

The evolution and importance of measurements for future communications networks

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The UK's National Physical Laboratory has a long and proud history of providing innovation and measurement solutions for communication technologies, e.g. we invented the packet switching concept and provide measurements for fibre and RF mobile generations, including some 5G capabilities. In this talk we will describe our plans.

Short to medium term we will characterise beamforming and massive MIMO systems, address interoperability, provide greater propagation and interference knowledge, traceable waveforms and multi-physics diagnostics for various 5G, LiFi, THz, and quantum devices. New methods to traceably deliver and characterise network time synchronisation are required, and characterisation of complex end-to-end systems, initially deployed in a variety of testbed scenarios, is pivotal.

Full characterisation of 2030 networks will likely require a future analogue of a digital twin, with real time embodiment of systems and traceable system feedback, plus traceable data provenance across complex virtualised systems. This will be across a variety of different, simultaneous applications, themselves driven by AI & ML optimisation. The need for an underpinning and responsive measurement infrastructure will not change as future communications evolve, providing a basis for trusted trade, national and international acceptance, de-risking commercial operations and to ensure effective and safe deployment and operations.