Private networks: The emergence of new telcos?

STL Partners

15/12/2021

DEAN BUBLEY

Disruptive Analysis

JOERI TRANCHET

Citymesh

CATHERINE GULL

Cellnex UK

AHMED ALI

STL Partners

STL PARTNERS

Agenda

1	**Introduction to private networks**	Ahmed Ali STL Partners	
2	**Rise of the New Telcos**	Dean Bubley Disruptive Analysis	
3	**The trinity of innovation** driven by private networks	Joeri Tranchet Citymesh	
4	**Why new telcos**	Catherine Gull Cellnex UK	
5	**Panel discussion and Q&A**		

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During 2020 and 2021 the deployments have been demonstrated across almost all verticals

Manufacturing

- ABB (Sweden)
- Danfos (Finland)
- Mitsubishi (Japan)
- Bosch (UK)
- Philips 66 (USA)
- MYNXG (Germany

Mining

- Polymetal (Russia)
- Sandvik (Finland)
- Teck Resources (Canada)
- Vale's Carajás mine (Brazil)
- Shandong Energy (China)

Aviation

- Langkawi Airport (Malaysia)
- Lufthansa/Hamburg airport (Germany)
- Paris airports (France)
- Zaventem Brussels (Belgium)

Transportation

- Paris Metro (France)
- Belfast Port (UK)
- Ports of Seattle (USA)
- Deutsche Bahn (Germany)

Utilities

- Ameren (USA)
- Northumbrian Water (UK)
- Xcel (USA)
- Siemens Microgrid (Austria)

Smart city

- City of Antwerp (Belgium)
- City of Graz (Austria)
- City of Tainan (Taiwan)
- City of Tucson (USA)

Energy

- Centrica (UK)
- Ørsted Wind Farm (Taiwan)
- Ørsted (UK)
- Pantex Plant (USA)

Education

- Utah Education & Telehealth Network (USA)
- Bexar County School District (USA)
- University of Connecticut (USA)

Healthcare

- Memorial Health System Clinic (USA)
- Liverpool 5G (UK)
- Ellison Institute for Transformative Medicine (USA)
- Bravis Hospital (Netherlands)

Manufacturing/ automotive

- BMW (Germany)
- Ford (UK)
- GM (USA)
- Magna Steyr (Austria)
- Toyota (Japan)

The emergence of new telcos and specialist players leads to a highly competitive and dynamic ecosystem

Mobile network operators

- Public, regional and national MNOs

Major telecoms stakeholders and other network service providers

- Fixed & cable providers
- MVNOs
- FWA and WISPs
- Tower & infrastructure companies

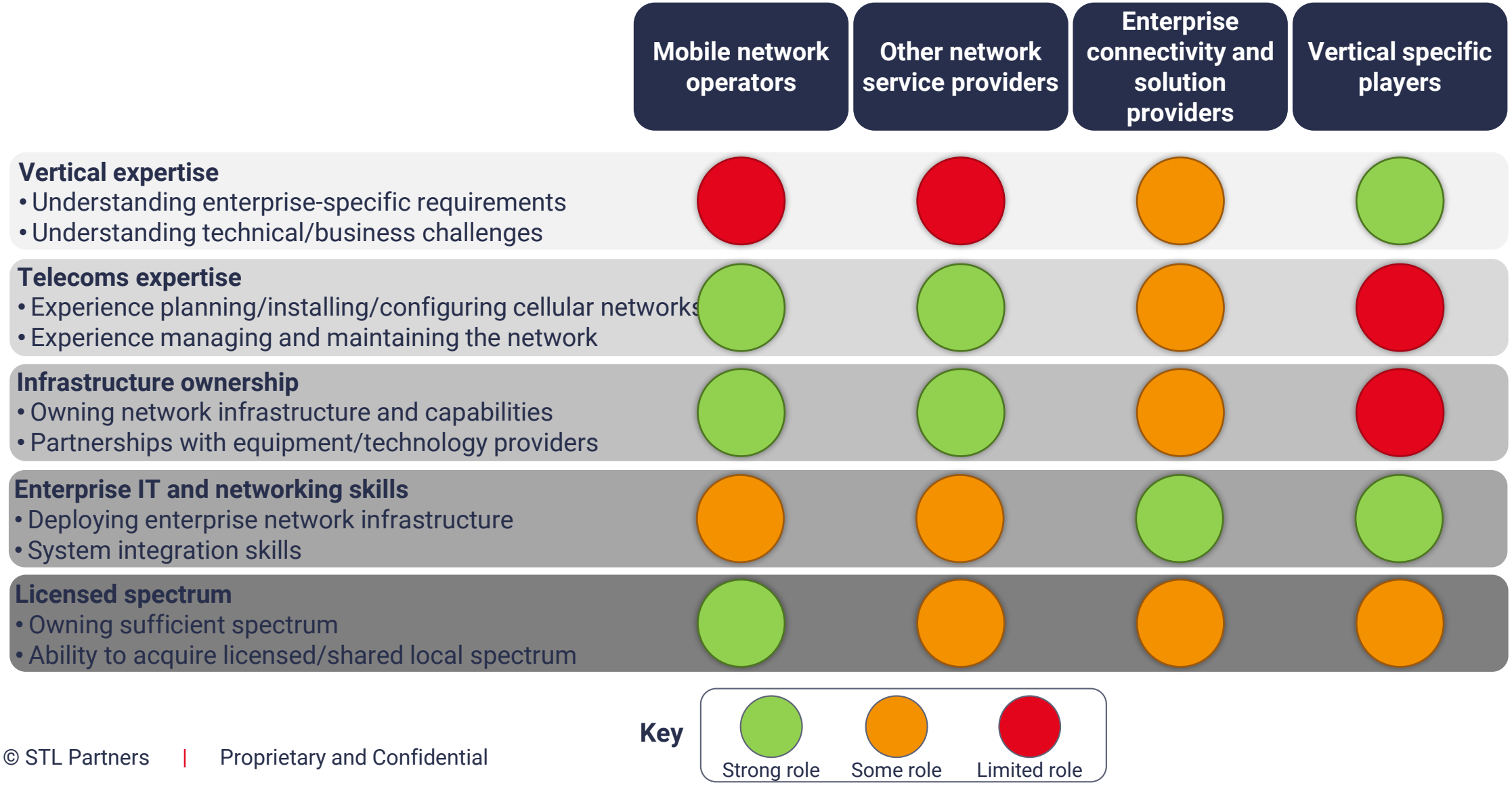
Enterprise connectivity and solution providers

- Neutral host players
- Specialist IoT connectivity providers
- IT & networking providers
- Hyperscalers and cloud service providers
- System integrators

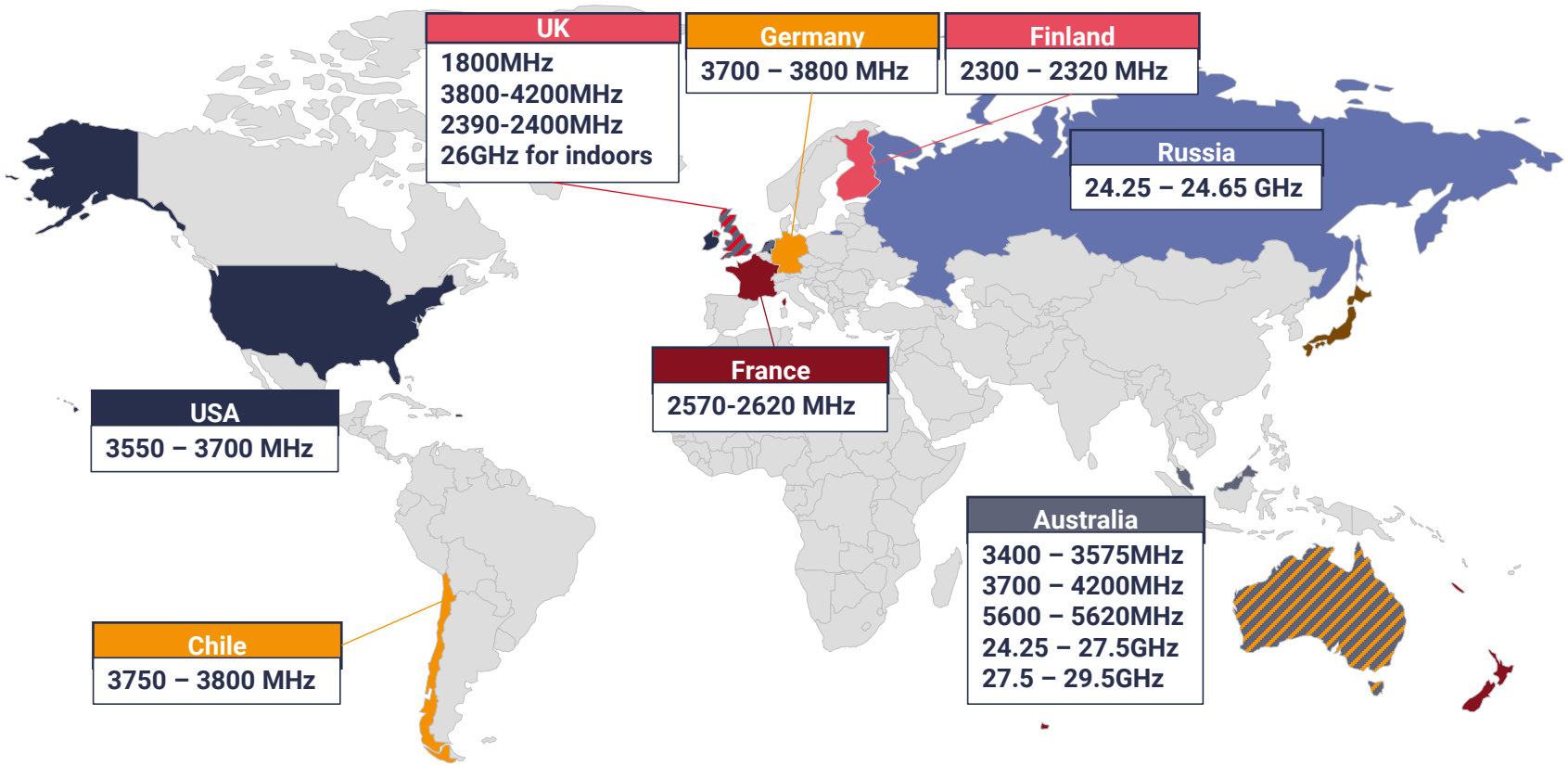
Vertical specific players

- Manufacturing and industrial automation
- Energy and \utility
- City municipalities and government authorities
- Railway operators
- Airlines, airports and ports
- Universities and schools
- Architecture, engineering and construction
- Hospitals and healthcare providers
- Hospitality and entertainment

Most traditional telco operators lack the vertical expertise required for private networks



The rise of local spectrum licensing threatens some telcos



Mid bands	2.3GHz	3.5GHz	2.6GHz	3.7GHz
High bands	24GHz	26GHz	28GHz	

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Rise of the New Telcos

From Private 5G to Broad Democratisation

15/12/2021

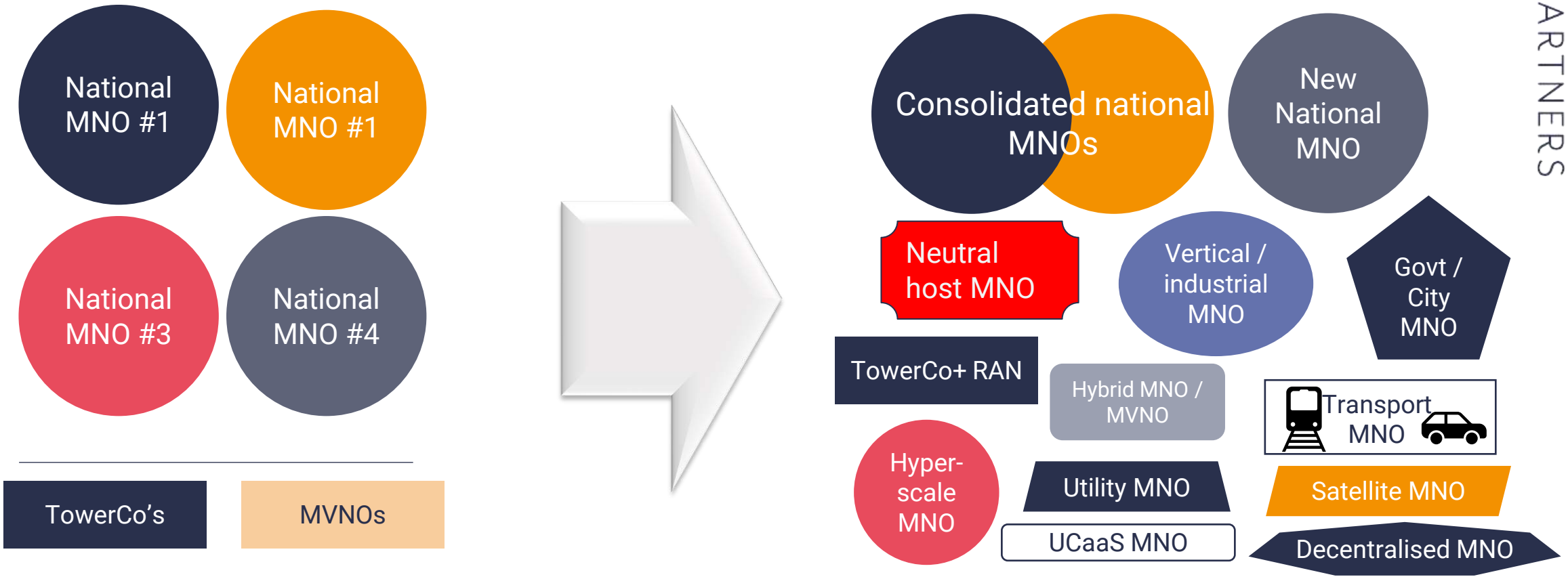
Dean Bubley, Associate Director

STL PARTNERS

Alternative telcos / NOs are not completely “new”

- MVNOs
- Wholesalers
- Fibre AltNets
- Regional operators
- Supporting cast
  - Towercos
  - Internet Exchanges
  - (W)ISPs
  - Satellite

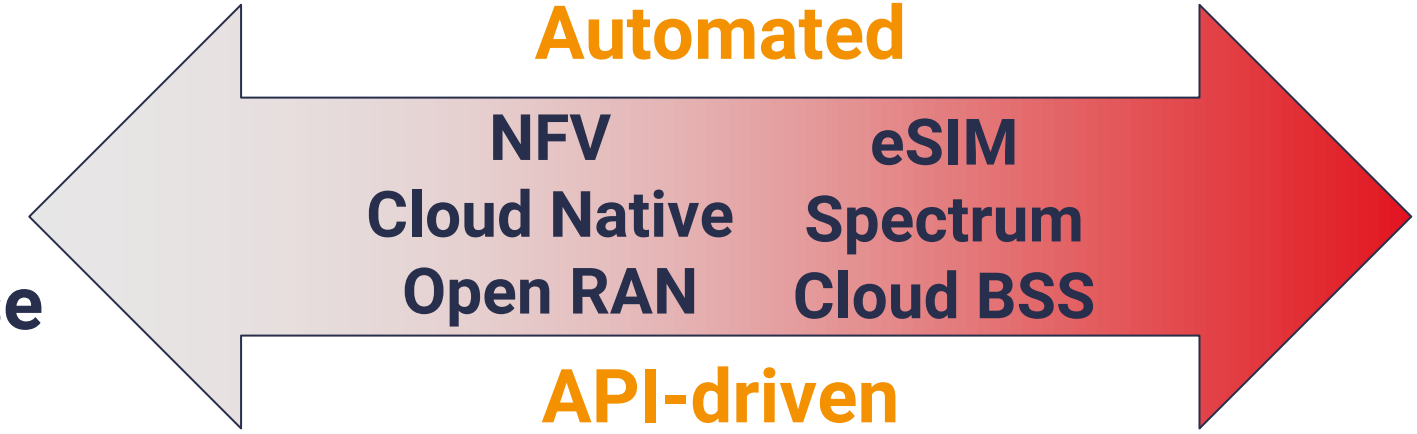
But the 5G era drives transformation of telecom itself



Source:Disruptive Analysis

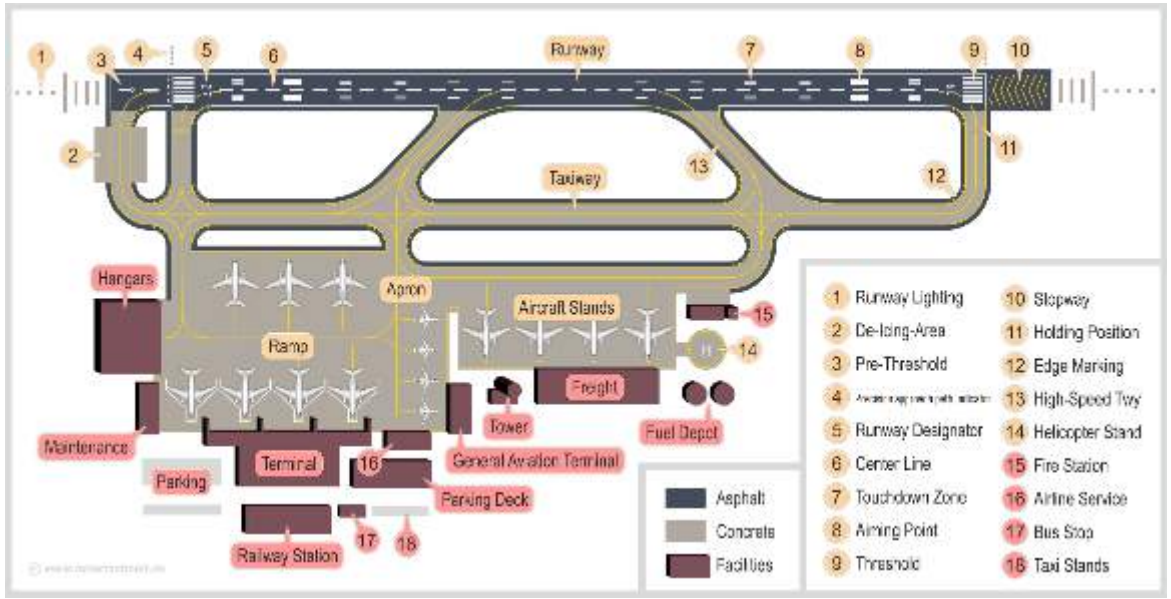
+ similar trends in fixed line

Supply side: The Cloud/Networking Paradox



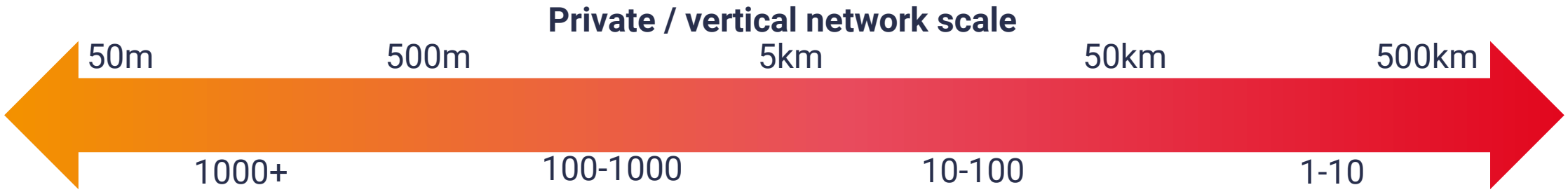
Note: Not just 5G. Also cloud-enabled FTTx, Wi-Fi, ethernet, 60GHz, satellite, SDWAN etc

Demand side: "Verticals" require specialism



Application	Public 4G / 5G	Private 4G	Private 5G	Wi-Fi	Other
Passenger smartphones	Indoor coverage supplied via DAS & possible neutral host	CBRS support on some phones in US, but SIM onboarding may be complex	Limited frequency support, plus regulatory complexities	Available almost ubiquitously. Logon improving with Passpoint etc	
Passenger laptops & tablets	Limited penetration of cellular-connected devices	Few devices & no way to provision SIMs	Possible future option for enterprise but unproven today	Ubiquitous	
Staff critical voice communications / push-to-talk	Not available	Some MC-PTT devices & networks deployed	Few 5G-capable PTT critical comms devices yet	Some indoor use, not suitable for critical applications	TETRA, P25 and similar systems, plus DECT cordless
Airside vehicle data access	Usable if MNO has good coverage / collaboration	Optimal mix of coverage & device availability	More important in future. Few devices / deployments today	Only suitable for small areas. Subject to interference	Legacy / niche wireless systems
Automation systems in baggage sorting / storage etc	Low coverage	Good potential but may face capacity / speed constrains	Potential key use-case for 5G and URLLC in airports	Quite widely used but variable performance Improves with WiFi6	Use of fibre & other wired connections, or proprietary wireless
Sensors & distributed airport-wide IoT	Potential for use of public MNO NB-IoT	Private NB-IoT a possible option	(NB-IoT is technically a 4G technology)	Unsuitable for wide-area coverage until HaLow version avail.	LoRa, fibre to sensors & niche solutions
Data onload / offload from aircraft	Ability for aircraft to use roaming SIMs internationally	Useful at home airport for mid-speed data transfers	Potential for high-speed / secure data upload / offload	GateLink Wi-Fi widely used but can be congested	Some use of satellite connections
Security & situational awareness cameras	Useful for external cameras if coverage OK	Potential for airport-wide coverage indoor & outdoors. Good for vehicles	Potential for airport-wide coverage indoor & outdoors. Good for vehicles	Useful for indoor cameras but unsuited to mobile / outdoor use	Many cameras have fibre / fixed connections but not useful for vehicles

New telcos are emerging across different scales



Potential number of networks per major country

Office building Hotel Shopping mall Stadium Ships Warehouse / logistics Finance trading floor Inside data centres	Hospital complex University campus Industrial plant Airport Port Theme park Business park Music festival	Smart city Mining Oil & gas Military tactical Agricultural Rural neutral host County-level network Remote office / retail	Rail network Highways Public safety Utility grid National wholesale High-frequency trading

Early examples of “new telcos”

What should the “old telco” world do?

- Drop the “them and us” rhetoric & sense of “network privilege”
- Reform existing industry bodies (GSMA, ETNO, CTIA) or form new ones
- Partner with new classes of SP / telco, **starting with Private 5G**
- Accept need for customisation & specialisation for verticals
- Expect certain new telco categories to explode, and others to fizzle
- Be aware that *software + automation = democratisation*
- Lobby for regulation that fits *all* telco categories
- Regulators need to give serious consideration to “new telcos”
  - Many questions to address
  - Lawful intercept, hybrids, boundaries, “semi-public” networks, competition etc
  - Current regulatory & legal frameworks won’t be enough
- Coming soon: STL’s “Field Guide to Spotting New Telco Species”

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CITYMESH
the art of connectivity

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the art of connectivity

4TH BELGIAN OPERATOR

FROM 0G TO 5G

NO B2C
B2B FOCUS

MAJORITY SHAREHOLDER
CEGEKA
+600M +6.000FTE

5G LICENCE NATIONWIDE
UNTILL 2040
PRE-EMPTION IN AUCTION

4G LICENCE NATIONWIDE
UNTILL 2035

0G BELGIAN SIGFOX
NETWORK OPERATOR

WIFI

cegeka

INDUSTRY 4.0
MISSION CRITICAL &
BUSINESS CRITICAL
CONNECTIVITY

15 YEARS TELECOM

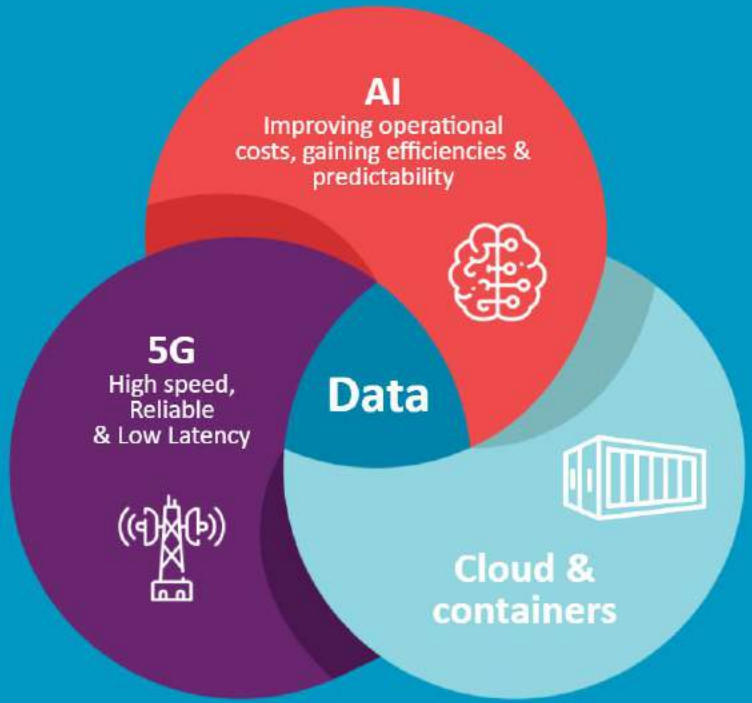
BRUGGE
ANTWERPEN
VRESSE-SUR-SEMOIS
HOUSTON (US)

TEAM 80+ EXPERTS

LARGE SCALE DEPLOYMENTS

The trinity of innovation for the next decade

What's in it for business?



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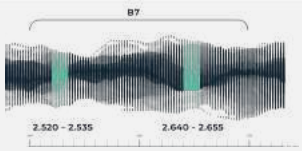
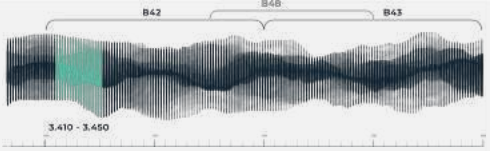
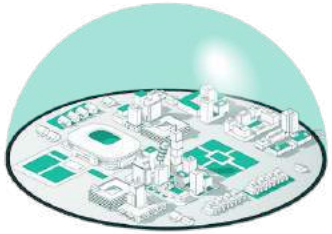




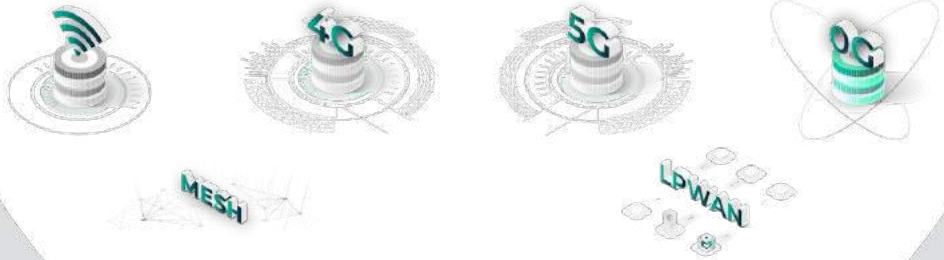
MOBILE PRIVATE NETWORKS



YOUR

FACTORY - HOSPITAL - (AIR)PORT - CAMPUS
LOGISTIC CENTER - CITY - WAREHOUSE - ...

CITYMESH CONNECT



We build unique **mobile private networks** with an optional link to the best **public network** and a broad portfolio of **OTT services** to leverage the network.

OTT SERVICES

CONNECTED ASSETS
PTT/PTV - HANDHELDS - CPE - SENSORS

REMOTE OPERATIONS
SAFETY DRONE - SEAHUB

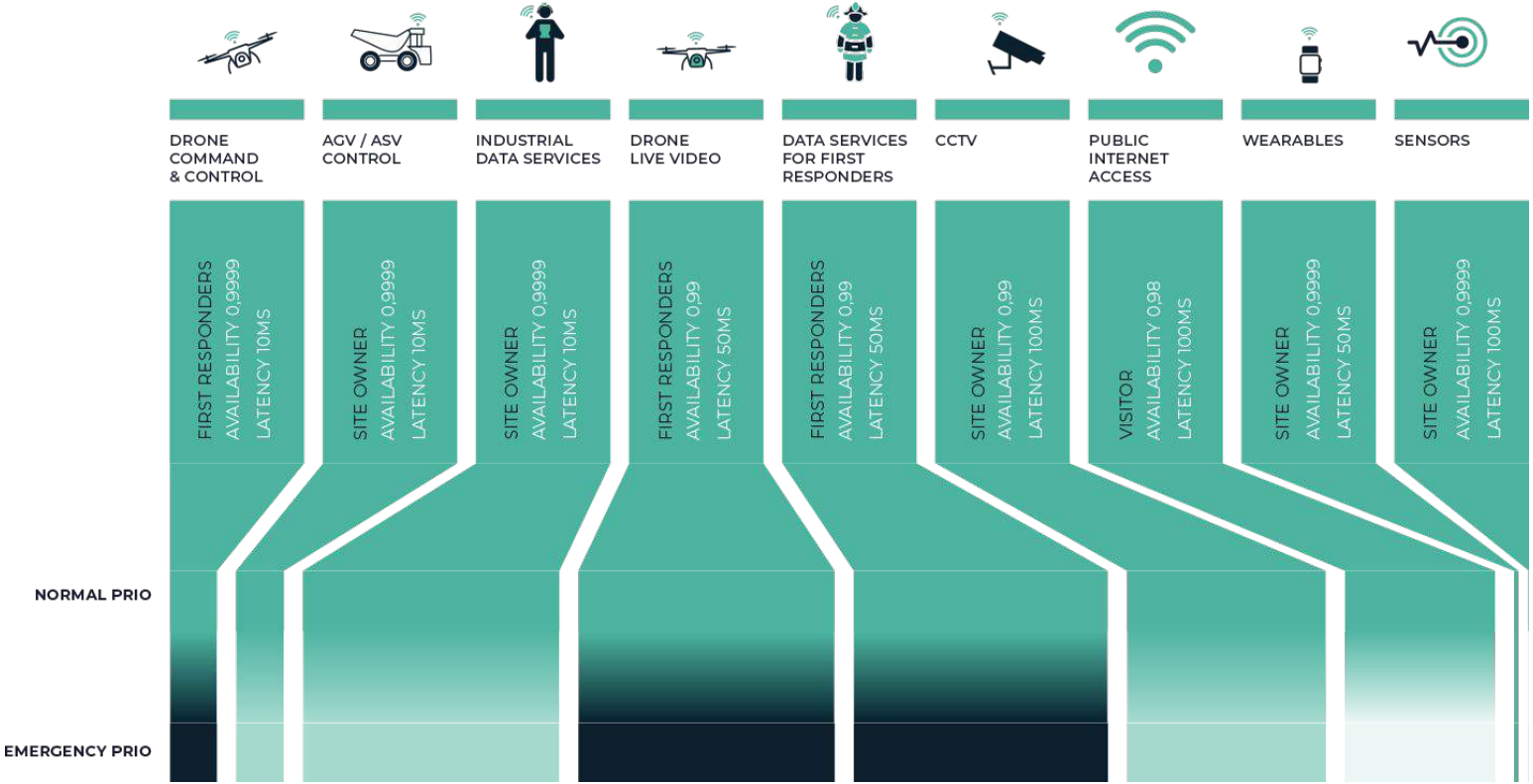
DATA
ENGINEERING - GOV - SCIENCE

APPLICATIONS
SOFTWARE & VISUALISATIONS

Public
Private
Public Network
Public Network with Private APN
Public Network with Network slicing
Public Network through Telco RAN sharing
Private Network
Antenna ownership
Telco ownership
Private
Spectrum ownership
Telco ownership
Dedicated Licensed spectrum (bought, leased from telco)
Core network ownership
Telco ownership
Private on-premise EPC
(e)SIM & customer data ownership
Telco SIM & customer data ownership
SIM & customer data owned by industry
Applications & use cases
Public
Private
Specifically available Public apps or private
Custom network slicing - guaranteed bandwith & latency
Mobility outside of campus
Nationwide
Via E-sim, Dual sim or roaming agreement
Security & Application data privacy
Coverage
Guaranteed coverage (indoor & outdoor)
QoS
Best effort*
Best effort*
Guaranteed QoS (Depending on Telco coverage)
Best effort*
Guaranteed QoS per application/use case/device
*Coverage can be improved (through specific DAS deployments)
** Data remains on-premise
Study performed by Agoria & Capgemini - 12/2019

NETWORK SLICING

Selecting the right technology for the right use case



Port of Zeebrugge

Provide connectivity all over the harbour

5G network
Safety Drone
MPN

Brussels Airport Company

Need for mission-critical connectivity

MPN
FFAI

NMBS

Provide connectivity to travellers

MPN

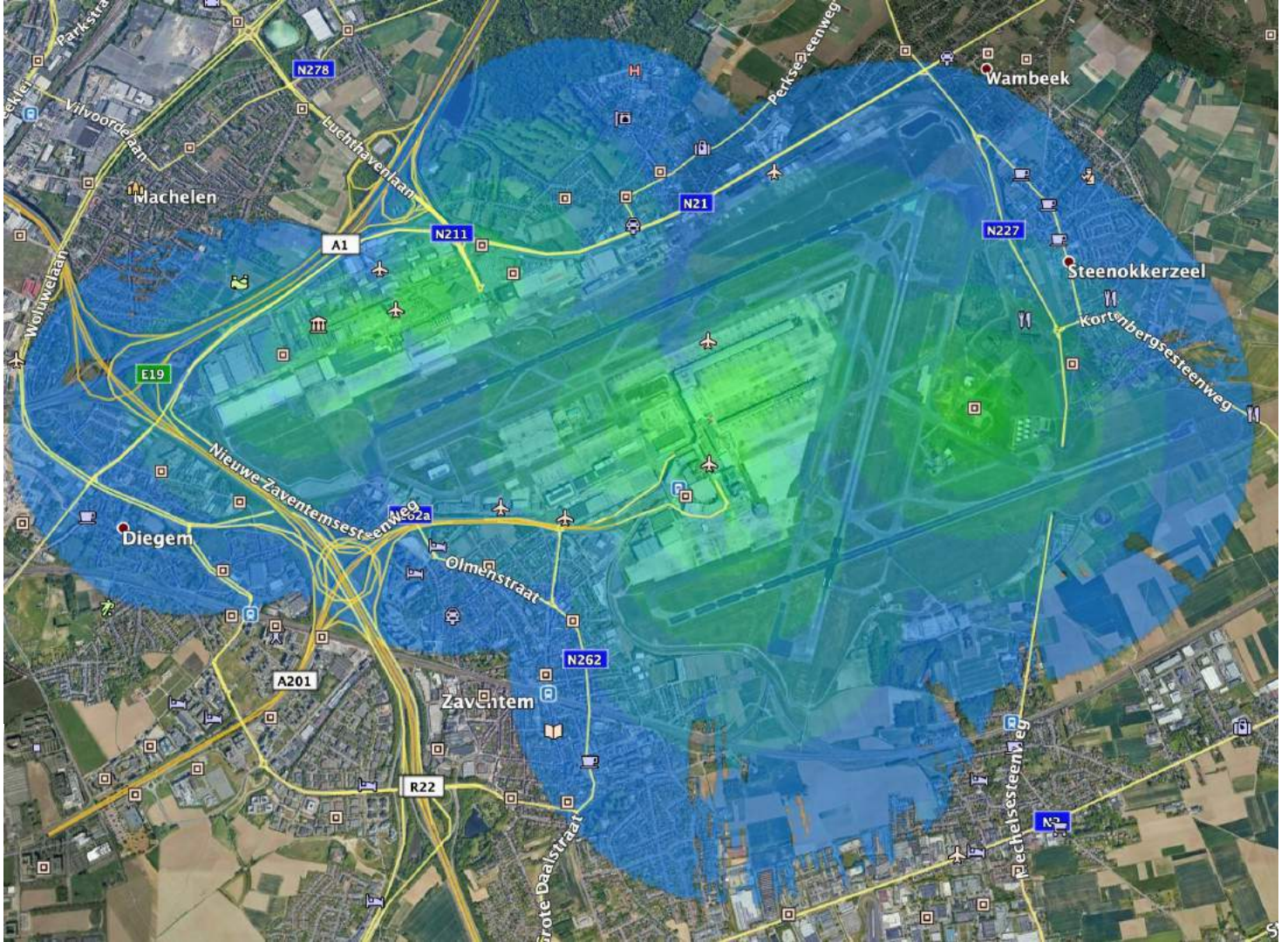
+40 PRIVATE NETWORKS BUILT

BRUSSELS AIRPORT COMPANY IS BUILDING A PRIVATE NETWORK AT THE AIRPORT IN COLLABORATION WITH FINNISH NOKIA AND BELGIAN OPERATOR CITYMESH

brussels airport

Brussels Airport

MPN outdoor & indoor



MISSION CRITICAL PUSH-TO-TALK / VIDEO / DATA

Modern communication technologies have a profound impact on a variety of business processes. They help improve the quality and efficiency while lowering costs. Our MC PTT-solution can give an organization a competitive advantage.

Our applications provide

- Push-to-talk (PTT)
- Push-to-video,
- GPS and indoor localization
- Task management
- Patrol control
- Lone worker
- Legacy radio network integration
- ...

SOLUTIONS

Advantages of private 4G/5G for Airports

Shorter time to market for innovations - Cut the cable - Flexibility - Badging (access control) - Reduce paperflow

One mission critical network - Safe/Secure, guaranteed coverage, redundant core-on-site, Data stays at on-site

More Efficient operations - GSE (Usage, localisation), Que monitoring, Single device operations, (+50 cases inventorised)

Increased safety & security - Critical communications (voice & video) Crowd control - Cameras on vehicles - Safety drone

Better passenger experience - Shuttle bus, in plane connectivity, Cleanliness monitoring, COVID-control

Standardised & consolidated - One network for operations - Clear responsibility - 1 segmentation - No pingpong

Revenue generation - All critical partner operations on one network - Service catalogue offering - Driving innovation

Cost savings mobile volumes - Traffic on own network becomes free of charge - Partner traffic kickback

Values of partnership

Each at his core strength: Airport: Running airport & strategic partnerships - Citymesh: Building mission critical network and accelerating innovation

One clear SLA responsibility: Use case + Network, example: Critical communication - less governance

Service catalogue / Commercialisation: Dedicated commercial resource - Joint effort

Cost reduction network: Private network @ cost, BIPT License reduction, Tetra transfer, Consolidated networks = 1 coverage layer

Cost reduction use cases: M2M -overall cost reduction because of scale of deployment,

Why combine with Trunking

Clear evolution scenario: Crossroad of trunking and 5G resolved

Ownership/Responsibility: Clear responsibility / Integrated

Cost efficiency: Avoid additional spectrum costs

Future proof: devices (Tetra + Private 5G), push to video, bodycam, man down, positioning, ...

Investment in future technology: Coverage extension 4G/5G

Unique position of Citymesh

Only MPN company with 4G/5G license for several years - Dedicated leased spectrum in primary bands

Expert in Private network offering - Private data - Critical environments - Private network focus

Focus on use cases - End-to-end support & responsibility - Managed services - Partnerships

Disruptor in MNO market - 4th operator - B2B only focus - B2B2E approach - fast growing

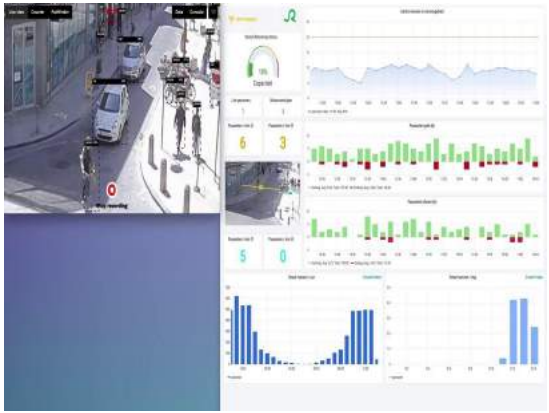
Innovator - FFAI (Covid), Safety Drone, IoT network, 5G, Private networking

Long term vision - Trinity of innovation - reference environment

FFAI - FOOTFALL ANALYTICS INSIGHTS

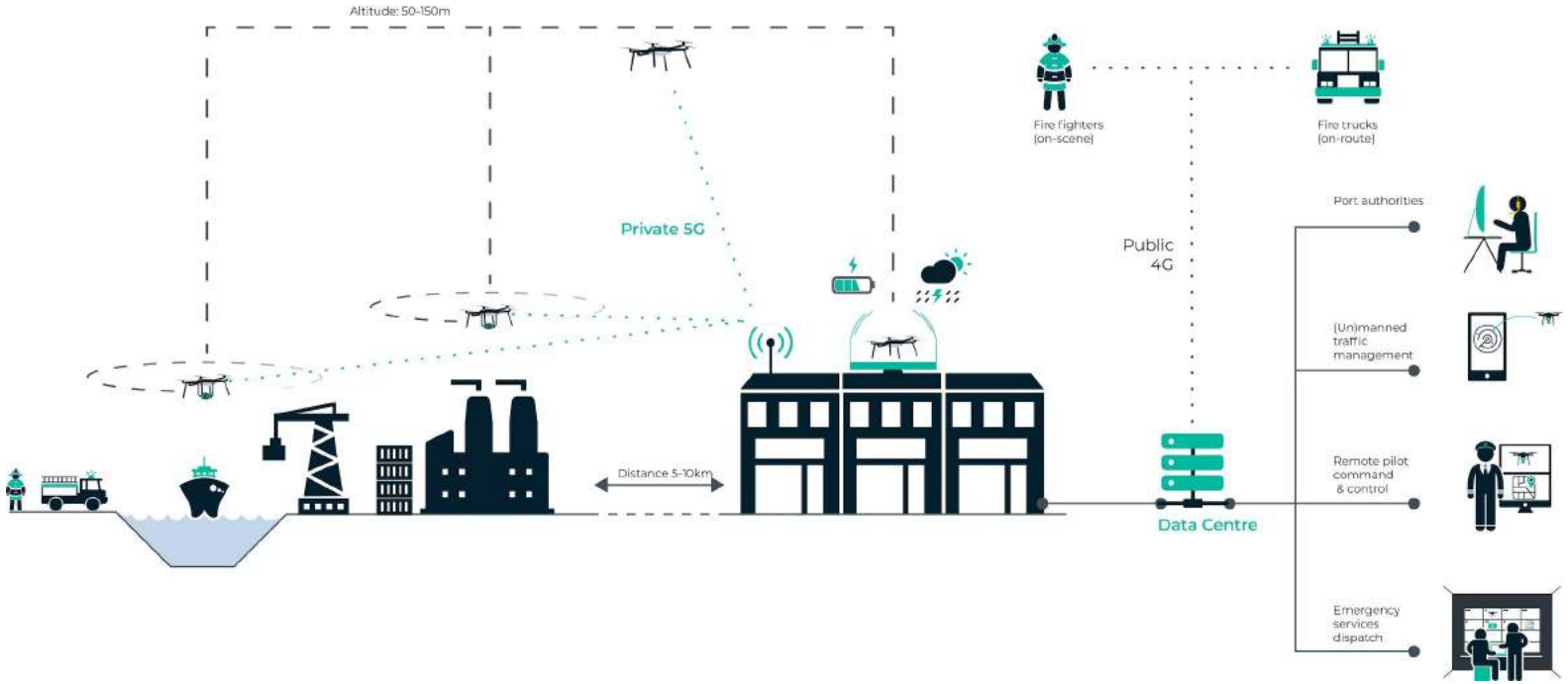
Footfall Analytics allows your organisation to obtain valuable insights in the number of visitors, to detect objects and to have an instant overview of crowded places, enabling your organisation to take real-time action.

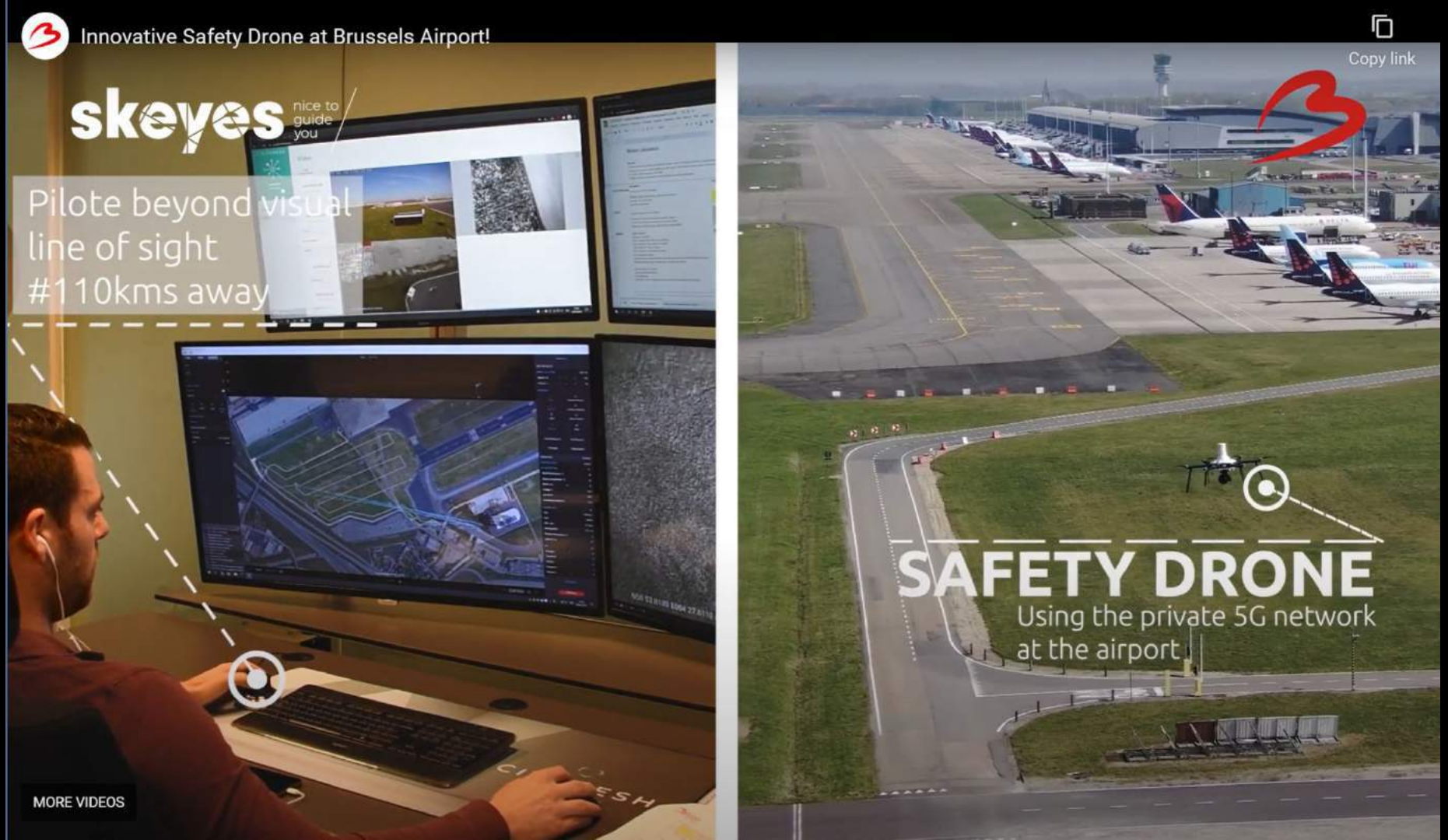
- Safety helmet/vest detection,
- Crowds per area,
- Type of transport,
- Walking/driving direction,
- ANPR,
- Loitering & littering,
- Custom object detections,



SOLUTIONS

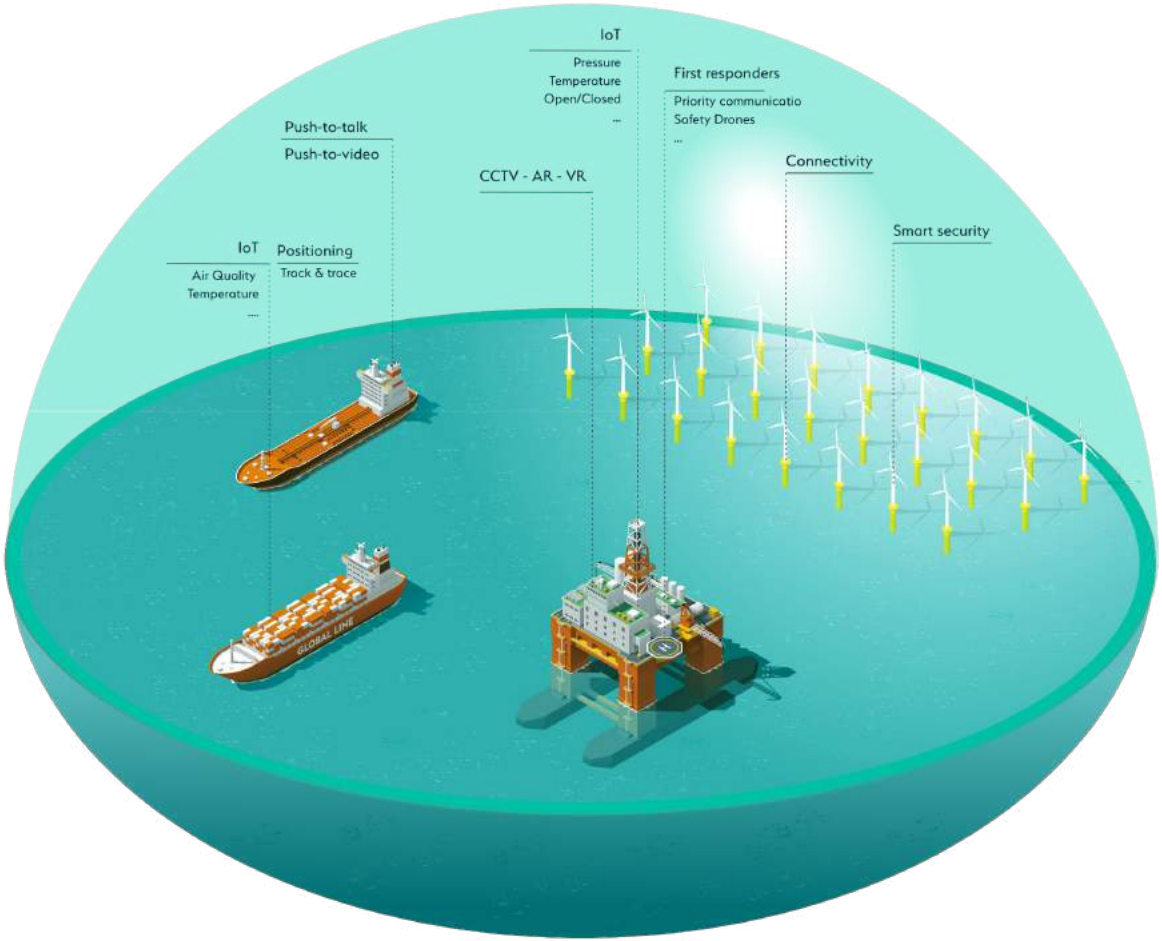
A COMPLETE AERIAL-INSIGHTS SOLUTION WITH SHARED ADVANTAGES





Safety Drone

OFFSHORE



Jan De Nul GROUP

DEME
Dredging, Environmental & Marine Engineering

TRITON KNOLL

MHI VESTAS OFFSHORE WIND

Van Oord
Marine ingenuity

SEAFAR

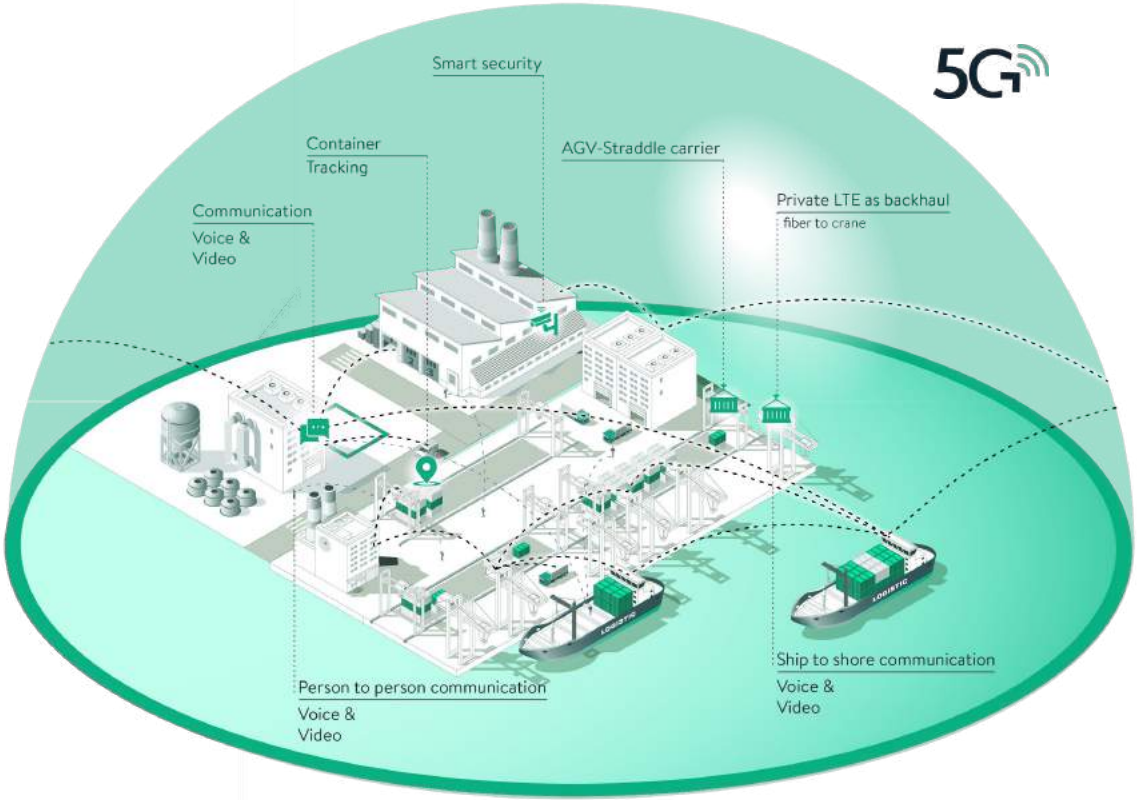
OFFSHORE

Port operations

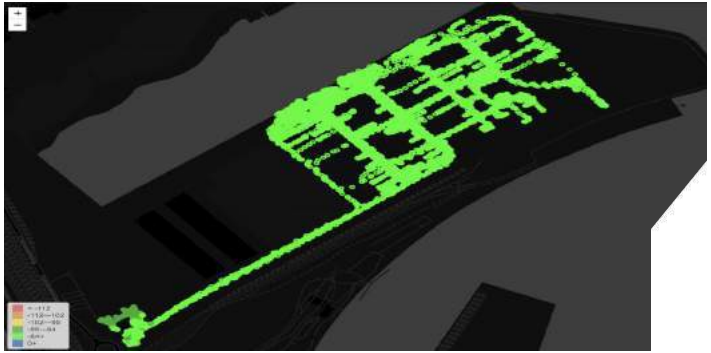
A private network which provides you total control over who uses this network

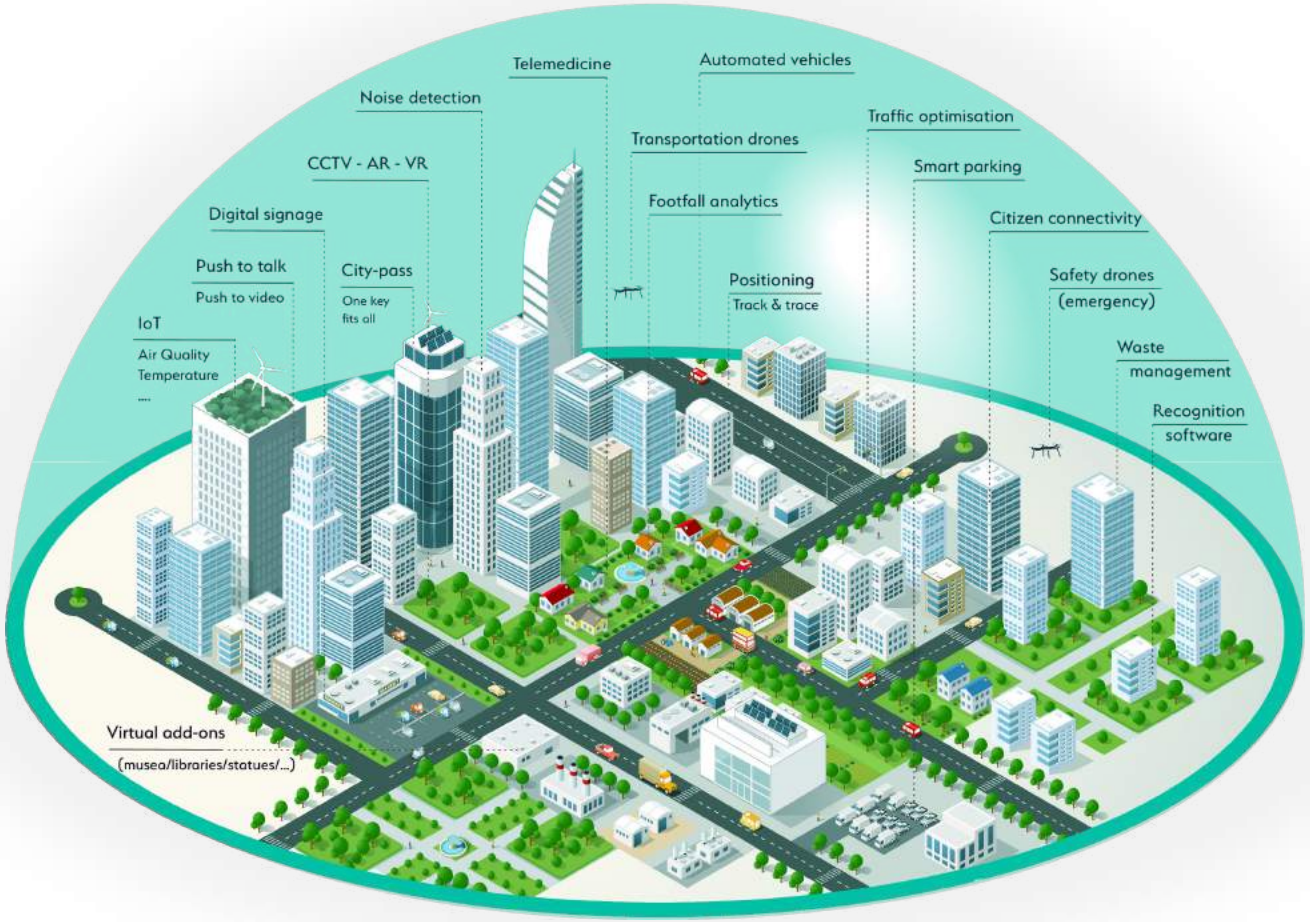
Different technologies are integrated into one connectivity experience:

- Critical Tetra communications
- Public smartphone subscriptions
- Private industrial cellular communications
- Indoor high bandwidth WIFI guest
- Security network
- SD-Wan optimised backbone
- Camera
- Detection




Albert-II-Laan
eNodeB 0
eNodeB 1




Telemedicine
Automated vehicles
Noise detection
Traffic optimisation
Transportation drones
CCTV - AR - VR
Smart parking
Footfall analytics
Digital signage
Citizen connectivity
Push to talk
Push to video
City-pass
One key fits all
Positioning
Track & trace
Safety drones (emergency)
IoT
Air Quality
Temperature
....
Waste management
Recognition software
Virtual add-ons
(musea/libraries/statues/...)

LOGISTICS/RETAIL

A private 4G/5G network which provides you total control over who uses this network

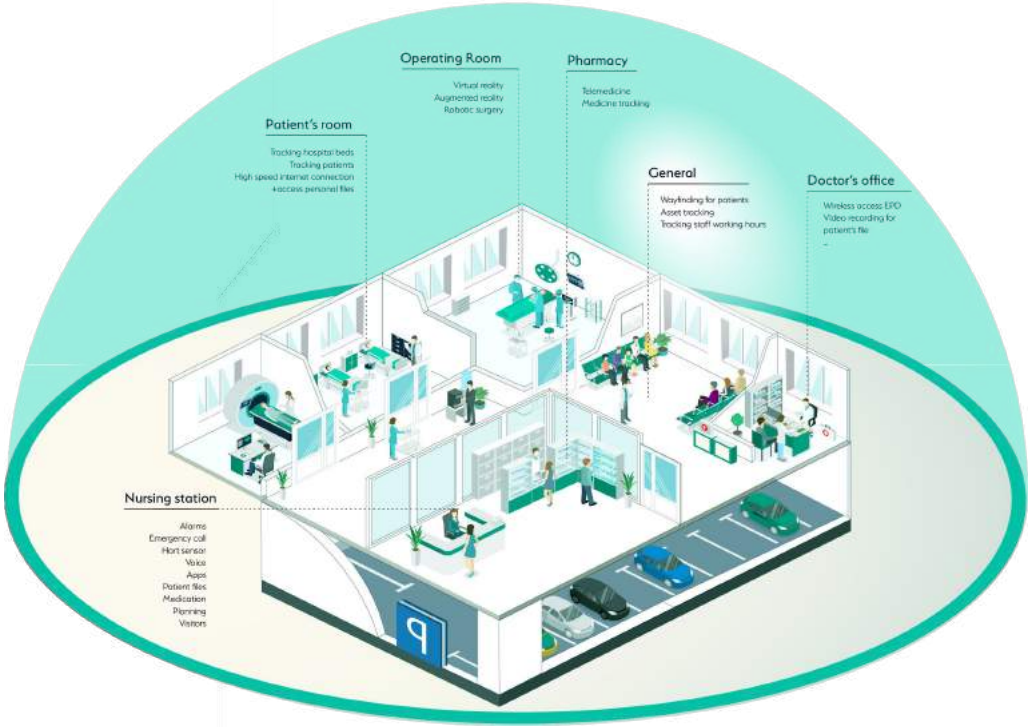
- POS
- Scanning
- Smartphones
- Camera's
- Edge detection
- AGV

HEALTHCARE

A private network which provides you total control over who uses this network.

The private network of the future is user and use case based and comprehends different technologies in order to serve the needs of every user.

Where private meets public




CITYMESH
the art of connectivity
Do you want to discover the endless possibilities? Get in touch with one of our explorers and venture where none has gone before.

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cellnex
driving telecom connectivity

Cellnex Private Networks
The Emergence of New Telco's

Cellnex
The facts

+35
Private Networks deployed

£6.1 billion
Investment in the UK since 2019

+200 million
People connected

±128k
sites

#1 EU
Wireless telecom infrastructure provider

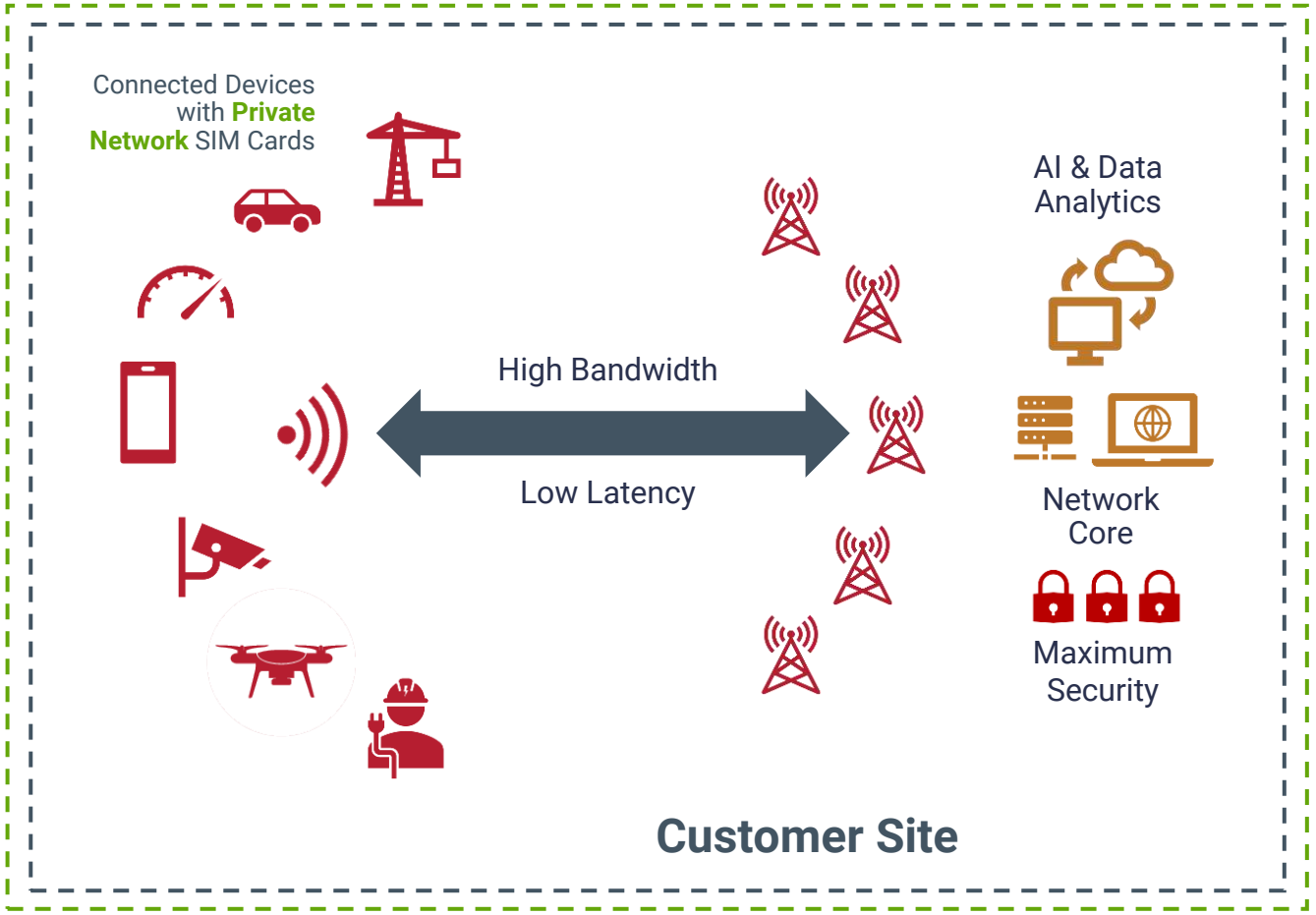
"Bringing value through neutral innovation"

Drive to Private Networks

The Reason

Private Wireless Edge Network

What is it – Use Cases



Safety

Productivity

Reliability and availability

Public or Private: 5G or Other

The difference

Private wireless networks

Public wireless networks

Dedicate capacity and campus coverage
Network performance optimized
Maximum availability and reliability
Privacy and control
SLA's

Wider area coverage
International roaming
Lower upfront cost
Reduced network management
No SLA's

The Ecosystem

What it takes

Existing Telco

- Have existing revenues and systems to protect
- Need to adapt – Slow and costly
- Large enterprises
- Systems accommodate mass markets not individual needs

New Telco

- Core focus on Private Networks
- Dynamic and agile
- Sector and ecosystems
- Specialised to meet the needs of enterprises

What's Next

The future

Network of Networks

Control of who is on your network

Choice of who/what to enable

Sole drive to optimise and benefit your enterprise

Thank you

Catherine Gull

Catherine.gull@cellnextelecom.co.uk

cellnextelecom.co.uk

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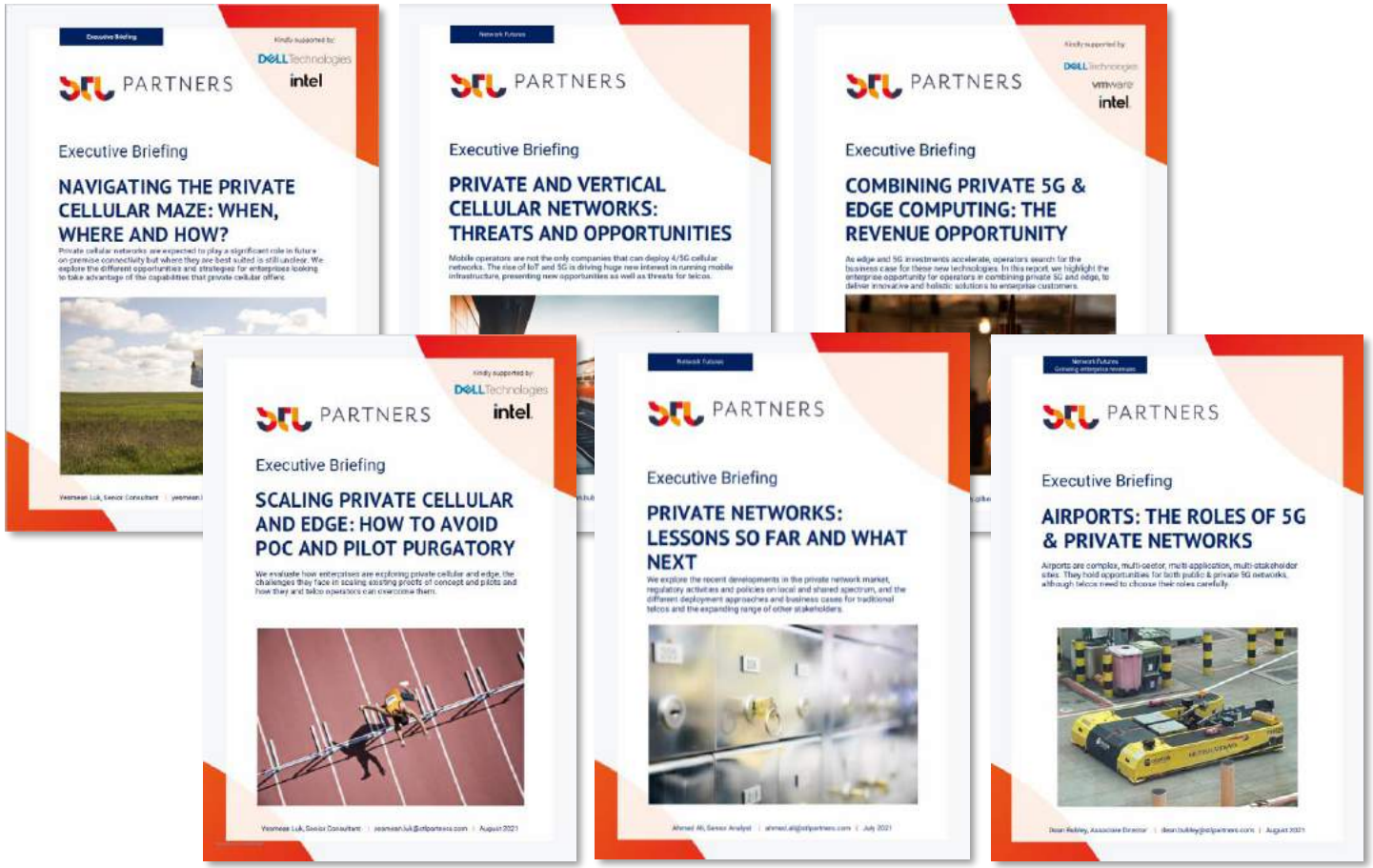
Panel discussion and Q&A

We have published several reports and delivered a few webinars on the topic of private cellular networks



*Click each tile for the report and more details

Sign up to our next webinar on private cellular networks

Fraunhofer IPT, WZL and STL Partners have developed a tool to evaluate the **economic potential of 5G for applications in the manufacturing industry**. This webinar will provide a live demonstration of the tool and how it can be used by **end-customers (manufacturers), industrial solution providers and 5G service providers.**

We will provide a presentation and discuss the following key questions:

- Why is the manufacturing sector exploring 5G and what are its perceived benefits?
- Which use cases are driving adoption?
- When will longer use cases mature and what are the dependencies?
- What are the economic benefits of private 5G in enabling Industry 4.0?
- Deep-dive on automated guided vehicles (AGVs) as a use case

This webinar will be running twice on the same day, **Thursday 10th February 2022**:

- Session 1: 8am GMT / 9am CET / 1.30pm IST / 4pm SGT
- Session 2: 4pm GMT / 5pm CET / 11am ET / 8am PT

Sign up via our webinars portal: www.stlpartners.com/webinars

Thank you to everyone for joining

We hope you enjoyed the session!

If you have any further questions, please email:

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