

Mark Cooke

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Profile

I am a skilled embedded systems programmer with good system administration skills. I am a motivated and dynamic team-worker with an enthusiastic and dedicated approach, who pays keen attention to detail. I have a mature and responsible attitude, which combined with good inter-personal skills command respect, and promote the formation of strong working relationships.

IT Skills Summary

I have a sound working knowledge of a wide range of IT systems, including:

Server Administration	OSs & GUIs	Networking	Languages	Applications
Solaris 2.x	Windows XP/2000/NT	TCP/IP, NetBeui	C, C++	Tripwire, TCP Wrappers
Linux	Windows 98/95/3.11	Samba servers	Pascal	PGP, Secure Shell
Windows NT 4.0	MS-DOS	Packet Filters	Assembler	Apache HTTP Server
	X Windows	Encrypted VPN	Bourne Shell	Qmail, Ezmlm, Hypermail
	RedHat	HTTP, NAT	Expect	Big Brother Monitor
	RTAI Linux	DNS, SMTP	CGI Scripts	Mentor Graphics
		IPSEC	Basic	

I have practical knowledge of networking security issues. A primary facet of my system administration role has been the securing of the network of computer-aided design workstations running Solaris and Mentor Graphics. Part of the strategy was the replacement of telnet with secure shell, closing down many unused services, and improving the general security awareness of the system users.

I have deployed a network of new NT-based CAD stations, protected by a packet filtering firewall using Linux. I am familiar with the construction of router access control lists, and the configuration of application proxies for the protected hosts. Network address translation was employed for this firewall, and a private name service, DHCP lease and WINS server were configured for the internal network.

My knowledge of the hypertext transport protocol includes the configuration of the Apache web server, web page production, SSI, CGI, and CSS. I have also authored a simple http server dedicated to serving camera pictures to connected clients.

As part of an early warning system, and to ease the overheads in maintaining the network, I run monitoring tools on the workstations. A lightly modified release of 'Big Brother' provides monitors for system load, active processes, network connectivity and so forth. An ongoing project is to provide a web based query scheme to an SQL based database of network events. The goal is to familiarise myself with database-web interaction processes, and develop a useful attack monitoring tool.

I also maintain an archive of software packages, based on the 'Redhat Package Manager' format. This allows a rapid deployment of software updates across both the Solaris and the Linux based machines that I maintain.

Programming Skills

I am currently employed by the Space Research Group at the University of Birmingham. My primary role here is as a programmer for the space instrument programme in the group. I was initially employed in July 1995 to work on the satellite onboard control software for the Joint European Telescope for X-ray astronomy (JET-X).

The JET-X instrument comprises of two X-ray ccd telescopes, two attitude monitors, two radiation detectors, and other associated systems. The onboard control system is a network of four 8086 processors, loosely coupled by serial interfaces, with a military standard 1553 interface to the spacecraft subsystems.

My role was to develop and test the data processing and instrument control system for the instrument. JET-X has a number of major modes, ranging from a low power mode, to full observing, with emergency modes for radiation belt passages, solar flare response and so forth.

From July 1998 until the launch in January 2003, I worked on a satellite instrument called the Solar Mass Ejection Imager (SMEI). SMEI is based on a Texas Instruments supplied digital signal processor. The SMEI instrument is a three camera design, with each camera sampling a 60 degree arc of the sky every four seconds.

My role on SMEI was to design and write the onboard instrument control software, and also to produce ground-based instrument support tools for controlling and testing the hardware both pre- and post-launch. I also had a role in the hardware design, with feedback into the design process to ensure that the hardware-software interface can be as straight forward as possible.

The ground segment software for SMEI is based around a Microsoft Windows front-end written with Visual C++ and Visual Basic. This is capable of displaying the telemetry and extracting image data.

The onboard systems are written in Texas assembler, for the fine-grained control and reliability required for a space mission. Use of assembler allows error-resilient constructs to be used easily, and facilitates the level of timing controls necessary to meet the design criteria.

Since the successful launch of this satellite in January 2003, my role has evolved into an operational support resource, providing technical assistance and expertise as needed.

My current primary programming activity is for a satellite mission called SMART-2. This is a gravity wave exploration mission where I am using a real time operating kernel to develop prototype software for two satellite sub-systems. Use of POSIX with RTAI Linux

for the development system maintains a low-cost low-risk development approach, with an easy upgrade path to a COTS RTOS for the flight units.

I also maintain a small software development role in SECCHI – a solar observation satellite mission.

A personal project is a firewall proxy for ICQ and Windows Messenger, to permit direct file transfers to work across a network-address-translation device.

Scripting Skills

I routinely write shell scripts in bourne shell and occasionally in expect and perl, to streamline common processes on my workstations. For example, a script automatically mirrors changes to the SunSolve patch site, and processes any changes to the recommended patch clusters into a human-friendly format, which is then e-mailed out.

Other small scripts monitoring network traffic, system load, web cache hit rates are tied-in to a graphing package, MRTG, and associated web pages are continuously updated.

Other examples are shell and php scripts procesing SMEI telemetry data, extracting parameters for graphing, and presentation of these via a web-based interface.

Education and Qualifications

October 1992 - May 1995: University of Bristol, England.

Studied for a BEng degree in Electrical and Electronic Engineering.

September 1984 - July 1991: King Edward's School for Boys, Birmingham, England.

A-Levels: Mathematics (A), Further Mathematics (A), Physics (A),
Chemistry (B), General Studies (B), A/S Electronics (A).

Career History

July 1995 - Present: Space Research Group, University of Birmingham, England.

- Development and testing of the onboard control software for the JET-X space observatory.
- Design, development and testing of the onboard control software and ground system software for the Solar Mass Ejection Imaging space instrument.
- Design, development and testing of the onboard control software and ground system software for two sub-systems on the SMART-2 gravity wave satellite.
- Primary system administration for a networked cluster of Sun workstations and X-terminals used for CAD design work.
- Responsible for hardware upgrades to the computing infrastructure.

June-August 1992, 1993, 1994: Physics and Astronomy Group, University of Leicester, England.

Design and programming of data acquisition software and a graphical interface for the JET-X space instrument.

August 1991-July 1992: Accounting Officer, University of Birmingham, England.

Invoice and order tracking for the University of Birmingham.

Positions of Responsibility

October 1993 - May 1995: Network Representative for Badock Hall, Bristol, England.

A member of departmental computer support staff at the University of Bristol. This involved the day-to-day running of a student-access computer room with an Internet connection, installation and administration of a Unix server and Windows clients running Microsoft Office and technical support for 200+ users.

Interests

I have a well developed interest in electronics, particularly in computing. Exposure to networking has led to practical experience with small firewalls, network address translation, intrusion detection and monitoring tools.

I enjoy reading and watching science fiction, which has led to my involvement with an online science fiction role-play group.

Other pursuits I enjoy include walking, cycling, badminton and fencing. I have recently taken up skiing and I am learning Italian.

Miscellaneous

Holder of the British Academy of Fencing, Two Star Foil award.

IT consultant for the South Birmingham Young Homeless Project.