

PEOPLE SPIN OFF

Part One: Professor Christopher Bishop

In this edition of Fusion Business we start a new series, profiling people who started their careers in fusion and are now using the skills they developed for the benefit of industry.



Professor Christopher Bishop is Assistant Director of Microsoft Research at Cambridge. He also holds a chair at Edinburgh University. His background is as a theoretical physicist (Oxford and Edinburgh) who worked at Culham as a theoretician for 8 years from 1983.

In 1991 he transferred to Harwell to follow up a longstanding interest in machine intelligence. This is now his main field of interest (although his responsibilities at Microsoft also include management and external relations as well as research).

On leaving UKAEA in 1993, Professor Bishop went to Aston University where he was responsible for enhancing the research status of the Department of Computer Science and Applied Mathematics, including the necessary fund raising.

This success was followed by a six-month secondment to the Isaac Newton Institute in Cambridge before being head hunted by Microsoft.

Professor Bishop says his time at Culham enabled application and considerable development of his expertise and interest in machine intelligence. This was at the same time as the early growth of neural network computing and, as is often the case with such new tools, an early application was solving some of the extreme problems found in fusion.

In this case the successful use of neural network computing to achieve feedback control of COMPASS was a major achievement.

STOP PRESS! Culham Science Centre is to host Venturefest 2001. The event is held over 2 days, June 25 & 26 2001. Details at www.venturefest.com

Connection Contacts

W W Fischer is the latest company to stage an exhibition of its products and expertise at the Culham Science Centre.

The exhibition featured a range of the company's circular push/pull locking electrical connectors and components from small coaxial connectors to NIM-CAMAC specifications, to multipole and H.T., through to IP68, vacuum sealed and hybrid fibre optics.



Sales Engineer, Yvan Atkinson, says: "This mini exhibition was a chance to renew contact with UKAEA and allowed us to show new product lines, with emphasis on multipole and hybrid fibre optic connectors, to a wide range of contacts on site.

We were pleased with the response from the engineers at Culham and hope that we have shown W W Fischer can provide quality solutions to the engineers' interconnection and cabling projects."

More details from Yvan Atkinson on 023 92241122

TENDER & CONTRACTS UPDATE

Three more UK companies have been nominated for work on the latest European fusion project, First Wall Fixing Keys and First Wall Graphite Tiles for the RFX machine at Padova, Italy.

If your company would like to be added to our database for future fusion projects, please email:

fusion.industry@ukaea.org.uk

Views expressed herein do not necessarily reflect those of the EURATOM/UKAEA Fusion Association. No liability is accepted whatsoever for errors or omissions in Fusion Business. This work is funded by EURATOM and the UK Department of Trade and Industry. Please visit our web site at: www.fusion.org.uk/industry

Fusion

BUSINESS

5 4 3 2 1 Countdown...



Picture courtesy of Carlton International, owners of the Captain Scarlet, Thunderbirds and Supermarionation shows

to 2065 at Culham

Culham Science Centre has welcomed the creator of the TV sci-fi adventure series Thunderbirds and Captain Scarlet on a fusion fact-finding mission. Gerry Anderson toured Culham as part of his research for a possible new series or TV film of Captain Scarlet, which may be ready for screening in 2002.

The action would be set in the year 2065, when fusion power stations should have been operating for some years, so Mr Anderson was keen to make sure he has his fusion facts right.

He says: "I was quite amazed by the scale of the operation, but the visit was really helpful and means the central idea for our plot will be believable." Mr Anderson has agreed to give the annual SET (Science & Engineering Technology) public lecture at Culham next March.

UKAEA

WORKING FROM HOME

The world's largest fusion experiment, JET, sited at Culham Science Centre, has entered a new phase of cyber-collaboration (Remote Participation). Scientists from all over Europe are using computer technology, developed by Euratom Associate fusion laboratories in conjunction with industry, to access data in the JET facilities from their home laboratories.

The two main components of Remote Participation are Remote Data Access (RDA) and Remote Computer Access (RCA).

RDA* allows the JET data to be read and analysed at remote locations, using a three-tier client-middleware-server solution. RCA** allows login to the various JET computer platforms to monitor / participate in experiments, prepare experimental sessions, analyse data and access the office computing services. Richard Layne, a consultant from Abingdon based company Tessella who is employed at the JET facilities, says "The fast response times mean that users are able to work with the JET data just as effectively as if they were actually at Culham".

More details from: schmidt@igi.pd.cnr.it,
how@drfc.cad.cea.fr, or richard.layne@jet.uk



Photograph shows, left to right, Federico Milani, Robert Felton and Xavier Litaudon in the JET control room, taking part in a remote access demonstration with delegates at this year's SOFT conference in Madrid.

* RDA: The data resides on an IBM mainframe. A dedicated data server running on Windows NT provides a single point of access to raw and processed data. Communication is via the HTTP 1.1 protocol using the libwww library. The data is transferred using netCDF formatting. A portable client library has been written and is available on most popular computer platforms.

** RCA is provided via dedicated Windows NT servers running the CITRIX Metaframe software. Remote client machines use CITRIX ICA to communicate with these servers. The ICA client software is available on all popular platforms.

Innovation Centre Boost for Start-Up Companies

'UKAEA's Fusion and Industry team has unveiled plans to open an Innovation Centre for UK businesses at the Culham Science Centre, as part of a series of new initiatives designed to forge closer links with Industry.

The Innovation Centre is intended for engineering and technology start-up companies, who may be able to benefit from the skills and technologies used in fusion research. In mid-2001 UKAEA is hosting the Venturefest conference, bringing together scientists and entrepreneurs from Oxfordshire and the Thames Valley to present their ideas to business support agencies and venture capitalists.



Cleve Forty, Fusion and Industry Manager

UKAEA Culham Science Centre is recognised as a world leader in fusion research. Fusion and Industry Manager Cleve Forty says: "Our research brings together an enviable set of engineering skills and expertise for companies to tap into. For example, our simulation and modelling skills are as applicable for financial modelling as they are for increasing the efficiency of gas-turbine engines. We are in discussions with one of the country's leading organisations specialising in new business development among the engineering and science community."

With plans for the Innovation Centre at an advanced stage, Fusion and Industry is inviting UK companies to consider locating part of their activities in the Innovation Centre, where they might benefit from fusion consultancy.

For more details about the Innovation Centre and other Fusion and Industry initiatives, contact: Cleve Forty on 01235 463534 or e-mail cleve.forty@ukaea.org.uk.'

CONFERENCE & EVENTS DIARY 2001

17-22 June - 28th IEEE International Conference on Plasma Science, Las Vegas, Nevada, USA; **18-22 June** - European Conference on Controlled Fusion & Plasma Physics, Funchal-Madeira, Portugal; **2-6 July** - 3rd International Symposium on Applied Plasma Science (ISAPS '01), Alaska, USA; **16-27 July** - 38th Culham Plasma Physics Summer School; **1-4 Oct** - IEEE 19th Symposium on Fusion Engineering, New Jersey, USA; **29 Oct - 2 Nov** - 43rd APS Division of Plasma Physics Annual Meeting, California, USA.

UNDER OUR ROOF

AMEC's specialist company, C V Buchan, has pushed back the boundaries of concrete manufacturing technology in its work on the MAST facility at Culham.

Buchan was challenged to manufacture components for the roof structure which incorporated a level of tolerance associated with the precision engineering industry.

To meet the UKAEA brief, Buchan manufactured 69 precast T-shape concrete beams (pictured below), varying in length from 3.5m to 8.6m, to a tolerance of +/- one millimetre.

Such tight tolerances are critical to the success of the roof because of the need to minimise the gaps between beams.



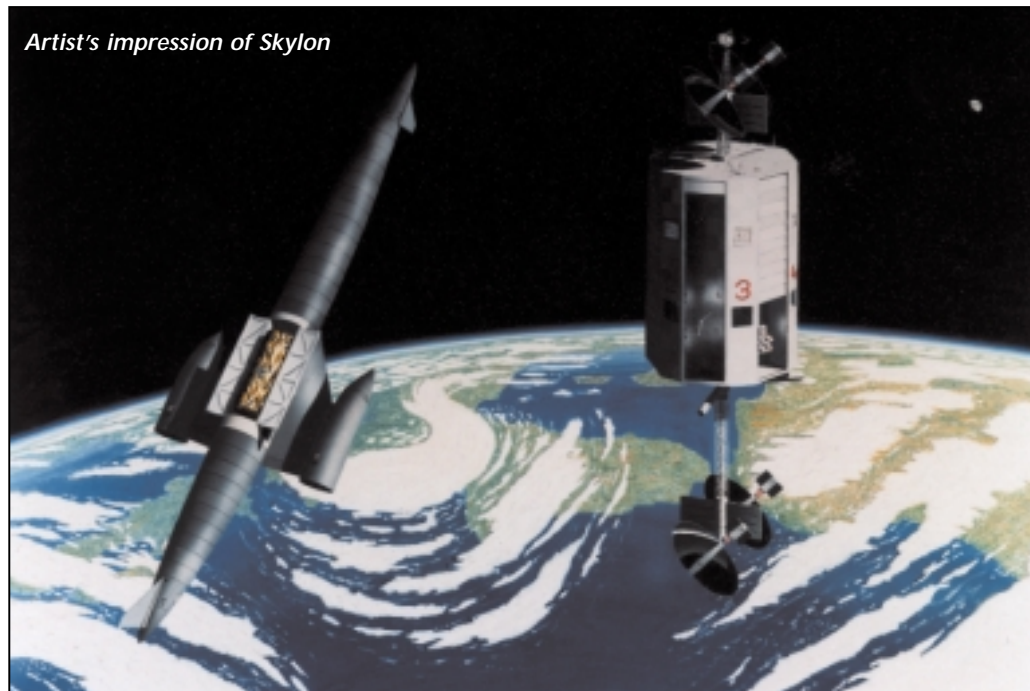
Buchan utilised, and further modified, innovative manufacturing technology that it developed for high quality tunnel linings, to ensure that the beams met the exacting requirements of the UKAEA's technical specification. This involved specially constructed concrete moulds that provided a smoother and more accurate surface finish. They were also more robust than timber or steel mould alternatives which can develop small distortions when concrete is poured into them.

Another innovation involved the use of polypropylene fibres within the concrete mix to further avoid the potential shedding of concrete particles.

UKAEA Project Manager, Andrew Darke, commented: "We are delighted with the end product. In particular the tolerances achieved were remarkable!"

The beams were manufactured at Buchan's Coleshill factory, near Birmingham. More details from Frank Stokes on 01789 204288 or email frank.stokes@amec.com

SPACE FOR NEW SKYLON BACKING



Developers of the Skylon space plane, featured in the first edition of Fusion Business, are now looking for financial backing to take the project to its next stage.

Skylon is a cross between a rocket and an aircraft, designed to cut the cost of transporting satellites and components into space.

Alan Bond, Director of Reaction Engines Ltd (REL), the company behind the project, says: "Skylon brings access to space within reach of a wide range of industries which until now have only had limited or no access to the potential that space offers.

"This might include drug research, developing innovative engineering techniques, as well as space station construction."

Skylon is using modelling and analytical skills developed by Alan Bond during his 14 years at the UKAEA Culham Science Centre working in fusion.



It will use low density (7% of water) liquid hydrogen as its fuel, and unidirectional carbon fibre reinforced plastic composites, most commonly found in advanced sports equipment, including fishing rods, for the internal space frame members of the fuselage and wings. More details from Alan Bond on: 01367 718880.

JET Facilities Update

The first experiments on the JET machine at Culham, under its new organisational framework, have been hailed as a success. With the launch of the new EFDA (European Fusion Development Agreement) framework on January 1st, the scientific programme for the JET facilities is carried out by a series of Task Forces,

under the management of the EFDA Close Support Unit at Culham.

Task Force Leaders are co-ordinating the work of fusion scientists, who are seconded from all European Euratom Associations laboratories involved in EFDA. A total of 170 visiting scientists will have worked on the JET facility by the end of this year. The work programme has been designed to continue the development of fusion towards the 'next step', the planned fusion experimental reactor, ITER.

Experiments during 2000 have focussed on plasma shaping, performance near operational limits and further characterisation of the divertor (exhaust system).

According to EFDA Associate Leader for JET, Jérôme Paméla, this is a new organisation with a new spirit, offering all fusion scientists in Europe a chance to take part in exciting and new experiments on the largest fusion device in the world.

Industry continues to play an important part in the work on the JET facilities, through contracts placed via the tendering system for a range of equipment, technologies and services.

The main enhancement in progress is an upgrade of the Neutral Beam heating system which should provide an additional 7.5MW in 2002.

Following a call for tenders for new power supplies and accelerator grids, the relevant contracts are now being placed.

More details at www.jet.efda.org or from Industry coordinator Miriam Mason on 01235 464104.