RUTHERFORD BULLETIN

5 May 1980 No.8

New Initiative for Robots

SRC has decided to fund a major new initiative in Industrial Robotics research in selected Universities and Polytechnics. The intention is to "leap-frog" the present generation of robots and to provide the research needed to ensure UK industry can take full advantage of the intelligent robot as it emerges in the mid-1980s. The new initiative can draw on at least £500K per annum over the next five years. It will be co-ordinated by a small technical management team at RL/AL, which may later expand to carry out some research itself.

Challenging

The research required is extremely challenging, and covers a wide range of disciplines; a subsequent article will give more details of what is needed, and why. The main topics will probably be sensors, fine mechanical engineering, control engineering and adaptive (learning) systems. Improved software is likely to dominate all but the second. The Engineering Board has accepted a proposal that most of this work should at first take place in ad-hoc partnerships to be set up between individual University groups and firms applying (or sometimes building) robots. A firm building robots may be a suitable partner if it acts as a "window" through which the University group may be aware of not just one, but a number of potential applications which can benefit from the proposed work.

Partnership

The partnership idea will help to ensure that future research is firmly rooted in the soil of real problems encountered now when trying to introduce present generation robots into current manufacture. It seems unwise to expect the academic to design better robotic systems without first learning what is wrong (and what is perfectly good enough already) in present robots. Possible disadvantages of forming the partnerships are first, that SRC will be supporting R and D, which, in the early stages at least, involves relatively little R; and second, some tricky questions of commercial confidentiality and rights ownership may need to be considered at an early stage of drawing up the "marriage contract". Both these problems are inherent in most good engineering research and the success of the Engineering Board's Teaching Company scheme is witness that both can be overcome. The Board's use of University/Industrial partnerships for the Robotics Initiative is a short-term measure to increase the number and knowledge of academics working in robotics research in Universities, not an end in itself. It is hoped that the better partnerships will become increasingly independent of SRC support as their robotics work begins to bear fruit.

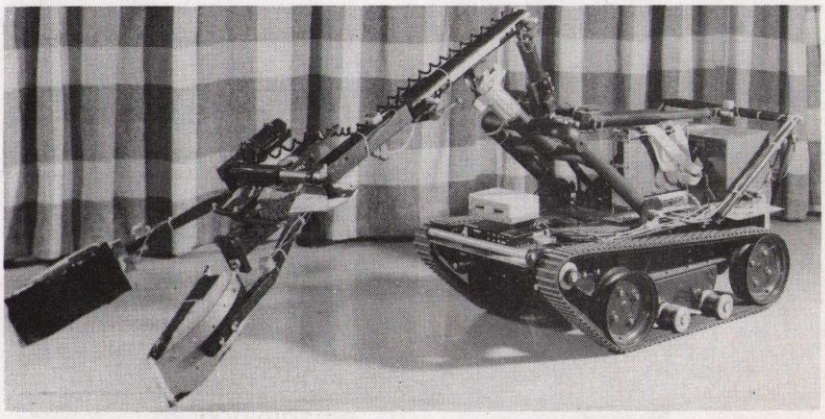
Co-ordination

The Laboratory will have an important role in all this. A small co-ordinating staff has already started on a world-wide assessment of current IR research and made contact with many University groups likely to be able to make a major contribution to robotics research, as well as with firms who have already expressed interest in becoming partners. It is hoped to give increasing guidance in the formation of new partnerships and the drafting of grant applications to plug gaps in the technical programme. Five partnership proposals have already emerged from this effort and the Engineering Board has approved the first, between Langing-Bagnall (Basingstoke) Ltd and the robotics group of Dr Mike Larcombe at Warwick University. The object of this proposal is to extend Dr Larcombe's earlier work on robot vehicles towards the production of a fullsize Free Ranging Industrial Truck (FRAIT) for which a considerable market is seen, especially in the use of FRAITs to interface between an automatic warehousing system and a goods-vehicle loading bay.

Central Pool

Some part of the research work is also expected to take place at the Laboratory: budgetary provision has been made for an increase to 5 staff by 1983. The likeliest topic will be one required to underpin the work of all the University partnerships, eg the design and production of silicon devices for hard-wired implementation of special algorithms for feature extraction and adaptive control; or the later stages of helping to groom a robot user-language for adoption as a potential international standard. Meanwhile, the co-ordinating staff intend to acquire a number of currently available robotics ancillaries, particularly "robotic eyes" for loan to, and comparative assessment by, University groups. If funds permit, a small loan pool of micros suitable for University use in a multiprocessor robot environment will also be established. This will run on a similar basis to that maintained by the Distributed Computing System project. It is hoped to arrange ad-hoc topical meetings among the University/Industry community on subjects such as demands on the assembly robot, latest techniques in visual feature extraction; a communal multiprocessor architecture, problems in arc welding and adhesives application; and language structures.

We are indebted to Dr Peter Davey for this news.



The Warwick University robot "Commander Bill" can be left to wander at will, keeping clear of obstacles by sonar soundings, picking up only such objects as its pressure sensors are programmed to accept. 32010

INTERNAL Events

NIMROD LECTURES
LECTURE THEATRE - 1400 hrs

13 May: Dr Michael D Sokoloff/Berkely
1100 hrs "Evidence for Hard Gluon Bremsstrahlung in a Deep Inelastic Neutrino Scattering Experiment".

19 May: Dr R J N Phillips/RL
"Neutrino Oscillations".

HEP SEMINARS
R61 CONFERENCE ROOM - 1100 hrs.

7 May: Dr Colin Fisher/RL
"Studying Hadronic Charm Production using the High Resolution Bubble Chamber. Results and Future Prospects".

14 May: Dr D Morgan/RL
"$\bar{p}p \to \pi\pi$ in the Resonance Region".

21 May: Dr P M Watkins/Birmingham
"Dimuon Production in 40 GeV/c Hadron Beams".

FILM SHOW
LECTURE THEATRE - 1215 hrs

9 May - "Such Stuff as Dreams are made on"

SRC Appleton production.

EXTERNAL Events

THEO.PHYS.SEMINARS
T.P.L.TH. - AERE - 1400 hrs.

13 May: Prof A K Jonscher/Chelsea
"The Universal Dialectric Response of Solids".

20 May: Dr A M Stoneham/AERE
"Non-Radiative Processes in Materials Science".

N.P.COLLOQUIUM
CONF.RM.H8 - AERE - 1515 hrs.

8 May: Dr R Harman/SURRC
"Paleo-climatology".

15 May: Dr C J Sofield/AERE
"Charge Exchange in Solids".

PHYSICS COLLOQUIA
CLARENDON LAB - OXFORD - 1515 hrs

9 May: Dr J C Taylor/Oxford
"How are Quarks Confined?"

16 May: Prof Hermann Bondi FRS/DofE
"The Energy Scene".

23 May: Prof K F Smith/Sussex
"The Electric and Magnetic Moments of the Neutron".

ELEM PART PHYS SEMINARS
NPD OXFORD - 1415 hrs

8 May Prof. G Snow/CERN-Maryland.
"Probing Neutrons and Protons Separately with High Energy Neutrinos".

HEP SEMINARS
DAMTP - CAMBRIDGE - 1500 hrs.

9 May: D H Perkins/Oxford
"Past and Future Experiments on the Proton Lifetime".

16 May: L Tyburski/Oxford
Title to be announced.

HEP SEMINARS
CAVENDISH LAB - CAMBRIDGE - 1500 hrs.

21 May: Dr F Loebinger/Manchester
"Results from the JADE Experiment at PETRA".

28 May: Dr D Websdale/Imperial
Title to be announced.

ELEM.PART.PHYS.SEMINARS
UNIVERSITY COLLEGE LONDON - 1415 hrs.

7 May: F Close/RL
"Filling Cavities with QCD".

14 May: A Hey/Southampton
"Are There Exotic Hadron States".

21 May: R Hughes/Oxford
"The Meaning of Asymptotic Freedom".

ELEM.PART.PHYS.SEMINAR
WESTFIELD COLLEGE - 1400 hrs.

8 May: Prof E Lomon/Paris
"Isobars, Quarks and Intermediate Energy Nucleon-Nucleon Scattering".

SHEP SEMINARS
SOUTHAMPTON - 1430 hrs.

9 May: Dr G Macauley/Birmingham
"Strings and Things".

16 May: Dr P V Landshoff/Cambridge
"High Order QCD Corrections to Exclusive Processes".

23 May: Dr D R T Jones/RL
"Dimensional Regularisation and Supersymmetry".

PART.PHYS.SEMINARS
BIRMINGHAM - 1615 hrs.

16 May: Prof D Perkins/Oxford
"Proton Decay Experiments".

23 May: Dr M Teper/RL
"Lepton Pair Production when the Simple Drell Yan Picture Breaks Down".

COMPUTER SCIENCE SEMINARS
LIVERPOOL - 1415 hrs.

7 May: Dr C Greenough/RL
"SRC Support for Finite Element Software".

21 May: Dr B Ward/Unilever
"Statistical Problems in Pattern Recognition".

Lost & Found

Found in R25 Computer Room on April 3 1980, a ring holding three keys with a tag reading B13.9. In R1, another key - National Key Y1 makers name Cole National USA, has also been found.

For further details on these items, and all enquiries on Lost Property, please telephone Personnel Group, Ext 495.

Sums of money have been found in both the R2 area and the Atlas Centre. For further information please ring Personnel Ext 495.

Would the owner of a Parker Pen found in R1 on 8 April 1980 please contact Derek Jones, R63 Ext 666/6185.

Thanks

Kate Gascoingne wishes to thank all those who contributed to her farewell gift, and would like to apologise to those she was unable to thank personally.

Film Badge Notice

It is Period 5 Colour Strip BLUE. Please change your films promptly and check that all old ones are returned. Next Film Change Monday 19 May.

Trade Exhibition

There will be a mobile exhibition by Tektronix, of Computer Graphics Systems, outside R20 on Wednesday 7 May from 1000 - 1600 hrs.

Sales to Employees

Sales of scrap metal/plastics as set out in RLN 12/73 will be made on 9 May and 23 May at the scrap compound, rear of R40 from 1200 - 1230 hrs.

Coffee at Cosener's

This month's Coffee Morning will be held on 6 May at the Cosener's House Abingdon from 10.30am - noon.
All wives and children of Rutherford and Appleton Laboratories staff are welcome, also the families of University visitors.

Starlink

The Computing Division of Rutherford/ Appleton Laboratory is to manage 'Starlink'; an SRC initiative to provide and coordinate image processing and data reduction facilities for use by the UK astronomical community.

UK astronomers now have access to a wide range of observational instruments both on the ground and in space. Most of these are producing data in the form of large digital arrays and the requirement for powerful data processing facilities has become critical. Important sources of data now are the Anglo-Australian and the UK Schmidt telescopes in New South Wales, the International Ultraviolet Explorer (a joint NASA, ESA, SRC Satellite for UV-spectroscopy) and the various photographic plate measuring machines. In the future the SRC telescopes being erected on La Palma in the Canary Islands and the Space Telescope, due for launch by the Space Shuttle in 1983, will dramatically increase the digital data rate.

Essential Facilities

There have hitherto been very limited facilities in the UK for performing scientific analysis of the observations. Astronomers have either had to reduce the data manually, or devise their own data processing facilities on an ad hoc basis. Even those modest facilities which exist can be used by only a few astronomers and they are heavily oversubscribed. Also, effective interaction of the astronomer with the reduction procedures is very much in demand. In the 1980s the vast majority of astronomy will be done using data in digital form and adequate image processing facilities will be essential. Starlink is SRC's response to these problems and is in line with its policy to maintain the UK in the fore front of astronomy.

Starlink Computers

Starlink is based on six computers - VAX 11/780s located at Chilton, at the two Royal Observatories, and at UCL, Cambridge and Manchester, all important centres of astronomical research. All but the one at Manchester are now installed and working. The systems will be linked to the one at Chilton to enable software to be managed and distributed, and so that the various centres run a coordinated service. System software, in particular an 'environment' for interactive data reduction, will be developed at the Laboratory. It is hoped that astronomical applications work, while being coordinated centrally, will be undertaken at a large number of sites.

Image Processing

Interactive image processing has become an important technique in astronomy. Starlink has ordered from the British Company Sigma Electronics, twelve of their new 'Advanced Raster Graphics Systems' (ARGS): a system where a television-type display is refreshed from semi-conductor picture stores. It contains powerful 16-bit microprocessors, giving an extensive range of graphics operations, together with facilities to store subroutines and picture files. The Starlink systems will each contain ½Mbyte of memory which can be assigned to images in a flexible way (ARGS will accommodate up to 16Mbyte in principle). There will be two such 'image processing workstations' connected to each VAX, allowing display and manipulation of astronomical images in full colour on high precision 22" monitors.

It is hoped that the first Starlink ARGS will be delivered here before mid year.

Ariel VI Film

"SUCH STUFF AS DREAMS ARE MADE ON"

R22 Lecture Theatre

Friday 9 May 1215 hrs.

This film is an SRC (Appleton Laboratory) production about the preparation of experiments to be mounted on the satellite Ariel VI, culminating in the launch in June 1979. It will last for an hour and the producer Dr Roger Burdett will be present to answer questions.

After an introduction to the overall scientific intentions of Ariel VI by the project scientist, the film visits each of the university experimenters in turn. The scientific background to each experiment is described and the film then follows the manufacture of the instruments including visits to all the main contractors used by the experimenters.

The Control Centre at Appleton Laboratory is described as well as the method of data reception from the spacecraft and the processing of data before it is sent to experimenters.

Following integration and testing of the spacecraft, the film shows the final test phase and attachment of the satellite to the launch vehicle at the rocket range in the USA.

Launch rehearsal procedures lead on to the climax of the film, the launch.

Library Notice

Would whoever removed the following issues of 'Nature' from the Library, please return them as other people would like to see them.

Nature for 6 March 1980 (can LEP be built in 1980)
Nature for 20 March 1980 (particle beam weapons)

Cricket

Cricketers please note there are practice sessions TUESDAYS at 5.30 at the nets.

Rutherford Medal

We are pleased to announce the joint award to Dr J J Thresher (Rutherford Laboratory) and Professor P G Murphy (Manchester University) of the Institute of Physics" 1980 Rutherford Medal and Prize. The award was made in recognition of their "contribution to elementary particle physics through measurement of the elastic scattering and polarisation differential cross sections for pion-proton scattering".

Dr Thresher, as most of us know, is head of High Energy Physics Division, and Professor Murphy is a Rutherford Laboratory visitor to the Division, who was a staff member prior to taking up an appointment at Manchester.

The Award is made in even dated years for contributions to nuclear physics, elementary particle physics or nuclear technology. The Presentation of the Awards will take place on 7 May in London.

Queen's Award

The Queen's Award for Technology has been won by Oxford Instruments for "highly advanced superconducting systems for nuclear magnetic resonance spectroscopy". A major part of the system, the high field NMR magnet, was developed in collaboration with the Rutherford Laboratory.

This is the second award for this work; the first being the American I.R.100 Award won in September 1979. *(Bulletin 19.1979)*.

The magnet differs from earlier superconducting magnets in that it uses filamentary niobium-tin superconductor as well as the usual niobium-titanium. The essence of the Laboratory's contribution to the magnet is the technique for manufacturing very good joints between the two types of superconductor.

Acknowledgement

The family of the late Mr James Henry Casterton would like to express their sincere thanks to all at the Rutherford Laboratory who sent messages of sympathy, and for the lovely floral tributes received in their recent sad bereavement.

Thankyou Ernie

The Laboratory lost another of its well known characters on Friday 18 April, when Ernie Angell retired after eighteen years with the Mechanical and Electrical Services Group of Engineering and Building Works Division.

Ernie started his career as an electrician apprentice with the LMS at Euston in 1930, and by 1945 was working for the Cornwall Electric Power Company. Nine years later he joined the Air Ministry Works Department and spent the next five years keeping St Eval Airfield in Cornwall electrically serviced. He then spent 3 years at the Wiltshire College of Further Education before coming to Chilton in 1962.

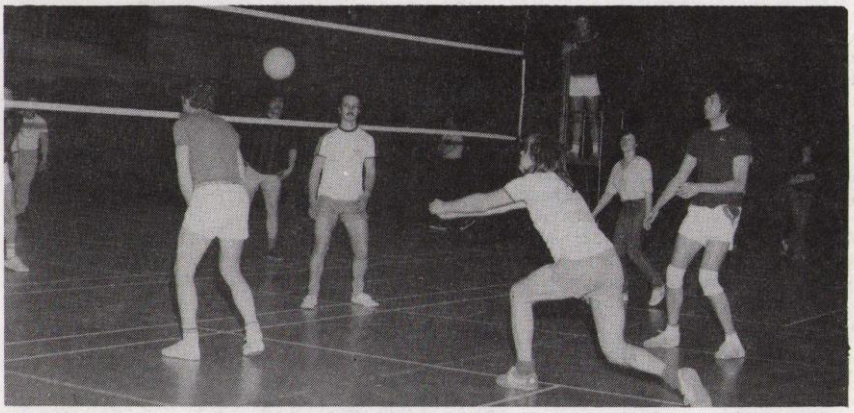
The nature of Ernie's job took him all over the Chilton site, most electrical equipment being known to him personally It is said that at portable tool testing time Ernie could extract a particularly urgently required tool not by reading the labels, but by recognising its piece of string! The generous and helpful nature of Ernie, made him a popular and respected member of the Laboratory community, so it was no surprise that R18 mess room was packed to the gunnels with friends and colleagues for his retirement Presentation Ceremony.

"Thank you on behalf of the Division and the Laboratory for all you have done for us - you will be greatly missed", said Mr Bert Brooks as he presented Ernie with a 'Flymo' grass cutter on behalf of all Ernie's friends. "Its really for my wife, observed Ernie".

Nevertheless retirement for Ernie looks like being a busy time. He is still a member of the Royal Observer Corps and attends summer camps, is stage electrician for the "Wantage Domino Players", is restoring an old car, and functions as general electrical consultant.

Ernie thanked everyone for the generous gifts. He was sorry to be leaving and would miss all the friendly faces. He hoped he'd been of some help to all, and wished everyone the best for the future. 'Lastly', he said, "I must thank Harry for all the shoe leather he has used on the card signing tour!"

Indoor Sports Day



This year's event was a great success in every way. A great venue, the 'Oasis' at Swindon, smooth organisation, and a lively Disco to end the day made it a very entertaining occasion.

Events

BADMINTON MIXED DOUBLES
Another tournament dominated by the Rutherford Lab. Kate Knight and Richard Lawrence winning and Pam Richens and Brian Boardman filling the runners-up spot.

BADMINTON - MENS DOUBLES
Won again this year by the defending champions David Wooton and Roger Wolfender (RL) with Peter Parry and Peter Gear (RL) being runners-up.

SQUASH
The toughest tournament of the day! Despite a brave effort by Leona Cooke, Bob McClure and Frank Close who finished in second place the title went to Daresbury.

DARTS
Another long day. Mind you they had the advantage of playing adjacent to the bar, so liquid refreshment was always on hand! The winners were the Rutherford Laboratory team of Ian Forster, Tudor Morgan, Ken Biles and Paul Angel.

CRIB
No trouble here for the Rutherford Lab. Steve Hancock and George Dussold after a shaky start ran out easy winners.

VOLLEYBALL
There was no success for any of the Labs teams. We don't seem to take this event very seriously, but the players enjoyed themselves, and Appleton won.

CHESS
A good tournament this with some exciting games, played to a fixed time limit (10 minutes) each player/game. Tim Jones (RL) winning the event, beat Peter Flint of Daresbury 2 games to nil in the final.

BRIDGE
This event was won by Appleton. Rutherford didn't have any entries. Surely someone must play.

TABLE TENNIS
An exciting event. After another long day, the final was played off between the Rutherford team and an Atlas Centre team, with the Rutherford team of John Varley, Harry Jarvis and Arthur Chilvers winning 6-3.

It really was a most enjoyable day, attended by about 120 Rutherford Staff.

P.C.

Flyfishing

Anyone interested in flyfishing, whether expert or beginner, is asked to contact Harry Edwards Ext 6177 or Peter Craske Ext 232.
If there is reasonable response we will arrange a meeting of those interested in the very near future.

The idea is to start an informal Club to share expertise in tackle and methods and perhaps arrange outings to local and semi-local fisheries.

RUTHERFORD LABORATORY BULLETIN
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