



# Emergency Communication with Calling Frequency & Dispatcher

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# Agenda

- Introduction of our Situation
  - USKA Sektion Zug and the Kanton of Zug
  - Scenarios
  - Technologies used
- Emergency Communication with Calling Frequency & Dispatcher
  - Used scenario and sample network
  - Objectives
  - How message exchange works
- Duty of the Dispatcher
  - Frequency-Station-Matrix
  - Station-Station-Matrix
  - Message exchange at dispatcher's site

# USKA Zug

- Regional Amateur Radio Club, 65 members
- Branch of the national USKA
- Emergency group team: 20 members
- Agreement with the local authority:
  → 10 members are operational after 1 hour

# Kanton of Zug

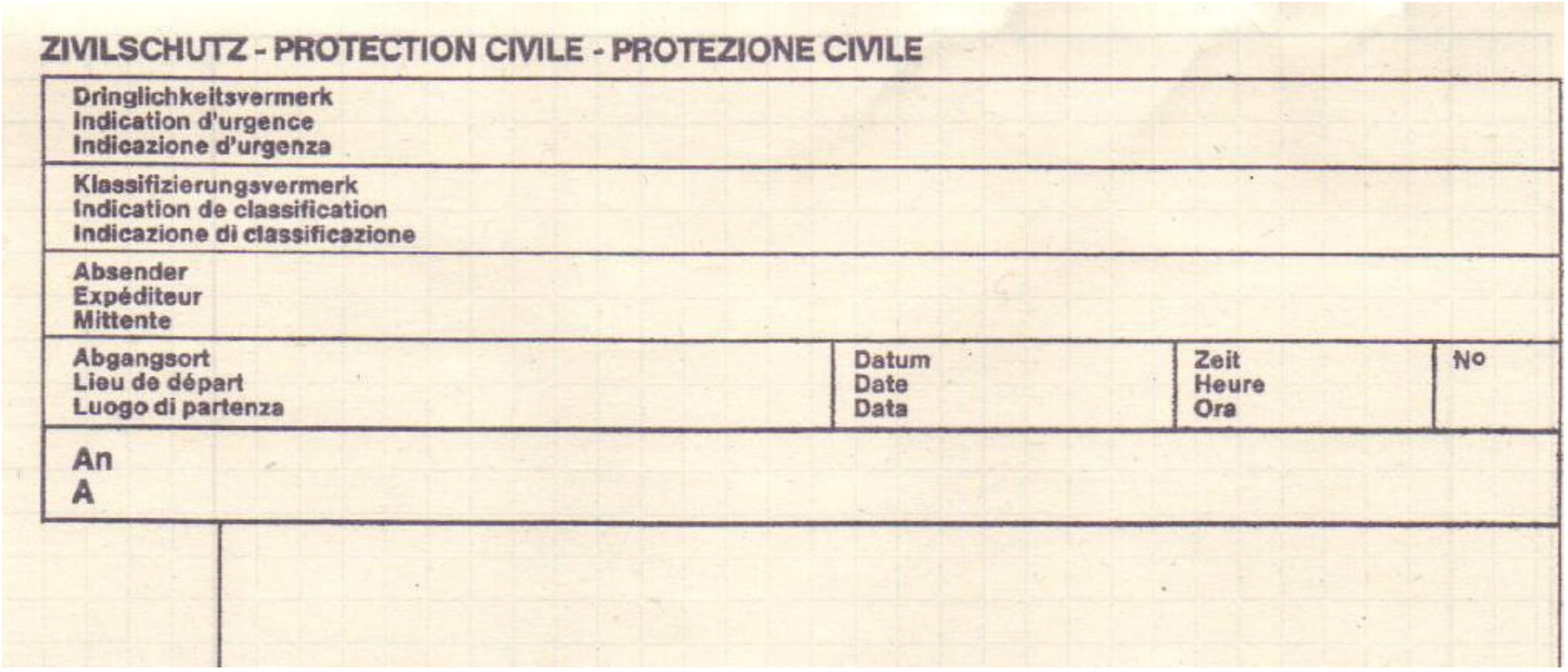
Area: 239 km², popul.: 115.000, communities: 11

# Scenarios

- Natural hazards:
  - landslide
  - flash flood
  - earthquake
- Other hazards:
  - airplain crash into a city

# Technologies used

- Voice communication VHF/UHF FM (D-Star)
- 3 stationary and 2 portable repeaters
- Message forms

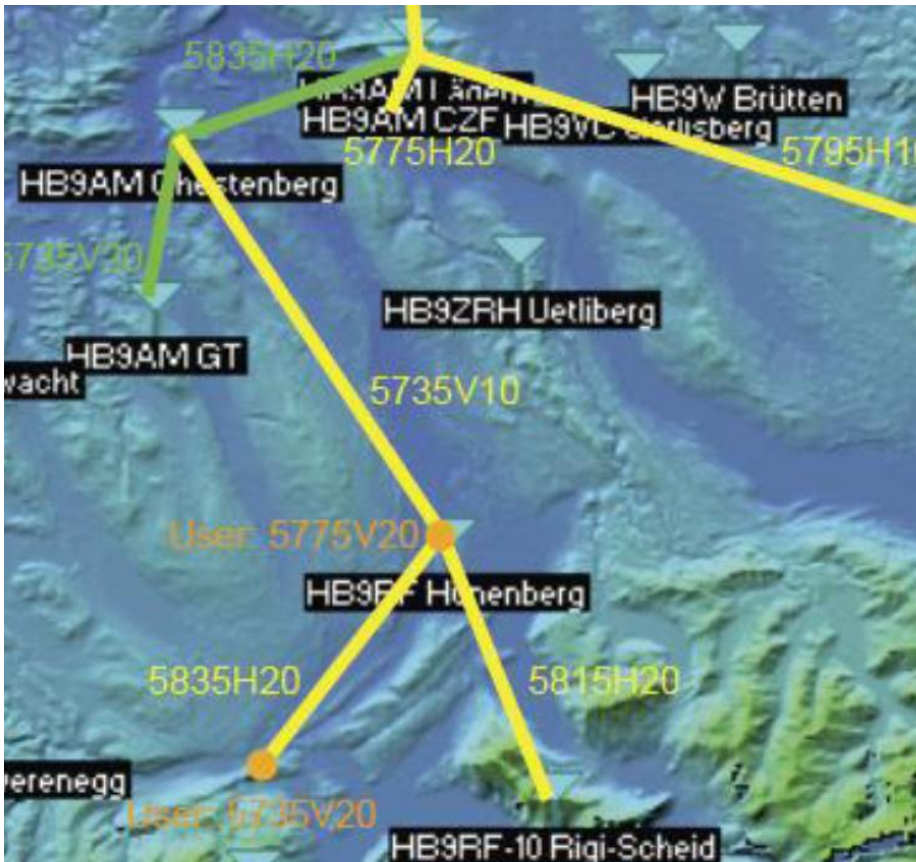


ZIVILSCHUTZ - PROTECTION CIVILE - PROTEZIONE CIVILE

| | | | |
|---|---|---|---|
| Dringlichkeitsvermerk<br>Indication d'urgence<br>Indicazione d'urgenza | | | |
| Klassifizierungsvermerk<br>Indication de classification<br>Indicazione di classificazione | | | |
| Absender<br>Expéditeur<br>Mittente | | | |
| Abgangsort<br>Lieu de départ<br>Luogo di partenza | Datum<br>Date<br>Data | Zeit<br>Heure<br>Ora | No |
| An<br>A | | | |

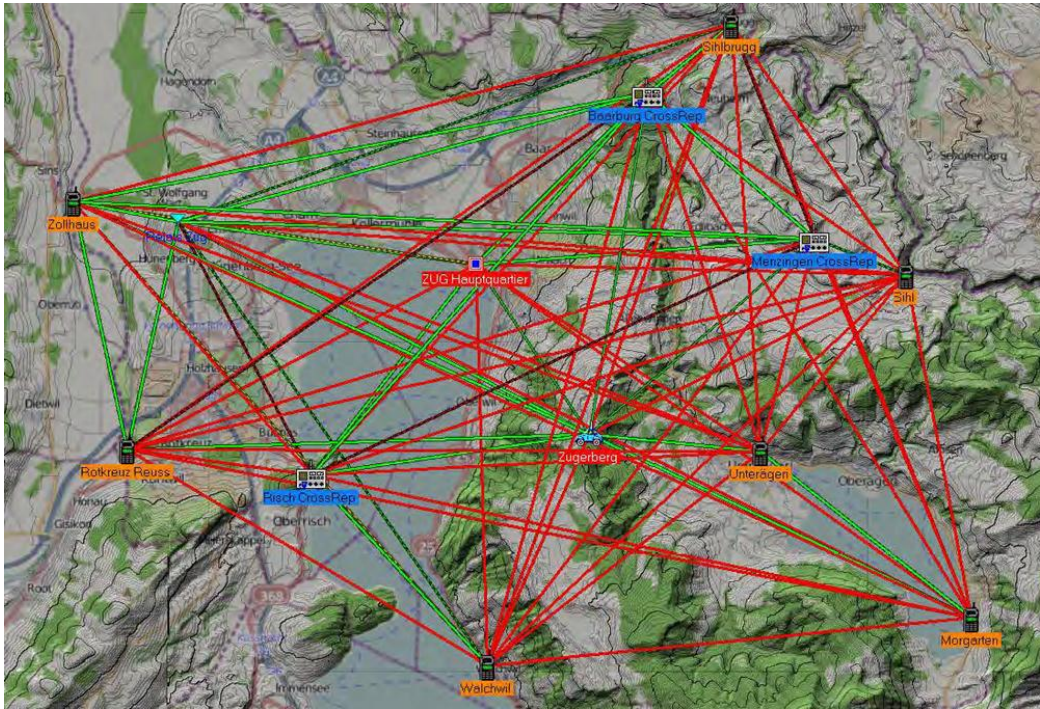
# Technologies used

- HAMNET digital communication in construction
- Based on WIFI 5.8 GHz
- Link Range up to 30 km
- Line of sight requiered
- Up to 5 Mbit/s



# Emergency Communication with Calling Frequency & Dispatcher

- How to organize the voice communication in a complex network?
- If there are 5 or more stations which have to communicate with each other?



# Objectives

- Using more than one frequency for more throughput.
- Repeaters are rare and have to be used by several stations.
- Every station has to be reached reliable.

# Required Structure

- Calling frequency
- Several message exchange frequencies
- Dispatcher

# How it Works

- A station which has a message to transfer, calls the dispatcher and asks for the target station.
- The dispatcher does allocate a frequency to both stations.
- Both stations change to that frequency and exchange the message.
- After exchanging the messages, both stations come back to the calling frequency and report back to the dispatcher.

# Duties of the Dispatcher

- He does coordinate the stations and frequencies.
- He has to know the net and must know which stations cannot communicate with each other directly and how to arrange a message via other stations (QSP).
- Maintain of a task list with all open tasks. If a station is not available for a QSO because it is exchanging messages, the dispatcher does originate the QSO between the two stations as soon as they are back on call the frequency.

# Duties of Dispatcher (cont.)

- The dispatcher is always QRV on the calling frequency.
- The dispatcher never exchanges messages by himself.
- He does maintain a frequency/station-matrix so he always know what frequencies are occupied and on what frequency the stations are.

# Frequency-Station-Matrix simple

| | CALL | | | | |
|---|---|---|---|---|---|
| | Repeater 1 | Repeater 2 | QRG 3 simplex | QRG 4 simplex | QRG 5 simplex |
| Station A | | | | | |
| Station B | | | | | |
| Station C | | X | | | |
| Station D | | | | X | |
| Station E | | | | | |
| Station F | | X | | X | |
| Station G | | | | | |

X = Mark occupied frequencies/stations by coins

# If the Net Structure is Complex

- The dispatcher cannot hear all stations on the same frequency.
  → A second calling frequency is necessary.
  → A second TRX is necessary to listen to the second frequency at the same time.

- Some stations cannot QSO together.
  → QSP; message exchange over 3rd station.

# Station-Station-Matrix

| | | CALL | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Dispatcher | Repeater 1 | Repeater 2 | Station A | Station B | Station C | Station D | Station E | Station F | Station G |
| Dispatcher | | ■ | ■ | | | ■ | ■ | ■ | ■ | |
| Repeater 1 | ■ | | | ■ | ■ | | ■ | ■ | ■ | |
| Repeater 2 | ■ | | | | ■ | ■ | | | ■ | |
| Station A | | ■ | | | ■ | ■ | ■ | | ■ | |
| Station B | | ■ | ■ | ■ | | ■ | ■ | ■ | ■ | |
| Station C | ■ | | ■ | ■ | ■ | | ■ | ■ | | ■ |
| Station D | ■ | ■ | | ■ | ■ | ■ | | ■ | ■ | |
| Station E | ■ | ■ | | | ■ | ■ | ■ | | ■ | |
| Station F | ■ | ■ | ■ | ■ | ■ | | ■ | ■ | | ■ |
| Station G | | | | | | ■ | | | ■ | |

# Frequency-Station-Matrix complex

| | CALL | | CALL | | |
|---|---|---|---|---|---|
| | Repeater 1 | Repeater 2 | QRG 3 simplex | QRG 4 simplex | QRG 5 simplex |
| Station A | | | | | |
| Station B | | | | | |
| Station C | | X | | | |
| Station D | | | | X | |
| Station E | | | | | |
| Station F | | X | | X | |
| Station G | | | Via station C or F | | |

X = Mark occupied frequencies/stations by coins

# Message Exchange at Dispatcher's site

- A second operator is necessary to exchange the messages at the site of the dispatcher.
- Otherwise the dispatcher cannot comply with his duties:
  - Always be QRV on the calling frequency.
  - Never exchange messages on the calling frequency, if possible.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