

WIRELESS MYTHS, REALITIES AND FUTURES...

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The Myth [1]: Sixty years of research following Shannon's pioneering paper has led to telecommunications solutions operating arbitrarily close to the channel capacity - 'flawless tele-presence' with zero error is available to anyone, anywhere, anytime across the globe...

The Reality [1]: Once we leave home or the office, even top of the range iPhones and tablet-computers fail to maintain 'flawless tele-presence' quality. They also fail to approach the theoretical performance predictions...

The 1000-fold throughput increase of the best third-generation (3G) phones over second-generation (2G) GSM phones and the 1000-fold increased tele-traffic predictions of the next decade require substantial further bandwidth expansion towards ever increasing carrier frequencies, expanding beyond the radio frequency (RF) band to optical frequencies, where substantial bandwidths are available.

The Future [1]: However, at the time of writing optical- and quantum-domain wireless communications is less well developed than RF wireless. It is also widely recognized that the path-loss of RF wireless systems monotonically increases with the carrier frequency and this additional challenge has to be tackled by appropriate counter-measures in future research. Hence we set out to seek promising techniques of tackling the above-mentioned challenges and for resolving the conflicting design constraints imposed on the flawless tele-presence systems of the future.



Lajos Hanzo his first-class Master degree in electronics in 1976, his PhD in 1983 and his Doctor of Sciences (DSc) degree in 2004. He is a Fellow of the Royal Academy of Engineering (FREng), FIEEE, FIET and a EURASIP Fellow. He co-authored 20 IEEE Press - John

Wiley books totalling in excess of 10 000 pages on mobile radio communications, published about 1300 research entries at IEEE Xplore, organised and chaired major IEEE conferences and has been awarded a number of distinctions. Lajos is also an IEEE Distinguished Lecturer. During 2008 - 2012 he was the Editor-in-Chief of the IEEE Press and acted as a Chaired Prof. at Tsinghua University, Beijing. For further information on research in progress and associated publications please refer to <http://www-mobile.ecs.soton.ac.uk>;

1. REFERENCES

- [1] L. Hanzo, H. Haas, S. Imre, D.O'Brien, M. Rupp, and L. Gyongyosi, Wireless myths, realities, and futures: From 3g/4g to optical and quantum wireless, Proceedings of the IEEE, vol. 100, pp. 1853 –1888, 13 2012, Invited Paper in the Centennial Issue <http://eprints.soton.ac.uk/339181/>