



Deploying IPv6 in Wireless Networks

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Agenda

- Wireless networks and IPv6 features
- IPv6 over GPRS
- IPv6 over WLAN
- Wireless networks and MobileIPv6
- IPv6 in 3G
- IPv6 and Heterogeneous Wireless Networks
- The 6WINIT Project
- The 6WINIT Demos
- Other Wireless IPv6 Deployments

Wireless networks and IPv6 features

- Address space important for operators with millions of subscribers
- Header compression potentially makes IPv6 more efficient than IPv4
- Mandatory IPsec provides more options for securing networks and applications
- MobileIPv6 far superior to MobileIPv4
- Developing SEND technology will provide improved security over the air interface

IPv6 over GPRS

- Currently deployed GPRS networks do not support native IPv6
- In many cases private addresses are allocated to terminals – therefore public tunnel brokers can't be used
- In many cases addresses are dynamically assigned – tunnels have to be frequently reconfigured

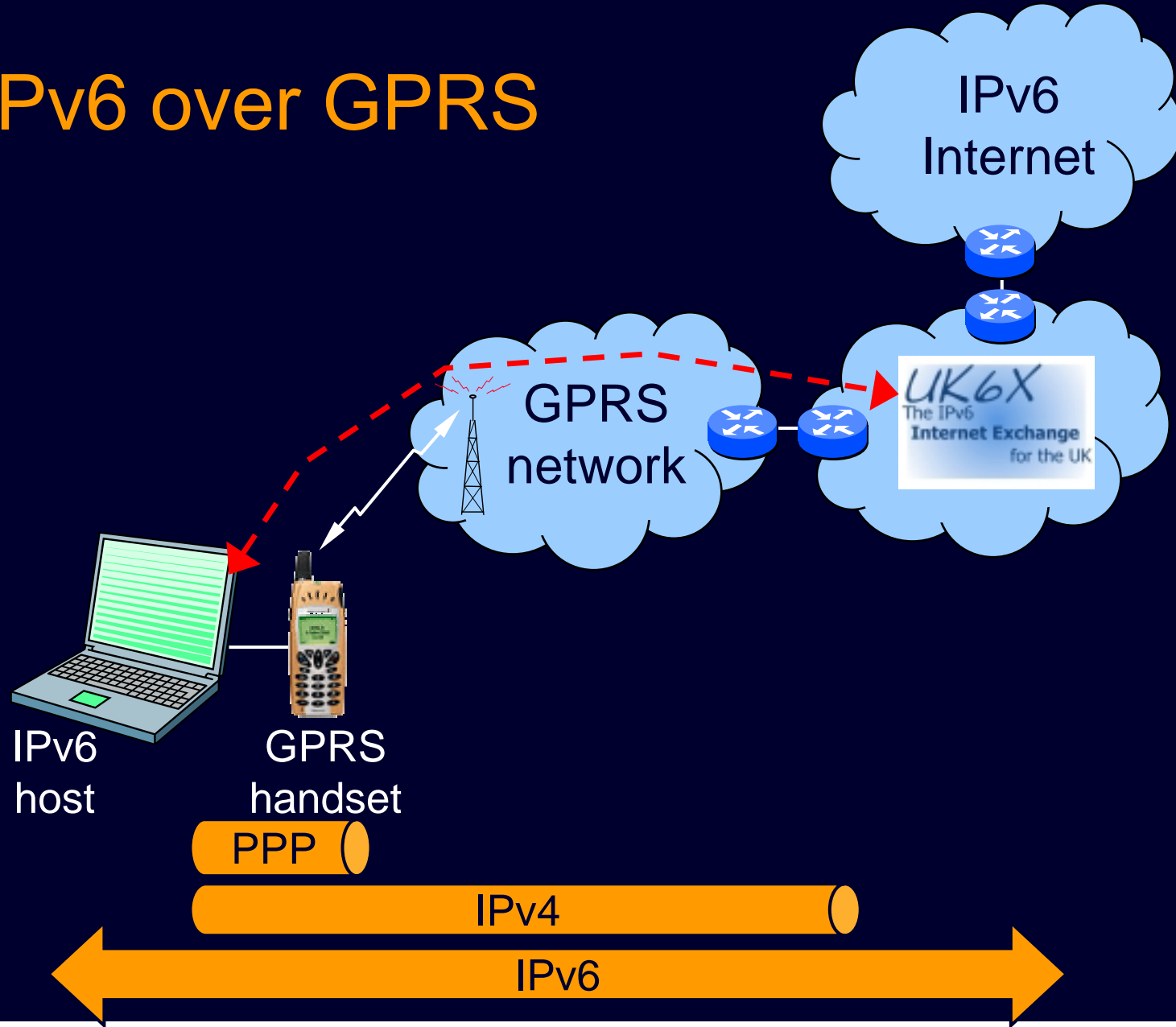
IPv6 over GPRS

- BTextact operates a private bearer circuit to UK6X
- Allows us to terminate IPv6-in-IPv4 tunnels from GPRS-connected terminals
- Also provide IPv6/IPv4 interworking functionality via Ultima (NAT-PT)
- Several test services are available as part of the UK6X



www.uk6x.com

IPv6 over GPRS



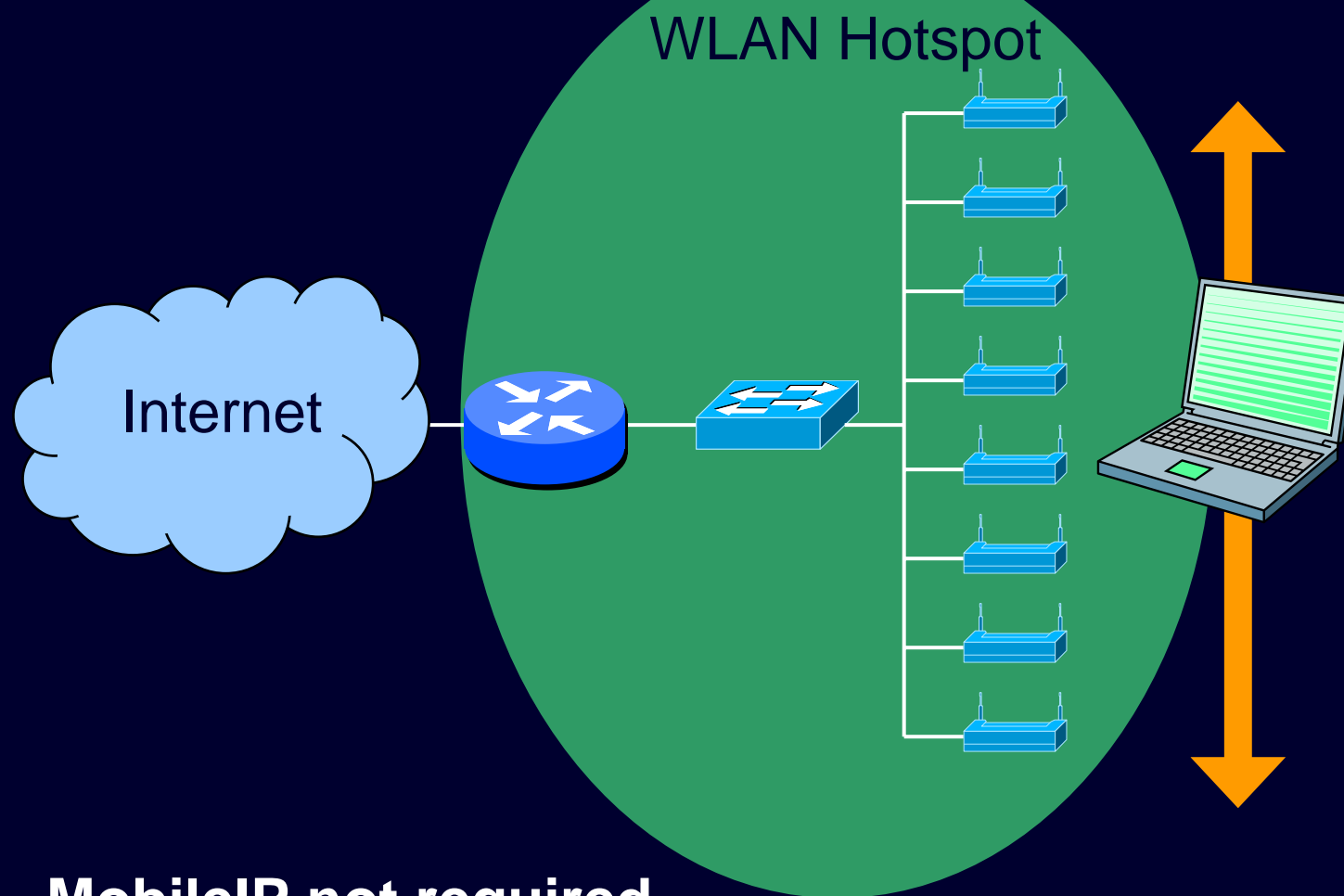
IPv6 over WLAN

- Should just work
- Available during this event
- Only potential problem is disabling of L2 multicast which causes Neighbour Discovery procedure to fail

Wireless networks and MobileIPv6

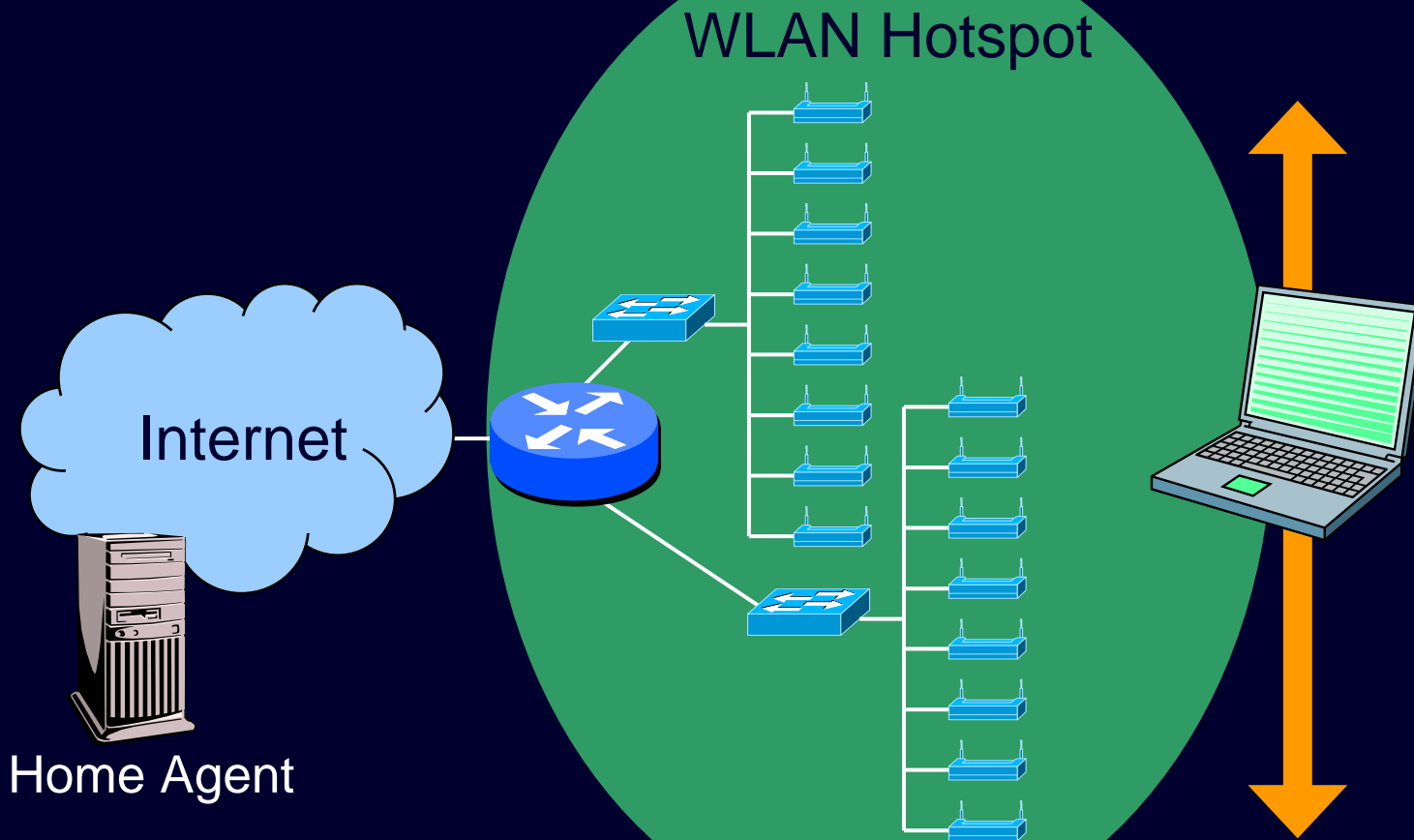
- Existing WLAN hotspot deployments are typically large flat LANs
- MobileIPv6 is one of the technology solutions being explored to improve the scalability of these networks
- MobileIPv6 allows mobile hosts to roam between subnets without breaking any existing sessions

WLAN and MobileIPv6



MobileIP not required

WLAN and MobileIPv6



MobileIPv6 required

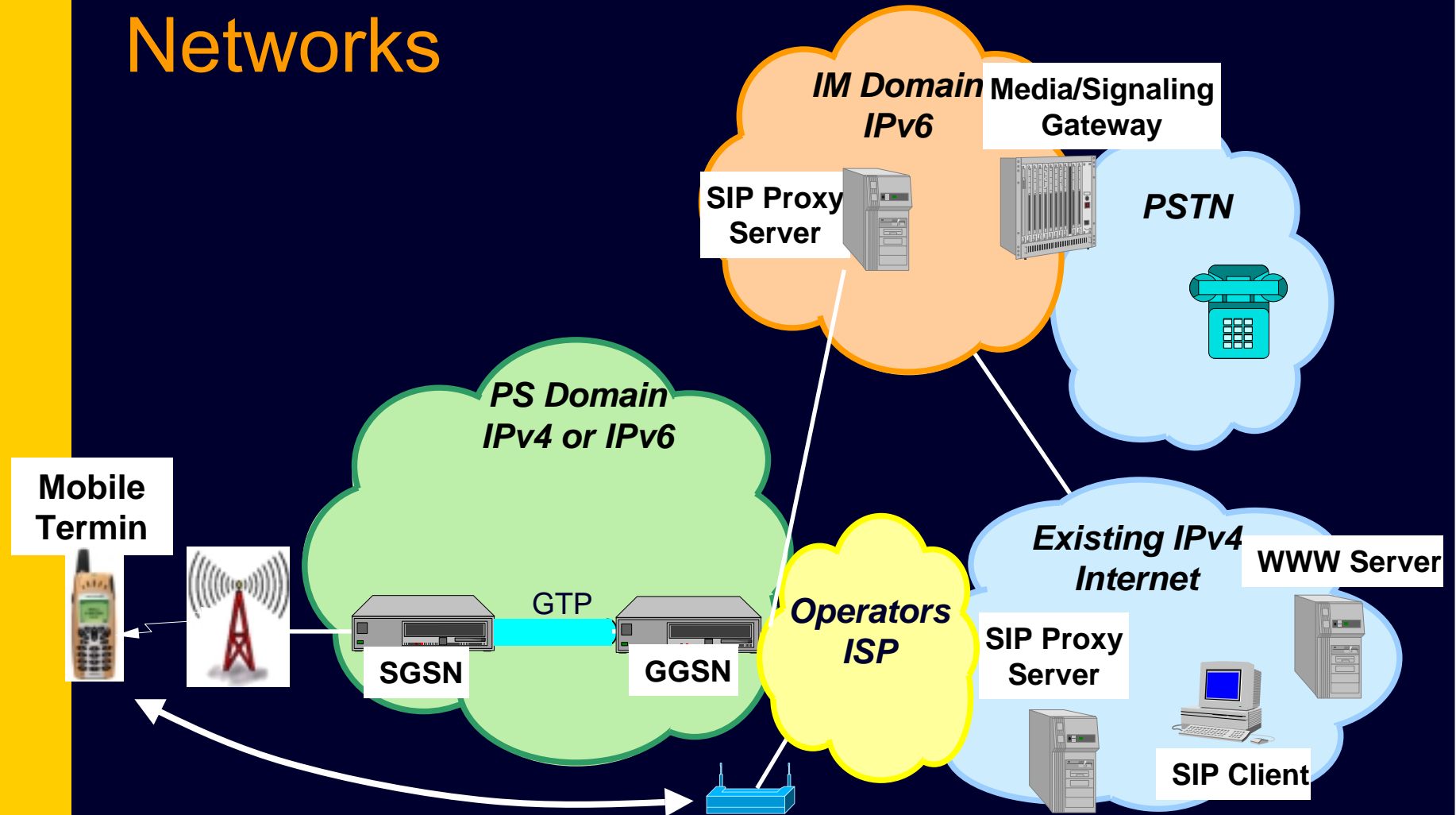
IPv6 and 3G

- UTRAN IP Transport option mandates IPv6, IPv4 still an option
- Rel5 IMS mandates IPv6 only
- NAT-PT and tunnelling are the principal interworking tools
- IPv6 dependencies for Rel5 all now completed
- Interworking for SIP still requires a lot of work
- MobileIPv6 has been investigated by 3GPP – not specified yet

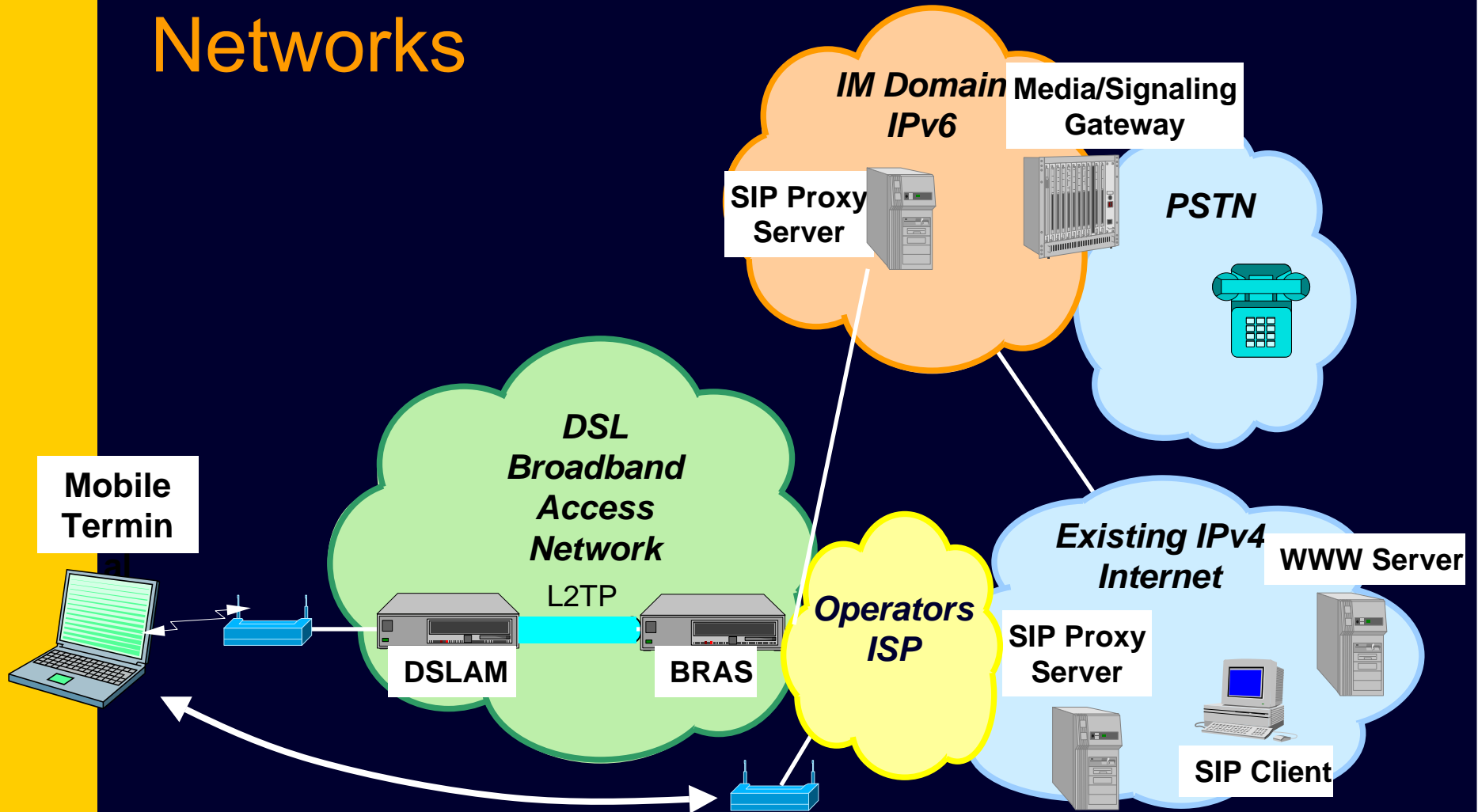
IPv6 and Heterogeneous Wireless Networks

- 3GPP starting to explore handovers between WLAN and 3G
- Future broadband architectures may replicate 3G IMS
- End-to-end IPv6 and common network architectures make interworking between multiple wireless technologies simpler

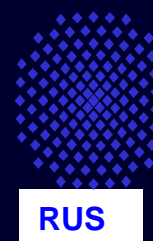
IPv6 and Heterogeneous Wireless Networks



IPv6 and Heterogeneous Wireless Networks



The 6WINIT Project



6WINIT – vital statistics

- A major international IPv6 Testbed
 - To prepare for next generation wireless networks
- 2 years from 1/1/01
- Project cost: 6M Euro (EC 3.5M Euro)
- 550 person months
- 15 partners

6WINIT - Objectives

- To validate the feasibility of running real applications for the wireless Internet using IPv6 & GPRS/UMTS
- To demonstrate these by running complete applications on a testbed
- To show generic applications
- To show solutions not tied to supplier
- To maintain international dimension

6WINIT - Roles of Partners - I

- BT, T-Nova
 - provide network support, IPv6-IPv4 Interoperability
- Ericsson-Research
 - architecture, possibly UMTS testbed
- Ericsson-Telebit
 - architecture, MIP, router
- IABG
 - Road Warrior, MIP, IPsec, IPAQ
- 6WIND
 - router

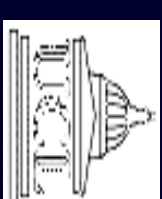
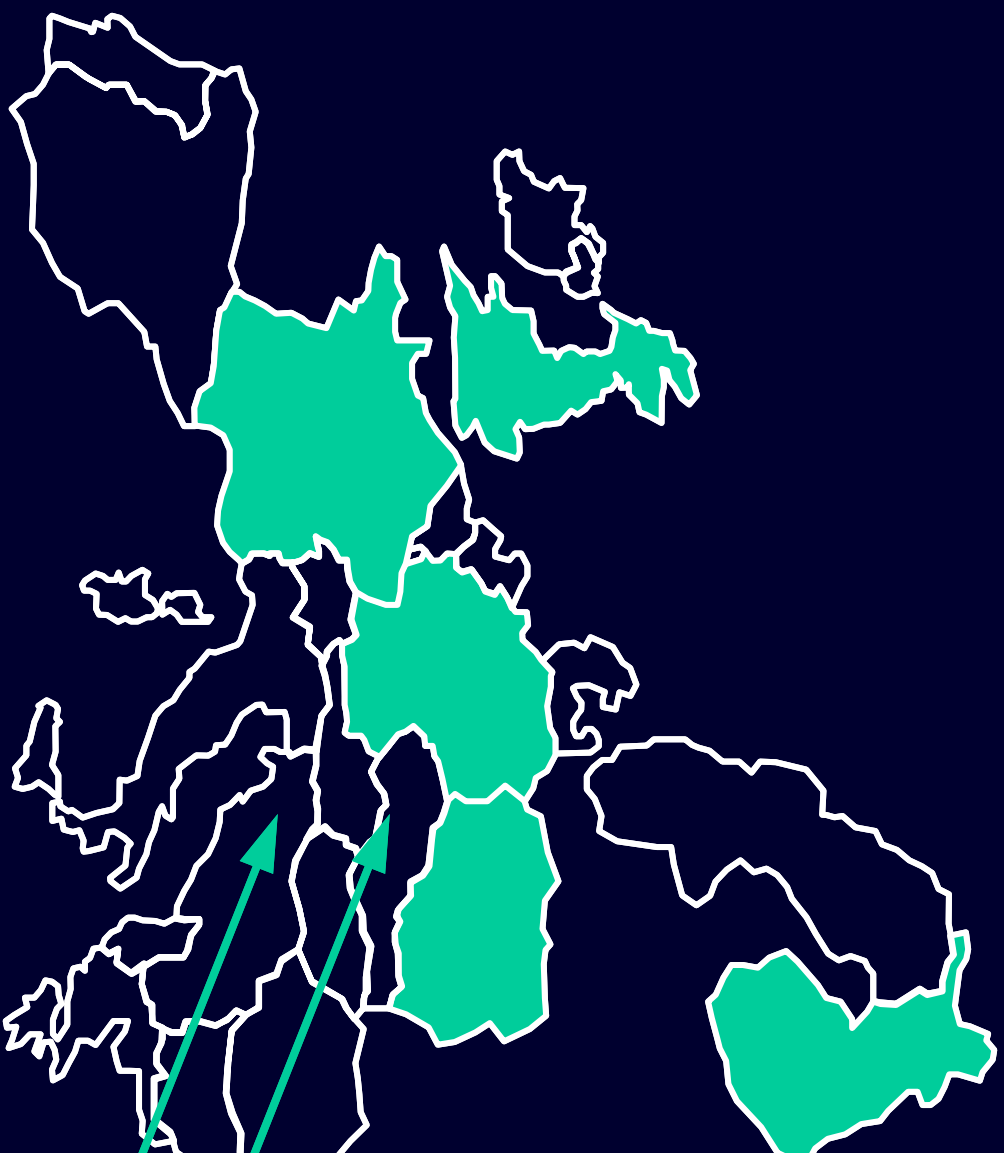
6WINIT - Roles of Partners - II

- TZI
 - Gateway for SIP, Media
- VTT
 - Apps (Weather station, mobile spatial)
- UCL
 - Active TAG, IPAQ, CHIME Support, Conferencing App
- UoS
 - Transition aids, Agents
- UMM
 - IPAQ, Streaming, User I/F, WAP
- ETRI
 - Stacks, Transition Aids, MIP, connectivity

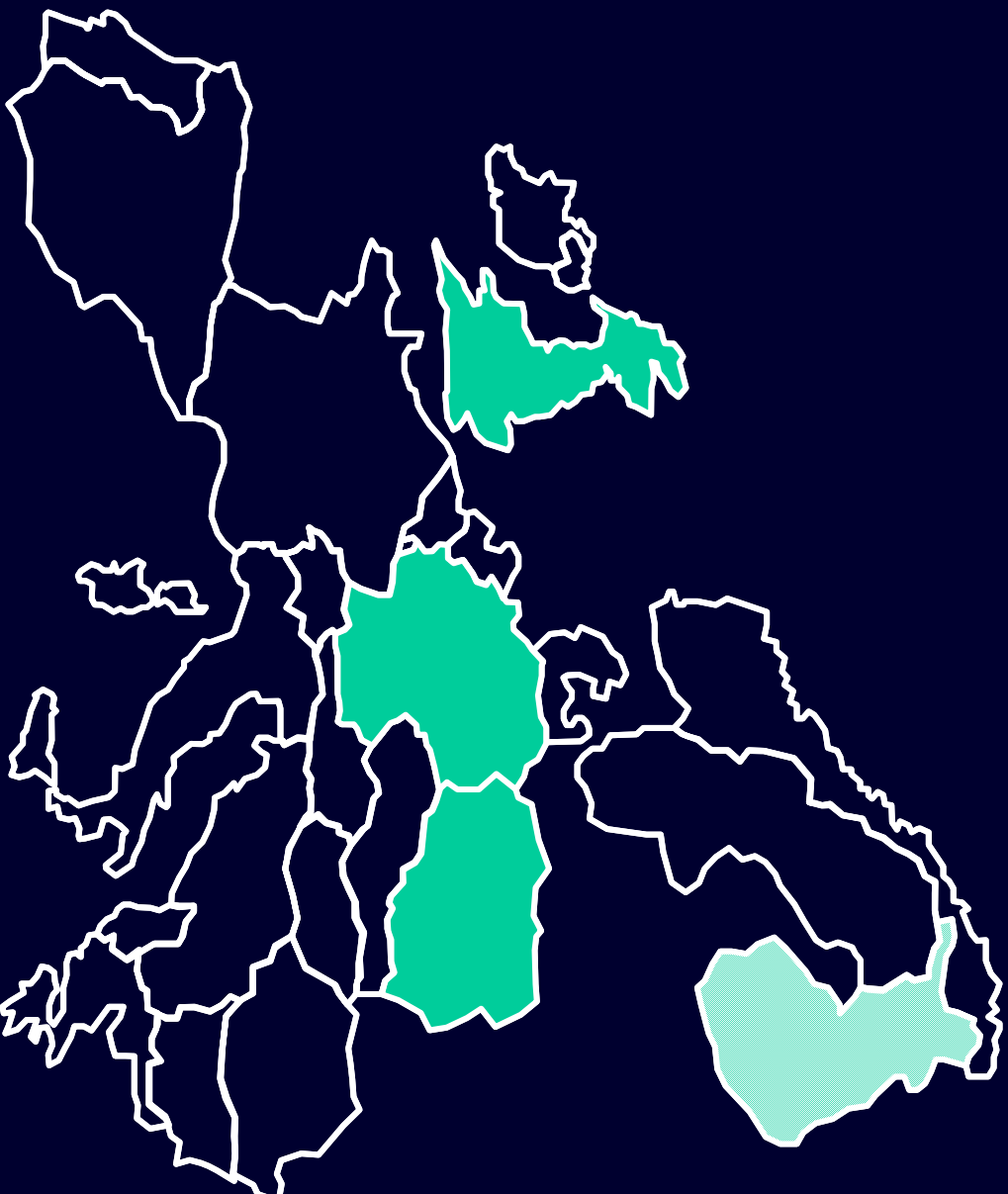
6WINIT - Roles of Partners - III

- UKT/RUS
 - Ambulance Clinical App
- UCL-CHIME/UCL
 - Clinical database App
- John Paul II/UMM
 - Radiology + teleconsultation
- Telscom
 - Dissemination, VoIP App

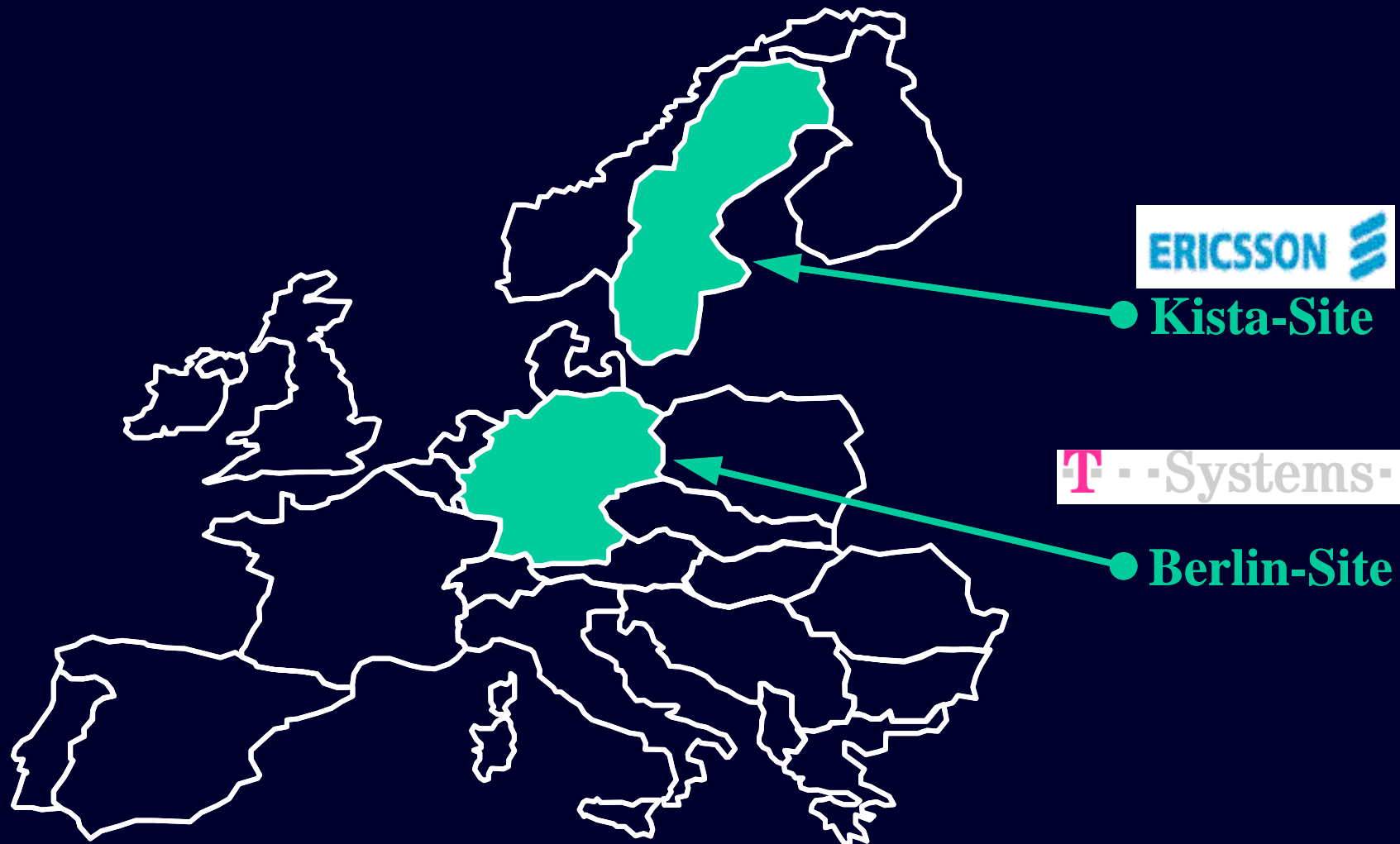
6WINIT - Local Testbeds



6W/INIT - GPRS Availability



6WINIT - UMTS Local Test Sites



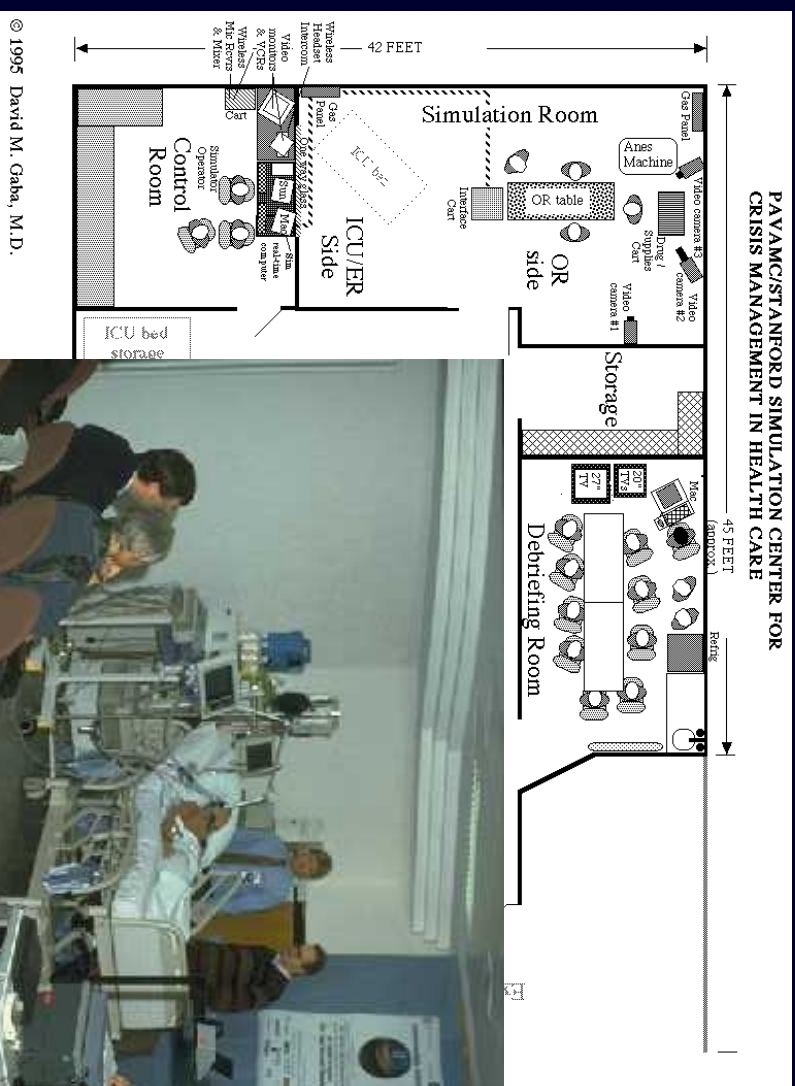
6WINIT - Generic Applications

- Conferencing, weather station, streaming, conferencing
- Linux IPv6 Road Warrior
- Positioning System
- Home equipment control

6WINIT - Clinical Applications

- UKT/RUS developed audio/vital data and patient simulator over GPRS
- CHIME developed access to cardiology database via iPAQ and GPRS
- John Paul II Hospital developed access to records and radiological images via WAP, and VIC on iPAQ

6WINIT - Clinical Applications

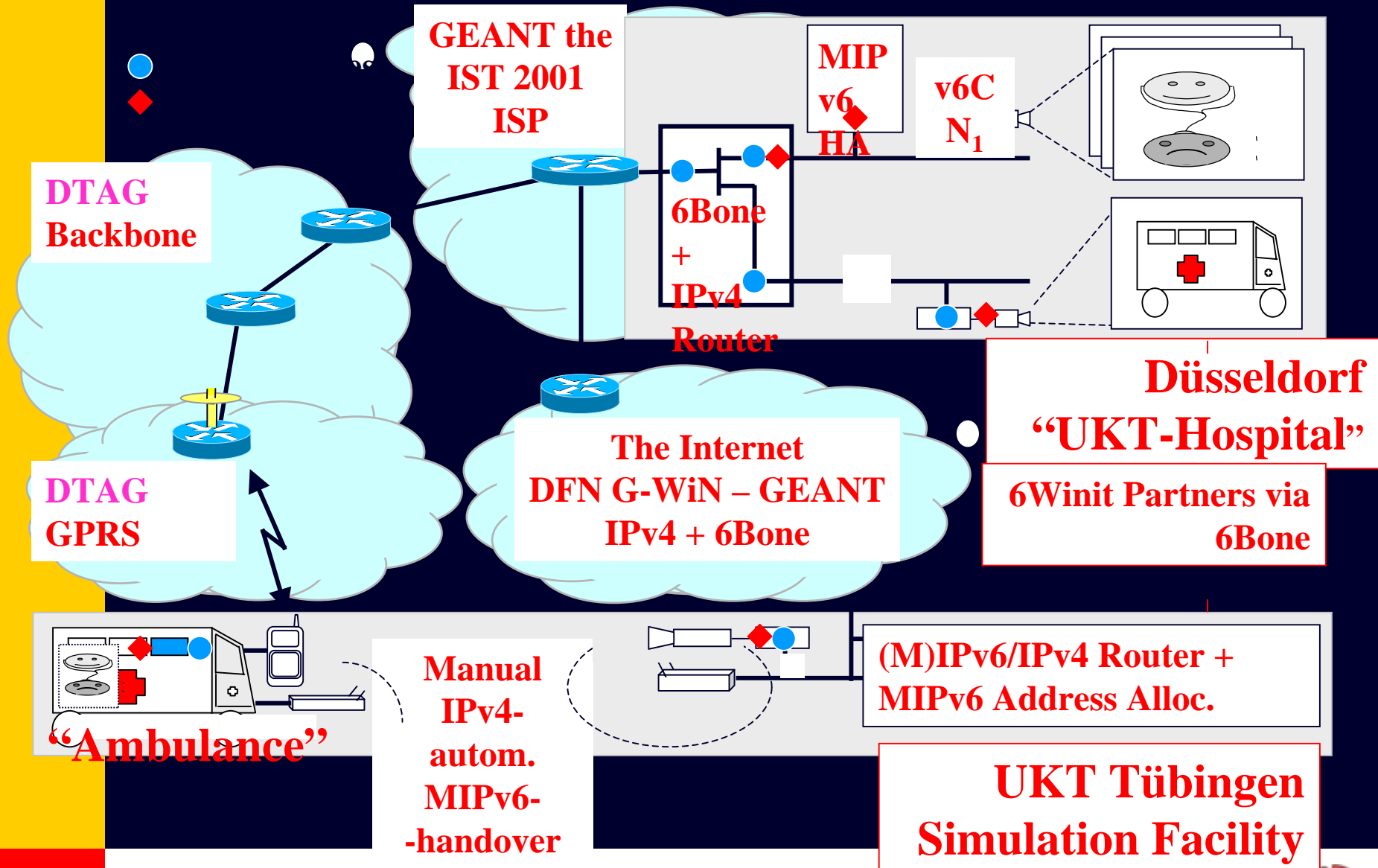


6WINIT Demos - IST2001



VTT demonstrated WLAN positioning at the IST 2001 exhibition in Düsseldorf in December 2001. *Pictures:* setting up the demo; Commissioner Erkki Liikanen visiting the booth; the demo setup

6WINIT Demos - Ambulance Demo



6WINIT Demos - INET2002



IABG's Road Warrior was demonstrated with one of the clinical applications and VTT demonstrated remote access to home environment.

Pictures: setting up the demo; presenting home environment; presenting Road Warrior and Vint Cerf visiting the posters.

6WINIT Demos - IST2002



Two integrated scenarios were demonstrated at the IST 2002 conference: an updated version of IABG's Road Warrior was demonstrated with one of the clinical applications. VTT demonstrated remote access to the home environment, which was combined with the intrusion management mechanism from UoS' Slite Agent Framework. Finally, ETRI demonstrated video streaming.

6WINIT Demos - Final Review

- Ericsson provided 3G testbed providing over 300kbps downstream bandwidth
- 6WINIT showed VoIP, and medical applications using this testbed
- This marked an IPv6 over 3G world first

Other Wireless IPv6 Deployments - The NEX Experiment



ODAKYU(TOKYO)



KEIKYU(TOKYO)



NEX(TOKYO)



Madrid Global IPv6 Summit Demo

- Mobile IPv6
- IPv6 over WLAN
- IPv6 applications
- Wide-area connectivity and network services provided by UK6X

Thanks for your attention!

Any questions?

