

Wireless Heritage SIG**'Time for Telecoms'**Friday 16th April 2018

The Wireless Heritage SIG is championed by Stirling Essex of **Espansivo**, Steve Haseldine of **Radio Communication Museum of Great Britain**, Andy Sutton of **BT**, Geoff Varrall of **RTT Online**, Nigel Wall of **Climate Associates** and Simon Rockman of **Fuss Free Phones**.

Venue: Science Museum, Exhibition Road, London, SW7 2DD**INFORMAL AGENDA****15:50** Mustering and muttering – meet in the 2nd floor café next to the clock museum**16:00** Self-guided tour of the clocks**17:00** The Wells Cathedral Clock strikes 5.00pm
Ticking since 1393, Richard Second marks the minutes and chimes the hour**17:00** Relocate to the Dana Research Centre and Library**17:05** **Dr John Haine, Royal Academy of Engineering, Visiting Professor at Bristol University**
'Professor Robertson's Clock'

David Robertson, the first professor of electrical engineering at Bristol University, designed a novel clock that kept University time and controlled the bell, Great George, from 1925 to the mid-60s. The clock was intended to be the world's first phase locked loop being synchronised to a daily time pulse from Greenwich distributed by telegraph line. John Haine describes the clock and how the synchronization worked from a modern viewpoint; and its current restoration.

17:35 **Stephen Haseldine, FIMC FRSA, Chairman, Deaf Alerter, Chairman of the Board of Trustees, Radio Communication Museum of Great Britain and Wireless Heritage SIG Champion**
'Time for the Hajj'

Just like the Wells Cathedral Clock calling the faithful to prayer, accurate time keeping is an essential part of the Hajj. Stephen Haseldine talks about the largest installation of networked (NTP LAN) wall clocks in the world.

18:00 **Tony Flavin, Manager of Strategic Research, Chronos Technology Limited**
"GPS as a time source and the need for alternatives?"**18:30** **Professor Andy Sutton, BT Principal Network Architect and Wireless Heritage SIG Champion**
'The history of synchronisation in digital cellular networks'

As data rates have increased it has become necessary to improve the timing and synchronisation and stability of cellular networks. This presentation reviews the history of timing and synchronisation in second, third and fourth generation cellular radio and the present and future timing requirements for fixed and mobile networks.

19:00 **Networking over drinks and refreshments, where a short film about the Post Office Mk II Speaking Clock will be shown.**

A Dollis Hill development of the Mk I used in Britain from 1936 until 1963, still using photocells and optical discs but intended to be controlled by quartz clock for greater accuracy. The production Mk IIs were installed in Melbourne and Sydney in Australia in 1954. The prototype remained in the UK and came to the Science Museum in 1957

20:00 **Event ends****Profile of CW**

CW is the leading international community for companies involved in the research, development and application of wireless and mobile, internet, semiconductor and software technologies. With over 400 members from major network operators and device manufacturers to innovative start-ups and universities, CW stimulates debate and collaboration, harnesses and shares knowledge, and helps to build connections between academia and industry. CW's 20 Special Interest Groups (SIGs) provide its members with a dynamic forum where they can network with their peers, track the latest technology trends and business developments and position their organisations in key market sectors. CW also organises major conferences and start-up competitions along with other high-quality industry networking events and dinners. With headquarters at the heart of Cambridge, UK, CW partners with other international industry clusters and organisations to extend its reach and remain at the forefront of global developments and business opportunities. www.cambridgewireless.co.uk

About the Clockmakers Gallery

The Clockmakers Gallery includes more than 1000 watches, 80 clocks, 25 marine chronometers and a number of fine sundials and examples of hand engraving, mapping the history of innovation in watch and clock making in London from 1600 to the present day. Assembled by the Worshipful Company of Clockmakers and once located in the Guildhall, this remarkable array of timepieces traces the story of the capital's clockmakers—from their first marine chronometers and mechanical clocks through the evolution of the wristwatch.

John Harrison was the inventor of the marine chronometer. Among the collection's highlights are the fifth chronometer he made, which he completed in 1770, and a four-month duration longcase clock by the father of English watchmaking, Thomas Tompion. www.sciencemuseum.org.uk/see-and-do/clockmakers-museum

Speaker Bios

John Haine, Visiting Professor, Bristol University (Communication Systems & Networks Research Group)

Dr. John Haine is a Visiting Professor at Bristol University, and was the founding chair of the IoT Security Foundation (where he still sits on the board), whose mission is promote best practice in appropriate security to those who specify, make and use IoT products and systems. John is a Life Member of the IEEE and serves on the CW Board.

John has spent his career in the electronics and communications industry, working for BT, Marconi, PA Consulting, and with start-ups including Cognito and Ionica. In 1999 he joined TTP Communications working on research, technology strategy and M&A activities; and then became Director of Technology Strategy in Motorola Mobile Devices when they acquired TTPCom. He was CTO Enterprise Systems with ip.access Limited, the leading manufacturer of GSM picocells and 3G femtocells. In 2010 he joined Cognovo Ltd, later acquired by u-blox AG. In u-blox he led the company's activities in the nascent NB-IoT standards activities and collaboration with Huawei, Neul and Vodafone in early trials. John retired from u-blox in 2015.

Stephen Haseldine, Chairman, Deaf Alerter, Chairman of the Board of Trustees, Radio Communication Museum of Great Britain

Steve Haseldine FIMC FRSA is the Chairman of three companies, Alerter Group plc, Electronic Communications Ltd and Evets Communications Ltd, businesses that design and manufacture in-building, radio-based, emergency communication systems; software defined radio solutions and operate PMR, FM Broadcast and Cellular transmission sites. His connection with radio started over 50 years ago as a schoolboy, when he became a licensed radio amateur, an interest which has influenced much of his professional career. Sponsored as a Computer Science student focused on software development with Rolls Royce, he subsequently worked for GEC Telecommunications before becoming a Management Consultant with Price Waterhouse.

Starting his own software house and radio communication businesses in 1979 he has found it rewarding that his two passions of software and radio have evolved into an almost common technology. He has seen his own companies being judged the Midlands Best Small Business of 2013 and the leading Company for Innovation in both 2012 and 2013. As well as remaining an active radio amateur, Steve has now amassed one of the largest personal collections of communication radio equipment in the UK, with over 3000 receivers, transmitters and ancillary equipment, the vast majority of which are fully operational. The collection spans from the early spark transmitters to the latest Software Defined Radios.

Tony Flavin, Manager of Strategic Research, Chronos Technology Limited

Tony joined the Post Office Research department (later to become BT) as an apprentice in 1974 and started his career in electronic and semiconductor design for early digital transmission systems. Later he helped develop the first optical fibre networks, before specialising in SDH and network synchronisation. He represented BT's interests globally at ETSI and ITU for SDH and OTN/DWDM transport systems and gained experience across network design, procure, test, development and rollout. In the later years with BT he was responsible for BT's Timing platforms supporting frequency time and phase across all of its platform domains.

At Chronos, Tony is responsible for strategic research, technical support within the research projects and helping new products to emerge into the marketplace.

Andy Sutton, BT Principal Network Architect

Andy Sutton is a Principal Network Architect within BT Architecture and Strategy team. He is responsible for 5G end to end network architecture, RAN architecture evolution and mobile backhaul strategy and architecture. Andy holds an MSc in mobile communications from the University of Salford and has over 30 years of experience within the telecommunications industry.

Andy's research interests include; distributed and centralised RAN and core architectures and protocols, network dimensioning, QoS and mobile backhaul (optical transmission, microwave and millimetre wave radio systems, network architecture and protocols along with synchronisation and time distribution in telecommunications networks). He also works on low latency and ultra-reliable networks architecture and design.

During his career Andy has worked for Mercury Communications Ltd, Orange, H3G, EE and BT. Andy is a Visiting Professor at the University of Salford and a research mentor at the 5G Innovation Centre at the University of Surrey. Andy is a chartered engineer and holds fellowships from the IET, BCS and ITP.

Andy contributes to International telecommunications standardisation activities and several industry forums. Andy also has an interest in the history and heritage of telecommunications and is a CW Heritage SIG Champion.