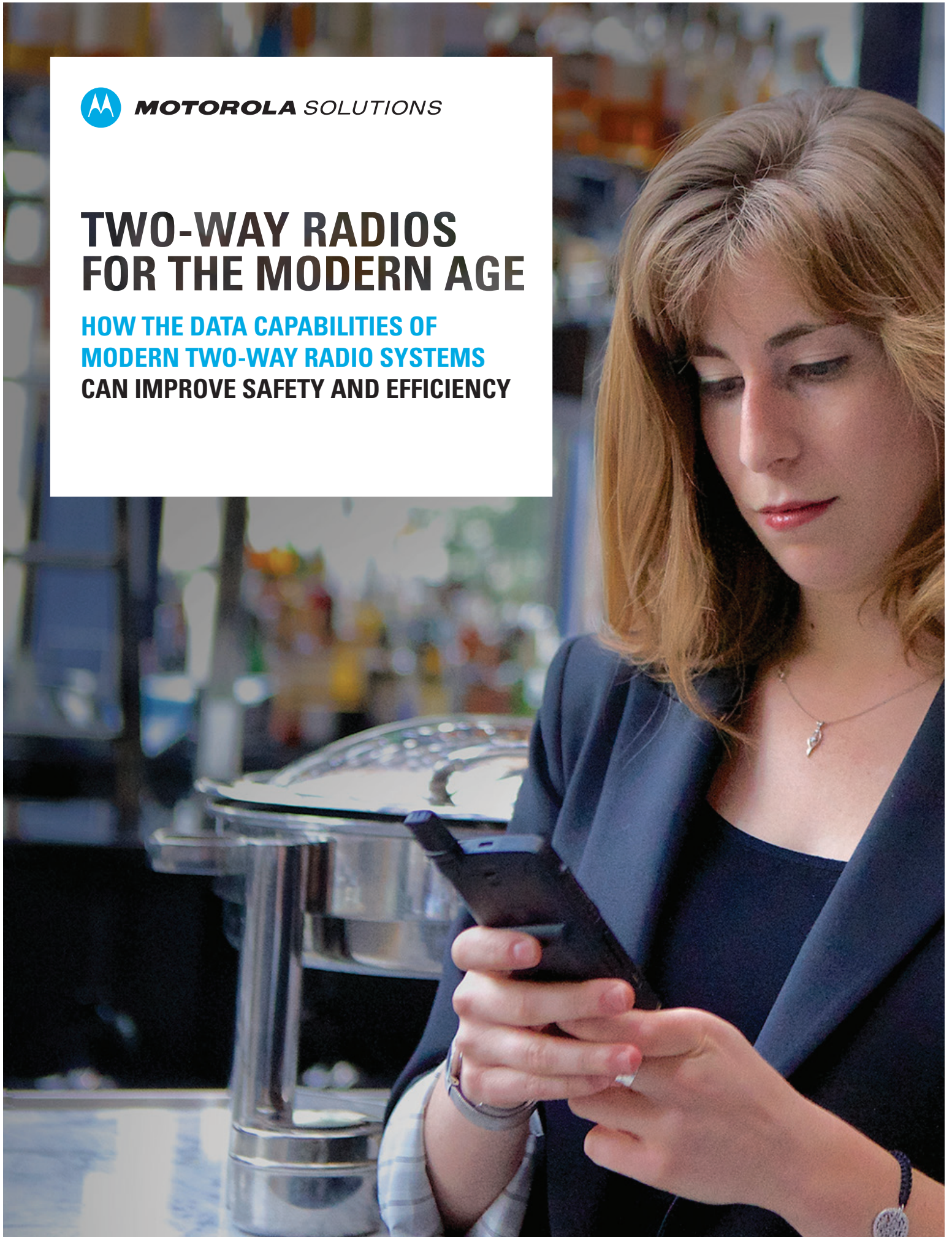




MOTOROLA SOLUTIONS

TWO-WAY RADIOS FOR THE MODERN AGE

**HOW THE DATA CAPABILITIES OF
MODERN TWO-WAY RADIO SYSTEMS
CAN IMPROVE SAFETY AND EFFICIENCY**



INSTANT VOICE COMMUNICATION: BETTER THAN EVER

When introduced in the 1940's, two-way radios revolutionized communication. The benefits of this simple, instant, one-to-many platform were immediately recognized – first by the military, and soon after by public safety officials and businesses. Today, with proven reliability and easy operation, two-way radios are considered mission-critical for businesses and public safety officials alike. Two-way radios are, perhaps, the most important piece of safety equipment you can carry.

DIGITAL TECHNOLOGY HAS TRANSFORMED TWO-WAY RADIOS.

- Digital systems improve the delivery of voice, with better quality and intelligibility.
- Digital encoding processes only the essential components of voice, so your colleagues sound more clear with less bandwidth.
- Digital radios are staggeringly efficient. Where a 25 kHz channel was required for each analog voice call, that bandwidth can now support up to 4 digital calls.
- With built-in error correction, digital communications are far more resistant to interference, noise and static.
- Sophisticated signal processing can deliver advanced features such as echo cancellation, feedback suppression and audio leveling.



TWO-WAY RADIOS: BUILT FOR THE WORKPLACE



OPEN STANDARDS DEFINED

To increase market confidence, the industry has defined several open standards for digital radio communications. The most widely adopted is Digital Mobile Radio, or DMR¹. This uses a 12.5 kHz channel, subdivided into two timeslots carrying digital voice and data. DMR radios generally operate in the VHF (136-175 MHz), UHF (403-527 MHz) or 8/900 (806-941 MHz) bands². The Motorola Solutions MOTOTRBO™ product line is one of the most commonly deployed examples.

RELIABILITY IS NOT NEGOTIABLE

Unlike email or instant messages, high-value communications must be delivered every time with the minimum possible delay. Built on the requirements of the most demanding users – armed forces and first responders – two-way radio has reliability built into its DNA.

THE 4 “C’S” OF RADIO ARE NOW A SUPER-CHARGED 5

WHY THE CHARACTERISTICS OF TWO-WAY RADIO MAKE IT IDEAL FOR PRIVATE COMMUNICATIONS.

1. CONTROL

Ownership of a two-way radio system means independence from 3rd party providers. And control over the entire network.

2. COVERAGE

A private two-way radio system can be engineered to deliver quality service in every square foot of your facility, from the basement to the rooftop.

3. CAPACITY

Your system is engineered to support your needs, even at the busiest of times.

4. COST

With no monthly fees, a digital two-way radio system is one of the most cost-effective ways to reduce your expenses. And it is within reach of every organization.

5. CAPABILITY

Now, with the introduction of data, your two-way radio system just became super-charged.

DIGITAL TWO-WAY RADIO: THE DAWN OF DATA

Already delivering better voice communication, digital radio systems are also paving the way for data – the real game changer. Systems designed to carry digital speech are also robust enough to handle other digital traffic. Traffic like location information, text messaging, dispatch messaging and telemetry. And while 12.5 kHz of bandwidth may not seem like much, it's more than enough to handle the data most often required in the field, and in the moment.

SMARTER RADIOS MEAN SMARTER OPERATIONS AND IMPROVED TEAM COMMUNICATIONS

Operations-critical communication is about precision and reliability. In the heat of the moment, your people don't need to browse the internet or access high-def video, they need data to make decisions accurately and to act quickly. That's why, in this era of ubiquitous broadband, two-way radios still remain the best tool for mission critical workplace communication.

Moreover, two-way technology has evolved. The latest generation of digital radio systems such as MOTOTRBO™ continue to deliver the push-to-talk instant communication that everyone expects – but now with data connectivity bringing text messaging, Bluetooth® connectivity, GPS awareness, and Wi-Fi® to the front lines. These solutions provide enhanced team communications that improve the real-time flow of information, ideas and decisions that drive efficiencies and improve collaboration across businesses.



BECAUSE YOU DON'T NEED BROADBAND AT THE CUTTING EDGE

INFORMATION FLOW IN THE WORKPLACE

Busy workers on a factory shop floor have no time for large databases and high definition video. Their high-value communications are "Go there", "Do this" and "Come quickly". That's why, at the cutting edge of your organization, narrowband two-way radio can't be bettered.



TURNING INFORMATION INTO RESULTS



DATABASES



VIDEO FEEDS



EMAIL



INTERNET BROWSING



GO TO BAY 8

SHORT VOICE MESSAGE

FIX MACHINE #2

TEXT MESSAGING

OPEN DOOR 54

MACHINE TELEMETRY

CUSTOMIZED APPLICATIONS PULL IT ALL TOGETHER

Data applications build the features and capabilities of modern two-way radio into a business support platform. They are the glue that can synchronize and pull your operation together. MOTOTRBO has the most mature ecosystem of Application Developers, working closely with customers to design and deploy customized applications to fit every situation.^{3,4}



DATA APPLICATIONS:



Command and Control

Modern, IP-based console solutions for efficient business management



Personnel Safety

Integrated safety and emergency response tools



Messaging

Text and email integration, with logging and archiving tools



System Monitoring

System status dashboards for optimal operation



Interoperability

Interconnecting radio systems, telephone networks and data solutions



Voice Dispatch

Centralized workforce management, even from a remote location



Location

Indoor and outdoor tracking integrated into interactive consoles



Work Order Ticket Management

Automatic workforce dispatching and productivity tracking

A SOLUTION FOR EVERY OPERATION

MAINTENANCE TECHNICIANS ARE SAFER

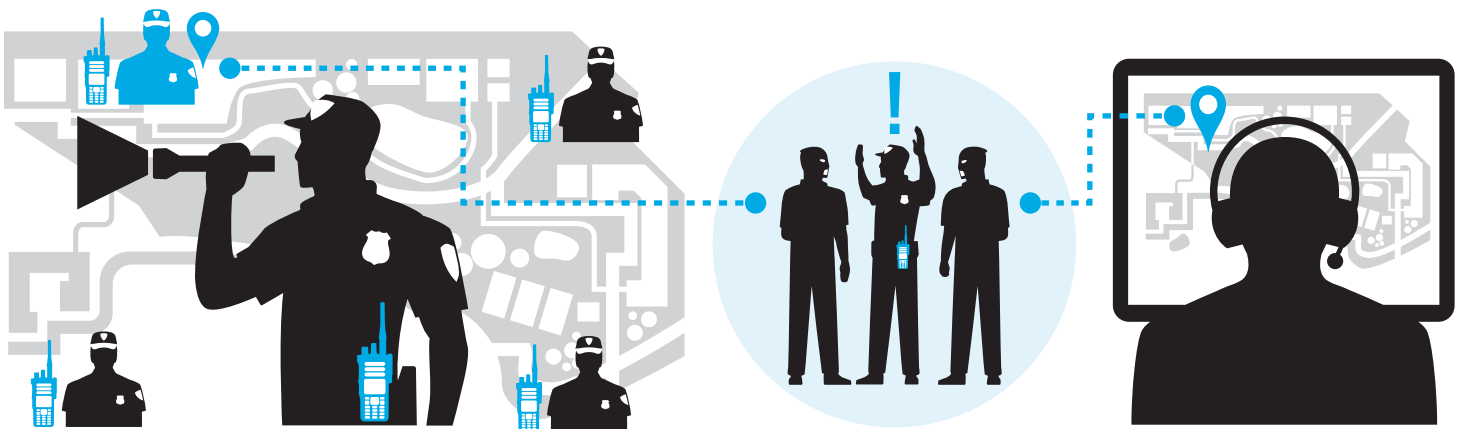


This maintenance shop needs to get trucks serviced rapidly and efficiently. The technicians all carry MOTOTRBO radios, so they can coordinate operations.

When their repairs take them to the chemical store for supplies, the Safety Officer is concerned that they may be overcome by fumes. So the company has a **location aware** safety application that uses **geo-fencing** to monitor their workers in hazardous locations.

If a technician falls in the chemical store, the dispatcher will be alerted – and will immediately see where to send the response team.

SECURITY PATROLS ARE MORE ACCOUNTABLE

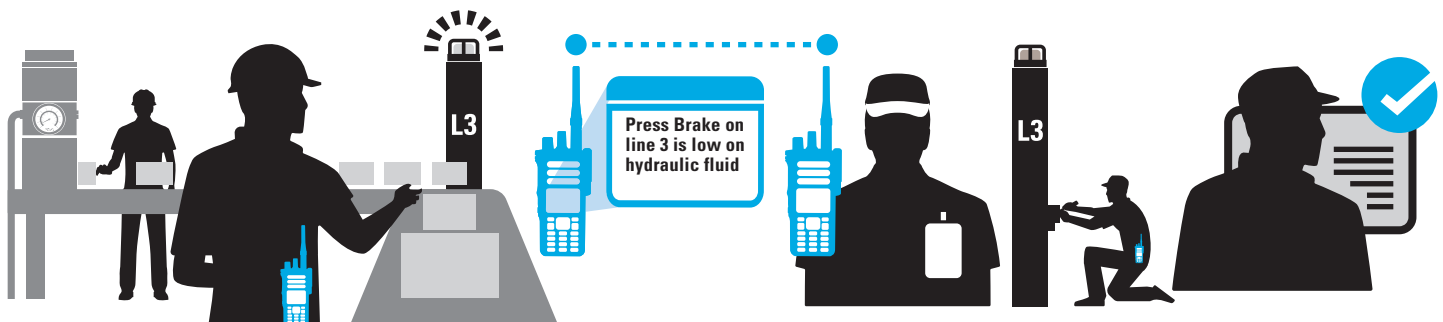


This nightshift security team patrols the whole campus, and they're contractually obliged to check into certain locations at least once every hour.

The company uses MOTOTRBO with a central work management application. The application logs the position of each radio every 30 seconds. The logs are reviewed every morning, then archived for proof of compliance.

The radios are also configured for **"Lone Worker"**: if the user does not respond to periodic alerts, a **"Silent Emergency"** is triggered.

FACTORY WORKERS ARE MORE PRODUCTIVE



This factory needs to keep the production line up and running at all times. Downtime is a huge cost.

The stamping machine on line 3 is reporting low hydraulic fluid. The server sends a **work order ticket** to the nearest maintenance technician. It is delivered to his radio as a text message.

He acknowledges receipt with a button-press. From the fault description he can see where to go, and what parts and materials he should take with him.

When the work is complete, he closes the ticket, producing a **performance metric** that can be reviewed later.

The server also sends an email to the maintenance supervisor: this is the third alarm from this machine this month. It's time for further investigation.



OPERATIONS-CRITICAL BEYOND SIMPLE VOICE

Digital technology has transformed the two-way radio. Voice communications are clearer and crisper, with longer range and better efficiency.

But the real revolution is the addition of data capabilities. Your radio system can now deliver operations-critical messaging and control applications, helping you improve workplace management, safety and efficiency.

Learn how your operation can benefit from data on a two-way radio system:
motorolasolutions.com/mototrboapps

SOURCE:

1. "Digital mobile radio," Wikipedia, https://en.wikipedia.org/wiki/Digital_mobile_radio
2. "Multi-Band Excitation", Wikipedia, https://en.wikipedia.org/wiki/Multi-Band_Excitation
3. "MOTOTRBO Applications for North America," Motorola Solutions, <https://www.motorolasolutions.com/content/dam/msi/Products/product-lines/mototrbo/documents/MOTOTRBO-interactive-apps-selection-guide.pdf>
4. "MOTOTRBO Application Partners," Motorola Solutions, http://www.motorolasolutions.com/en_us/products/twoway-radio-applications/mototrbo-system/mototrbo-application-partners.html#tabproductinfo

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