



Mobile Netze zur Datenübertragung

3. Generation: Technologie UMTS Teil 3

(Universal Mobile Telephone Service)
Prof. Dr. -Ing. Klaus Rebensburg



UMTS™ by ETSI™ / ITU's IMT-2000 framework:

- Data speeds of up to 2 Mbps (portable videophones)
- Target: Mass market for highly personalised and user friendly mobile access to the Information Society.

UMTS builds on and extends the capability of today's mobile, cordless and satellite technologies

- by providing increased capacity, data capability
- + a far greater range of services
- using an innovative radio access scheme and an enhanced, evolving core network



Charakteristika von UMTS

- UMTS = Teil der Vision der ITU eines globalen Standards für die 3. Generation des Mobilfunks (IMT-2000)
- Kombination von zwei Standardisierungs-Ansätzen für Multiple Access CDMA(Code) und TDMA(Time)
- Datenübertragungsraten:
 - bis 384 kbit/s unterwegs
 - bis zu 2 Mbit/s zu Hause / am Arbeitsplatz
- Qualität der Dienste ist vergleichbar mit ISDN
- Heutige Mobilfunkdienste werden weiterhin unterstützt
- Globales Roaming
- Anwendungen im Bereich Internet / Intranet-Zugang,
- Mobile Multimedia-Anwendungen aller Art



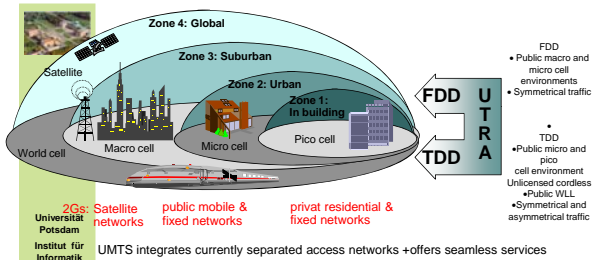
No "versus" of IP and ATM



- Layer 2: ATM**
 - key benefit in backbone: multi-service platform (supports IP, Frame Relay, ...)
 - introduced in UTRAN, AAL2 is a new solution for voice over ATM
 - Consequence:
 - all applications on top of ATM (e.g. voice over AAL2),
 - below ATM different physical layers (e.g. PDH, SDH)
 - Layer 3: IP**
 - emerging key technology for the mobile data applications market (GPRS)
 - IP is the key for the mega merger: Mobile Communication and Internet
- IP and ATM will be beneficially used together**
IP is coming into PLMS anyway, ATM will fruitfully support that

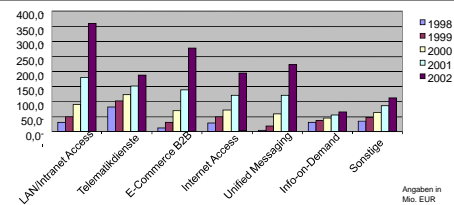


User environments and their UTRA modes





Umsatzentwicklung mobiler Breitband-Dienste nach Anwendungsbereichen



Die wichtigsten Anwendungen zu Beginn sind die, bei denen die Inhalte durch den Anwender selbst produziert oder vorgehalten werden. Die Vermarktung vorproduzierter Inhalte ist eng an die Existenz eines Massenmarkts geknüpft.



Blick in die Zukunft

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- Neue Terminals
- IP basiert

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Vision GSM

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3GIG (3G Interest Group)

- The GSM MoU's Third Generation [Interest Group](#) (3GIG) propose a gradual evolution of current cellular technology like GSM - and it's cousin systems - PCS 1900 in the US and DCS 1800 in Europe - towards what is now being called [UMTS](#), or Universal Mobile Telecommunications System.
- A political mandate has already been given by the European Parliament to establish a [UMTS](#) Forum as the central body charged with the elaboration of European policy towards the implementation of [UMTS](#) and based on industry-wide consensus.

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Visionen 2

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Global Roaming

UMTS, as a Third Generation System promises a wide range of personal mobility features using a multimedia-like phone. Some of the new features promised with the new devices include

- home shopping
- interactive education and training with virtual reality support
- navigation, multi-media multi-party consultation
- entertainment, multi-connection surveillance
- information seeking and retrieval
- communicating laptop PCs and video communication.

It also promises to standardize cellular technology around the world, so that your phone will be just as useable in another corner of the world as it is in your home or office. International roaming is already a reality, but UMTS takes it one step further - to Global Roaming.

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Mobile Satellite Systems

Here's where the new generations of Mobile Satellite Systems (MSS) like Globalstar come in. MSS satellites have been launched and promise digital voice, data and SMS coverage to users on most parts of the globe using handsets not that much larger than current GSM cellphones. The idea is that Third Generation phones that can work on both Globalstar and GSM would allow a user to automatically connect to a Globalstar satellite whenever they are out of GSM range, and back to GSM when in range of the GSM network. This satellite "roaming" will however require special dual phones that will only be available sometime around 1999.



DECT & GSM

- Integration of cordless phones in homes or offices with cellular networks to ultimately dispense with the need for a cellphone and a fixed-line phone.
- This convergence would mean that the phones in an office/home would connect to cordless phone-like base station when in the office/home, and then when the user moves out of this environment, then connect to a cellular network.
- The user would then only need one telephone number - and only one phone. Already Ericsson have unveiled a prototype system using a phone that auto-switches between a digital cordless telephone phone standard called DECT, and GSM.
- One of UMTSs' main goals in fact is that there will always be a path to it from existing 2nd-generation digital systems like GSM 900, DCS 1800 and DECT.



Built-in LCD colour screens

- The phones and networks promise high-speed data transmission - up to 1000x faster than current systems - which could even allow video conferencing from cellphones using built-in LCD colour screens and mini-cameras. The phone could in fact become a lightweight multi-media terminal that could even view movies-on-demand.
- The Japanese have already demonstrated a rather bulky prototype version using their PHS cellular system. The high speeds will have a significant impact on mobile office users who no longer need to suffer relatively slow GSM speeds.



Upgradeable Phones

- Third Generation cellular phones will also be upgradeable over the air to allow more internal features to be added without the need for going into a workshop.
- When roaming, a user will also be able to use the settings, keyboard shortcuts, and commands they normally use on their home network.
- The user interface will be completely customizable, so that even if your swap phones, you'll still have the same menus and numbers.
- Last but not least, the new generation phones will be under 100g, and have more than 10 days standby time.

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Terminals of the Future:

Swatch Talk - a swatch mobile phone

„...fashion accessory that happens to tell time“



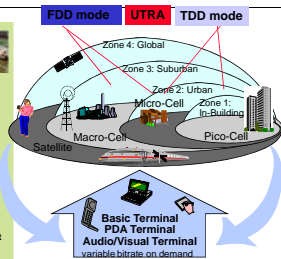
Wrist PC (things to wear- activity at MIT)

Foldable screens by electrophoretic foils, the electronic newspaper* projections directly in the eye



acceptance of applications depends on size, shape and performance of terminal

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UMTS will offer access methods that are currently served by dedicated systems:

- cellular public networks
 - cordless for domestic use
 - cordless terminal mobility
 - wireless PABX
 - wireless LAN
 - wireless local loop
 - private mobile radio
 - mobile data networks
 - paging networks
 - satellite systems
- => access anytime, anywhere

Positioning parameters for future service providers

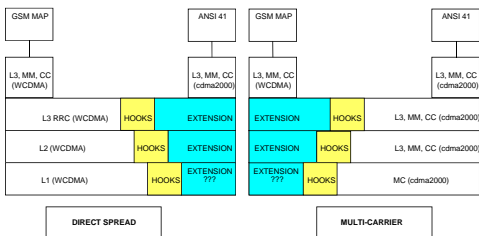
- private ... public
- local coverage ... global coverage
- low mobility ... high mobility
- low data ... high data
- basic services ... multi-media services

UMTS will enhance capacity due to high spectrum efficiency and will support flexible bandwidth on demand in all environments.



Harmonization Approach Operator Harmonization Group

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Kolloquium Buzzwords ff.

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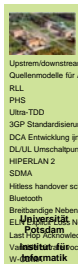


- M MSE channel estimation
- M SDO Multi-step-pair-detection
- Code polling
- Blind, semiblind estimation
- Projection based Subspace Tracking
- Stochastic Beamforming
- SDR Software defined Radio
- SCMT
- OFDM
- DVB-T
- DAPS-K Modulation
- AMR Codec
- Intersymbolfrei
- Softbit Sprachcodierung für den AMR Codec
- GPRS, EDGE im Zusammenhang mit GSM und UTM5
- CELP Struktur basierte Codes
- Kanalkodierer (Turbo Codes)
- INVINET, COMCAR in UTM5

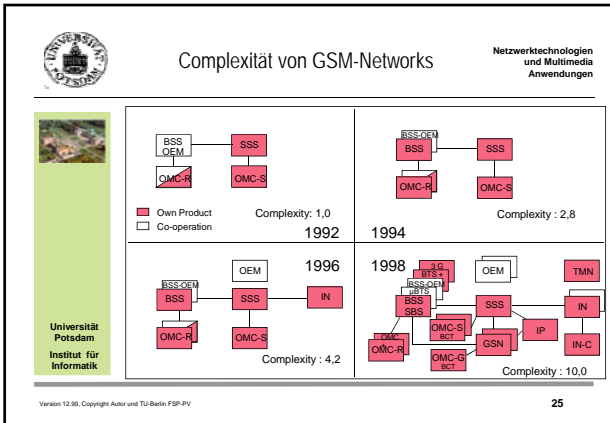


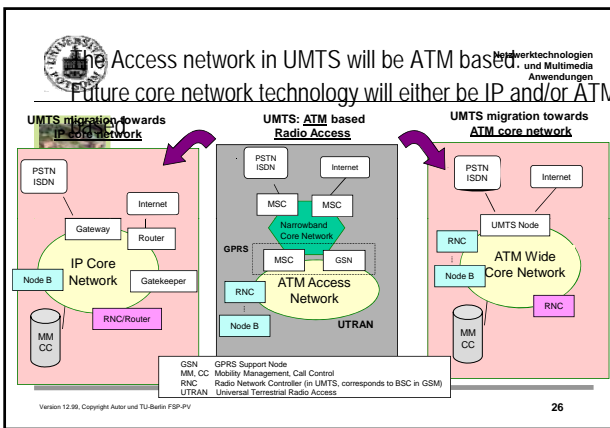
Kolloquium Buzzwords

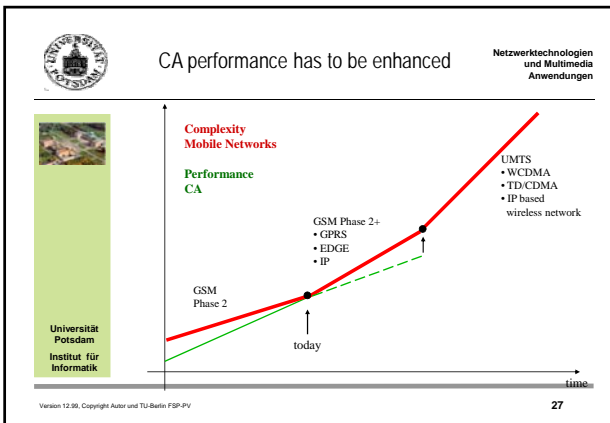
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- Upstream/Downstream beiber
- Quellenmodelle für ATM Klassen
- RLT
- PHS
- Ultra-TDD
- ISIP Standardisierung
- DCA Entwicklung in GSM
- DLUL Umschaltpunkt (SP) ist variabel
- HIPERLAN 2
- SDMA
- Hilless handover scheme based on OAM-like inband signalling
- Bluetooth
- Erweiterte Nebensendungen in CDMA Systemen
- z. Universität
- Universität Potsdam
- Lehrstuhl für Informations- und Kommunikationstechnik
- Universität Potsdam
- Institut für Informatik
- RAKE, SIMO Single Multi Inputs?








Verschiedenes ff

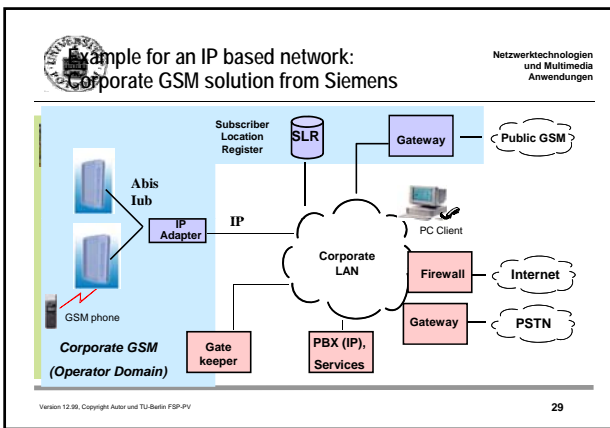
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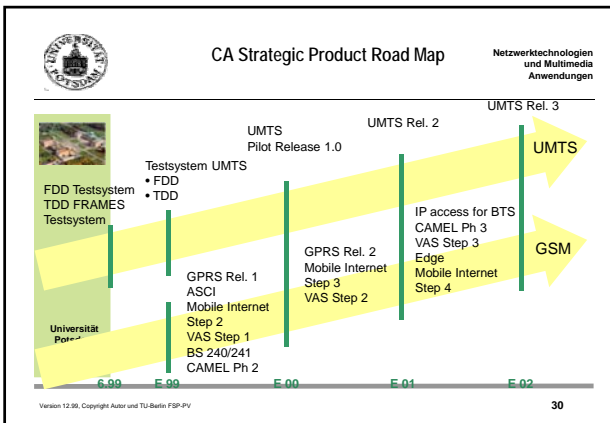


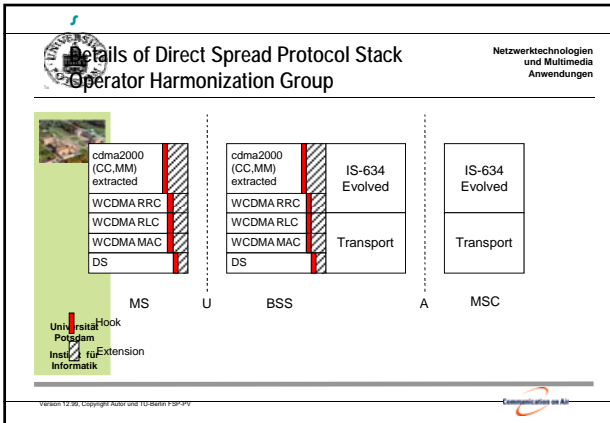
SOVA Soft-in - Soft-out decoders
 FDD, TDD Modus
 SIR Targeter für Speech- und UDD Dienste
 FDE for OFDMA () Frequ domain equalization for OFDMA
 Space-time codes

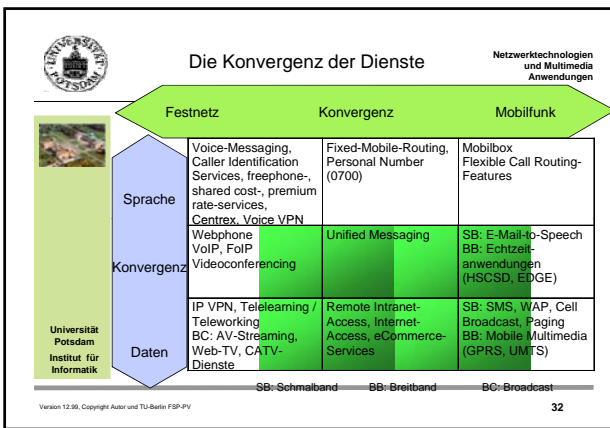
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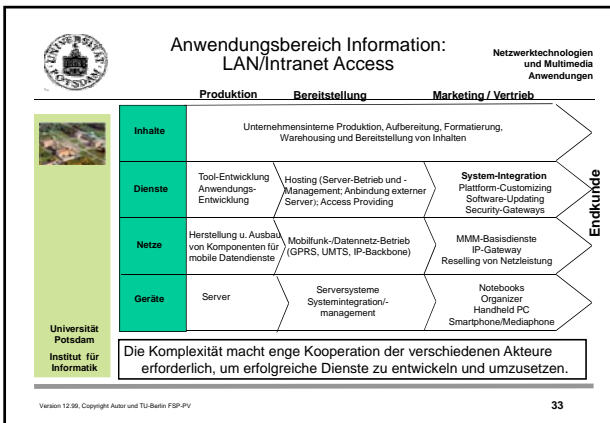
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UMTS integrated core node solution
 Upgrade of SIEMENS GPRS and MSC (SSNC based) nodes possible to U-MSC

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Characteristics:

- 2 protocol instances on one physical Iu interface
- In RNC discrimination of cs and ps
- separated procedures cs + ps
- separated signalling messages cs+ps
- packet-switched mobility management
- circuit-switched mobility management

Benefits:

- Secures investment in SIEMENS 2G nodes
- Interworking with vendors who only support separated node concept possible
- Reduce number of physical Iu interfaces to UTRAN
- Reduce number of physical MAP interfaces
- Common O&M and billing (charging tickets)
- Reduced number of network nodes

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Smooth upgrade from GSM to UMTS

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Upgrading SIEMENS GSM nodes to UMTS
 Siemens One Platform concept gives optimal flexibility

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SIEMENS recommended solution

Securing your 2G investment by upgradeability

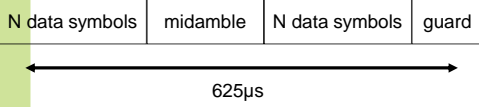
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TDD burst structure



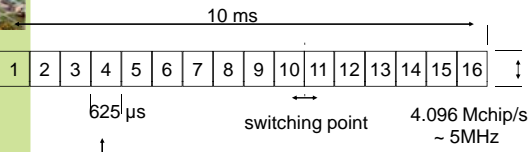
one time slot:



midamble sufficient to estimate at least 8 radio channels



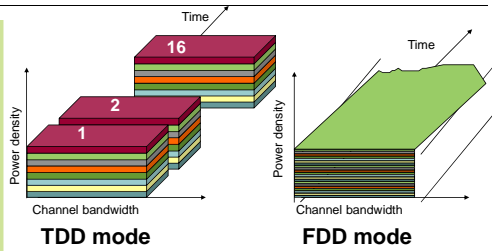
TDD frame structure



single slot burst structure



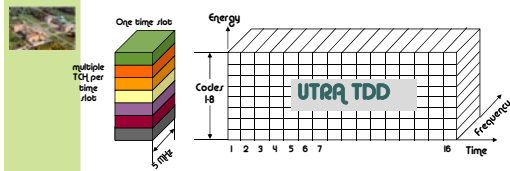
UTRA modes



Both with harmonised bandwidth, chiprate and pulse shape



TDD channel structure

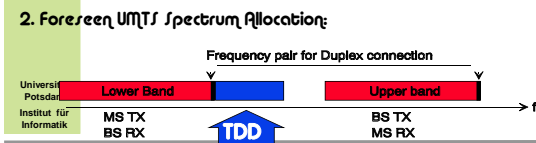
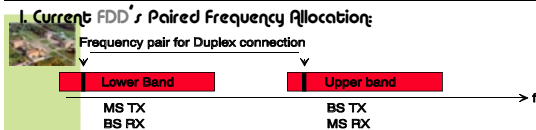


Merge of benefits:

- CDMA provides interference control and high system capacity
- TDD provides Fair Power Control Free operation
- TDD provides asymmetrical data transfer



UTRA use of spectrum





UTRA-TDD mode Asymmetrical traffic handling

