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NPO STUDY · 5G & VHCN ECOSYSTEM

Secure State Communication for Emergency Services

5G & PPDR technologies across the European Union

STUDY 22 | Population protection & cybersecurity

AT A GLANCE

Study 22 reviews how EU member states secure mission-critical communication for their emergency and security services, and how **5G and PPDR** (Public Protection and Disaster Relief) technologies can modernise crisis communication. It analyses the current technology landscape, examines concrete implementations abroad, and identifies approaches that could be adopted at national level.

What the study covers

Secure, reliable crisis communication is a cornerstone of an effective state response to emergencies. It guarantees the smooth exchange of information between the components of the Integrated Rescue System — the Police, the Fire Rescue Service and the Medical Rescue Service.

Police — Fire Rescue — Medical Rescue

Why it matters

Communication systems must be not only secure and resilient, but also flexible and able to react quickly to new threats. The pressure comes from a rising tempo of events that strain conventional networks:

- **More frequent** natural disasters
- **Terrorist** threats
- **Technological** accidents

From a 1980s legacy to broadband 5G

Emergency services still rely heavily on narrowband digital radio that emerged in the late 1980s and 1990s — chiefly two competing standards: the proprietary French **TETRAPOL** (Matra, from 1987) and the open European ETSI standard **TETRA** (first published in 1995). Modern broadband technologies, combined with comprehensive applications, open up entirely new possibilities: transfer of large data sets and live video. **Network slicing** can guarantee the required parameters — including resource availability on a locally congested network — while preserving nationwide coverage.

LEGACY NARROWBAND
TETRA & TETRAPOL
competing voice radio standards

Voice-centric · dedicated low data capacity

5G + slicing

5G BROADBAND PPDR

- **eMBB** HD video from body / helmet cameras
- **URLLC** mission-critical low-latency control
- **PTx** dispatcher group communication

Guaranteed availability even on a locally congested network, with nationwide coverage · backup via secure non-public network

PPDR use cases for first responders

Group voice (PTx)
Dispatcher-controlled group communication — still the most effective way to coordinate first responders.

Body & helmet cameras
Real-time video streaming from responders on the scene to command, enabled by broadband 5G.

Connected patrol vehicles
High-capacity, low-latency, highly available links for on-board cameras and internal systems, nationwide and at speed.

Surveillance systems
High-resolution, AI-assisted video to support safety across varied locations and scenarios.

International inspiration

The research draws on concrete implementations abroad, with two member states standing out as references:

FI **Finland**
A reference implementation showing how modern technologies strengthen the security and reliability of crisis communication.

DE **Germany**
A further example of how modern communication technologies raise resilience — insight that can guide comparable systems elsewhere in the EU.

Recommendations — four goals for emergency-service networks

1
Own communication networks
Modernise via 5G & PPDR; secure non-public backup network

2
Interoperability
Compatibility with international systems and standards

3
Security & encryption
Advanced encryption standards and protective measures

4
Research & development
Greater investment to drive innovation in secure communication

TOWARD A NATIONAL STRATEGY

The study argues for moving from a declarative approach to a systematic strategy for non-public 5G networks for PPDR and critical infrastructure, aligned with the EU-wide cybersecurity framework of the 2019 Prague Proposals. Such a strategy should set out:

- Clear allocation of spectrum dedicated to non-public networks
- Interoperability between today's voice systems and IP infrastructure
- Sustainable operating and financing models
- Binding milestones for modernising critical technologies
- Active participation in international standardisation
- A framework for testing hybrid public / non-public models
- Stronger investment in secure-communication research and development

KEY TAKEAWAY Modern 5G and PPDR networks can make state crisis communication faster, more resilient and interoperable — a shared priority for emergency services across the European Union.