Data and applications with TETRA & TEDS

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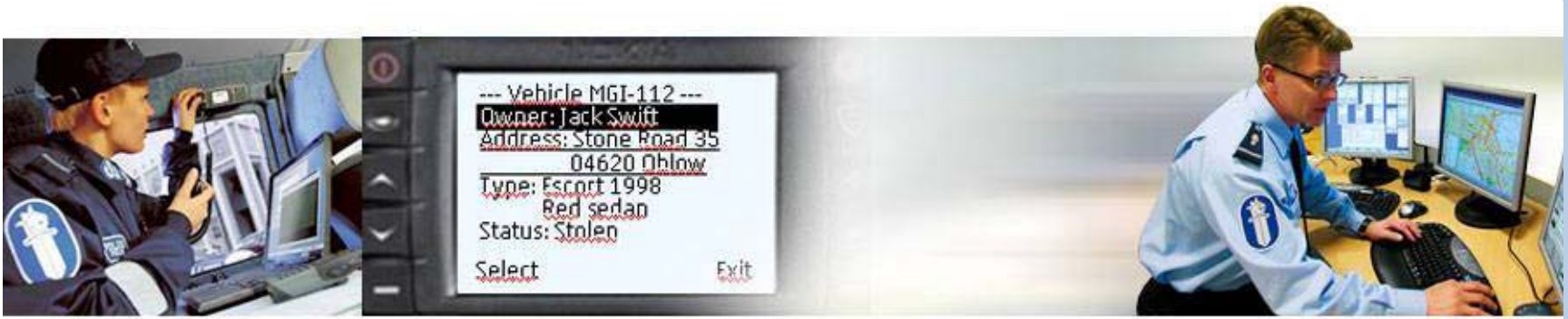
Risto Toikkanen



Contents

- *The need for data applications*
- *Mission critical vs. commercial data services*
- *Examples of advanced data applications*
  - *Image communication*
  - *Handheld computing*
  - *In-vehicle computing*
  - *Automatic location services*
- *TEDS as enabler for new applications*

Trend: Field operations call for data applications

TETRA Enhanced Data Service

TETRA IP packet data

TETRA short data messages

TETRA status messages

Being always connected	Voice
Precise situation awareness	Data
Rapid information sharing	Data
More effective field commanding	Data
More effective daily routines	Data

Precise situation awareness requires data and pictures

Why not commercial services for critical data?

- Commercial services (GSM, GPRS, 3G, …) are not always available when the need is highest, they can collapse under heavy load:
  - Several examples: London Metro bombing, Madrid bombing
  - Network resources and loading are not under user's own control
- Data is critical in creating right situation picture quickly
- CEPT Public Protection and Disaster Relief Workshop March 2010: "Public mobile networks can not be used for PPDR applications"

- TETRA serves as mission critical always available wide area voice and data backbone, which can be complemented by other technologies if needed

Examples of TETRA data applications

Image communication

Handheld computing

In-vehicle computing

Automatic location services

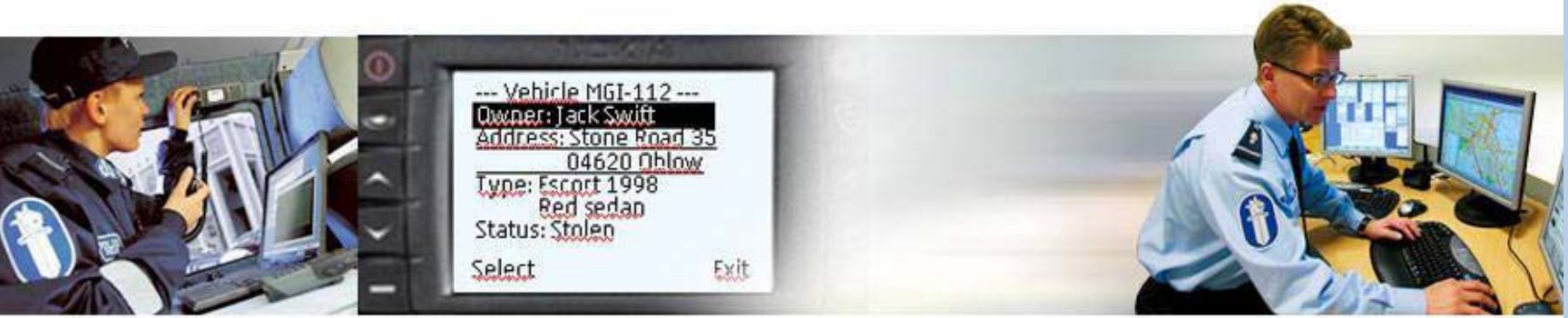


Image communication

"Data" is not only numbers or text

Seeing helps when there is the need to

- Identify
- See what is happening
- See who is doing
- Remember
- Inform
- Compare
- Record
- Understand

Seeing is believing

Image communication

- Image push to all units in the field is a fast way to share picture information
- TETRA IP packet data suits well for image transmission
- Control room applications optimise resolution for the limited screen size and reduce file size for fast delivery
- No extra equipment needed, all you need is: TETRA terminal
- Reaches all users in wanted area
- Increases efficiency and improves officer safety

Handheld computing

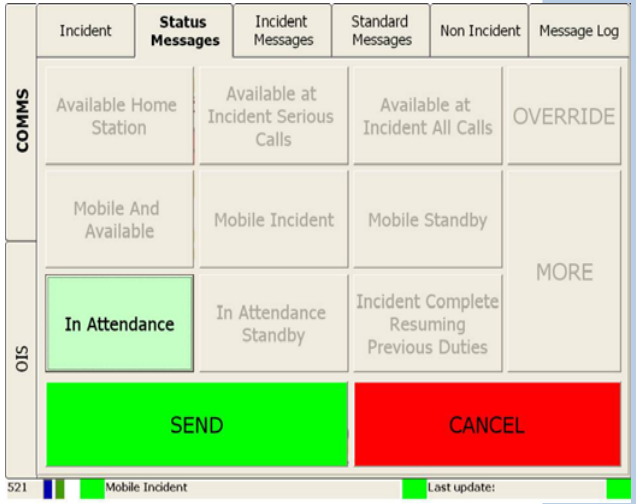
- Big mass of information requires high resolution screen
- But most users have handsets and also need service
- Selected information can be shared with handhelds:
  - directions, location/coordinates, photos, jpg images
  - database queries, field reporting, messaging
- Handsets and PDA's can be used to capture information:
  - daylight/infrared cameras
  - license plate reading
  - fingerprint reader
  - ID card readers, bar code, magnetic, RFID

In-vehicle computing

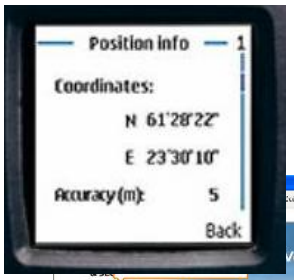
- Receive incidents
- Share with other vehicles
- Status
- maps with route calculation

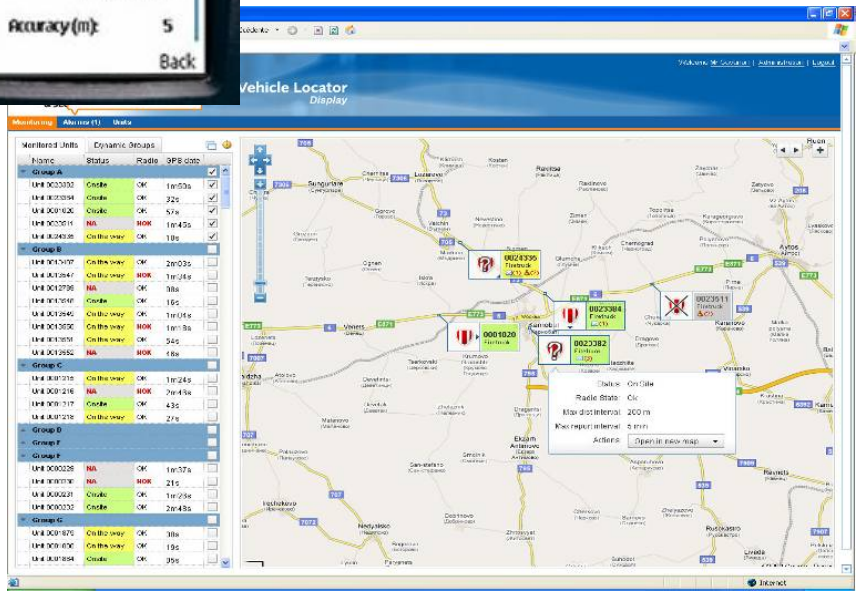
- Building maps
- Database inquiry local or remote
- Messaging capability

Bulk data loading may need e.g. WiFi at fire station etc



Positioning and resource management

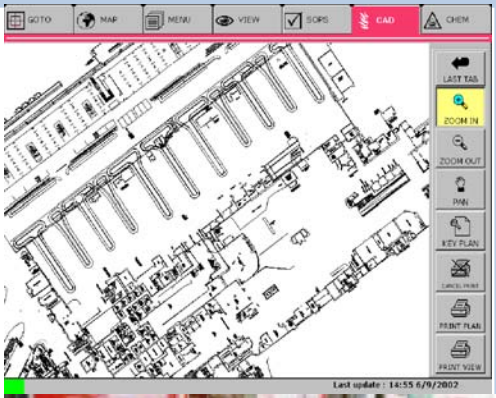




- Most TETRA handsets have GPS receiver
- Position of every unit in real time, adaptively (speed/time interval)
- Location shown in real time in control room
- TETRA SDS and TETRA LIP standard used to deliver location information in compact format
- Location info utilised in computer aided dispatch systems e.g. to select closest free units

When more details needed

- More detailed graphics or photos
- Map delivery over the air
- Floor plans etc detailed documents
- Bigger display in mobile computer
- Video clips
- Very many users addressing a database
- Complex databases with pictures etc
- Data services provided to all users



- TETRA Release 1 has limited IP data capacity
- That limit is overcome by TETRA Release 2 TEDS

New data opportunities with TEDS

- TETRA Enhanced Data Service (TEDS) in TETRA Release 2:
  - Upgrade to existing TETRA network – integrated to TETRA
  - Secure – Reliable – Always available – Wide area
  - up to 100 kbps net speed, user experience comparable to GPRS/EDGE

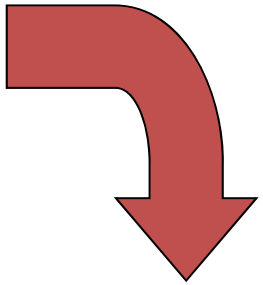
TEDS enables :

- All services provided by narrow band IP packet data plus in addition:
  - Video clips, high-resolution images
  - Multimedia databases
  - Surveillance
  - Greater number of applications and users at the same time

TEDS is a capacity booster

TETRA Rel 1 vs TEDS

Features	TETRA 1	TEDS
Channel access	TDMA	TDMA
Modulation	π/4QPSK	4/16/64QAM
Carrier bandwidth	25 kHz	25/50/100/150 kHz
Channels/carrier	4	4



Modulation and coding	Throughput
TETRA 1 all 4 slots, 25 kHz	10 kbit/s
TEDS 4QAM, r=1/2, 50 kHz	26 kbit/s
TEDS 16QAM, r=1/2, 50 kHz	51 kbit/s
TEDS 64QAM, r=2/3, 50 kHz	103 kbit/s

TEDS status today

- Standard and TIP available for IOP certification
- Ten times higher data rate by 50 kHz channel
- Five times better spectrum efficiency with 100 kbit/s
- Only one BS radio for 100 kbit/s (instead of 10 radios)
- Prototypes demonstrated since 2007
- Contracts in place from Norway to South Africa
- First pilot ongoing in field
- TEDS ready base station hardware available for some time
- TEDS capable radios announced in TETRA World Congress

Summary

- Combination of fast group voice and smart data in same network enables efficiency and safety in the field
- TETRA makes an always-available voice + data backbone
- Mission critical users are deploying intelligent data services today – data becomes mission critical
- TETRA offers future proof service development road map
- TEDS brings new speed to TETRA networks

Thank you

www.tetra-association.com

risto.toikkanen@eads.com