

5G & SATELLITE 2017

SPECTRUM, STANDARDS AND SCALE

A TECHNO ECONOMICS WORKSHOP

30-31 OCTOBER, SYDNEY, AUSTRALIA

6-7 NOVEMBER, SINGAPORE

5G and Satellite

**Registration
ON NOW**



**IN CONJUNCTION WITH RADCOMMS 2017,
1 - 2 NOVEMBER, 2017, SYDNEY, AUSTRALIA
THE AUSTRALIAN COMMUNICATIONS AND MEDIA
AUTHORITY'S (THE ACMA) LEADING SPECTRUM
MANAGEMENT CONFERENCE**

Your Vision. Our Expertise.

The workshop combines practical detail with strategic insight gained from over 30 years of involvement in the mobile broadband and satellite sector and consists of four sessions by UK and Global Expert, Geoff Varrall.

"TECHNO ECONOMICS AND PERFORMANCE COMPARISON FOR MOBILE COMMS AND SATELLITE INDUSTRY"

"QUALIFY AND VALIDATE PRESENT AND FUTURE SPECTRAL AND TECHNOLOGY INVESTMENT DECISIONS"



A Niche Markets Asia & RTT UK Collaboration

Past Attendees include the Singapore Police Force and McKinsey & Co.

Website: 5G and Satellite

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5G and Satellite Workshop

"A key objective of the workshop is to provide an objective analysis of the relative economics of 5G versus Satellite based K band mobile and fixed broadband connectivity.

We analyse the opex multipliers implicit in 5G terrestrial network densification and compare these with the rapidly changing economics of LEO, MEO and GSO space based delivery.

Within the past ten years the throughput of 'The Big Sats' has moved from 320 gbps to 1000 gbps per satellite.

Co-location and on orbit servicing and hardware upgrades promise a further step function leap in GSO capacity matched by even larger improvements in LEO and MEO platform capability.

New launch options and production methods are transferring the economics of delivering satellites into space.

Electric satellites and new solar cell technologies are together increasing the RF power available from space and orbit life expectation.

Flat panel adaptive and passive antennas combined with the 'nearly always nearly overhead' link connectivity available from high count mixed LEO, MEO and GSO constellations can and will produce significantly stronger flux densities than terrestrial based systems working in K band spectrum".



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"Technology innovation is reducing capex and opex in the satellite industry but increasing capex and opex in the mobile broadband industry.

We analyse the impact this will have on 5G and satellite operators and vendors and other stakeholders including Google, Apple, Facebook and Amazon (the GAFA quartet)."

Who Should Attend:

- engineering, marketing and financial team leaders planning or implementing 5G networks,
- next generation LEO, MEO and GSO satellite networks in South East Asia and the wider Asia Pacific,
- Asia Pacific vendors developing associated products and services,
- vertical market stakeholders including the automotive industry, utilities, public safety agencies and defence industry, web scale internet companies and regulatory agencies.



"The successful launch from New Zealand of the first Rocket lab space vehicle at the end of May marks another step in developing low cost access to space.

The launch is further validation that space economics are changing faster than most terrestrial operators realize suggesting that satellites can and should be factored into 5G business modelling."

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About Your Techno Economics Presenter

Geoff Varrall joined RTT in 1985 as an executive director and shareholder to develop RTT's international business as a provider of technology and business services to the wireless industry.

He co-developed RTT's original series of design and facilitation workshops including 'RF Technology', 'Data over Radio', 'Introduction to Mobile Radio', and 'Private Mobile Radio Systems and developed 'The Oxford programme', a five day strategic technology and market programme presented annually between 1991 and 2005. Geoff has been running in depth technology and market workshops for the industry for over 33 years, spanning five generations of mobile cellular technology.

A co-author of the Mobile Radio Servicing Handbook (Heinemann Butterworth, UK), Data Over Radio, (Quantum Publishing, Mendocino, USA and 3G Handset and Network Design (John Wiley, New York). Geoff's fourth book, Making Telecoms Work – from technical innovation to commercial success (John Wiley) was published in early 2012. His most recent book, 5G Spectrum and Standards was published by Artech House in July 2016.

He also writes regularly for a number of European trade journals and chairs a broad cross section of industry conference and trade events, and is a co-author of the Policy Tracker study - 5G and its vertical markets - challenges and opportunities 2015-2030.

Geoff graduated from St Johns College Cambridge in 1975, has played Jazz trumpet for just over 50 years and is a keen and moderately competitive marathon runner.

RTT is an affiliate SME Partner to 5G Innovation Centre (5GIC).

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Workshop Programme:

Day 1 Morning

Session 1: 5G and Satellite Spectrum

There is considerable debate as to where 5G can be profitably deployed in terms of spectrum allocation with options that include UHF, L band, S band, C band, Ku-band, Ka-band and E band.

In this first session we review all present pass band options and possible channel plans and explore the technical trade-offs between multiplexing gain, RF efficiency and DSP bandwidth.

5G and Satellite coexistence and spectral access and ownership issues are discussed together with guard band and filter implications and their related impact on device performance and device and network economics.

We include

- a case study on sub 1 GHz 5G (Sub G 5G) and 3GPP/IMT2020 Low Mobility Large Cell work items
- and consider the potential benefits of scaling 5G to larger radius cells coupled to the use of Satellites for 5G backhaul and as 5G repeaters and relays for urban and rural large and small cell coverage.



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Day 1 Afternoon

Session 2: 5G and Satellite Standards and Scale

We summarize the present 3GPP Release 15 and Release 16 standards process and related IEEE and 5GTF standards initiatives including

- the proposed convergence of fixed access and mobile standards
- and review the practical impact of band plan and channel plan and guard band options on physical layer implementation including sub carrier options (15, 30, 60, 120, 240 KHz or 75 KHz) and modulation options
- with a case study of how candidate 5G waveforms (FBMC, UFMC, GFDM and f-OFDM) will coexist with Satellite A-PSK.

We compare the 5G standards process with present and likely future Satellite standards and the link between Satellite enabling technologies (angular power management and fractional beam width antennas) and standards based intellectual property added value and cost and highlight the need for global scale as a pre-requisite for sustainable ROI.

The cost economics of sub 1 GHz 5G are explored (450 MHz, 600, 700, 800, 900 MHz 5G refarming) in the context of specific vertical market requirements together with a cost economic assessment of Satellite and terrestrial service integration.



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Day 2 Morning

Session 3: 5G and Satellite Supply Chain and Stakeholder Interests

We compare and contrast the 5G and Satellite industry supply chains and other related supply chains including the automotive industry, web scale companies, defence and near and deep space industry.

Our sector analysis includes enterprise value and related debt ratios, cash position and future competitive positioning.

Day 2 Afternoon

Session 4: 5G and Satellite Regulatory and Competition Policy

The impact of the evolving supply chain on 5G and Satellite regulatory and competition policy is analysed and discussed in the context of future spectral asset value including related issues of auction policy and the arguments for and against low cost and no cost spectrum and primary and secondary access rights.

Every delegate receives a copy of Geoff Varrall's latest book '5G Spectrum and Standards' published by Artech House and an electronic copy of the slide deck.



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Registration

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Before 7 Aug 2017	Before 7 Sept 2017	On-site
\$1,795	\$1,895	\$1,995



6-7 NOVEMBER, SINGAPORE

Currency: SGD

Team Registration

3-5 attendees receive a 20% discount
6-10 attendees receive a 30% discount
10+ attendees receive a 40% discount
Discount is based on current pricing.

To register, please email daniel@nichemarketsasia.com, thank you!

Limited Seats to ensure Quality of Training is not compromised.

Tour and Accommodation

For our international delegates, you can experience a range of full-day and overnight tours to discover local culture, food, shopping and more – perfect for accompanying partners and those delegates wishing to spend more time either before or after the Workshop. We can customize for you.

Industry Learning Tour

Enjoy Integrated learning approach with Expert-Led Workshops, Site Tours and Study Visits to peer organizations around the world. **2017-2018 Tours Available!**

