Trends in Mobile Communications in Europe

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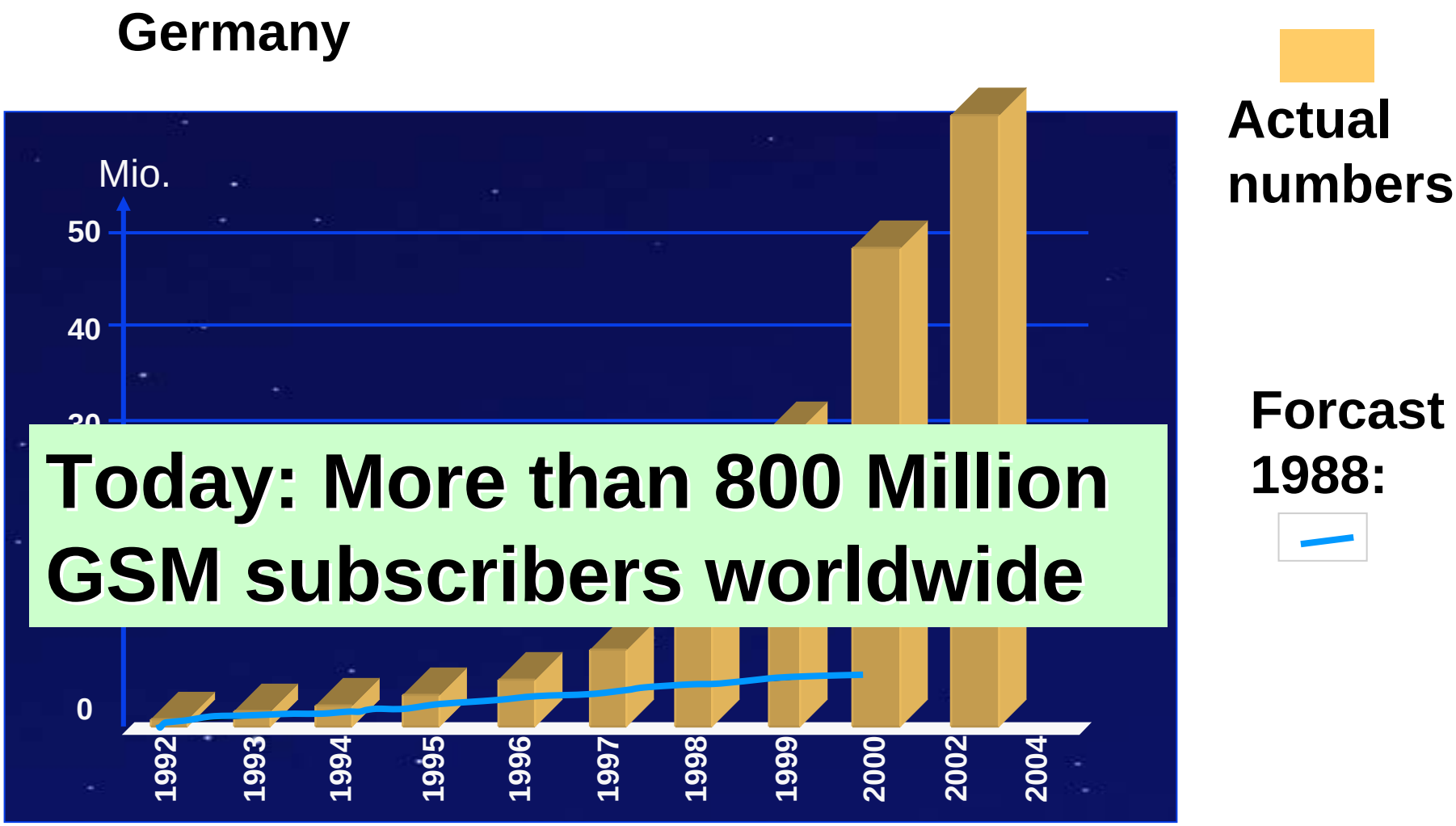
The Outline

- Current Situation in Europe: from 2G to 3G
- All is about innovative Services and Applications
- The Newcomer: Wireless LAN
- Looking „Beyond 3G“
- Conclusion and Outlook

Ongoing Growth of Number of GSM Subscribers

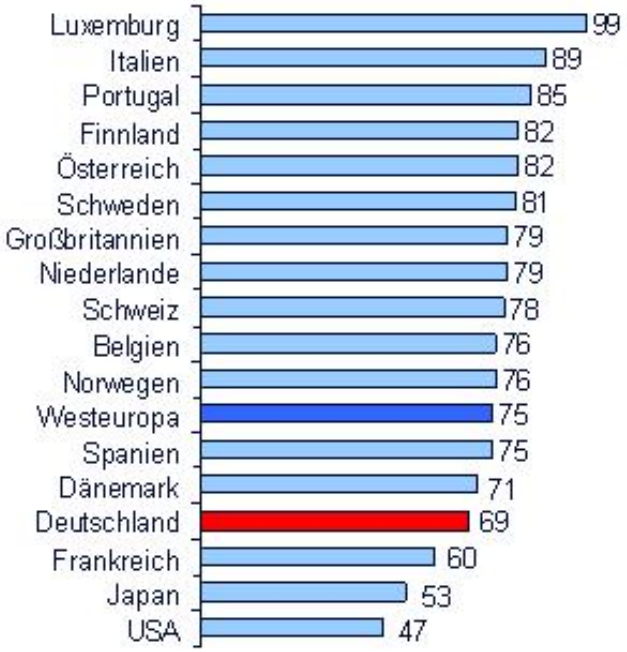


Source: O_2 et al.

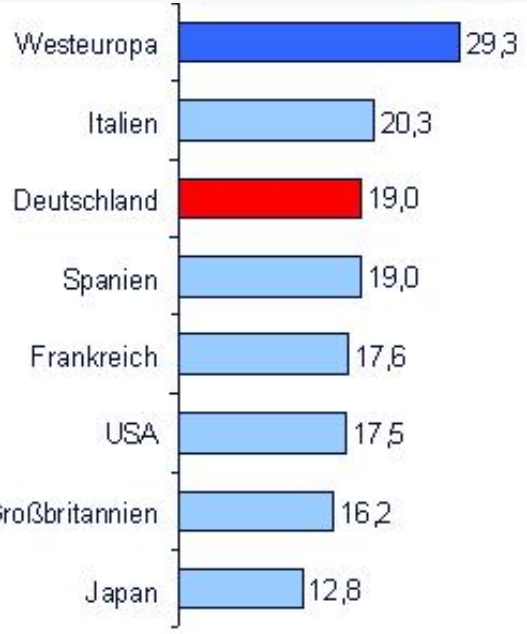
Mobile Communication Penetration in Western Europe

High penetration and high, but decreasing growth rates

Mobile Phones per 100 Inhabitants in 2001



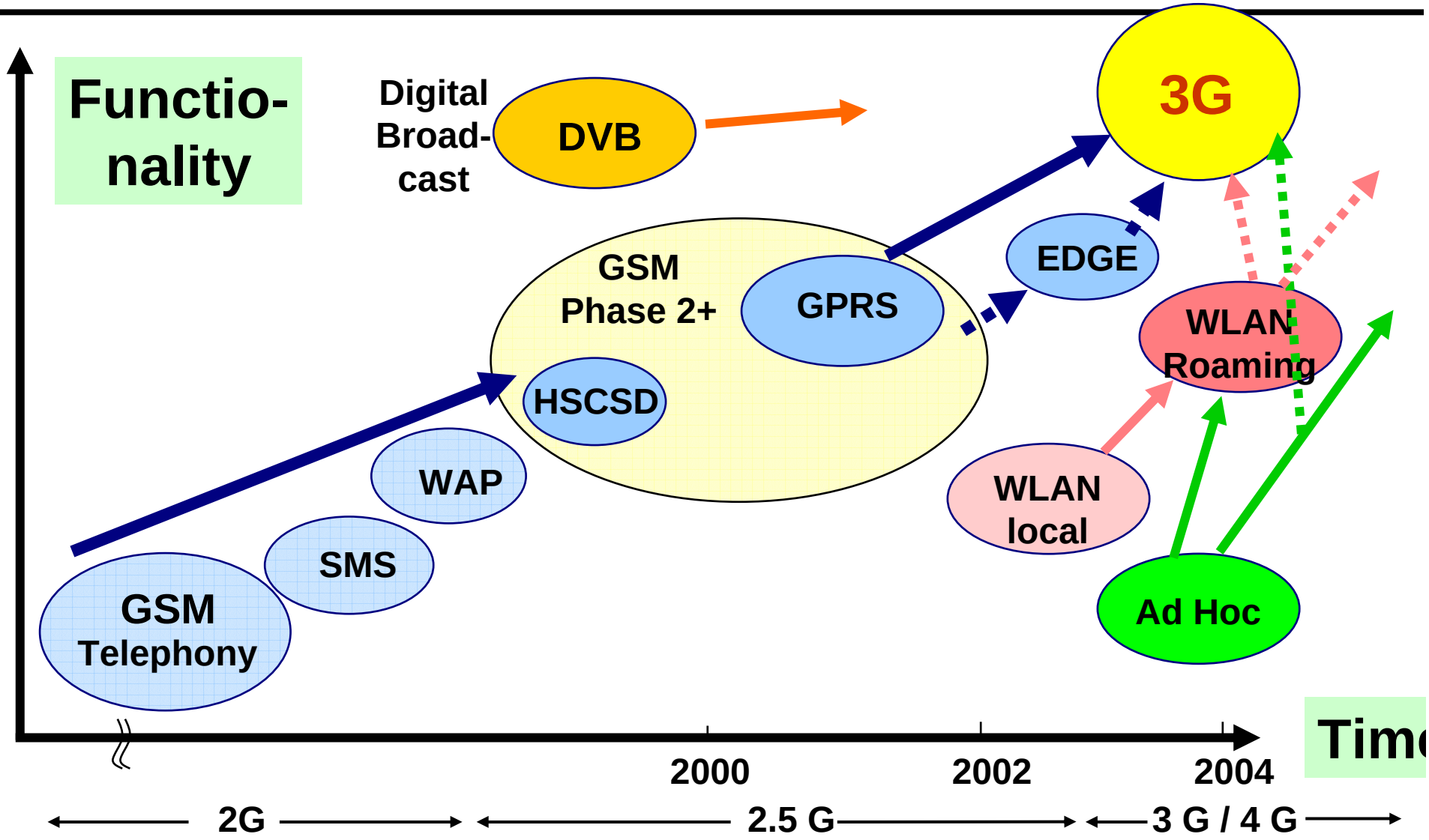
Increase in % compared to 2000



* Subskriptionen (inkl. Prepaid) in analogen oder digitalen Mobilfunknetzen

BITKOM, 2001 und 2002

Mobile Network Evolution: From Voice to Data



The expected benefits of 3G/UMTS to the user?

New Data Services for new Applications:

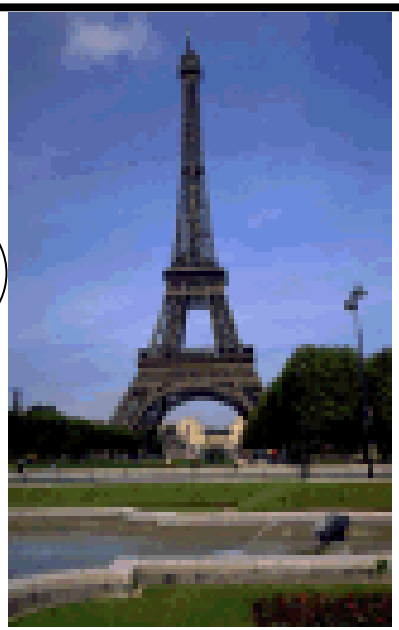
- **Multimedia Messaging (Note: Short Message Service SMS is big success!)**
- **Fast Internet and Intranet Access**
- **Location based and Personalized Services**
- **Audiovisual Communication**
- **Infotainment**

Factors contributing to the Delays in UMTS/3G Deployment

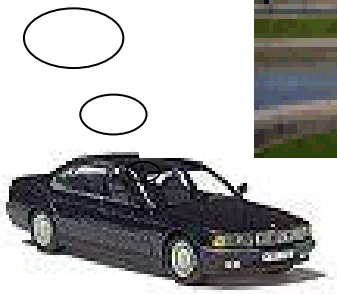
- Technological Challenges
- Lack of available UMTS Handsets
- Operator Debts
- Downturn in the Telecoms Market
- Visibility of Demand for Data Services
- Availability of Innovative Data Services

But nevertheless, 3G is needed and will be successful!

Location and Situation Dependent Services



Fastest Route?
Congestion?
Metro Stop?



Opening hours?
Price? Good
Restaurant?

In the Future: Usage of the "Context"

- Speed
- Time of Day
- Weather
- Vehicle Type
- Orientation
- Nearby buildings/objects
- Mood
- others

Location and Situation Dependent Services

Success factors:

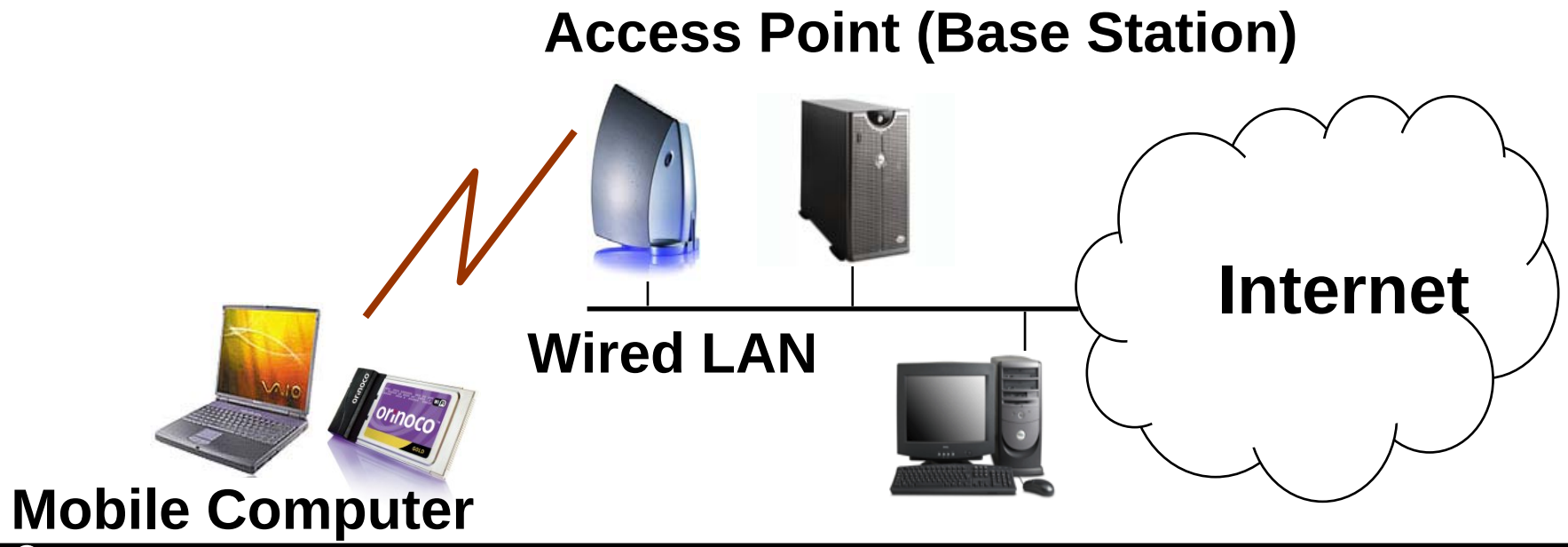
- Viable business models
- Cooperation between network operators, service providers and content suppliers
- Open Architecture

VirtualCityGuide

Source: TU München and BMW

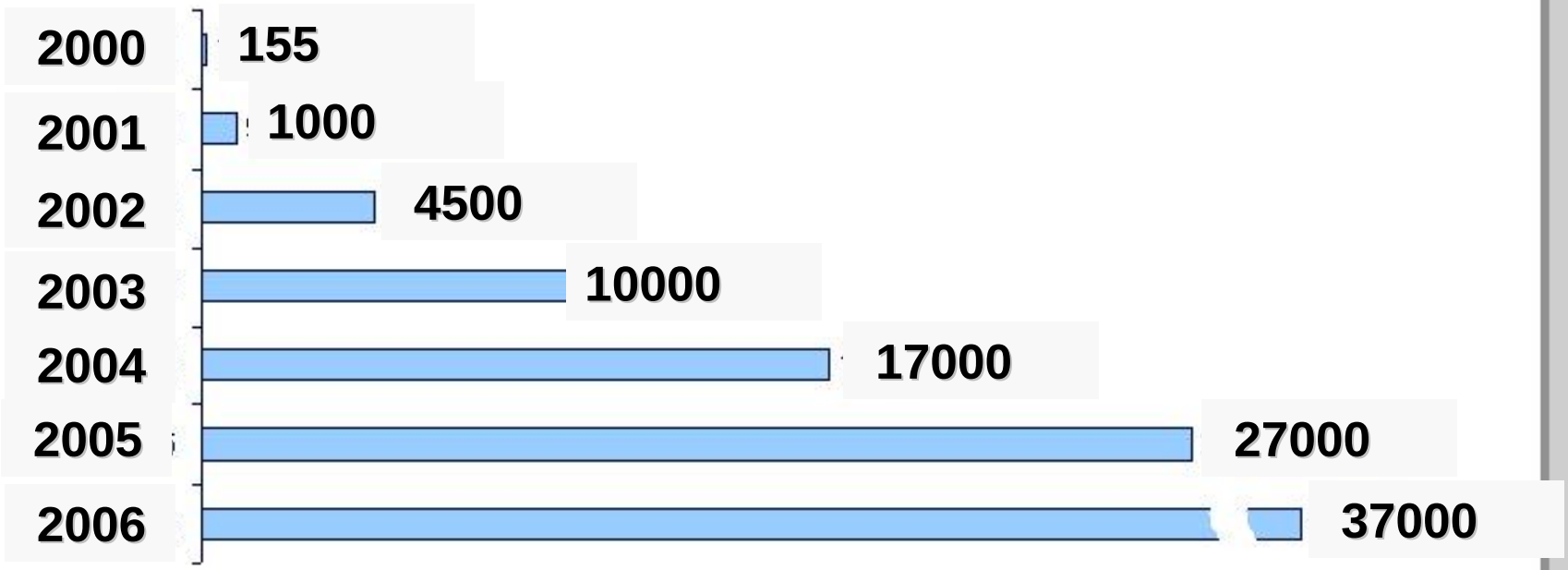
Wireless LAN (WLAN) for Hot Spots

- **Standards: IEEE 802.11x, unlicensed frequency bands**
- **Bit rates: today 11 Mbit/s…54 Mbit/s; tomorrow 100…1000 Mbit/s**
- **Direct communication between mobiles possible**
- **Only deployed in “islands” (hot spots)**
- **Yet lacking security and roaming**



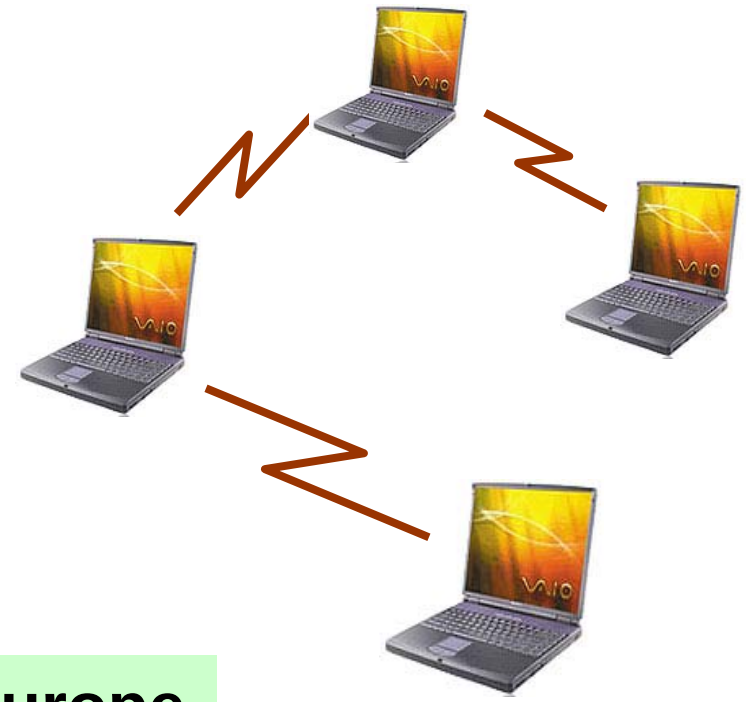
WLAN or Bluetooth Hot Spots Western Europe

Forecast by Frost & Sullivan 2001



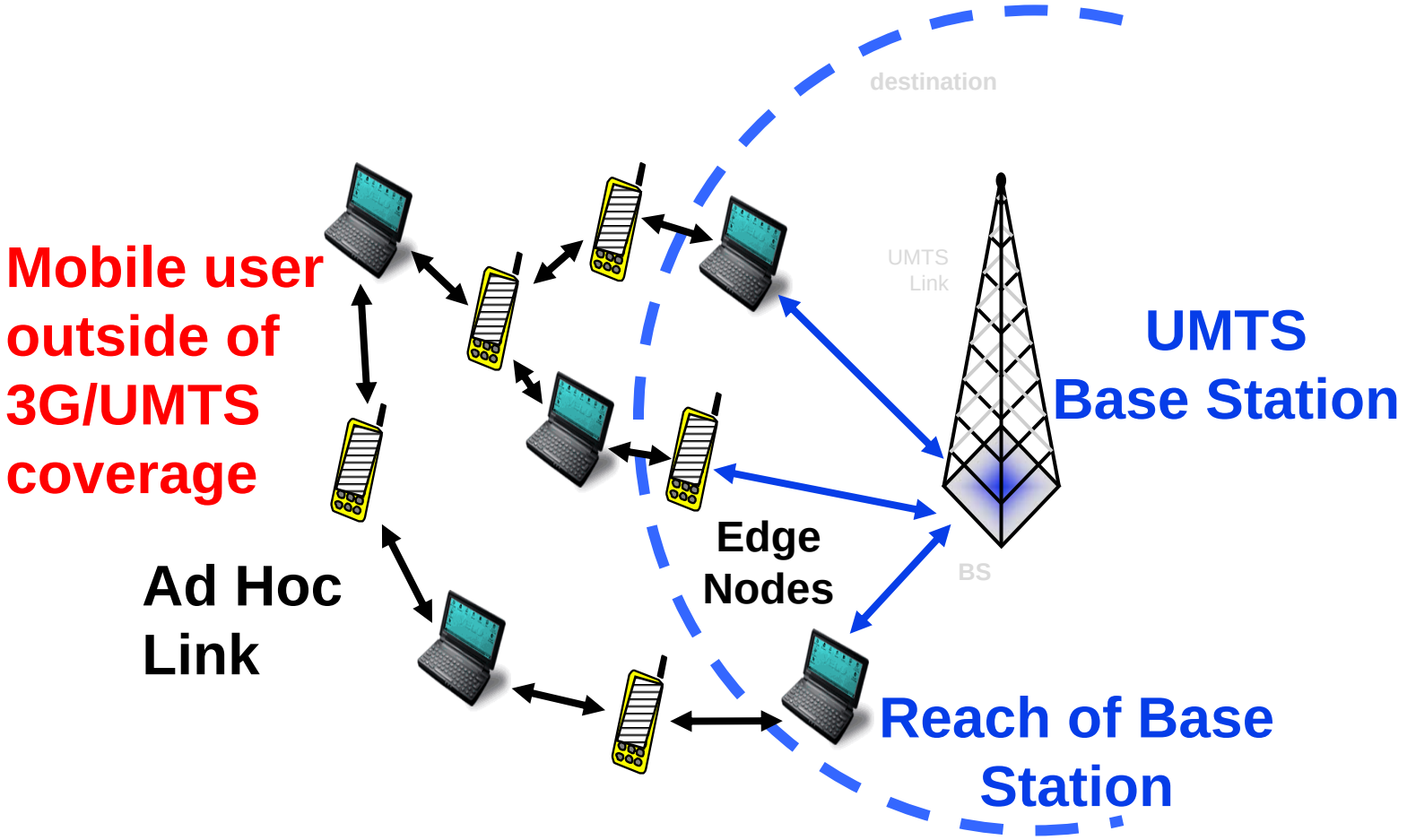
Adhoc Networks are…

- …self organising
- …wireless
- …consist of mobile nodes
- …without infrastructure



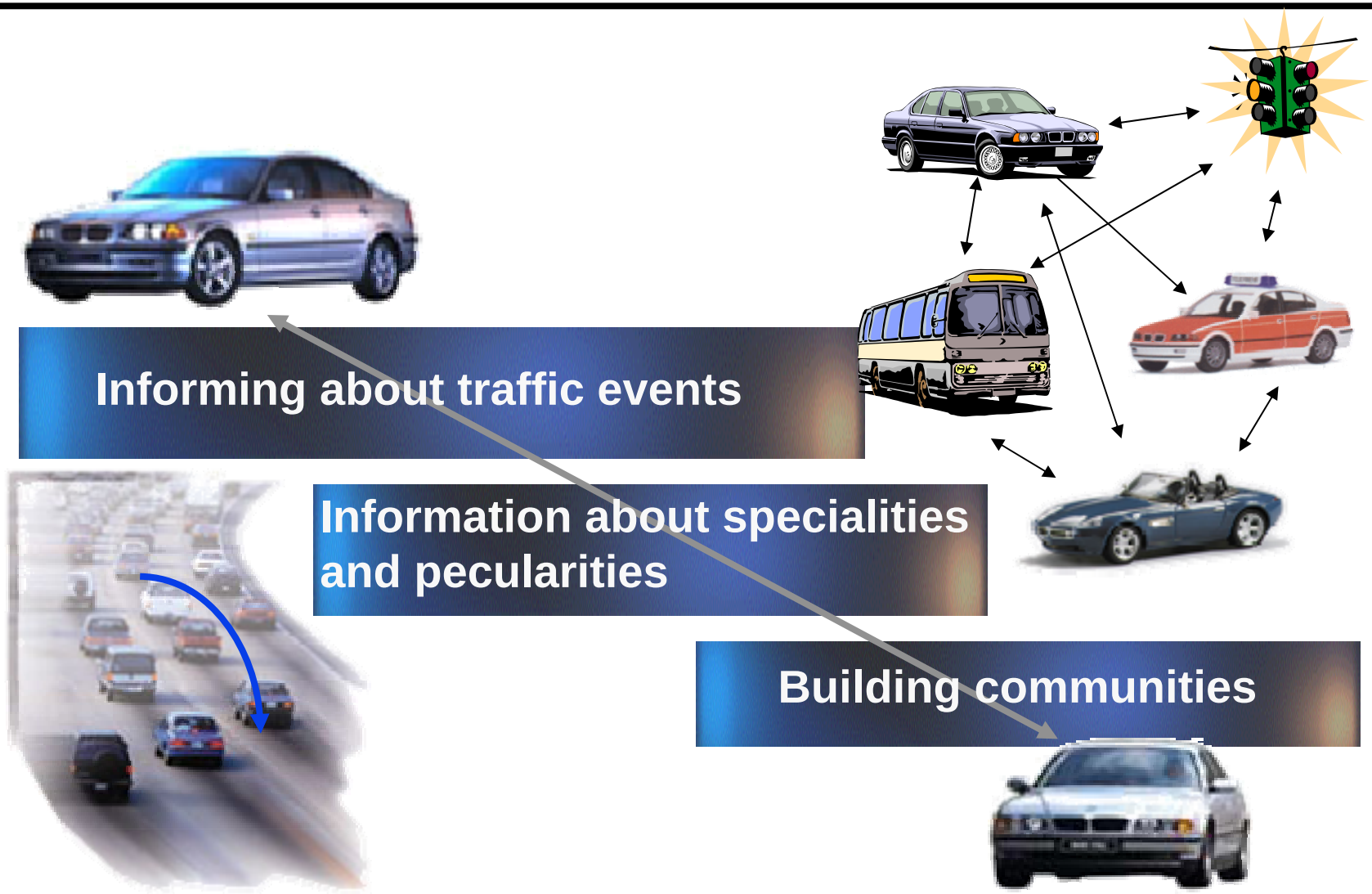
- Massive R&D going on in Europe for different application fields

3G Coverage Extension



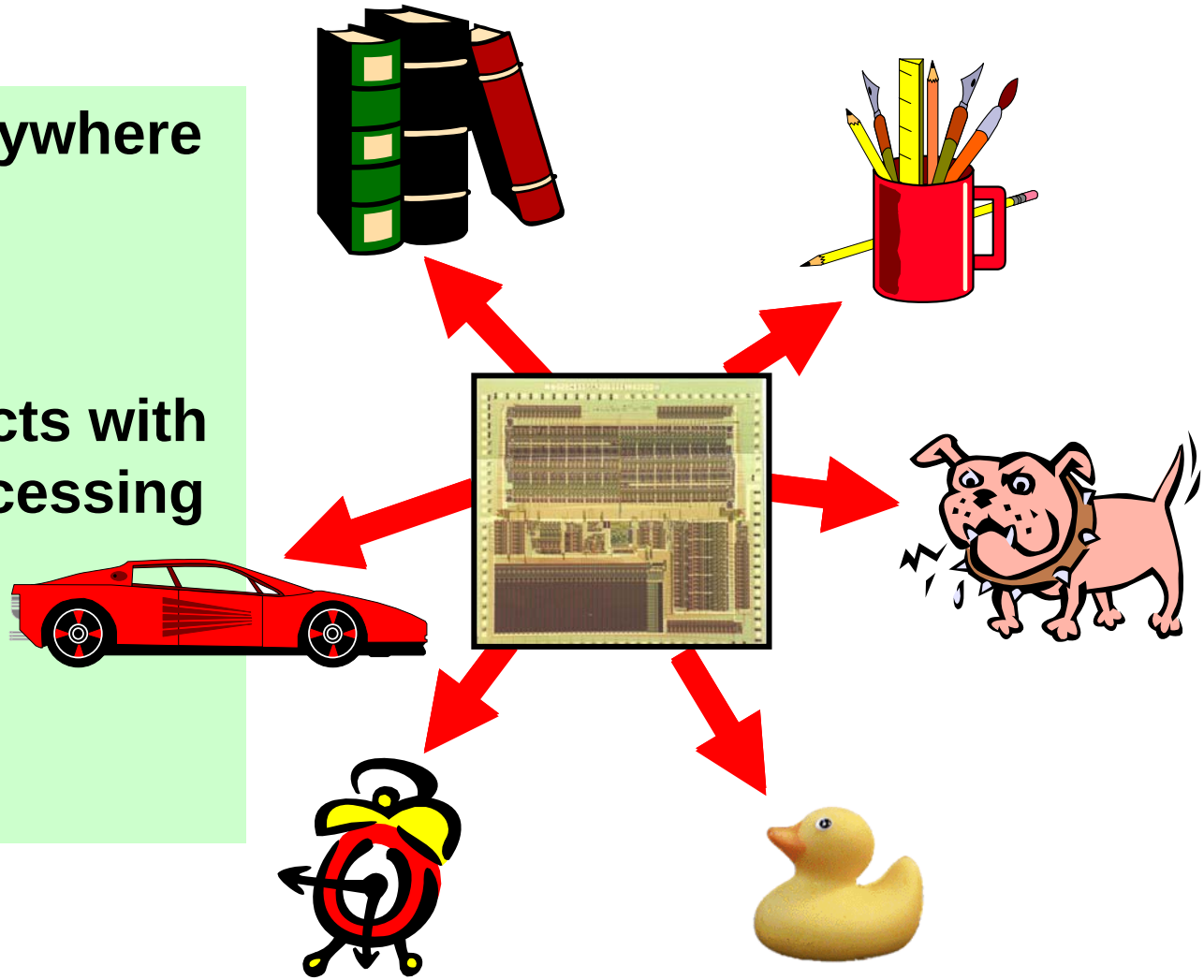
Source: IP-on-Air project; TU München and Siemens

Direct Vehicle-to-Vehicle Communication



The future: Communicating Smart Objects

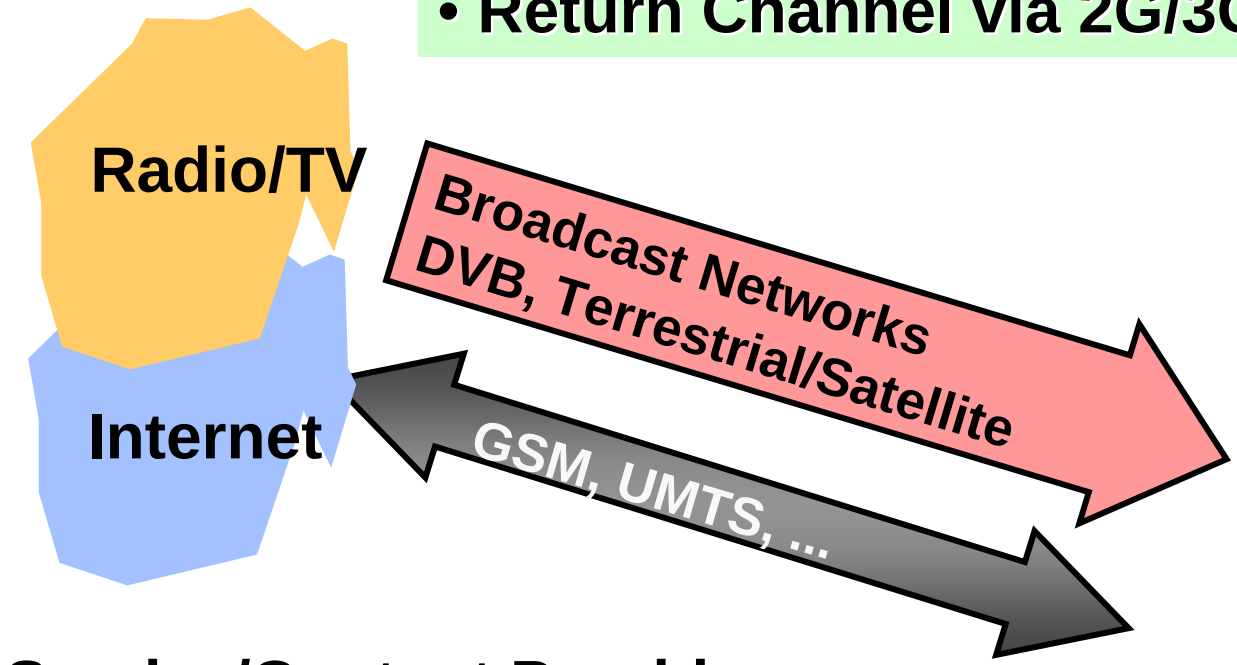
- Microchips everywhere
- Sensor-based
- Real-world objects with information processing features
- Wireless communication



Source: Mattern, ETH Zürich

Using the digital Broadcast Network for Internet Access

- Downlink: Digital Video Broadcast Channel
- Datacasting plus Audio/Video Distribution
- Return Channel via 2G/3G, if needed



Service/Content Provider

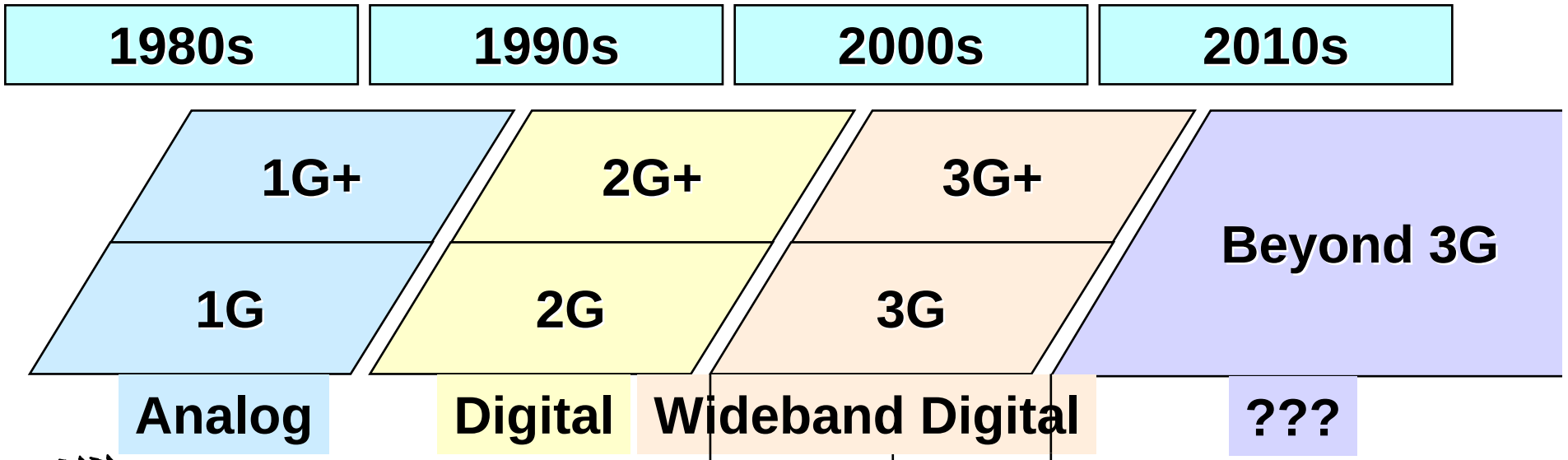
Mobile User

Requirements for Future Mobile Networks

3G and WLAN will not be the end. We need...

- Speed at the air-interface >> 1 Mbit/s
- Better Quality-of-Service
- New Multimedia Services
- Personalisation and Adaptivity
- Fixed-Mobile Convergence
- Support of Heterogeneous Networking
- Higher Level of Security
- Easy to Use
- Shorter Development Cycles
- … and a lot more

The Race is on towards „Beyond 3G“



Source: WWRF

European Research Programmes (Public Sector)

- 5th framework (ongoing)
- 6th framework (in preparation)
  - Large Joint Projects (Integrated Projects IP)
  - Networks of Excellence NoE
- National initiatives in all countries
- Germany
  - BMBF (UMTS extensions, IP-on-Air, …)
  - National Research Foundation (Post 3G, Ad Hoc…)
  - Countries („Länder“) Programs (UMTS Services,…)
- Mostly strong industry involvement

Conclusion and Outlook

- 2G/2.5G has yet good market growth
- 3G/UMTS will be deployed later in the year 2003
- Multimedia and new data services as drivers
- WLAN complementary/competitive to cellular
- Research and planning for „B3G“ has started
- Global joint approach needed
- This symposium will be a step to make the future of mobile communications successful!

Our Symposium:
Mobile Communications and Society

Sessions:

- **Mobile Communications: from Today to Beyond 3G**
- **Broadband Content Delivery and Mobile Multimedia**
- **Ketai („Handy“) and Human Aspects**
- **Business Models, Markets and Services**

Our Symposium

Thanks to all the people who have prepared this symposium so well!

Among others:

Prof. Aoyama

Dr.. Tachikawa

Dr. Mochida

Prof. Thielmann

Our Symposium

Thank you for your attention!