Business Critical Communications

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Two-way radio communication is here to stay

- In 2017 the two-way radio industry was $13.5 billion, by 2022 the predicted worth is $30 billions.

- Market is split between Analogue/Digital systems which is quickly moving towards predominantly Digital.

- The biggest growth factor of the industry is the ever growing speed at which digital radio systems are replacing analogue.

- What is the main driving force behind the switch to digital?

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The drive behind digitalization

- More efficient utilization of available licensed RF spectrum supported by national regulatory bodies.

- Combining voice and data services in the same terminal providing more actionable information to the user.

- Integration and interoperability with background and external data systems.

- Practical and easy to implement encryption options without the loss of voice communication quality typical in analogue encryption solutions.

- Increased network capacity without the need for new base stations.
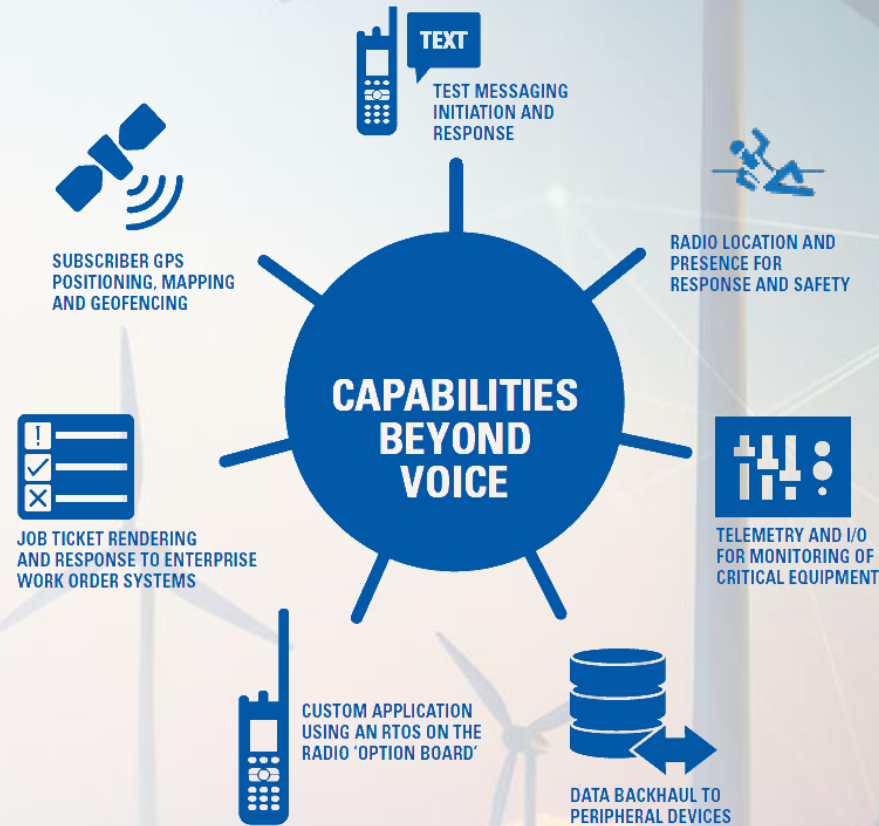
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TDMA – Increased system capacity
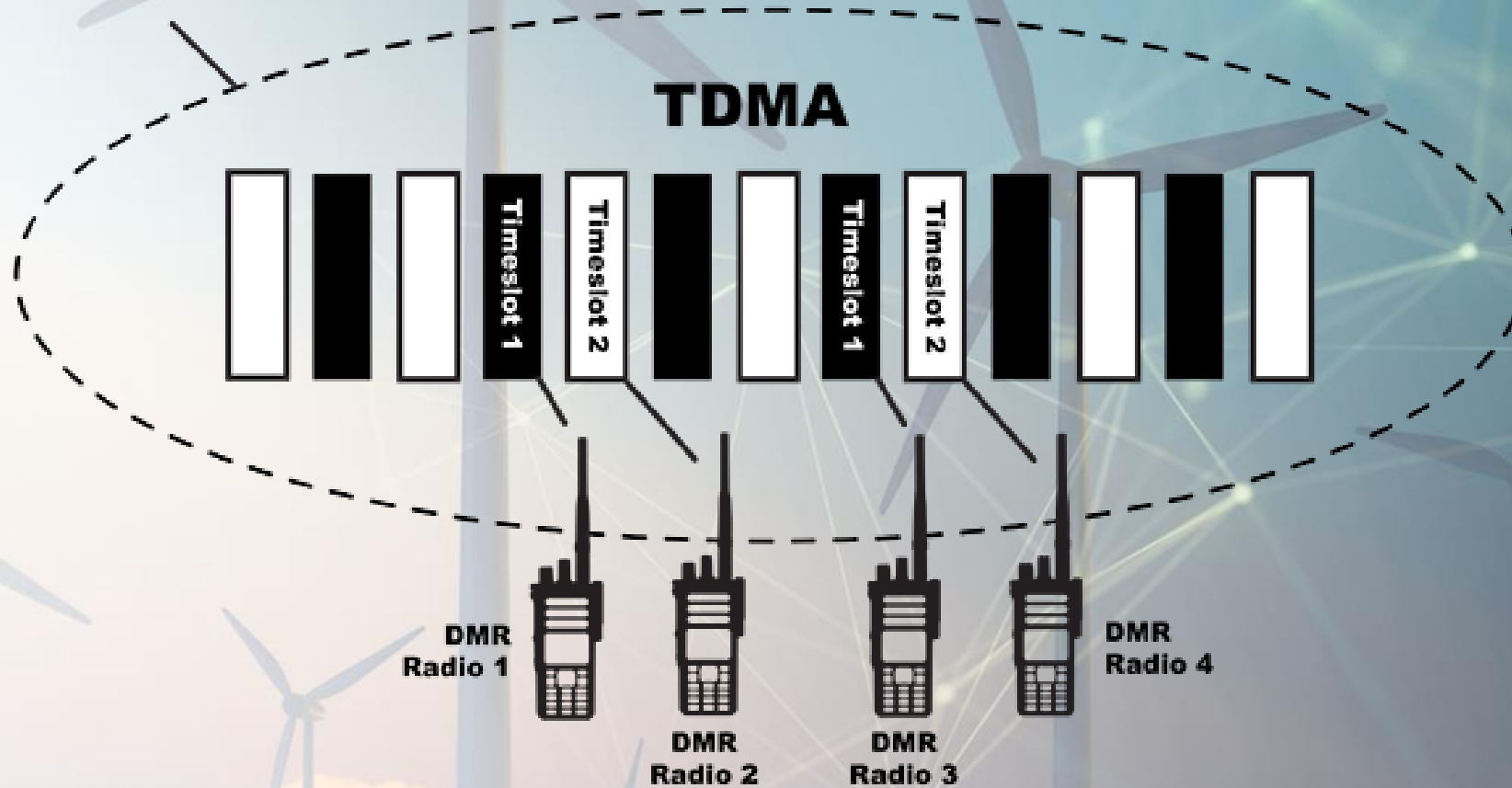
*Support from the national regulatory bodies for digitalization of radio systems at one point will turn into pressure aimed at more efficient utilization of the national RF spectrum.

More Data = More Eficiency

SUBSCRIBER GPS POSITIONING, MAPPING AND GEOFENCING

TEST MESSAGING INITIATION AND RESPONSE

RADIO LOCATION AND PRESENCE FOR RESPONSE AND SAFETY

CAPABILITIES BEYOND VOICE

JOB TICKET RENDERING AND RESPONSE TO ENTERPRISE WORK ORDER SYSTEMS

TELEMETRY AND I/O FOR MONITORING OF CRITICAL EQUIPMENT

CUSTOM APPLICATION USING AN RTOS ON THE RADIO 'OPTION BOARD'

DATA BACKHAUL TO PERIPHERAL DEVICES

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- Geolocation and Geofencing

- Man-down options

- Lone worker alarms

- Interoperability with other systems

- Digital transfer of many types of information

- Telephony

- Advanced Dispatch solutions

Shift in the operational paradigm

Increased frequency efficiency = Free frequency resources for other purposes

- Organizations which use two-way radio communication quickly realized this opportunity to improve their operational procedures

- The market very quickly adapted to their sudden demand for advanced data solutions.

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What next?

- The ingenuity of the solutions can't always overcome the physical limitations.
- The nature of the RF signal limits the available bandwidth of a communication channel.
- An interesting phenomenon is that as an organization starts using data services, they start noticing and thinking of additional ways data services and applications can improve their operational procedures.
  - If we can send a message, why not a word/excel document?
  - If we can send a document, why not a picture?
  - If a picture is possible, why not a video?
  - Why not a video call?

PTToC- Push to Talk over Cellular/LTE

- Very quickly the opportunity for wideband mobile networks to expand the capabilities of two-way radio networks becomes clear.

- PTT-over-Cellular technologies appear the early 1990's long before digital radio systems.

Three classes of PTT-over-Cellular:

- Carrier-based

- Over-the-Top

- Mission Critical

Carrier-based PTToC

- This PTT service is offered by mobile operators and in this architecture the PTT technology is tightly integrated with their network.

- This PTT architecture is of course very attractive for many reasons :
  - It runs on standard smartphones
  - instead of owning a comms system, organization can purchase subscriptions from a commercial provider
  - Built in QoS – a built in mechanism to provide priority to your traffic in high congestion scenarios

- Although this type of PTT communication works with standard smartphones, oftentimes the mobile operator limits the service to specific models which might not be the most appropriate for you.

- Interoperability between two operator using different PTT technologies or even the same is very difficult to do.

- Inability to provide a Direct Mode communication, meaning the entire communication has to go through the operator LTE network.

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Over the top PTToC

- Running as a software application over the top of the operator network and does not depend on carrier or device.

- A properly designed OTT system can communicate over traditional wireless carrier networks, Wi-Fi networks (public or private), standard wired networks (for PC clients), and private LTE networks.

- The mobile operator/internet provider is simply the data transportation provider and the system is "carrier-agnostic".

- If the mobile operator/internet provider offer enhanced QoS then this architecture becomes known as Advanced Over the Top PTT.

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Functionality comparison

Functionality	Over-the-Top	Carrier Integrated
Carrier Agnostic	√	✗
Cross Carrier Communication	√	✗
Quality of Service (QoS)	✗	√
Cross Carrier Quality of Service (QoS)	✗	✗
Hosting Options		
Cloud	√	√
Carrier Data Center	✗	√
Customer Hosted/ On premises	√	✗
Deployable Off Network / Air-Gapped	√	✗

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When and How to implement them

- PTT-over-LTE can be implemented in 2 ways
    - Standalone PTT-over-LTE
    - Integrated with a DMR radio system
- OPEX vs CAPEX
- BYOD – Bring your own device
- Nationwide coverage
- Who should take a look at standalone PTT-over-LTE
    - Hospitality
    - Retail
    - Education
    - Transportation and Logistics

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Conclusion

- Two-way radio communication is not going anywhere so you should have no compulsion about investing in a DMR system.

- The DMR application market has a wide variety of solutions for any and all operational needs.

- PTT-over-LTE is a very viable option to extend your DMR system with advanced data services and the ability to vastly increase coverage.

- In some cases it makes more sense to deploy a standalone PTT-over-LTE system for a more OPEX based model suited for small or geographically spread out organizations.

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