
SVFuA – The German SDR Program

Streitkräftegemeinsame Verbundfähige Funkgeräte-Ausstattung

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Motivation

International SCA-based SDR Programs

- Military tactical communication is taking the next step in evolution
 - Key enabler: modern **Software Defined Radio** (SDR) technology
 - increasing interest in SCA-based SDRs worldwide (Software Communications Architecture)
 - surveys of international SDR programs have recently been published



Motivation

International SCA-based SDR Programs

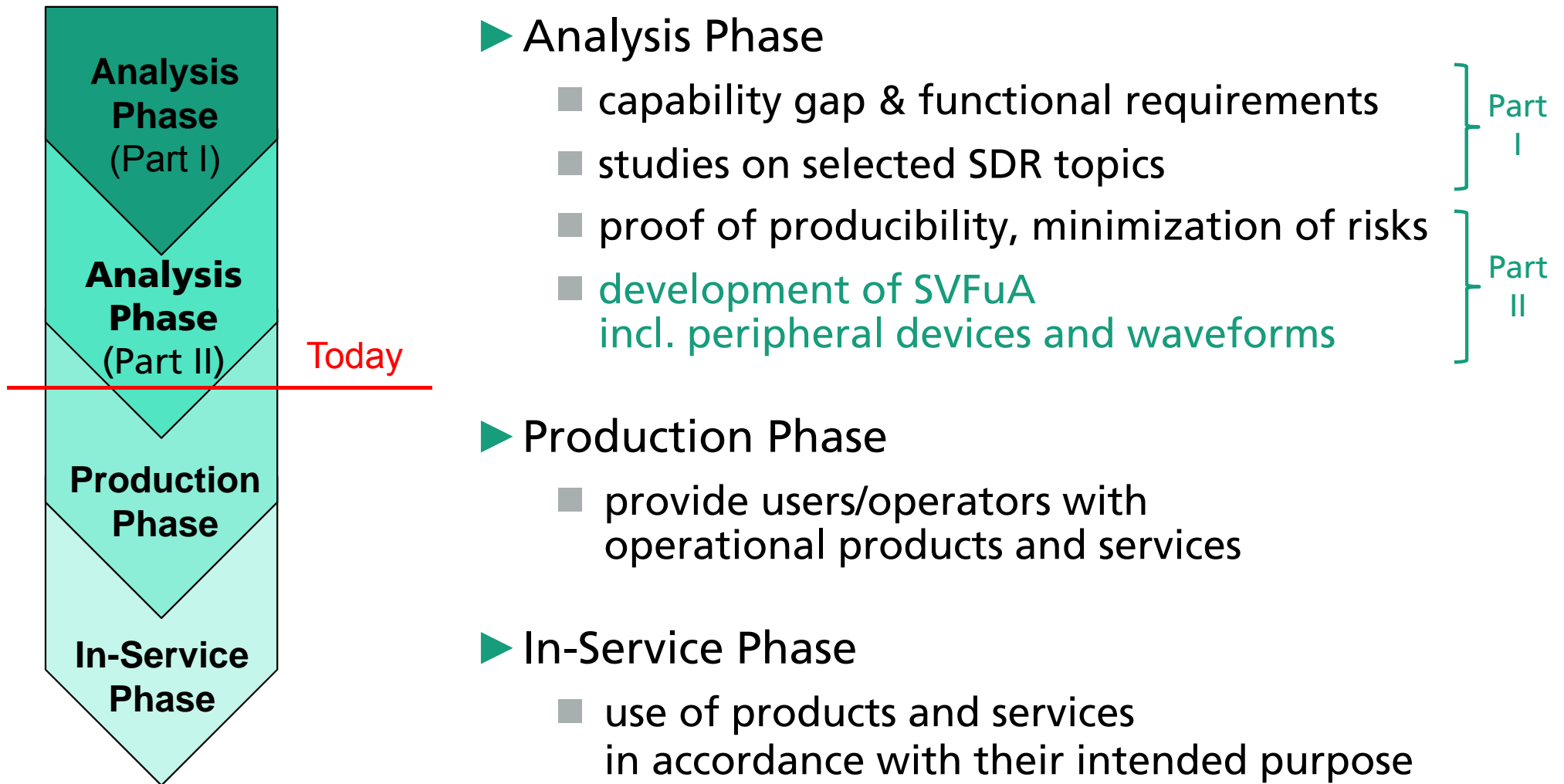
- The German SCA-based SDR program is called “SVFuA”
 - Network Capable Radio Equipment for Joint & Combined Forces
- Outline of this presentation:
 - Preparatory SDR Studies
 - Key Technical Facts
 - Operational Environment
 - Milestones
 - International Cooperation



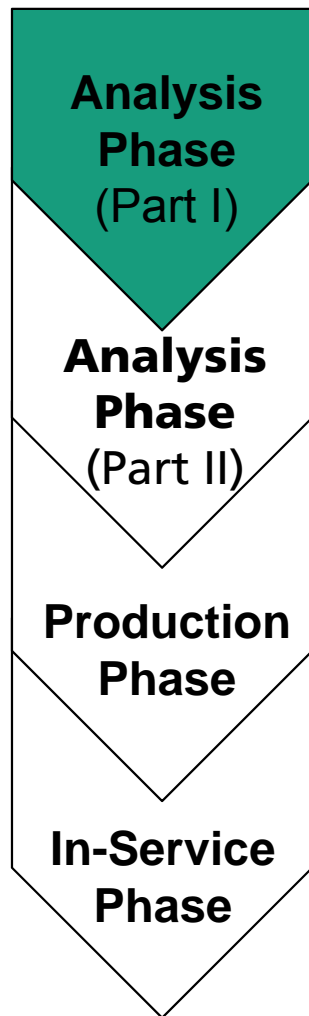
Streitkräftegemeinsame Verbundfähige
Funkgeräte-Ausstattung (SVFuA)

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

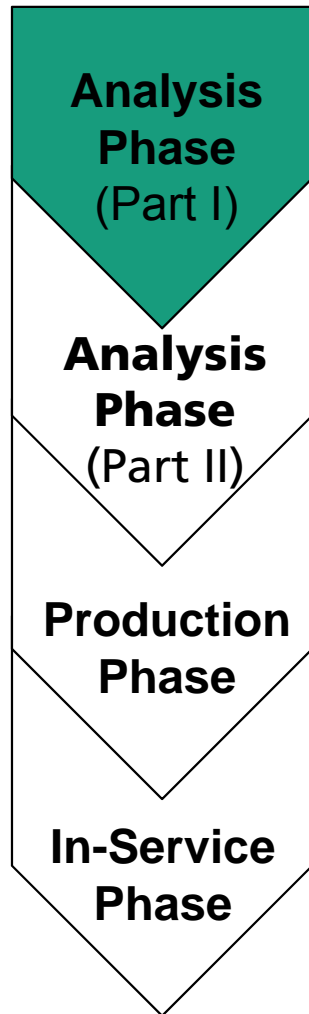
- 3Q / 1998 until 3Q / 2004
- frequency range 1,5 – 600 MHz
- simultaneous operation of 2 channels
- 7 waveforms realized in SW
- extensive utilization of COTS products
- modular in SW and HW
- software defined, but not SCA-compliant
(the SCA specifications were not publicly available at that time)



► Key results

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

Wideband Networking Waveforms & INFOSEC-Module for the SDR Bw

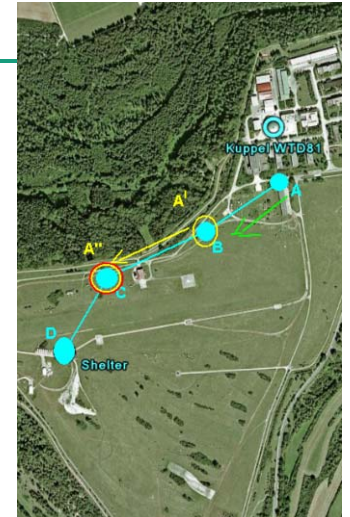


► National Study

- 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)

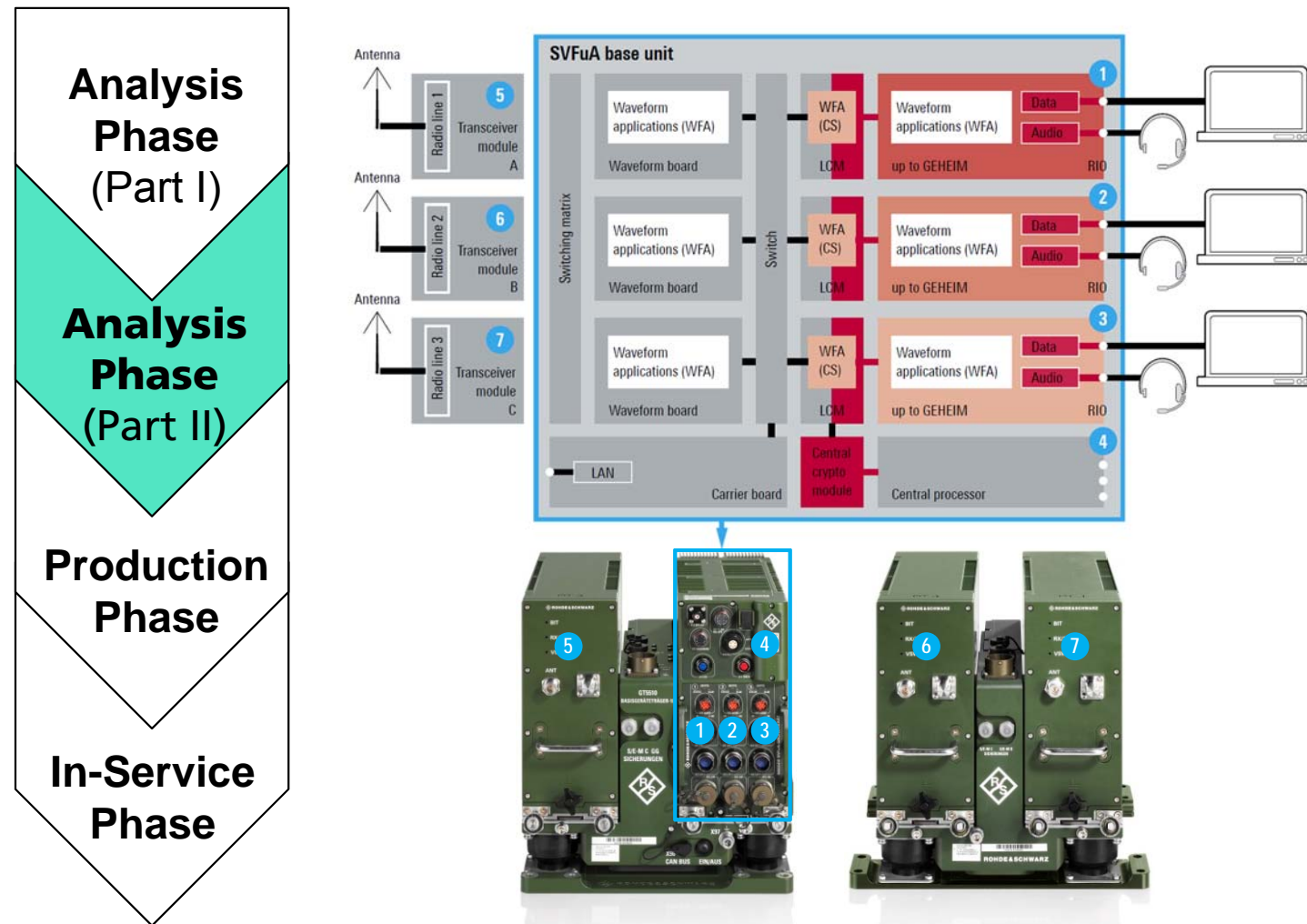
► Key results

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



© BAAIN Bw

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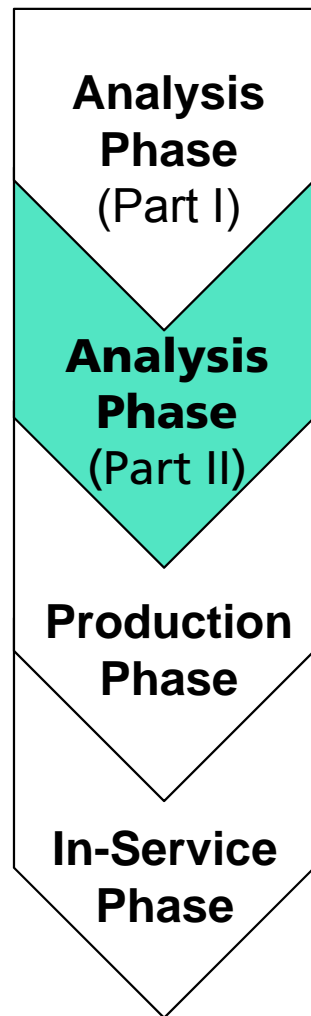
Abbreviations:

CS: Core security

LCM: Line crypto module

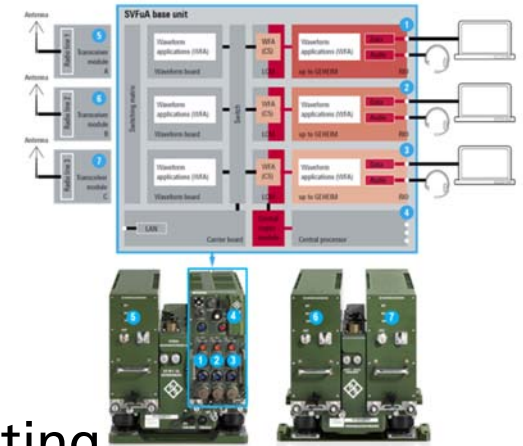
RIO: Red input / output

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► Some Details

- kick-off in Dec. 2008
- three communication lines
- SCA v2.2.2 / JTRS APIs
- SW-based INFOSEC / MLS
- three types of radio modules supporting
 - HF - frequencies (1.5 – 30.0 MHz)
 - VHF/UHF - frequencies (30 – 600 MHz)
 - Broadband - frequencies (600 MHz – 3 GHz)
- 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



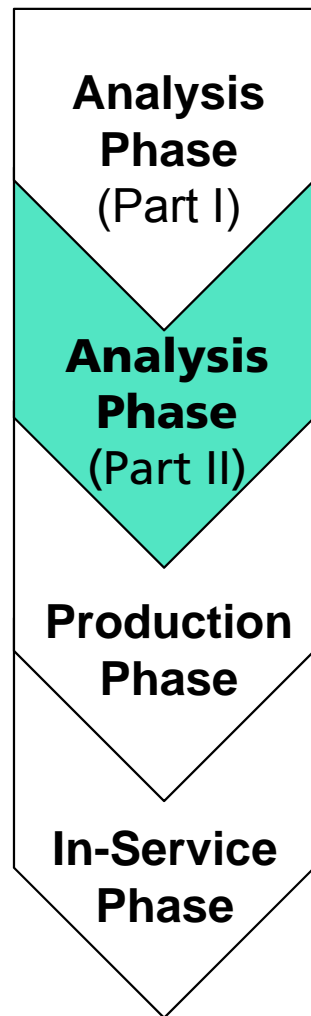
Consultants



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

- standardized Interfaces
- Waveform Development Process

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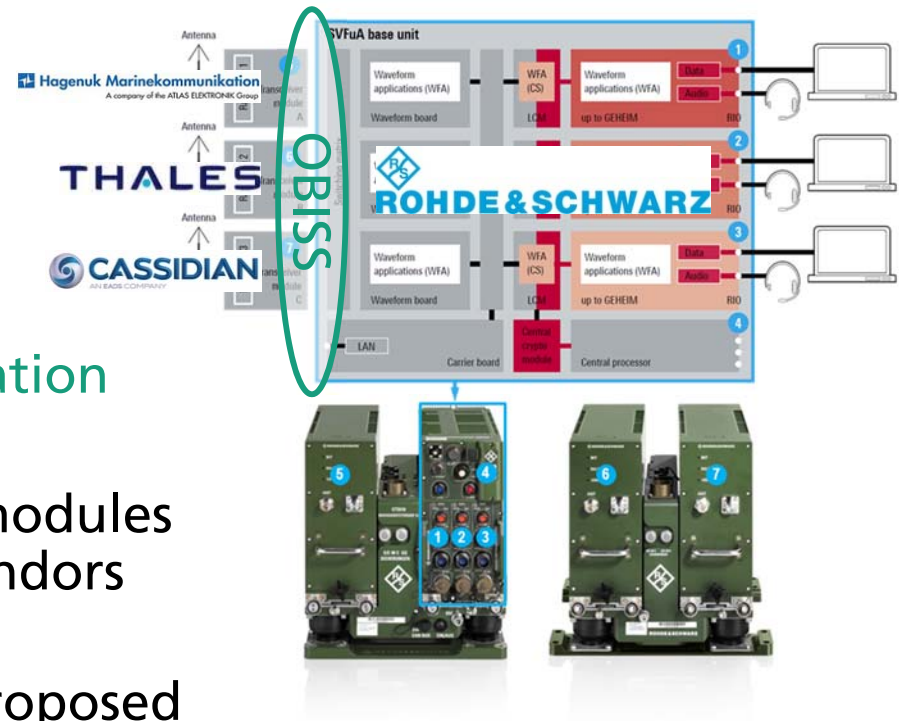
► Exemplary Standardized Interface

■ Open Baseband Interface Specification for SDR (OBISS)

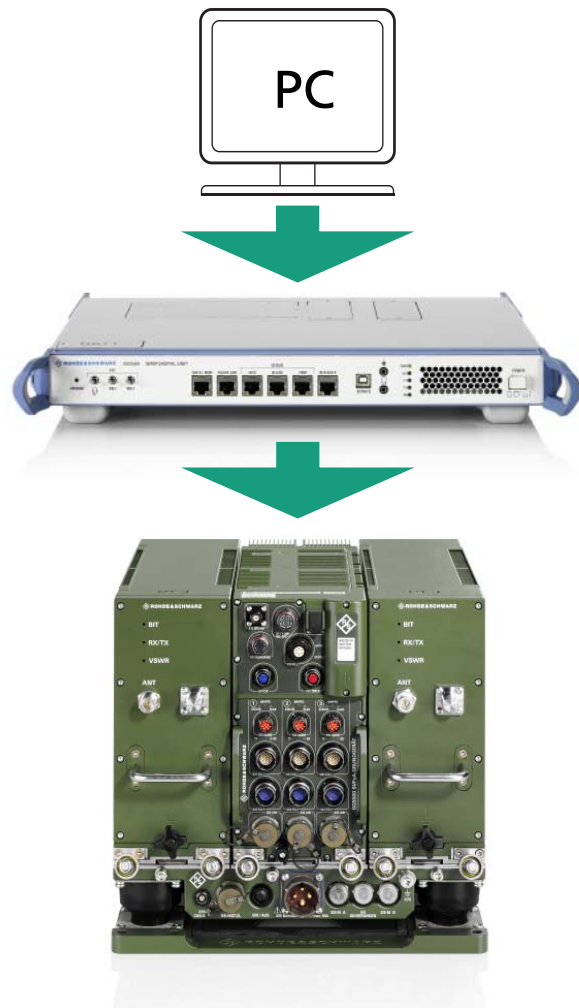
allows for radio modules from different vendors

■ OBISS has been proposed for international standardization at

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



Waveform Development & Porting Process



■ Waveform Simulation Platform (WFSP)

- verification of the waveform model
- checking the data flow

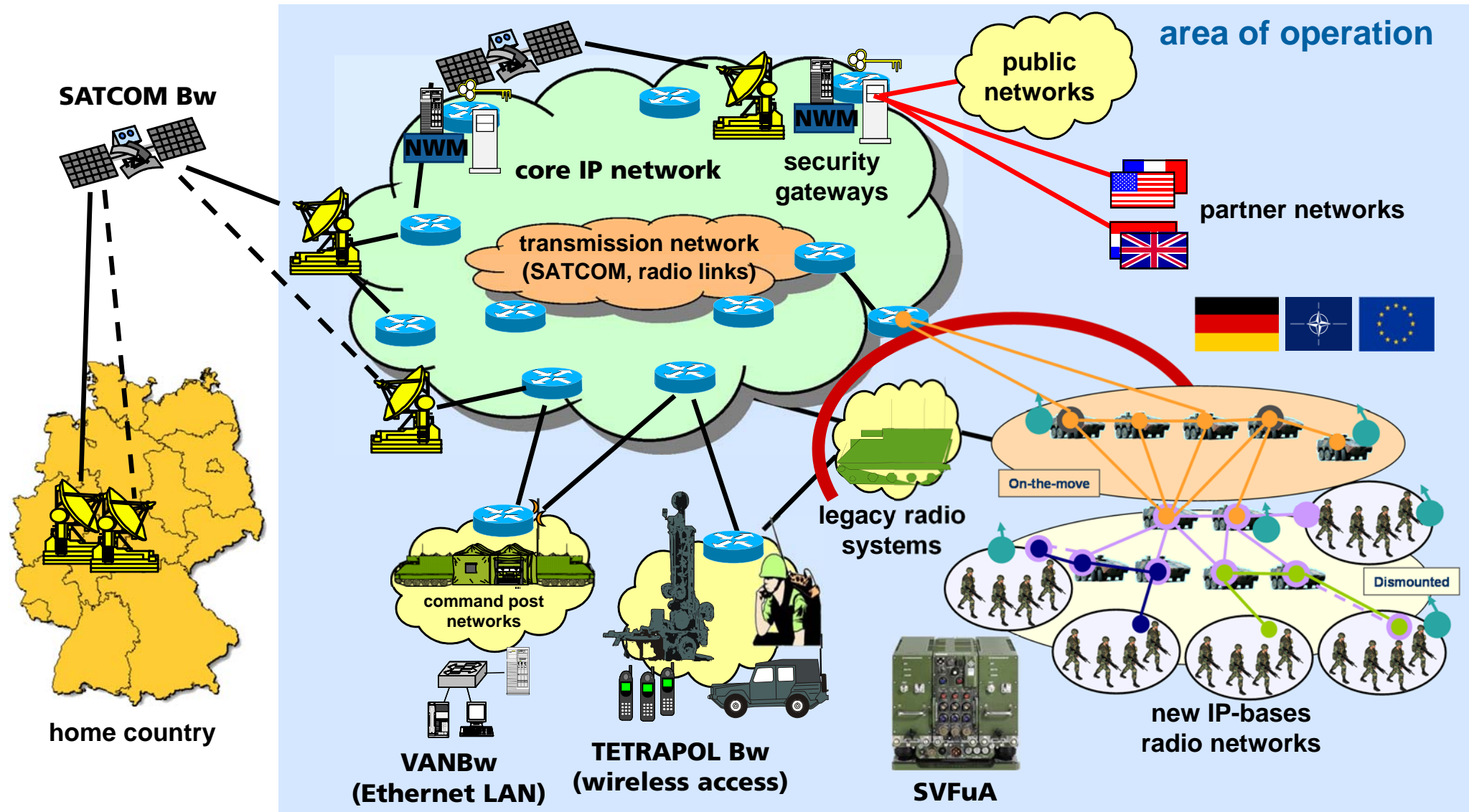
■ Waveform Development Platform (WFEP)

- testing the real time performance
- real-time debugging
- access to transceiver module

■ SVFuA

- security features (encryption etc.)
- multiple lines (relay, gateway, etc.)

Extension of the core network via SVFuA into the mobile domain



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

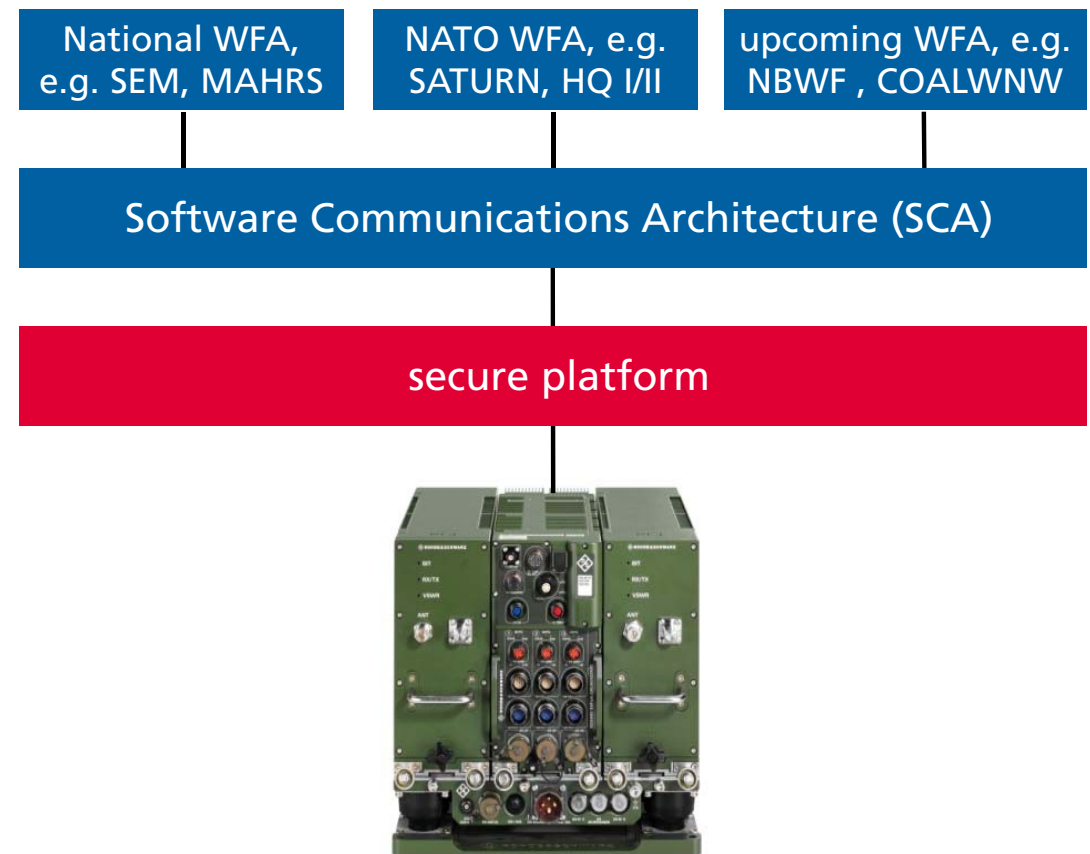
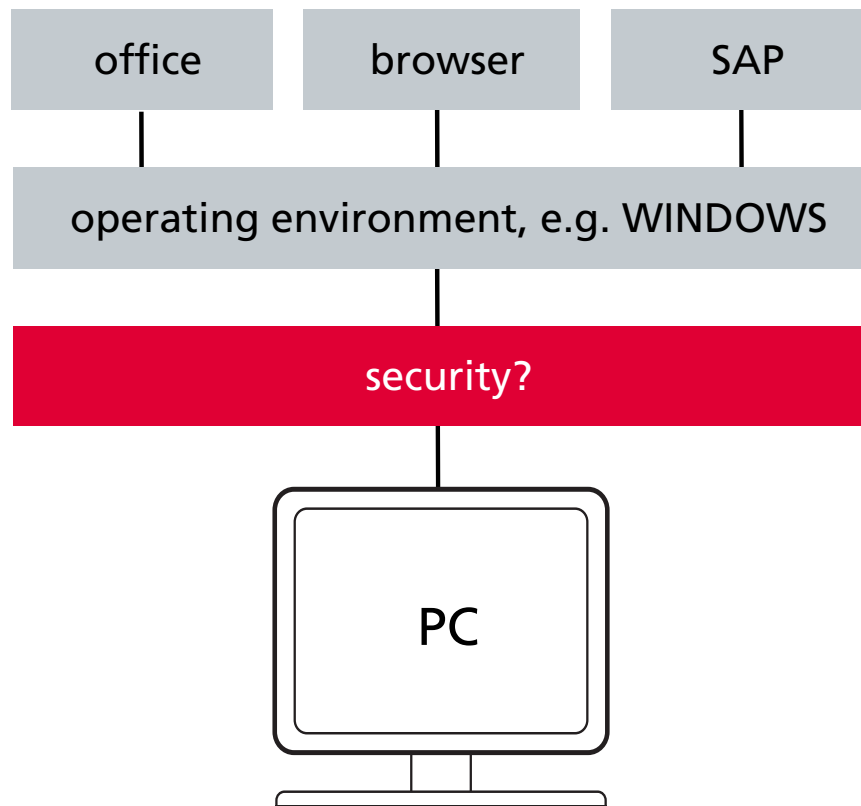


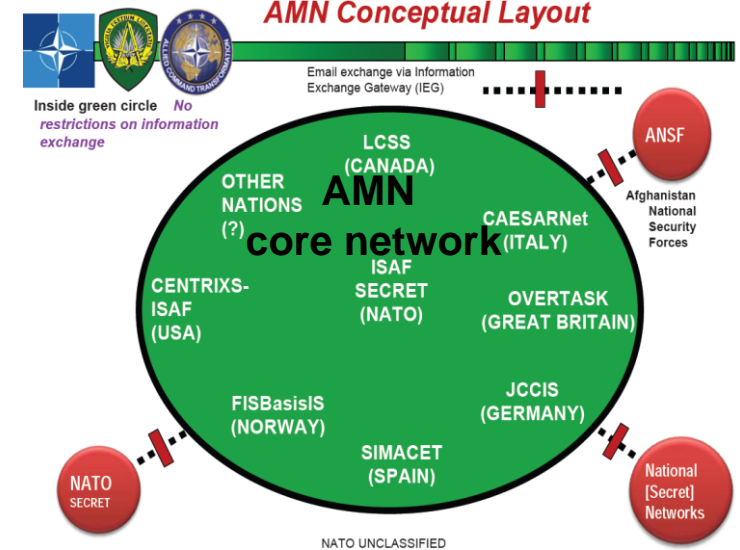
EAGLE IV
Status: in preparation
Source: Bundeswehr/Genzmer



ENNOK
Status: in preparation
Source: Bundeswehr/Heide

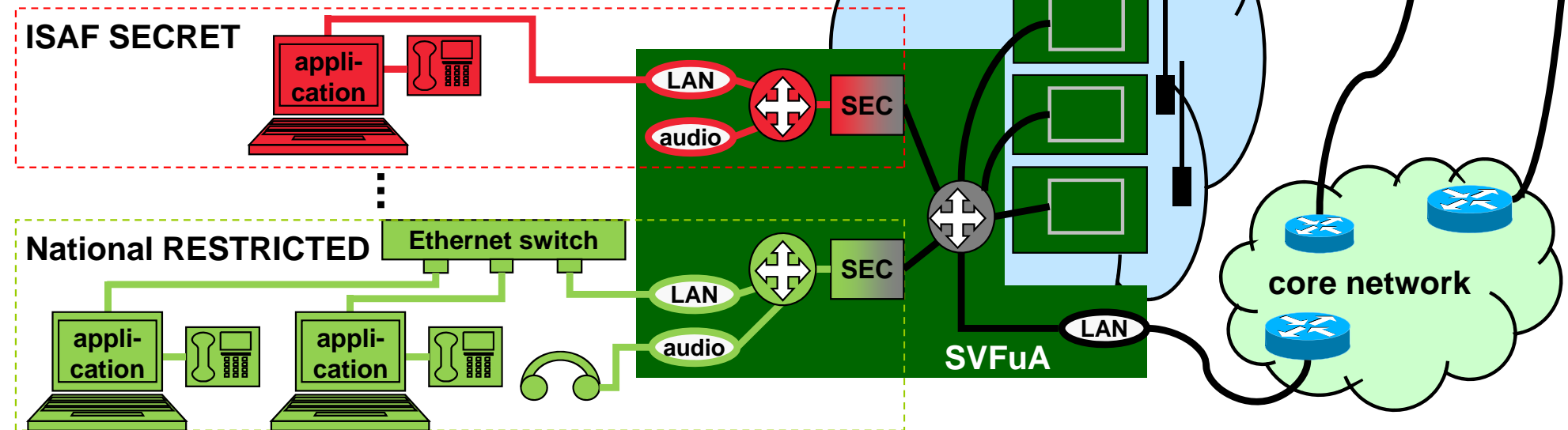
SVFuA is an essential prerequisite for national security requirements





Concept for integrating SVFuA into mission 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

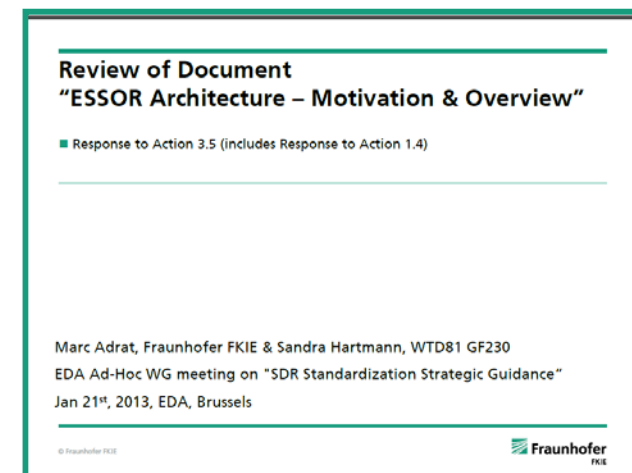
I/2016

initial series
production

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 (COALWWN)



Conclusions



- With the delivery and verification of the first configuration of SVFuA this summer
 - an important milestone will be taken and
 - a proof of concept will be achieved
- Combining software defined radio technology with high security certification was the greatest challenge
- The software defined security solution is the key enabler for the growth potential in the direction of multinational interoperability
- Multinational standardization further enhances the benefits of SDR solutions and international cooperation

Thanks for your Attention!

Questions or Comments?