Global Summit
A NEW SPECTRUM MINDSET
November 3-5, 2020
VIRTUAL EVENT
Monica Paolini, PhD, is the founder and principal of Senza Fili. She is an expert in wireless technologies and has helped clients worldwide to understand new technologies and customer requirements, create and assess financial models, evaluate business plan opportunities, market their services and products, and estimate the market size and revenue opportunity of new and established wireless technologies. She frequently gives presentations at conferences, and writes reports, blog entries and articles on wireless technologies and services, covering end-to-end mobile networks, the operator, enterprise and IoT markets. She has a PhD in cognitive science from the University of California, San Diego (US), an MBA from the University of Oxford (UK), and a BA/MA in philosophy from the University of Bologna (Italy).
Guest Speakers

- Mr. Mohammed A. Alabdulqader, CITC Spectrum Team, Communications and Information Technology Commission (Saudi Arabia)
- Alan Norman, Public Policy Director, Facebook
- Jameson Dempsey, Government Affairs Council, Loon, an Alphabet Company
- Mark Reudink, Vice President Product Development, Crown Castle
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mmWaves and Regulatory Challenges

MOHAMMED ALABDULQADER
Timing and volume of mmWave spectrum release:

- There is uncertainty over the timing and spectrum needs of mmWave networks.

- How much mmWave spectrum will be required and when will it be needed?

- mmWave spectrum could be assigned to classic mobile operators now, but it may remain unused or under utilised for many years to come.

- Other usage scenarios will continue to evolve and assigning mmWave spectrum too early, without clarity on different users’ actual needs, may leave insufficient spectrum available for nascent usage cases that are yet to develop.
Efficient Assignment Challenges

**mmWave - Large bandwidth sufficient to accommodate both mobile and other users**

- **USA**
  - FCC auctioned mmWave spectrum in 24, 26, 37-40 and 37-50 GHz.
  - Bidding for key bands 24 upper, 35 and 37-40 GHz competitive.
  - Late competition for other bands (24 lower, 47 GHz) less.

- **Finland**
  - No competition for spectrum in 26 GHz band in the auction - settled at reserve price.

- **Italy**
  - No competition for spectrum in 36 GHz band in the auction - settled at reserve price.

- **Taiwan**
  - No competition for spectrum in 26 GHz band - settled at reserve price.

- **Thailand**
  - No competition for spectrum in 26 GHz band in the auction - settled at reserve price.

- **Hong Kong**
  - Direct assignment of 26 GHz band due to lack of demand.

**Auctions to date have highlighted that the large bandwidths available in mmWave bands can accommodate both mobile and other users**

- Limited propagation makes these bands ideal for geographic sharing.
- Large bandwidth ideal to provide ultra-high speeds, volume, & of connections.
- Small / low opportunity cost - access could be free (or subject to small fee to recover regulator's cost).

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Efficient Assignment Challenges

- **Appropriate licensing frameworks:**
  - Nationwide block assignments, or geographically limited licences to cater for private users and industry verticals, or Unlicensed or lightly-licensed?
  - What are the appropriate protection requirements? Mobile operators with national block assignments can manage interference from within their own networks, but geographically restricted licensees typically require some degree of protection (e.g. minimum distance between users, or guard-bands etc). These considerations must form part of the ‘big picture’ plan when deciding how to efficiently assign mmWave spectrum.
mmWave deployments will require very dense networks.

Operators already face challenges in deploying physical infrastructure (towers etc.):

- Obtaining local government planning permission to construct towers/sites.
  
  There is a need for streamlined urban planning rules and regulatory policy on infrastructure access to ease the deployment of denser networks of mmWave sites when demand grows for mmWave services.

- Public concerns in local communities about EMF exposure.
mmWaves and Regulatory Challenges

JAMESON DEMPSEY
THE SOLUTION

If we want to connect all the places, people, and things that need it, we need something more. We need a third layer in the connectivity ecosystem.

ADVANTAGES

- DIRECT-TO-HANDSET SERVICE
- MASSIVE COVERAGE AREAS
- FLEXIBILITY

Loon is building a new layer of the connectivity ecosystem in the stratosphere.

TERRESTRIAL INFRASTRUCTURE
20 KM

LEO SATELLITES
500+ KM

GEO SATELLITES
35,786 KM
MNO PARTNERSHIPS SPANNING MULTIPLE CONTINENTS

2013+: LATIN AMERICA
Reconnected 100,000+ Telefonica users after floods and earthquake, multi-year commercial contract

2017+: PUERTO RICO
Provided internet to 250,000+ Puerto Ricans after Hurricane Maria, offering disaster preparedness services worldwide

2020+: AFRICA
Launching commercial 4G service with Telkom Kenya, first step to connect 47% of SSA pop. uncovered by mobile internet

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LOON MESH NETWORK CONNECTIVITY

4,000 KILOMETERS 20+ LINK MESH
WHAT DOES IT DO?

- Uses physical, environmental, and regulatory data to efficiently orchestrate networks of moving nodes (HAPS, NGSO satellites, etc.)
- Anticipates and avoids interference with incumbent networks.
- Opens the possibility of hybrid networks, where HAPS can complement and extend existing networks.
ENABLES CO-EXISTENCE OF AEROSPACE NETWORKS

TS-SDN enables aerospace networks such as HAPS and NGSO satellites to efficiently coexist with each other and with traditional ground-based point-to-point networks. This supports the case for flexible licensing within high-interest mmW bands.

BUILDS UPON LICENSING MODERNIZATION EFFORTS

Regulatory innovations such as self-coordinated light licensing databases in E-Band spectrum have served as a critical input into TS-SDN. By increasing standardization and transparency of backhaul spectrum licensing information, regulators can increase efficient use of this spectrum, enabling rapid deployment of innovative aerospace networks.

FACILITATES FUTURE LICENSING INNOVATION

Loon’s TS-SDN shines a light on a future of temporospatial dynamic spectrum management for backhaul networks, in parallel with similar efforts in the world of aviation.
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Thank You