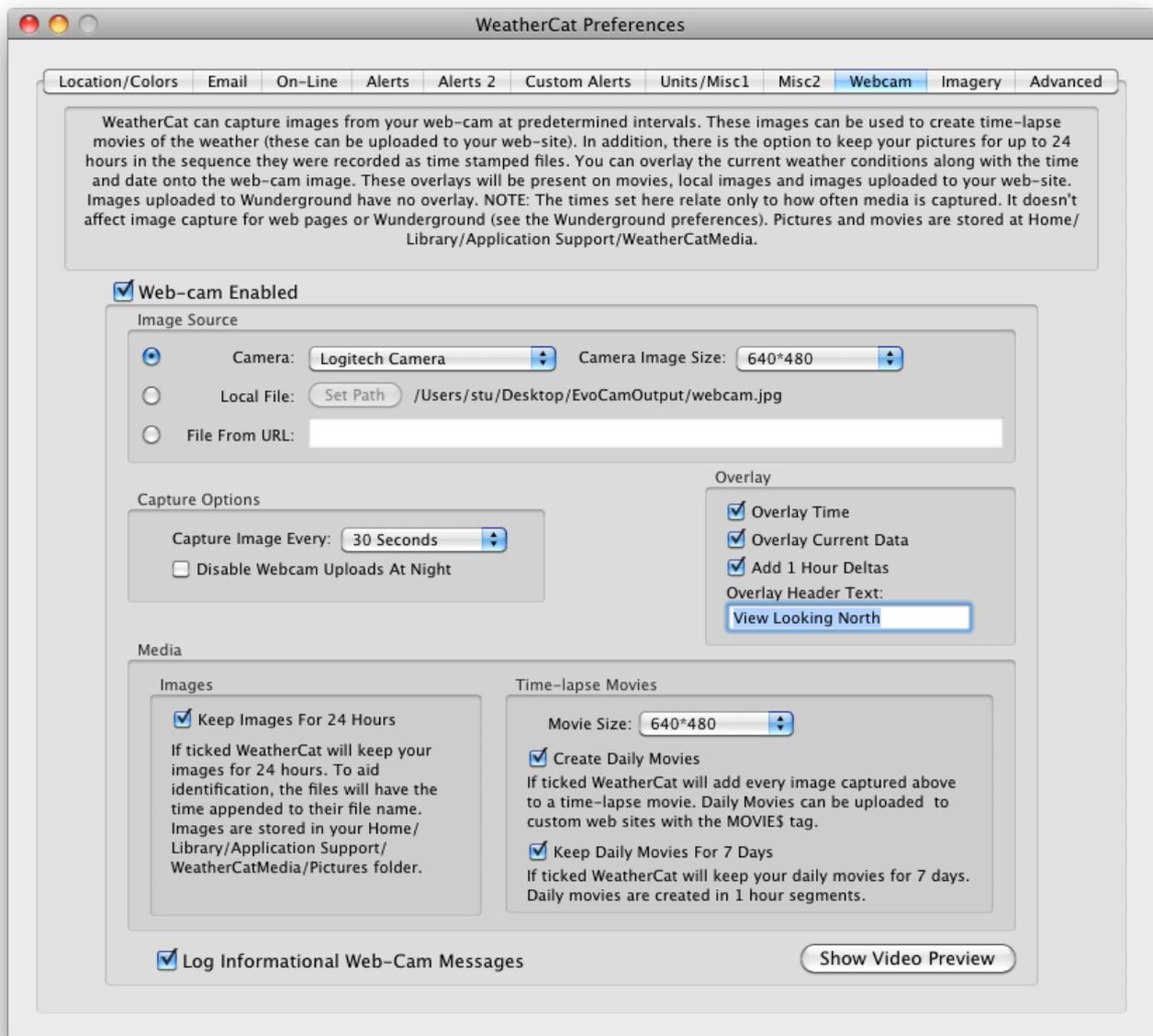
Note: If you are using an external iSight camera (Firewire) with WeatherCat, please use the older webcam driver as described in the Advanced Preferences on page 134. If you do not, the camera will stop capturing images after a few hours running.

How Do I Upload Web Pages To a Web Server?

WeatherCat can create web pages in two ways – the fastest method is called the 'Simple Web Pages' which gives you 'canned' web pages with very little effort – you just need to know your FTP log-in details and create a directory on your server for WeatherCat to upload your files to.

The second method is called 'Custom Web Pages'. First we will describe the simple web pages.

Simple Web Pages

By clicking a few buttons, entering some descriptive text and setting up your FTP details you can put your weather web pages on-line very quickly.

An example of how these web pages look can be found on our web site at the following URL:
http://www.trixology.com/live_weather/simple

1. Open WeatherCat's Preferences and select the 'On-Line' tab.
2. Open the Simple Web tab – it will look like the picture below.
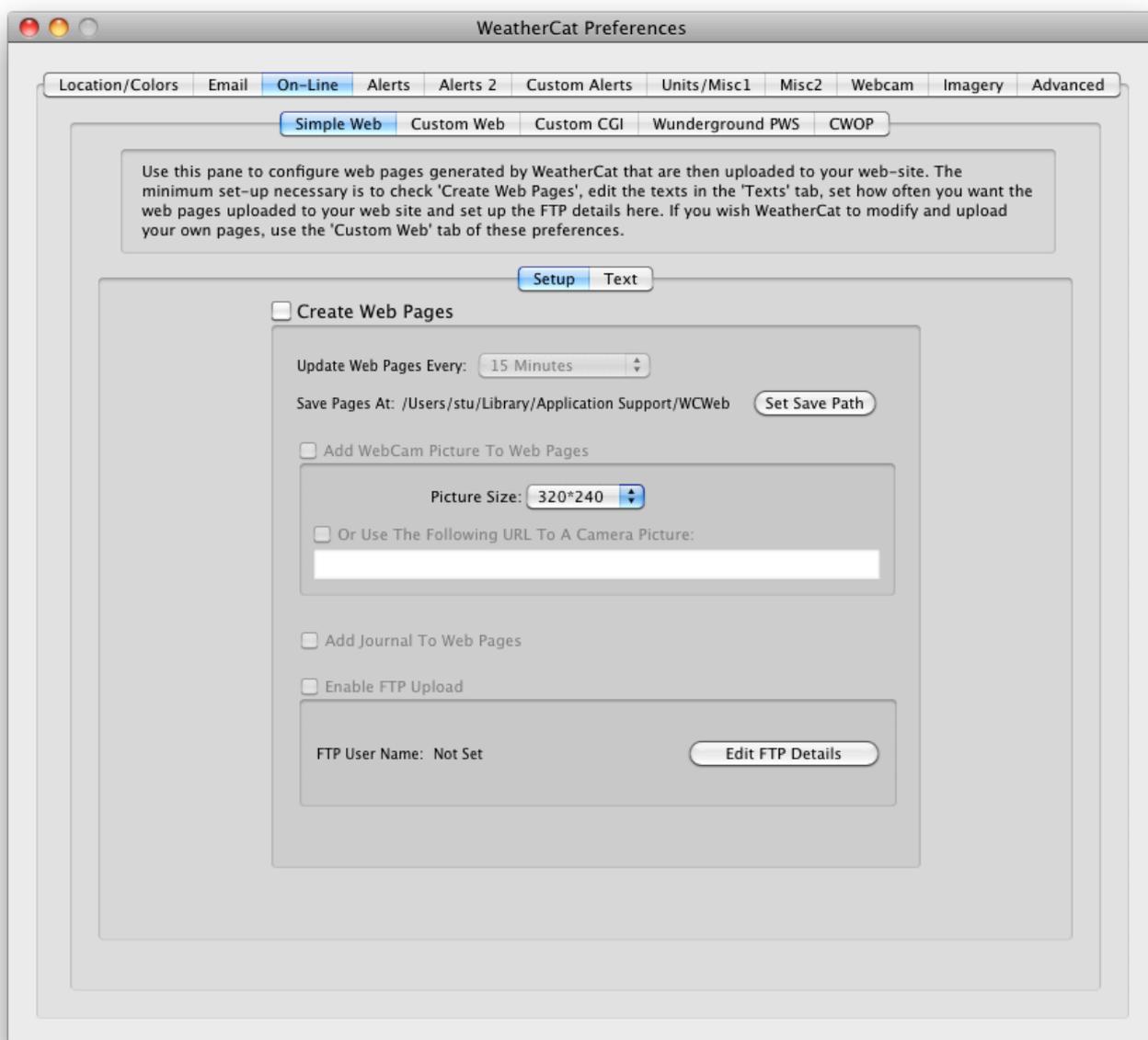
3. Check the Create Web Pages tick-box.
4. If you have enabled your webcam tick the 'Add WebCam Picture To Web Pages' tick-box.

5. If you wish to display your weather journal on your web site, check the 'Add Journal To Web pages' tick-box.
6. Click on the 'Edit FTP Details' button; a sheet will pop-up (picture below) where you can enter your FTP details. Be sure the URL ends in a '/' character. You can use the 'Test' button to perform a test upload.
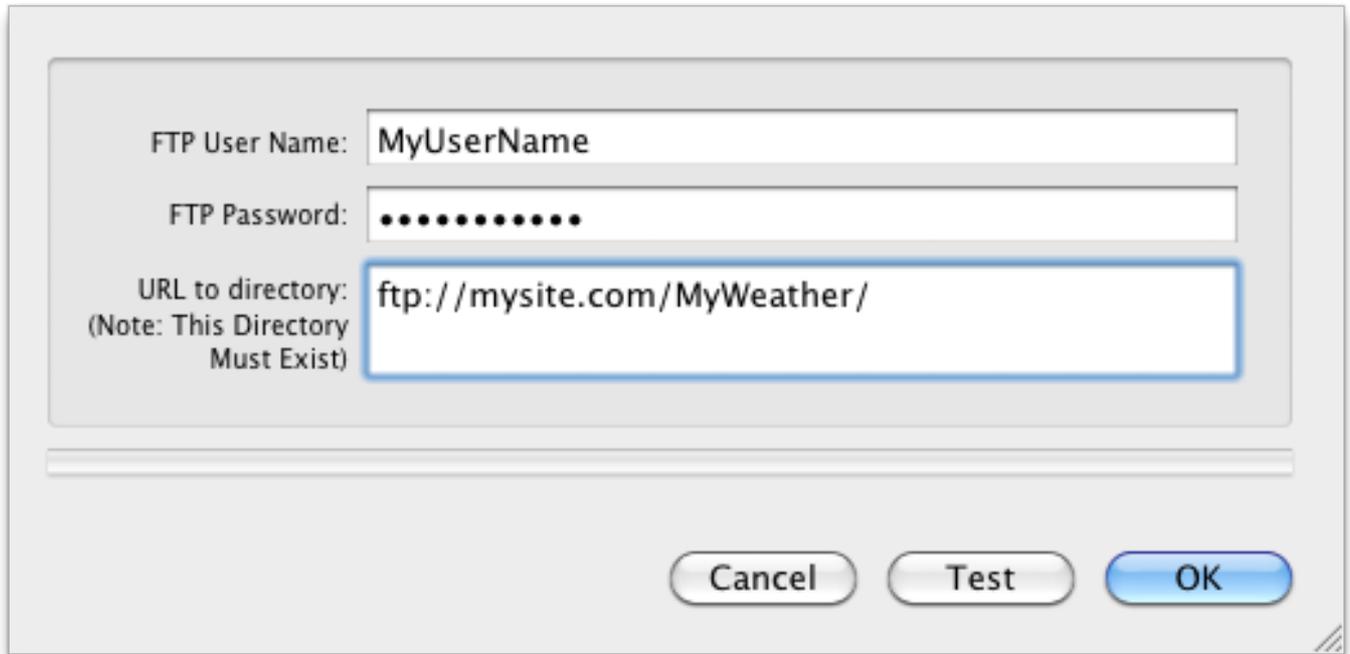
7. When your FTP details are set-up and tested, click the OK button.
8. (Optional) You can add some text describing your weather pages by clicking on the 'Texts' tab as per the next picture.
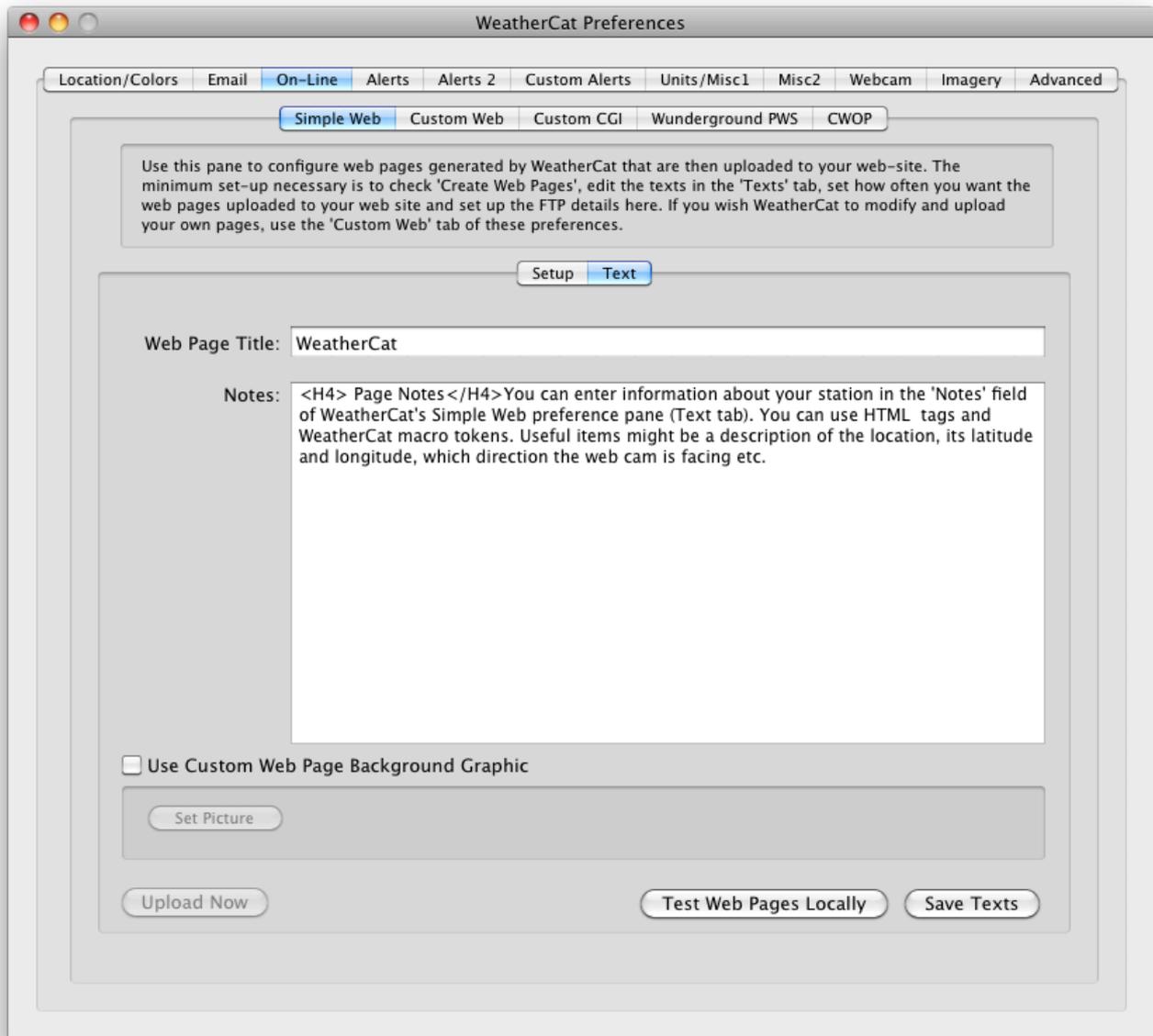
9. Once you are happy with the texts, press the 'Save Texts' button.
10. Press the 'Test Web Pages Locally' button. WeatherCat will process your web pages and open them in your browser.
11. Go back to the 'Setup' tab and tick the 'Enable FTP Upload' tick-box.

From now on, every 15 minutes WeatherCat will generate the web pages and FTP them to your web-server.

You can change the upload rate with the 'Update Web Pages Every' pop-up menu.

The remaining options will be described in detail in the 'Preferences' section of this manual later.

The simple web pages are designed to give basic web pages for use on your site. For more complex web pages, using your own design, we need to look at WeatherCat's custom web pages facilities.

Custom Web Pages

WeatherCat can take your own web pages, we will call them 'templates', replace any 'tags', with weather data, generate any needed graphics and movies requested by the tags and then upload the processed files to your web server.

When processing your templates, WeatherCat takes the pages found in your source folder (set with the 'Set HTML Source' button), processes them for tag replacement and then saves the resultant pages at the save path (set with the 'Set Save Path' button).

WeatherCat tags end in the '$' symbol, so for example if, in your template file, you had the tag 'WCAM$', WeatherCat would replace it with the current webcam picture (actually it would replace it with the html code to draw the picture and make sure the webcam picture was also uploaded as a jpeg file).

WeatherCat tags come in two varieties – high level tags which typically display more than one item and lower level tags which only display one item but are finer grained and hence more flexible.

An example high-level tag is 'CT$' which is replaced with the current temperature, the temperature units string and 1 hour delta – it would be printed as '46.2°F (0.2)'.

Another high-level tag is JOURNT$ which is replaced with the journal text for the station and STDAILY$ is replaced with the daily hourly statistics. STDAILY should normally be surrounded by preformatted tags; i.e. `<PRE> STDAILY$ </PRE>`

Low-level tags are constructed from the STAT$ keyword and some parameters. The list of parameters starts and ends with a $ symbol. STAT$ tags create queries to WeatherCat's Stats Manager and are replaced with the result of the query.

The basic format is:
STAT$ITEM:TYPE:PERIOD$

ITEM can be one of:

RAIN, DAILYRAIN, RAINDAYS, FROSTDAYS, DAILYSUN, TEMPERATURE, DEWPOINT, WINDCHILL, HEATINDEX, PRESSURE, WINDSPEED, AVERAGEWINDSPEED, WINDGUST, WINDDIRECTION, WINDRUN, EXTHUMIDITY, INTHUMIDITY, INTTEMPERATURE, UV, SOLAR or SUNSHINEHOURS.

TYPE can be one of:
CURRENT, MIN, MAX, AVERAGE, TOTAL.

PERIOD can be one of:

TODAY, YESTERDAY, THISWEEK, LASTWEEK, THISMONTH, LASTMONTH, THISYEAR, LASTYEAR, THISSEASON, ALLTIME.

By appending TIME we can display the time of the event:
STAT$ITEM:TYPE:PERIOD:TIME$

For example, to find the highest temperature today:
STAT$TEMPERATURE:MAX:TODAY$
STAT$TEMPERATURE:MAX:TODAY:TIME$.

These tags are rendered as:
8.22
12:10 AM

To find the highest temperature yesterday:
STAT$TEMPERATURE:MAX:YESTERDAY$
STAT$TEMPERATURE:MAX:YESTERDAY:TIME$.

These tags are rendered as:
9.39
9:00 PM

CURRENT will display the real-time value of a given item. This is different to CT$ or CD$ etc. as those values are pulled from the database which has a resolution of 1 minute. In the case of CURRENT, the time field (TODAY, YESTERDAY etc) will be ignored and can be omitted.
To display the current outdoor temperature:
STAT$TEMPERATURE:CURRENT$
This is rendered as:
5.33

DELTA1 will display the 1 hour change of a given item.
For DELTA1 the time field (TODAY, YESTERDAY etc) will be ignored and can be omitted.
NOTE that wind direction delta is not supported and will return an undefined value
To display the current outdoor temperature 1 hour change:
STAT$TEMPERATURE:DELTA1$
This is rendered as:
1.28

Notes:
SUNSHINEHOURS can only be used with TOTAL (to find the total number of hours over a given date range)

e.g. Hours of sunshine today = STAT$SUNSHINEHOURS:TOTAL:TODAY$
is rendered as:
Hours of sunshine today = 0.52

DAILYSUN can only be used with MAX (to find the sunniest day in a given date range)
e.g. The sunniest day this year: STAT$DAILYSUN:MAX:THISYEAR:TIME$
(STAT$DAILYSUN:MAX:THISYEAR$ hours)
is rendered as:
The sunniest day this year: 18 Feb 2012 (0.52 hours)

THISSEASON can only be used with RAIN
e.g. STAT$RAIN:TOTAL:THISSEASON$
is rendered as:
91.60
or
STAT$RAIN:AVERAGE:THISSEASON$ RAINUNITS$/h
is rendered as:
0.0616 mm/h

(The rain season start month is set in the preferences)

DAILYRAIN can only be used with MAX or AVERAGE.
e.g. STAT$DAILYRAIN:MAX:THISWEEK$ on
STAT$DAILYRAIN:MAX:THISWEEK:TIME$
is rendered as:
2.80 mm on 18 Feb 2012

RAINDAYS can only be used with TOTAL and returns the number of rain days over a
given period.
e.g. STAT$RAINDAYS:TOTAL:THISMONTH$
is rendered as:
3

FROSTDAYS can only be used with TOTAL and returns the number of frost days (or air
frosts)over a given period.
e.g. STAT$FROSTDAYS:TOTAL:THISMONTH$
is rendered as:
8

Tag Errors
In the case of an invalid tag configuration, the tag will either be processed - for example:

Highest wind direction today = STAT$WINDDIRECTION:MAX:TODAY$ degrees
returns an undefined value and is rendered as
'Highest wind direction today = 294.56 degrees'.

or it may render as an error. For example:
Average wind direction today = STAT$WINDDIRECTION:AVERAGE:TODAY$
degrees on STAT$WINDDIRECTION:AVERAGE:TODAY:TIME$ renders as:
Average wind direction today = 255.24 degrees on ***Error - No time available for
averages***

Dials and graphs can be displayed with the 'D" and 'GR' type tags – for example
DTEMPO$ is replaced with the outside temperature gauge. 'GRTEMPO$' is replaced with
the simple outside temperature graph.

Custom graphs are displayed by using their web-tag as indicated in their settings.

There are some miscellaneous tags for printing units strings – for example TEMPUNITS$
is replaced with the string for Temperature units – typical 'C' or 'F'.

Example templates are supplied in the distribution. A very simple one, called
'WeatherCat_All_Tags' simply demonstrates all the tags currently available in
WeatherCat.

You can view a live demonstration of this template at:
http://www.trixology.com/live_weather/custom/

Another template, 'atkinsfamily.org', written by Todd Atkins, demonstrates a more useful
real world template. We will use the 'atkinsfamily.org' template, demonstrate what it looks
like and then put it on-line. You can of course modify it to your needs or create your own
template from scratch. (Todd has more templates available at:
http://atkinsfamily.org/weather-templates/)

We will now run through the steps to use one of the supplied templates, later we will look
at how to create your own template.

1. Open WeatherCat's Preferences and select the 'On-Line' tab.
2. Go to WeatherCat's 'Custom Web Pages' tab of the preferences and, using the 'Set
    HTML Source' button, navigate to the 'WeatherCat/Web
    Templates/atkinsfamily.org' folder as per the picture below. This tells WeatherCat
    where to find the pages to be processed (see picture below).
3. Press the 'Test Web Pages Locally' button.
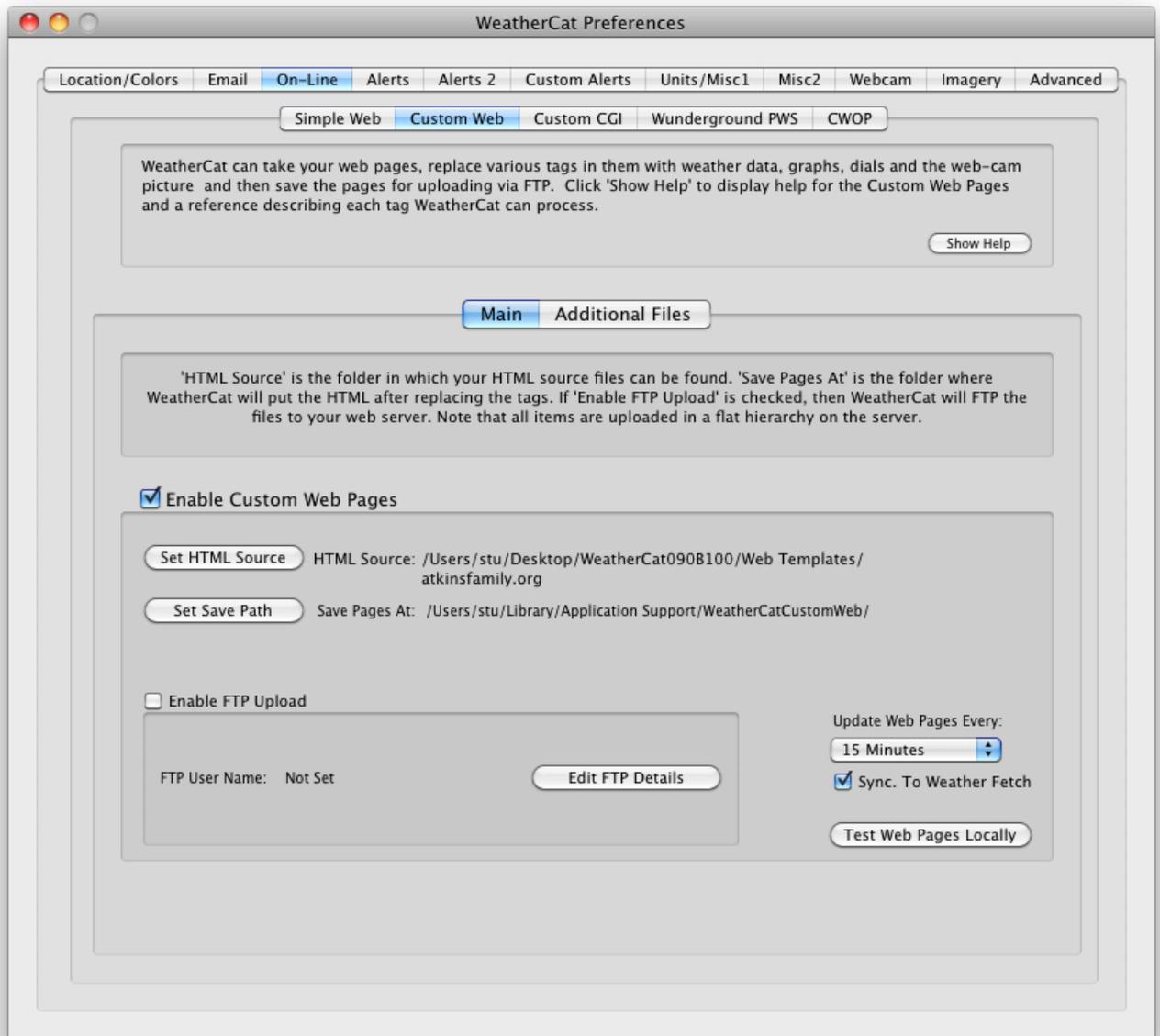
Figure 36 - Custom Web Example

WeatherCat will process the template, generate the pages and required objects then open them in your web browser. WeatherCat tries to open all documents that are to be uploaded, so you may find a CSS file opened in a text editor, and if you are using a webcam and have used webcam tags in your template, these pictures and movies will open in your graphics editor and QuickTime Player.

Examine the results and edit the template to suit your needs. After each change to a template file, save it and then press the 'Test Web Pages Locally' button to see how your changes look when processed.

A complete list of WeatherCat tags can be found at Appendix 4 (on page 152), or by pressing the 'Show Help' button in the Custom Web tab of WeatherCat's preferences. At this point you may want to create your own template – more details can be found below. NOTE: Whenever you change templates, you need to delete the old processed files found

in WeatherCat's Save Path folder, otherwise the old objects will be opened every time you test your template.

When you are happy with the results, you may now want to put your pages on the web as follows.

1. Press the 'Edit FTP Details' button and configure WeatherCat to FTP to your server (as shown previously in the Simple Web pages); you can test the FTP connection from the FTP dialog box that appears. Note that the directory to upload to must exist on the server - WeatherCat will not create the directory or the path to the directory.

2. After testing you can FTP, select the 'Enable FTP Upload' check box. WeatherCat will now update your pages at the periods set with the 'Update Web Pages Every' pop-up menu.

Notes:
1. Never put any items in the Save folder - the folder set with the 'Set Save Path' button. The contents of this folder may be deleted by WeatherCat.

2. You do not have to enable FTP for the custom web pages - you may just want them saved on your disk for use by another program or served from your Mac via the web server that comes with OS X. (Available from OS X's System Preferences (under Sharing->Web Sharing)).

3. If you start receiving warning emails from WeatherCat with regards to 'FTP Overload' it means you may be generating web pages faster than they can be uploaded (typically these problems are spurious in nature).

How Do I Create A Custom Web Template?

1. Create a folder somewhere for your web pages - for example in your Documents folder and call it something like "Weather Pages Source".

2. Referring to WeatherCat's tags reference at Appendix 4, create your web pages in your preferred web page editor and save them in your Weather Pages Source folder. Wherever you want a weather item to appear in your pages, insert the relevant tag, for example if you want the webcam image inserted, use the WCAM$ tag.

3. You can put other items in your source folder to be uploaded to your web site - for example, images. WeatherCat will look in files with extensions of .htm, .html, .htx, .css, .xml, .txt, .php, .shtml, .stm, and .shtm for tags to replace. All other types of file are not processed but are uploaded.

Now continue as above for the pre-constructed templates.

Additional WebTag Resources

A full reference for WeatherCat tags can be found in Appendix 4 or from within WeatherCat via the 'Help' button in the Custom Web Pages pane of the preferences.

Finally, the WeatherCat Web Templates forum can be found at:
http://athena.trixology.com/index.php?board=5.0

How Do I Upload Data to UKWN or NZWN?

Custom Web templates are provided that allows WeatherCat to upload data to the UK Weather Network (http://www.metserv.info/page/ukwn.html) and New Zealand Weather Network (http://www.nzweather.net/nzwn.html). These sites work by reading a file from your web site at periodic intervals.

The templates can be found in the 'Web Templates' folder of the WeatherCat distribution; simply copy the relevant template file into your custom web source directory.

WeatherCat will now process and upload the file to your web site at the periods specified in WeatherCat's Custom Web preferences. Alternatively, you can upload the files more frequently with the Custom Web 'Additional Files' feature.

If you do not have a custom web site (and don't plan on having one), set one up using just the UKWN or NZWN template as the only file that is processed (see page 70).

How Do I Set Up A Weather Alert?

WeatherCat can send emails and run items on your Mac (for example AppleScripts) when an alert triggers.

Predefined Alerts

WeatherCat comes with four pre-defined alerts – Ice, Rain, Clear Sky and Rain Start. To set up one of these alerts proceed as follows:

1. Open WeatherCat's preferences and go to the 'Alerts1' or 'Alert2' tab.
2. Click on which actions you wish WeatherCat to perform when the alert triggers – 'Send Email' or 'Launch User Item'.
3. Adjust any optional parameters, such as how heavy the rain needs to be.
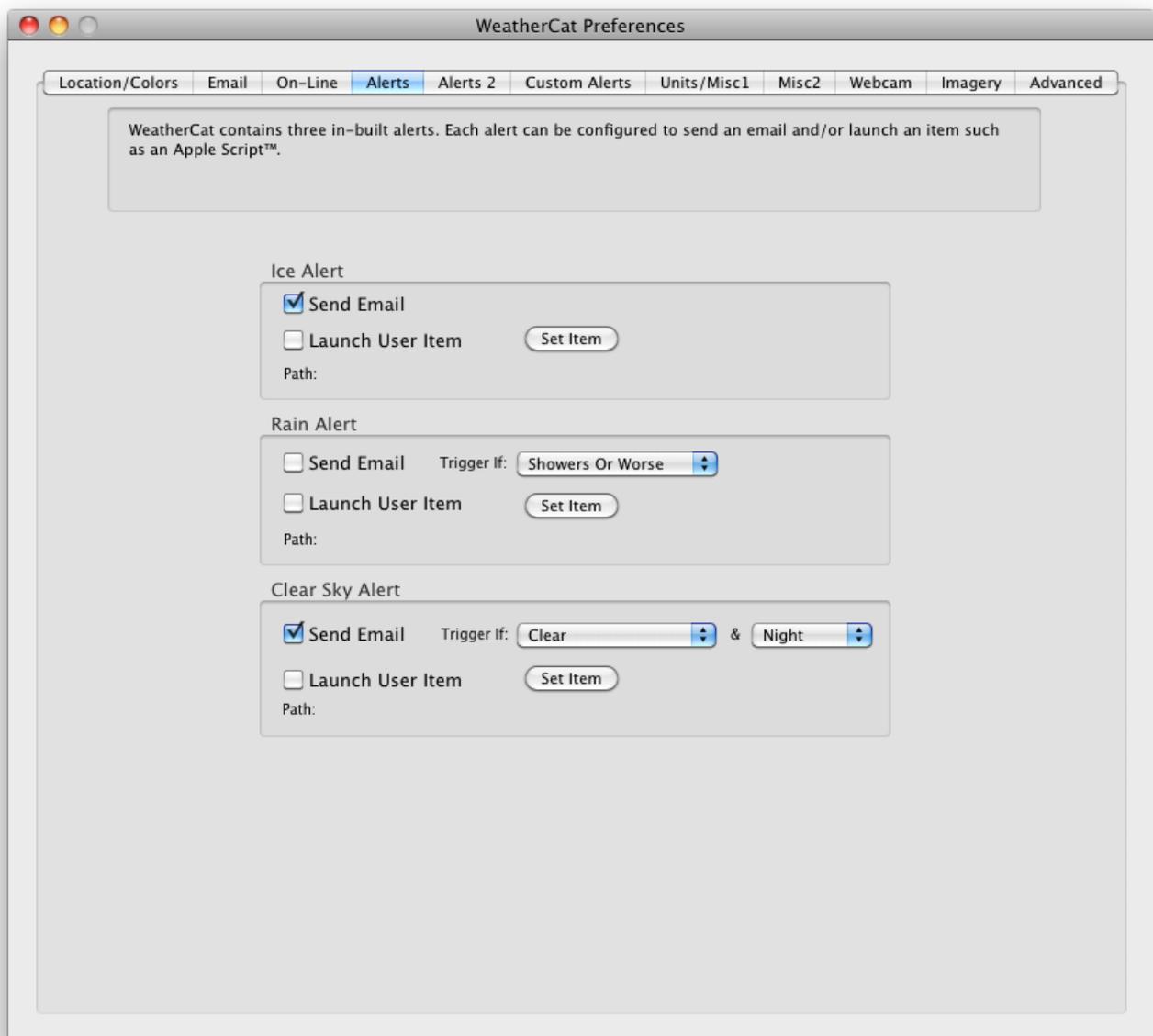
For details of the individual alerts, please see the 'WeatherCat Preferences' section later in this manual (page 112).

Custom Alerts

WeatherCat allows you to create and edit an unlimited number of custom alerts. To create a new alert follow these steps:

1. Open WeatherCat's preferences and select the 'Custom Alerts' tab.
2. Click the 'New' button.
3. In the resultant sheet, select the criteria for the alert.
4. Select the actions you wish to perform when the alert triggers and when the alert clears.
5. When you are happy with the Alerts settings, click the 'OK' button. The alert is now active.

The custom alerts are described in more details in the 'WeatherCat Preferences' section on page 115.

How Do I Control My Environment with WeatherCat?

There's no 'right' way of doing this – WeatherCat provides facilities for external programs to monitor the data.

The first option is to use the WXNOW.TXT file generated by WeatherCat when it is uploading to CWOP. This file is generated every time WeatherCat reports to CWOP and can be parsed periodically.

The second option is to use WeatherCat's custom web facilities to parse an XML template to produce the data you need.

The third way is to use the Custom Alerts to run scripts.

The fourth way is via WeatherCat's AppleScript interface. This provides access to the current weather data and WeatherCat's status via AppleScript properties. Please see appendix 1 on page 138 for a full description of this interface.

How Do I Use AppleScript With WeatherCat?

WeatherCat makes all channels and status information available via its AppleScript interface.

Here's a very quick example of how to use AppleScript to speak the current temperature as it changes.

First, open the AppleScript editor program (/Applications/Utilities/AppleScriptEditor.app) – you should be presented with a screen looking like:

Figure 37 - AppleScript Editor

Now, paste the following AppleScript code into the window:

```
tell application "WeatherCat"
    set oldCurrentTemperature to 40 -- set old temperature to something sensible

    repeat -- run around this loop forever, once every 10 seconds
        set currentTemperature to ExternalTemp -- read temperature from
                WeatherCat
        if oldCurrentTemperature ≠ currentTemperature then
            tell current application
```

```applescript
            say "Current temperature is"
            say currentTemperature as string
         end tell
      end if
      set oldCurrentTemperature to currentTemperature -- save the current
            temperature so we can check for a change next time around
            the loop
      delay 10
   end repeat
end tell
```

The window should now look like:


```applescript
tell application "WeatherCat"
    set oldCurrentTemperature to 40 -- set old temperature to something sensible

    repeat -- run around this loop forever, once every 10 seconds
        set currentTemperature to ExternalTemp -- read temperature from WeatherCat
        if oldCurrentTemperature ≠ currentTemperature then
            tell current application
                say "Current temperature is"
                say currentTemperature as string
            end tell
        end if
        set oldCurrentTemperature to currentTemperature -- save the current
            temperature so we can check for a change next time around the loop
        delay 10
    end repeat
end tell
```

Figure 38 - Example AppleScript To Speak Temperature

If you now hit the 'Run' button in the AppleScript Editor, the temperature will be spoken every time it changes (if WeatherCat isn't running it will be launched when you press the 'Run' button).

Finally, you can save the script as an application from the AppleScript Editor via 'Save As…' from its File menu.

For more information on WeatherCat's AppleScript interface, please see Appendix 1 on page 138.

How Do I Send Data In Real Time To A Server On The Internet?

The Custom CGI feature allows you to transmit real-time weather data to a server on the Internet in an efficient fashion.

We have supplied two simple php scripts by way of example (found in the 'Server Scripts' folder of the WeatherCat distribution). The first takes the data from WeatherCat and saves the data as a text file on your server. The second displays the data in a web page.

To set up WeatherCat for Custom CGI follow these steps.

1. In the WeatherCat distribution open the ServerScripts folder found at the top level and upload the following two scripts and text file to your server:
a). submit_weather.php
b). watch_weather.php
c). weather_data.txt

(You may need to set the permissions of the files as appropriate for your server.)

The submit_weather script is the script WeatherCat sends the current weather data to.
The watch_weather script is loaded in your browser to see the current weather data.
The weather_data.txt file is where the submit_weather script stores the data.
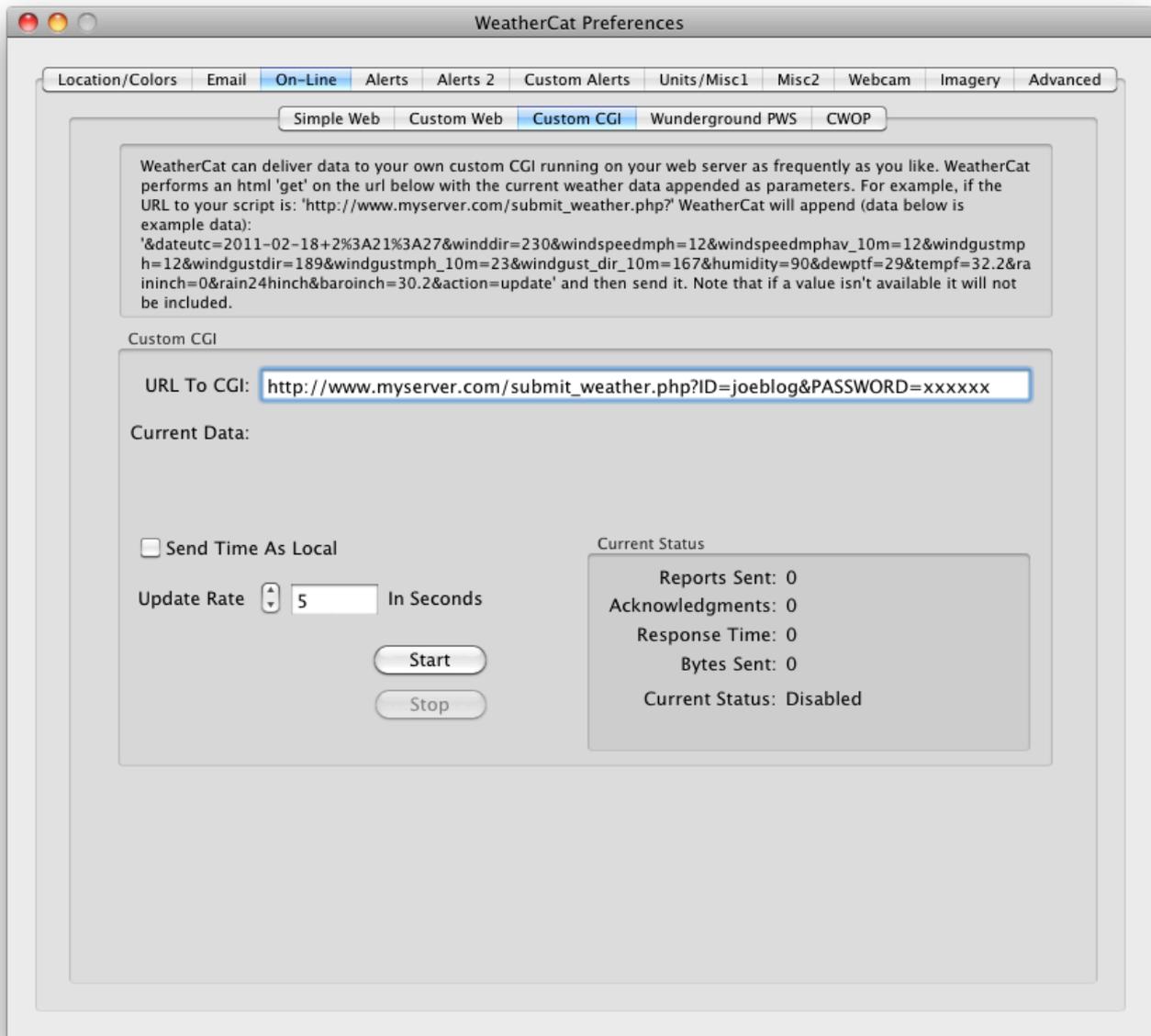
Figure 39 - Custom CGI

2. Enter the URL to the submit_weather.php script into the URL in the CustomCGI preferences - enter it exactly as above, just change the URL to your script. You'll probably only have to modify the www.yourserver.com part of the URL. The script by default expects the user name to be joeblog and the password to be xxxxxx.

3. Hit the start button.

4. In your web browser open http://www.yourserver.com/watch_weather.php

If all has gone well, you should see live weather from your weather station.

If not, check the URL's and the location of the scripts on your server. Check if your hosting provider allows you to run scripts; also check where you should put them.

5. IMPORTANT: When everything is running correctly, edit the submit_weather script to change the user name and passwords!

Notes

1. Please feel free to modify the scripts to suit your needs. The submit_weather script can be modified to save the data in any format you require - for example some flash based gauges need XML formatted data.

2. You may have other scripts you want to drive - you can write CGI's in whatever language you prefer - we have used PHP here as a simple example.

3. Any CGI you write must take the data as formatted by WeatherCat - you cannot change the format of the data WeatherCat sends.

4. The data WeatherCat is sending is displayed live in the Custom CGI preferences tab as it is transmitted.

5. We may add further data items to the request in the future, so your CGI should be able to handle new parameters - even if it's just to ignore them until you can update the CGI.

6. If a data item is not available (because, for example that particular sensor is unserviceable) it may not be sent - your script needs to deal with this.

Please see our web templates forum at http://athena.trixology.com/index.php?board=5.0 for discussion of this feature.

How Do I Use The WeatherCat Client Program?

WeatherCat is supplied with a small client program that can run on any Mac on either your local network or over the Internet. All you need to do is copy the client to the computer you wish to run it on and launch it (the client will run on OS X 10.4 or later). Within a couple of seconds it will pick up the data stream from WeatherCat and display weather gauges in real time. If you wish to connect to a WeatherCat server running over the Internet, open the preferences on the client and enter the URL to the server, then hit the connect button.

You can run more than one client at a time; you can also run the client on the same machine as WeatherCat is running on.

WeatherCat uses a fixed port in the range 49250 to 49254 to serve data to clients. If you are running WeatherCat on a machine with a firewall and the client is not working on other machines on your network then opening ports 49250 to 49254 on the machine WeatherCat is running on should allow the client to see WeatherCat and work correctly.

Similarly for access from the Internet, you will need to 'port forward' these ports to the local I.P. address of the machine WeatherCat is running on in your Firewall (it's best if the machine running WeatherCat has a fixed I.P. address. Check with your router documentation how to forward a range of ports.

It's likely your 'Internet' I.P. address will change over time; a dynamic D.N.S. company can greatly aid here. They can provide a domain name that tracks your I.P. address over time so rather than having to know your I.P. address, you can use your 'domain name' to connect.

Finally, you can disable all client access in the 'Advanced' pane of WeatherCat's preferences.

iOS Client

Poohbah Industries have made available a client for iOS devices that, like the Mac client, can work either over the local network or the Internet.
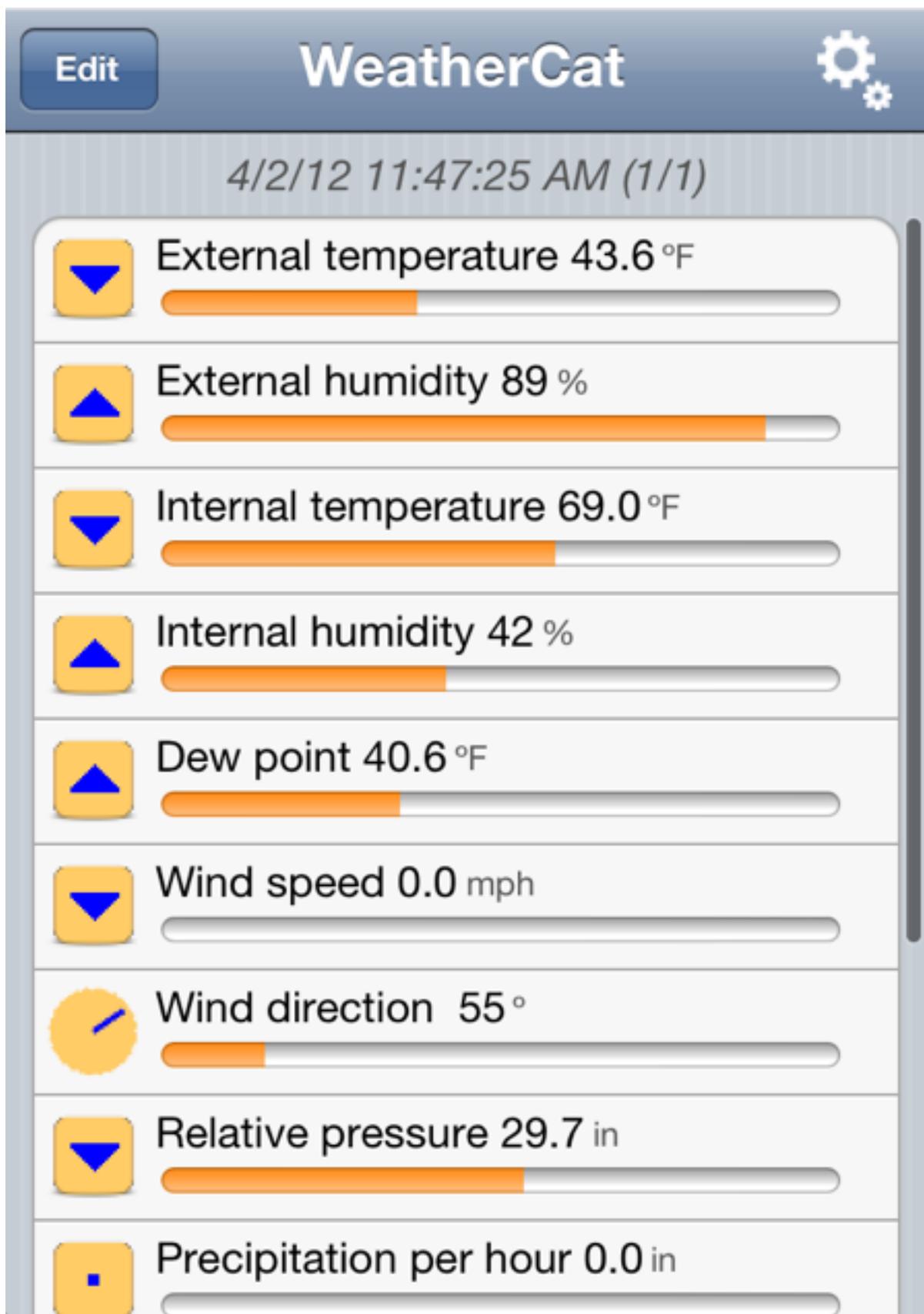
Figure 40 - iOS Client

To download the iOS client please go to: http://itunes.com/app/poohbahindustries

Support for the iOS client is provided via the [WeatherCat iOS Client Forum](#)

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WeatherCat Preferences

This section details all of WeatherCat's options. We suggest you read this section to fine-tune WeatherCat to your requirements and to get an understanding of the various options and facilities available in WeatherCat.

Location/Colours

This tab allows you to set up your location details and adjust some of the drawing options.
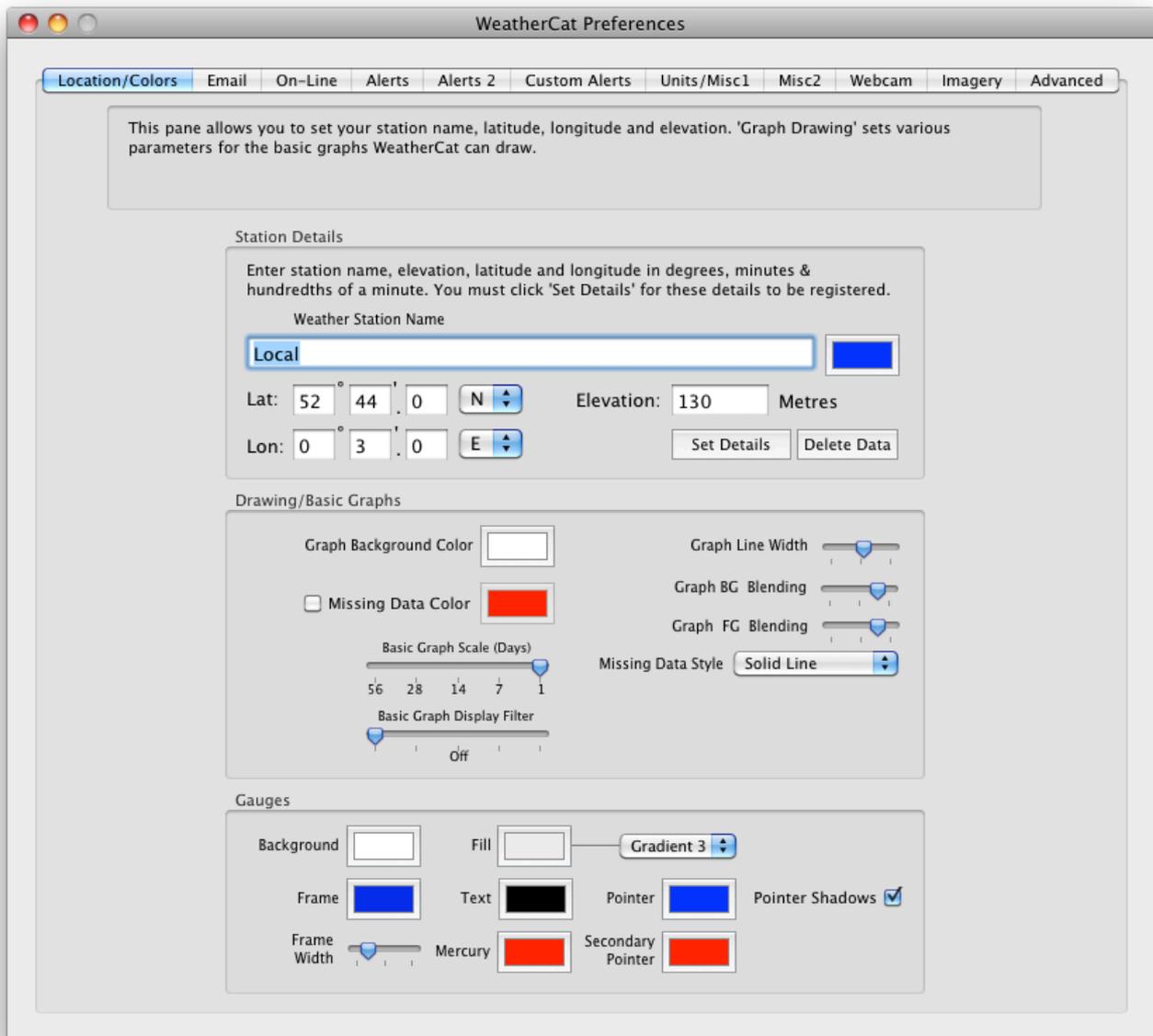
Figure 41 - Preferences - Location/Colours

Please see the basic setup section of this manual (page 22) for a description of the Location details.

Basic Graphs/Gauges Colours

This tab of the preferences also allows you to change the colour of various elements within WeatherCat

Preferences – Email

Figure 42 - Preferences - Email

SMTP Server:
Enter the address of the SMTP server you wish to use to send email.

Port:
Enter the port on the SMTP server to use. Normally this is 25.

User and Password:
If your mail server requires it, enter your username and password in these fields.

Authentication:

Tick this if your server is set to use authentication – typically this takes the form of SSL or TLS. WeatherCat automatically negotiates the best method to use.

Admin Addresses:

Enter the address(es) you would like all of WeatherCat's alerts and other emails sent to; multiple addresses are separated by commas. After entering an email address you can test it is working with the 'Test Now' button. WeatherCat will try to send a test email and notify you of the results. If the test fails an error message will be displayed.

The Admin Email addresses receive all emails sent from WeatherCat. If WeatherCat detects a problem it tries to send admin emails to these address. For example if WeatherCat detects the CWOP task is no longer responding, it will send an email to the Admin addresses and try to restart the task. The results of the restart will be emailed again to the Admin addresses.

User Addresses:

All emails apart from Admin emails are sent to these addresses. Again you can test them with the 'Test Now' button.

Email Forecasts

If this tick-box is ticked, and your hardware support forecasts, WeatherCat will email the current forecast at 7 a.m., 4 p.m. and midnight. This feature is currently supported by WS23xx's, Vantages and Vues.

Email Reports

If this tick-box is ticked, every 24 hours, WeatherCat will email the daily report. On the last day of the month it will also email the monthly report.

Email new Records

When this option is selected, whenever a new weather record is set, WeatherCat will send out an email detailing the record that has been broken; for example:
```
****New Low Pressure Record for MyStation! Previous low was 983.07mBar on 2010-02-16 18:47:54
+0000. New low is 982.06mBar****
```
```
Sent from WeatherBox
```

Send Admin Emails

When this option is selected, if WeatherCat has a problem it thinks you should be notified of, it will send an email to the Admin email addresses.

Daily Data Email

This section allows you to set WeatherCat to send you an email with a tab-delimited data set covering the previous 24 hours weather data. You can select which items of data you want sent. The format of the message is as follows (we have snipped out most of the data as indicated by '…'):

```
WeatherCat Daily Data Message.
Posted at 00:00:03 17-Feb-12

Data for My Station follows:

Temperature
6    6    6    6    6    6
6    …


Dewpoint
2    2    2    2    2    2
2    …


Windspeed
2    2    2    2    2    2
2    …


Pressure
1025 1025 1025 1025 1025 1025
1025 …


User Text: Sent from Fellini

END MESSAGE
```

The data included in the email is spaced at 1-minute intervals, thus there are 1440 entries (24 hours x 60 minutes per hour) for each variable sent. The email is sent shortly after midnight each day.

User Text

Any text entered here is sent with all emails. You might for example want to use it to indicate from which machine the message was sent.

Preferences – On-Line

This tab is split into a number of sub-panes and covers the settings for all of WeatherCat's on-line features.

Simple Web
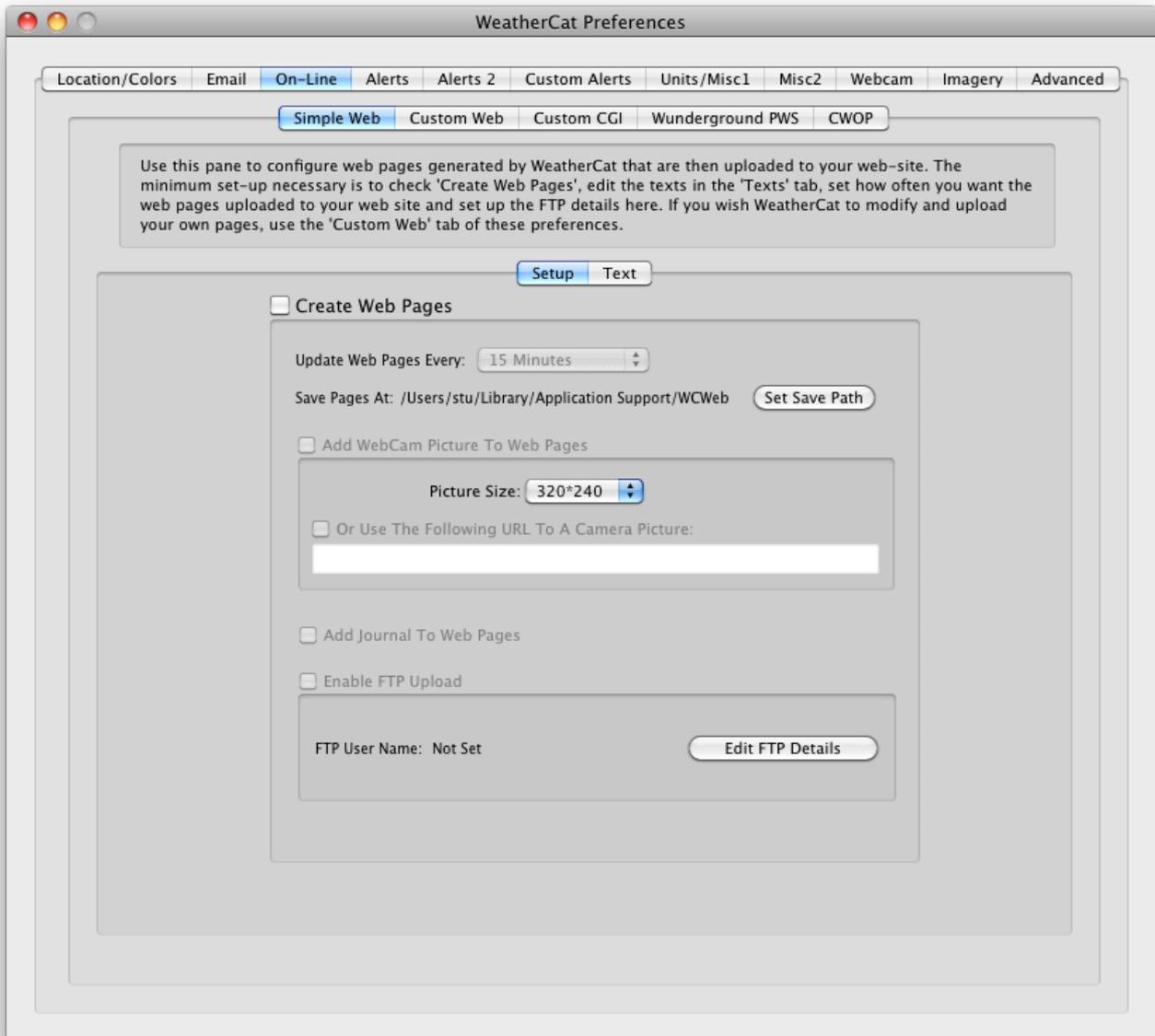
Figure 43 - Preferences - On-Line Simple Web

Create Web Page
This option enables and disables all web related functions of the Simple Web pages.

Update Pages Every:
WeatherCat will generate and upload pages as per the time period set here.

Set Save Path:

Before WeatherCat uploads web pages to your web server it has to create and save them somewhere. The default location is ~/Library /Application Support/WeatherCatWeb. We suggest you leave this as set. However, if you are serving the web pages via personal Web Sharing you may need to change this location (with the 'Set Path' button) to suite your local server. Typically this will be the 'Sites' folder in your home directory. *Please make sure the user running WeatherCat, has write permissions to wherever you set this path.*

Add Web Cam Pictures To Web Pages

WeatherCat can add a web cam picture to your web pages. You can use either your own web cam, or you can link to someone else's web cam pictures.

Please see the section 'How Do I Use A Web-cam With WeatherCat' for details of setting up your webcam.

Alternatively, by clicking the 'Or use the following URL…' checkbox and entering the URL to the web cam picture you wish to use, WeatherCat will generate the required HTML code to link to the picture. Typically web cam's can be found on Internet Search sites such as http://www.google.com
WeatherCat can only link to picture based images; for example .jpg and .png files; Java based web cam images probably won't work.

Add Journal To Web Pages

If this option is checked WeatherCat1 will upload a page for the journal and add a link to the main page.

Enable FTP Upload

If this option is ticked then WeatherCat will FTP the web pages up to your web server. You need to set the FTP login and server path via the 'Edit FTP Account' button.

Edit FTP Account

This button allows you to set and edit your FTP login name, password and the path on the server to where the web pages should be sent. A test button allows you to perform a test upload to the server.

About FTP

For WeatherCat to be able to upload the web pages to your server, the full path must already exist. For example if the path to upload your pages should be:
ftp://ftp.myserver.com/www/WeatherCatWeb/
then the directory WeatherCatWeb must exist before WeatherCat can upload to it.

To prevent possible problems with Firewalls WeatherCat always uses PASV mode when establishing an FTP connection.

Simple Web - Text
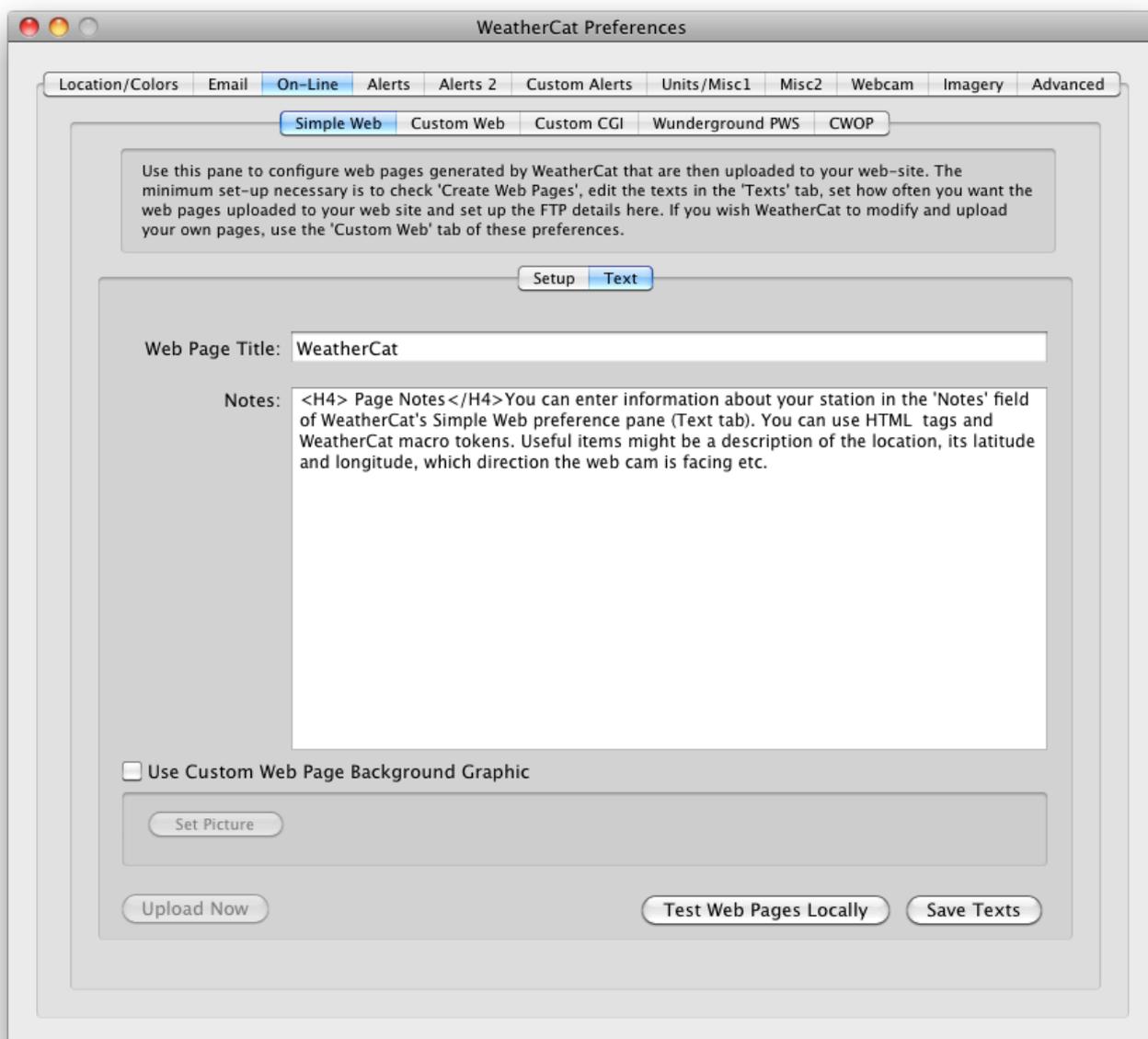
Figure 44 - Preferences - On-Line - Simple Web Texts

This tab allows you to set the title of your web pages, add notes that are displayed on the page and set a custom background graphic. Please note that the texts are not automatically saved, you must press the 'Save Texts' button to commit the changes to your web pages.

Test Web Pages Locally
This button will cause WeatherCat to generate the web pages and display them in your default browser. This is a useful time saver when checking edits to the pages without have to upload them to your web site first.

Custom Web - Main
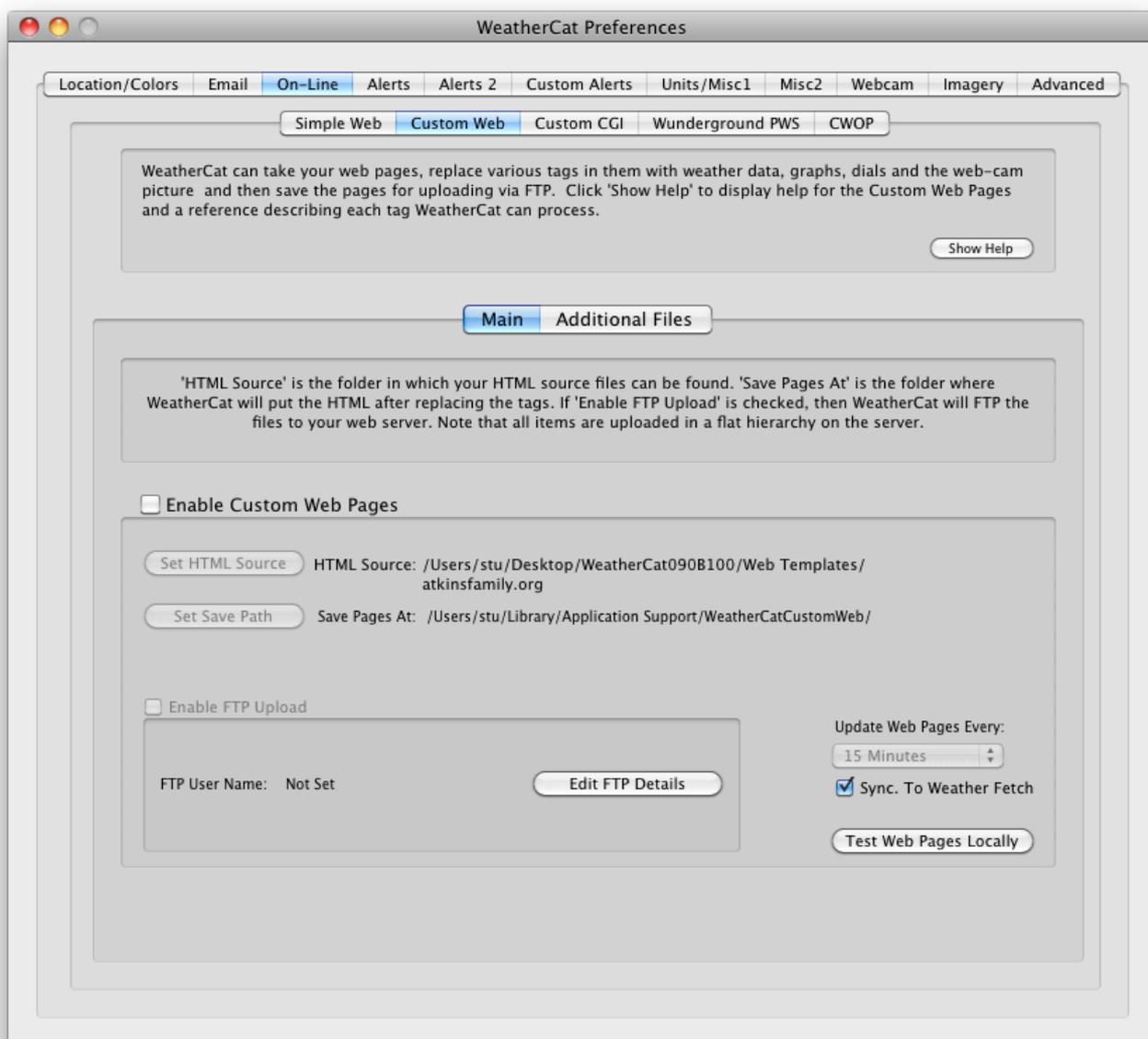
Figure 45 - Preferences - On-Line - Custom Web

WeatherCat can take your web page templates, replace WeatherCat tags within the files and upload the resultant file and related objects to your web-server.

Show Help
This button will open a window containing basic help for custom web pages and a full reference to the tags WeatherCat can use in custom web pages:
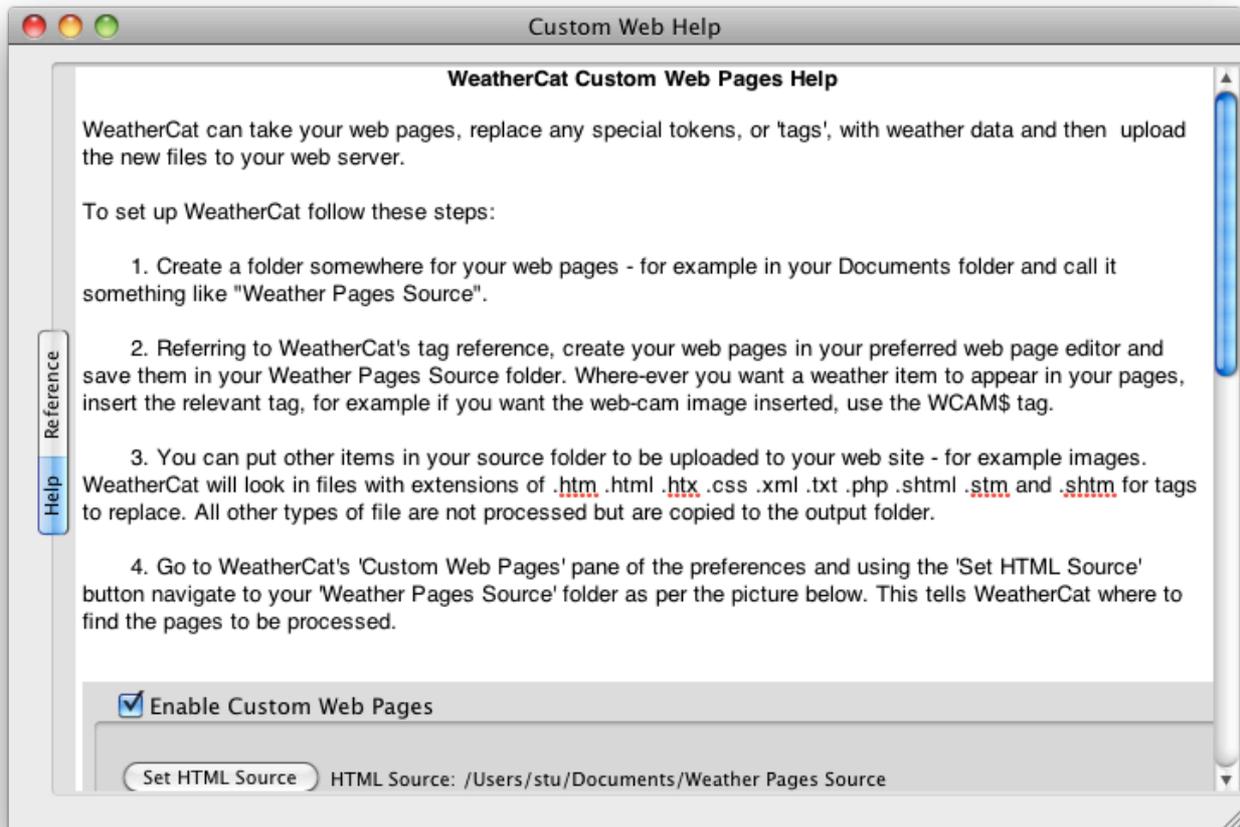
Figure 46 - Custom Web Help Screen

Enable Custom Web Pages
This option enables and disables all web-related functions of the Custom Web pages.

Set HTML Source
Sets the source folder for your template.

Set Save Path
Before WeatherCat uploads web pages to your web server it has to create and save them somewhere. The default location is ~/Library/Application Support/WeatherCatCustomWeb. We suggest you leave this as set. However, if you are serving the web pages via personal Web Sharing you may need to change this location (with the 'Set Path' button) to suit your local server. Typically this will be the 'Sites' folder in your home folder. *Please make sure the user running WeatherCat has write permissions to wherever you set this path.*

Enable FTP Upload
If this option is ticked then WeatherCat will FTP the web pages up to your web server. You need to set the FTP login and server path via the 'Edit FTP Account' button.

Note also that the Simple Web Pages and Custom Web Pages are independent of each other including the FTP; you can run both simultaneously and to different servers if need be.

Update Web Pages Every:
WeatherCat will process and upload pages as per the time set here. Custom web pages can be uploaded more frequently than the Simple Web pages.

Sync. To Weather Fetch
If this option is ticked, WeatherCat will wait until it takes a weather sample before processing the custom web pages. This ensures your pages are processed with the very latest data and statistics.

For details of setting up a template and the tags you can use, please see the 'How Do I Create A Custom Web Template' on page 75.

Custom Web – Additional Files
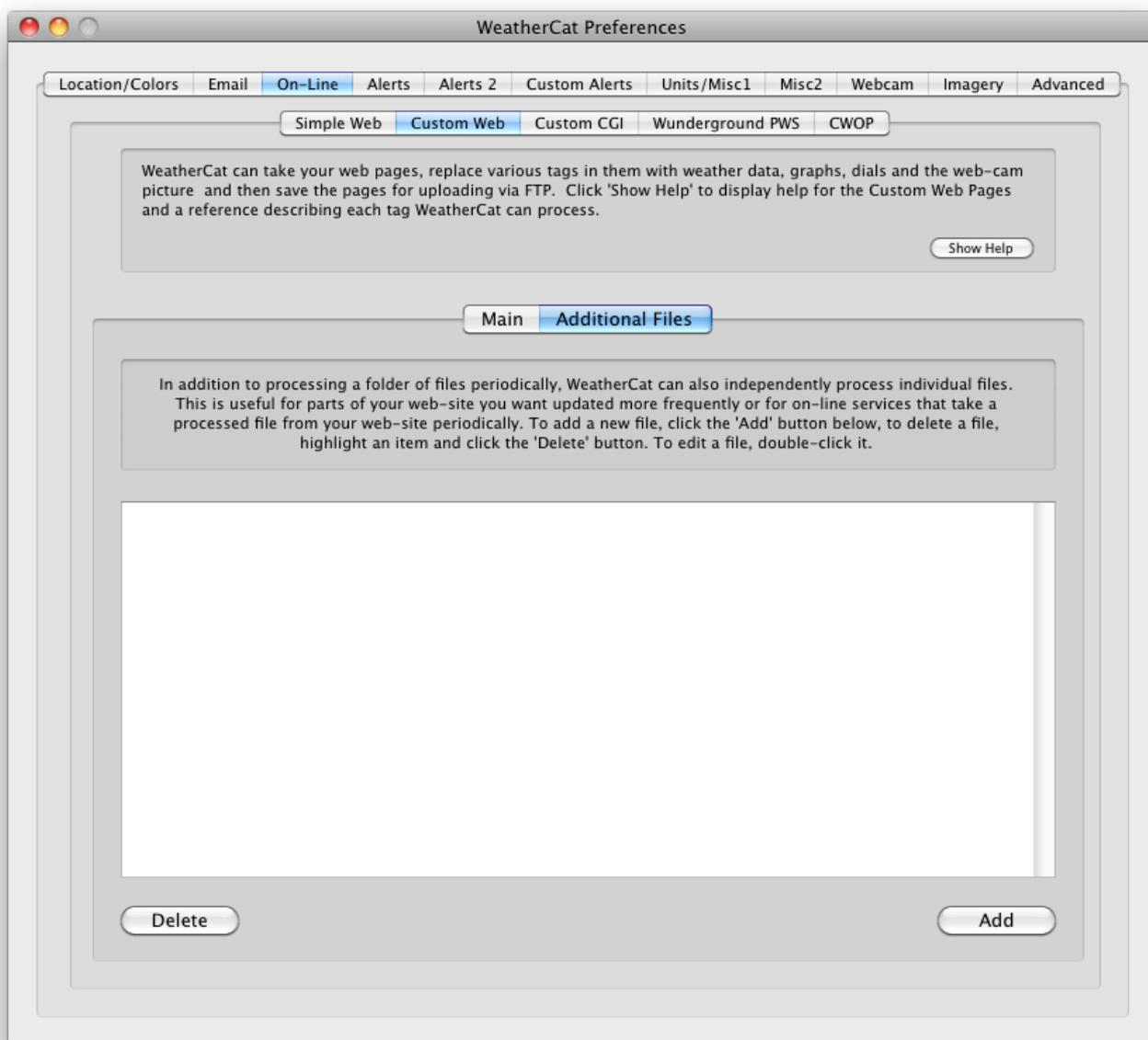
Figure 47 - Preferences - On-Line - Custom Web – Additional Files

WeatherCat's Custom web feature can process additional files independent of the main custom web processing. For each file, the processing period can be set from between 0.1 to 1000 minutes and the file, once processed, can be optionally uploaded to your custom web-site. This is useful for faster updates for certain parts of your web-site or generating files for on-line services that can pick up the processed file from your custom web-site.

Note1: With the ability to process and upload files as fast as once every 6 seconds there is the potential for:
   a). Using far more bandwidth than you thought you'd use.
   b). Being identified as a denial of service attack by your FTP server (this can be extremely embarrassing).

c). Generating files faster than WeatherCat can actually process them (this is dependent on your hardware and tags used - for example a webcam tag can take many seconds to process as WeatherCat waits for the image to settle down). WeatherCat is protected against files being generated faster than they can be processed - it will log a message to the console log in this case.

Note2: If Custom web is synchronized to weather sampling, additional files will not be processed whilst custom web is waiting for the sync (i.e. additional files are queued whilst custom web is waiting for sync).

Custom CGI
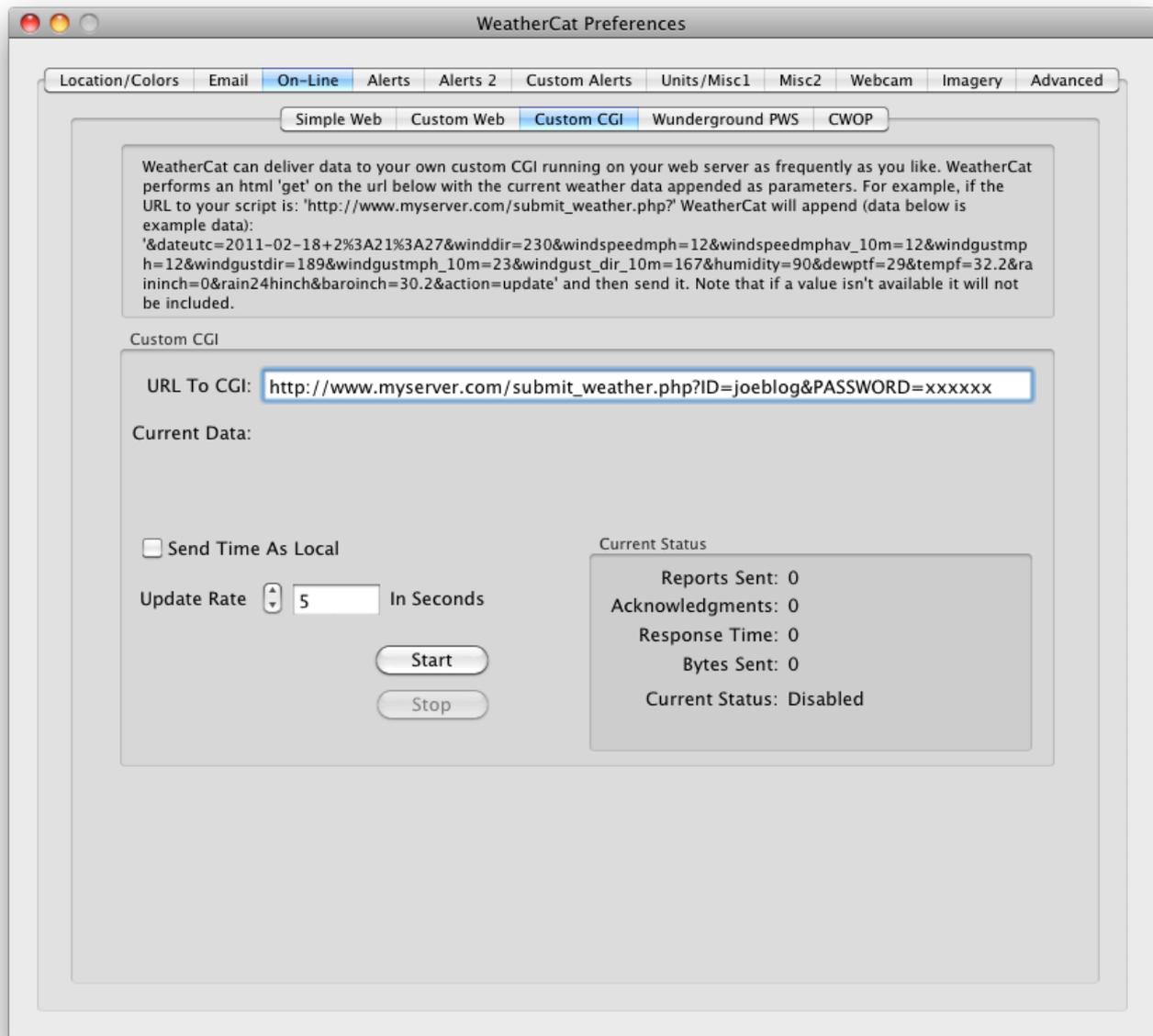
Figure 48 - Preferences - On-Line - Custom CGI

The Custom CGI tab of the On-Line preferences allows you to send weather data in real-time to a server on the Internet. Please see the 'How Do I…' section on page 85 for a tutorial on how to use this feature, here we will describe the preferences.

URL To CGI
Enter the URL to your CGI script here including any static parameters needed such as the user name and password. WeatherCat will append the real time data to the request as it runs.

Update Rate
Here you can set how often WeatherCat makes the request. You can set times as low as 0.1 second.

Current Status

The Current Status Area indicates how many requests have been made (Reports Sent), how many acknowledgements have been received, the instantaneous and average response times and the number of bytes actually sent.

The Current Stats field indicates any problems with the CustomCGI – a range of errors can be reported here which can aid in diagnostics, if there are no errors, 'Running' is shown.

Wunderground PWS

WeatherCat can upload your weather data to Wunderground. Please see the 'How Do I…' section of this manual on page 61 for details on how to set up the preferences on this tab. The section will detail the individual preferences.
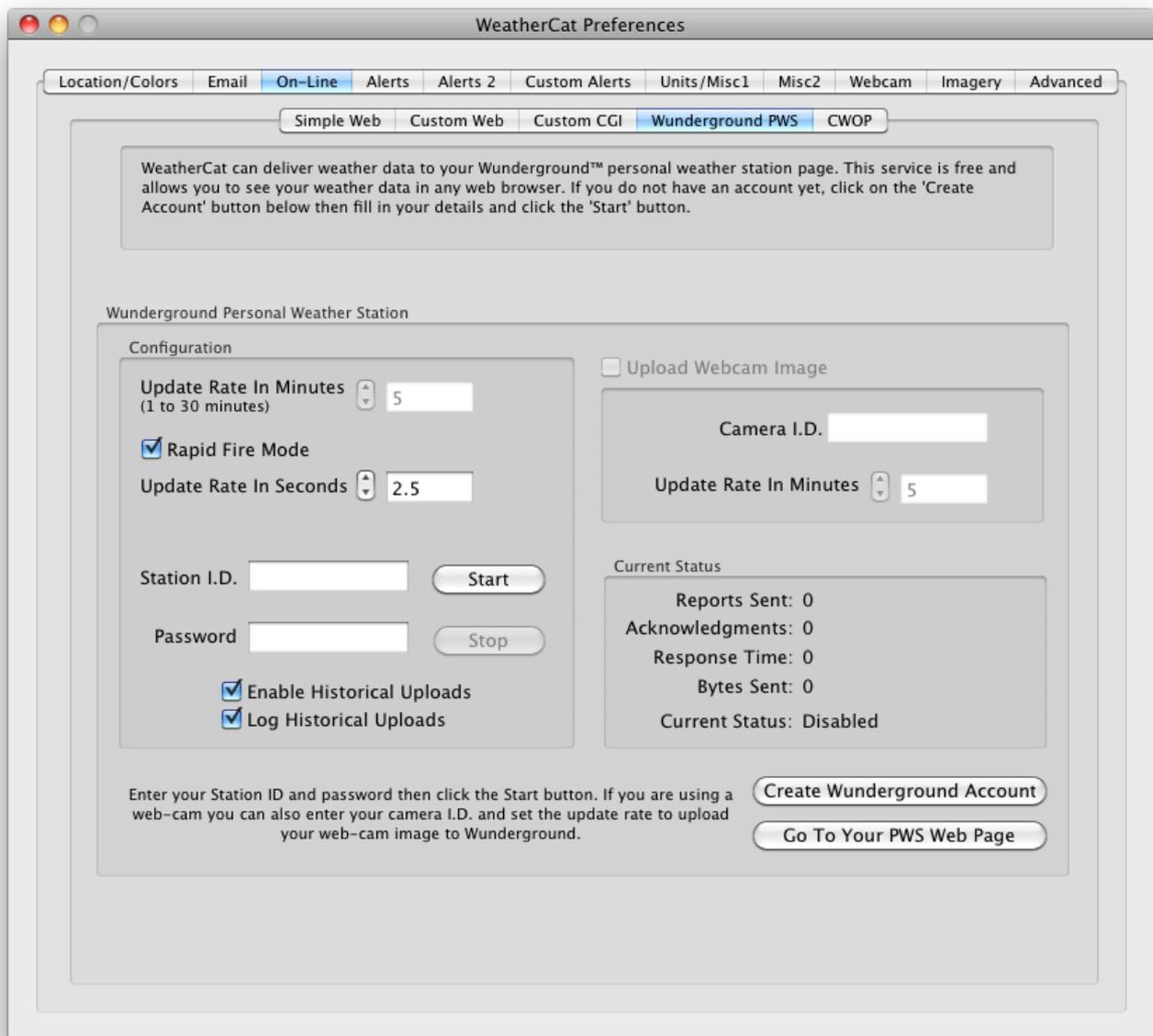
Figure 49 - Preferences - On-Line - Wunderground

Update Rate In Minutes
How often WeatherCat should upload data to Wunderground. WeatherCat can run in two modes – normal or RapidFire. Normal mode can update at a maximum rate of once per minute, RapidFire can update as fast as 1 second. We would recommend RapidFire set at about 5 seconds for good performance.

Rapid Fire Mode
Enables WeatherCat's RapidFire mode.

Update Rate In Seconds
If RapidFire mode is enabled, how often in seconds WeatherCat should upload the data.

Enable Historical Uploads
WeatherCat will upload missing records to Wunderground if it determines the last upload was more than 32 minutes ago. Historical records are uploaded at 5-minute intervals and all valid channels are uploaded. This can happen if for example WeatherCat was not running, your Internet stops working or the Wunderground servers go temporarily off-line.

If WeatherCat has not been running for a period of time, the historical upload to Wunderground will be held off until WeatherCat has read the missing data from your data-logger.

The date of the last upload to Wunderground is kept in the file called WeatherCatLastWundergroundUpload.plist at ~/Library/Application Support/WeatherCatTemp/ (where ~ is your home directory).

Log Historical Uploads
If this is ticked, historical upload progress is logged to WeatherCat's log window.

Upload Webcam Image
WeatherCat can upload your webcam image to Wunderground. Enable this tick-box, enter your Wunderground Camera ID and set the update rate in minutes. Note that the webcam must be enabled in the Webcam tab of WeatherCat's preferences.

You can get a Wunderground camera I.D. from your Wunderground members' page.

Current Status
The Current Status Area indicates how many reports have been made (Reports Sent), how many acknowledgements have been received, the instantaneous and average response times and the number of bytes actually sent.

The Current Stats field indicates any problems with the Wundergound PWS task – a range of errors can be reported here which can aid in diagnostics, if there are no errors, 'Running' is shown.

Programmatic access to WeatherCat's Wunderground status can be obtained via the AppleScript interface (see page 138).

C.W.O.P.

WeatherCat can upload your weather data to the Citizen's Weather Observer Program. Please see the 'How Do I…' section of this manual, page 64, for details on how to set up the preferences on this tab. The section will detail the individual preferences.

Figure 50 - Preferences - On-Line - C.W.O.P.

Station ID
Enter your CWOP station ID here.

Log Operation
If ticked, WeatherCat will report CWOP transmissions in its log window.

Current Status

Shows the current status of the CWOP task – as with other WeatherCat on-line tasks, a range of errors can be reported here which can aid in diagnostics. If there are no errors, 'Running' is shown along with the CWOP server WeatherCat last contacted.

Advanced Options

This button opens a sheet with additional options for CWOP. Normally you shouldn't need to touch these but occasionally things at CWOP change (servers for example) so you may need to adjust the data that is sent.

CWOP – Advanced Settings

Figure 51 - Preferences - On-Line - CWOP Advanced

Server 1 through 5

WeatherCat tries the CWOP servers, via the respective port in the order listed here. Only change these if you are sure of the new settings. If in doubt, ask on the WeatherCat support forum.

Update Time
Periodically CWOP changes their advice about how often to report – at the time of publication it is 10 minutes, if it changes you can adjust the time here.

Passcode
If you need to use a passcode, enter it here.

Data To Omit
Data sent to CWOP is ingested by various weather organisations – MADIS is typical. From here the data is further disseminated to other organisations, such as The Weather Underground. Because of the importance placed on your data you may not want to transmit certain data if you know there is a problem with that data. The check boxes here allow you to disable certain items until such time that the data is good again. A typical example might be anemometer wind damage.

Restore Factory Defaults
Restores all the advanced settings back to defaults.

Programmatic access to WeatherCat's C.W.O.P. status can be obtained via the AppleScript interface (see page 138).

Preferences – Alerts 1
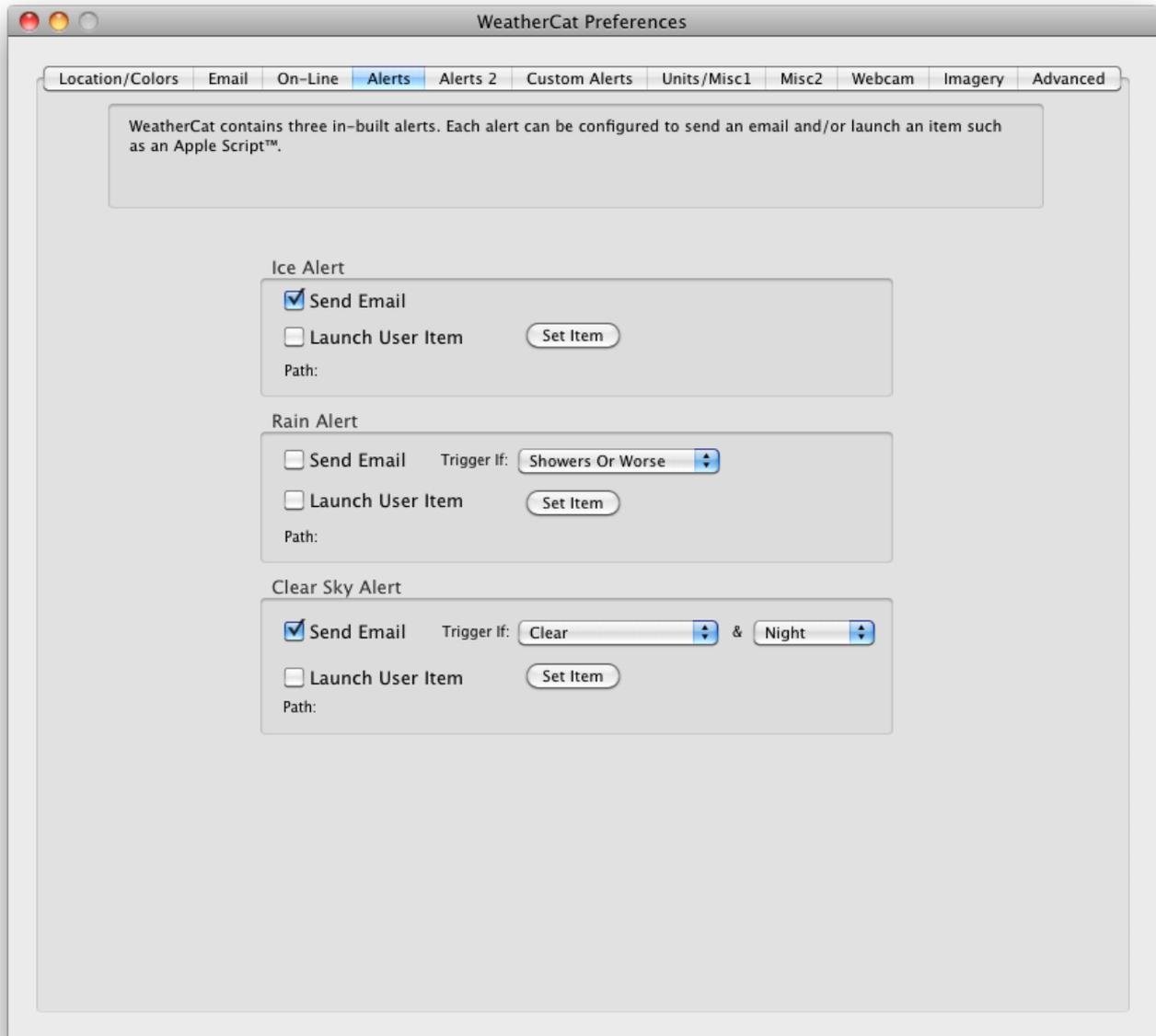
Figure 52 - Preferences - Alerts

The Alerts tab contains pre-configured alerts for Ice, Rain and Clear Sky. The Alerts 2 tab contains a Rain Start alert (a single tip of the rain bucket).

These alerts share the following characteristics:
- A send email tick box; if ticked WeatherCat will send a pre-configured email if the alert triggers.
- A 'Launch User item' tick-box. If ticked WeatherCat will launch the item you've set with the 'Set Path' button. This could be an application, AppleScript or anything else the Finder can launch.

Ice Alert

This alert sends a warning email as the temperature falls below 4°C and then an alert email and launches the user item as the temperature falls below 1°C.

Rain Alert

You can customise this alert by setting the level of rain required to trigger the alert. You can set it to: 'Showers Or Worse', 'Light Rain Or Worse' or finally 'Rain or worse'.

Clear Sky Alert

You can set the sensitivity of this alert to either 'Clear' or 'Light Cloud/Clear'. In addition you can set it to only trigger during the night (1900 to 05:59) or day (06:00 to 18:59), or at any time. This alert might be useful if you're an amateur astronomer.

Preferences – Alerts 2

Rain Start Alert

This pane currently contains one alert – the Rain Start alert.

This alert can be used to watch for a single tip of your rain bucket. It works by monitoring the rain from your station; if the rain increases (i.e. the bucket has tipped) the alert is triggered and a timer is started. Subsequent tips whilst the timer is running restart the timer. The alert is cleared if the timer expires or (if enabled) a rain rate is detected before the timer expires.
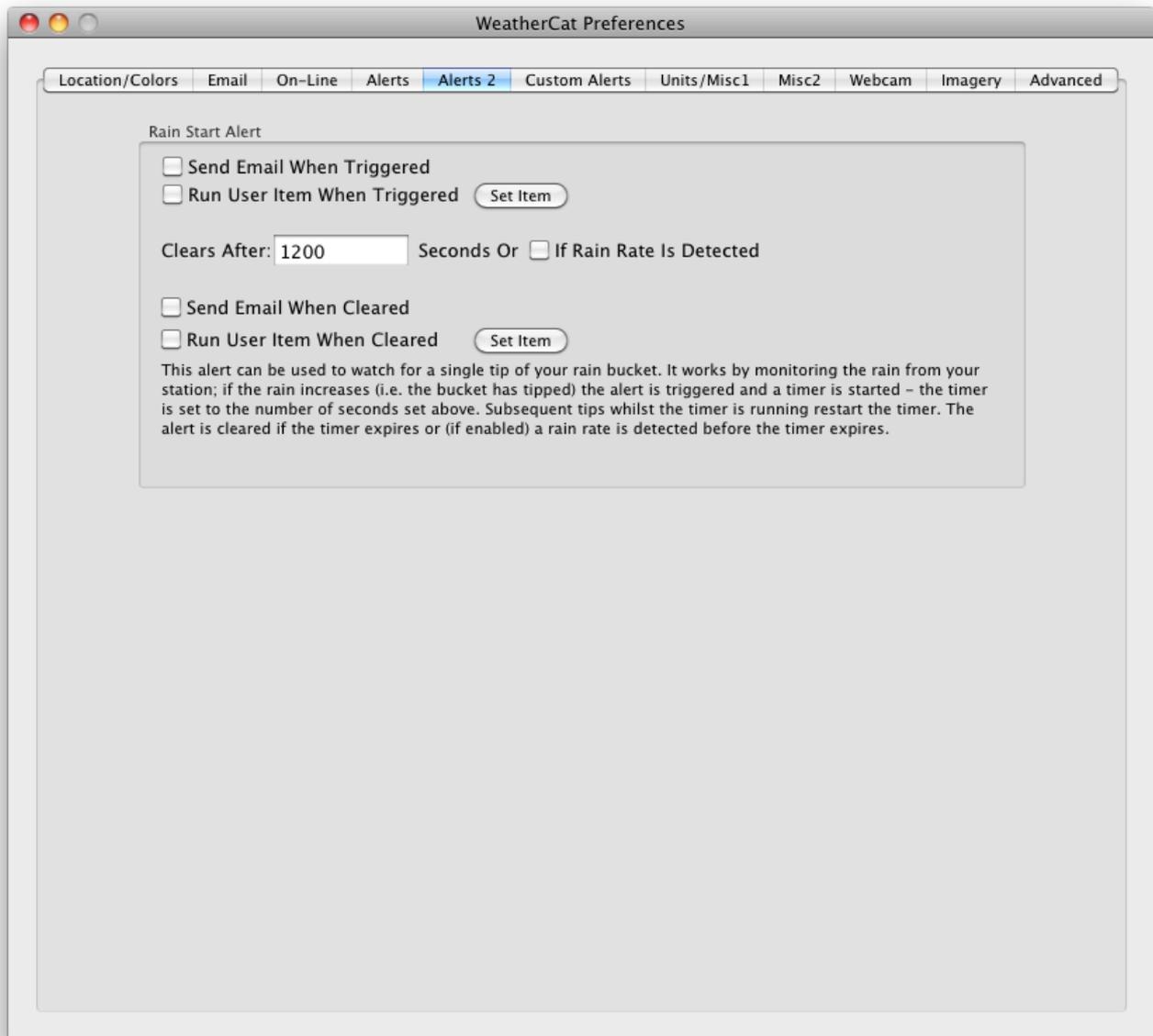
Figure 53 - Preferences - Alerts 2

Preferences - Custom Alerts

The basics of setting up custom alerts are covered in the 'How Do I…' part of this manual, found on page 78. This section details the individual options available when programming custom alerts and goes into more detail.
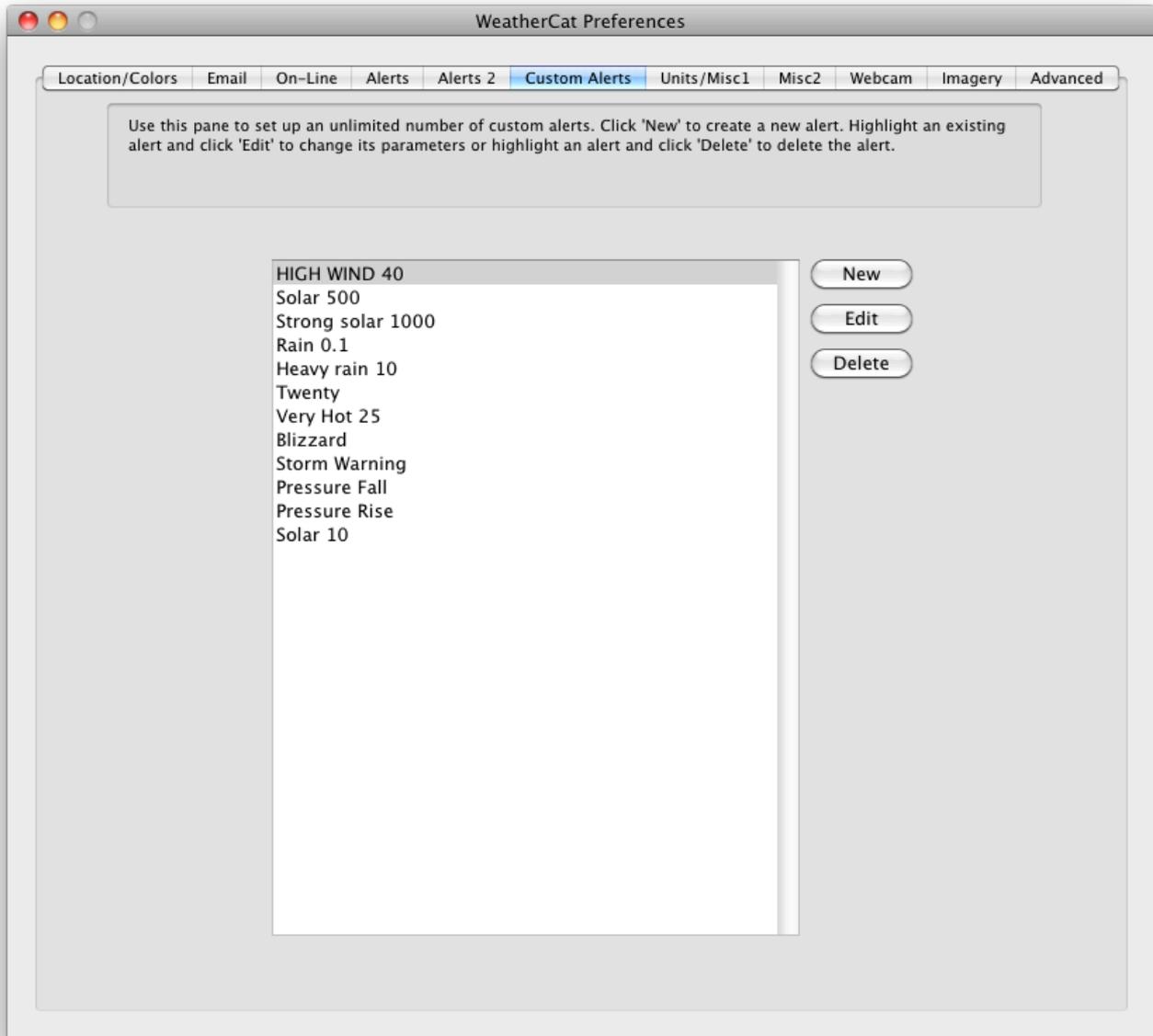
Figure 54 - Preferences - Custom Alerts

This tab allows you to create, edit and delete custom alerts. Press 'New' to create a new alert, 'Edit' to edit the selected alert or 'Delete' to delete the selected alert.

Creating and editing custom alerts

Pressing 'New' in the 'Custom Alerts' tab of the preferences creates a new alert. The alert will have template email texts already configured.
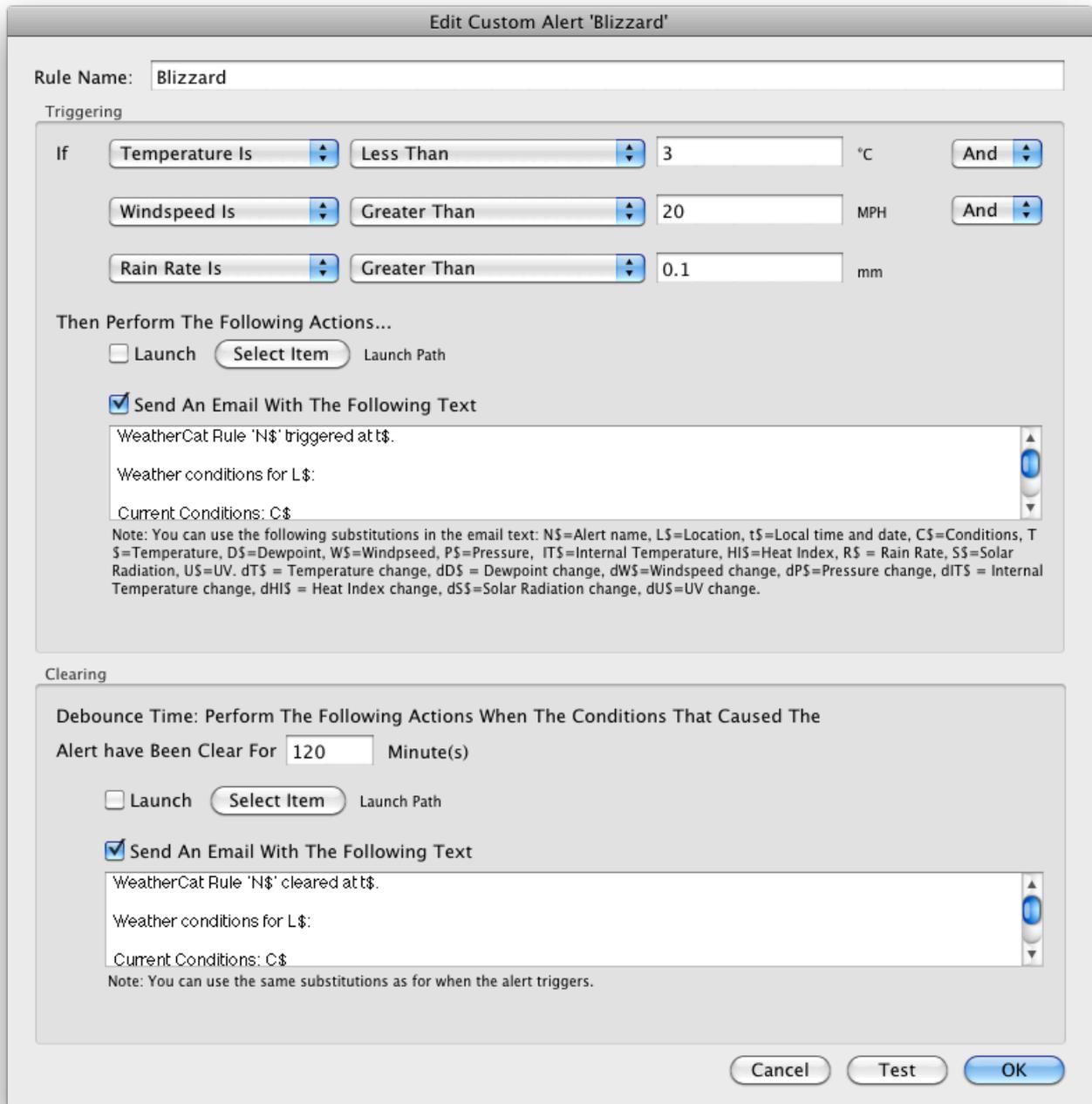
Figure 55 - Custom Alert

You can enter the alert name and then up to three conditions that need to match the current conditions for the alert to trigger. If the alert triggers you can set an item to launch and/or send an email.

Similarly, when the alert clears you can again carry out one or more actions.

For an alert to clear, WeatherCat needs to see the conditions that caused an alert to be **not** present for a period of time (the de-bounce time). This can be 0 if you want the alert to clear immediately.

This de-bounce time can be used to ensure the alert doesn't clear if the variable is a little unsteady - for example if we have an alert to trigger at 7°C and above and the temperature becomes 7°C then the alert will trigger. Now it's possible for the temperature to drop to 6.9°C before moving back to 7°C - the de-bounce time can stop the alert clearing during this period. **All custom alerts default to 2 hours; you will need to edit them to set the clear times you want.**

Custom Alerts Email Macro Expansions

The text of the alert email can have macro expansions as follows:
* N$ - The rule name.
* L$ - the location being monitored
* t$ - the local time
* C$ - the current conditions
* T$ - the current temperature
* D$ - the current dew point
* W$ - the current wind speed
* WD$ - the current wind direction
* P$ - the current pressure
* IT$ - the current internal temperature
* HI$ - the current heat index
* R$ - the current rain rate
* S$ - the current solar radiation (if supported by your station)
* U$ - the current U.V. index (if supported by your station)
* dT$ - the current hourly change in temperature
* dD$ - the current hourly change in dew point
* dW$ - the current hourly change in wind speed
* dP$ - the current hourly change in pressure.
* dIT$ - the current hourly change in heat index
* DHI$ - the current hourly change in internal humidity
* DS$ - the current hourly change ins solar radiation
* DU$ - the current hourly change in U.V. index

The rule text is editable on a rule-by-rule basis. For example if you entered 'Current Conditions = C$', if the current conditions were sunny when the alert was triggered, the email as sent would read 'Current Conditions = sunny'.

Testing of Custom Alerts

You can test the alert before committing it by pressing the 'Test' button in the New/Edit custom alert dialog above.

Figure 56 - Custom Alert Test

Here you can enter values for major weather variables, then press the 'Test' button. The result is indicated in the 'Result:' text field. You can also perform an email test to see how the email looks when formatted in your email client. You can use this test dialog in conjunction with the 'New/Edit' custom alert dialog box to fine-tune the alert to your requirements.

Custom Alerts Programming Example

WeatherCat allows you to set up to three conditions that must be matched before the alert triggers. These conditions are evaluated strictly top to bottom. As an example, let's look at the following alert:

Figure 57 - Blizzard Alert

Lets assume the temperature for location 1 is 4°C, the wind speed is 18 miles per hour and the rain rate is 0.2 inches per hour. When evaluating this alert WeatherCat first checks the temperature; it compares it to 3°C and finds it is greater, so sets the result of the first part of the IF to 'False'. Next it checks if the wind speed is greater than 20 miles per hour. It isn't so sets the result of the second part of the IF to 'False'. Finally it checks it checks if

the rain rate is greater than 0.1 mm per hour; it is so sets the result of the third part of the rule to 'True'.

WeatherCat now takes the results of the first and second parts and logically AND's them together – a 'False' anded with a 'False' gives a 'False' result. Next it AND's the result of the third part with the intermediate result of the first and second parts – a 'False' AND'd with a 'True' is a False. This final result is tested and if 'True' the condition is triggered. In this case the final result is 'False' and so the alert is not triggered.

Lets assume that an hour later that the wind speed has increased to 19 miles per hour, the temperature has dropped to 2 °C and the precipitation is still 0.2 mm's per hour. Now the temperature comparison evaluates as 'True' and the rain comparison also evaluates as 'True' but the wind speed criteria still isn't met – nothing happens.

The wind keeps increasing however and ten minutes later the wind speed increases above the 20 miles per hour set in the alert. At this point, all the criteria evaluates as 'True' and the alert triggers.

In this particular case, the Alert would send the following email:

To: test@trixology.com
Subject: ***WeahterCat 'Blizzard Alert' Triggered***


```
***Custom Alert for My Station Triggered***

WeatherCat Rule 'Blizzard Alert' triggered at 20:16:16 21-Jan-12.

Temperature: 2 °C Dewpoint: 1 °C Windspeed: 26.0 MPH Pressure: 1003.72 mb


User Text: Sent from WeatherBox

WeatherCat TimeStamp: 20:16:17 21-May-10

<END MESSAGE>
```


Five minutes later, the wind speed drops below 25 miles per hour. Because the de-bounce time is set to 120 minutes, WeatherCat notices the drop in wind speed but does not clear the alert yet, instead the alert changes to the 'clearing' state. WeatherCat continues to monitor the wind speed over the de-bounce period (the next 115 minutes in this case) and if the wind speed does not increase above 20 miles per hour, then the alert will clear. However, if the wind speed does increase to over 20 miles per hour, WeatherCat resets the de-bounce timer.

Hence, the alert will not clear until the conditions that caused it to trigger in the first place have been clear for the de-bounce time – in this case 120 minutes.

Had we set the de-bounce time to 0 minutes, then the alert would clear as soon as any of the conditions it requires to be met are no-longer true. Thus, if you want an alert to clear immediately, set the de-bounce time to 0 minutes.

Once an alert has cleared, it is then ready to re-trigger.

To sum up: Alerts in WeatherCat have 3 possible states – triggered, clearing and cleared. Alerts will trigger immediately the conditions they are dependent upon are true. Alerts will clear once the conditions they are dependent on have been clear for the de-bounce time. Once an alert has cleared it can retrigger immediately.

If you are using alerts to post notifications via email and you find you are receiving emails pretty much constantly as the alert triggers and then clears, increase the de-bounce time in those alerts. This will ensure WeatherCat treats lulls in the conditions that are causing the alert as part of the same event.

Editing Alerts

WeatherCat's custom alerts monitor the weather on a continuous basis. The latency within WeatherCat from the time data received from your station matches a particular alert and the alert actually reacts is in the order of 10 seconds. Because each alert is monitoring the weather there is a warm-up time associated with the alerts – in WeatherCat this warm up time is about a minute. Thus custom alerts are not running for the first minute after WeatherCat is launched.

When you modify an alert, the modifications are carried out live and the editing can affect the trigger state of an alert.

For example if we have a very simple alert that triggers if the external temperature is below 4°C and the current external temperature is 5°C - the alert is not triggered. If we then edit that alert so it triggers if the external temperature is below 6°C, the alert will trigger within 10 seconds of the OK button being pressed after making the modifications in the alert's settings. Similarly, if the de-bounce time is set to 0, the alert will clear immediately if edited so that the trigger conditions are no-longer true.

The only exception to this operation is when you add or delete a new alert. In this case, the alerts will start to reset. As noted above, this takes about a minute and when the alerts are finished resetting, any alerts that were previously triggered will trigger again as they have been reset.

Alert Deltas

Weather data deltas can be used in custom alerts – for example to test if the barometric pressure is falling at a rate greater than a given amount (a storm alert). In general the delta used is the one-hour delta actually measured over an hour – i.e. WeatherCat subtracts the

reading obtained one hour ago from the current value to calculate the current one-hour delta.

The exceptions to this rule are Solar Radiation, U.V. and rain rate. These variables can change so quickly that WeatherCat uses a one-hour delta calculated over a 10 second period so as to be able to react to the very fast changes these variables can exhibit.

Alert Persistence

Alerts in WeatherCat are persistent across reboots of WeatherCat. This means that if an alert is triggered when WeatherCat is quit, if the alert is still triggered when WeatherCat reboots, it will not retrigger. The exception to this is if WeatherCat is updated – all triggered states are cleared if WeatherCat detects it has been updated.

Preferences – Units/Misc1
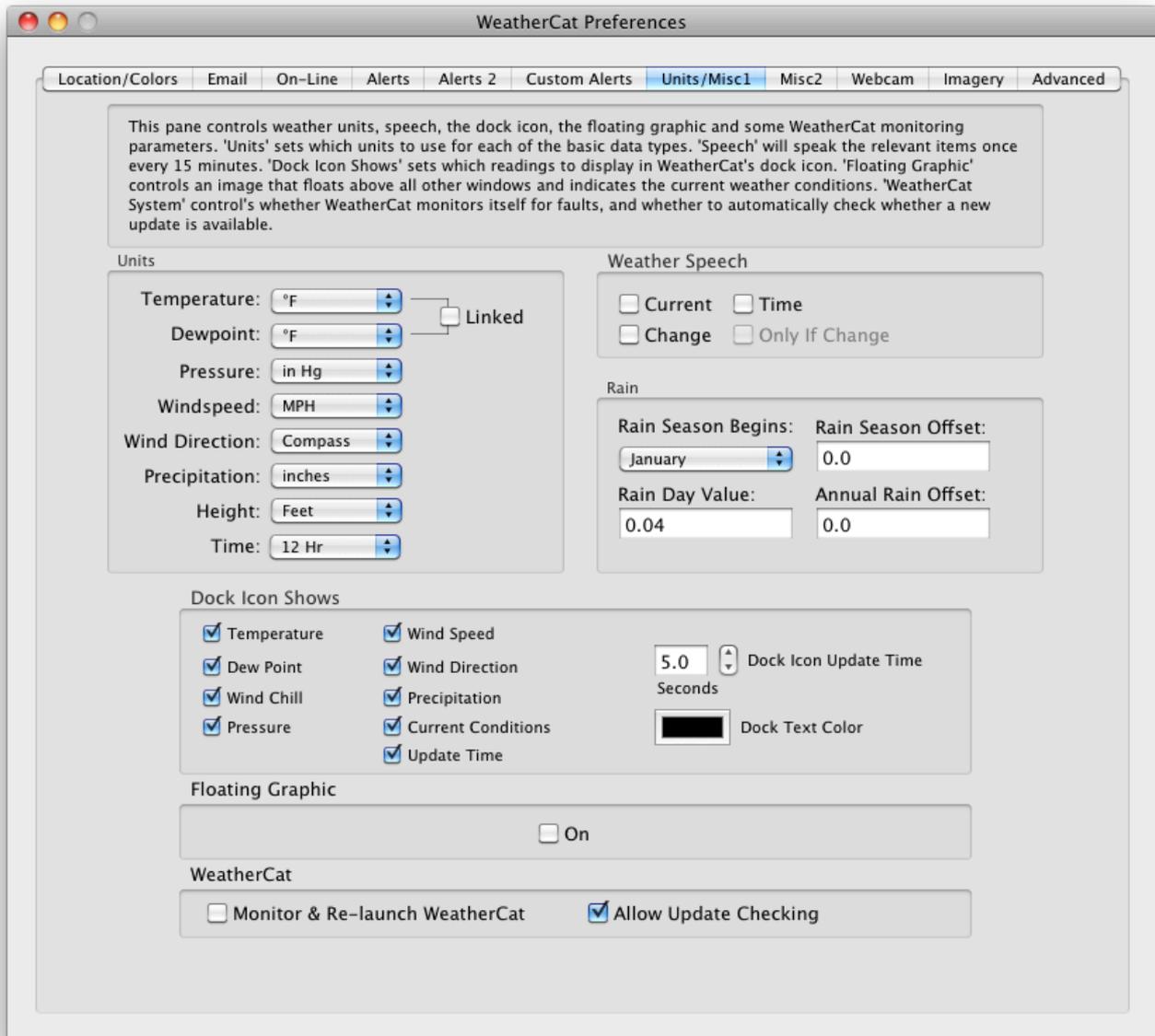
Figure 58 - Preferences - Misc. 1

Units

This area allows you to select a unit for a given measurement. For example, you might want your temperature and dew point displayed in °F, the pressure in inches of Mercury and the wind speed in kilometres per hour. Note that the units selected apply right throughout WeatherCat, including custom alerts, reports, graphs, gauges and so on.

The temperature and dew point may be linked together to make relative humidity readings easier to interpret. Note that when linked, the dew point units will become the same as the temperature units.

Also note that the Temperature Units are also used for wind chill and heat index.

Dock Icon Shows

The dock icon in Weather can show any of 9 different items or if nothing is selected, it shows WeatherCat's default icon. The dock icon update time is programmable from 1 second to 59 seconds; this time is how quickly WeatherCat flips from one item, say the temperature, to the next. If the current data is not valid, the data in the dock icon is given a red hue.

Floating Graphic

WeatherCat can display a floating current conditions graphic on the Desktop.

The 'floater' displays a graphic representation of the current conditions for a given location.

Figure 59 - The Floater

Weather Speech

WeatherCat can speak the current weather (as it samples), and the changes (i.e. falling, steady, rising) along with the time or a combination of any or all of these items.

'Only If Change' forces WeatherCat to only speak if something has changed since the last sample was taken; if nothing has changed, WeatherCat will be silent.

Rain
Rain Season Begins
For use with the rain web-tag, WeatherCat allows you to specify when the rain season starts (normally either January or July depending on your location).

It can be used as per the following examples:
```
Highest rain rate this season = STAT$RAIN:MAX:THISSEASON$ RAINUNITS$/h on
STAT$RAIN:MAX:THISSEASON:TIME$
```

```
Average rain rate this season = STAT$RAIN:AVERAGE:THISSEASON$ RAINUNITS$

Rain this season = STAT$RAIN:TOTAL:THISSEASON$ RAINUNITS$
```

Rain Season Offset

The Rain Season Offset is added to the result of the following web-tag and only affects the CURRENT rain season total result - it will not affect any other web-tag or rain time scale (for example THISYEAR):
```
STAT$RAIN:TOTAL:THISSEASON$
```

Annual Rain Offset

This can be used to correct the annual rain web-tag (`STAT$RAIN:TOTAL:THISYEAR$`) and the annual rain as displayed in the stats window in the first year of running WeatherCat.

Be sure to set this to 0 on the 1st of January if you do have an offset programmed.

Rain Day Value

This value is used by WeatherCat when calculating rain days. Any day with a daily rain greater than this amount is a rain day.

Monitor & Re-launch WeatherCat

This option tries to keep WeatherCat running. We cannot guarantee WeatherCat will never crash hence this option, if ticked, will launch a small background process, which monitors WeatherCat. If WeatherCat unexpectedly quits it will be automatically re-launched within 20 seconds thus guaranteeing no lost data or frozen web pages. Changes to this option take effect immediately. This option also allows WeatherCat to monitor itself for hang-ups. If WeatherCat hangs for more than approximately 2 minutes it will reboot itself.

Preferences - Misc 2
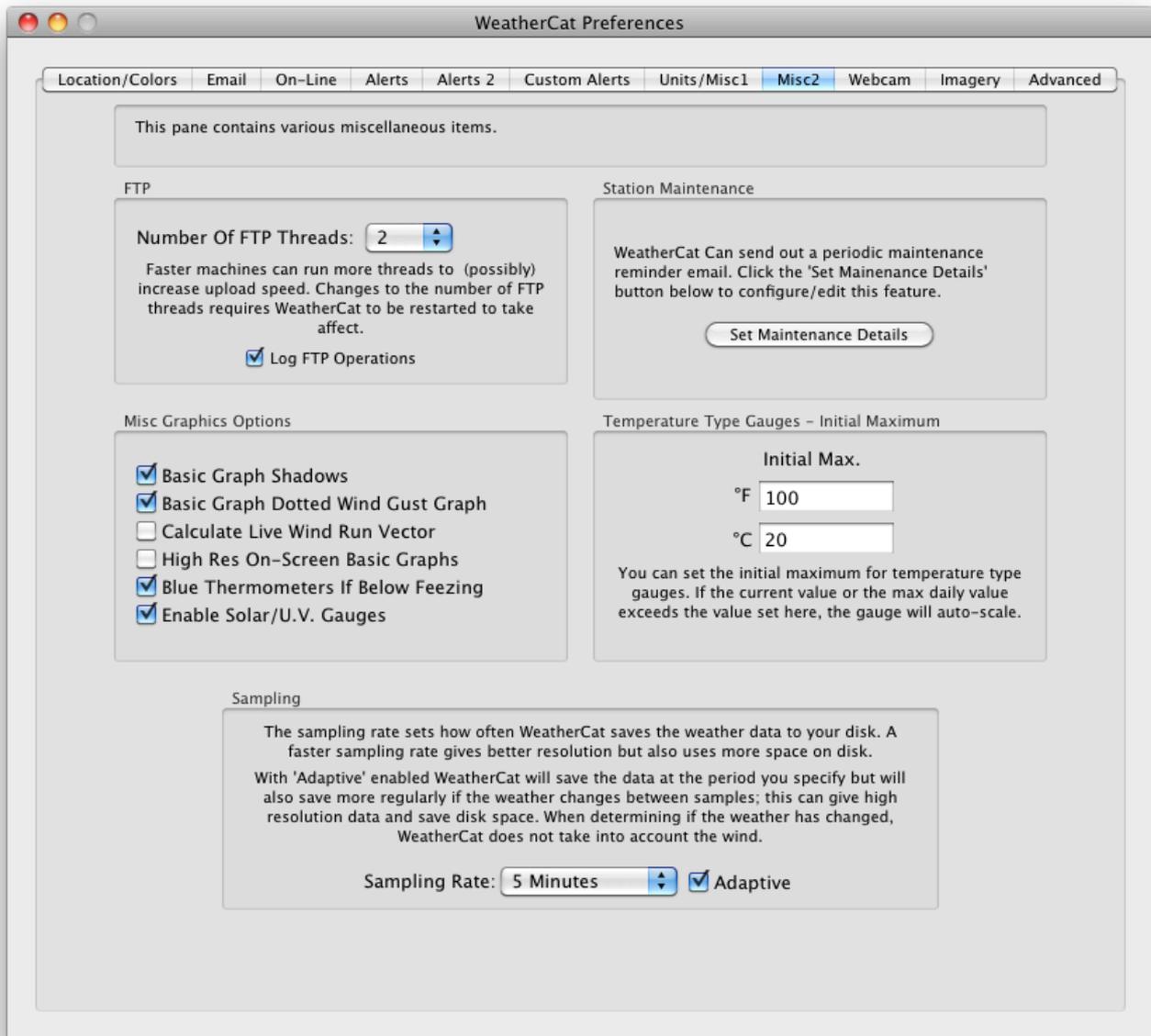
Figure 60 - Preferences - Misc 2

Number Of FTP Threads

When FTP'ing your web pages, WeatherCat can run up to 3 upload operations simultaneously. The more threads used, the faster the uploads will complete, but WeatherCat will use more of your processor.

Log FTP Operations

If ticked, WeatherCat will log every file uploaded to its log window.

Station Maintenance

WeatherCat can send out periodic maintenance emails. When you click the Set Maintenance Details button the following sheet appears:

Figure 61 - Station Maintenance Reminder

You can set the date of the initial reminder and the period between subsequent reminders. You can edit the default text we have supplied by clicking anywhere in the text box.

On the specified date WeatherCat will send you a reminder email and again at the periods specified.

Basic Graph Dotted Wind Gust Graph

If ticked, when graphing wind gust (plotted on the wind basic graph along with the average wind speed) WeatherCat will draw a dotted line rather than a solid line.

Calculate Live Wind Run Vector

If ticked, WeatherCat displays on the wind run gauge the instantaneous wind run vector. This tick-box also affects any WeatherCat client wind run gauges.

High-Res On Screen Basic Graphs

If ticked WeatherCat always draws on-screen simple graphs using all samples available. If not ticked, on horizontal scales greater than 24 hours, WeatherCat skips samples to speed up the drawing.

Blue Thermometers If Below Freezing

If ticked, thermometer-type gauges are drawn in blue if the temperature is below freezing. This option is also present in the client.

Temperature Type Gauges – Initial Maximum

You can set the initial maximum value for thermometer-type gauges here. If the temperature exceeds the value set here, the gauge will auto-scale. At midnight, the scale will reset to the value set here (if possible).

Sampling

The sampling rate sets how often WeatherCat saves the weather data to your disk. A faster sampling rate gives better resolution but also uses more space on disk. The sampling rate can be set to between 1 and 30 minutes.

WeatherCat will align its sampling to the local time – for example if you set WeatherCat to sample at 5 minute intervals, then the samples will be taken at 5 past the hour, 10 past, 15 minutes past and so on. This feature can be used in conjunction with the Custom Web Pages 'Sync. To Weather Fetch' option to ensure data on your custom web pages is updated at the same times each hour (see page 102) assuming the custom web update rate is set to less than or the same as the sampling rate.

With 'Adaptive' enabled WeatherCat will save the data at the period you specify but will also save more regularly if the weather changes between samples; this can give high-resolution data *and* save disk space. When determining if the weather has changed, WeatherCat does not take into account the wind. With adaptive enabled WeatherCat will sample at a rate between once per minute and the period you have set in the Sampling Rate pop-up menu.

Preferences - Webcam
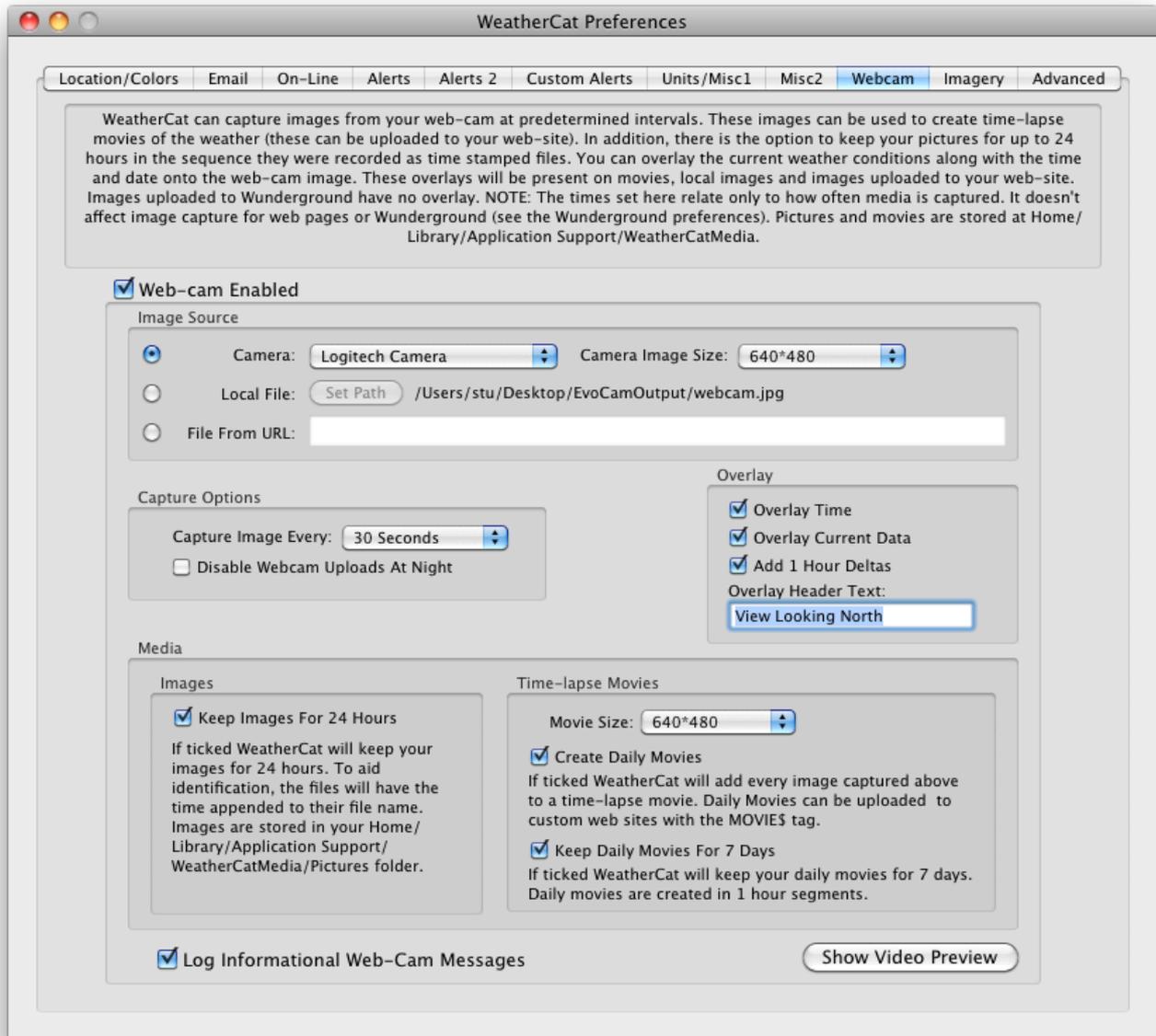
Figure 62 - Preferences - Webcam

WeatherCat can capture images from your camera at predetermined intervals.

The webcam can be directly plugged in and controlled by WeatherCat or you can pick up an image from a local file (updated by third party webcam software for example) or from a URL, which is useful for IP based cameras with in-built web severs.

The images WeatherCat captures can be used to create time-lapse movies of the weather (which can be used in your web pages) and/or provide images for use on Wunderground or your web site. In addition, there is the option to keep your pictures for up to 24 hours in the sequence they were recorded as time-stamped files. Your movies can be kept for up to 7 days again as time-stamped files.

You can also overlay the current weather conditions along with a header and time/date onto the webcam image. These overlays will be present on movies, local images and images uploaded to your web site. Images uploaded to Wunderground have no overlay apart from the time and header.

Pictures and movies are stored in your Home/Library/Application Support/WeatherCatMedia folder.

The Webcam preferences contain the master enable for the webcam – the 'Web-cam Enabled' tick-box. If this isn't ticked then webcam images and movies will not be available.

Image Source

As noted above, WeatherCat can capture an image from a locally connected camera, a local file or from a URL. Available cameras are listed in the 'Camera' pop-up menu.

The 'Camera Image Size' pop-up menu selects the size WeatherCat should try to capture the image at. For locally connected cameras, WeatherCat will try to adjust the camera to the resolution selected here. For local or a file from a URL, WeatherCat will use the image size as it finds it.

For use on your custom web pages there are various web-tags to produce a scaled image from the initial capture.

Capture Image Every

If the webcam is enabled then a picture is taken at the frequency specified here; the pictures are stored in the Pictures folder of the WeatherCatMedia folder. This also specifies how frequently a frame is added to the daily movie. 30 seconds to a minute is a good starting point.

Disable Webcam Uploads At Night

If set, uploads to Simple & Custom web pages along with Wunderground camera images are stopped at night-time.

Keep Images For 24 Hours

As noted above, a picture is taken periodically. These images are stored for up to 24 hours if this tick-box is ticked. Older images are automatically deleted. If this box is not ticked, then images are deleted as soon as they have been used. The images are named webcam_hh_mm_ss.jpg.

Movie Size

This pop-up menu specifies the frame size of the time-lapse movie. We strongly suggest you do not make this larger than the 'Camera Image Size' to avoid image degradation.

The larger the movie size the larger the movie and the more time it will take to process each frame as it is captured. Start with an initial size of 320x240, especially if you are uploading the movie to your web site.

Overlay

These options control overlay elements for images and movies.

Create Daily Movies and Keep Daily Movies For 7 Days

If enabled, WeatherCat will create a new time-lapse movie every hour – frames will be recorded at the rate specified by the 'Capture An Image Every' pop-up menu. The old 1-hour movie will be renamed with the time in its file name.

Time-lapse movies are available for use in custom web pages by using the MOVIE$ tag. At midnight all movies for that day are deleted unless 'Keep Daily Movies For 7 Days' is ticked, in which case, the current days' movies are renamed with the date and a new daily movie folder is created. Movies older than 7 days are deleted.

The movie files are named WeatherCatDailyMovie_hh_mm.mov.

Movies for previous days are held in folders named WeatherCatDailyMovie_yyyy_mm_dd.

Movies are uploaded to your web pages (simple web and/or custom web) after the turn of the hour. Shortly after the hour has changed, the current movie is renamed with its historical name, the web page processing is notified a new file is available and a new movie is created for the next hour. On the next upload of the web pages, the movie will also be uploaded.

Preferences – Imagery
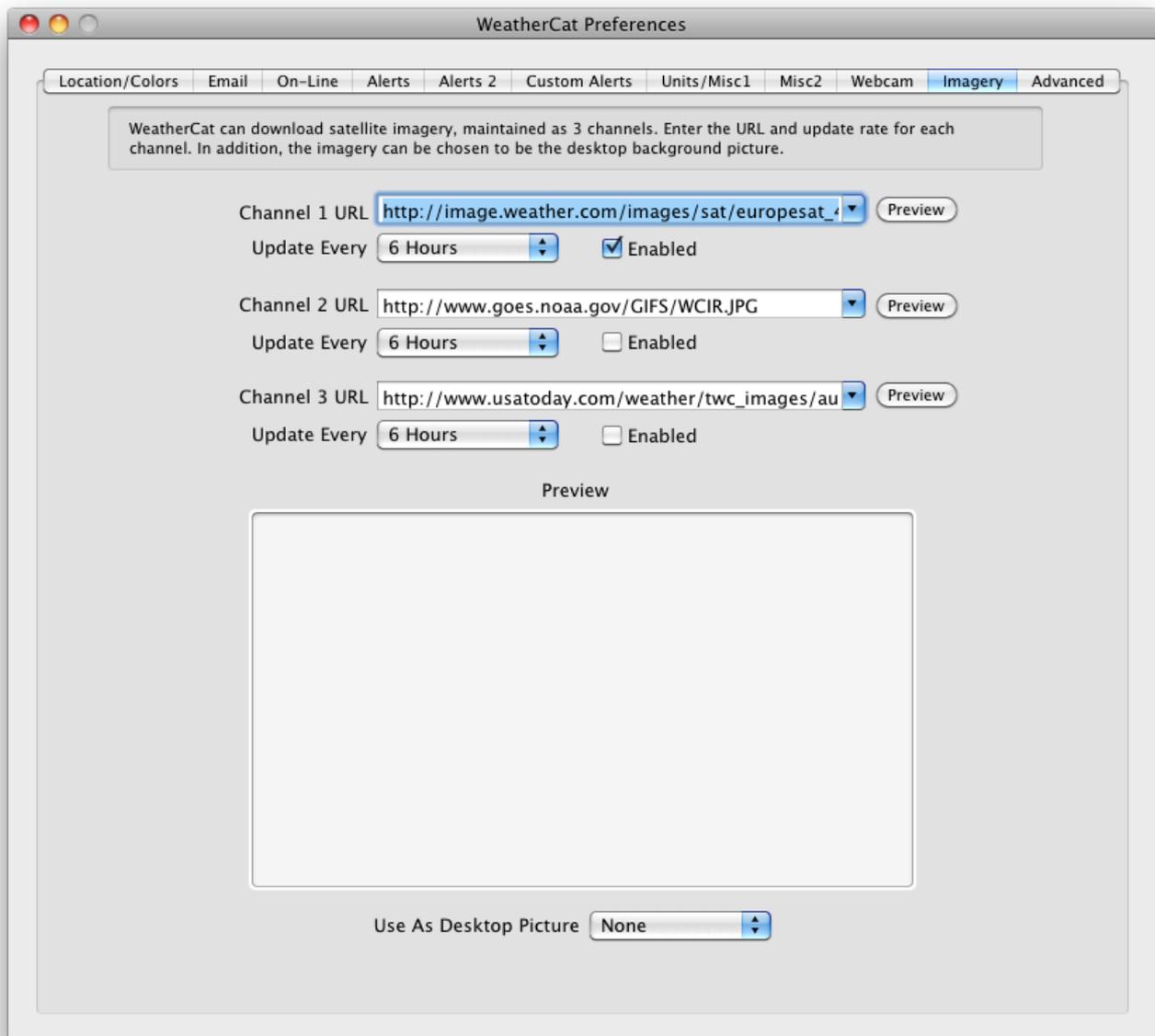
Figure 63 - Preferences - Imagery

WeatherCat can fetch and store up to three 'channels' of imagery in its database. The satellite imagery window (Tools menu) can either display the most recent imagery as a static image, as a movie loop, or, as you scroll about the data from WeatherCat's Daily View window, the historical image for that time and date (assuming it is present in your database).

If no imagery is available in the database for a given date and time, WeatherCat will display colour bars.

For each channel you can either set one of the supplied imagery URL's or enter your own. The preview buttons show the image for a given URL. The update menus specify the period between each fetch of the imagery for each location; these generally range from every 2 hours to every 6 hours.

Note: Because of the storage requirements for satellite imagery, we recommend an imagery update interval of 2 hours or greater.

The 'Use As Desktop Picture' menu can set the imagery for any of the channels as the Desktop picture on the main monitor as the imagery is updated.

Preferences – Advanced
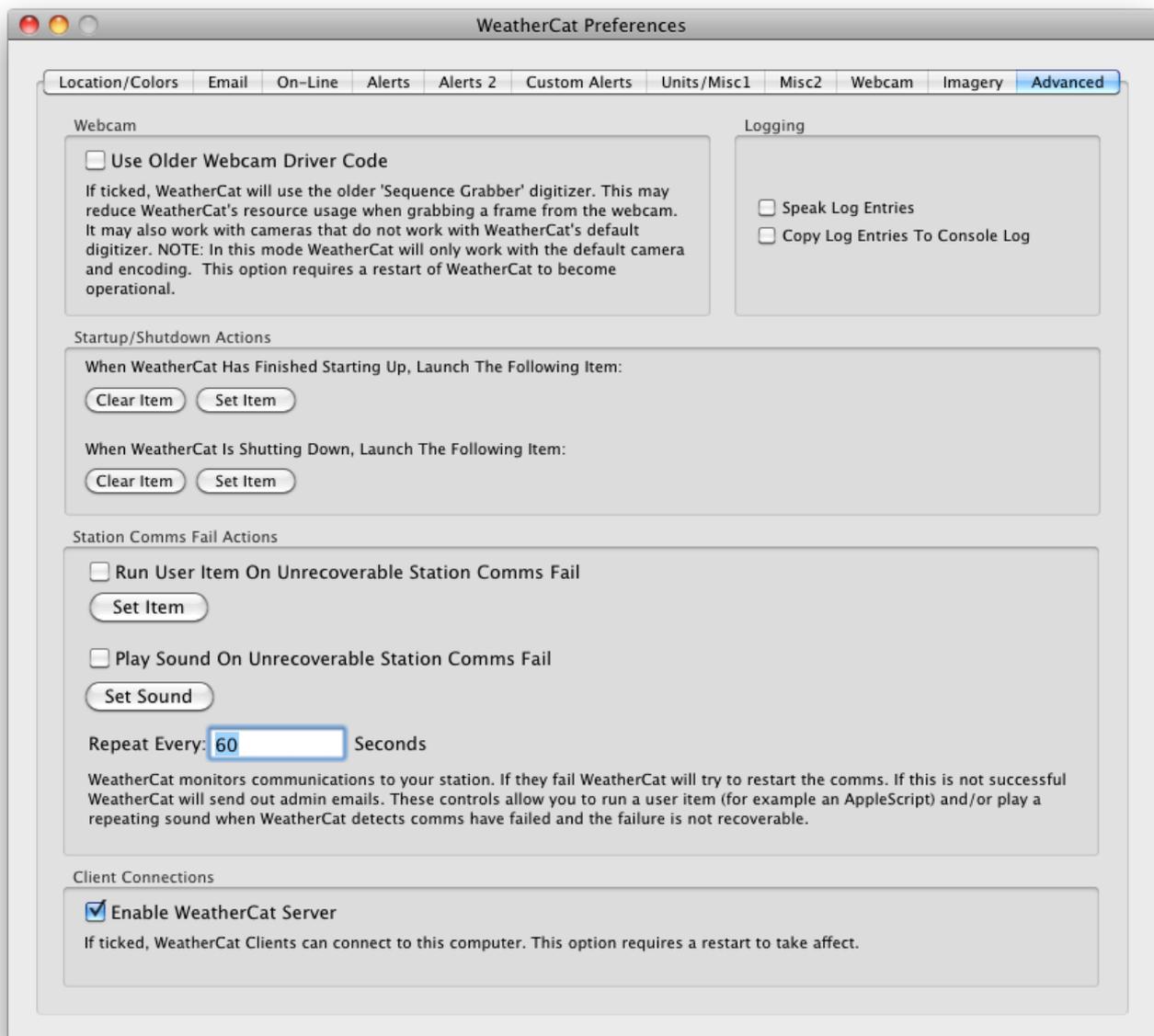
Figure 64 - Preferences - Advanced

Use Older Webcam Driver Code

WeatherCat uses QTKit to manage and work with cameras. Whilst this works with a wide range of cameras, for backwards compatibility WeatherCat also offers the use of an older technology driver. If your camera is not recognised by WeatherCat or is performing poorly, try selecting this option then rebooting WeatherCat.

There are some limitations to the older driver: It only works with the system default camera (the camera selector menu in WeatherCat's webcam preferences will be disabled) and modifications to the camera's setting are not saved.

Note: If you are using an external iSight camera (Firewire) with WeatherCat, please use the older webcam driver. If you do not, the camera will stop capturing images after a few hours running.

Speak Log Entries

This will speak log entries apart from weather data updates (these can be enabled from the Misc 1 pane of the preferences). The speech is not buffered and will skip to the latest entry to keep up with log output as necessary.

Speak Log Entries

This option copies all the text in WeatherCat's Log window to the System console log.

Startup/Shutdown Actions

WeatherCat has startup and shutdown items that are run as WeatherCat completes startup or is about to shutdown (Preferences->Advanced). These items are designed to launch scripts that launch or quit other scripts/processes thus synchronising WeatherCat with external programs. The startup item is launched after WeatherCat has taken the first sample, thus guaranteeing the data is ready.

Station Comms. Fail Actions

This option can run a User Item – for example an AppleScript and/or play a sound if WeatherCat detects communications to the weather station have irretrievably failed.

Enable WeatherCat Server

By default, WeatherCat sets up a Bonjour service to provide data to WeatherCat clients. You can turn this service off here.

WeatherCat and Data

General

WeatherCat stores its database in your ~/Library folder, for example:
/Users/John/Library/WeatherCatData/

Within the WeatherCatData folder will be a folder for each location. Within each of these folders lives the actual data organised by year and month folders.

WeatherCat data is held in simple text-based files that can be viewed or edited in any text editor. These files are given a '.cat' extension, for example '6_WeatherCatData.cat', and each file holds the data for a month; in this example June.

Each .cat file is commented at the top with the layout of the data making the data format more human friendly and easy to edit should you need to. Each sample takes up one line in the file and is simply appended to the current file. The data format uses a simple key/value coding – if a channel is not present on your hardware, it isn't recorded.

WeatherCat also maintains hourly statistics files – these are maintained by WeatherCat as each sample is taken and are given a '.hrs' extension, for example '6_WeatherCatData.cat.hrs'.

Important Note: If you edit a .cat file, delete the corresponding .hrs file. WeatherCat will rebuild the .hrs when it launches. Never edit a .cat with WeatherCat running – always quit WeatherCat before editing the data.

The satellite imagery is stored in WeatherCat's database on disk at:
~/Library/WeatherCat/Location1/Imagery as jpeg files. Each file is named 'Imagery_hh_mm_dd_mm_yy.jpg' to aid identifying each file by date.

Custom Rules

WeatherCat saves your custom rules in the same '~/Library/WeatherCatData' folder in a text based XML format.

Custom Graphs

WeatherCat saves your custom graphs in the same '~/Library/WeatherCatData' folder again in a text based XML format.

Journal

WeatherCat saves your journal entries in the '~/Library/WeatherCatData' folder again in a text based XML format.

Appendices

Appendix 1 - WeatherCat AppleScript Interface

This interface exposes station data and WeaterCat status information to your scripts/applications.

The interface provides both simple data access for quick and dirty access and a more flexible interface based on the notion of a 'working channel' which can save many lines of code in your AppleScripts.

The interface also provides access to status information and allows the setting of the current conditions as displayed and logged.

Simple Data Access

Properties are provided to access the real-time value of any channel available on your hardware, along with the current 1 hour delta for that channel. These are named as you would expect - for example **CurrentConditions** returns a string with the current conditions and **AverageWindSpeed** returns the current average wind speed. These properties contain values converted to the units you have selected in WeatherCat's preferences.

In the following list, the name of the property is in **bold**, this is followed by the 'type' of data where 'text' means the property is a string, 'real' means the property is a number and 'boolean' means the property is either 'true' or 'false'. An 'r/o' following the type means the property is read only – i.e. you cannot set it.

The following properties are currently available:

CurrentConditions (text) : Returns the current conditions. Can also be used to set the current conditions - see below under 'Miscellaneous Properties' for more details.

ExternalTemp (real, r/o) : Returns the current external temperature in the units as set in WeatherCat's preferences for temperature

DewPoint (real, r/o) : Returns the current dew point in the units as set in WeatherCat's preferences for temperature

Pressure (real, r/o) : Returns the current barometric pressure in the units as set in WeatherCats preferences for pressure

WindSpeed (real, r/o) : Returns the current wind speed in the units as set in WeatherCat's preferences for wind speed

AverageWindSpeed (real, r/o) : Returns the current average wind speed in the units as set in WeatherCat's preferences for wind speed

WindGust (real, r/o) : Returns the current 10 minute wind gust in the units as set in WeatherCat's preferences for wind speed

WindDirection (real, r/o) : Returns the current wind direction in degrees

AverageWindDirection (real, r/o) : Returns the current average wind direction in degrees

PrecipitationPerHour (real, r/o) : Returns the current precipitation per hour in the units as set in WeatherCat's preferences for precipitation

PrecipitationDaily (real, r/o) : Returns the current daily precipitation in the units as set in WeatherCat's preferences for precipitation

Precipitation (real, r/o) : Returns the current raw precipitation in the units as set in WeatherCat's preferences for precipitation

WindChill (real, r/o) : Returns the current wind chill in the units as set in WeatherCat's preferences for temperature

ExternalRH (real, r/o) : Returns the current external humidity

InternalTemp (real, r/o) : Returns the current internal temperature in the units as set in WeatherCat's preferences for temperature

InternalRH (real, r/o) : Returns the current internal humidity

SolarRadiation (real, r/o) : Returns the current solar radiation in watts per metre squared (if fitted)

UVIndex (real, r/o) : Returns the current U.V. index (if fitted)

T1 (real, r/o) : Returns the current extra temperature sensor 1 value in the units as set in WeatherCat's preferences for temperature (if fitted)

T2 (real, r/o) : Returns the current extra temperature sensor 2 value in the units as set in WeatherCat's preferences for temperature (if fitted)

T3 (real, r/o) : Returns the current extra temperature sensor 3 value in the units as set in WeatherCat's preferences for temperature (if fitted)

T4 (real, r/o) : Returns the current extra temperature sensor 4 value in the units as set in WeatherCat's preferences for temperature (if fitted)

T5 (real, r/o) : Returns the current extra temperature sensor 5 value in the units as set in WeatherCat's preferences for temperature (if fitted)

T6 (real, r/o) : Returns the current extra temperature sensor 6 value in the units as set in WeatherCat's preferences for temperature (if fitted)

T7 (real, r/o) : Returns the current extra temperature sensor 7 value in the units as set in WeatherCat's preferences for temperature (if fitted)

T8 (real, r/o) : Returns the current extra temperature sensor 8 value in the units as set in WeatherCat's preferences for temperature (if fitted)

H1 (real, r/o) : Returns the current extra humidity sensor 1 value (if fitted)

H2 (real, r/o) : Returns the current extra humidity sensor 2 value (if fitted)

H3 (real, r/o) : Returns the current extra humidity sensor 3 value (if fitted)

H4 (real, r/o) : Returns the current extra humidity sensor 4 value (if fitted)

H5 (real, r/o) : Returns the current extra humidity sensor 5 value (if fitted)

H6 (real, r/o) : Returns the current extra humidity sensor 6 value (if fitted)

H7 (real, r/o) : Returns the current extra humidity sensor 7 value (if fitted)

H8 (real, r/o) : Returns the current extra humidity sensor 8 value (if fitted)

LW1 (real, r/o) : Returns the current leaf wetness sensor 1 value (if fitted)

LW2 (real, r/o) : Returns the current leaf wetness sensor 2 value (if fitted)

LW3 (real, r/o) : Returns the current leaf wetness sensor 3 value (if fitted)

LW4 (real, r/o) : Returns the current leaf wetness sensor 4 value (if fitted)

LT1 (real, r/o) : Returns the current leaf temperature sensor 1 value in degrees C (if fitted)

LT2 (real, r/o) : Returns the current leaf temperature sensor 2 value in degrees C (if fitted)

LT3 (real, r/o) : Returns the current leaf temperature sensor 3 value in degrees C (if fitted)

LT4 (real, r/o) : Returns the current leaf temperature sensor 4 value in degrees C (if fitted)

SM1 (real, r/o) : Returns the current soil moisture sensor 1 value (if fitted)

SM2 (real, r/o) : Returns the current soil moisture sensor 2 value (if fitted)

SM3 (real, r/o) : Returns the current soil moisture sensor 3 value (if fitted)

SM4 (real, r/o) : Returns the current soil moisture sensor 4 value (if fitted)

ST1 (real) : Returns the current soil temperature sensor 1 value in degrees C (if fitted)

ST2 (real) : Returns the current soil temperature sensor 2 value in degrees C (if fitted)

ST3 (real) : Returns the current soil temperature sensor 3 value in degrees C (if fitted)

ST4 (real) : Returns the current soil temperature sensor 4 value in degrees C (if fitted)

Deltas

Properties are also provided to get 1-hour deltas for major data types. In the case of barometric pressure Weathercat also provides a 3-hour delta. Note that unconverted deltas are also provided (see WeatherCat's dictionary for full details).

ExternalTempDelta1 (real, r/o) : Returns the external temperature 1-hour delta in the units as set in WeatherCat's preferences for temperature

DewPointDelta1 (real, r/o) : Returns the current dew point 1-hour delta in the units as set in WeatherCat's preferences for temperature

PressureDelta1 (real, r/o) : Returns the current barometric pressure 1-hour delta in the units as set in WeatherCat's preferences for pressure

PressureDelta3 (real, r/o) : Returns the current barometric pressure 3-hour delta in the units as set in WeatherCat's preferences for pressure

WindSpeedDelta1 (real, r/o) : Returns the current wind speed 1-hour delta in the units as set in WeatherCat's preferences for wind speed

AverageWindSpeedDelta1 (real, r/o) : Returns the current average wind speed 1-hour delta in the units as set in WeatherCat's preferences for wind speed

WindGustDelta1 (real, r/o) : Returns the current 10 minute wind gust 1-hour delta in the units as set in WeatherCat's preferences for wind speed

WindDirectionDelta1 (real, r/o) : Returns the current wind direction 1-hour delta in degrees

PrecipitationPerHourDelta1 (real, r/o) : Returns the current precipitation per hour 1-hour delta in the units as set in WeatherCat's preferences for precipitation

PrecipitationDelta1 (real, r/o) : Returns the current raw precipitation 1-hour delta in the units as set in WeatherCat's preferences for precipitation

WindChillDelta1 (real, r/o) : Returns the current wind chill 1-hour delta in the units as set in WeatherCat's preferences for temperature

ExternalRHDelta1 (real, r/o) : Returns the current external humidity 1-hour delta

InternalTempDelta1 (real, r/o) : Returns the current internal temperature 1-hour delta in the units as set in WeatherCat's preferences for temperature

InternalRHDelta1 (real, r/o) : Returns the current internal humidity 1-hour delta

SolarRadiationDelta1 (real, r/o) : Returns the current solar radiation 1-hour delta in watts per metre squared (if fitted)

UVIndexDelta1 (real, r/o) : Returns the current U.V. index 1-hour delta (if fitted)

Working Channel

The above properties provide simple access to most channel data, but if you wanted access to a channel not directly provided, for example the Daily E.T. on a Vantage, or if you wanted to scan all channels on a regular basis, for example to save the data in a database or to display the data somewhere else, you'll have to write a lot of lines of (laborious and repetitive) code.

To make it easier to write more complex and useful scripts, WeatherCat provides the notion of a 'working channel'. When the working channel is set to a valid channel number, all future calls to working channel properties use the working channel number.

NumberOfChannels (integer, r/o) : Returns the number of channels present on the current hardware.

WorkingChannel (integer) : Set or read the channel used in WorkingChannelxxxx properties. Channel numbers run between 1 and NumberOfChannels.

WorkingChannelValue (real, r/o) : Returns the real time converted value of the working channel.

WorkingChannelValueUnconverted (real, r/o) : Returns the real time unconverted value of the working channel.

WorkingChannelStatus (boolean, r/o) : Returns whether the working channel is currently valid.

WorkingChannelName (text, r/o) : Returns the name of the working channel.

Channels within WeatherCat are numbered as follows:

```
external_temperature                   1
dewpoint                               2
windchill                              3
pressure                               4
windspeed_instantaneous                5
windspeed_average_10mins               6
winddirection_instantaneous            7
winddirection_average                  8
precipitation_per_hour                 9
precipitation_daily                    10
precipitation_raw (station dependent)  11
external_rh,                           12
internal_rh,                           13
internal_temperature                   14
windgust_1mins                         15
windgust_5mins                         16
windgust_10mins                        17
windgust_15mins                        18
windgust_dir_1mins                     19
windgust_dir_5mins                     20
windgust_dir_10mins                    21
windgust_dir_15mins                    22
solar_radiation_WM2                    23
uv_index                               24

aux_temperature_1                      25
aux_temperature_2                      26
aux_temperature_3                      27
aux_temperature_4                      28
aux_temperature_5                      29
aux_temperature_6                      30
aux_temperature_7                      31
aux_temperature_8                      32

aux_rh1                                33
aux_rh2                                34
aux_rh3                                35
aux_rh4                                36
aux_rh5                                37
aux_rh6                                38
aux_rh7                                39
aux_rh8                                40

leaf_wetness1                          41
leaf_wetness2                          42
leaf_wetness3                          43
leaf_wetness4                          44

soil_moisture1                         45
soil_moisture2                         46
soil_moisture3                         47
soil_moisture4                         48

leaf_temperature1                      49
leaf_temperature2                      50
leaf_temperature3                      51
leaf_temperature4                      52

soil_temperature1                      53
```

```
    soil_temperature2                         54
    soil_temperature3                         55
    soil_temperature4                         56

    monthly rain                              57
    yearly rain                               58
    daily et                                  59
    monthly et                                60
    yearly et                                 61
```

`(For WeatherCat SDK users, these channel numbers are defined in StationPlugInProtocol.h)`

Please note: **NumberOfChannels** may return more than 61. Channels above 61 are not yet documented.

Working Channel Example

repeat with theIncrementValue **from** 1 **to** NumberOfChannels
    set WorkingChannel **to** theIncrementValue
    set wcname **to** WorkingChannelName
    set wcvalue **to** WorkingChannelValue
    set wcstatus **to** WorkingChannelStatus
    -- do whatever you do with the data here
end repeat

Miscellaneous Properties

WeatherCatASIFVers (real, r/o) : Returns the version number of WeatherCat's AppleScript interface

StationDriverStatus (boolean, r/o) : Returns the station driver status where true means all OK, false means communications have failed to the hardware and WeatherCat was not able to rectify the situation.

The **CurrentConditions** property is writable; this allows the current conditions within WeatherCat to be controlled by AppleScript which can offer extended capabilities to calculate the current conditions. When text is written to this property it becomes the active current conditions for 10 minutes. In this situation the Current Conditions Calculator window will append '(Ext)' to its display to show the current conditions are being controlled externally.

Example:
tell *application* "WeatherCat"
    if ExternalTemp > 80 **and** WindSpeed > 20 **then**
        set CurrentConditions **to** "Warm but windy"
    end if

end tell

Assuming the temperature was greater than 80 and the wind speed greater than 20 then the current conditions calculator will be displaying:

urrent Result: Warm but windy (Ext)

The **CWOPState** property provides detailed information about the state of WeatherCat's CWOP driver. CWOPState returns an integer, which will be one of the following values (these values are guaranteed not to change in the future):

CWOP_starting=0	States 0 to 92 are used to time the startup of WeatherCat's CWOP driver.
CWOP_start=92	
CWOP_disabled=100	CWOP is disabled in the preferences.
CWOP_ok=200	Normal state if all OK and not in any other state.
CWOP_transmitting=210	Transmitting packet
CWOP_server1=250	Using CWOP server 1
CWOP_server2=251	Using CWOP server 2
CWOP_server3=252	Using CWOP server 3
CWOP_server4=253	Using CWOP server 4
CWOP_server5=254	Using CWOP server 5
CWOP_good_response=255	Packet acknowledged by CWOP
CWOP_bad_data=400	Error in weather data (sensor error). If the error is permanent, omit the sensor in WeatherCat's advanced CWOP preferences.
CWOP_no_station_name_error=500	CWOP station ID in the CWOP preferences is empty. The CWOP driver will stop.
CWOP_no_password_error=510	Currently not in use (reserved for future use)
CWOP_no_response=710	Couldn't find a CWOP server (server down or DNS error). Temporary fatal.
CWOP_error_no_reply=711	Server found but did not reply. WeatherCat will try again.
CWOP_error_latlong=720	Latitude/Longitude not set in the preferences - can't send. The CWOP driver will stop.
CWOP_internet_down=800	WeatherCat was not able to open a TCP/IP socket. WeatherCat will retry shortly.
CWOP_server_busy=801	The CWOP server refused WeatherCat's connection request; WeatherCat will try another server.

The CWOP state can change rapidly. Normally when working, the state will be switching between `CWOP_transmitting` (logging into the server), `CWOP_serverX (where X is 1 through 5)` (logged into server X - see WeatherCat's advanced CWOP preferences for the server addresses), `CWOP_good_response` (packet sent with no errors) and `CWOP_OK` (all done, last packet transmitted OK, idle waiting for next transmission).

Normal running state can be determined by examining the CWOPState and if it's between 200 and 399, all is good.

Many CWOP error states are spurious in nature; WeatherCat will try to correct the problem either by selecting another server, waiting for a small period of time and trying again or restarting its CWOP driver.

The **WundergroundState** property. This property provides detailed information about the state of WeatherCat's Wunderground driver. WundergroundState returns an integer value, which will be one of the following values (these are guaranteed not to change in future):

`wunderground_starting=`0	States 0 to 90 are used to time the start-up of WeatherCat's Wunderground driver.
`wunderground_start=`90	
`wundergound_disabled=`100	Wunderground is disabled in the preferences.
`wunderground_ok=`200	Normal state if all OK and not in any other state.
`wunderground_ok_historical=`201	Normal state if all OK and uploading historical data and not in any other state.
`wunderground_transmitting=`210	Transmitting packet
`wunderground_receiving=`211	Receiving reply from Wunderground
`wunderground_bad_data=`400	Error in weather data (sensor error). Will retry.
`wunderground_no_station_name_error=`500	Wunderground station ID in the Wunderground preferences is empty. Correct station ID.
`wunderground_no_password_error=`510	Wunderground password in the Wunderground preferences is empty. Correct the password.
`wunderground_reception_error=`700	WeatherCat couldn't decode the reply from Wunderground. WeatherCat will retry.
`wunderground_no_response=`710	WeatherCat timed out whilst waiting for the reply from Wunderground. WeatherCat will retry.
`wunderground_error_no_reply=`711	WeatherCat received an empty reply from Wunderground WeatherCat will retry.
`wunderground_error_could_not_transmit=`712	WeatherCat couldn't open a connection to Wunderground. WeatherCat will retry.
`wunderground_pwd=`720	Wunderground did not recognise station ID or wrong password. Correct log-in details.
`wunderground_internet_down=`800	The Internet is taking a nap. WeatherCat will retry.
`wunderground_error=`990	General Wunderground error state not represented by any other state. WeatherCat will retry.

Like the CWOP state, the Wunderground state can change very rapidly. Normally when working, the state will be switching between `wunderground_transmitting` (logging into the server), `wunderground_receiving` (receiving a reply from Wunderground), `wunderground_ok` (transaction complete with no errors).

Like the CWOP state, normal running state can be determined by examining the wundergroundState property and if it's between 200 and 399, all is good.

Many Wunderground error states are spurious in nature; WeatherCat will try to correct the problem either by waiting for a small period of time and trying again or by restarting its Wunderground driver.

Status values 0 through 90 are used to delay Wunderground start-up by approximately 90 seconds when WeatherCat starts up - this is the countdown you can observe in WeatherCat's Status window just after it has started.

The **MailFailed** property. This is set if WeatherCat failed to send an email. It is cleared when a mail is successfully sent.

The **FTPFailed** property. This is set if WeatherCat failed to FTP a file. It is cleared when a file is successfully FTP'd.

CommsCount (real) : Returns the current number of good packets WeatherCat has received from the hardware.

CommsErrorsTO (real) : Returns the current number of communications errors(time-outs) WeatherCat has detected whilst communicating with the hardware.

CommsErrorsVA (real) : Returns the current number of communications errors(validation) WeatherCat has detected whilst communicating with the hardware.

SensorErrors (real) : Returns the current number of sensor errors WeatherCat has detected whilst communicating with the hardware.

UnixBootTime (real) : Returns the time WeatherCat was booted as the number of seconds elapsed since the first instant of 1 January 1970 GMT

UpTime (real) : Returns the number of seconds elapsed since WeatherCat was launched

WCIdentifier (text, r/o) : Returns WeatherCat's version and build number.

General AppleScript Tips

1. If you are continuously calling WeatherCat from a loop in your script, it is wise to insert a delay in your loop so as not to cause 100% processor usage.

2. There are many good books available on AppleScript. In addition there is almost an infinite amount of information on the WWW. For help with AppleScript syntax and usage, your favourite search engine is your best friend.

Appendix 2 – Common Email Settings

1. Your Local ISP

SMTP Server: Normally something like smtp.yourisp.com or mail.yourisp.com

Port: Normally 25 (Check with your ISP if port 25 doesn't work)

User: Blank

Password: Blank

Authentication: Not checked

Note: Check with your ISP if this doesn't work - they may require authentication checked, user, password and a different port.

2. MobileMe

SMTP Server: smtp.me.com

Port: 587

User: Your MobileMe user name (not username@me.com)

Password: Your MobileMe password

Authentication: Checked

Note: The email 'From' field in WeatherCat MUST be one of your registered email addresses. For example if your MobileMe email address is fred@me.com then enter fred@me.com into WeatherCat's Email 'From' field.

3. GMail or GoogleMail

SMTP Server: smtp.gmail.com or smtp.googlemail.com (depending on your location)

Port: 587

User: username@gmail.com or username@googlemail.com

Password: Your GMail/GoogleMail password.

Authentication: Checked

Appendix 3 – Common USB to Serial Converter Drivers

Davis CP210x (WeatherLink USB) –
http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx
(Download VCP Driver Kit (version 2.9 is current at time of writing)).

PL2303 based converters - http://www.prolific.com.tw/eng/downloads.asp?id=31

FTDI – These are frequently found bundled with WS2350's -
http://www.ftdichip.com/Drivers/VCP.htm

Appendix 4 - WeatherCat Web-Tags Reference

This appendix details WeatherCat tags that can be used in custom web pages.

WeatherCat tags are case sensitive and end in a dollar symbol "$". For example WCAM$ is correct whereas wcam$ is incorrect and will not work. Where a tag takes parameters, there must be no spaces between the tag and parameter or between successive parameters.

Where a tag takes parameters, there must be no spaces between the tag and parameter or between successive parameters.

For example HTML please see the file 'index.html' found in the WeatherCat_AllTags folder of the Web Templates folder of WeatherCat's distribution.

WeatherCat Tag	Description	Example
CURRENT READINGS		
CT$	Replaced with the current temperature, temperature units and hourly change in brackets.	Temperature is CT$
CD$	Replaced with the current dew point, dew point units and hourly change in brackets.	Dew point is CD$
CWC$	Replaced with the current wind chill, wind chill units and hourly change in brackets.	Wind chill is CWC$
CX$	Replaced with the current wind direction and units.	Wind direction is: CX$
CW$	Replaced with the current average wind speed and units.	Average wind speed is CW$
CG$	Replaced with the current wind gust and units.	Wind gust is CG$
CP$	Replaced with current barometric pressure, units and hourly change.	Current pressure is CP$
CR$	Replaced with current hourly precipitation rate, units and hourly change.	Current hourly precipitation is CR$
CC$	Replaced with current conditions (when available)	Current conditions: CC$
CF$	Replaced with current forecast (Vantage/Vue/WLIP/WS23xx only currently)	Current forecast: CF$
CSF$	Replaced with current short forecast (Vantage/Vue/WLIP only currently)	Current short forecast: CSF$
CU$	Replaced with the time of the last valid data	Time of data: CU$
WDTEXT$	Replaced with the current 16 sector 10-minute average wind direction as text	Current Wind Direction: WDTEXT$

WDDEGREES$	Replaced with the current 10-minute average wind direction as degrees	Current Wind Direction: WDDEGREES$
BTTEXT$	Replaced with the current barometric trend as text	Current Barometric Trend: BTTEXT$
RS$	Rain storm value (Vantage/Vue/WLIP)	Current rain storm value: RS$ RAINUNITS$
RSD$	Rain storm start date (Vantage/Vue/WLIP)	Current rain storm start date: RSD$
RLD$	Last significant (0.6mm or more) rain date and amount	Last known rain date: RLD$
MISC ITEMS		
WEATHERFACT$	Replaced with a interesting weather fact/note. A new fact is generated daily at random.	WEATHERFACT$
JOURNT$	Replaced with the journal text.	Station journal JOURNT$
COUNTEDJOURNT$nnnn$	Replaced with the latest nnnn journal entries (where nnnn is 1 to 9999).	Last 5 station journal entries COUNTEDJOURNT$ 5$
STRECORDS$	Replaced with station records as preformatted text (enclose in <PRE> and </PRE> HTML tags.	**Records: STRECORDS$**
STRECENT$	Replaced with recent statistics as preformatted text (enclose in <PRE> and </PRE> HTML tags.	**Recent: STRECENT$**
STDAILY$	Replaced with the current daily statistics as preformatted text (enclose in <PRE> and </PRE> HTML tags.	**Daily Statistics: STDAILY$**
STMONTHLY1$	Replaced with the current monthly statistics (part 1) as preformatted text (enclose in <PRE> and </PRE> HTML tags.	**Monthly Statistics (part 1): STMONTHLY1$**
STMONTHLY2$	Replaced with the current monthly statistics (part 2) as preformatted text (enclose in <PRE> and </PRE> HTML tags.	**Monthly Statistics (part 2): STMONTHLY2$**
STMONTHLY$	Replaced with the current monthly statistics (all) as preformatted text (enclose in <PRE> and </PRE> HTML tags.	**Monthly Statistics: STMONTHLY$**
STYEAROVERYEAR$	Replaced with the year over year statistics as preformatted text (enclose in <PRE> and </PRE> HTML tags.	**Year Over Year Statistics: STYEAROVERYEAR$**
BD$	Build information	BD$
L$	Station name	Station: L$
D$	Date and time	Date: D$
UT$	Uptime	Uptime (days:hours:minutes): UT$
t12$	Time (12 hour clock)	Time: t12$
t24$	Time (24 hour clock)	Time: t24$
t12s$	Time with seconds (12 hour clock)	Time: t12s$
t24s$	Time with seconds (24 hour	Time: t24s$

	clock)	
da$	Date in the format of month/day/year	Date: da$
de$	Date in the format of day/month/year	Date: de$
SUNRISELOCAL$	Sunrise local time	Sunrise today: SUNRISELOCAL$
SUNSETLOCAL$	Sunset local time	Sunset today: SUNSETLOCAL$
SUNRISEUTC$	Sunrise time UTC	Sunrise today (UTC): SUNRISEUTC$
SUNSETUTC$	Sunset (UTC)	Sunset today (UTC): SUNSETUTC$
DAYLIGHTTIME$	Hours:Minutes of daylight today	Daylight time today: DAYLIGHTTIME$
SUNRISELOCAL1$	Sunrise local time tomorrow	Sunrise tomorrow: SUNRISELOCAL1$
SUNSETLOCAL1$	Sunset local time tomorrow	Sunset tomorrow: SUNSETLOCAL1$
SUNRISEUTC1$	Sunrise time UTC tomorrow	Sunrise tomorrow (UTC): SUNRISEUTC1$
SUNSETUTC1$	Sunset (UTC) tomorrow	Sunset tomorrow (UTC): SUNSETUTC1$
DAYLIGHTTIME1$	Hours:Minutes of daylight tomorrow	Daylight time tomorrow: DAYLIGHTTIME1$
WEBCAM		
WCAM$	Replaced with the current web-cam picture at the resolution as set in the web-cam preferences.	Current web-cam picture at camera resolution WCAM$
WCAM320$.	Replaced with the current web-cam picture at a horizontal resolution of 320. The vertical resolution is a nominal 240 pixels but this is dependent on your camera as the aspect ratio is always maintained. We also provide WCAM640$, WCAM800$ and WCAM1280$	Current web-cam picture scaled to 320 pixels horizontal resolution (camera is running at 640*480) WCAM320$
MOVIE$	Replaced with a link to the last time-lapse movie.	Latest time-lapse movie: MOVIE$
DIALS AND GAUGES		
DALL$	Replaced with all dials. (Also available is DALLC$ which is replaced with all dials and comms counts)	DALL$
DWINDD$	Replaced with current wind direction dial.	DWINDD$
DWINDS$	Replaced with current wind speed dial.	DWINDS$
DWINDR$	Replaced with current wind run dial.	DWINDR$
DBARO$	Replaced with current barometer dial.	DBARO$
DCLOUDB$	Replaced with current calculated cloud base dial.	DCLOUDB$
DSOLAR$	Replaced with current solar meter.	DSOLAR$
DTEMPO$	Replaced with current outside temperature meter.	DTEMPO$
DDEW$	Replaced with current dew point meter.	DDEW$
DWINDCH$	Replaced with current wind chill meter.	DWINDCH$
DHEATI$	Replaced with current heat	DHEATI$

	index meter.	
DHUMO$	Replaced with current outside humidity meter.	DHUMO$
DTEMPI$	Replaced with current inside temperature meter.	DTEMPI$
DHUMI$	Replaced with current inside humidity meter.	DHUMI$
DRAIN1$	Replaced with current 1 hour rain rate meter.	DRAIN1$
DRAIN24$	Replaced with current 24 hour rain rate meter.	DRAIN24$
DUV$	Replaced with current U.V. meter.	DUV$
GRAPHS - BASIC		
GRTEMPO$	Replaced with current outside temperature graph.	GRTEMPO$
GRDEW$	Replaced with current dew point graph.	GRDEW$
GRHUMO$	Replaced with current outside humidity graph.	GRHUMO$
GRWINDCH$	Replaced with current wind chill graph.	GRWINDCH$
GRHEATI$	Replaced with current heat index graph.	GRHEATI$
GRSOLAR$	Replaced with current solar radiation graph.	GRSOLAR$
GRUV$	Replaced with current U.V. graph. Note: There's no U.V. sensor on the station here.	GRUV$
GRWINDD$	Replaced with current wind direction graph.	GRWINDD$
GRWINDS$	Replaced with current wind speed graph.	GRWINDS$
GRPRESSURE$	Replaced with current barometric pressure graph.	GRPRESSURE$
GRCLOUDB$	Replaced with current calculated cloud base graph.	GRCLOUDB$
GRRAIN1$	Replaced with current 1 hour rain rate graph.	GRRAIN1$
GRRAIN24$	Replaced with current daily rain rate graph.	GRRAIN24$
GRHUMI$	Replaced with current internal humidity graph.	GRHUMI$
GRTEMPI$	Replaced with current internal temperature graph.	GRTEMPI$
GRAPHS - CUSTOM		
Custom Graphs - an unlimited number of custom graphs can be generated - here's an example - CUSTOMGRAPH1	Replaced with custom graph #1.	CUSTOMGRAPH1
Custom Graphs - here's another example - CUSTOMGRAPH2	Replaced with custom graph #2.	CUSTOMGRAPH2
Custom Graphs - here's another example - CUSTOMGRAPH3	Replaced with custom graph #3.	CUSTOMGRAPH3

UNITS		
TEMPUNITS$	Replaced with the current temperature units.	Temperature units are set to: TEMPUNITS$
RAINUNITS$	Replaced with the current rain units.	Rain units are set to: RAINUNITS$
PRESSUREUNITS$	Replaced with the current pressure units.	Pressure units are set to: PRESSUREUNITS$
WINDSPEEDUNITS$	Replaced with the current wind speed units.	Wind speed units are set to: WINDSPEEDUNITS$

Individual Stats

The STAT tag is used to create a query that is sent to WeatherCat's statistics system and the result of the query replaces the text of the tag. The STAT tag takes a list of parameters which starts and ends with a $ symbol.

The basic format is:
STAT$ITEM:TYPE:PERIOD$

ITEM can be one of:

RAIN	Either rain rate or accumulated rain (depending on the query context)
DAILYRAIN	Total rain on a daily basis
RAINDAYS	How many rain days over a given period
FROSTDAYS	How many frost days over a given period
DAILYSUN	Total sun on a daily basis
TEMPERATURE	External temperature
DEWPOINT	Dew point
WINDCHILL	Wind chill
HEATINDEX	Heat index
PRESSURE	Barometric pressure
WINDSPEED	Wind speed (context sensitive - see notes below)
AVERAGEWINDSPEED	Average wind speed (10-minute)
WINDGUST	Wind gust (10-minute)
WINDDIRECTION	Wind direction
WINDRUN	Wind run
EXTHUMIDITY	External humidity
INTHUMIDITY	Internal humidity
INTTEMPERATURE	Internal temperature
UV	U.V. radiation
SOLAR	Solar radiation
SUNSHINEHOURS	Sunshine hours

TYPE can be one of:

CURRENT	Real time value

24HRSAGO	The value 24 hours ago.
MIN	Minimum
MAX	Maximum
AVERAGE	Average
TOTAL	Total

PERIOD can be one of:
    TODAY
    YESTERDAY
    THISWEEK
    LASTWEEK
    THISMONTH
    LASTMONTH
    THIS YEAR
    LAST YEAR
    THISSEASON
    ALLTIME
    or a user defined date range (Please see 'User Defined Date Ranges' below)

By appending TIME we can display the time of the event:
STAT$ITEM:TYPE:PERIOD:TIME$

For example, to display the highest temperature today:
STAT$TEMPERATURE:MAX:TODAY$

To display the time of highest temperature today:
STAT$TEMPERATURE:MAX:TODAY:TIME$

Thus the follow code:
Highest temperature today: STAT$TEMPERATURE:MAX:TODAY$ at
STAT$TEMPERATURE:MAX:TODAY:TIME$.

Is rendered as:
Highest temperature today is 15.72 at 12:01 AM.

We can use the TEMPUNITS$ tag to display the temperature units, so the complete line of
code would look like:

Highest temperature today: STAT$TEMPERATURE:MAX:TODAY$ TEMPUNITS$
 at STAT$TEMPERATURE:MAX:TODAY:TIME$.

Example:

To find the highest temperature yesterday:
STAT$TEMPERATURE:MAX:YESTERDAY$
STAT$TEMPERATURE:MAX:YESTERDAY:TIME$.

These tags are rendered as:
23.17
5:39 PM

Notes:
CURRENT will display the real-time value of a given item – these queries are replaced with the data value at the time of the query. This is different to the higher level tags such as CT$ or CD$ etc. as those values are pulled from the database which has a resolution of 1 minute.

In the case of CURRENT, the time field (TODAY, YESTERDAY etc) will be ignored and can be omitted.

To display the current outdoor temperature:
STAT$TEMPERATURE:CURRENT$
This is rendered as:
12.17

CURRENT can also return the value of the following additional sensors:
LW1, LW2, LW3, LW4 - leaf wetness sensors.
SM1, SM2, SM3, SM4 - soil moisture sensors.
ST1, ST2, ST3, ST4 - soil temperature sensors.
T1, T2, T3, T4, T5, T6, T7, T8 - extra temperature sensors.
H1, H2, H3, H4, H5, H6, H7, H8 - extra humidity sensors.
DAILYET, MONTHLYET, YEARLYET - Daily, monthly or yearly evapotranspiration

Example:
`Current Soil Moisture 1: STAT$SM1:CURRENT$ Centibar<BR>`

24HRSAGO will display the value of a given item 24 hours ago.
In the case of 24HRSAGO, the time field (TODAY, YESTERDAY etc) will be ignored and can be omitted.`<BR>`
To display the outdoor temperature 24 hours ago:
STAT$TEMPERATURE:24HRSAGO$
24HRSAGO may only be used with the following data types:
TEMPERATURE, WINDCHILL, HEATINDEX, DEWPOINT, EXTHUMIDITY, PRESSURE, WINDSPEED, WINDGUST, AVERAGEWINDSPEED, WINDDIRECTION, RAIN (in this case the rain rate), INTTEMPERATURE, INTHUMIDITY, SOLAR, UV.

SUNSHINEHOURS can only be used with TOTAL (to find the total number of hours over a given date range)
e.g. Hours of sunshine today = STAT$SUNSHINEHOURS:TOTAL:TODAY$
is rendered as:
Hours of sunshine today = 0.52

DAILYSUN can only be used with MAX (to find the sunniest day in a given date range)
e.g. The sunniest day this year: STAT$DAILYSUN:MAX:THISYEAR:TIME$ (STAT$DAILYSUN:MAX:THISYEAR$ hours)
is rendered as:
The sunniest day this year: 18 Feb 2012 (0.52 hours)

THISSEASON can only be used with RAIN
e.g. STAT$RAIN:TOTAL:THISSEASON$
is rendered as:
92.20
or
STAT$RAIN:AVERAGE:THISSEASON$ RAINUNITS$/h
is rendered as:
0.0613 mm/h

(The rain season start month is set in the preferences)

DAILYRAIN can only be used with MAX or AVERAGE.
e.g. STAT$DAILYRAIN:MAX:THISWEEK$ on
STAT$DAILYRAIN:MAX:THISWEEK:TIME$
is rendered as:
3.40 mm on 18 Feb 2012

RAINDAYS can only be used with TOTAL and returns the number of rain days over a given period.
e.g. STAT$RAINDAYS:TOTAL:THISMONTH$
is rendered as:
3

FROSTDAYS can only be used with TOTAL and returns the number of frost days (or air frosts)over a given period.
e.g. STAT$FROSTDAYS:TOTAL:THISMONTH$
is rendered as:
8

Deltas
DELTA1 will display the 1-hour change of a given item (i.e. the current value – the value an hour ago).

For DELTA1 the time field (TODAY, YESTERDAY etc) will be ignored and can be omitted.
NOTE that wind direction delta is not supported and will return an undefined value
To display the current outdoor temperature 1 hour change:
STAT$TEMPERATURE:DELTA1$
This is rendered as:
-0.28

DELTA24 will display the 24-hour change of a given item (i.e. the current value – the value 24 hours ago).
For DELTA24 the time field (TODAY, YESTERDAY etc) will be ignored and can be omitted.
NOTE that wind direction delta is not supported and will return an undefined value
To display the current outdoor temperature 24 hour change:
STAT$TEMPERATURE:DELTA24$
This is rendered as:
3.2

Deltas may only be used with the following data types:
TEMPERATURE, WINDCHILL, HEATINDEX, DEWPOINT, EXTHUMIDITY, PRESSURE, WINDSPEED, WINDGUST, AVERAGEWINDSPEED, WINDDIRECTION, RAIN (in this case, the rain rate), INTTEMPERATURE, INTHUMIDITY, SOLAR, UV.

User Defined Date Range
Date ranges are specified as yyyy-mm-dd/yyyy-mm-dd. The time range runs from the first minute of the first date to the first minute-1 of the second date.
Example:
STAT$TEMPERATURE:MIN:2010-12-01/2011-04-01$TEMPUNITS$
Finds the lowest temperature between 1st December 2010 and 1st April 2011 and displays it along with the time of the occurrence. The above example would display as:
-15.4°C
You can also use a user defined date range with the time tag to print the time/date of a query result. For example, to print the time and date of the above query:
STAT$TEMPERATURE:MIN:2010-12-01/2011-04-01:TIME$
The above example would display as a localised time and date - e.g. '8 December 2010 06:35 A.M'.

Tag Errors
Note that some configurations of this tag are invalid - in this case WeatherCat will either allow the tag to be processed - for example:

Highest wind direction today = STAT$WINDDIRECTION:MAX:TODAY$ degrees
returns an undefined value and is rendered as
'Highest wind direction today = 329.00 degrees'.

or it may render as an error; for example:

Average wind direction today = STAT$WINDDIRECTION:AVERAGE:TODAY$ degrees on STAT$WINDDIRECTION:AVERAGE:TODAY:TIME$ renders as: Average wind direction today = 83.78 degrees on ***Error - No time available for averages***

Latest Tags And More Information

WeatherCat is continually evolving; for an up-to-date list of tags, please see: http://trixology.com/live_weather/custom

In addition, the WeatherCat Web Templates forum offers hints, tips and templates: http://athena.trixology.com/index.php?board=5.0

Appendix 5 – File Extensions Processed By Custom Web Page Processing

The following file types will be processed by WeatherCat for tag replacement when processing custom web page:

.htm
.html
.htx
.css
.xml
.txt
.php
.shtml
.stm
.shtm

All other file types will be uploaded but not processed for tag replacement.

Note that when processing tags which generate html links to files, for example graphs or gauges, only the filename will be generated if the file is php, in all other cases, html to link to the file will be generated.

Appendix 6 – Uninstalling WeatherCat

Drag the 'WeatherCat' folder to the trash.

To delete files created by WeatherCat, drag the following folders and files to the trash (some of these may not exist):
~/Library/WeatherCatData
~/Library/Application Support/WeatherCatCustomWeb
~/Library/Application Support/WeatherCatMedia
~/Library/Application Support/WeatherCatTemp
~/Library/Application Support/WeatherCatWeb
~/Library/Preferences/com.trixology.weathercat.plist

(where ~ is your home directory).

Note that on OS X 10.7 or later, the Library folder is hidden. You can make it visible again via the following terminal command:
```
chflags nohidden ~/Library/
```

Appendix 7 – Frequently Asked Questions

Actually, these aren't asked frequently at all, but we've seen them frequently enough to document them.

1. Q: WMR 928/968 - comms counts increasing fast and data bouncing up and down?

A: Quit WeatherCat, unplug your serial to USB converter, count to 5, plug it back in and run WeatherCat.

2. Q: WS23xx - rain incorrect on historical download.

A. Historical rain counter is out of sync. with real-time rain counter in console. Quit WeatherCat. Unplug console from computer and mains power, take batteries out, count to 10, batteries back in, power up and connect to computer. Reset console by holding down Wind and Pressure buttons until console beeps (indicating it has reset). Set-up the console, especially the date & time then run WeatherCat. From the Tools Menu select 'Station Hardware Options' and set the data logger interval to your preferred interval.

3. Q: Vantage - I wish to try WeatherCat and I've installed the latest USB drivers for the Vantage but WeatherCat is not seeing my station?

A. If you've used your Vantage with WeatherLink on a PC it may have switched your data logger to USB mode; WeatherCat needs it to be in serial mode before it will be able to see it. You should be able to switch the mode back to serial in WeatherLink for Windows.

4: Q: Is it OK to put my computer to sleep whilst running WeatherCat?

A: We do not recommend putting your computer to sleep if running WeatherCat as many USB to serial converters have problems waking up. Instead we suggest either quitting WeatherCat before putting the computer to sleep, or shutting the computer down entirely. Sleep with an IP based data-logger, such as WeatherLink IP, is OK.

5. Q: How Do I back up my weather data?

A: WeatherCat's data is stored at ~/Library/WeatherCatData (where ~ is your home directory). You should back it up at least once per week, ideally more often. If you are running OS X 10.5 or later then Time Machine can do this for you. For more information on Time Machine click on your desktop, click the Help menu then type in Time Machine to the search box.

6. Q: I sometimes get a message from WeatherCat saying communications have failed to the station and/or the USB driver has failed – is there anything I can do about this?

A: Communication failures are typically caused by electrical or radio frequency noise interfering with and/or crashing the USB to serial driver supplied by either the station manufacturer or the manufacturer of your USB to serial converter; these drivers live in the kernel space so if you do get this message it is wise to re-boot your computer.

The Davis USB data-logger is particularly prone to the problem and on OS X 10.6/7 the driver crashes in such a way that WeatherCat is not able to restart the driver - the only recourse is to reboot (on OS X 10.5, WeatherCat can generally restart the driver automatically). Davis have an F.A.Q. on their web site which may help but the general advice is to make sure you don't have any sources of RF or electromagnetic interference near the console, its power supply or computer (TV's, fluorescent lights, electrical switches, thermostats, RF transmitters etc) and to add some ferrite rings or clamps to the USB cable at both ends and the power supply cable as near as possible to the plug that plugs into the console.

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WeatherCat will try its best to send out weather alerts and warnings. However we do not guarantee that any alert or warning generated will reach its intended recipient.

Even in WeatherCat's display, glitches might occur. Before undertaking any journey or other activity that may be adversely affected by the weather, you should check with multiple sources of information and appraise local weather conditions yourself. With all these pieces of information you should make a judgment. Failure to do so could be fatal. Only you can know whether it is safe - WeatherCat cannot.

With all this in mind, Trixology will not be held responsible for any accident, or loss of business, or other unfortunate event that might occur from decisions based upon WeatherCat. If your local laws do not allow this limitation of liability then you should not use WeatherCat.

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French Localisation: Michel Le Berre & Frederic Genevey
German Localisation: Reinhard Unterwurzacher
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Floater Graphics: Charles Cohn

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This software is brought to you via the colour blue!