CELTIC-NEXT
Innovate UK Summer Briefing

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MmWave Devices and Systems for Mobile Industrial Internet of Things [DS-MI²oT]

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Teaser

What is the main benefit of the idea/proposal?

Key technology enabler for MmWave Cellular IoT

What makes the added value?

Hardware-informed algorithms together with the circuits, for the particular MI²oT challenges that require combined data transmission and localisation.

Why should I participate in the project?

Enable headstart for next generation mmWave cellular IoT

Organisation Profile

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Research draws together expertise from two leading Wireless Communications and Circuits groups in University College London (UCL) and University of East London (UEL
UCL is committed to supporting collaborative research in wireless communications by, for instance, being part of the £1.13M 2009-2012 project "UK-China Science Bridges: R&D on B4G Wireless Mobile Communications" funded by RCUK, and as a member of the industrially led WWRF forum, dedicated to addressing societal challenges through wireless communications.
Recently, Aeroflex Inc. (USA) donated £1.5M worth of network development equipment toward the establishment of the Wireless Laboratory at UCL, providing unique facilities for hands-on research in LTE/5G technologies, that will serve as the experimentation platform of this project...
UEL has been successful in obtaining FP7 and H2020 grants in excess of over £6M for ICT and KTPs (2018-21) amounting to £1M, including for signal processing and digital design/hardware acceleration.

Proposal Introduction (1)

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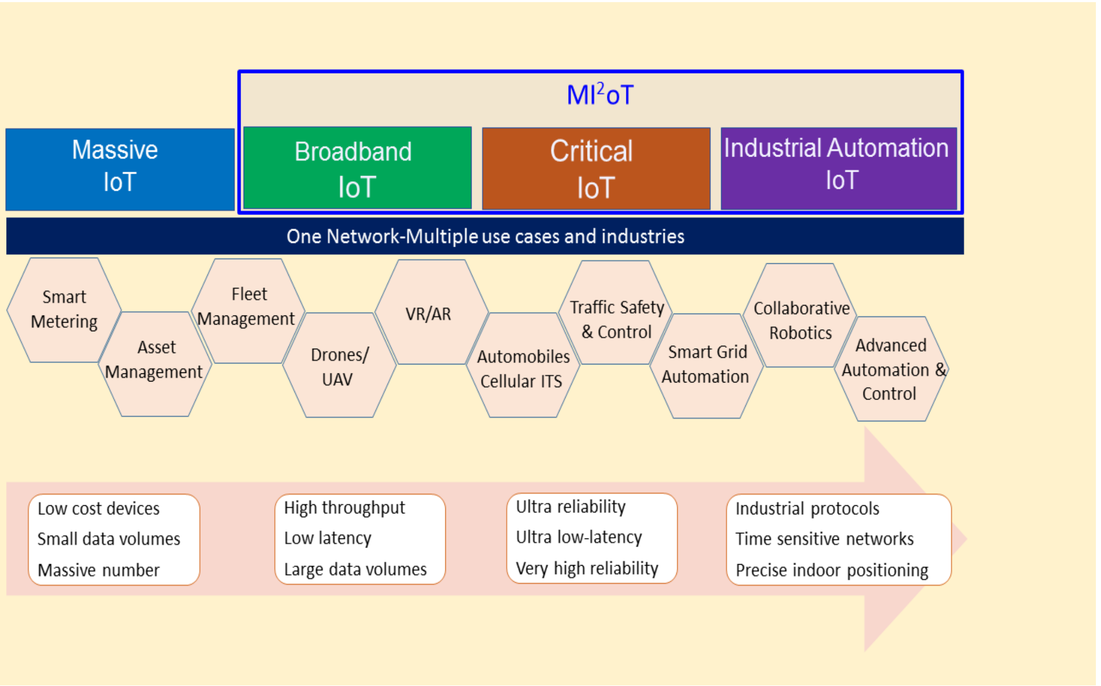
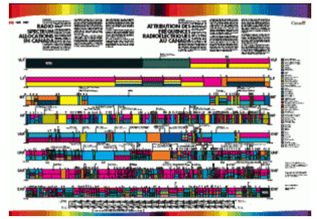
Next Generation Telecommunications



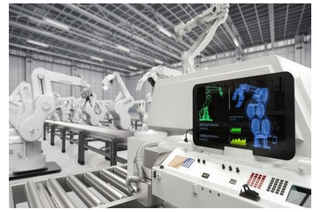
NB IoT/LTE-M ☹

Complex IoT Devices will require
Higher spectral efficiency 30/-15 bps/Hz with reduced latency.

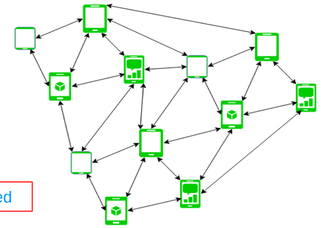
- Ultra-reliable low-latency communications (URLCC) Real-time control of machines for greater number of machines connected to IoT.
- Directional transmission
- HD video (Drones-insurance claims)



Contiguous, broader and harmonized frequency bands across countries. for further expanding the capability of Broadband IoT.
Currently different countries different bandwidth, leads to interference and device complexity



FoF: High location accuracy 5m-20 cm.
Radar sensors can locate, but , cannot communicate



Public Safety D2D adhoc mobile network

5GNR Rel-16 will allocate above 6 GHz f(MmWave) frequencies to facilitate 5× increase in capacity, and ~23× faster response (as compared to the current 4G network) with 1.4 GB/s of median of browsing speed

Proposal Introduction (1)

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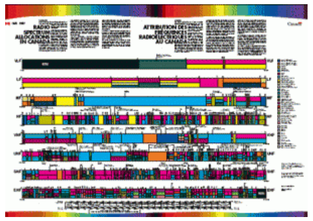
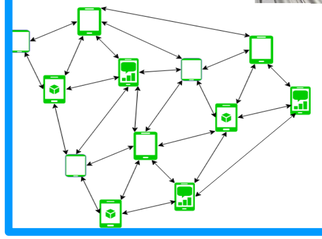
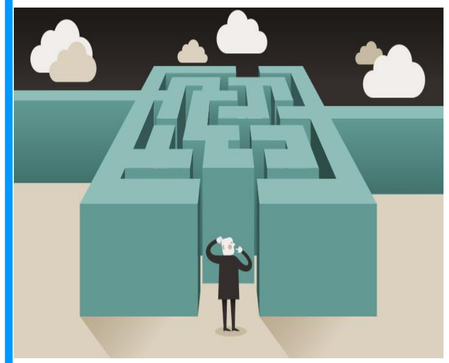




CHALLENGES ADDRESED AT UEL, UCL



- Fast Beam switching
- CSI-robust transmission with analog codebooks, even non-coherent transmission
- Novel strategies for hybrid beamforming with low-resolution DACs/ADCs that can lower the power consumption
- Joint accurate localisation and mmWave data rate transfer
- Low power ASIC for Doppler and Range Computation

Proposal Introduction (2)

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Impact:
A paradigm shift in the design of MI²oT devices by jointly designing hardware-informed algorithms together with the circuits, for the particular MI²oT challenges that require combined data transmission and localisation.

Partners

Existing consortium UEL, UCL.
Expertise, profiles and types of partners we are looking for:

- *Autonomous vehicles, mobile robots and drones.*

Contact Info

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For more information and for interest to participate please contact:

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Join the follow-up Telco

10 September 10-10.30 CET

Meeting number: 951 855 092
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Can't join the meeting?