SIEMENS

Corporate Technology

# CONCERTO

Content and context aware delivery for interactive multimedia healthcare applications

EU co-funded R&D project, Dec 2011 – Feb 2015
SHPERA Workshop | Innsbruck | July 1, 2014

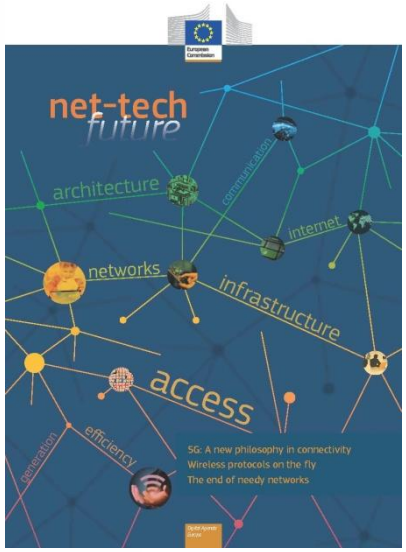
Peter Amon, Wenrong Weng, Andreas Hutter & CONCERTO partners

Siemens AG, Corporate Technology
Research and Technology Center
Imaging and Computer Vision

Contact: p.amon@siemens.com

SIEMENS

# CONCERTO




## SAVING LIVES WITH REAL-TIME E-HEALTH

SIEMENS

## Overview

**Key topics**

- Compression and protection of medical images and videos
- Cross-layer optimized adaptation and QoS provisioning for coping with variable bandwidth availability
- Media-caching aided content-aware wireless delivery with scalable mobility

**Target use cases**

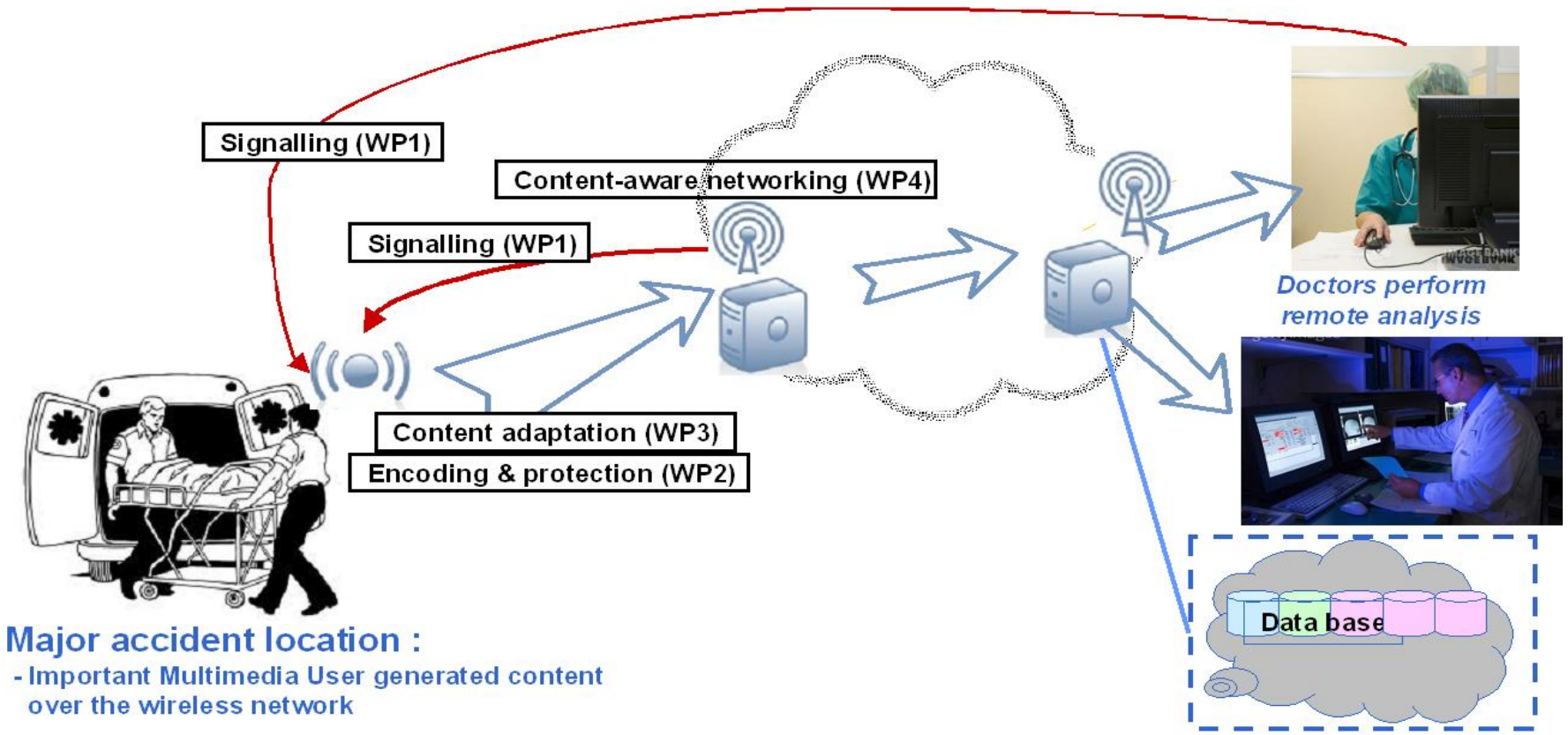
1. Ambulance and emergency areas
2. Emergency areas with multiple casualties
3. Emergency rooms
4. Ubiquitous tele-consultations
5. Surgical assistance
6. In-hospital scenarios
7. Medical education

"Multimedia solutions for Healthcare applications"

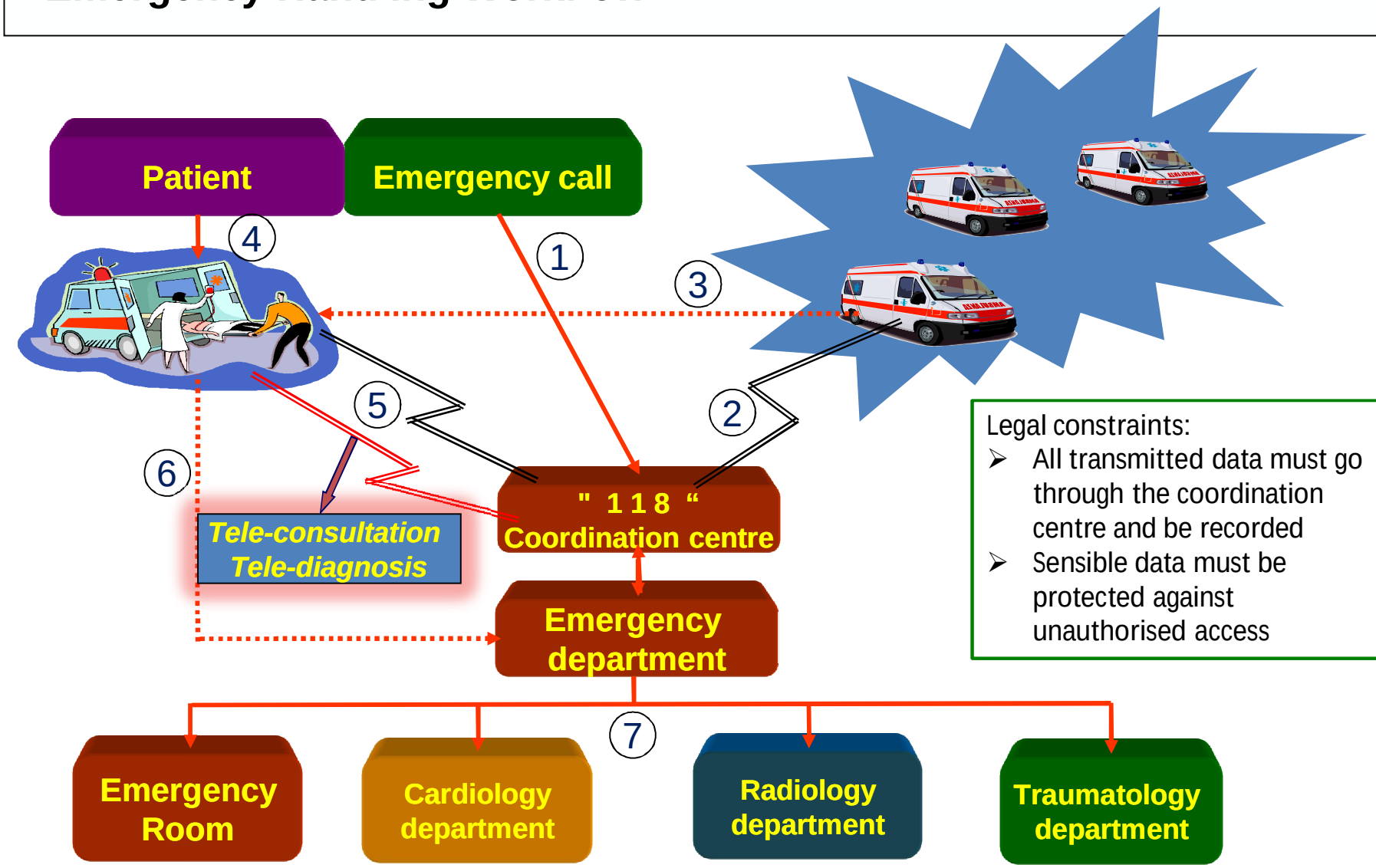
SIEMENS

# Main Use Case: Ambulance and Emergency Areas



# Emergency Handling Workflow



SIEMENS

## Objectives

**Enhance wireless and mobile telemedicine**

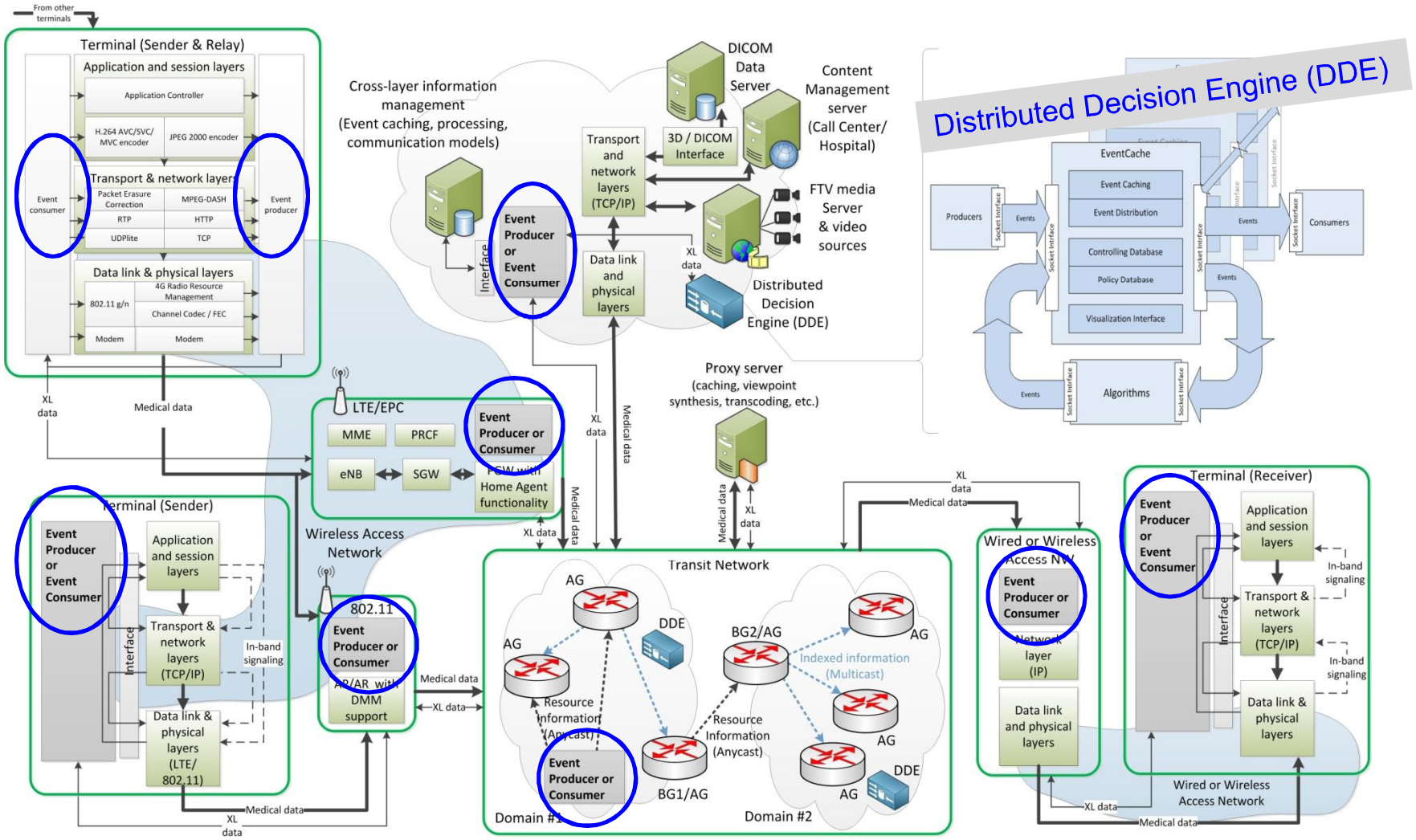
- Diagnostic-quality medical image/video sharing
- Interactive transmission and remote display of medical imaging data from ambulances and retrieval of data from emergency room or hospital databases for remote diagnosis (e.g., tele-radiology, tele-surgery, etc.)

**Address the need for next generation compression tools and advanced client server concepts including protocols**

- High fidelity for medical Quality of Experience (QoE)
- Low data rates for reduced loading time
- Algorithmic improvement specifically addressing 3D/4D imaging

# CONCERTO Architecture



SIEMENS

## Key Results

- Definition of a cross layer signaling strategy
- New QoE metrics adapted to medical domain
- Image and video compression algorithms for both medical and standard contents
- Multi-view and multi-camera video acquisition campaign
- Dynamic adaptation strategies for multimedia encoding and transmission
- Fine-grained distributed and dynamic mobility management with strong X-Layer optimization support
- New selective encryption algorithms
- Development of content- and context-aware network solutions
- Realization of a system simulator
- End-user validation of project technical results
- Collaboration with two hospitals
- Proof-of-concept demonstrator

# Multi-view and multi-camera video acquisition campaign (@Hospital of Perugia)

SIEMENS

## Objectives

- Realize multi-camera and multi-view videos in a medical context
- Test an emergency area scenario in realistic conditions
- Test of demonstrator components

# Consortium

SIEMENS

## Industry

- Thales, France (coordinator)
- Siemens, Germany
- NEC, UK

## Research institutes

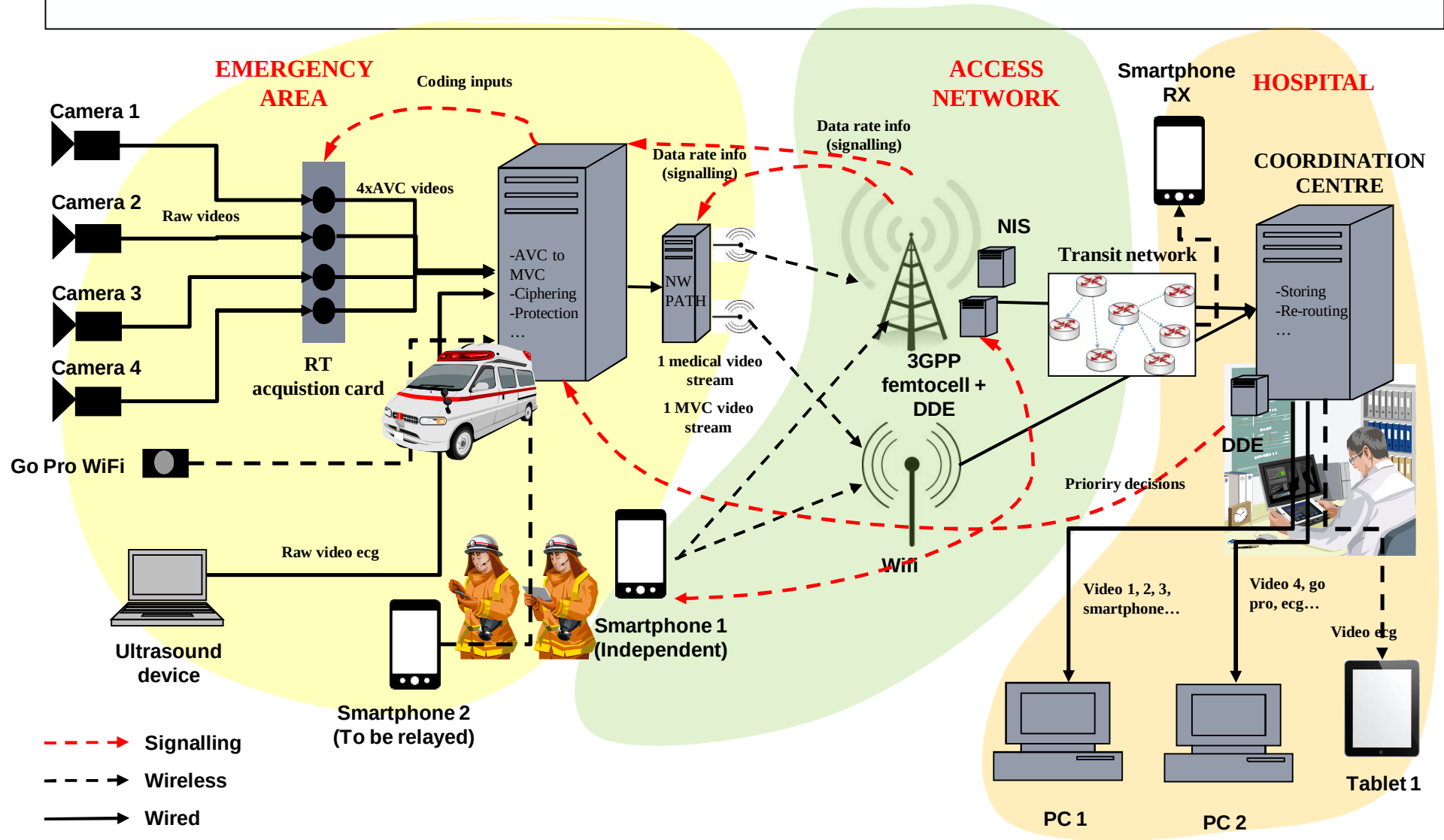
- VTT (Technical Research Centre of Finland)
- Cefriel, Italy
- CNIT/University of Bologna, Italy

## Academia / hospital

- University of Southampton, UK
- Kingston University, UK
- Budapest University of Technology and Economics, Hungary
- University of Perugia (hospital), Italy

# Demonstrator



SIEMENS

# Demonstrator: Coordination Center @Hospital

# net-tech *future* Magazine 2014



## SAVING LIVES WITH REAL-TIME E-HEALTH

*Despite the benefits of e-health, it is rarely used in emergency situations – it lacks the technology medics need to make accurate and real-time remote diagnoses. The CONCERTO team is hoping to change this by developing telemedicine technology allowing medics to make life-saving decisions quickly.*

Over the last century, scientific breakthroughs like X-rays, antibiotics and advanced surgical techniques have helped to more than double the average life expectancy of people living in developed countries.

Today, e-health is considered the next big advance, while remote care is crucial to further improving patient outcomes. But in emergency situations, access to high-quality 3D images and video remains problematic for medics. Changing this would clear the way for efficient and correct diagnosis in real time.

CONCERTO

help save many lives.

currently, e-health is poorly applied in real-time emergency situations," says CONCERTO project coordinator Lorenzo Iacobelli of Thales Communications & Security in France. "Our project will support new scenarios where the patient can be fully analysed in an ambulance and his full results sent in real time to the specialist at the hospital for diagnosis. This saves precious time and can save lives."

The CONCERTO architecture will use an advanced cross-layer signalling system to support the efficient transmission of medical images and video streams from multiple, uncorrelated and rapidly moving sources. The team is also testing advanced algorithms and codecs that improve the compression and protection of medical images and videos.

### ANYTIME, ANYWHERE

The smart use of context awareness – a system that can sense its physical environment and adapt its behaviour accordingly – is also under development within CONCERTO.

This would mean that, in any given situation, [illegible] can be adapted and the data and video to [illegible] or a delivery, such

Although the project is not yet finished, the team already has some exciting findings. For example, the system for compressing and transmitting heavy and detailed medical images, which many medics initially dismissed as impossible, is now deemed viable and effective. A multi-view video system enabling the efficient encoding of sequences captured simultaneously from multiple cameras using a single video stream is also complete.

Iacobelli is convinced of CONCERTO's added value, saying that it will prove invaluable in emergency situations – patients' chances of survival will increase as the waiting time for diagnosis decreases.



### SAVING TIME, SAVING MONEY, SAVING LIVES

The CONCERTO technology also supports first responders like nurses and paramedics who will be able to send multiple data forms quickly and efficiently to specialists through wireless devices.

The technology would [illegible] made a diagnosis before [illegible] at the hospital, waiting times will also be reduced dramatically.


And by making health data like images and video accessible on the desktop, the CONCERTO system would also lead to faster healthcare decisions.

According to Iacobelli, CONCERTO [illegible] for medics [illegible] action before a face-to-face [illegible] This makes for a far more efficient and effective way of treating patients," he says.

Before CONCERTO finishes at the end of 2014, the team plans to hold a full demonstration at a Perugia hospital in Italy, where physicians will assess the system's overall effectiveness and added value. Beyond this, Iacobelli explains that a finished e-health product could be on the market within five years.

"This all depends on variations in national healthcare systems, legal procedures and the evolution of technology," he stresses. "However, some of the individual technological breakthroughs, such as the image compression system, could be available within a couple of years."

The CONCERTO findings are expected to lead to innovative solutions in other industries that use networking and video coding. In fact, the project team has already submitted several contributions to standardisation bodies such as the 3rd Generation Partnership Project (3GPP).

CONCERTO builds on a previous Seventh Framework Programme project, OPTIMIX, which studied innovative solutions to enhance video streaming.

More info: www.ict-concerto.eu



SIEMENS

## Thanks!

More information…

- Website: http://www.ict-concerto.eu
- Email: p.amon@siemens.com