What's new in ANY-maze version 4.60 and 4.63

Introduction
ANY-maze version 4.60 is a major new release of ANY-maze including a wide range of new and enhanced features. Version 4.63 is an incremental update to 4.60 and adds two new features as well as fixing some issues reported with 4.60.

New features in version 4.63
- The ability to import lists of animals and tests from CSV or text files.
- Improved navigation when playing video files and DVDs within ANY-maze.

New features in version 4.60
- Support for the new ANY-maze interface makes it easier than ever to sense and control external devices during tests.
- New operating modes allow you to use ANY-maze without having to track your animals.
- ANY-maze plug-ins allow you to add your own, custom analysis to ANY-maze.
- Tests can now be reviewed any number of times allowing additional behaviours to be added to the tests results.
- A new Test data report shows the exact details of what happened during a test and when.
- Trials can now be set to start automatically, for example, a certain time after the previous trial ended.
- You can now define arbitrary time periods in the protocol and view results for each one or analyse results between them.
- A new protocol element, Virtual switches, allow you to detect when a value is above, below or between certain values.
- Other enhancements:
  - The Data page can now optionally show repeated trials, and or time periods, in columns, making transfer to SPSS simpler.
  - ANY-maze format video files can now be converted to standard format .avi video files within ANY-maze.
  - New Actions allow you to run other programs, send e-mails or even send SMS messages when an Event occurs during a test.
  - Times can now be specified with units – for example, 4min or 4.5h
  - Various new measures have been added.
  - A number of other minor enhancements have been included.
The ability to import list of animals and tests

The new import facilities allow you to quickly import lists of animals or test that have been created in some other system such as Microsoft Excel. This avoids the necessity of retyping the information in ANY-maze.

Improved navigation when playing videos

When playing a video or DVD, ANY-maze now shows playback progress using a bar at the bottom of the window - similar to the one shown in Windows Media Player. You can jump to any point in the video by clicking or dragging in the bar.

As an alternative to scrolling the search bar, you can navigate to any point in a video simply by changing the playback time, which is shown on the far right of the bar. To do this you just need to point the mouse at either the hours, minutes or seconds and roll the mouse wheel. Each ‘step’ of the wheel will alter the value being pointed at by 1. So, to move forward 10 minutes in a video you would point at the minutes part of the time and roll the mouse wheel forward 10 steps.

Support for the ANY-maze interface

The ANY-maze interface (or AMi for short) is a device designed specifically for use with ANY-maze. AMi’s abilities are too numerous to mention here, they’re described fully in the AMi reference, but here’s a sample of what AMi allows you to do:

- Connect simple push button or lever switches and detect when they’re activated.
- Connect photo-beams and detect when they’re broken
- Connect arrays of photo-beams (up to 100cm wide) and detect when the animal breaks a beam in the array – great for detecting rearing
- Connect rotary encoders and count rotations, determine rpm, etc. Useful for rotational behaviour experiments or for connecting to a running wheel to quantify exercise.
- Connect temperature and light sensors and register their values automatically in your results. Or set up the AMi watchdog to alert you if sensor values go outside a certain range.
- Control devices based on what the animal is doing during a test - for example:
  - AMi can control shockers, pellet dispensers, syringe pumps, etc. and switch them on and off depending on the animal’s behaviour.
  - The AMi high-power switch can control mains operated devices such as pumps or motors - again this control can be based on what the animal is doing.
  - AMi’s 4 independent speaker channels can play any sound, at any volume, for any duration and the sounds can be altered based on the animal’s behaviour.

And all of the above features are fully integrated into ANY-maze. Amongst other things, this means that results are processed in the same way as other ANY-maze measures, so they’re not only reported for the entire test but can be analysed between zones and/or across time.

Operating modes
You can now use ANY-maze in one of three different operating modes: Video tracking mode, No tracking mode and No video mode.

The video tracking mode is the classic ANY-maze mode and all features are available.

No tracking mode switches off the tracking of animals but still allows you to view a video and to use keys and input/output devices (such as AMi) to score behaviours in the test. This is very useful if you don't want to track the animal but instead you just want observe and score its behaviour.

No video mode dispenses with the need to use video at all. However, all the input/output features are available making this mode ideal for automating equipment such as skinner boxes, where video is not required.

ANY-maze plug-ins

ANY-maze plug-ins are small programs which can be used to add new analysis to ANY-maze. For example, ANY-maze does not detect "darting" behaviour, but a plug-in could be written which would do this. Another use for plug-ins is to transfer ANY-maze tracking data to other programs in real-time. For example, a plug-in could be used to synchronise data from ANY-maze and an electrophysiology recording system.

Plug-ins have deliberately been designed to be simple to write and anyone with a little programming experience should find them easy to create, especially as we've included full documentation and the source code for two example plug-ins which can be used as templates for your own code.

Adding additional scoring to tests

If a test is recorded to video, then ANY-maze now allows you to review the video any number of times and add additional scoring to the results.

For example, imagine you want to use keys to score eight different behaviours that your animals can exhibit during a test (as well as having ANY-maze track the animal within your apparatus).

Trying to score all eight behaviours simultaneously would probably be impossible, so instead you could score just one or two behaviours when the test is actually run, and then you could review the test video multiple times scoring as many of the other behaviours as you want during each review.

The final results for the test will include all the scored behaviours and ANY-maze will analyse them in exactly the same way as it would have done if they'd all been recorded at the same time.

The Test data report

The new Test data report uses a spreadsheet format to show everything that occurred during a test. The first column shows the time and subsequent columns can be set to show such things as:

- The x,y coordinates of the animal's centre point, head or tail.
- The animal's speed.
- Entries and/or exits into zone.
- The distance of the animal from a zone.
- Presses and releases of keys.
- Activation and deactivation of switches.
• Photo-beams being broken.
• The value of sensors.
• ...in fact there are over 60 options in all.

The spreadsheet format makes it easy to copy and paste this data to other programs such as Excel, or it can be saved in a variety of standard formats.

Automatically starting repeated trials
It is now possible to specify that the trials in a stage should start automatically at a certain time. There are a range of options for when a trial should begin including:

• A certain time after the previous trial ended.
• A certain time after the previous trial started.
• A random time (between set limits) after the previous trial started or ended.
• At a certain time of day.

Time periods
ANY-maze has always been able to break tests into equal length time periods and analyse results for each period separately, but in version 4.60 we've taken this ability to a new level.

You can now define any number of arbitrary length time periods and ANY-maze will analyse your results for each of them. The periods are entirely independent, so they can overlap or be non-contiguous. Furthermore, one period can actually equate to different absolute times in different stages.

For example, in a fear conditioning protocol you may want to analyse results for a period of 30 seconds during which the animal receives a stimulus of some kind. However, the stimulus may occur 1 minute after the test start in the first stage of the experiment and 2 minutes after the test start in the second stage. To address this you could create a period called "Stimulus" covering the period 1min – 1min 30sec in the first stage, and 2min – 2min 30 sec in the second stage. You could then compare results for the stimulus period in the two stages without needing to worry about the differences in the absolute times.

Periods can also be based on Events - in other words on something the animal does. For example, a period could be set to start 10 seconds before the animal enters a certain zone for the first time and end when it actually enters the zone. Obviously for different animals in different tests the absolute time of this period would vary, but for all animals the period would last 10 seconds and thus the results would be comparable, allowing you to analyse them.

Virtual switches
Virtual switches are a new protocol element. A virtual switch is a little like a key that the software will "press" for you when something occurs - for example, when the animal moves faster than a certain speed. ANY-maze can report measures such as the count of occurrences, their total duration and the mean duration of each occurrence, and, as always, it can split these results between zones and/or across time.

There are a wide range of things that can be used to trigger virtual switches including:

• The animal’s speed
• The distance from a zone
• The distance from a point
• The value of a sensor
• the rotational velocity of a running wheel
• etc., etc

What’s more one value can be used in multiple switches. For example, you could create a virtual switch called “High speed” and set it to be activate when the animal is moving faster than 100cm/s. You could create another switch called “Medium speed”, to be active when the animal is moving between 30cm/s and 100cm/s and a third called "Low speed", to be active when the animal is moving between 1cm/s and 30cm/s. You would then be able to analyse how much time your animals spend moving at high, medium and low speeds.

Virtual switches can also be used to “connect” other on/off type items in ANY-maze. For example, you might use an AMi photo-beam array to detect when the animal is rearing and you might use a key press to score when the animal is grooming; now you’d like to know how many time the animal was grooming when it reared. Using a virtual switch you could AND these two values, so the virtual switch would only be ‘on’ when the animal was rearing AND grooming simultaneously.

Of course, like almost everything in an ANY-maze protocol, you can add or edit virtual switches at any time and the system will simply reanalyse your tests to generate the switch’s results.

**Other smaller enhancements**

*The Data page is now more SPSS friendly*

The data page can now be formatted so that the results for repeated trials are shown in separate columns, rather than separate rows, making it easier to transfer data to SPSS (and other statistics packages) which expect data to be plotted in this way.

*Converting ANY-maze video files to AVI format*

There is now an option on the “Monitor” page that allows an ANY-maze video to be converted to a standard format AVI file, which can then be played in other software. In fact this same feature allows you to record any video source to an AVI file.

*New Actions*

The effects of an Action now include options to “Run a program” and to “Send an alert message”. The latter effect can display a message on screen, send an e-mail or send an SMS message to a cell phone.

*New format for times*

In version 4.60, all times within ANY-maze can now be specified with units. For example, the duration of a test can now be entered as “40 min” instead of “2400” as before. The old format is still valid so this won’t cause a problem in your existing experiments. The new format also supports mixed units, such as “3h 20min” and decimals, such as “2.5 min”.
New measures

The following new measures have been added

- Latency to become mobile
- Latency to become immobile
- Time orientated towards a zone
- Time the animal's head was in a zone when its centre was outside the zone
- Path efficiency to the zone
- Corrected integrated path length for a zone
- Number of times a sequence was broken

Remember we add new measures for free, so if there's something you'd like included, just let us know.

Other minor enhancements:

- Links in reports, such as Results reports or the Test details report, now include pop-up messages describing what the links do - just hover the mouse over a link for a second for the message to appear. These are particularly useful for the "Action" links in the Test details report.
- Spreadsheets, such as the Animal treatments and data table, now allow you to paste data into editable cells.
- When a spreadsheet includes a selection, the right-click menu now shows an option called Selection statistics. This shows information such as max, min, average, count, etc. of the cells selected in the spreadsheet.
- The protocol page has always had an Optimal fit button to arrange the panes on the page in an optimal way. It is now possible to arrange the panes in way you think is optimal, then, by right clicking the button, save your optimal layout. Thereafter, whenever you click the button the panes will snap to your saved layout.
- The Help menu now includes direct links to the major sections of the help system as well as a new option to Activate an ANY-maze license and another to Send the ANY-maze log file directly to ANY-maze technical support.
- Calculations now support comparison operators.
- Version 4.60 includes optimisations to take full advantage of Intel's latest Core 2 Dual and Quad core processors.

What was new in previous versions of ANY-maze

- What was new in ANY-maze version 4.50
- What was new in ANY-maze version 4.30
- What was new in ANY-maze version 4.20
- What was new in ANY-maze version 4.10