# Editorial

**The editor's comments on the world of RISC OS**

Well another few months have gone by but the RISC OS scene remains fairly quiet with the usual promises of things to come. Luckily H.G. Wells was a bit more optimistic on the future rate of change, at the moment the RISC OS scene reminds me more of Satie's Trois Gymnopedies - fairly static!

Still I must try to be optimistic. My new iMac G5 is really great: I listen to my CDs and radio, watch Red Dwarf DVDs, store my photos from my new Panasonic camera, crea....Slap wrist! Really must remember this column is supposed to be about RISC OS.

Still all this quiet has given me a chance to have another play with Ovation Pro, so you might - if you actually read this magazine - notice a few changes in it's layout. Whether you like it or not is another question but it keeps me off the streets and reminds me why I like RISC OS so much.

As I'm writing this I have Photodesk, Strong Ed, Draw, ThumbCat and Paint all open on the desk top. I can drag a photo from Thumbcat into Photodesk, alter the picture and drag it from Photodesk straight into a frame in Ovation Pro. Open a text file and drag text into a waiting frame. Alter a picture - just OLE it out into Paint or Draw. Have I had to navigate through miles of menus to do this which then disappear if I select an item, so that I then have to navigate through them again to choose another item out of the same menu - no! Just use adjust and good old 'drag and drop'

In RISCOS everything just works together. If one program cannot do what I want, then another one can. Each program interacts with each other to make a huge whole. Use RISC OS! You don't need bloatware.

# Contents

***Looks like a very expensive way to achieve aural stimulation!***

# RISC Bytes

**RISC OS news over the last couple of months**

# Wakefield 2006

The Wakefield RISCOS Computer Show is being held on Saturday 13th May 2006. The list of exhibitors includes:-

The Fourth Dimension
APDL
Advantage 6 Ltd
Archive
ARM Club
Brain Games
Castle Technology
CJE Micros
EFF
Etc. Systems
Fortran Friends
Genesys Developments Ltd
Icon Technology
JGH BBC Software
The MathMagical Software Co.
Liquid Silicon
M W Software
NetBSD
Qercus
R-Comp/R-Comp
Interactive
RISCOS Ltd
RISCOS
Packaging Project
RiscCAD
Spelling Computer
Services
Stuart Tyrrell
Virtual Acorn/3QD
Wakefield RISCOS
Computer Club
WROCC Charity
Stall
X-Ample

Once again there is a show theatre in operation.

The current (provisional) theatre programme is:

| Time | Who | Subject |
|---|---|---|
| 10:30 | Advantage 6 | The future! |
| 11:30 | Castle | |
| 13:00 | Paul Middleton | |
| 14:00 | Martin Wuerthner | Graphics design with ArtWorks 2 |
| 15:15 | John Cartmell | Qercus world |

Each presentation will be 45 mins.

Entrance is free, but there are only 80 seats available.

Please keep checking the show website for updates:
**http://www.wakefield show.org.uk**

The Show, 2006, will once again have a charity stall raising money for the Wakefield Hospice. This has been done for the past 8 years and has raised over £14,000 in that time thanks to your generosity.

As many people will know some changes have had to be made to what was acceptable as a result of the introduction of the regulations (which were delayed to this year, but in fact many disposal companies were already following the new regulations).

As a result there are restrictions on what will be acceptable on the charity stall.

Basically this means NO PRINTERS, NO PCs, and generally no Monitors. A limited (and we mean limited) number of RiscPCs and A7000+s by prior arrangement only will be accepted(any unsold at the end of the day an exhibitor has kindly agreed to take away and make a contribution to the hospice).

It is also possible that one or two BBC B/Masters may be accepted, again by prior arrangement, since someone is interested in these.

Please do NOT abuse this facility. Last year someone from the Cheshire area dumped some 40 PCs from a business on the stand. The Hospice ended up having to pay for the disposal - not very nice. The Hospice will NOT accept computers, monitors, or printers, unless we have agreed to it in advance. Smaller items can still be sent/taken in advance to:

Wakefield Hospice (Fund Raising) Ltd
Hemingway House
Thornes Moor Business Park
Thornes Moor Road
WAKEFIELD
WF2 8PG

They can accept direct deliveries between 8:30 am and 4:00 pm Monday to Friday
PLEASE ENSURE YOU MARK THE PARCEL:
"FOR THE ATTENTION OF TERRY RIGG - WAKEFIELD 2006 RISC OS SHOW"

You can of course still bring items to the stall on the day, the earlier the better.

Visit the show website at
http://www.wakefieldshow.org.uk
Show enquires to: show2006i ...
@wakefieldshow.org.uk

The show is organised by Chris Hughes on behalf of the Wakefield RISCOS Computer Club and other volunteer members help run the show, doing many varied tasks from manning the club stand and charity stall to collecting tickets and stewarding, etc..

# Analogue/Digital–Gate simulation program.

Mijas Software have released a further update to their Analogue/Digital-Gate simulation program. This new version allows the user to change the width, type and colour of connection lines and has updated symbols for digital gates making viewing and editing easier.

A Demonstration version and a full manual can be downloaded from

**http://mijas.orpheusweb.co.uk**

Existing users can update their copy by downloading the demonstration copy and inserting their existing license.

!ArcSimp has a very wide range of applications - here are a few:-
a) Digital Visual demonstration of digital gates and combinations of gates.
Demonstrating simple digital gate circuits eg counters, A to D conversion D to A conversion.
b) Analogue Visual demonstration of mathematical relationships eg sin^2 + cos^2 =1
Building of models of the outside world - eg car with automatic gearbox accelerating - effect of hill climbing etc.
Building of models of control systems in a single simulation OR More than one (interacting) copy of !ArcSimp can represent for example an aircraft or car and further copies can represent a single or multiple-redundant control system.
c) Analogue/Digital

The digital and analogue functions can run concurrently hence the ability to simulate an analogue to digital converter. In more complex cases the logic of a multiple redundant control can be simulated along with the control itself.

**History of !ArcSimp**

A non-graphical version of this program was used for many years to assist in the development and testing of aircraft jet engine controls. It was completely re-written with a graphical interface for the Archimedes and now runs on all versions of RISCOS. More recent applications have included the study of the dynamics of chemical reactions.

# Not so cute now?

The A9home is one of those things that seems to inspire a strong first reaction, more often than not, "That's so cute!"

Here at Advantage6, while we like "cute", we know that "capable" is also important and we have been working to add to the capabilities of the A9 range.

Traditionally the Wakefield Show is where we take the opportunity to demonstrate the potential cross–overs between our OEM and the retail market – and 2006 will be no exception.

This year we will be focusing on connectivity, and the first item which is confirmed to be a part of the demonstration will be our A9 with integrated Bluetooth proof–of–concept.

Although the body of the work has been done to meet specific OEM requirements, the core design is based on the same components as the A9home – and Advantage6 have retained the rights to this, meaning that – given sufficient demand – broader support could be developed and offered as an upgrade to existing A9home owners.

With animals, nothing dispels "cute" so quickly as being shown some teeth, but with the A9 we're not so sure that the two can't co–exist – come along to the Wakefield Show and judge for yourself!

The A9 is a range of computers made up from a selection of base profiles. These can then be customised for any specific requirement except for set top box or thin client. Evaluation kits are available ex–stock to qualified OEM customers. The A9home is one such targeted machine. The A9 range run RISC OS Adjust32 from RISCOS Ltd.

**http://www.thea9.info**

# *4D release version 3.28 of Impact*

Further enhancements and bug-fixes to the popular relational database package.

Version 3.28

* Option of a two-level menu of databases grouped by parent directory
* Three choices of Return key action in database cards
* Fixed bug with Auto mode for backups in version 3.27
* Fixed bug with text default values and calculation fields in 3.27
* Various other small improvements to backups, other older bugs fixed.

Users of version 3.27 can download the upgrade for free from the 4D website

**http://www.cjemicros.co.uk/impact**

# DrawView

DrawView is an application that allows Draw files to be displayed on a Linux or other Unix system. It is written in C++ and released under the GNU GPL.

The file is displayed in a desktop window which can be scrolled and zoomed as required. The drawing can be exported in PDF or PostScript format for printing or use in other applications.

All the usual Draw file formats - from Draw, DrawPlus, Vector, Poster, Chameleon and many other applications - are supported. All types of standard Draw objects, and the additional ones provided by Vector, are supported and displayed. There are some features that it is not possible to reproduce exactly, due to limitations in the library or the underlying platform, but the results obtained should be reasonably close to the original.

DrawView requires the Qt 4 libraries, available from www.trolltech.com or included in many Linux distributions. Qt/X11 is free for use and for open-source applications. It may in theory be possible to run DrawView under Windows or MacOS using the appropriate Qt package. Installation follows the standard GNU build/install system.

Best results for text display are obtained if a good selection of TrueType fonts are installed. The mapping between the original Acorn font names and available fonts is configurable.

The source download (with some example files) and further information is available from the home page:

**http://www.keelhaul.demon.co.uk/acorn/drawview/**

Further facilities and improvements are planned. Reasonable suggestions, bug or problem reports are welcome.

Jonathan Marten **http://www.keelhaul.demon.co.uk/**

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## The Omega USB Development Project

**Ian Karley is attempting to bring USB support toMicrodigital Omega users. He has have found a developer who is willing to do the work. Unfortunately it's going to be quite a costly project so he needs to get an accurate idea if enough people are interested. He will then beable to decide if the project has enough support to start development and also get a better idea of the eventual cost.**

**If you are interested in getting USB support for your Omega and haven't emailed him yet please send an email to.**

**u ... @iank.org.uk**

# BeebIt 0.59 released

BeebIt is a freeware BBC Micro computer emulator for RISC OS versions 3.00 and above. It emulates the Acorn BBC Model B, BBC Model B+ and BBC Master range of computers. BeebIt has been updated so that it will now run on Castle Technologies Iyonix computer.

The following improvements have been done since 0.58.

- When emulating a Master, the video routines can now read from FS RAM which allows the Level 9 graphics adventures to display correctly.
- Separated the code for the 6512 cpu emulation from the 6502 code.
- Made the memory read and write routines less generic, which helps speed up execution.
- Fixed reading and writing to shadow memory in B+ mode. This allows the Level 9 adventures to work in text mode.

You can get the latest version from

**<URL:http://homepages.paradise.net.nz/mjfoot/>**
under the BBC Emulator link.

# !meDDLe update

Version 2.00 of the freeware !meDDLe is now available at:

**<URL:http://www.rayfavre.me.uk/dwapps.html>**

!meDDLe is an application (authored using Dr Wimp, of course) which converts an OvationPro DDL document file into HTML. The main advantage of the DDL format is that it captures a complete Ovation/Impression document (with any pictures) and not just the text from a single 'story'.

Version 2.00 is a major enhancement in that the application now also automatically extracts pictures and converts them to HTML–friendly file–types.

Several other minor improvements have also been made.

Upgraded Manuals in Impression and OvationPro formats are also on the web–site – and the DDL version of the Manual is included in the application and can be used to demonstrate the process.

!meDDLe firstly extracts the Styles from the input DDL file and they are presented to the user so that a mapping to HTML codes can be chosen.

Subsequent processing automatically produces a complete suite of HTML pages with the text reflecting the chosen Style mappings plus 'embedded' pictures displayed in their correct places.

An optional Contents page lists links to each of the other pages. The user can also chose a Style to be used to generate additional named markers e.g. to mark sub–section headings – and these will appear as indented sub–links in the Contents page.

Each HTML page is also given helpful links to navigate backwards/forwards etc.

## !WordCalc – a utility for programmers.

!WordCalc is a calculator for calculating word, byte and bit values, converting between hexadecimal, decimal and binary to provide a quick and simple way of displaying word values for memory locations and registers etc.

It's laid out in a way that you can quickly see what values should go into which flag when a SWI call requires various parameters.

In addition to quickly displaying hex and binary values, you can do various operations on bits, bytes or complete words, such as reversing or EORing bits.

WordCalc is FREEWARE and v1.00 can be downloaded from

**<URL:http://www.vigay.com/software/>**

# New Geminus “feature”

Neil Spellings has announced that a new version of Geminus is now available for download and purchasing.

As previewed at the SouthWest show in February, Geminus can now accelerate JPEG rendering on all recent RISC OS hardware (RiscPC, IYONIX pc, A9 Home).

In addition to what we previewed in February, we have also added support for JPEG rotation – a feature that the native OS JPEG rendering has never supported.

We see this release as being of great benefit to users who work with images from digital cameras, as JPEG is the preferred format in this area. Because we intercept calls to the SpriteExtend JPEG plotting SWIs, this means that many applications can make immediate use of the acceleration without modification, and some even allow the use of rotated and transformed (eg. skewed) JPEG images. Just a few of the applications to benefit are: !Draw, !OpenVector, !OvationPro, and !ArtWorks2.

Full details:

* Decoding and rendering on the IYONIX is about 3 times faster than the RISC OS 5 SpriteExtend module. Other machines also exhibit faster rendering than the RISC OS 4/Select/Adjust SpriteExtend module but the difference is not as great because these versions already have faster JPEG decoding.)

*Decoding and rendering of JPEGs is now performed in USR mode so that audio playback and ShareFS network traffic, for example, will continue even when decoding and rendering large images. (This also allows the code to be Alt–Breaked in the event that an incorrect/corrupted file exposes a flaw in the decoder.)

*Greater robustness against incorrectly coded images. (RISC OS 5 SpriteExtend will often crash the machine if presented with spurious information.)

*A modified version of the 'djpeg' utility will be released as open source code allowing other applications to benefit from the faster JPEG decoding by calling the Geminus module.

*!OpenVector has been updated to allow rotated JPEGs. Geminus (JPEG acceleration & rotation) is available for all OSes and priced at 25UKP+vat.

As with all our software, a free time–limited demo version is also available for you to "try before you buy"

Existing Geminus (graphics acceleration) users may wish to download the free upgrade to 1 .3 to take advantage of a few minor bug–fixes made in that area.

To coincide with this release, new versions of our Open source conversions of OpenVector, DrawPlus and OpenGridPro have been released with support added for rotated JPEGs and other minor enhancements. These are available as a free upgrade for existing users or 10UKP+vat for new users.

The full releases notes for both products can be found on our website.**http://www.spellings.net/**

# Improved version of Bazound now available

'Bazound' is a small configuration and diagnostic utility for the RISC OS sound system. As well as the current value of configurable parameters (such as the sample rate) it shows the names and addresses of components registered with the SoundDMA module (such as the current 16 bit linear handler). It may be useful to programmers writing sound software, and in situations where programs have left the sound system in an indeterminate state.

I have just released version 0.23 (18 Feb 2006), which can be downloaded from my web space on Acorn Arcade:

**<URL:http://starfighter.acornarcade.com/mysite/utilities.htm#bazound>**

Improvements since last public release:

- The 'Sound system components' window is now updated automatically in real time rather than requiring manual refreshes. The background monitoring required for both this and the 'Sound status' window takes less than 1% of CPU time on my machine.
- Fixed an embarrassing bug where the values returned by SWI Sound_Mode were misinterpreted in such a way that the hardware type of machines with 16-bit sound was always reported as '16 bit linear, external clock (DAC clock is slave)'.
- The 'Sound status' window now displays an indication of whether oversampling is enabled or not, and oversampling is no longer momentarily disabled when populating the 'DMA handler' dialogue box.
- Added a 'Reinitialise' menu to allow different components of the sound system (or the whole) to be reset without recourse to the command line and *RMReInit. For the adventurous this offers a convenient way to restore default settings.
- Fixed backward linkage between two of the writable fields in the 'Sound DMA handler' dialogue box.
- Added limited interactive help messages.

'Bazound' was written using Joe Taylor's 'AppBasic', which simplifies the task of creating applications using only BASIC and the Toolbox. Full source code is included in one of the archives, which may be of interest to anyone considering 'AppBasic' for their own use.

# *GCCSDK GCC 3.4.5 Release 1 for RISC OS*

GCC is a free collection of compilers that provide the user with a powerful tool for translating C, C++ and Fortran source into fast ARM assembler that is suitable for execution on RISC OS.
GCCSDK is a portable build environment for creating ARM executables to be run natively on RISC OS. The build environment is designed to be hosted on an Unix–like system, such as GNU/Linux, FreeBSD or Windows (under Cygwin).
See <URL: **http://gccsdk.riscos.info/** > for download information.
This is first and probably only release of GCC 3.4.5 for RISC OS.
New features:
* Update to full GCC 3.4.5 release.
See**http://gcc.gnu.org/gcc–3.4/changes.html#3.4.5** for more information about this release.
* RISC OS modules can now be created in C++ too.
* cmunge: Upgraded to v0.72 which now contains GCCSDK support and several bugs fixes and enhancements. All details in !gcc.docs.CMunge.History. Many thanks to Justin Fletcher for his full support.
* Porting tools are now using the environment variables GCCSDK_INSTALL_ENV and GCCSDK_INSTALL_CROSSBIN to locate their files. This allows easy switching between multiple cross–compiler versions or installation at non–default directories.
* Included Andreas Dehmel's DRenderer v0.52 source & binary which recently became GPL licensed. Any future development of DRenderer can happen in the GCCSDK project.
Important bug fixes:
* Longstanding Fortran COMMON bug is fixed.
* Calling SharedCLibrary functions (–mlibscl option) having one or more float arguments resulted in wrong behaviour. This is now fixed.
* as: Under some circumstances, reserved AOF symbol attributes were set and this could be triggered too by GCC usage of 'as'. drlink: A warning is given when unsupported/reserved AOF symbol attributes are detected.
* UnixLib's regex implementation is now derived from the PostgreSQL codebase resulting in significantly faster timings.
* UnixLib got several bug fixes which improved its stability and its API compliance.
* The module SharedUnixLibrary got two important bug fixes resulting in version 1.09.
* Removed the old (26 bit only) rink version. Use the latest 26/32 bit neutral version at **http://www.compton.nu/rink.html** .
For the complete list of changes to GCC and Unixlib, please consult the documentation enclosed in the GCCSDK release.

# *PDF's viewable in GView*

GView is a front-end for GhostScript, a free PostScript interpreter, turning the latter into a desktop viewer for PostScript files. Up to now, GView could not be used to view PDF files even though GhostScript has been able to render PDF files for quite a while.

Version 1.50 of GView is now available, which handles PDF files as well. Just as with PostScript files, you can view individual pages, go forward and backward, jump to a specific page number and save individual pages or the complete document as sprite files.

There are other PDF viewers for RISC OS, so why would you want to use GhostScript/GView for PDF files? The answer is that in general, you would not do that because other viewers offer more features (e.g., bookmarks, links and Draw export) and operate much faster. There are, however, PDF files that no other RISC OS based viewer can handle. For instance, the text in some PDF files is displayed as random characters by !PDF and RiScript. GhostScript/GView displays such files without problems and is hence the only way to view them under RISC OS. In addition, GhostScript supports some advanced PDF features that the other viewers do not support, e.g., graduated fills.

You can download GView 1.50 from

**http://www.mw–software.com/software/gview/gview.html**

You can download a 32-bit safe GhostScript executable from

**http://www.mw–software.com/software/ghostscript/ghostscript.html**

Both GView and GhostScript run on all RISC OS platforms, including the Iyonix and the A9Home.

Please note: GView is FreeWare, so you are welcome to use it free of charge, but if you find the program useful, please donate a small amount of money to support its further development. You can find further information and online donation buttons on the GView web page.

## The first release of Moonfish is now available

Moonfish is an NFS server, which can be used to share files on local discs with other computers. It can communicate with other platforms that support NFS, such as Linux, or it be used to share files between RISC OS systems when used in conjunction with a client such as Sunfish.

Moonfish supports the NFS2 and NFS3 protocols, over both UDP and TCP connections. Full source code is supplied under the GPL.

A RiscPkg package for Moonfish is also available, see my site for more details.

**http://www.alexwaugh.com/networking/**

# Software from Paul Vigay

**ROTunes** is aRISC OS iTunes lookalike, and for those who have been living in a cave for the past couple of years, iTunes is Apple's comprehensive MP3 player and management system.

ROTunes will manage all your MP3s, allowing random play, multiple volume controls, CallerID support (automatically lowers the volume when the phone rings) and a whole host of other features to make your MP3 listening more pleasurable.

Version 0.08 is a comprehensive upgrade from previous versions with a whole

host of new features, bug fixes and cosmetic changes.

It now includes ID3 tag recognition and hence now stores genres and track times in addition to 'time last played' and user ratings.

In addition to ID3v1, it will also recognise a whole variety of ID3v2 tags, including the full range of WinAmp genres as well as Apple iTunes user-added genres.

It's undergone a comprehensive revamp internally, which is coupled with a new manual in HTML format.

Therefore, version 0.08 is now supplied with my new 'Universal Application Installer', which takes you step-by-step through the installation process - either to upgrade a previous version or to install a new version. (see Weblog at <URL:http://www.paulsdomain.co.uk> for ramblings on that....)

As usual, feedback and comments are welcome - as are any bugs (especially as so much has changed in this version, coupled with the new installer!).

**Misc Setup** is a plugin for the Iyonix universal !Boot configuration system and allows you to configure various options which aren't catered for in the standard RISC OS configuration options.

Although, I aim to develop this utility to provide access to any options people require, at present it provides the easy configuration of the following facilities:-

- Setting the default desktop font size
- Setting the default desktop font aspect ratio
- Setting the default Nextslot size
- the LMTransport protocol
- The option of whether or not to replace the boring Iyonix taskswitcher icon with a nice 'Acorn' one. :-)
- Patch the sound sample rate to 44.1KHz (New to v1.05!)

This version also re-designs the window template slightly.

MiscSetup v1.05 is available to download now, from
**http://www.vigay.com/software/**

**CloseFiles** is (yet another) utility for closing any open files which may have been left behind.

The advantage of this one over some of the existing closefile utilities is that !CloseFiles can optionally suppress common files such as fonts or system devices, thus giving a cleaner and simpler listing.

It's very simple and basic, just giving the file number, filename and a 'close' button. I wrote it to aid myself when programming, but thought I'd release it in case anyone else finds it useful.

!CloseFiles is FREEWARE and can be downloaded from my software page at **http://www.vigay.com/software/**

**Posty**, a minor update to (the email client within the old Argonet/Orpheus Voyager suite) as well as a new utility formanaging email addresses.

Posty v1.40 is available to download now, from **http://www.vigay.com/voyager/** and fixes a bug that could result in incorrect domain names being used with extra email addresses.

**VoyEmails**, is available from
**http://www.vigay.com/voyager/extraemails.html** which is a stand-alone utility for enabling and disabling 'extra email' addresses within Posty. Previously this needed to be done by Argonet, but since the closure last July, it's been difficult to enable/disable user accounts without manually creating and editing files within Voyager. This new utility makes it simple and you can just click a button to either enable a new address, or disable an old one.

**Task Setup** (a brand new plugin for the Iyonix/Universal !Boot sequence) gives you a simple way to control which applications are loaded or seen as part of the bootup sequence.

Three display panels show you what modules/files are installed in PreDesk, Tasks and Resources. Each has a 'disable' button so that you can temporarily disable various parts of the !Boot sequence, or re-enable them at a later date. An additional 'safety catch' will provide warning before you disable anything that can be potentially harmful to the bootup.

**http://www.riscos.org/cgi-bin/search?q=mo0046&c=modules&d=x**

# MUGs Away – new RISCOS user group formed

The inaugural meeting of MUGs the Midlands User Group (RISCOS)was held last Saturday 4th February at the home of one of the founder members, Robin Edwards, located a little South of the M42.

The group started following a call for interest in the pages of the ARM Club magazine by Ralph Sillett, who was not able to attend the first meeting.

This inaugural meeting was informal and included a demonstration of an A9home machine. This nearly came to grief when a screen mode was chosen which the A9home didn't like. Fortunately, an F12 and a spot of blind typing of Wimpmode 21 restored the screen.

There was a lively discussion of how to run a router off the back of a dial-up modem and a discussion of USB device support comparing Iyonix with A9Home.

Ways of publicising the group were discussed and agreed and and various founder members were charged with contacting Archive, CSA.Announce, Qercus and Drobe. We also agreed to look for a hall to hold a bigger meeting later in the year.

The group agreed to meet again on the 1st April at the same venue. It looks likely that this will be the area chosen for most meetings as it is the geographical centre for the current members. The spread of members is 70 miles North - South.

A webpage with further information and contact details will be appearing shortly.

It is hoped that more RISC OS enthusiasts will be able to join despite the very dispersed nature of potential members.

## New DrawToSprite released

A new version, 1.05, of the increasingly inappropriately named DrawToSprite has just been released and is available at **http://www.sinenomine.freeserve.co.uk/software/**

This version has the ability to output GIF files. On the whole it is recommended InterGIF for this, as InterGIF can optimise the palette selection to produce very good coloured GIFs. However InterGIF can run out of memory when outputting large GIFs on 26–bit versions of RISC OS and besides sometimes renders Draw files incorrectly. DrawToSprite can output files which are too large to fit in memory, so does not suffer these restrictions, and is ideal for producing output in black and white or greyscale for high definition printing.

## *7th software announce the release of MoreDesk,*

Moredesk is a powerful virtual desktop manager for RISC OS.

MoreDesk allows you to organise your windows on over a space which is larger than the normal desktop. It does this by creating a grid of desktop spaces and by allowing you to select which of these is the one you are currently looking at.

You can easily move windows between desktops and get a view of the entire desktop space. You can even have different sets of pinboard icons and a different backdrop image for each of the desktops.

MoreDesk costs just GBP 14.99 and can be purchased on-line or by sending an order form to 7th software.

For more information, including screenshots, a free demonstration version, user guide and even some comparisons with other virtual desktop programs available for the platform.

**http://www.7thsoftware.com/moredesk/**

# *RISC OS Summer Roadshow 2006 going Dutch*

**It has been reported that the previous organisers of the Dutch Risc OS Expo are unable to organise the usual June show this year, so we have taken the decision to arrange an event on the same basis as the RISC OS Christmas Roadshow 2005.**

**The RISC OS Summer Roadshow 2006 will be going Dutch to the Hotel Mercure in Nieuwegein on Saturday 17th June 2006 from 10:00 – 17:00. Anyone wishing to exhibit should contact me as soon as possible.**

**The prices for exhibitors will be kept to the same level as the RISC OS Christmas Roadshow.**

**There is space for approximately 40 tables at the venue and we hope that the usual British and local companies will attend.**

# *A new version of Webtotals is released*

*Version 3.02 has been completely rewritten and now runs natively on Iyonix (Previous versions needed Aemulor). Webtotals is a small application to keep track of visitors to your websites.*
*With the release of the new version support for the old version will cease on 31/3/06.*
*The software can be obtained from*
**http://www.jpeachey.co.uk/computing/software/download**

# *Textseek*

Textseek is a fast file search program which will locate and display text in context using the throwback mechanism. It can search files of any type (including tokenised BASIC) or a user-defined list of types, e.g. Obey,Basic,Data while checking for occurrences of a given system variable within an application directory.

It is a quick and easy way of locating words and phrases on your computer's hard disc. :-)

Version 1.44 has a bug-fix to the detokenisation routines (which could,

in exceptional circumstances, result in displayed lines being truncated at the start) and uses an updated version of the DrWimp library in order to ensure compatibility with the new A9 computer.

It also now supports Adam Richardson's HelpScan and detokenises files of type Basic26, as used by Aemulor.Textseek v1.44 is available for download from

**http://starfighter.acornarcade.com/mysite/utilities.htm#textseek**

## Bubble Train game

**http://alanb.drobe.co.uk/bubbletrain**

***A train of coloured bubbles goes along a track and you have a cannon which allows you to fire more bubbles on to it. When there are 3 or more carriages of the same colour they explode and the train shrinks.***

***Full details of the game can be seen at the originals website:***

**http://dwarfcity.co.uk/games/bubbletrain.php**

***It's only been tried on an Iyonix.***

## Rune Seeker re-released as freeware!

Now converted it to 32–bit, as it made extensive use of pre–Iyonix colour graphics, screen modes and sound sample modules.

A few improvements have been made to the original.

Rune Seeker is a traditional graphical arcade adventure game, where you have to solve devious puzzles and explore a maze in order to collect all the coins that have been dropped. There are 12 levels of increasing deviousness, including bombs, lawn mowers(!) and a cuddly(?) yeti inhabiting later levels.

Version 1.08 is available to download now from

**http://www.vigay.com/software/**

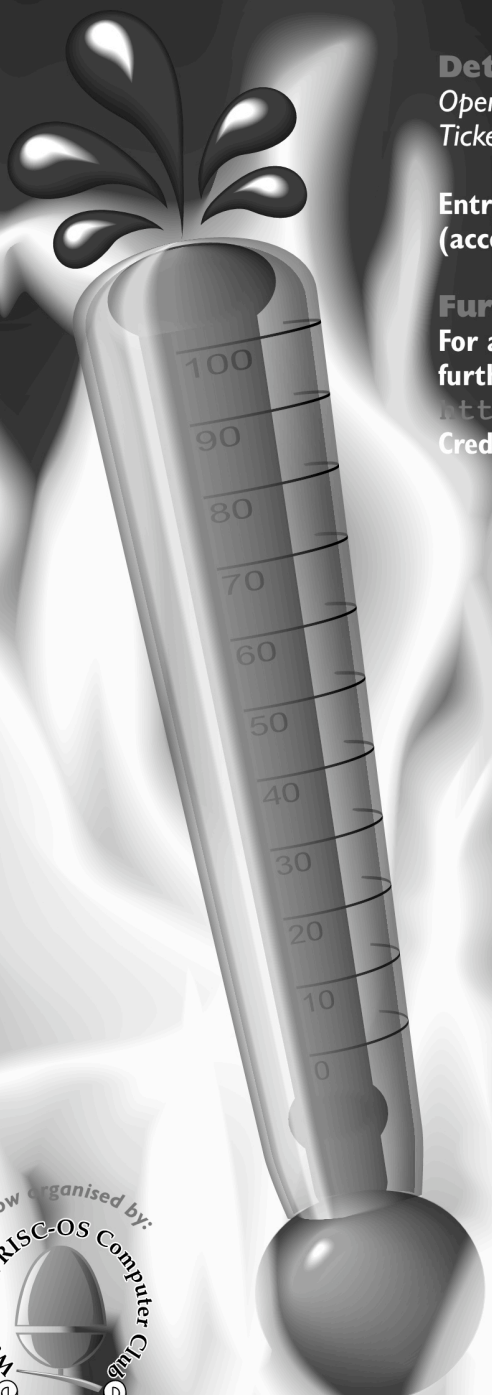
RISC OS Computer Show

# Wakefield '06

Saturday, 13th May 2006

## Thornes Park Athletics Stadium
## Horbury Road, Wakefield
## West Yorkshire WF2 8TY

## Come and see what's COOKING at the premier RISC OS show




### Details and prices

*Opening time* 10:00am to 5:00pm

*Ticket price* In advance: £5
At the door: £6

Entry for children aged 5 or under (accompanied by an adult) is FREE

### Advance tickets

For advance tickets, send cheques or postal orders to:

*Wakefield Show 2006,*
*3 Riverdale Avenue, Stanley,*
*Wakefield, West Yorks WF3 4LF*

Cheques/postal orders should be made payable to: WROCC Show

### Further information

For advance ticket orders and further details, visit the Wakefield Show Web site:
http://www.wakefieldshow.org.uk/
Credit card ordering and advance tickets available online from April 2006

### Attractions

- Small Developer Community Area
- Show theatre
- Charity stall
- Free car parking
- On-site catering
- AA signs to event
- Disabled access

(Charity stall fund-raising for Wakefield Hospice)

Show organised by: Wakefield RISC-OS Computer Club Formed 1983

Sponsors: Advantage Six Ltd, APDL, MW Software, VIRTUAL ACORN, Spellings Computer Services

It's Hot Up North!

Designed by Richard G. Hallas • Richard@Hallas.net • +44 (0)1484 460280 • Created with ArtWorks 2 on an IYONIX pc

# RSS to HTML with PHP

**Kevin Wells**

Many web sites have a rss feed of their news headlines and with that you can add it to your web site to create up to date news and headlines, so that when that site news gets updated so does your site. Many news based web sites use rss feeds and with RISC OS you can view the feeds direct with the likes of Ticker or with Hermes from Rcomp. The BBC site has many news feed; some are specialised feeds e.g sports, technology, entertainment, politics, news etc, but in this article we will be concentrating on Drobe, The Iconbar and Filebase.

You can see this in action over at the Invicta RISC OS Users Group news page at http://irug.kevsoft.co.uk/news.php

First of all you will need a text editor, a web browser and Webjames with php support, you can download Webjames from http://www.cp15.org/webjames/. After you have downloaded Webjames and unpacked it, create a directory and for this exercise we will call it Temp.

I always keep an unaltered copy of Webjames and every time I create a php site I copy the master copy of Webjames into that directory so for this exercise you would have saved the unarchived copy of webjames some where on your hard disc.

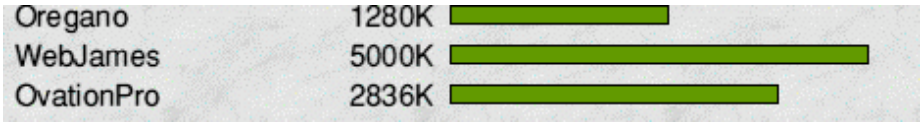



*fig. 1 Webjames registered with the task manager.*

Copy Webjames from your hard disc into temp, then create a directory called Site.

Double click on Webjames; after a bit of disc activity it will appear if nothing had happened but Webjames does not leave anything on the iconbar, so go to the Task manager and look under Applications and you will see an entry called

WebJames with some memory allocated to it, see *fig 1*.

The next step is to create a php file; for this exercise I will be using StrongED, but you could just as easy use Zap or edit. On the StrongED iconbar press the middle mouse button, then slide over the Create option, then slide over the Extra modes option, then click on PHP, you then open up a blank StrongED window with the php modes.

```
<?xml version="1.0" encoding="UTF-8" ?><rss version="2.0">
<channel>
<title>Drobe Launchpad News</title>
<link>http://www.drobe.co.uk/</link>
<description>Latest RISC OS news and information</description>
<image>
 <title>Drobe Rocket</title>
 <url>http://www.drobe.co.uk/images/rss.png</url>
 <link>http://www.drobe.co.uk/</link>
</image>
<item>
<title>Speak open sourced</title>
<description>Ported to Linux, dances with KDE</description>
<pubDate>Tue, 28 Mar 2006 20:42:43 GMT</pubDate>
<author>chris@drobe.co.uk</author>
<link>http://www.drobe.co.uk/riscos/artifact1569.html</link>
</item>
```

*fig. 2 the Drobe rss feed seen inside a StrongED window*

Save this file as index/php inside the directory called Site. With php you can include normal html codes with php codes but to call the php codes you must let the server know and to do that you put <?php before the codes and at the end of the codes you put ?>.

So on the first line we will put <?php in the file index/php . We will then need to get the first rss feed which in this case would be from Drobe, which you will find at http://www.drobe.co.uk/rss.php

As you can see by *fig. 2* the rss commands are not the same as the html commands or those that are the same mean different things, e.g <title> in html is what gets put on the top of your browser window but in rss it is the title of the article.

What we now need to do is to get the drobe rss feed into an array and to do this we use this command on the 2nd line $story = file('http://www.drobe.co.uk/rss.php').

We now need to swap over the rss commands to html commands so what we do is first get the rss commands that we want to get replace, which would be on the next line:


*fig. 3 the rss commands we want to swap*

```
$rss = array(
'<title>',
'</title>',
<description>',
'</description>',
'<pubDate>',
'</pubDate>',
'<author>',
'</author>',
'<link>',
'</link>',
'<item>',
'</item>',
'</channel>',
'</rss>');
```

Then we list the html that is replacing the rss commands and they must be in the order of the rss commands that you are replacing it with, e.g the first rss command listed would be replaced by the first html command listed and so on. After the last line give a couple of blank lines .

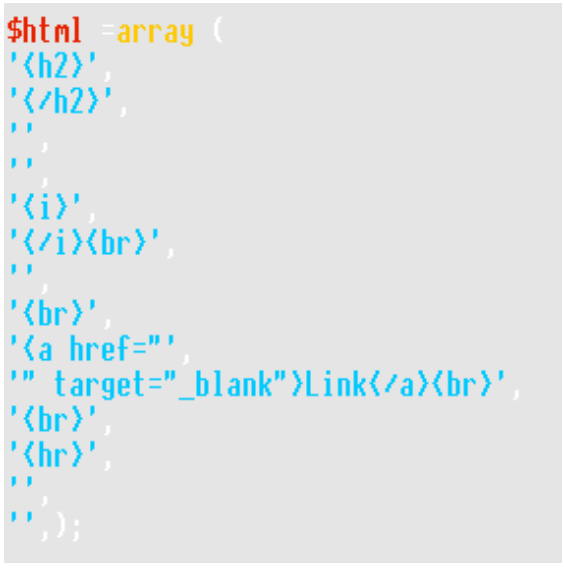



*fig. 4 html commands we want to swap*

```
 $html =array (
'<h2>',
'</h2>',
'',
'',
'<i>',
'</i><br>',
'',
'<br>',
'<a href="',
'"
target="_blank">Link
</a><br>',
```

‘<br>’,
‘<hr>’,
‘’
‘’,
‘’,);

We now tell the computer to swap the rss commands to html commands with the following command:

*fig 5 swapping the rss to html and outputting it.*

```
$newstory = str_replace($rss, $html, $story);

$loop = count($story);
for ($i = 11; $i <=$loop; $i++) {
      echo $newstory[($i)];
      }
?>
```

If you are wondering why $i=11 in the loop it is because we do not need the lines above it so we ignore them.


*fig. 6 the output of the rss news feed converted into html*

Save the file as index/php inside the directory called Site, then in your browser url bar type in localhost and hit the return key. You then should get the latest news from Drobe in your browser, which will look like *fig 6*.

If you then click on the view source you will see that all the rss commands have been converted to html.

```
<?php
$story = file('http://www.drobe.co.uk/rss.php');
$rss =array(
'<title>',
'</title>',
'<description>',
'</description>',
'<pubDate>',
'</pubDate>',
'<author>',
'</author>',
'<link>',
'</link>',
'<item>',
'</item>',
'</channel>',
'</rss>');

$html =array (
'<h2>',
'</h2>',
'',
'',
'<i>',
'</i><br>',
'',
'<br>',
'<a href="',
'" target="_blank">Link</a><br>',
'<br>',
'<hr>',
'',
'',);

$newstory = str_replace($rss, $html, $story);

$loop = count($story);
for ($i = 11; $i <=$loop; $i++) {
    echo $newstory[($i)];
    }
    ?>
```

*fig. 7 the complete code for Drobe.*

As you can see from *fig 7*, there is not a lot of code there.

You would place this code inside your html where you want the news to appear, so before the <?php you could have something like this:

<h1>My RISC OS News page</h1>

<h1><a href="http://www.drobe.co.uk/" target="_blank">News from drobe</h1> <br>

You would of course need all the normal head and body commands at the beginning and the closing commands at the end of the html.

The contents of $rss = array( ); and of $html =array(); could all be on same line, it is just easier with each word you want to swap on a line of it's own but they must have a ' at the beginning of the word and a ' at the end of the word or command you are swapping and a comma in between.

We now will do one for the iconbar feed which is different to the drobe feed, but we will have the iconbar feed next to the Drobe feed, by using tables so before the start of the Drobe information we will add this
<table width="100%" border="1" cellspacing="2">
<tr>
<td valgn="top">

And after the Drobe code we will do the following
</td>

<td valign=”top”>

If you wish to add anything before the feed do so between this and the start of the conversion process. We are ready now to start the iconbar feed conversion. So like we did with the Drobe conversion we have to go into php by issuing the following:

<php
$story = file(‘http://www.iconbar.com/cgi-bin/iconbar.rss’);

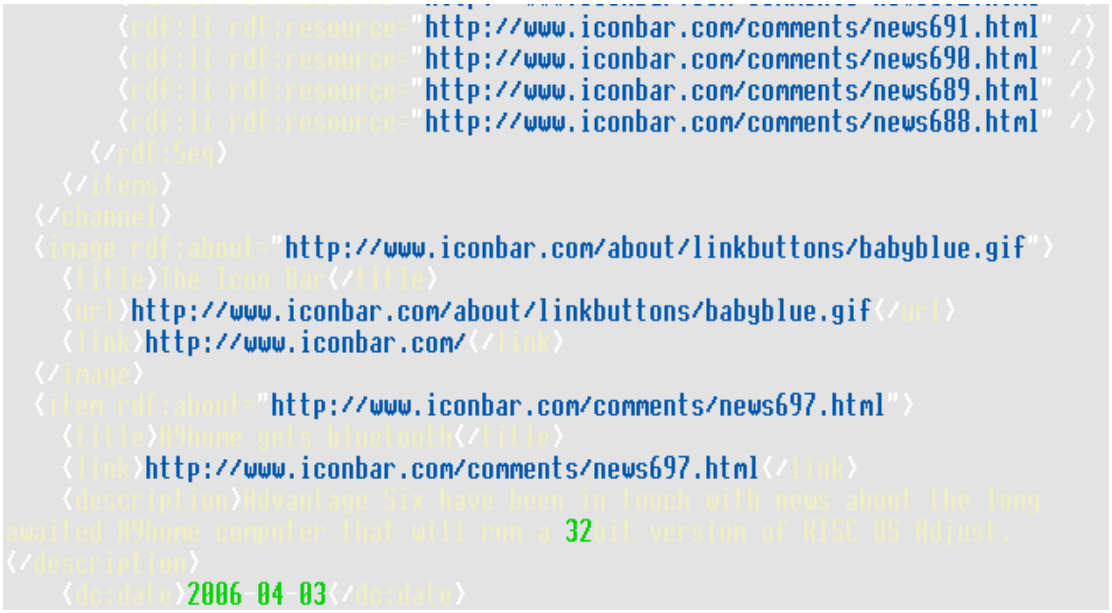



*fig. 8 the iconbar rss feed*

We are now ready to for the conversion process and swap the rss commands to html commands, but as both use different rss commands to each other we need to modify the drobe code for the iconbar.

As you can see by *fig. 8* for the iconbar rss feed, the differences in some cases are very small but in others their is a great deal of difference. One difference is that on the iconbar the link comes before the description but with Drobe it is the other way round, so with the iconbar feed we can have the description as the link.

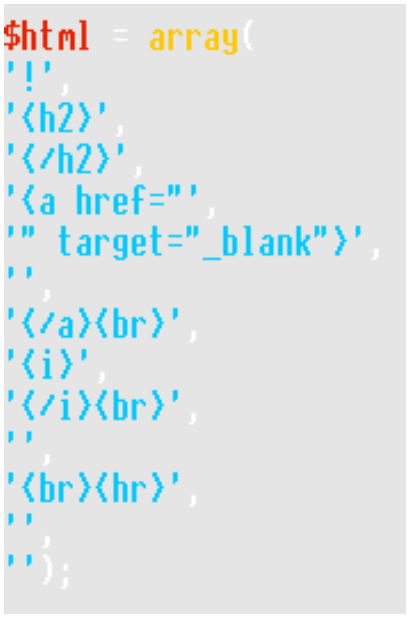
We start the conversion process with the same two arrays so for the rss we use the following:

*fig. 9 iconbar rss commands*

```
$rss = array(
'item rdf:about',
'<title>',
'</title>',
'<link>',
'</link>',
'<description>',
'</description>',
'<dc:date>',
'</dc:date>',
'<dc:author>',
'</dc:author>',
'</item>',
'</rdf:RDF>');
```

We would now get the html commands we are using to replace the rss commands using the following:

*fig. 10 iconbar html commands*



```
$html = array(
'!',
'<h2>',
'</h2>',
'<a href="',
'" target="_blank">',
'',
'</a><br>',
'<i>',
'</i><br>',
'',
'<br><hr>',
'',
'');
```

We would then start the swapping process as we did the drobe one with the following code.

```
$newstory = str_replace($rss, $html, $story);

$loop = count($story);
for ($i = 29; $i <=$loop; $i++) {
   echo $newstory[($i)];
   }
   ?>
```

We would then close the table off with </td></tr></table> re save the file and type localhost in the browser's url bar and with any luck you should have both the Drobe and iconbar news feed on your page.

```
$newstory = str_replace($rss, $html, $story);

$loop = count($story);
for ($i = 29; $i <$loop; $i++) {
    echo $newstory[($i)];
    }
    ?>
```

*fig. 11 swapping the rss to html with the iconbar*


*fig. 12 output with both 7th April 2006 Drobe and Iconbar feeds*

As you can see from *fig. 13* the iconbar conversion code is not very big either and it has some slight changes over the drobe code

This time we started the conversion on line 29 of the iconbar rss feed as we did not need the earlier part of the feed so we just skipped them.

The feed for the filebase uses the same commands as does the iconbar, the feed for filebase is :

**http://www.filebase.org.uk/new.rss** for new software and

**http://www.filebase.org.uk/updated.rss** for updated software

```
<?php
$story = file('http://www.iconbar.com/cgi-bin/iconbar.rss');

$rss = array(
'item rdf:about',
'<title>',
'</title>',
'<link>',
'</link>',
'<description>',
'</description>',
'<dc:date>',
'</dc:date>',
'<dc:author>',
'</dc:author>',
'</item>',
'</rdf:RDF>');

$html = array(
'!',
'<h2>',
'</h2>',
'<a href="',
'" target="_blank">',
'',
'</a><br>',
'<i>',
'</i><br>',
'',
'<br><hr>',
'',
'');

$newstory = str_replace($rss, $html, $story);

$loop = count($story);
for ($i = 29; $i <$loop; $i++) {
    echo $newstory[($i)];
    }
    ?>
```

*fig 13*

*The complete code for iconbar conversion*

So to get them to work just use the same code as you did for the iconbar but change $story =file(''); to point to the filebase feed you want. Good luck and I hope you find this useful.

# RISC OS SW Show 2006

**Andrew Wyver**

I set off quite early to do the 200 mile trip to the Webbington Hotel in Somerset in time to make it for the 10 o' clock start to the RISC OS South West Show.

From the word go the show appeared to be quite busy with a steady stream of people coming through the doors all day. My first stop was the Arm Club stand manned by Matt (who had brought dozens of used hard drives to sell) and Ralph.

I wandered over to Paul Beverly of Archive magazine and had a look at his new booklets he is selling for £5 each. Each booklet covers one topic, bringing together all recent Archive articles dealing with it. I ended up buying one on Networking and one on Ovation Pro. Much easier to read on the loo than


***Matt and Ralph on The Arm Club stand***


*The Castle stand*

carting the laptop in with me.

There were four theatre presentations during the day, Castle, Qercus, Risc OS ltd and Artworks. Jack Lillingston of Castle gave his machine talk much the same as at the last RISC OS show but adding that 'build your own Iyonix's' were again available and that there was a new beta release of C tools giving faster speed, instruction sequencer optimisation and numerous c99 extensions. *Continued on page 35*


***The right hand side of the hall as you go in showing the Qercus stand on the left***

The colour of magic!


Matt makes a sale

Old Acorns

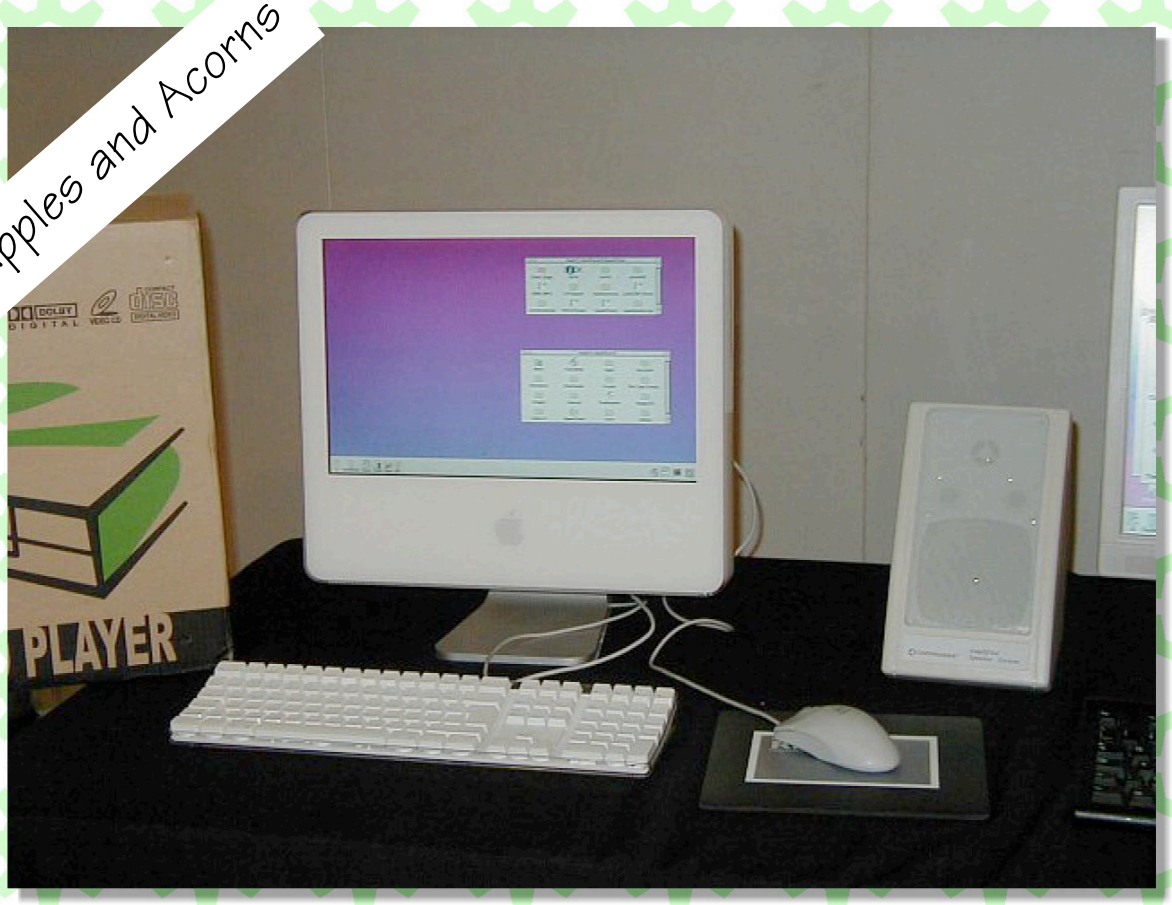
It makes a good desk light

What's inside?

The Castle stand

Apples and girls


Apples and Acorns




Photos by the Editor


***Bell ringing in the home for RISC OS***

Artworks now updates graduated fills on the fly. Paul Middleton is doing a fund raising share issue to fund RISC OS 4 development. The next issue of Qercus still promised to arrive soon *(its now April and it has still not arrived! Ed.)*. And the A9 Home still on it's way. I should have spent more time in the hall but then again I might have spent more money!

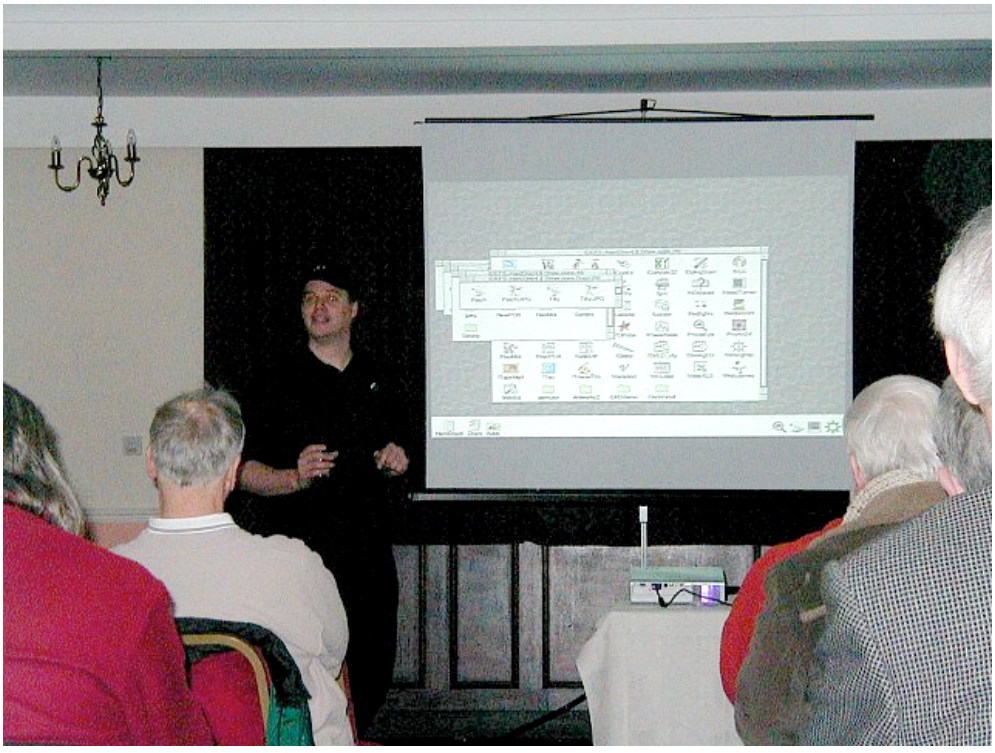
Neil Spellings was demonstrating Geminus's new JPEG acceleration. John Norris his bell ringing apparatus and


***Playing at trains with RISC OS***

*Jack Lillingston showing his machines*

David Snell had linked an Epson projector to his Iyonix and was showing pictures of his table top model railway.

So not much new to report. I managed to spend a bit of money, had a good chat to a few people, the Arm Club gained a few more members and at 4pm I left for the long drive home.



*Matt Edgar showing his machine*

# The Ron Briscoe Column

Well here I am again with more tales from the Briscoe dwelling. People of a sensitive nature or with taste may wish to quickly turn the page now.

Having reached the age of Sixty I have been rewarded with a free senior citizens pass enabling me to travel all over the West Midlands by train, bus and tram. Practising my quick draw and display has so far resulted in twice throwing my pass over my shoulder and having to get back off the bus to retrieve it from the gutter. It has also given rise to many comments along the lines of. "Isn't it about time you updated the user photo?" And "I thought that people like you had to have a number printed on your picture."

Not to be outdone Christine now has a 'Travel Card' to accentuate the fact that; (a) she is much younger than me and therefore needs to pay, (b) she travels about a lot. By a strange coincidence we had our photo's taken by the same person, but whilst she looks her normal attractive self, I look absolutely thuggish. No wonder I am mistaken for an escaped convict.

Reaching Sixty has also resulted in my 'Phased Retirement Plan' being put into action. This consists of reducing my paid work load from its admittedly low amount, to zero. To be achieved, of course, by dint of many cunning plans and subterfuges.

Christine and I travelled down to the South West, she to visit Bristol zoo and I to continue on to Weston-Super-Mare and thence to the show. Having seen Christine safely on the bus to the zoo, I purchase a return ticket to

Weston and then am gobsmacked to find out that I will have to go by road not rail. Not only that but I have missed one coach and there is not another for an hour.

Eventually reaching Weston station I excite my heart by dashing over to and onto the mini bus for the show venue. Surviving the unaccustomed exercise I ascertain from the driver, himself from the Midlands, that the last trip back is approximately timed for one-thirty and I realize that I will need to move sharpish if I am to empty my wallet in exchange for RISC OS goodies.

Having done a couple of quick purchase circuits and exchanged cash for goods at various points I am about to pass the time of day with various people when the hall magically empties. I sniff my armpits. No it is not me, almost everyone has beetled off to watch Martin Weurthner put the excellent Artworks through its paces. Having refused many kind offers of lifts back to Birmingham, thinking that as much as Christine likes Bristol she would not take kindly to being stranded there, I catch the last trip to Weston. The mini bus driver even waited for me to finish saying my goodbyes.

The day's adventures are not over however for upon boarding the return coach from Weston to Bristol I spot that the coach driver has pimples and a pony tail. This fills me for some unknown reason with foreboding. My uneasiness turns out to be well founded as the driver has never driven this route and is relying on a map placed on his lap. He also drives with a continual verbal commentary, like. "Come on girlie! That's a motor you've got there, not a pushchair!" I buckle my safety belt up and resign myself into the care of the gods of the mentally defective. They come through as usual and we eventually reach Bristol Temple Meads station and as I am early I wonder off to buy some much needed nerve restorer.

We outcasts in the West Midlands have formed our own group, the 'Midland Users Group' and I notice quite a few well known names amongst the membership. By the time you read this, Editor willing, the group should have elected its officers and agreed on a regular meeting place.

Special thanks should be given to Robin Edwards of Serious Statistical Software fame for allowing the group to meet in his house whilst we find a suitable venue and to Kris Adcock for setting up a mailing list on his server. Not forgetting Ralph Sillett, John Rickman and others for their already stirling efforts in getting the group up and running.

Remember the chair? You know the one that I broke and had to replace at great personal time and cost. Well the replacement itself has now got to be replaced. Indeed as I type the order for the new chair is being processed and yet again my bank account is going to be feeling the loss.

I am sitting quietly, idly wondering whether my 'Senior Citizen' pass will entitle me to any free brown pop at my local when my thoughts are rudely broken by Christine saying insistently. "The fabric on my chair has frayed and is splitting and it must be your fault." "Why my fault?" I ask, still in a reverie of free brown pop. "Because there is only one fat lump in this house and it isn't me." came the tart rejoinder. "Besides you know that I never really liked that chair." she continues. Now being a married man of long standing I know the rules and keep quiet on the matter, only agreeing to the purchase of the new chair.

The new chair is going to be a red leather chair and I only hope that it does not turn out to be one of those that make strange noises whilst Christine makes herself comfortable in it. If it does then I can see yet more visits to furniture stores awaiting me. As an aside. why in the new hi-tech age does it seem to take so much longer to make things? Twelve weeks to make and deliver one chair. In the Nineteen Sixties Birmingham City council used to throw up a twelve storey block of flats in that time. Probably that is the reason that they are now demolishing them all.

You should be reading this article just prior to the Wakefield show. Be warned I shall be going there.

# Aviation Spreadsheets

David J. Ruck

Starting in April 2005, I finally got round to realising one of my ambitions, which is to learn to fly. I've lived within two miles of the local airfield since I was a child, and always wondered what all the planes were doing constantly flying around, and what everything looked like from up there. Its proved to be well worth the wait, flying a light aircraft is a great experience, and a wonderful way to gain a different perspective of the world around you. Flying over familiar places at a few thousand feet and 90kts is much better than the brief glimpses of ground and during take off an landing in a passenger jet.

As well as being taught to physically control the plane, there is

a lot of mental learning required to pass the private pilots licence (PPL). After years of doing roughly the same thing at work, learning new skills and subjects has proved to be a welcome challenge. The PPL course covers many interesting areas such as the technical operation of planes, performance of the human body, navigation and meteorology, which has given a whole new perspective to looking up at clouds in the sky! This is countered by the drier subject of Aviation Law, but luckily that exam is tackled early on in the course, so you can then concentrate on the more interesting stuff.

The initial lessons cover basic handling of the aircraft in manoeuvres such as climbing and turning. Then you move on to circuit work, repeatedly practising taking offs and landings, flying in a square pattern around the airfield, performing normal landings with flaps, faster ones without flaps, slow gliding approaches, and more challenging situations where the wind is blowing across the runway. This builds up to your first and unrepeatable experience of solo flight, giving you the exhilaration – and fear – of being in charge of an aircraft yourself with no one to make sure you are doing it right. Apart from turning from a quiet afternoon into seemingly an aerial traffic jam as soon as I went up on my own, my first solo back in August was over all too quickly and very smoothly.


*fig. 1*

*The aviation map*

In parallel with the lessons in the air, you start learning the academic side and taking the exams. The air and ground lessons then come together as you finish circuit work and move to further away from the airfield again, to start to concentrate on navigation. The first thing to learn is how to relate features on an aviation map (*fig. 1*) (which seems to have 10x as much information on it as a road map) to features on the ground, such as towns, hills, roads, rivers and railways. Its amazing how much green countryside there is down there, and how one small town looks like another from the air without the benefit of road signs – the fixed wing pilots can't just nip down for a look like the rotary flyers! You then move on to pre-flight planning, deciding your route, calculating your speeds, headings, timings, and fuels, looking up frequencies of airfields and controllers you'll need to talk to on the way, checking all the aircraft advisory notices, and details of any royal or Red Arrows flights in the area. Its not a quick process, you can spend as much time doing this before a private flight as you do hanging around at an airport check in and departure for a commercial trip.

Like the flying school planes themselves which are pretty old designs (the technology in the Cessna 152 I fly dates back to the fifties, with a carburettor and manual everything), the method of calculating your flight plan is pretty old fashioned too, involving maps and circular aeronautical slide rules, known as whiz wheels. Although you can get aviation sat nav units just like car ones, you have to know how to work it out yourself for the PPL. The first step is to draw your route on the map, often you can't just draw a straight line from A to B due to restrictions such as controlled airspace around an airfield, so there may be a number of straight lines, called legs. You measure each leg's distance and angle from true north (the track) and put these on to your flight plan. Next you examine the map 10nm in each side of your lines looking for the highest points, not just high ground but also tall masts and other structures. You add 1000ft on for safety (1500ft for sustained high ground or over large populated areas) to give the minimum planned altitude, which means if the cloud base is close to or below this you can't fly the route. In practice you normally chose to fly higher than the minimum, as it gives you a better view of the ground making spotting navigation features easier.

When flying on anything other than a dead calm day you can't

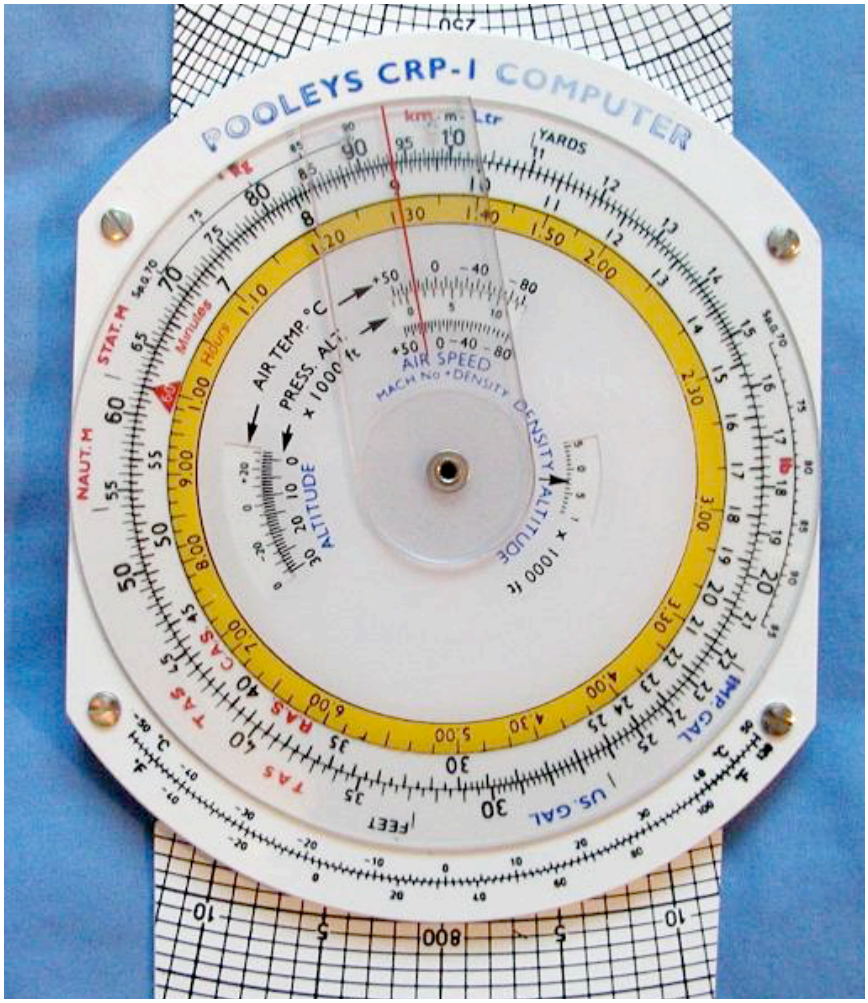



*fig. 2*

*The air speed calculator slide rule*

just point the aircraft along a track and hope to reach your destination, as the wind will blow you off course. Instead you have to take this into account, and point the aircraft into the wind by a certain amount (the heading). Its the same as if you want to row a boat straight across the river, you have to aim upstream in order to not get washed down with the current. The amount of wind correction can be calculated mathematically, which is where the slide rule comes in. *(fig. 2)* The first step is to use the calculator side to work out how fast you are travelling through the air (the true airspeed), as although the plane has an air speed indicator, its reading depends on how dense the air is. This varies with atmospheric pressure at the flying altitude, and the temperature of the air. Luckily the Met Offices aviation briefing service, available online (which is the one modern part of this process) gives the wind direction, speed and temperature at a range of altitudes at various points across the country. You rotate the dial of the calculator side of the whiz wheel, so the temperature is over the altitude in a little window in the centre of the dial, and then read off the value on the outside scale, corresponding to your indicated airspeed on the inside scale. So

if you want to fly at 3000ft with an air temperature of 1°C (its chilly up there), and your plane cruises at 90kts, your true air speed will be 93kts (107mph). Now you know how fast you are going relative to the wind, you can use the wind side of the whiz wheel to calculate the heading angle needed to achieve a particular track angle. First you move the dial round to the wind direction, and put a mark on the transparent window corresponding to the wind speed up from the centre dot using the scale on the sliding card behind. You then rotate the dial round to the track, and slide the card up or down so your mark is on the line of your true air speed. The distance your mark is to the left or right of the centre is the amount to subtract or add to the track to give the heading. The position of the centre dot gives the ground speed you will be achieving, less than the true airspeed if there is a head wind, more if you are lucky enough to get a tail wind.

For example with a wind of 30kts from 073° marked on the window, rotating to a track of 023° and sliding the card so the mark is between the 92 and 94 curved horizontal lines for 93kts, its then 7° to the left of the vertical centre line indicating a heading of 016° is required. The centre dot is on 106kts indicating a tail wind. *(fig. 3)*

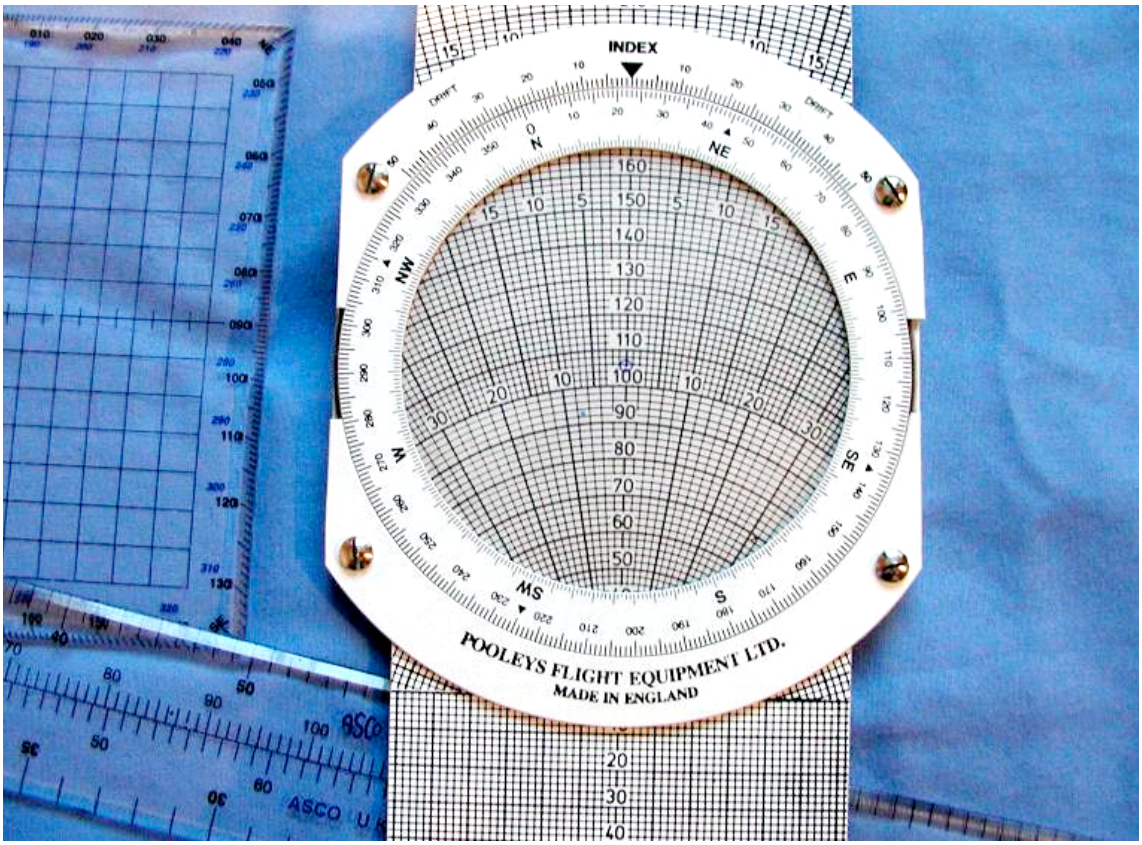



*fig. 3*

*Showing the wind direction and speed*

You can then transfer the heading and ground speed values to your flight log, but there is one more thing to do with the heading, before you can use it. Maps are always aligned with the true north pole of the earth, however the plane navigates using a compass that points at the magnetic north pole, which isn't in the same place (and is moving slowly every year). Depending on where you are in the world, there is a significant variation between true and magnetic north, which is shown on aviation maps as dashed blue isogonal lines. In western England its 3 to 4 degrees west, so this must be added to the true heading to get the value to steer the plane to on the compass. Knowing the ground speed and the distances of the legs then allows you to calculate how long it will take to get there. Turning back to the calculator side of the whiz wheel the time can be calculated by putting the 60 mark on the inner scale against the speed on the outer scale, then the distance on the outer scale will read against the time in minutes on the inner scale. The slide rule divides the distance in nautical miles by the speed in nautical miles per hour (kts), then multiplies by 60 to get minutes, but you have to have a rough idea of the result, as slide rules only work out the digits and not where the decimal point or extra zeros go. So you need to know if the correct answer is 0.5 minutes, 5 minutes or 50 minutes. Once the time for each leg is known you can compete the last column of the flight log which is the amount of fuel which is required, plus additional allowances for delays. Unlike in a car where you may not worry about running it down to almost dry, that isn't good in a plane which can't just pop in to the nearest filling station. Again using the calculator side of the whiz wheel to this time multiply the rate by the time, the 60 mark of the lower scale is placed against the fuel consumption, (normally in litres per hour these days, rather than Imperial or US gallons, as that's what airfield pumps read in), then for the time on the inner scale the fuel required is on the outer scale – being even more careful to get the magnitude right.

So you are probably thinking by now, couldn't a computer work all that out a lot easier? I certainly did, and although I still have to use the whiz wheel, I wanted to be able to cross check my results for any silly mistakes using the wheel such as reading from the upper when it should be the lower scale, although for me most likely during seemingly simple mental arithmetic such as subtracting wind correction and adding magnetic variations.

I decided a spreadsheet matched the layout of a paper flight log quite closely, and also should have enough arithmetic and trigonometry functions to be able to do the calculations. My Iyonix was supplied with FireWorkZ, so I decided to use that, and produced the basic layout of rows for each leg and columns for the various speeds, directions, distances and times. The next step was to work out the formulas, so straight on to the internet to have a google around. I quite quickly turned up a page on aviation mathematical theory which had the formulas to convert indicated airspeed to true airspeed given a density altitude, which was in turn calculated from a pressure altitude and air temperature.

T.A.S = True Air Speed
C.A.S = Calibrated Air Speed
P.Alt = Pressure Altitude
D.Alt = Density Altitude
T = Temperature

$$Tr = 0.0019812$$

$$Ts = 15 - Tr \times P.Alt + 273.15$$

$$D.Alt = P.Alt + \frac{Ts}{Tr} \times \left(1 - \left(\frac{Ts}{T}\right)^{0.2349690}\right)$$

$$T.A.S = \frac{C.A.S}{(1 - 6.8755856e^{-6} \times D.Alt)^{2.127940}}$$

As you can see its quite complicated and certainly makes you realise that while a slide rule may seem primitive, it can do quite powerful calculations just by using a graduated series of lines. It looks even more complicated when fully expanded and converted in to the syntax for a FireWorkZ spreadsheet cell, with all the necessary parentheses.

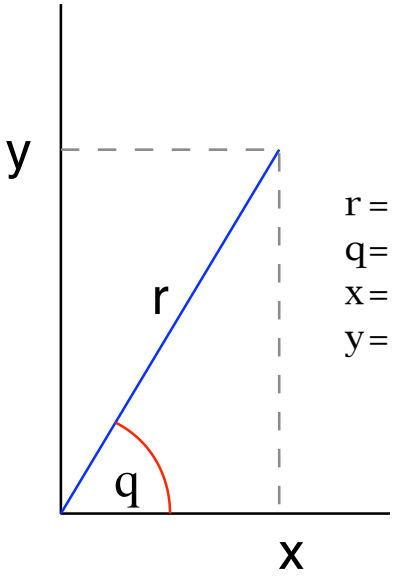
### *True Airspeed spreadsheet cell*

b4 = C.A.S
c4 = Calibrated Air Speed
d4 = Temperature

```
if(b4,b4/((1-(6.8755856*(c4+((288.15-c4*0.0019812)
/0.0019812)*(1-((288.15-c4*0.0019812)/(273.15+d4))
^0.234969))/1000000))^2.12794),"")
```

Note to raise a number to a power, the ^ operator is used as in BBC BASIC. The formula is also enclosed in an if statement checking for the presence of a value in the first column to prevent arithmetic errors being displayed in rows which haven't been filled out.

I did a lot of searching but didn't have any luck finding formulas to calculate the wind correction, there were lots of sites explaining how to do it on the whiz wheel, or selling their own software to calculate it, but none giving away the secrets. No problem I thought, I got good grades in two maths A levels at school, although that was 20 years ago, surely I can remember enough to work it out using the principles of trigonometry. The wind correction is the addition of two vectors to form a third, you have one line representing the wind speed and direction, another which is the heading and true airspeed, and when added together you end up with the third which is the track and ground speed. The direction and speeds are the magnitude and angle of the vector in polar co-ordinates, and can be converted to X and Y values by taking the sine and cosine of the angle and multiplying by the magnitude. You can then add the X and Y of heading vector to the wind vector, to get the track X and Y. You can convert this back to polar co-ordinates as the angle is the arctangent of X over Y, and the magnitude is the square root of the sum of the squares of X and Y.



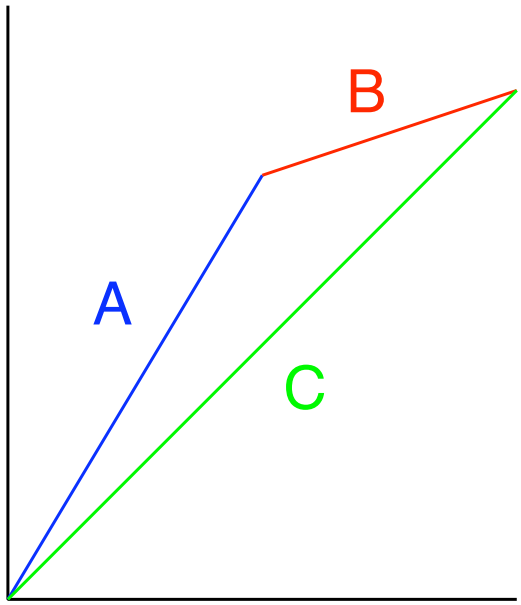

r = magnitude of vector in polar co-ordinates
q= angle of vector in polar co-ordinates
x = horizontal cartesian coordinate
y = vertical cartesian coordinate

$$x = r \cos\theta$$

$$y = r \sin\theta$$

$$r = \sqrt{x^2 + y^2}$$

$$\theta = \arctan\left(\frac{x}{y}\right)$$




*Addition of vectors A and B to give C.*

In cartesian co-ordinates:-

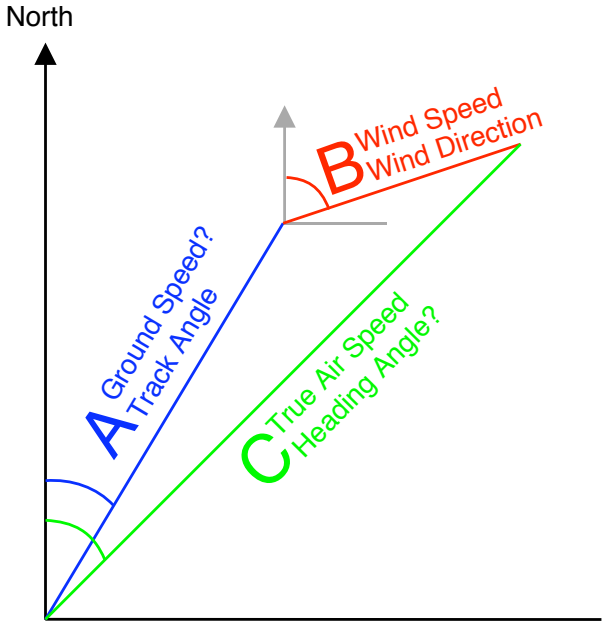
$$C_x = A_x + B_x$$

$$C_y = A_y + B_y$$

In polar co-ordinates:-

$$C_r = \sqrt{(A_r \sin A_\theta + B_r \sin B_\theta)^2 + (A_r \cos A_\theta + B_r \cos B_\theta)^2}$$

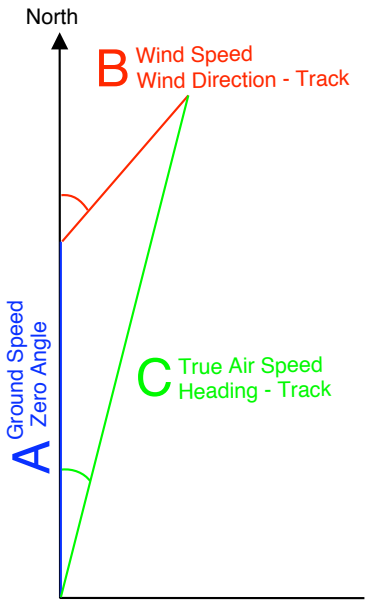
$$C_\theta = \arctan\left(\frac{A_r \sin A_\theta + B_r \sin B_\theta}{A_r \cos A_\theta + B_r \cos B_\theta}\right)$$




*Wind diagram*

But hold on, when doing the wind correction, you don't know all the information for two vectors in order to calculate the third. You know both the wind speed and direction, which forms one line, but for the others you know the track angle, but you don't know its magnitude of which is the ground speed, you don't know the heading angle, but you do know its magnitude, which is the true airspeed.

So instead of there being one unknown on the left side of each of the above equations, there are two unknowns, which stumped me, despite spending several days scratching my head, and drawing it out on paper many times. Further Internet searching didn't turn up any clues, so I widened my enquires to general trigonometry and discovered lots of things I'd forgotten, but nothing of direct help. It took a couple more days before the answer suddenly came to me – I needed to rotate the whole diagram by subtracting the track angle from all the others, so the track line lay along the vertical axis (angles being measured from north). This trick of making one angle zero causes its sine also to be zero, eliminating part of the one equation with one unknown term in it, which means a simple rearrangement finds the other term. Then this can be substituted back in to the other equation where the cosine of a zero angle has become 1, further simplifying matters.




Starting by substituting the polar coordinates into the vector addition equation, and highlighting the unknown terms in bold, we have:-

$$C_r \sin \boldsymbol{C}_\theta = \boldsymbol{A_r} \sin A_\theta + B_r \sin B_\theta$$
$$C_y \cos \boldsymbol{C}_\theta = \boldsymbol{A_r} \cos A_\theta + B_r \cos B_\theta$$

After rotating, the sine and cosine of a zero angle becomes 0 and 1, so we get:-

$$C_r \sin(\boldsymbol{C}_\theta - A_\theta) = 0 + B_r \sin(B_\theta - A_\theta)$$
$$C_r \cos(\boldsymbol{C}_\theta - A_\theta) = \boldsymbol{A_r} + B_r \cos(B_\theta - A_\theta)$$

Rearranging to put the unknows on the left:-

$$\sin(\boldsymbol{C}_\theta - A_\theta) = \frac{B_r \sin(B_\theta - A_\theta)}{C_r}$$
$$\boldsymbol{A_r} = C_r \cos(\boldsymbol{C}_\theta - A_\theta) - B_r \cos(B_\theta - A_\theta)$$

Then in the top equation by taking the arcsine of each side and subtracting the known angle, we are left with the unknown term. This can then be substituted into the lower equation to allow both to be calcuated.

$$C_\theta = arcsin\left(\frac{B_r \, sin\ (B_\theta - A_\theta)}{C_r}\right) + A_\theta$$

$$A_r = C_r \, cos\left(arcsin\left(\frac{B_r \, sin\ (B_\theta - A_\theta)}{C_r}\right)\right) - B_r \, cos\ (B_\theta - A_\theta)$$

Replacing the magnitudes and angles of vectors A, B and C with the aeronautical terms, we get the solution for the heading and ground speeds.

$$HDG = arcsin\left(\frac{W.V}{T.A.S} \times sin\left(W.D - TRK\right)\right) + TRK$$

$$G.S = \left(T.A.S \times cos\left(arcsin\left(\frac{W.V}{T.A.S} \times sin\left(W.D - TRK\right)\right)\right)\right) - \left(W.V \times cos\left(W.D - TRK\right)\right)$$

HDG = Heading
TRK = Track
T.A.S = True Air Speed
G.S = Ground Speed
W.V = Wind Velocity
W.D = Wind Direction

Once this was done, it was just a case of converting long formulas into the spreadsheet syntax, remembering that like BBC BASIC the spreadsheet doesn't work in degrees for trig functions but in radians, so RAD functions have to be added to convert the argument of each SIN or COS function.

### *Heading spreadsheet cell*

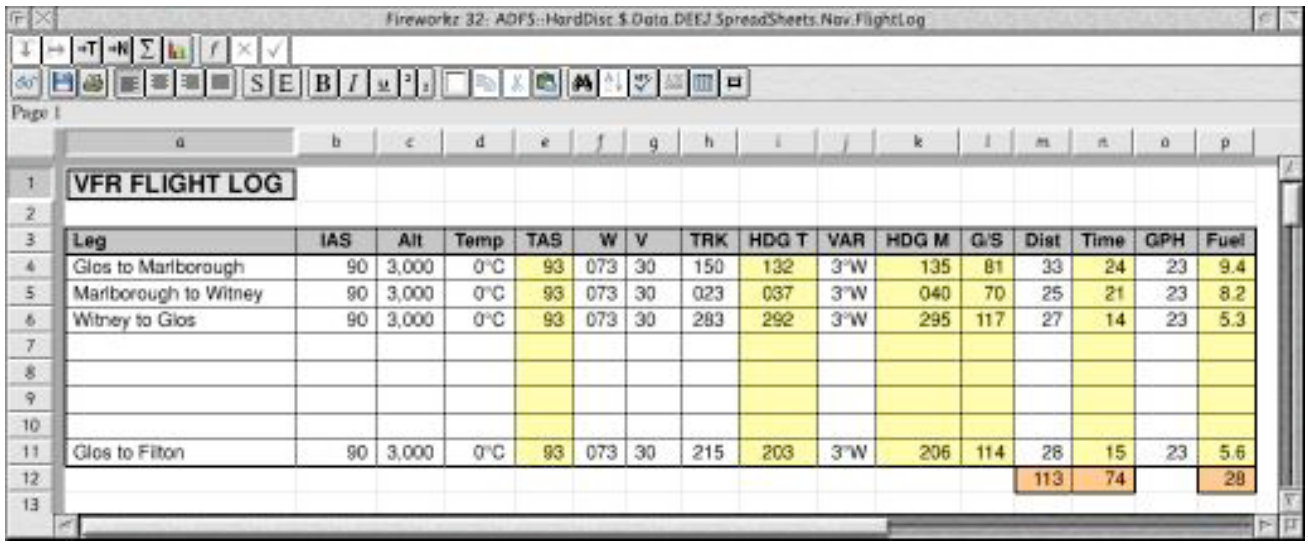
b4 = First column value
e4 = True Air Speed
f4 = Wind Direction
g4 = Wind Velocity
h4 = Track

```
if(b4,mod(360+deg(asin(g4/e4*sin(rad(f4-h4))))+h4
,360),"")
```

Note that the value has 360 added to it then the modulus of 360 taken, so that negative values aren't produced and the result is always between 0° and 359°.

### *Ground Speed spreadsheet cell*

```
if(b4,(e4*(cos(asin(g4/e4*sin(rad(f4-h4))))))-(g4
*cos(rad(f4-h4))),"")
```




| Leg | IAS | Alt | Temp | TAS | W | V | TRK | HDG T | VAR | HDG M | G/S | Dist | Time | GPH | Fuel |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Glos to Marlborough | 90 | 3,000 | 0°C | 93 | 073 | 30 | 150 | 132 | 3°W | 135 | 81 | 33 | 24 | 23 | 9.4 |
| Marlborough to Witney | 90 | 3,000 | 0°C | 93 | 073 | 30 | 023 | 037 | 3°W | 040 | 70 | 25 | 21 | 23 | 8.2 |
| Witney to Glos | 90 | 3,000 | 0°C | 93 | 073 | 30 | 283 | 292 | 3°W | 295 | 117 | 27 | 14 | 23 | 5.3 |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| Glos to Filton | 90 | 3,000 | 0°C | 93 | 073 | 30 | 215 | 203 | 3°W | 206 | 114 | 28 | 15 | 23 | 5.6 |
| | | | | | | | | | | | | 113 | 74 | | 28 |

*fig. 4 FireworkZ spreadsheet*

Once the spreadsheet *(fig.4)* was completed and working on FireWorkZ, I could then use it at home to check my calculations at home before going off to a flying lesson. But during the winter the weather is often variable, so

changes in plans can occur at short notice, so I really needed to be able to do it on the move. I have a sat nav PDA and while I don't have aviation software for it yet, it does have a built in Pocket Excel spreadsheet which is compatible with the Windows desktop version. So I saved the sheet out from FireWorkZ in Lotus123 format, and emailed it to myself at work. Excel loaded the sheet and converted most of the formulas, but editing was required to change FireWorkZ's ^ and RAD() to Excel's POWER() and RADIANS() to get them to work, plus the cell formatting needed recreating as it didn't survive the conversion process. But it was quite simple to reproduce identical results in Excel, which were then sent down the USB cable to my PDA, where it also worked straight away there too. The only drawback being the tiny screen in portrait mode only shows a couple of columns, but it still allows me to check the results at anytime, and I've used it on several cross country flights. Its very pleasing to find the my results with the whiz wheel are the same as the spreadsheet to the nearest degree or knot, any more than that and I know I've usually made a silly adding or subtracting error, and can quickly correct my flight plan.

I sat my Navigation exam a few weeks ago, and I obviously wasn't allowed to take the PDA in with me, but luckily by then the amount of practice comparing results on the whiz wheel with the sheet, and the general sharpening up of my brain from having to work out the maths paid off. The exam is multiple choice like all the others, but the difference with this one is you can't just sit down and start ticking the boxes, you have to spend almost half the time carefully drawing out the described route on the map, measuring and filling in a flight log, and then most of the questions are on the results of this. I managed pass with flying colours only getting one question wrong from the flight log section, where two of the four possible answers for a heading were 28° and 30°, and my calculation was bang in between at 29°, so I picked one, but unfortunately it was the wrong one. But that was down to a slight inaccuracy in drawing the line on the chart, rather than the maths or the whiz wheel use, something that would catch you out using whiz wheel or spreadsheet. But then again in real life errors of one degree are meaningless as wind

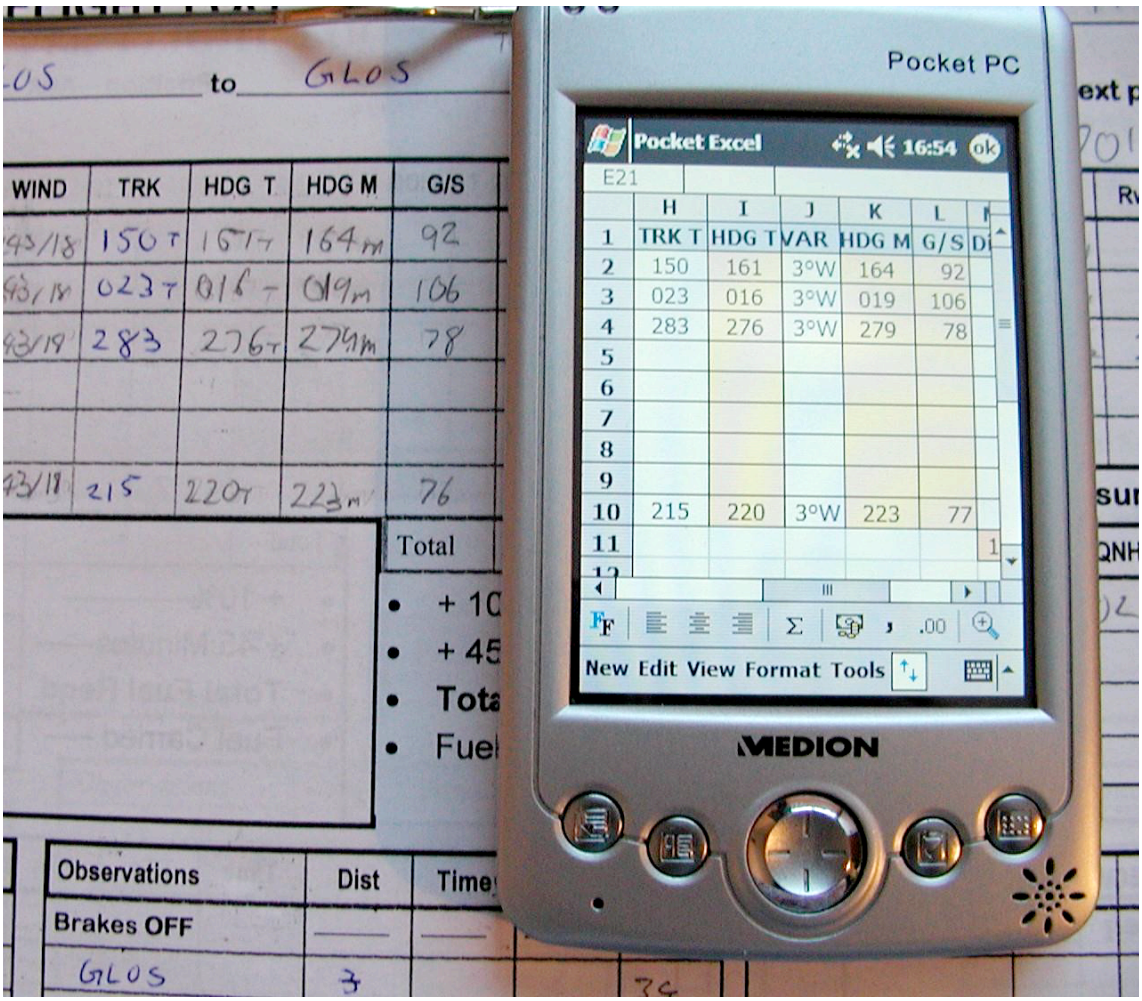



*fig. 5 the PDA showing the spreeadsheet*

speeds and directions are only approximate, and you'd easily correct for such errors in flight with visual references.

Stop press: I've been out for a flying lesson where I had to do diversion planning, which involves working out the wind corrected heading and time to destination, not in the relaxed setting of the briefing room on the ground, but in the cramped cockpit and flying the plane at the same time. Using no more than a pen to draw on the map, your eye to judge the angle, the end of your thumb to measure distance, and your brain to work everything out, while still maintaining control of the aircraft. No getting away with spreadsheets to substitute for the grey matter between the ears then!

# Winning Games With Logic Part 13

**Barry Aulton**

This time I thought we would look at navigation as some sort of plan. There is a limit to the number of actions a CCC can take. It can't leap off the screen, turn into **** BUY and sell you an over-large overpriced coffee, (YET!). This is both a handicap and a virtue. The virtue part comes in coz it makes the AI easier. DECISIONS DECISIONS shall I, PASS GO and COLLECT £200, play footy? etc. all those decisions your average dumbo computer controlled character doesn't have to make but humans do. It need only 'choose' between a limited number of feasible actions, most of which involve moving from A to B (without landing in C). Thus most AI methods are used for navigation. However we must first decide how to store the relevant information.

In the last article I extolled the virtues of finite state machines (FSMs). They are complete, self contained and what you see is what you get. The FSM, that is used to control autonomous entities, is the structure that is most used in game programming. The work of Rodney Brooks (ref 1) in designing and creating robots with human like behaviour illustrates their use.

*"The robot Genghis had 6 legs, making it look insect like. It had 6 infra-red sensors at the front, enabling it to detect heat emitting creatures. The software for Genghis consisted of 51 augmented finite state machines (AFSM being finite state machines with memory) implemented in a layered architecture.(see figs 1 and 2). AFSM's send each other data messages. An example of an AFSM (actually there is one for each leg) at the lowest level is STand UP which is :-*

*Continuously set Beta motor, which extended or contracted a leg, until its maximum extension is achieved.*

*Continuously set Alpha motor which can swing a leg forwards or backwards until its minimum value is achieved (where the leg is perpendicular to its body."* (*see fig. 2*)

## Planetary Ambassadors

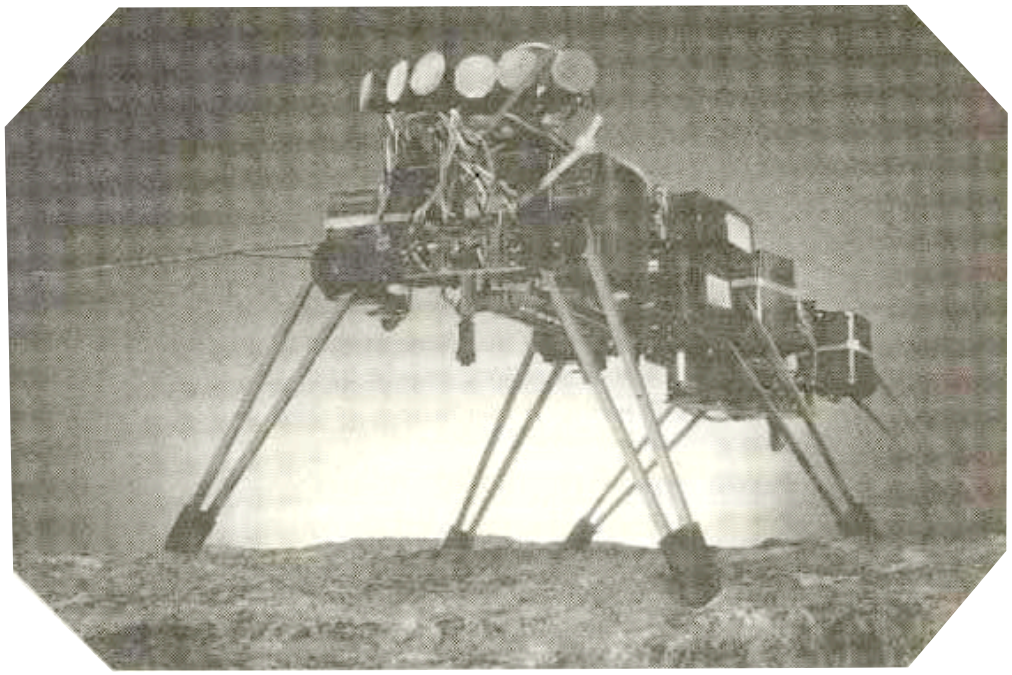


*fig. I*

*The robot Genghis. It has six legs, making it look very insectlike. The six pyroelectric sensors arrayed at the front of the robot allow it to sense the presence of heat-emitting mammals.*

Change of state in an AFSM occurs by :-

1) arrival of a message from another AFSM,
(e.g. game control announces the door is now open)
2) expiry of a timer
(e.g. an agent has been performing behaviour X, say for 20 secs and is getting nowhere. It's time to try something else.)

At the highest level for Genghis's control is an AFSM STEER which is :-

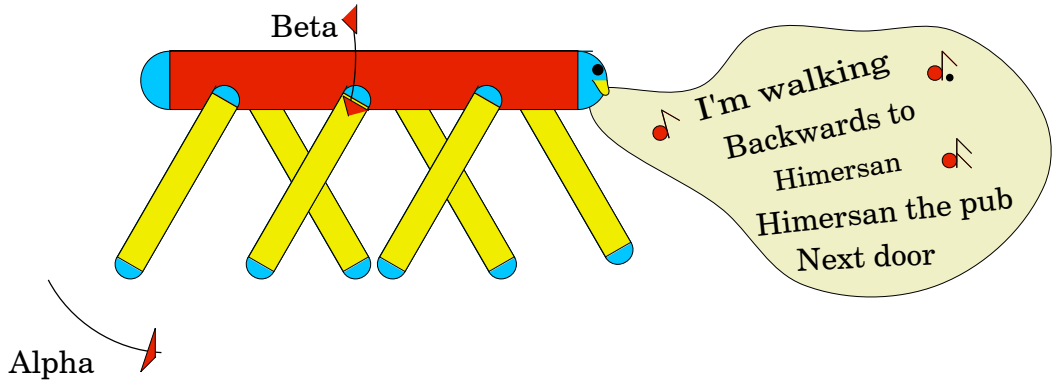
> *Continuously count the number of left and right sensors that are ON. If there are more on the left, send a message to the left legs to take smaller steps making the robot turn).*

With just simple AFSMs, Genghis could walk on any terrain following the heat emitted by humans, with only an on - off switch as its human interface. Fortunately, your average CCC doesn't need to walk just yet, but does need to decide where to go ie plan. Path planning, enabling a CCC to negotiate static obstacles makes use of AI search techniques. Each room in a game is regarded as a state and the goal of a CCC to reach that state (see previous issue). Clearly other CCC's can get in the way. (Simply setting a separation distance beyond which other

Each of Genghis's 6 legs had 2 degrees of freedom controlled by separate motors. The alpha motor swings the leg backwards & forwards, the beta motor swings the leg up & down

*fig. 2*

*Genghis*




CCC's can be ignored often works). Since the search technique is already in there, it can be used more generally eg you may need a key to open a door and the key may be elsewhere. By designing (and /or coding) everything as FSMs (as done in the text adventure compiler Infocom,) you can reuse the same boiler plate search technique to search for a solution to a goal state (eg getting to the treasure room, even if there are keys to find). AFSMs are clearly useful, but how do we set about coding one? Let's start with the data that one AFSM may pass to another.

## The Message

The idea of the Message is that you pass information (Messages) to game objects which are coded as AFSMs. It would make life easier if each word represents the same type of information, eg as in *fig. 3*. A message is the data to be sent if a condition or rule (set of conditions) evaluates to true. It may include several types of data such as :-

A) flags indicating the type of message, since game objects may only be able to respond to certain messages,
B) which flags to change if the message conditions are met,
C) who is to receive the message and where are the receivers,
D) minimum and maximum delivery times (outside which the message is irrelevant)
E) what state the receiver is to be in to receive the message (e.g. a CCC that is fleeing may not be in the right state to respond to a request for help)

F) who sent the message, and finally
G) has the message been sent?

We can see that messages can be simple or complex. Generally, simple messages are better for real time games. They may be sent periodically between CCC's or sent if a particular condition (or set of conditions) is true.

## The Condition

We may then ask ourselves what is a condition? What do we need to represent a condition? A condition may be of the form(s) IF (something or other) TRUE, or IF ( something > something_else ) TRUE

We thus need to know if the condition has been tested yet and if it

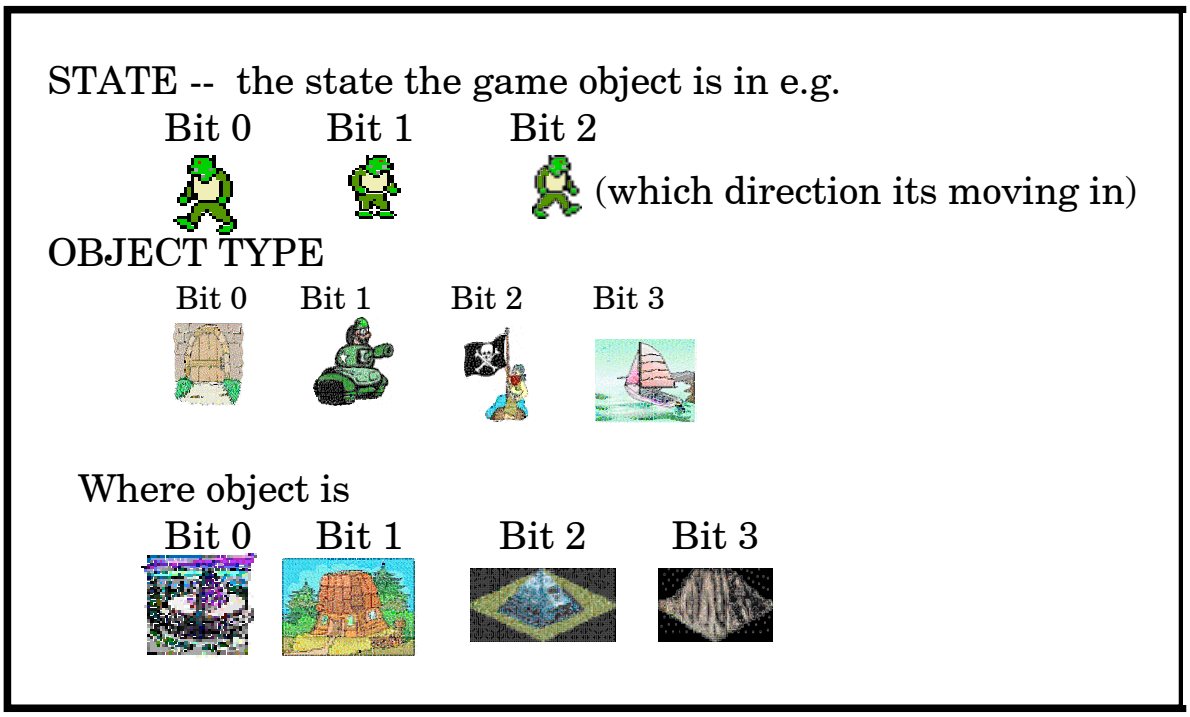



*fig. 3*

*A message object*

has, is it true. Thus we have two variables :-

```
bool is_tested;
bool is_satisfied;
```

if the condition is satisfied, we send a Message. This may correspond to an action for the CCC to perform if the condition is satisfied. However the condition may be part of a rule that has several conditions which must evaluate to true before it is satisfied. Several rules may have to evaluate to true before a game object (say just a door) changes state (eg from locked to open). Thus coding FSMs require further work which we will discuss next time.

## Game AI Resources

There are now various AI packages 'suitable' for game programs on the market. One such type is 'scripting', whereby the game designer writes in pseudo-code in a highly specialised language, which is then compiled to one which the Machine can understand. However this 'compiler' can get very complicated and produce inefficient code. Also, the code produced may not be complete or self consistent, often due to the designers lack of logic. Is the design clear and unambiguous? Have all cases been taken into account? To get round this problem, some AI modelling applications permit developers to design using graphical 'drag and drop' interfaces based on FSMs. In order to deal with complex situations, simple FSMs can be used as building blocks for more complex FSMs.

## Learning Using Finite State Machines

We can think of a simple FSM as a transition table (see last article) where the x axis is split into exclusive regions of states e.g:-

{0 dead 1, dyeing 2, injured 3, healthy, --- }

The y axis is partitioned into input regions e.g.

{0 weak player nearby, 1 strong player nearby
2 food nearby 3 ammunition nearby , ---- }

Being able to represent complex behaviour in this way is the difficult part. (We can see the problem of trying to make states exclusive. To get round this, some developers use the idea of 'fuzzy states' in which an agent (CCC) may be partially in several states simultaneously.) We then read off the corresponding output action that the CCC should take.

For a more intelligent CCC this may not be sufficient. Suppose we now consider an 'enhanced' FSM as a set of 3D graphs. Along the x axis we have the possible states a CCC can be in, along the y axis we have the possible stimuli as before. But, for the z axis for each x,y tuple we have a Z coordinate for each feasible action that the CCC could perform when in this state. This height represents the 'motivation', (how much of a good idea it is) for the CCC to perform this particular action when in state X

and experiencing an input Y. For instance, if the CCC is healthy and a weak enemy unit is nearby, we may have a large motivation to attack that enemy, but maybe also some motivation to regroup. We then select an appropriate action for the CCC to perform from the relative heights of the motivations, (perhaps simply selecting the action corresponding to the largest motivation). Any learning algorithm can then be used; eg a simple reward and punishment system whereby if the resulting action results in success, (eg food obtained, enemy destroyed) increase the motivation (height in the Z direction) if the action results in failure, decrease it.

Having all the data structures, we need a recipe for improving CCC intelligence that makes use of them. The proposed AI Recipe is:-

1) First, by playing the game, make suggestions that at any given point in the game would be a good idea for the opposing characters to do.
2) Next turn those ideas into simple logic IF this do that sort of stuff.
3) Then combine those logic proposals into things that can be quantified. (This is essentially what fuzzy logic is, namely a way of providing some means of quantification of a hitherto unquantifiable thing. For example we know that huge is "bigger" than large but is enormous bigger still? And where does giant fit in? You can test whether the process of rough quantification a la fuzzy logic makes sense by trying to use the logic on paper, before any coding.)

The basic approach resembles classical evolution (as per Darwin).

1) Start with simplistic behaviour however bad, (ie whatever is easiest to code)
2) Analyse the failures of the simple methods.
3) Observe the differences between successful behaviour (e.g. by human players) and the failures of computer players.
4) Try to identify the parameters that can be used to control successful behaviour (this is the hard bit).
5) Use code to allow the program to react to the parameters.
6) Complete the process by repeated testing whilst playing.

This method was tested using a standard test program, namely one of the 'bots' family of games. Each CCC in this game is an autonomous unit. To be successful in play, a unit must manoeuvre

effectively, fire its weapons, and evade enemy fire. If team-mates are present it should coordinate fire among team members to combine fire against single enemy units. If a unit takes damage it should flee until it is repaired.

The original algorithm tried was:-

A) Select closest enemy,
B) Turn to face it and attempt to close with it,
C) Fire at it relentlessly.

What went wrong? Mainly the unit took too much damage. The algorithm was modified so that the unit took into account its internal state (eg armour, weapons, ammunition ie a magic formula again). We now have two magic formulae, one giving the unit's motivation to fight, another giving the unit's motivation to flee. Also relentless closure on the enemy unit did not take into account weapon effectiveness. The algorithm was thus modified to make the unit try to maintain an optimum range to its chosen enemy unit for the weapon it has. Continuing the modify code - test - evaluate cycle resulted in good (if imperfect) overall performance. (For example a unit could flee from the nearest enemy straight into another one.) This method is viable. It fails when the programmer cannot identify the keys to changing poor behaviour. However any automated AI method will fail too!

This approach is a game programming standard. Eg in the game Dungeon keeper (by Bullfrog) *"The AI implemented makes use of a process called 'behavioural cloning' to learn from the human gamer's play. The brains of the monsters themselves come from many hours of internal play by the designers; every time a particularly nasty trick or sneak attack by one of the players worked out, it was incorporated by the designers into the monster's AI database."*

We now have a data structure suitable for game programming, we now need to do something with it. That's for next time.

ref 1 *ROBOT : The Future Of Flesh and Machines. Rodney A Brooks - Penguin*
ref 2 *Intelligent Behaviour Without AI : An Evolutionary approach. N Kirby*

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Copy date for next issue of Eureka is the 1st of July

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