

EMERGENCY RESPONSE: THE DIGITAL AGE OF EMERGENCY MEDICINE

Panasonic TOUGHBOOK technology for pre-hospital first aid and patient care



The use of technology in healthcare is becoming a fundamental component of the system itself, to the point of representing a cornerstone not only for hospitals and care facilities, but also for all the external elements that make up the ecosystem of pre-hospital emergency medicine. Technological devices allow medical staff to intervene on patients directly on site or in the ambulance, with unprecedented speed and effectiveness, even before reaching the hospital.

Thanks to advanced devices and equipment, next-generation ambulance crews can share a patient's symptoms and vital signs with the reference hospital in real time. The use of 5G networks, supported by augmented/virtual reality and the latest AI technologies, enables faster and more effective communication and diagnosis. High-resolution video calls, for instance, give doctors a better understanding of the type of emergency at hand: they can remotely monitor the

patient's condition, diagnose symptoms, and prescribe urgent treatments, which paramedics can promptly administer during transport to the hospital.

These are the scenarios of Augmented Healthcare, the focus of this white paper, which explores the digitalisation needs and technological solutions for healthcare emergencies, with particular attention to first aid in ambulances.

It begins with a broad contextual analysis, starting with a fact-finding study on the state of emergency medicine in Italy, moving on to the technologies developed by one of the hi-tech giants, Panasonic, to improve the efficiency, safety, and effectiveness of pre-hospital emergency medicine operations, and concluding with several international case histories where the Japanese company's digital solutions are delivering truly significant results in supporting the work of doctors and paramedics.

Emergency Medicine in Italy

Over the past five years, starting with the Covid-19 pandemic, the use of technology in healthcare has undergone continuous acceleration. Despite evident and consolidated progress, this technological transition is still evolving, also due to the chronic territorial and regional disparities across the country.

On July 26, 2023, the XII Parliamentary Commission decided to launch a fact-finding inquiry into the state of emergency medicine and emergency departments in Italy, with the aim of contributing to a comprehensive reform project for emergency healthcare services.

The inquiry focused on critical issues, including the shortage of healthcare professionals, hospital overcrowding, long waiting times in emergency rooms, and the related impact on working conditions and patient care. During the course of the investigation, various institutional stakeholders were heard, starting with the Minister of Health, followed by the Conference of Regions, professional healthcare associations, trade unions, and numerous other experts and authorities.

At the conclusion of the proceedings, which closed on May 21, 2024, several shortcomings and critical issues emerged that required urgent intervention: the high number of inappropriate emergency room visits (with “green codes” and “white codes” accounting for well over 50% of total admissions); the shortage of doctors and nurses; long boarding times for hospital admissions; the lack of available inpatient beds; and the growing disaffection towards emergency medicine, even among young doctors, who are increasingly reluctant to choose this specialisation.



This is, as a matter of fact, a demanding specialty, one that impacts quality of life and carries a high risk of assaults and legal disputes; as a result, it is increasingly difficult to ensure adequate staff turnover, leading to a heavy reliance on temporary “freelance” doctors.

Among the various proposed solutions, including legislative initiatives, many share a common key element: the urgent need to accelerate the digitalization of first aid services, communications, and healthcare facilities within the national health system. This requires the widespread implementation of technological devices that can optimise spaces, resources, and personnel. Indeed, by harnessing the enormous potential offered

today by “augmented” technological evolution, a reorganisation of the emergency and urgent care system has become imperative.

Such measures require considerable investment, which, in the long term, are more than compensated by gains in efficiency and by improvements in the quality of both hospital services and emergency-urgent care.

The Importance of an Integrated Connectivity Ecosystem

At the root of the most recent technological leap lies the near-universal availability of robust and reliable internet connectivity. A high-speed cellular, satellite, and wireless network enables seamless real-time data transfer between mobile devices and hospital clinicians, providing the foundation for every operation both at the intervention site and aboard the emergency vehicle.

Current 5G connectivity plays a crucial role in the implementation of new emergency protocols, allowing physicians to monitor vital signs, access medical records remotely, and, ultimately, give and receive rapid responses that are often life-saving - all within a much shorter time frame than in the past.

Thanks to the network’s low latency, doctors and paramedics can collaborate in an almost “tactile” way, even when kilometres apart.

This innovation is especially critical for stroke patients: every passing minute without treatment for a cerebral haemorrhage can worsen the damage. Imagine, for example, a neurologist who, through a video call, asks a patient to move an arm: a signal delay could prevent



the doctor from understanding whether the difficulty is caused by technical issues or by the stroke itself. 5G eliminates this uncertainty, enabling faster and more accurate interventions - crucial for saving lives and limiting damage.

In recent years, ambulance services in the United Kingdom, the United States, and across Europe have struggled to meet the growing demands of patients in a context marked by widespread staffing shortages. Once again, investments in technology and connectivity prove to be the key to maintaining optimal standards of care and ensuring patient safety.

In this regard, a smart ambulance system developed in Cardiff proved invaluable during the peak of the Covid-19 crisis, when hospitals were overwhelmed with patients. The vehicles were equipped with a combination of digital enhancements and connectivity services, including an integrated multi-WAN router, a portable Wi-Fi hotspot, a 4G optimisation antenna, and next-generation satellite services and technologies.

Building on that experience, healthcare providers in the UK are now increasingly and consistently experimenting with remote diagnostics carried out directly in ambulances, made possible by 5G networks and new devices available to medical staff.

The connected vehicle, in fact, offers an innovative way to enable real-time communication between patients, ambulance crews, and remotely located medical experts. Among the most interesting projects, the city of Birmingham tested a protocol that allowed doctors to perform certain procedures remotely through an immersive setup. A camera installed inside the ambulance transmitted high-definition footage to the remote doctor, with latency levels close to zero; by using a virtual reality headset and a joystick, the doctor was able to remotely guide the paramedic through haptic glove technology. Particularly valuable in this context is the use of Microsoft HoloLens smart glasses, which leverage augmented reality to display a patient's medical history, collect information, and plan personalised treatments for emergency care.

Panasonic Solutions for Emergency Services

It is evident how vital effective wireless communication is for personnel operating in emergency scenarios. In such situations, quick access to critical applications and data is essential.

Rescue teams often work in remote locations where vehicle access is limited, and patients must be reached on foot. Whether in open spaces or highly critical contexts, every supporting technology must be highly portable and robust enough to withstand any weather conditions. Battery life is equally crucial in these contexts, ensuring more than eight hours of service without the need for recharging.

Among the global technology leaders, Panasonic has in recent years developed rugged devices - next-generation tablets and laptops - specifically designed for Emergency Medical Services (EMS). *“For more than 20 years, we have worked with police, fire brigades, and ambulance services to provide robust and portable mobile computing solutions, both vehicle-mounted and handheld, delivering purpose-built technology tailored to today’s digital emergency services,”* said Nick Miller, Key Territory Manager UK & Ireland at Panasonic.

Within Panasonic’s portfolio, the **TOUGHBOOK** range stands out: these are devices equipped with reinforced frames, hardened casings, and sealed ports, ensuring resistance to extreme temperatures, humidity, and physical impacts that would normally damage conventional consumer devices. The series includes rugged laptops, 2-in-1s and tablets - **TOUGHBOOK 55**, **TOUGHBOOK 40**, **TOUGHBOOK 33** and **TOUGHBOOK G2**. *“Beyond being a leader in rugged device design, we*

provide a complete solution for our customers, which includes in-vehicle communication system design, as well as docks and even certification for safety testing,” said Chris Turner, Head of Go to Market Europe at Panasonic TOUGHBOOK Europe. “Moreover, we work closely with international partners such as Ericsson Wireless Solutions to deliver a comprehensive solution. For example, the American giant’s NetCloud service and wireless routers leverage the power of LTE and 5G networks - including nationwide public safety networks - to provide reliable connections to the mobile data terminals of emergency services.”

The TOUGHBOOK series therefore represents the perfect partner to support EMS teams in challenging environments, offering fast and secure access to patient information, powering other diagnostic equipment, and connecting to the wider healthcare system directly from the emergency scene. These are devices that enable work anywhere and under any weather conditions: the reinforced anti-reflective touchscreen allows tablets to be used both indoors and outdoors, in any lighting condition; the long-life battery ensures standby autonomy of up to 24 hours, enabling multiple consecutive emergency shifts; and full integration within the broader healthcare IT infrastructure is guaranteed without compromising patient data privacy.

“Our devices are used by emergency services all over the world because their connectivity is unmatched,” emphasised Luca Santonico, Key Account Manager Italy for Panasonic. “In particular, we are the only laptop manufacturer that designs and produces its own antennas and stress-tests them in our own anechoic chamber, in Japan.”



Features and Benefits of Panasonic TOUGHBOOK

Among the most valued qualities of EMS devices is undoubtedly multi-vehicle integration. Emergency teams must respond as quickly as possible, but high-speed travel through traffic and across rough terrain can cause dangerous movement of objects inside vehicles. To use TOUGHBOOK devices safely and effectively for navigation, communication, or medical support, they must be securely mounted and connected within the

vehicle cabin during transit: a range of in-vehicle docking solutions securely hold EMS devices during transport, making it easier and safer for first responders to access and update patient records and communicate while on the move. The durability of these devices is tested to military standards, allowing intensive 24/7 use even in challenging environments. TOUGHBOOK equipment also includes various adjustable mounts for emergency vehicles or helicopters, adaptable to a wide range of vehicles, models, and dashboard designs.



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One of the most rewarding and appreciated features of Panasonic TOUGHBOOK devices, especially for in-ward use, is the Windows 11 operating system, which allows the easy development of additional functionalities and applications tailored to evolving program requirements. *“Our solutions,”* Santonico noted, *“are ready both for future updates and for backward compatibility with legacy systems”*.



MobiMed by Ortivus, installed on the TOUGHBOOK tablet, is designed for intensive use directly at the intervention scene. Effective monitoring of vital signs, rapid access to patient medical records, and information regarding past or ongoing medication are all crucial factors in delivering immediate and effective care.

Thanks to TOUGHBOOK connectivity via LAN, Bluetooth, 4G/5G, and GPS, the emergency team can also access critical incident data and share vital patient information with other on-site components of the emergency system, providing detailed reports on the incident and treatments administered to ensure a seamless handover to hospital staff.

TOUGHBOOK devices can also be equipped with an **e-ID / Smart Card reader** and an integrated **HF-RFID (NFC)** reader, allowing users to securely access patients' sensitive digital medical records without the need for tokens or other authentication devices.



4G LTE OR 5GSA WITH ESIM
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WINDOWS 11 PRO

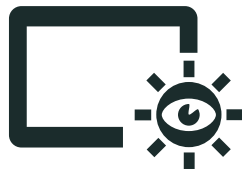
Protecting patients and healthcare personnel from potential infections is another key responsibility for medical teams. Any non-sterilised equipment can pose a contamination risk, making it a top priority to ensure the sterilisation of all technology in use. TOUGHBOOK tablets are built to withstand certified disinfectant sprays and wipes, a feature that helps teams protect patients by sanitising the device after each call-out. The touchscreen is also glove-compatible, allowing EMS teams to use the rugged tablet at the emergency scene without interrupting the delivery of critical care.



Finally, the range of accessories also includes washable silicone straps, as well as special port covers and screw cavity covers that prevent the accumulation of dirt: the sealed ports of the unit prevent any further dispersion of airborne particles and make cleaning easier.



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10,1" TOUCHSCREEN VISIBLE
UNDER DIRECT SUNLIGHT AND
USABLE WITH GLOVES



SEALED PORTS

Case Study: TOUGHBOOK in International Emergency Rescue

In the Czech Republic, the Seventh Regional Medical Rescue Service has long chosen **Panasonic TOUGHBOOK rugged laptops** for its fieldwork. These devices, designed to withstand shocks, humidity, dust, and drops, were recently adopted by the **Hradec Králové Regional Medical Rescue Service (ZZS KHK)**. Starting this year, the teams of this service have been equipped with **Panasonic TOUGHBOOK G2 tablets**, complete with rugged keyboards, specifically adapted to the needs of first responders.

The supply for the Hradec Králové regional rescue service was provided by **Medsol**, which also installed specialised software for synchronising patient data with information from medical facility databases. TOUGHBOOK devices are used by ZZS KHK not only in ambulances but also in helicopters operated by DSA for the Hradec Králové ambulance service. The advantage of this solution is not only the longer average device lifespan compared to consumer devices but also the excellent connectivity, essential for sharing patient data with hospital staff at the destination of the emergency service. *“Our devices are used by emergency services all over the world because their connectivity is unmatched,”* says **Jacek Wielgus, Key Account Manager DACH Region, Panasonic TOUGHBOOK**.

In the Netherlands, **Axira**, a network of regional ambulance care organisations, selected Panasonic as its technology partner. The push for innovation from Axira’s leadership began in 2011, when Axira experienced a significant shift toward digitalisation, moving away from complex and outdated paper-based

procedures in favour of **TOUGHBOOK CF-19 devices**. This partnership has led Axira to choose **Panasonic TOUGHBOOK devices** three times over the years to support its emergency operations. Today, Axira employs the latest TOUGHBOOK G2, a rugged device designed to operate in extreme conditions.

"From the chaotic hustle of ambulance life to the unexpected twists of the road, TOUGHBOOK tablets stand as a beacon of reliability for these unsung heroes on the front lines, tackling the complexities of emergency healthcare with grit and determination," says **Tom Lauwers, Key Territory Manager Benelux, Panasonic TOUGHBOOK.**

"The appreciation from our international partners who have chosen the TOUGHBOOK line is immense. Designed and built not only to endure but to remain resilient in the face of adversity, these tablets serve as lifelines connecting patients to care, perfectly bridging the gap between ambulance and hospital. With features like Bluetooth connectivity to defibrillators and ID scanning for patient identification, TOUGHBOOK allows first responders to focus on what truly matters: saving lives."

Conclusion

Technology has become a fundamental pillar for pre-hospital emergency medical services, where speed and effectiveness are crucial. In a context where advanced connectivity, such as 5G, is revolutionising operations daily - enabling real-time data transmission and new remote procedures - the reliability of devices is essential.

TOUGHBOOK devices stand out in the market as rugged, portable, and highly connected solutions, specifically designed to withstand the most extreme conditions while providing secure and rapid access to vital patient information. Their proven durability and ability to seamlessly integrate with both existing and future systems make them indispensable tools for field teams.

International case studies confirm that TOUGHBOOK devices significantly enhance the efficiency and safety of emergency operations, serving as a vital link between patients and hospital care. Investing in these technologies is therefore a strategic choice to optimise care delivery and improve the quality of emergency services.



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FPA serves central and local public administrations, as well as all providers of digital solutions and technological innovations interested in processes and pathways of change within the public sector, offering them services, support, and consultancy across multiple areas.

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For over 25 years, Panasonic TOUGHBOOK has been redefining mobile technology for the most challenging environments, offering a dedicated range of laptops, tablets, and handheld devices.

At the centre of action: we don't let water, dust, drops, or shocks hinder your work. Our rugged mobile IT solutions ensure you stay operational in rain, snow, or sunshine. TOUGHBOOK is built to endure.

Connected and secure: whether on the move, in the field, or in the office, TOUGHBOOK keeps you connected. Devices can be managed remotely, data remains secure, and continuous protection is ensured.

Versatility: TOUGHBOOK devices are lightweight and customisable for any need. Full-cycle battery life, hot-swap options, and flexible configurations allow work to continue without delays.

Website www.panasonic.it