



Surrey Network

Pioneering the "NewSpace" Revolution

A Study Day on Friday 21st February 2025 at The Menuhin Hall, Stoke d'Abernon

Speaker – Professor Craig Underwood

This study day examines how the University of Surrey came to pioneer a new approach to carrying out space missions using small satellites. This work has developed over many years, with Craig being involved since 1986. See the next page for a synopsis and further biographical information.

Programme

- 9.30 Registration – Water available but not Coffee / Tea
- 10.00 **UoSAT – An Amateur Radio Satellite for the UK** – In 1979, Martin Sweeting, a student at Surrey, had a vision for a new generation of small, low-cost, yet sophisticated satellites which would make use of the latest micro-electronic technology then becoming available. He organised a team to build them and was able to persuade NASA to launch them for free! The results: UoSAT-1 and -2 were astonishing successes, boosting STEM education worldwide.
- 11.00 Coffee / Tea
- 11.30 **Maintaining a Space Programme** – Successive UK Governments had little interest in having a national space effort, so how could Surrey continue? The answer was to form a unique university owned company to sell its expertise to the world and thus fund further development. Surrey Satellite Technology Ltd. (SSTL) was born, making the UK the world-leader in affordable space technology, now launched on European Ariane rockets from Kourou, South America.
- 12.30 Lunch – Bring-Your-Own – Tea / Coffee available
- 1.30 **New Capabilities – New Utility** – As the technology advanced, new paradigms for satellite applications became possible, such as the Disaster Monitoring Constellation. Even the UK now took notice, and the British National Space Centre’s MOSAIC program led to more sophisticated international missions – launched out of post-Cold-War Russia.
- 2.30 Tea / Coffee
- 3.00 **"Smaller, Faster, Cheaper"** – This was a NASA mantra coined in a time of budget cuts for carrying out its space missions. NASA more-or-less concluded it couldn't be done, but in the 21st Century, private enterprise was to show otherwise. What Surrey started 45 years ago has been taken up by a multitude of new space companies: "NewSpace" or "Space 2.0" is revolutionising the utility of space – but are we now surrounding Earth with space "junk"?
- 4.00 Departure

To Book – Send the slip below by 18th February with a cheque for Member £12, Guest £15, Online £7, payable to Surrey u3a Network, to Denise Dobbs – u3a, 5 Aldridge Rise, New Malden KT3 5RJ, Phone 07964 798791. Enclose an SAE or an email address for confirmation. **Or make a bank transfer** to HSBC Account No. 11519018 Sort Code 40-27-07, Event Ref. Feb2025, and send an email to surreyu3astudyday@outlook.com with the booking information below. **Or on day pay at door £15.**

SATELLITES Member £12 Guest £15 At Door £15 Online £7 21ST February 2025

Please Tick – Attend Hall or Virtually ; Email or SAE ; Cheque or BankTrsf .

Title First Name Surname Name of u3a

House Number/Name. Post Code Phone.

E-mail Address

If you need disabled parking, tick and give a car registration number ,

If you need a wheelchair space in the hall, tick or a step-free seat, tick .

If you would like to receive details about future study days by email, please tick here .

Pioneering the “NewSpace” Revolution – Extended Synopsis

Space technology plays a pivotal role in everyone’s lives today – often in hidden ways – and it is vital to the world’s economy. It is a global business which is growing across the world: especially in India and China, as well as in the West. For example, the ~£20 billion UK space industry alone employs more than 50,000 people directly and supports a further 125,000 jobs in the supply-chain. It is growing at ~£1 billion per year, and a further 100,000 UK space-related jobs are expected to be created in the next 20 years.

Much of this is being driven by private enterprise, with its leaner, cheaper and faster way of managing space missions compared to government agencies; and much relies on constellations of smaller, low-cost spacecraft, which leverage off “commercial-off-the-shelf” (COTS) technologies. This so-call “NewSpace” or “Space 2.0” approach is thought by many to be a recent 21st century concept, but surprisingly it was pioneered more than 40 years ago at the University of Surrey by (now) Professor Sir Martin Sweeting and his “UoSAT” Unit (now the Surrey Space Centre).

The University of Surrey and its spin-out company, Surrey Satellite Technology Ltd. (SSTL) remain world leaders in the design, construction and operation of “micro-satellites”. Whilst the first satellites were necessarily small, due to the limitations of the then available launch vehicles, satellites quickly grew to the large and expensive vehicles we see today. In the late 1970’s, Martin, then a student at the University of Surrey, and keen amateur radio enthusiast, realised that with the advent of the microprocessor, satellites could be built that were much smaller and cheaper than hitherto, and yet have capabilities that could match or even exceed those of the traditional large satellites – and so began the UoSAT (University of Surrey Satellite) programme. Initially, the satellites produced were part of the amateur radio satellite service, and so they also carried an OSCAR (Orbiting Satellite Carrying Amateur Radio) designation. Their purpose was to support science and engineering research (for example developing new digital communications technology) and to support STEM education by enabling schools and colleges to easily pick up their signals. This is where the speaker got involved – initially as a teacher, using the satellites in class, and then, as a physicist/ computer scientist, moving to Surrey to develop the ground-station facilities, and to help design of the satellites to survive the harsh environment of space.

Technological advances have made it possible to construct even smaller satellites, at an order of magnitude less cost. These “nano-satellites” open up many new possibilities for space exploration. In 2000, Surrey launched its first 6.5 kg nano-satellite: “SNAP-1”, which demonstrated remote inspection and autonomous orbital manoeuvring using advanced miniaturised technologies. Since then, the advent of the international “CubeSat” standard, has enabled whole new classes of space mission to be undertaken by universities, commercial enterprises and Space Agencies. This workshop will present the state of the art in highly miniaturised spacecraft, and discuss the Surrey’s pioneering role in these developments, including Surrey Space Centre’s STRaND-1, AISat-1N, InflateSail, and RemoveDebris missions, and its proposed LUCE VMMO lunar mission.

Biographical Information about our Speaker

Craig Underwood is Emeritus Professor of Spacecraft Engineering at the University of Surrey. He took his undergraduate degree in Physics with Computer Science at York and went on to teach Physics at Scarborough Sixth-Form College, where he first became involved with Surrey’s UoSAT satellites. In 1986, he joined Surrey as a researcher and later lecturer, gaining his PhD in 1996. His career focused on the space environment and its effects on spacecraft design, and on remote sensing instrumentation, leading the Environments & Instrumentation Group. He became Director of Teaching of the School of Electronics and Physical Sciences and subsequently Deputy Director of the Surrey Space Centre from 2007-2014. He formally retired in the summer of 2019 to expand his work on the public understanding of science and engineering. Craig Underwood formally retired from the University of Surrey in 2019 but continues to teach there and at the Guildford Institute.

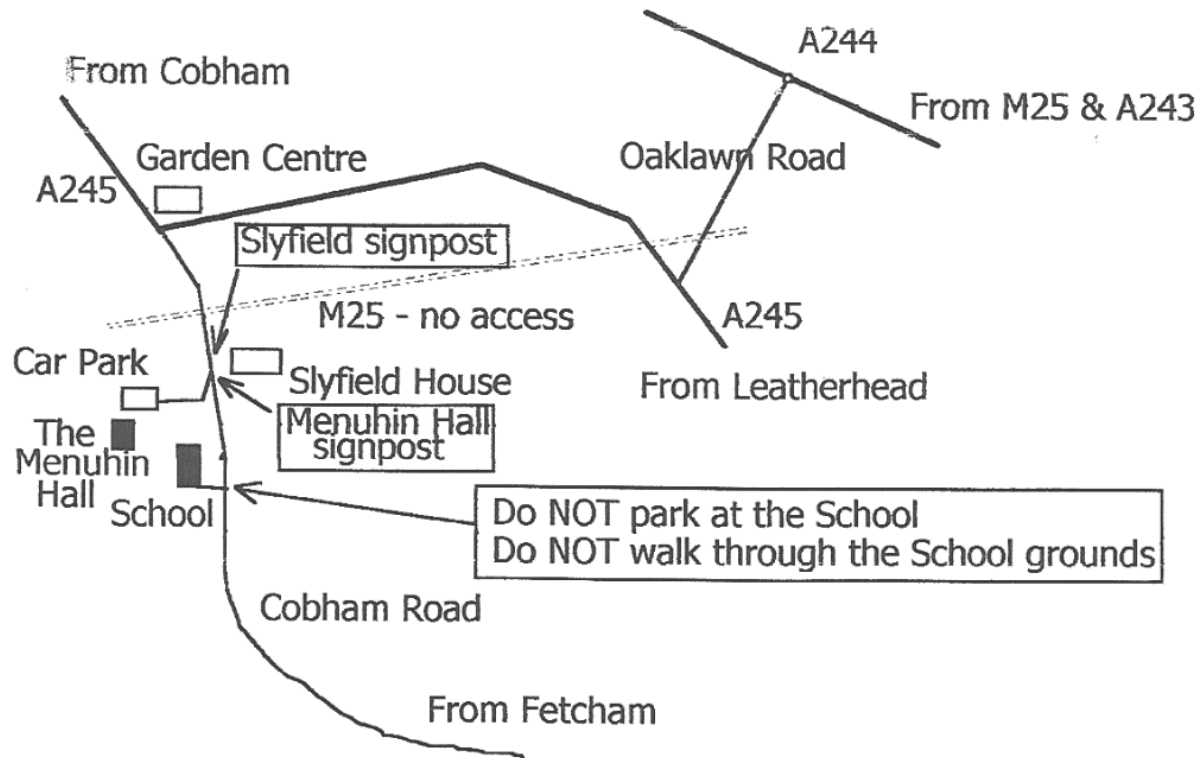
Location & Contact Details for Study Day

The Menuhin Hall, Cobham Road, Stoke d'Abernon, Surrey KT11 3QQ

Map Ref: TQ 132 579 on Landranger 187 & Explorer 146

Telephone 07763 805046 (Emergency - On-Day-Only) or Menuhin Hall Office 08700 842020

There is a Garden Centre (01932 862530), about 800 metres to the north of the Menuhin Hall where light lunches are available. Reservations are not required.



The Menuhin School was founded in 1962 in London and moved to its present site in 1964. It has around eighty pupils learning to play stringed instruments including piano and is financed, in part, by the DfE. Lord Menuhin was born in New York on 22nd April 1916 and died on 12th March 1999 in Berlin. His parents had come from Russia. His first public concert was in March 1924 and his first in Europe, in Paris, in 1927. His performance of Elgar's Violin Concerto was recorded at the Abbey Road Studios in 1932. The Hall, designed by Mark Foley, was conceived as a memorial to Yehudi and was handed over to the school on 5th August 2005. The official opening was on 7th January 2006. Yehudi is buried by the stone pillar in front of the Hall. Nearby is an oak which he planted on his 80th birthday. The Hall was first used for a Surrey Network Study Day on 14th October 2005.



Surrey Network

Study Days at the Menuhin Hall

Surrey Network Study Days – We welcome members and guests to our study days in the Menuhin Hall, while since the pandemic also making it possible to view the study days remotely.

Advertising & Booking – The practice of applying by post or by email continues, with booking responses being sent as members chose, while payment can be made by cheque or bank transfer. We advertise the study days with full details and booking forms on our website – <http://u3asites.org.uk/surreyu3anetwork/> and circulate the information electronically to all u3as in Surrey Network and surrounding areas. We also electronically circulate a poster suitable for advertising the future programme on display boards or websites.

Nut Allergies – The Menuhin School has pupils who have an allergic reaction to nuts and the staff have taken the decision to make the school and the Menuhin Hall a nut-free environment. Please ensure that your lunch does not contain any trace of nuts.

Disabled Parking – There are six spaces behind the hall and there are more in the main car park. If you have a blue badge and need level access to the hall, then tick Disabled Parking on the booking slip; you will then be allocated a space at the back of the hall and sent a permit. There is a drop-off space where disabled members have level access to the hall.

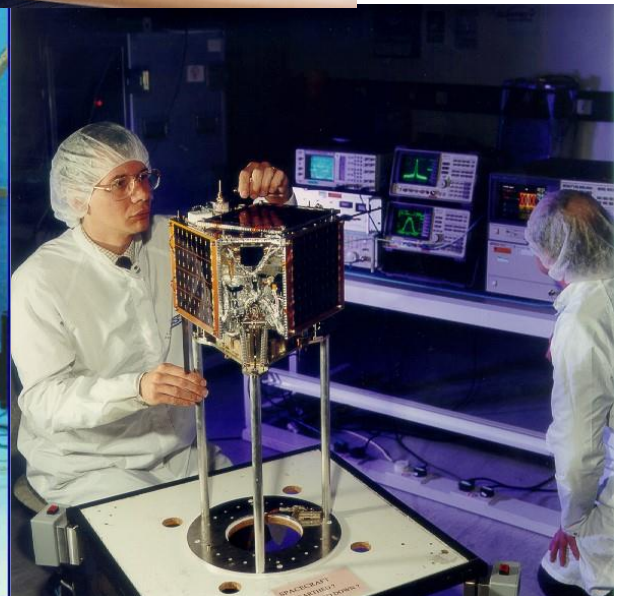
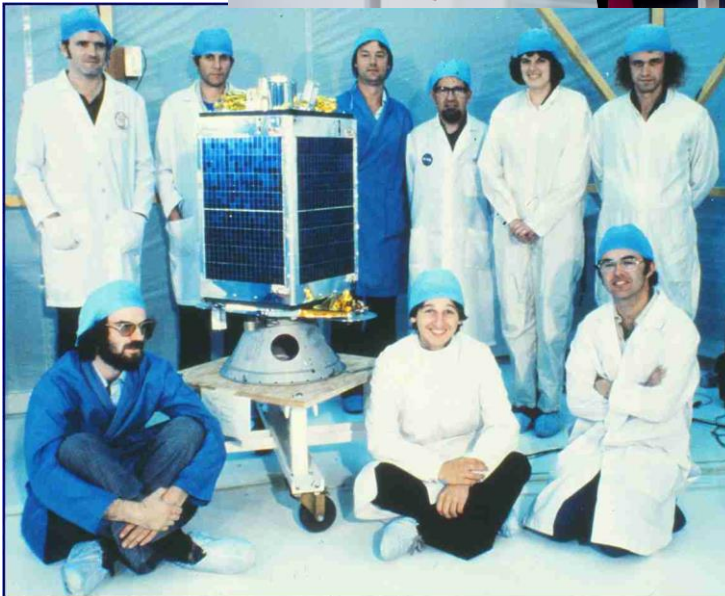
Wheelchair Spaces – If you need a seat removed in the hall to accommodate a wheelchair then tick Wheelchair on the booking slip.

Support for Network Committee – The study days have been running successfully for twenty years. New volunteers with ideas for the future programme and the commitment to help run future study days will be made very welcome. Please contact Surrey Network Chairman, Mike Brigden, on 07766 331642 with offers of help.

Surrey u3a Network Study Day

Pioneering the “NewSpace” Revolution

Presented by Professor Craig Underwood, University of Surrey



The Menuhin Hall, Stoke d'Abernon on Friday 21st February 2025

9.30am Registration for 10am Start

To book Members should send a completed booking slip with a cheque for a Member £12, for a Guest £15, or for Online £7, payable to Surrey U3A Network, to Denise Dobbs at u3a, 5 Aldridge Rise, New Malden KT3 5RJ, Phone 07964 798791, by Tuesday 18th February or make a bank transfer to HSBC Sort Code 40-27-07 Account Number 11519018, Event Reference Feb2025, and email booking information to surreyu3astudyday@outlook.com.