A Perspective on Public Safety and Critical Infrastructure Protection

Vision and market trends for Homeland Security and role in Critical Infrastructure Protection in response to the new security situation

“A safe and secure society with efficient infrastructure is the foundation for maintaining a competitive advantage in a rapidly changing world”

Whitepaper written by Terma 2011-04-05
The end of the Cold War and the 9/11-2001 terrorist attacks have changed the way safe and secure are interpreted by societies. Later the London and Madrid bombings showed that threats are often asymmetric and domestic. Ensuring a safe and secure society means protection against terrorist attacks and thus protection of domestic infrastructure. Climate change and natural disasters also increase the need for robust infrastructure protection.
Societies are becoming more dependent on Information and Communications Technologies (ICT) and protection of critical infrastructures is interlinked with continued operation of essential services in society. In most European countries, it will only take a few hours from failure of a critical infrastructure, e.g. power supply, until essential services like telecom, money transfers and water supply are unavailable, impacting regular citizens and potentially preventing first responders from acting.

First responders and owners of critical infrastructures must increasingly work together and share information, including operational details. In this respect, CIP is paramount for keeping society’s infrastructure running and integrated security solutions and information management are the appropriate response. Public safety and CIP must be seen in a network centric perspective to, among other things, interconnect decision makers and supply information to people on the scene. Modern society has to establish security solutions spanning first responders and critical infrastructure supporting operations with:

- Integrated voice communication
- Common operational picture
- Structured information exchange

A key parameter in such an environment is mobility of resources, first responders and other actors in the operation area.

Increasingly TETRA is the integrated voice communication technology of choice for both first responders and owners of critical infrastructures creating the foundation for voice communication. However, public mobile networks based on GSM/GPRS, UMTS and coming LTE technology have introduced a naturalness of high-speed wireless data services in addition to voice. The basic TETRA networks can only support a fraction of this even by migrating to support of data services TEDS. Efficiently cooperative response thus requires an intelligent combination of TETRA and public mobile networks:

![Figure 2: Critical Infrastructures’ dependence on ICT](image-url)

Critical infrastructures are potential targets of terrorism and may malfunction due to e.g. natural disasters with dire consequences for society. Such situations require cooperation between first responders and owners of critical infrastructures. We have to establish closer ties between “classic public safety and emergency actors” and Critical Infrastructure Protection (CIP), including reception of sensor information and concerted action between e.g. police and operators of harbours or airports.

![Figure 3: Example: Mobile connect setup](image-url)
The pressure for increased efficiency in the Homeland Security sector calls for flexible handling of the voice and data communication enabled by the TETRA networks between first responders as inter-person communication and at group level.

Based on the integrated voice and data communication the next natural step is building a shared Common Operational Picture (COP) that enables the people responsible throughout the chain of command to verify if the situation is evolving according to plan and decide on appropriate next actions.

The COP performs real-time data fusion and displays information into a geospatial reference from a wide range of sources such as sensors, incident management and dispatching systems, databases and information systems. Combined with user-configurable computer-aided analysis and decision support tools gives alarms and notifications to support advanced and fast decision-making and actions.

This is all based on an open information exchange where multiple strategies are needed to connect installed devices and systems from multiple vendors. The required functionality is primarily adaptation and distribution based on common standards to ensure real-time performance of the interconnection between systems and solutions.

Terma Homeland Security Systems

Terma Homeland Security Systems are focused on emergency services and CIP, which includes providing technologically advanced solutions for the individual implementation. It improves collaboration between different emergency services as well as critical infrastructure providers with key components for integrated communication, common operational picture and structured information and supports increased mobility of the resources in the field.

The T.react concept is based on an open integration platform which supports a rich suite of applications. With full scalability, the T.react Radio Dispatch communication platform allows interfaces to civilian as well as military Command & Control systems, enabling effective cooperation in day-to-day incidents as well as in large-scale incidents such as terrorist attacks or natural disasters.

The infrastructure part of the T.react CIP solution has the ability, in real-time, to securely scale and connect many control rooms and sensors via customers’ existing network and public network providers e.g. TETRA networks.

To meet specific customer requirements, T.react solutions use COTS (commercial off-the-shelf) products from partners, existing systems and Terma’s own applications to the greatest extent possible.

Furthermore, the T.react solutions can be tailored to utilize legacy systems to the extent required by the customer.
T.react Radio Dispatch – Mission Critical Communication Solution

The T.react Radio Dispatch is designed to offer the best possible tools to provide seamless voice communication between units and agencies during daily operations as well as major events. T.react Radio Dispatch enables control room operators to handle all voice communication in a modern digitalized TETRA network environment in crisis situations and in daily operations. Additionally, T.react Radio Dispatch facilitates cooperation across borders through the use of international communications standards and Inter System Interfaces (ISI).
The T.react Radio Dispatch is designed to offer the best possible tools to provide seamless voice communication between units and agencies during daily operations as well as major events. T.react Radio Dispatch enables control room operators to handle all voice communication in a modern digitalized TETRA network environment in crisis situations and in daily operations. Additionally, T.react Radio Dispatch facilitates cooperation across borders through the use of international communications standards and Inter System Interfaces (ISI).

T.react CIP: Critical Infrastructure Protection Solution

Terma’s flexible system for CIP - T.react CIP - ensures effective protection of key assets. T.react CIP combines radar surveillance with technologically advanced Command, Control and Communication systems capable of performing automated surveillance of the area of interest based on computer aided analyses and decision support tools.

The T.react CIP main capabilities are:

- Real-time coherent and total Picture Of Activity (POA) with zoom to appointed areas
- Real-time alerts and cue to slaved or fixed cameras on suspicious activity and intrusions in restricted areas
- Inception and incident management

Figure 7: T.react Radio Dispatch screen picture

Figure 8: Video camera and radar antenna of T.react CIP
T.react solutions

Terma’s T.react Radio Dispatch and T.react CIP improve collaboration between public safety actors and providers of critical infrastructures. T.react solutions enable crossorganisational cooperation with a shared operational picture, communication, mobility and business continuity. T.react solutions are scalable spanning from a single stand-alone low cost control room to fully networked nationwide control rooms. In addition, T.react products provide data sharing between preparedness actors and between operative, tactical and strategic levels in the organizations. The focus for T.react is “Network Centric Operations”. T.react solutions are tailored to user requirements from COTS (commercial off-the-shelf) products, existing legacy systems and Terma’s own applications to deliver networked solutions for homeland security with full flexibility, scalability and upgradeability.

Conclusion:
The civil population is very dependent on the ability of many homeland security organizations to work together and collaborate with the providers of critical infrastructures e.g. harbours and airports. European countries have never had a higher security level than today, but maintaining and improving it requires a massive introduction of advanced IT solutions.

T.react CIP provides a real-time situational overview for efficient handling of all situations; the system generates alarms based on target behavior and position. T.react CIP operates in real-time and thereby delivers a timely situation awareness that enables effective and timely decision making.