

# Current status of SVFuA and way ahead from an industry perspective

4th Annual Tactical Radio Workshop at WInnComm-Europe 2014

Roma, 6 November 2014

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# SVFuA: Streitkräftegemeinsame Verbundfähige Funkgeräte-Ausstattung

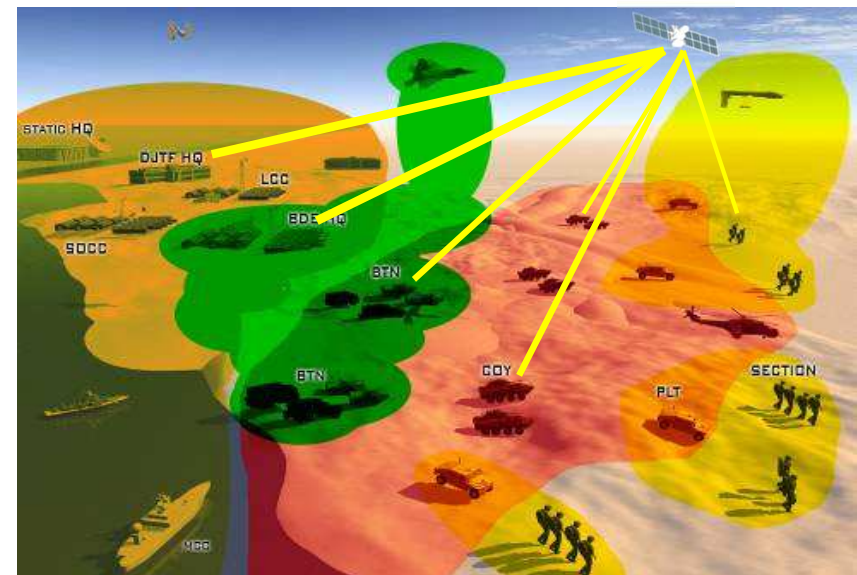
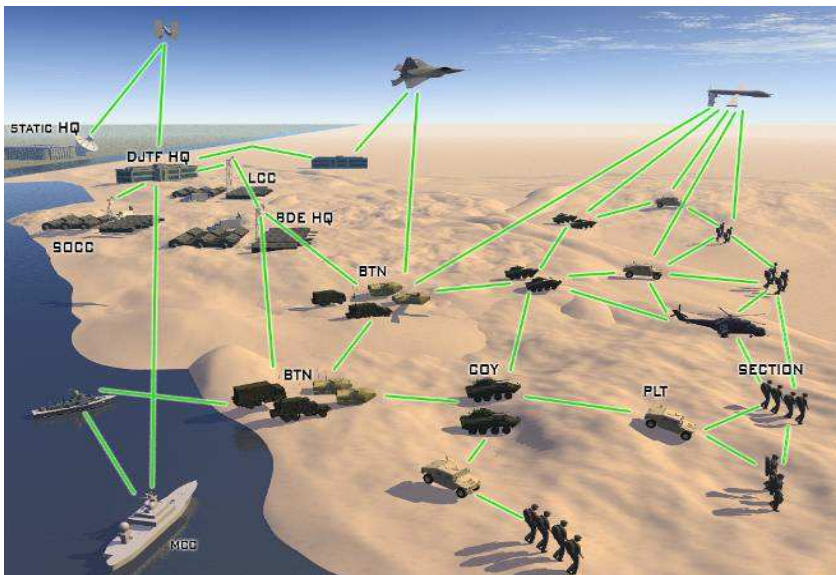
- The German SCA-based SDR program is called “SVFuA”:  
Network Capable Radio Equipment for Joint & Combined Forces
- Outline of this presentation:
  - Motivation for basing SVFuA on SDR Technology
  - Preparatory SDR Studies
  - Key Technical Facts
  - Operational Environment
  - Milestones
  - International Cooperation



Streitkräftegemeinsame Verbundfähige  
Funkgeräte-Ausstattung (SVFuA)

# Starting point for the current evolution in Tactical Communications

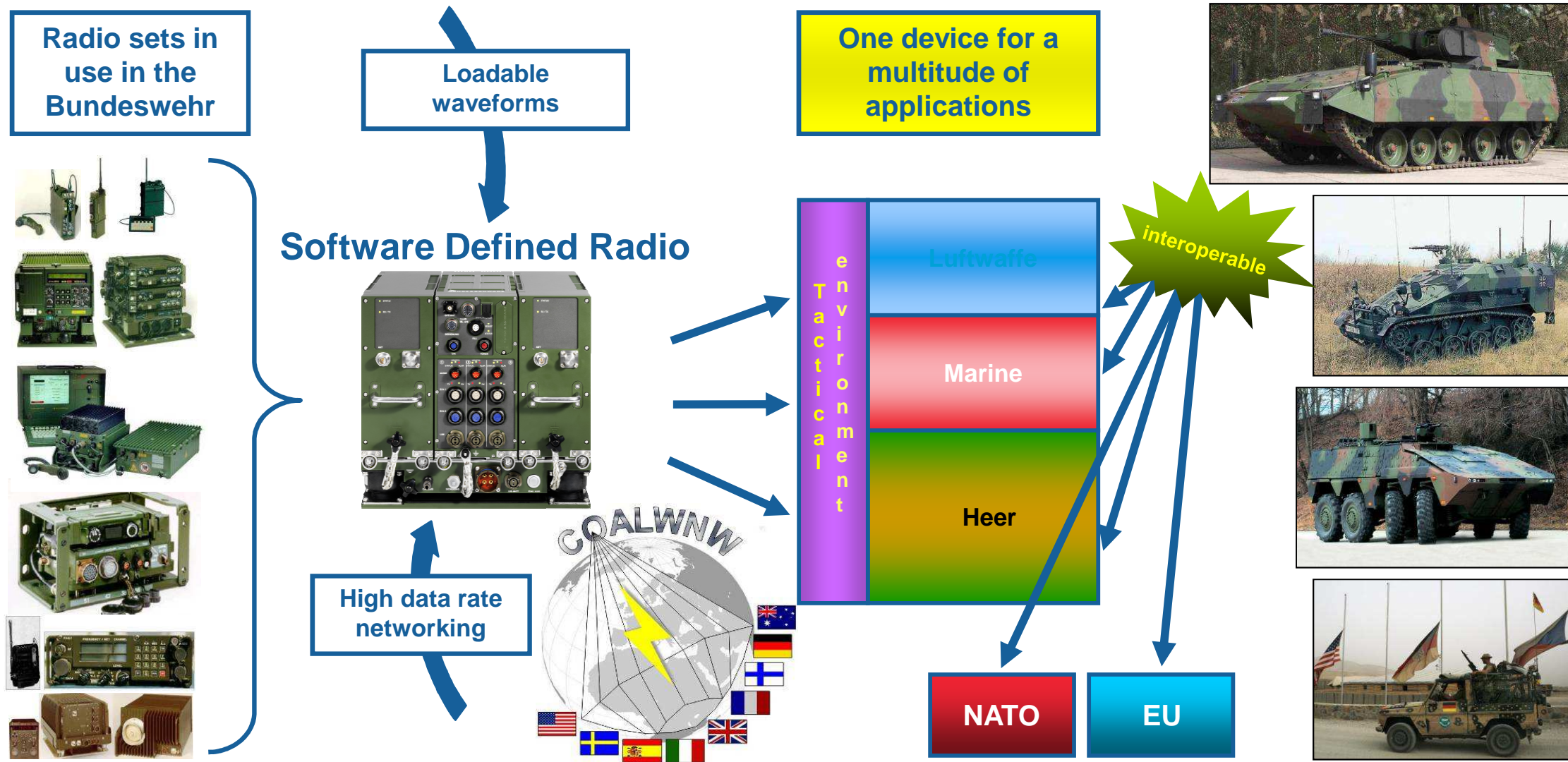
- What are the major changes in tactical communications in the last years?
  - The **information density** on the platforms has substantially increased.
  - The need for **data communication and networking** capabilities has significantly risen.
  - The need to distribute **real-time mission critical information** (e.g. a substantial portion of the common operational picture) to frontline units.
  - Multinational cooperation and thus the need for **interoperability** has become commonplace.



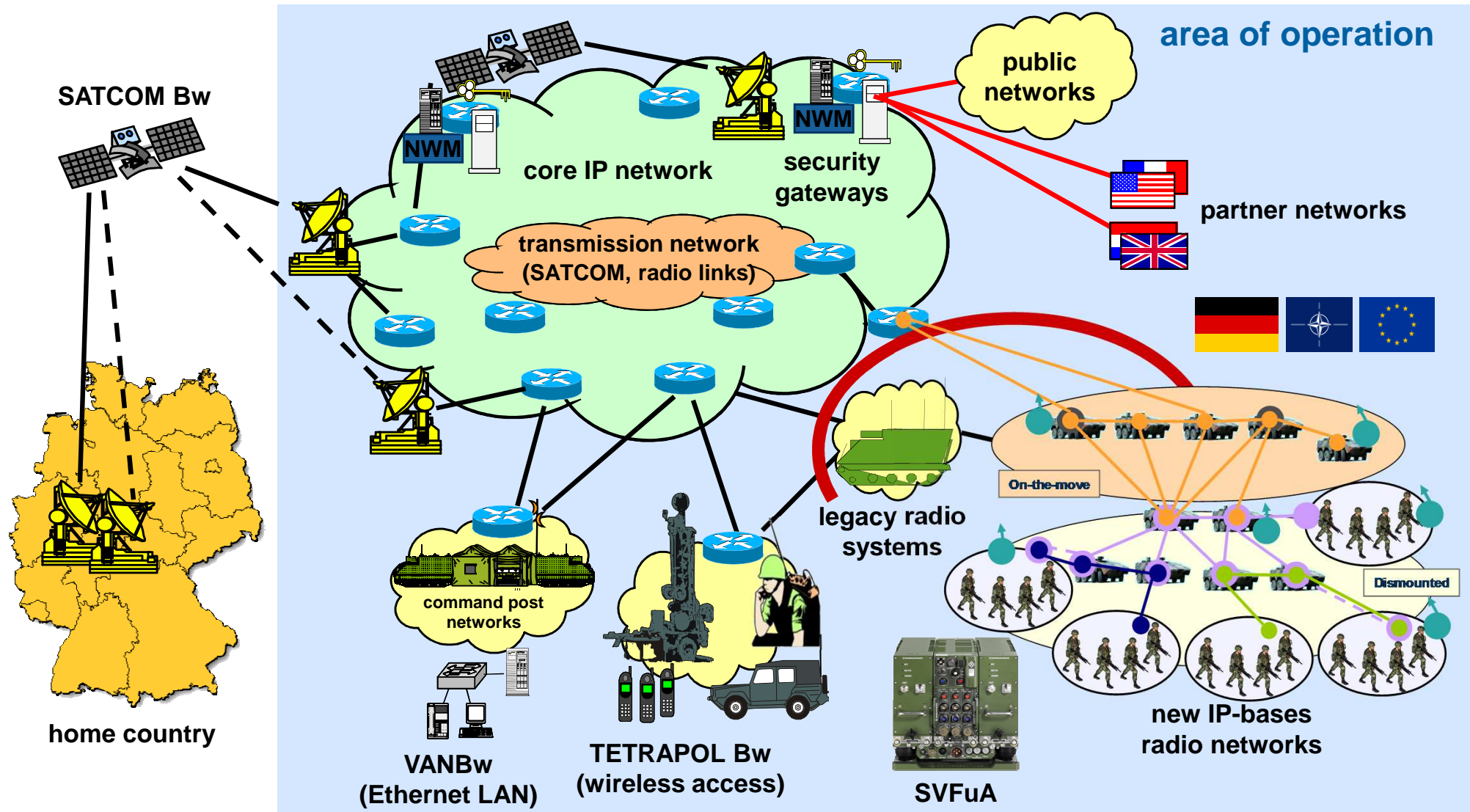
NATO illustration of the changes in radio communication



# SDR technology is key to enable operational flexibility

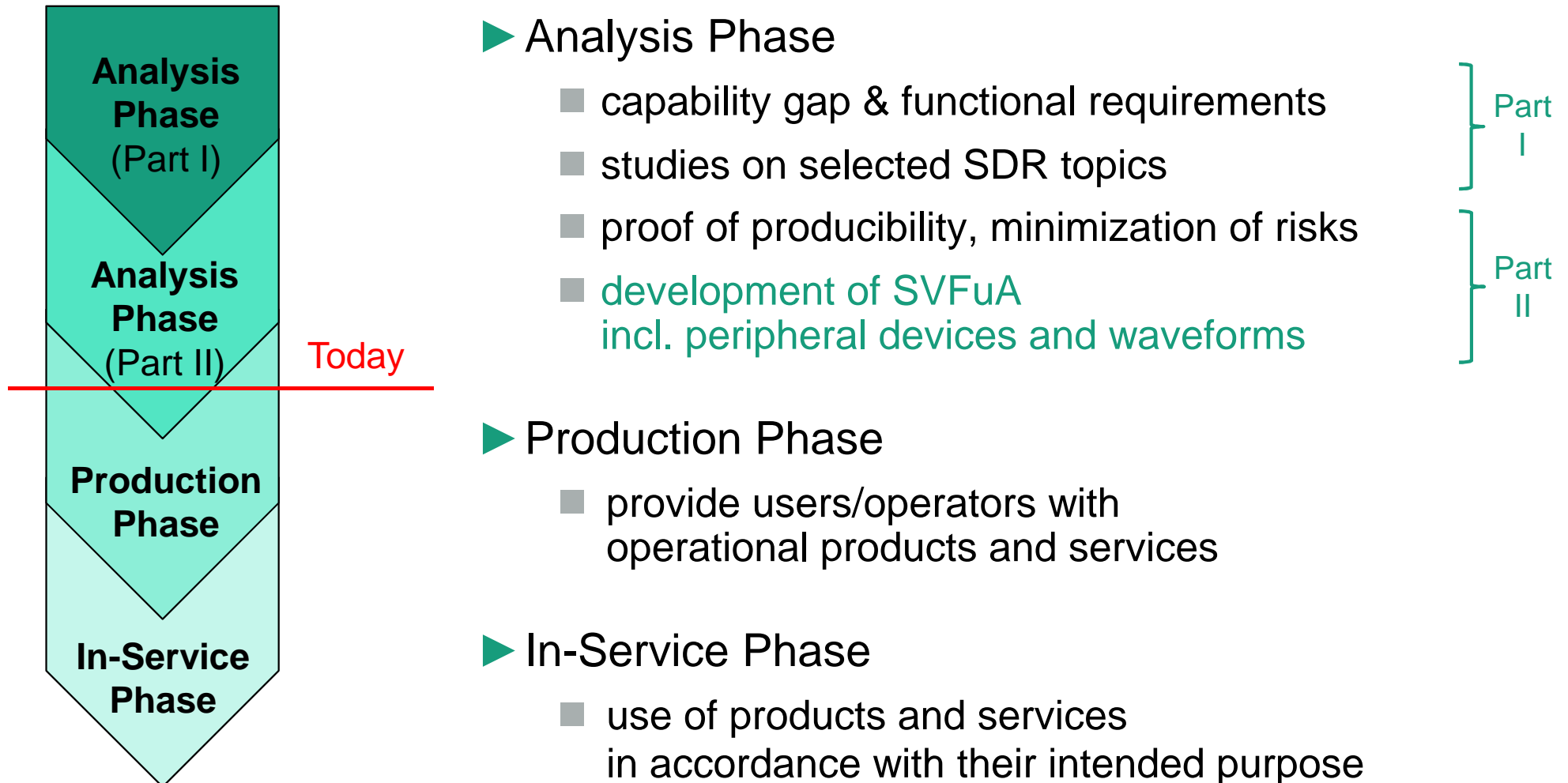


# SVFuA extends the core network into the mobile domain

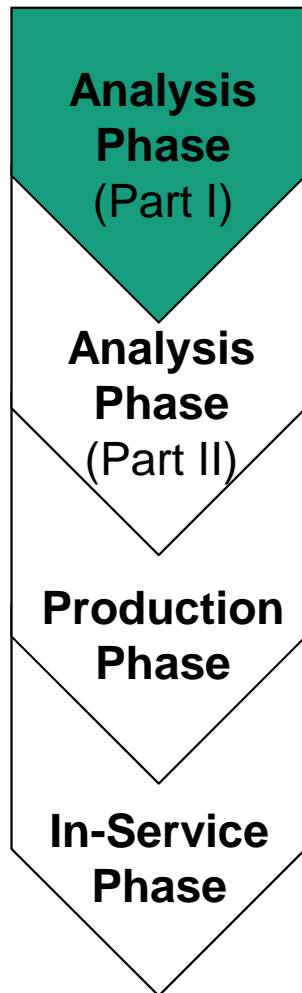


# On SDR Activities of German Bundeswehr

Customer Product Management (amended), Nov. 2012



# Multirole Multiband Radio – Advanced Demonstrator Mock-up (MMR-ADM)



## ► Joint R&D project of France & Germany

- 3Q / 1998 until 3Q / 2004
- frequency range 1,5 – 600 MHz
- simultaneous operation of 2 channels
- 7 waveforms realized in SW
- extensive utilization of COTS products
- modular in SW and HW
- software defined, but not SCA-compliant  
*(the SCA specifications were not publicly available at that time)*

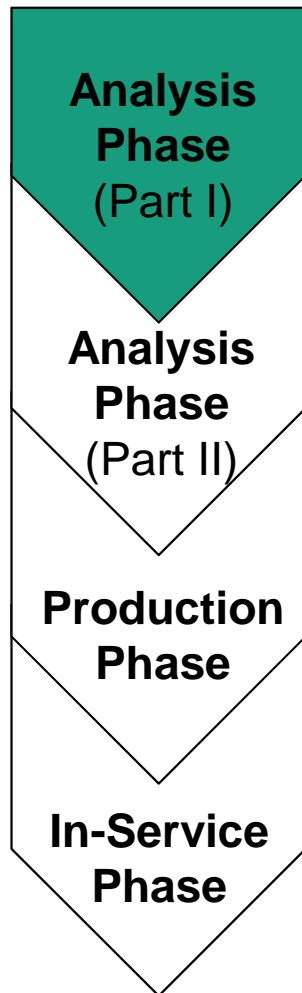


## ► Key results

- waveforms can be realized in software
- while preserving interoperability to legacy radios



# Wideband Networking Waveforms & INFOSEC-Module for the SDR Bw

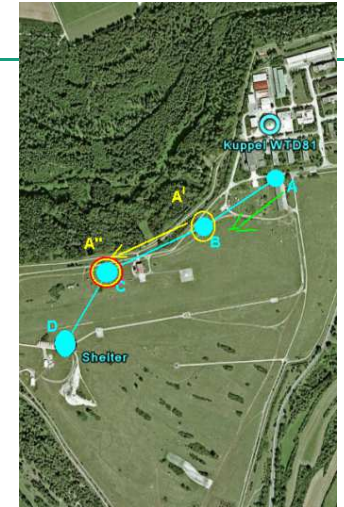


## ► National Study

- 3Q / 2005 until 3Q / 2007
- Wideband Networking Waveform (WNW)
- SCA-compliant realization of selected aspects of a WNW on SDR prototypes
- INFOSEC concepts
- development of an INFOSEC module prototype
- interaction between INFOSEC module and Operating Environment (OE)

## ► Key results

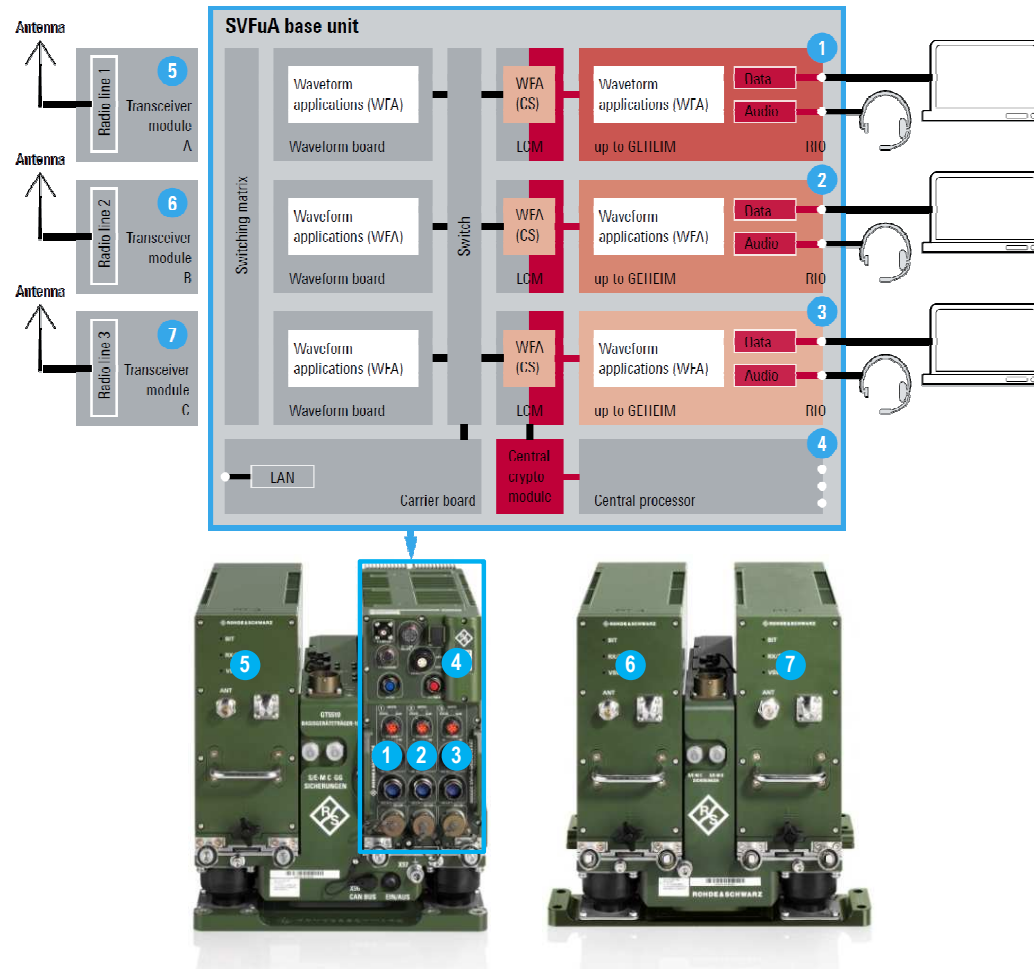
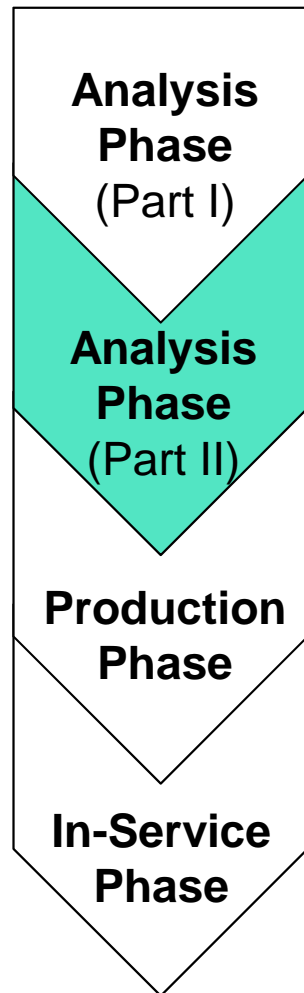
- SCA-compliant WNW can be realized
- SW-based INFOSEC modules are feasible



© BAAIN Bw



# Streitkräftegemeinsame Verbundfähige Funkgeräteausrüstung (SVFuA)



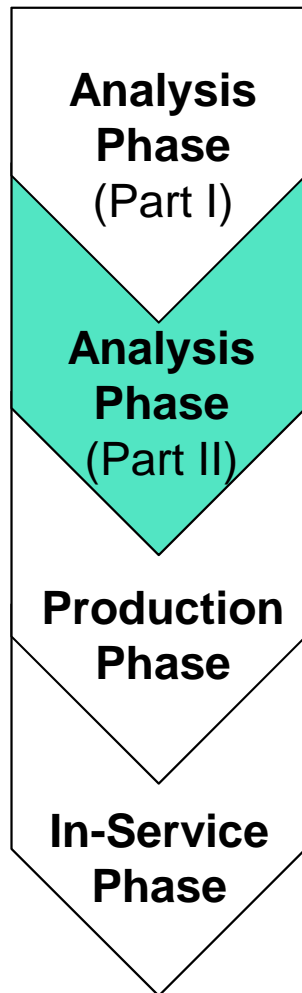
## Abbreviations:

CS: Core security

LCM: Line crypto module

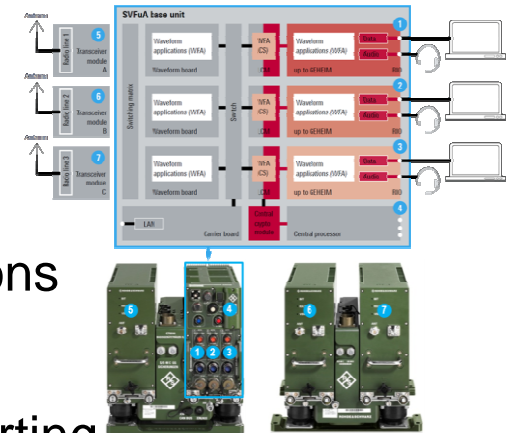
RIO: Red input / output

# Streitkräftegemeinsame Verbundfähige Funkgeräteausrüstung (SVFuA)



## ► Some Details

- kick-off in Dec. 2008
- three wireless communication channels
- **SCA 2.2.2 / JTRS APIs** + SVFuA extensions
- SW-based INFOSEC / MLS
- three types of transceiver modules supporting
  - HF - frequencies (1.5 – 30.0 MHz, 20 W, ext. 400 W)
  - VHF/UHF - frequencies (30 – 600 MHz, 50 W)
  - Broadband - frequencies (600 MHz – 3 GHz, 50 W)
- several waveforms
  - legacy: e.g., SEM 80/90/93, MAHRS/Tiger, HaveQuick I/II, NATO Fixed Frequencies
  - prepared for future WFs like COALWNW



# SVFuA – SDR of the German Bundeswehr

Key Technology enabling Network Centric Operations

## Contracting Authority



## Contractors



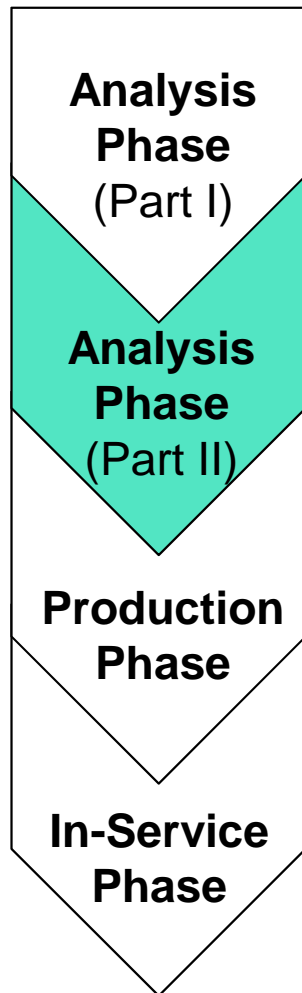
## Consultants



► Contributions from different vendors possible thanks to (among others)

- standardized Interfaces
- Waveform Development Process

# Streitkräftegemeinsame Verbundfähige Funkgeräteausstattung (SVFuA)



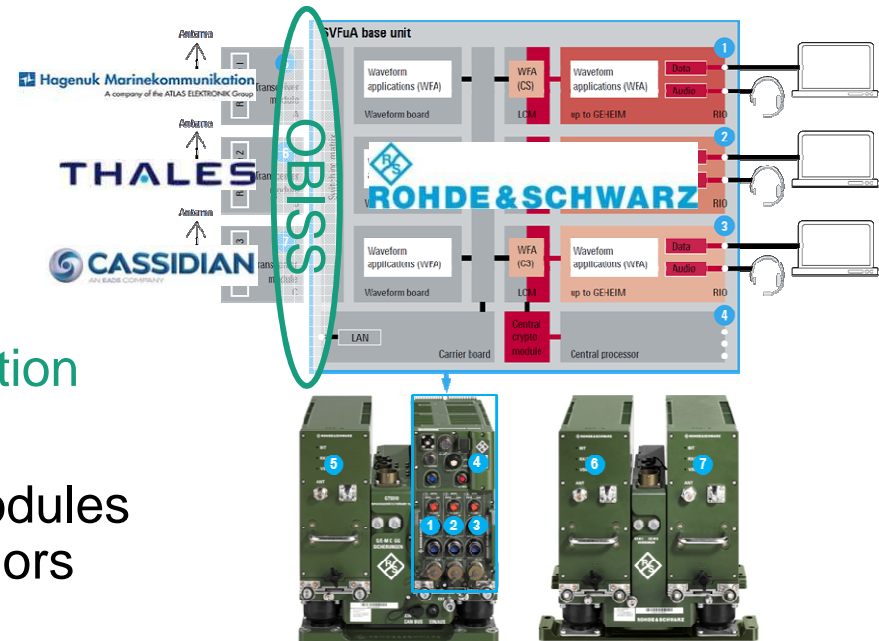
## ► Exemplary Standardized Interface

### ■ Open Baseband Interface Specification for SDR (OBISS)

allows for radio modules from different vendors

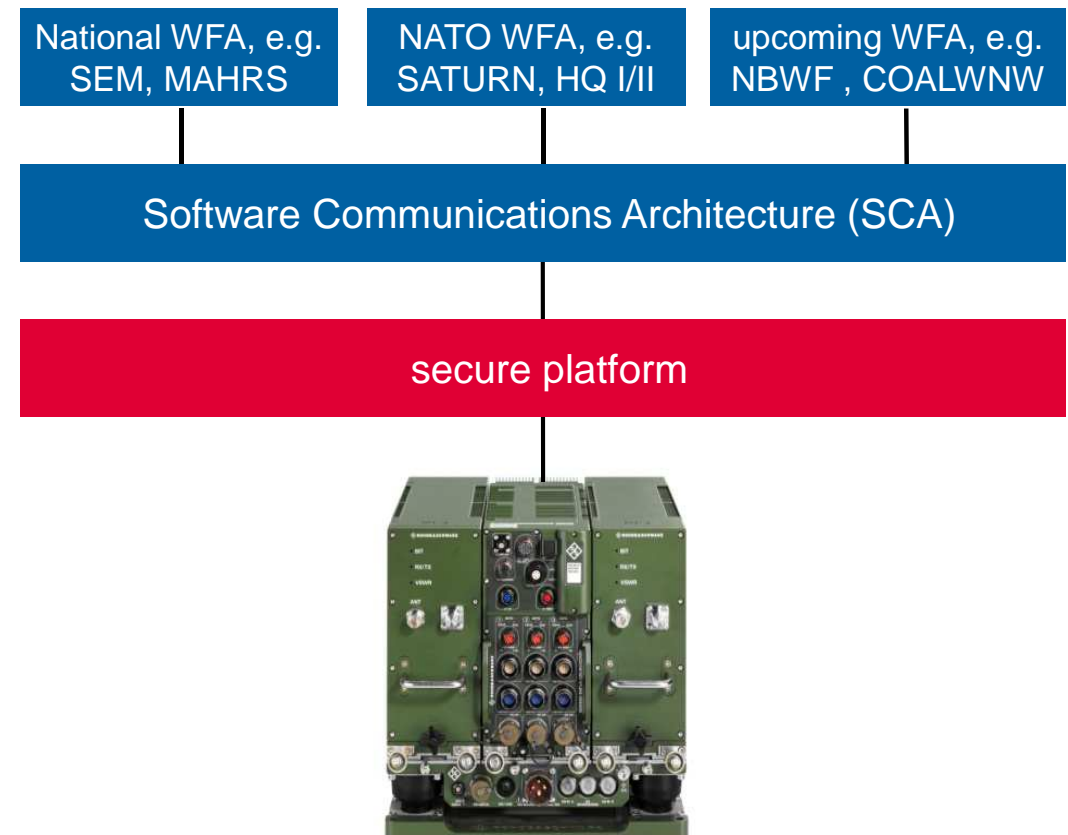
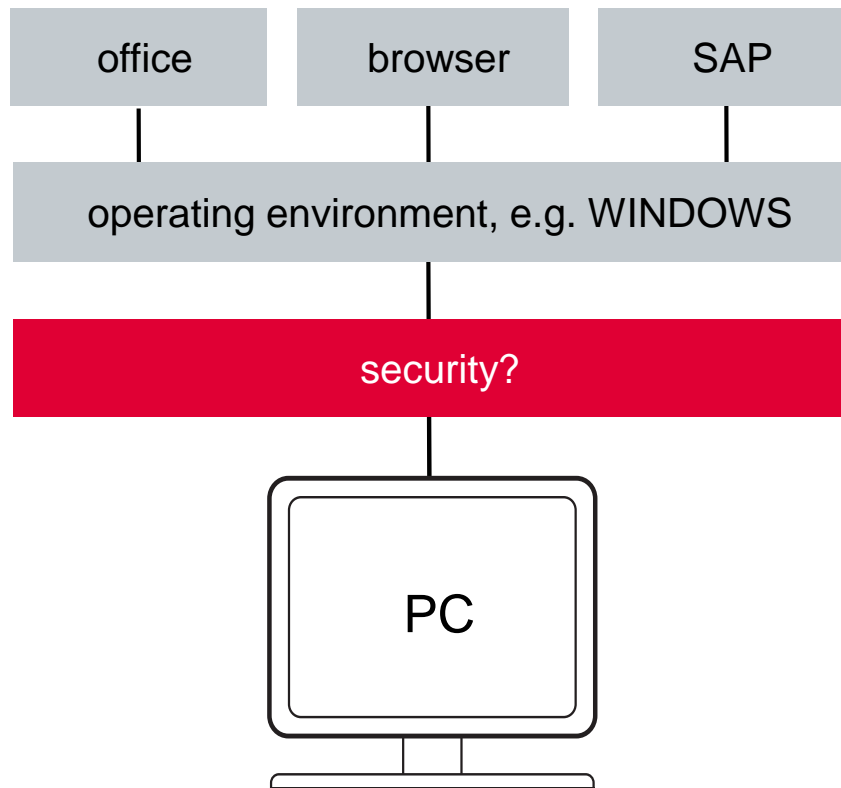
### ■ OBISS has been proposed for international standardization at

- Wireless Innovation Forum (Jan. 2009)
- NATO C3B SDR Users Group (Oct. 2009)



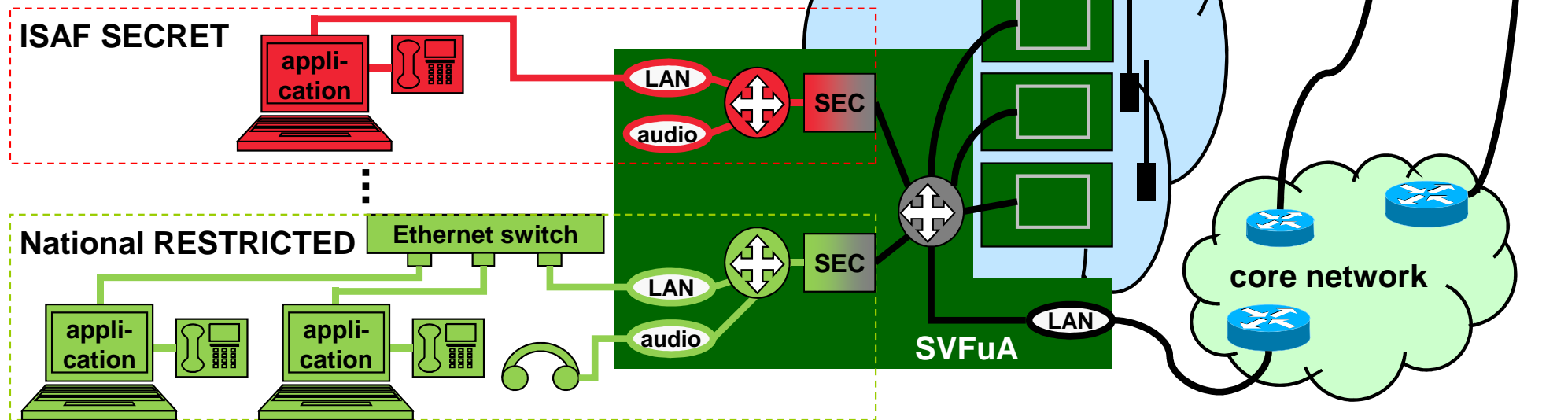


# SVFuA is an essential prerequisite for national security requirements



# SVFuA enables multinational multilevel secure IP networks

- Network oriented layout supporting voice and data in one network
- Provision of all relevant interfaces for vehicle integration (e.g. intercom)
- Support of transmission via IP-capable subsystems (black LAN)
- Multiple levels of security (MLS) with growth potential for future security solutions



# Next major milestones of the program



III/2013

first  
configuration

II/2014

following  
configurations

I/2016

initial series  
production

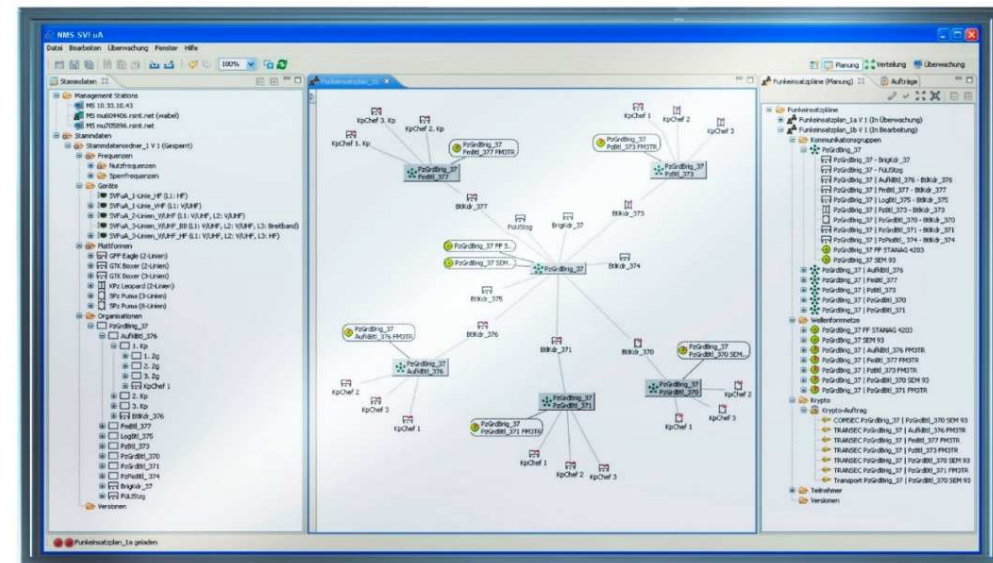


# Major accomplishments with milestone II/2014

- Three channel configuration completed
  - Mounts for three channel configuration
  - Radio platform fully functional
- Network Management System completed
  - A comprehensive solution for planning, configuring, management, and monitoring radio networks locally and remote
- System test-bed for SVFuA
  - Designed, constructed and delivered together with Fraunhofer
  - Allows to test radio networks with up to ten channels
- Live demonstration of SVFuA (details on next slide)



SVFuA system test-bed



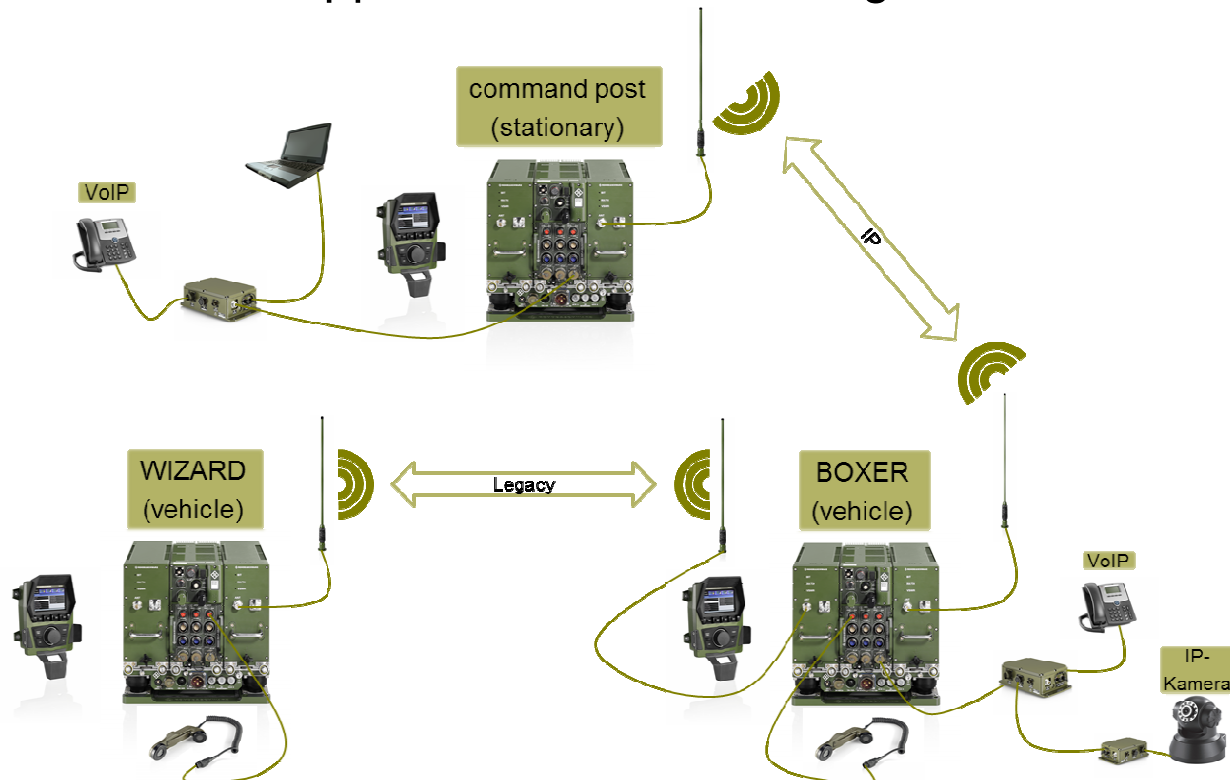
Network Management System



# Live demonstration of SVFuA

## ■ Topics addressed:

- Vehicle integration in BOXER, WIESEL, and WOLF
- Local and remote management and monitoring
- Parallel transmission of voice, data, and video
- Potential applications of networking waveforms



Key elements used in the example scenario



Interior view with SVFuA



Exterior view of the BOXER

# Next steps

- Complete the final integration of the legacy waveform applications still pending
- Complete the second user test of SVFuA with the following content:
  - Configure and monitor radio networks with the Network Management System
  - Perform interoperability tests with legacy solutions
  - Set up an HF-link over a distance of at least 200 km
  - Demonstrate high data rate communication over the complete frequency range
- Support full-scale vehicle integration into the selected military vehicles  
(see next slide)
- Support international cooperation  
(see next slide)



# German military vehicles designated for timely integration of SVFuA



**BOXER**

Status: ongoing

Source: ARTEC GmbH



**WOLF**

Status: ongoing

Source: ddp



**WIESEL**

Status: ongoing

Source: Bundeswehr/Wayman



**PUMA**

Status: ongoing

Source: Rheinmetall-Pressbild



**FENNEK**

Status: in preparation

Source: Bundeswehr/Schick



**DINGO 2**

Status: in preparation

Source: dpa/Gambarini



**EAGLE IV**

Status: in preparation

Source: Bundeswehr/Genzmer



**ENOK**

Status: in preparation

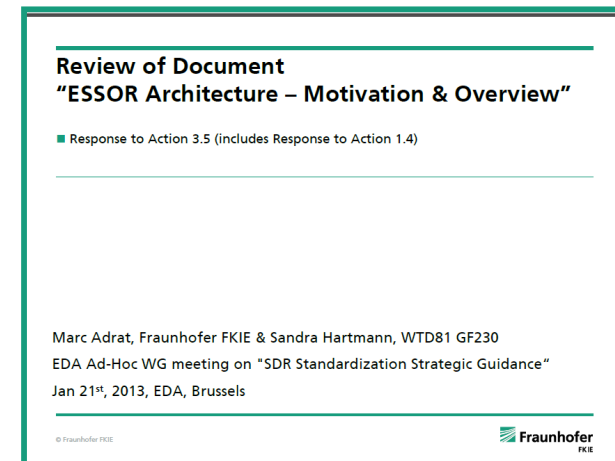
Source: Bundeswehr/Heide



# International Cooperation



- German SDR program SVFuA is contributing to
  - International Organizations and Agencies like
    - Wireless Innovation Forum
    - NATO (e.g. Science & Technology Organization)
    - EDA (SDR Standardization Strategic Guidance; EDA studies)
  - modern waveform development projects like
    - Coalition Wideband Networking Waveform (COALWNW)





# Conclusions



- With the delivery and verification of all radio set configurations and the Network Management System the foundation has been laid for substantial user tests and the finalization of the radio system
- Combining software defined radio technology with high security certification was the greatest challenge
- The software defined radio and security solution enables multinational interoperability by providing for updateability to future security standards
- Multinational standardization further enhances the benefits of SDR solutions and international cooperation

# Questions and Discussion

