

GETTING FROM HERE TO THERE

INCREASE TRANSPORTATION EFFICIENCY
AND SAFETY WITH CRITICAL
COMMUNICATIONS SOLUTIONS



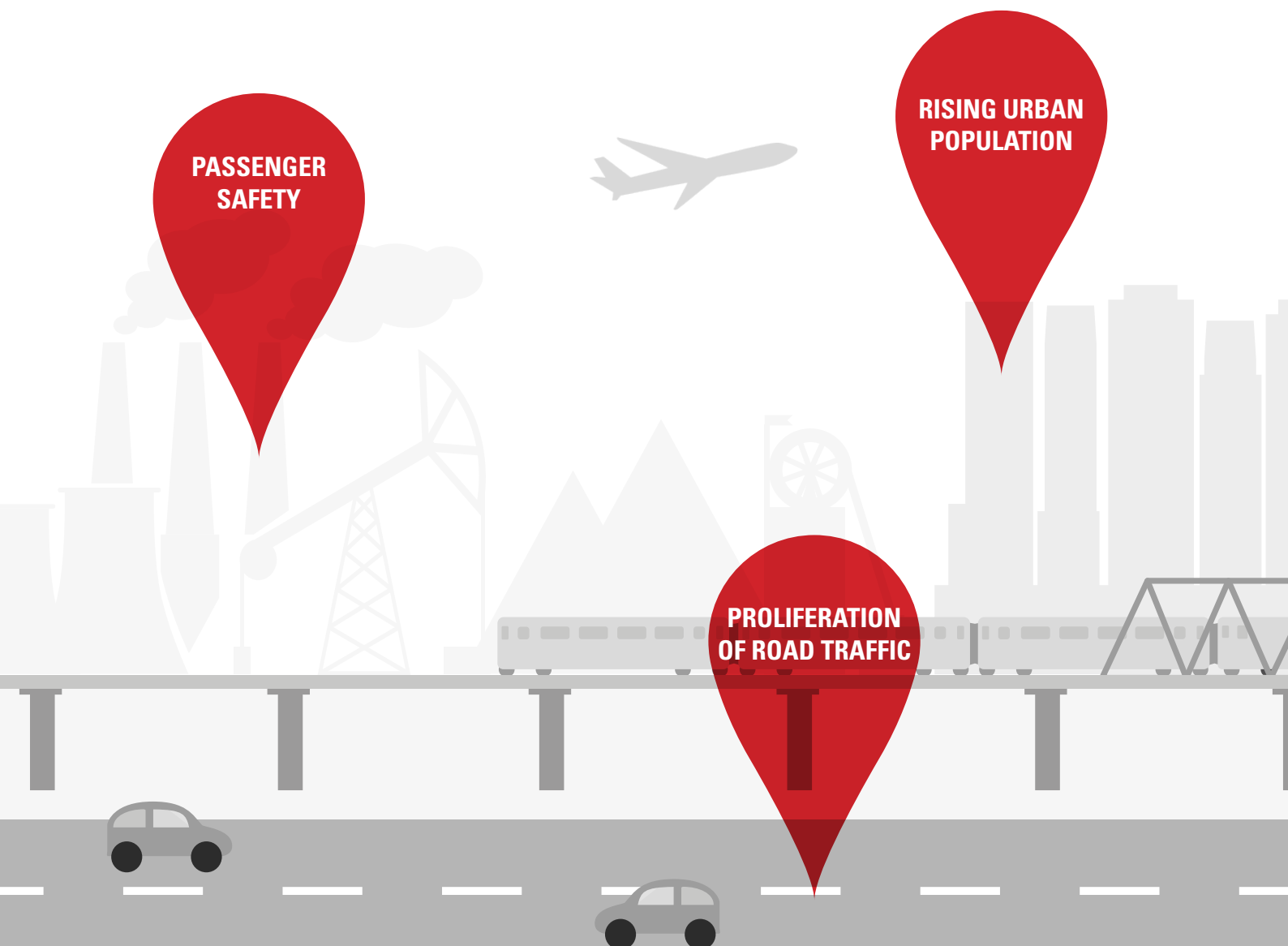
MOTOROLA SOLUTIONS



LOCAL AND GLOBAL CHALLENGES

Global trends are impacting how public transport providers optimise service quality for passengers. Rising urban populations, the proliferation of road traffic, climate change legislation, threats to public safety: these are the economic, political and social challenges that will continue to affect anyone involved in public transport in the years ahead. Increasing public transport mode share will also require beating off competition from private forms of transport. Urban-friendly electric vehicles are making it more economical for people to drive themselves.

While the trend for usage of public transport is generally on an upward curve, there remains a focus on driving up the share of travel by collective modes of transport and generate a virtuous circle for public transport. Operators are not complacent; they have to protect revenue and profit margins so they can continue to invest in maintaining and improving services. Every passenger lost to another mode of transport chips away at that investment capital.



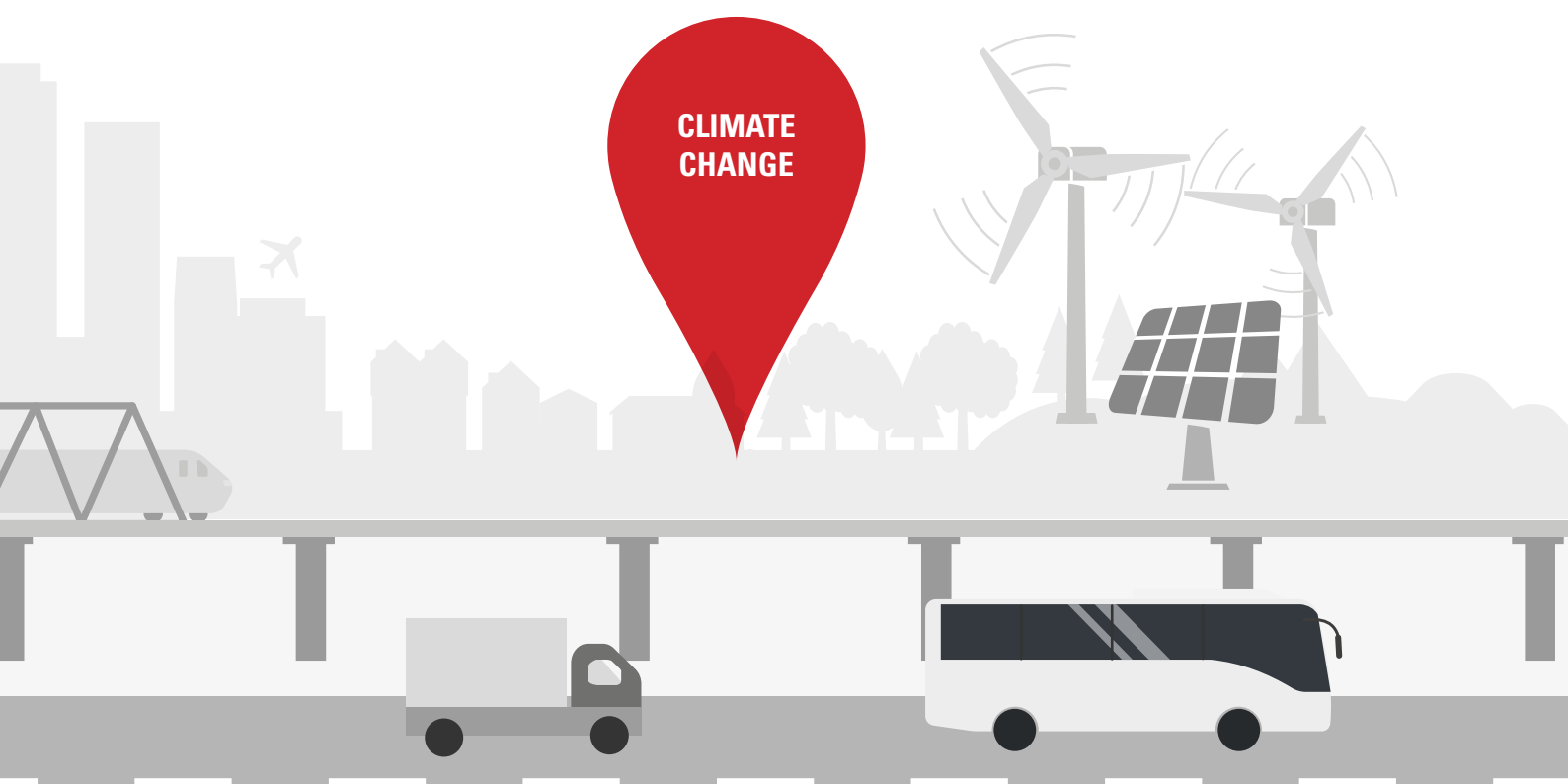
OVERCOME OBSTACLES WITH SAFETY AND EFFICIENCY

The challenge facing all transportation operators is the ability to transport passengers and goods to their scheduled destinations – safely and on time.

With rising urban populations and increased climate change legislation, safety and efficiency have become more critical than ever. And while demand for public transportation is growing, passengers' expectations are also on the rise. Transport operators and IT managers are expected to operate with fewer resources – all whilst meeting the expectations of passengers who have a choice of transportation options.

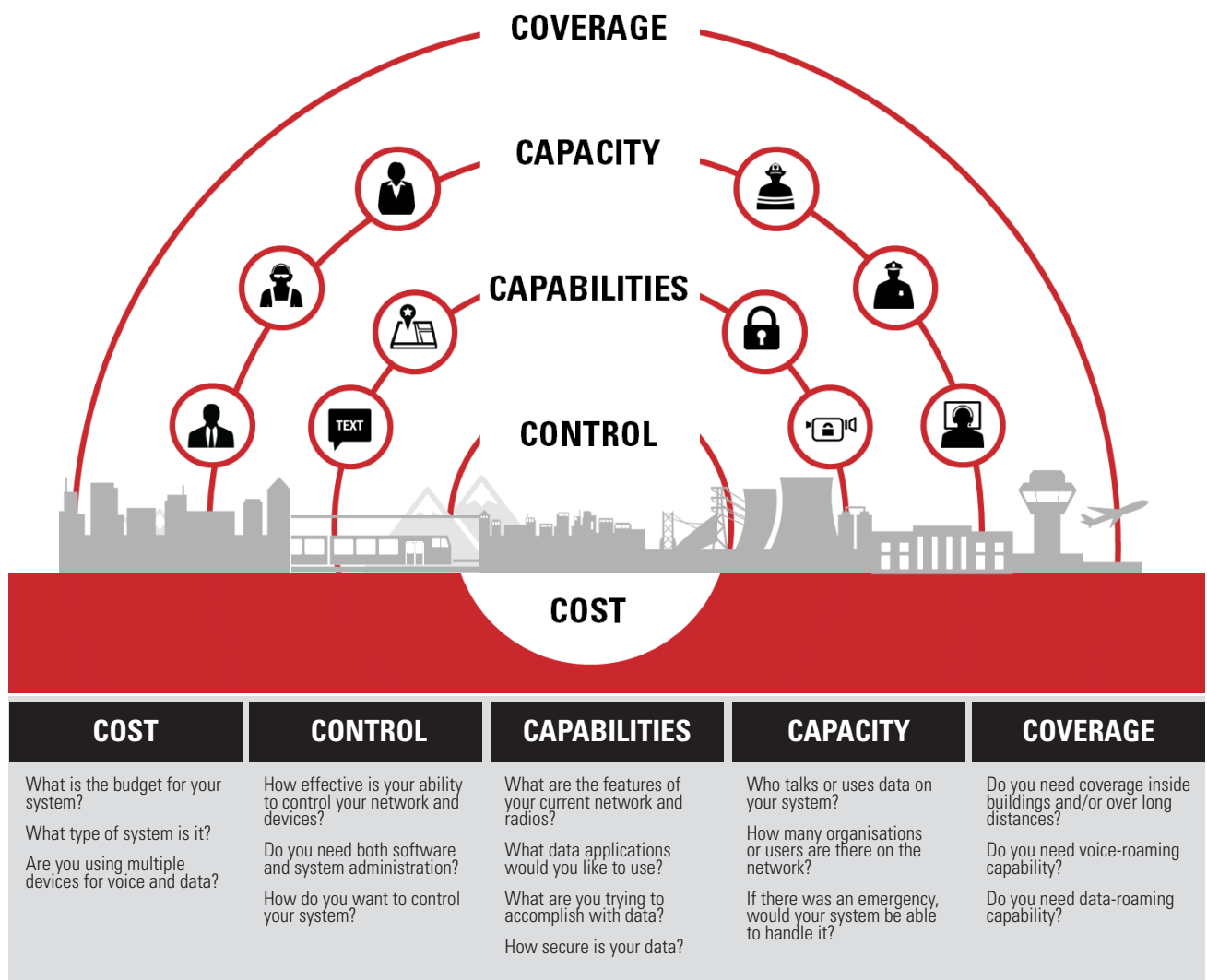
That is why a reliable communications network is imperative. Whether you are keeping the trains running on time or responding to an incident on at the gate, your communications network needs to support the full scope of daily operations and unpredicted situations. The right equipment for real-time monitoring and management of your system ensures you are anticipating issues before they become emergencies. The right communications empower employees with greater safety and efficiency, while delivering the level of service passengers now expect.

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THE FIVE C's OF CRITICAL COMMUNICATIONS

Determining which network is right for you depends on many things – such as the services you need, budget, and what constitutes sufficient network performance, to name a few. As you evaluate what communications technology is right for you, consider the following categories: coverage, capacity, capabilities, control and cost. By understanding these categories, you can start to evaluate what your top communication priorities are.



TETRA MISSION CRITICAL NETWORKS

TETRA is the communication network that you can trust for secure, reliable and efficient communications during daily operations and emergency response. Relied on by public safety agencies, transportation and logistics companies worldwide, TETRA networks have been deployed in more than 120 countries with more than 2 million users.

TETRA systems are implemented using dedicated, private radio spectrum and this helps ensure voice and data is available during emergencies and peak demand. TETRA provides the capacity you need for day-to-day interoperability and large-scale events. It helps minimise response times with intuitive dispatch solutions and accurate record-keeping of critical communications.



THE WAY AHEAD

By adopting advanced Motorola Solutions TETRA Dimetra IP radio technology, transport workers can extract greater value from their licensed radio spectrum: from simple voice to complex data-centric communications.

SIMPLIFIED INTEGRATION

TETRA systems from Motorola Solutions are based on IP architectures and harness the benefits of standardised, commercial, off-the-shelf IT technologies. For example, the dispatch communication functions of the radio system, such as group calling and broadcasting, can be easily integrated using Application Programming Interfaces with existing control room systems. Increased use of data applications to support routine processes and incident response also reduces the requirement for voice traffic.

REDUCED COST OF OWNERSHIP

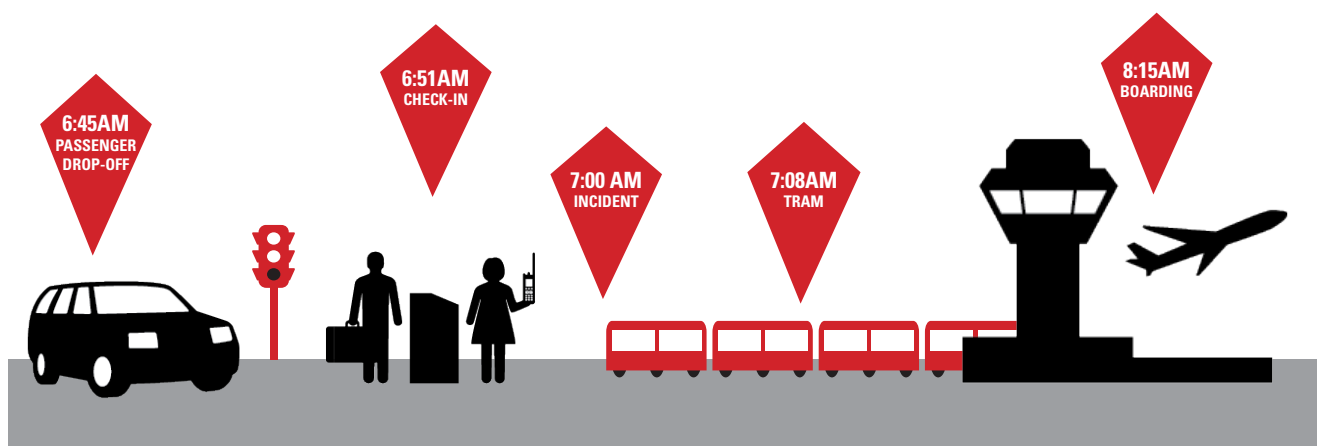
The greater capacity provided by advanced digital radio systems allows multiple user fleets to be supported on a single network, reducing maintenance and operational costs. In addition to voice communications, modern transport operations increasingly depend on telemetry and remote monitoring capabilities. By offering simultaneous voice and data services as well as the higher capacity TETRA Enhanced Data Service, Dimetra IP systems enable multiple applications to be supported on a single, unified communications platform.

MOTOROLA SOLUTIONS INDUSTRY LEADERSHIP

Motorola Solutions works with transport operators around the world in the development and provision of advanced networks designed to support the industry priorities of safety, efficiency, improving the passenger experience and reliable, effective communication. Solutions include dedicated and customised communication infrastructures for metro, airport, rail and bus service providers.

PROVIDING THE BEST SERVICE FROM DROP-OFF TO TAKE-OFF

Providing your workforce with the tools and connectivity to be productive and ensure their passengers' safety will become increasingly important. From ticket inspectors to maintenance engineers, they will need instant access to detailed information and communications via a device that is appropriate for their role. Intelligent network triggers and applications will help ensure that the right worker receives the right information in real time to successfully complete the right task.



6:45AM - PASSENGER DROP-OFF



As the passenger is dropped off, under-cover security officers monitor the area. They are using the **LEX L10 RUGGED LTE HANDHELD** to get access to real-time information such as photos and videos as well as location of other officers and incidents. The **WAVE** app allows them to communicate with radio-users at airport security, control room operators and customer service attendants.

6:51AM - CHECK-IN



The passenger has a dietary restriction he wants to make the flight crew aware of as soon as possible. The customer service attendant calls their colleague at the gate using their **ST7000 SMALL TETRA RADIO**, which fits nicely into their pocket. The attendant uses an earpiece that plugs into their radio so they can keep their focus on the task and customer they are interacting with. They receive confirmation that the flight crew will happily accommodate the dietary restriction.

6:55AM - CONTROL ROOM



An unauthorised person enters a restricted area in the airport. The sensor connected to an **ACE1000 REMOTE TERMINAL UNIT** detects the intruder and the surveillance camera takes a photo of the area and sends it to Command. The control room operator views the image of the intruder on **COMMANDCENTRAL** and shares it with a security guard who views it on his **TETRA** radio.

7:00AM - SECURITY



After the security guard receives the call and views the image on his **MTP6550 PORTABLE RADIO**, he makes his way to the restricted area. His **Si500 VIDEO SPEAKER MICROPHONE** records the interaction in case the intruder caused a threat. The video would be uploaded to a secure cloud and categorised automatically in case it was needed for evidence later.

7:08AM - TRAM TO THE GATE



The passenger takes a tram to get to their gate. The tram driver and guard are both able to use the **MTM5500 MOBILE RADIO** with **DUAL CONTROL HEADS** so they can communicate with each other and with passengers using a loud speaker in the train cabins. The guard can keep the driver informed of any incident that occurs on the tram and they are both able to receive updates from other workers in different areas of the airport.

8:15AM - BOARDING



Before the passenger boards, the engineers and refueling team perform standard tests and maintenance on the aircraft. They are all using the ATEX-Certified **MTP8550Ex PORTABLE RADIO** and **ACTIVE-NOISE-CANCELLING REMOTE SPEAKER MICROPHONE** which help to ensure they will hear and be heard over loud machinery and to ensure they will stay safe while using their radios in a hazardous environment.

THE CONNECTED TRANSPORT WORKER

Whether they are driving a bus or interfacing with a customer, it is imperative that your users stay connected. The right devices for the right users will help ensure they stay ahead of any issues before they become emergencies.

ACCESS VOICE AND DATA

With our extensive portfolio of devices, you will be able to find one that suits each user, from the platform worker who needs to send simple text messages to the supervisor who needs to fill out work reports at the end of their employees' shifts. Whether they need a full screen for mapping and work reports or a simple keyboard, there is a device for everyone.

END-TO-END ENCRYPTION

It is becoming increasingly important to protect your communications from the network level to the device itself, whether it is an LTE smartphone or a TETRA radio. Our devices meet government standards for both hardware and software encryption, helping to ensure your communications will not be compromised.

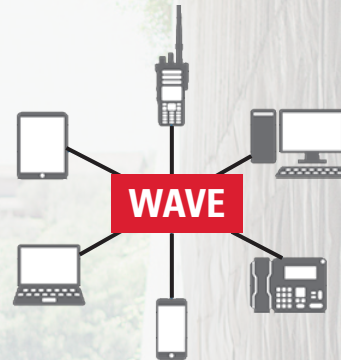
DESIGNED TO LAST

Motorola Solutions devices are designed to be durable and last the entire shift. They are certified to withstand dust, rain, shock and drops so your workers can use their devices in the rain or on a hot day. With an extremely reliable battery life, your users' focus can remain on the job, not the clock.



UNIFYING WORK GROUP COMMUNICATIONS

WAVE provides secure, real-time communications from any IP enabled position on the network, on any device - such as smartphones, laptops, PCs or tablets. This means that whether your workers are mobile or in the office, on the ground or in the air, they can effectively communicate and collaborate through voice, text and data.



EVERY DEVICE. EVERY NETWORK. EVERY TEAM.
CONNECTED LIKE NEVER BEFORE.



A passenger informs a platform worker of an unattended bag. The platform worker uses their radio to inform the rest of the workers assigned to their team about the security threat.



An off-site supervisor views the location of the incident and monitors the conversation using the WAVE app over LTE. He sends a group message advising the supervisors on site.



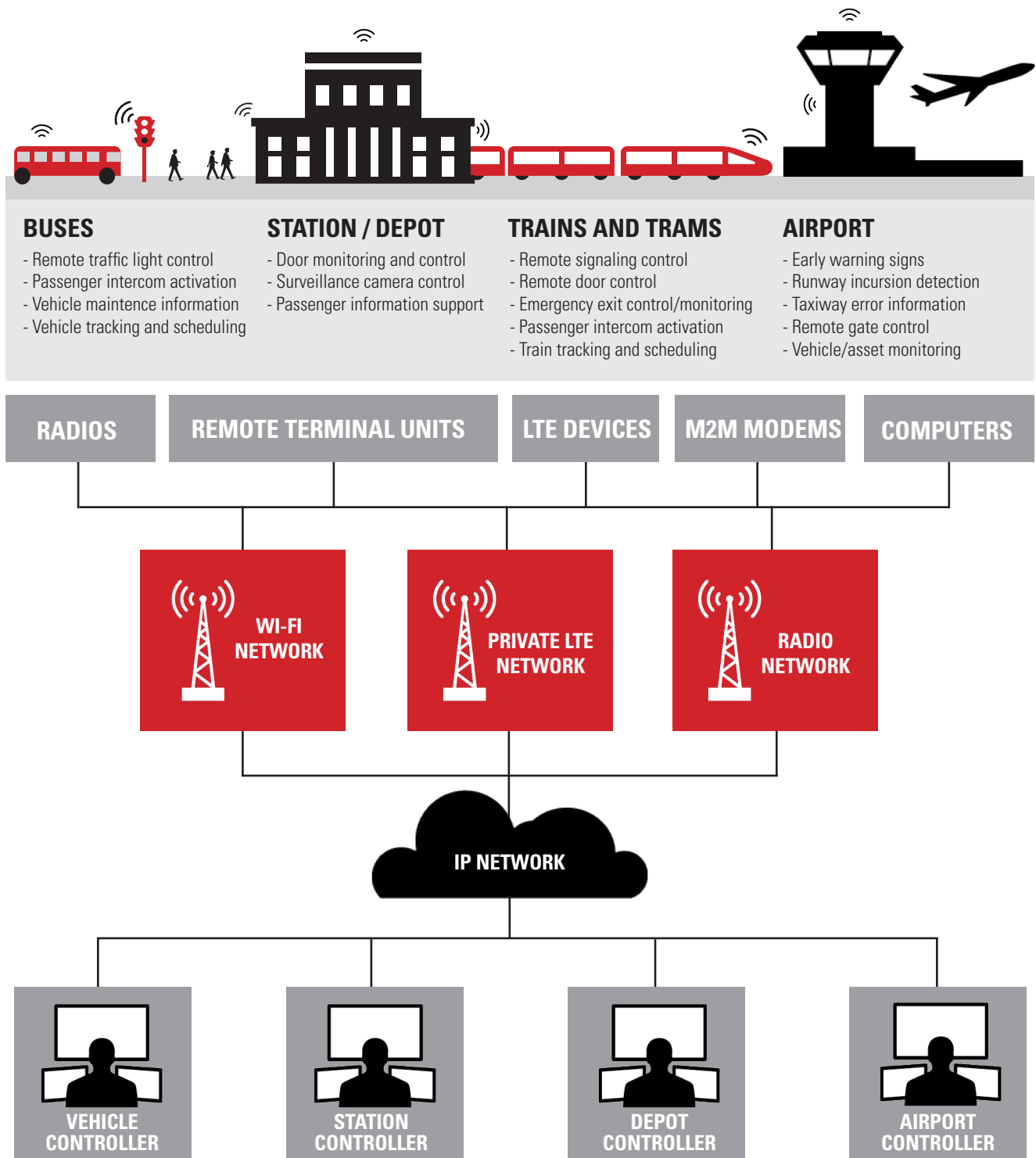
When the control room operator is notified using their WAVE Web Communicator over WiFi, they access the surveillance footage and inform the team when the bag is removed.



The security on staff immediately responds and removes the bag. They inform their supervisors and team that they should proceed with business and that no additional measures need to be taken.

CONTROL AND MONITORING OF CRITICAL TRANSPORT INFRASTRUCTURE

Industrial IoT provides an end-to-end solution, customisable for a variety of applications. sensors and SCADA remote terminal units (RTUs) help you operate more efficiently with powerful process automation and expansive communication capabilities seamlessly integrated across your organisation. M2M modems expand your organisational view and control by enabling further operational technology connectivity and data communication. Integrated SCADA solutions enable you to allocate the right resources and reduce lifecycle costs.



CASE STUDIES



THE LONDON UNDERGROUND REQUIREMENT: the creation of a single unified communications system enabling voice and text communications between drivers, line controllers, signalling and depot and an integrated alarm system for drivers and passengers.

The London Underground is one of the largest and oldest metros in the world. It carries over 3 million passengers per day covering 450 trains, 20 hours/day through 350km of tunnels, 270 stations and covering a surface area of >1000km². The communications network links train drivers, stations, depots and management into a single integrated TETRA system. Interoperability and coverage is also available to the police, fire and ambulance services tasked with dealing with emergencies in the Underground network.

THE SOLUTION

- 218 customised dispatch consoles, 1400 train based mobiles and 7000 portable radios. 2 network management systems, a trackside beacon system and voice and data logging
- More than 700km of radiating cable ensuring extremely high levels of coverage



PORT OF VALENCIA REQUIREMENT: the Port Authority of Valencia (PAV) must comply with stringent international standards and provide state-of-the-art facilities to ensure a competitive service.

The potentially hazardous nature of some of the cargo handled by PAV necessitated a robust solution that could be integrated with its existing Siemens SCADA network to provide early warning in the event of an emergency, enabling a co-ordinated and rapid response across all three ports.

ANFER has developed an application which allows users to monitor the sirens using their TETRA radios and select locally stored, pre-recorded messages to be broadcast in the event of an emergency. The solution has saved PAV time and money by allowing them to control the sirens automatically and upload pre-recorded messages remotely.

THE SOLUTION

- Dimetra IP Compact TETRA and Motorola/MOSCAD/ACE3600 Remote Terminal Unit (RTU) Network covering 80 kilometres of Spain's eastern coastline
- Approximately 100 MOSCAD ACE3600 RTUs which perform a variety of remote monitoring and control functions and can be integrated into non-Motorola SCADA systems



MILAN AIRPORTS REQUIREMENT: With 1,200 operating radios and an increase in operations, SEA needed a more dynamic solution for communications. Faced with the need to replace an outdated system and the need to cope with an increasing demand of services, SEA chose to switch to Motorola Solutions Dimetra TETRA.

In Malpensa - where the old and the new systems had to coexist in the migration phase - everything was fully operational within just two weeks, including the configuration of 1,000 new radios. At Linate airport, the system, supporting 400 new radios, was set up in just a week.

Motorola Solutions' high-performance TETRA base stations now deliver TETRA network coverage in both airports.

THE SOLUTION

- The Dimetra IP Compact system and supporting 400 radios were set up in just a week
- 1000 new radios configured in just two weeks
- A four-year managed services agreement with SEA, guarantees technology evolution including the replacement of its complete telecommunication system



RHEINBAHN AG, DÜSSELDORF REQUIREMENT: Rheinbahn AG manages a fleet of over 700 trains, buses and trams along 110 lines in a commuting area of 570 km² and employs about 2,800 persons. Their aim was to improve efficiency, safety and resource management along their transport lines.

MTS2 and MTS4 TETRA base stations and repeaters for both underground and overground transport communications provide 99.998% network availability and ensure the system will keep working in an emergency. Mobile radios were installed in every tram, bus and train so drivers can send and receive voice and data communications. They can effectively coordinate resources, manage their fleet, enhance efficiency and ensure safety. Most importantly, they can provide their passengers with the best service, through reliable connections and real-time information.

THE SOLUTION

- (50) MTS4 TETRA base stations (for outdoor use)
- (8) MTS2 TETRA base stations (for underground tunnels)
- Vehicles equipped with a next generation on-board computer – COPILOTpc2. It manages the voice and data radio communications with the central ITCS and transmits information like the latest vehicle location.



MOTOROLA SOLUTIONS

Motorola Solutions is the leader in mission-critical digital voice and data communications. Solutions include dedicated and customised communication infrastructures for metro, airport, rail and bus service providers. Motorola Solutions works with transport operators around the world in the development and provision of advanced networks designed to support the industry priorities of safety, efficiency, improving the passenger experience and reliable, effective communication.

For more information on our communication solutions
for rail operators you can:

Visit **motorolasolutions.com/transportation**

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