Digital Two-Way Radio System for the G8 Annual Summit 2007 in Heiligendamm
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Speaker:

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Director of Area Field 2

Responsible for the budget of the Neubrandenburg Police Authority

Responsible for Information & Communication, Police Technology and Economic Administration

Director of Subsection of Radio and Digital Radio Project Manager during the G8 Summit
Outline

1. Introduction
2. Concept/Design
3. Technical implementation
4. Application
Tetra4MV
Timeline - 2006

September 2006  Basic definition of tactical requirements for a digital two-way radio network and cost analysis

November 2006  Compilation of tactical requirements

Dezember 2006  Tactical certification by BAO KAVALA
                Publication of tender
                Bidder inquiries
## Timeline – 2007

<table>
<thead>
<tr>
<th>Month</th>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>January</td>
<td>2007</td>
<td>Proposal for leasing of the first 9 base stations</td>
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<td>Supply of the required HH-resources</td>
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<td>Application of the BOS digital radio frequencies</td>
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<td>29.01.07 order to Motorola</td>
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<td>February</td>
<td>2007</td>
<td>Application of the data lines</td>
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<td>Start training operating personnel</td>
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<td>(Radio control station terminals)</td>
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<td>March</td>
<td>2007</td>
<td>Leasing of 8 additional base stations</td>
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<td>Leasing of backup radio stations</td>
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Procedure – 2007

April 2007  
04/02/2007 Finalise system design of the anchor locations  
Award of contract  
Leasing of antennae locations, start of multiplier training

May 2007   
Acceptance for operation  
Receipt of the frequency license  
Initial operation of all base stations
2. Concept/Design

Design for the information and telecommunications technology center - technical assurance within G8 budget (Jan/Feb 2006)
- Deliberations with police and mission sections leaders
- Collation of tactical information
- Formulation of rough design
- Creation of technical structures, capacities and components
- Formulation of verifiable financial numbers

Suspension of planning due to the state visit of George W. Bush
Mandate:

Operational area:
- Around Heiligendamm with the boundaries of Wismar, Parchim, Güstrow, Ribnitz-Damgarten and 12 nautical miles along the coastline

Executive staff and commands of mission sections:
- 12 mission sections, approx. 40 mission subsections
- Common location of executive staff and the commands of 10 mission sections (Waldeck)
- 2 remote commands of EA Heiligendamm and Airport
Commitment of forces:
- Overall forces approx. 17,000 mission workers
- Requirement of approx. 250 to 300 talk groups (police only)

Quantity structure:
- 2 command & control stations with a total of 4 coordinating office work stations
- 3 mobile base stations mounted on motor vehicles
- 2100 terminals
- Accessories

In the design phase the terminal requirement was subject to strong fluctuations, so that optional requirements of up to 15% were provided in the specifications.
Defined operational area

Area approx. 9200 km²
(more than 3-times the area of Saarland)

Required area with portable radio coverage
(real portable radio coverage in approx. 80% of the total operational area)
Existing infrastructure

- analog common frequency with two layers in the area of operation
- Use by AAO and BAO loss conditions / terror
- 3 regional analog special repeaters in the city of Rostock
- 1 LUKW in the state of Mecklenburg Vorpommern

Requirements for the mission

- approx. 70 radio circuits available in the overall area of operation
  \(\Rightarrow\) equivalent to 70 analog common-frequency layers

- 180 to 230 regional repeaters supported radio channels and alternating voice channels, overlapping in the areas of Heiligendamm, Rostock and Laage airport
Decision for digital radio

Why?

- Required number of analog radio channels was neither technically nor economically feasible
- Concentration of transmitting / receiving stations in the closest area
- Transhorizon ranges
- Analog radio with simple technical resources can be bugged and disrupted
- Poor voice and transmission quality = additional stress for the mission force
Digital radio to what extent?

⇒ Less is sometimes more

⇒ For closed units principally, from the Police Leader to the leaders of around one hundred police
  - Receipt of the communications structures and workflows
  - Change digital to analog where otherwise change 4m to 2m
  - Logistics
  - Training problem
⇒ In selected areas personnel or vehicle equipment
⇒ Priority restriction to group communication
⇒ GPS and emergency call capability
3. Technical implementation

- **Frequency design**
  - Frequency application
  - Site certification

- **Documentation**
  - Communications plan
  - Fleet mapping

- **Boosting site efficiency**
  - Site acquisition
  - BTB
  - Setup of the antennae systems
  - Site acceptance

- **Site connection**
  - Network design
  - Wired connections
  - Directional radio connections

- **Delivery/setup of the system technology**
  - MSC/ NMC
  - Base stations
  - Control stations
  - Terminals/accessories

- **Training**
  - Technical personnel
  - Control station personnel
  - Multipliers for users
Frequency planning

- Calculation of the frequency requirement on the basis of the numbers of carriers (76) and the repeating options
- Exclusive frequencies for the mBS
- Application for the frequency license with BMI (Fed. Min. of Interior)
- Testing and implementation to Federal Police Center for Information and Communication specifications
- Bilateral frequency coordination with Denmark
- Receipt of the frequency license from the Federal Network Agency
- Filing and receipt of the site certification through the site owner
Documentation

Communications plan
- Implementation of the mission and command
- Diagram of information relationships
- Covering operations area

Fleet mapping
- Created on the basis of the communications plan
- 200 police talk groups and 90 NipoG talk groups arranged
  - to enable flexible reaction on changes during the mission
- Matrix of the allocation of all terminals by their respective authorization and role
  - predominant number of the terminals with equivalent authorizations
- additional talk groups only allowed in the upper leadership levels and for special users
Boosting site efficiency

- 9 anchor sites specified on exposed radio towers
  - Inclusion of the antennae systems in boosting of site efficiency
  - Chronological flow at anchor sites
  - 2 sites with 2 base stations (redundancy)
- 8 additional sites for covering the supply assignment and increase of redundancy
- Site preparations for MSC/NMC (climate control, emergency power, security)
Site connection

- Connection of all 17 BS-sites and 2 control centers to the MSC
  - 16 sites via E1-cable, 1 site via µ-wave
- Use of the DVZ - network as backbone
- Redundant directional radio connection of 3 base stations
- Redundant connection of the DVZ-network to the MSC via directional radio
- Wiring of ISDN-connections for the mobile base stations
Delivery / setup of the system technology

- Test run in Berlin (Factory Acceptance Test)
- Commissioning of the MSC/NMC
- Commissioning of 19 base stations
- Commissioning of 4 control center terminals
- Commissioning of mBS in Neubrandenburg in stand alone operation
- Commissioning of two mBS in Schwerin and Wismar via ISDN - links (prepared sites)
- Delivery of the terminals and accessories in coordinated intervals
Training

- Technical personnel (15 participants) received two weeks of training (network structure, individual user management, control center terminals, terminal programming)
- Control centre personnel (8 participants) two days of training
- Multipliers (15 participants) for terminals trained for one day
  - all training was performed by the system technology vendor

User instruction was provided on site by the technical personnel of BOS or by the multipliers
April 2, 2007 – Begin pilot operation

May 1 – Begin functional operation

Network operation and maintenance
- by Motorola
- 3 employees of Motorola

Individual user management/ terminal programming / installation
- by technical Information and Communications personnel of the M-V State Police
- Network monitoring
- Terminal distribution and vehicle installation
- Deployment of mobile base stations
4. Application

Temporary network expansions with mobile base stations

- Deployment of the mobile base stations for coverage of the unpredictable requirements for the special events in Schwerin and Wismar
- Setup of stationary antennae
- Connection of the mBS by means of ISDN
Utilized capacity / load distribution

- Main location Rostock (12 carriers) and Kröpelin (8 carriers) were suitable for the heavy traffic load
- In the area of Laage airport (multiple sites with 2 carriers)
  - maximum load was reached while the guest arrived
  - temporary capacity of 2 sites extended to 3 carriers each
- In the outskirts, 2 carriers per site were sufficient
- Specifications of criteria for terminal log-in can optimize the load distribution
User acceptance

Consistently positive feedback due to high availability and uncomplicated operation

- somewhat affected lower variety of accessories
- In contrast to the terminals, there were rarely any requisition notes in advance here
- the specific need was first formulated during application
- adaptations were necessary for quickly obtained accessories
Service

- in order to prevent long periods of interference, the parallel inclusion of all components possibly affected by the disruption was necessary

- a central location for the coordination and monitoring of all troubleshooting was valuable

- on site service of the network operator is indispensible for such applications
Application
Application
Application
Application
Thanks for your attentiveness