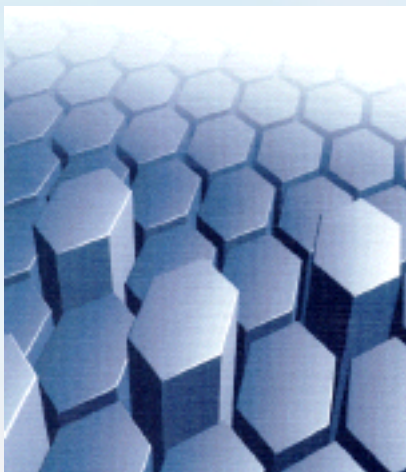


# Mobile Communications Beyond 3G in the Global Context

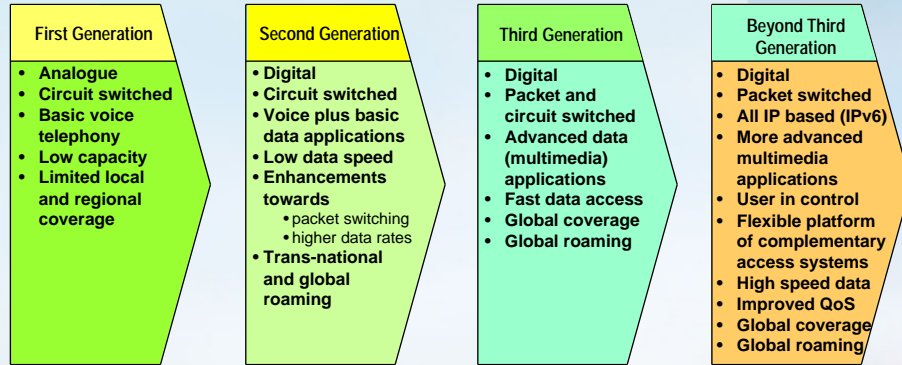
Werner Mohr  
Munich, Germany

## Outline



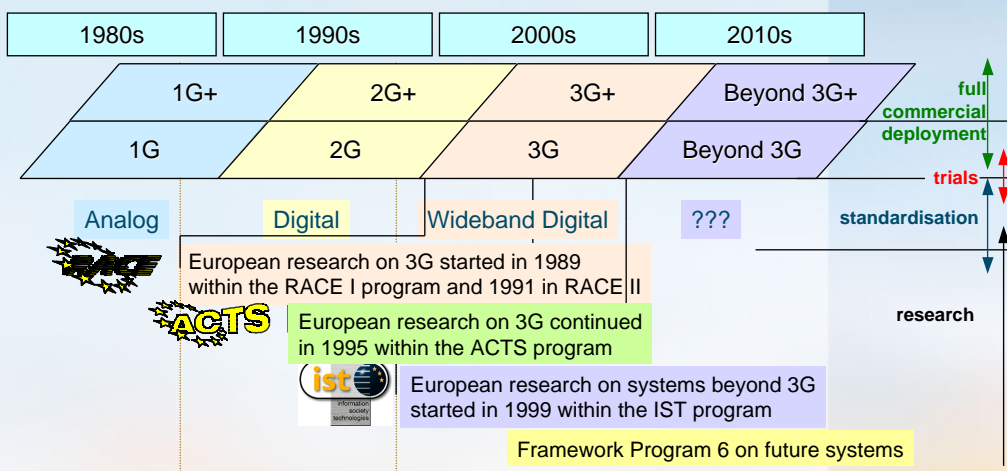
- Introduction
- Vision for systems beyond third generation
- WWRF
- Conclusions

# Paradigm shift from 1st generation towards beyond 3G



Wireless data already be introduced in second generation mobile

# Evolution of mobile communication systems

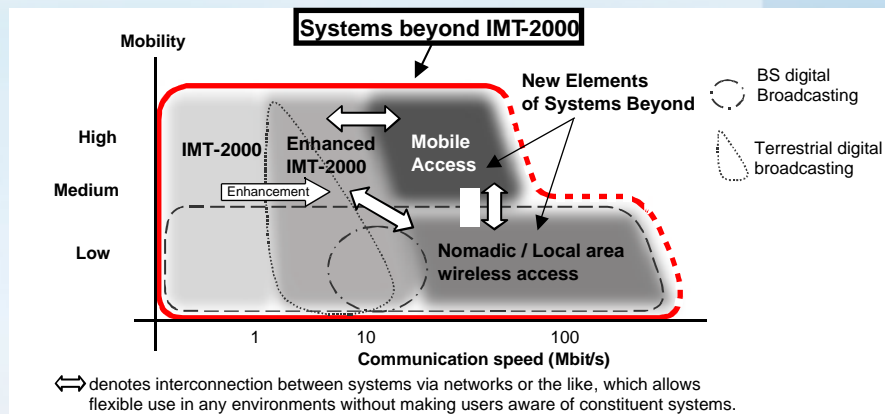


## MultiSphere Level Concept



Source: IST WSI Project

## Agreed position on system capabilities for Systems Beyond IMT-2000 (7th ITU-R WP8F meeting)

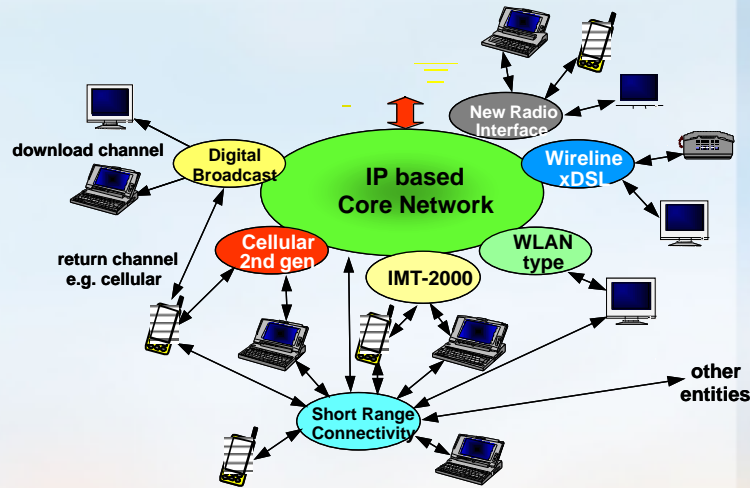


ITU-R WP8F position on systems beyond IMT-2000 includes complementary mobile systems

Source: ITU-R WP8F, 7th Meeting, Queenstown, February 27 - March 5, 2002, TEMP 251r1e

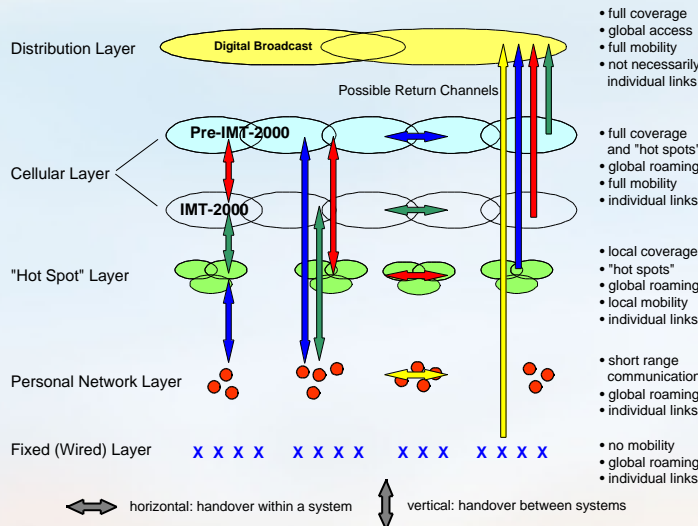
# Vision of Wireless Communications beyond 3G

## Seamless network of complementary access systems



Source: ITU-R WP8F, 7th Meeting, Queenstown, February 27 – March 5, 2002, TEMP 251r1e

# Layered system structure beyond third generation



Source: ITU-R WP8F, 7th Meeting, Queenstown, February 27 – March 5, 2002, TEMP 251r1e



# WWRF - Wireless World Research Forum




- WWRF launched on August 14, 2001
- Founding members:
  - 
  - 
  - 
  - 
  - 
- Membership (status beginning of April 2002)
  - 86 members
  - 27 manufacturers
  - 13 operators
  - 46 universities, Research Centres and SMEs from America, Asia, Australia and Europe
- Web site:
  - [www.wireless-world-research.org](http://www.wireless-world-research.org)

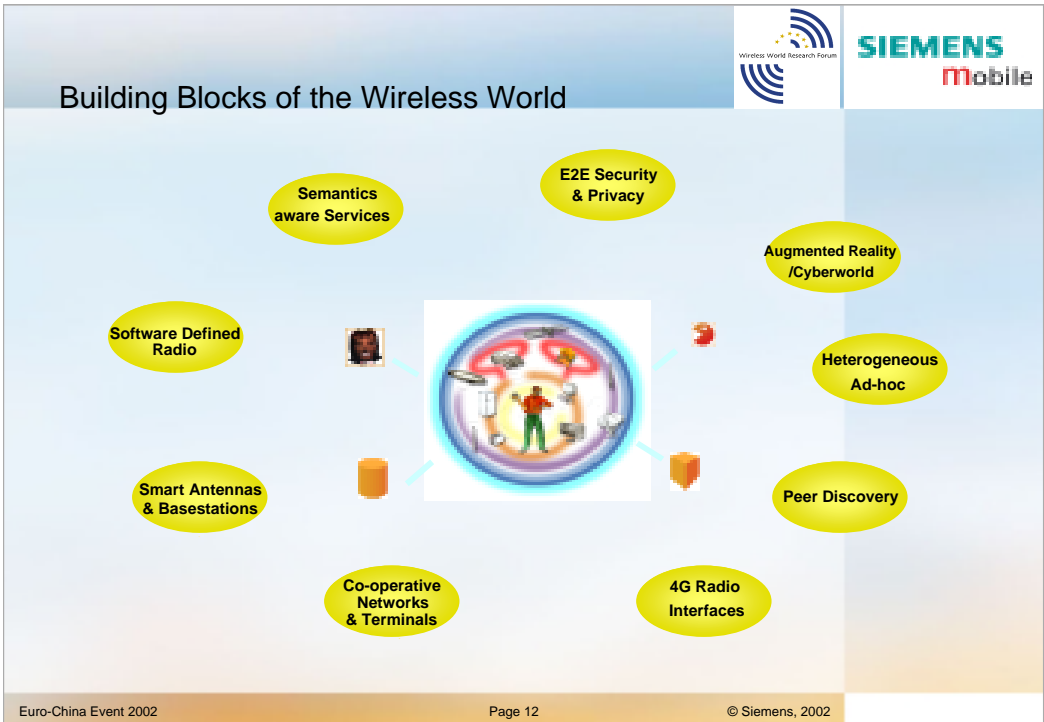
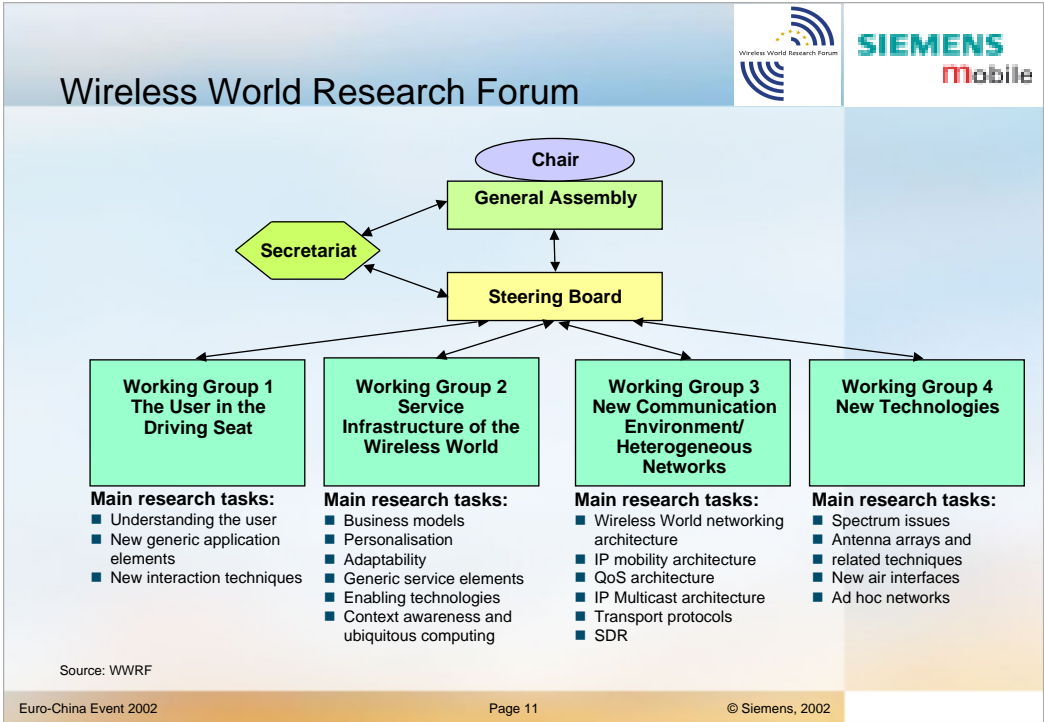
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Page 9
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# Objectives and Scope

- Major objectives
  - to contribute to the vision of the Wireless World
  - to develop and maintain a consistent vision of the Wireless World
  - to generate, identify, and promote research areas and technical and society trends for mobile and wireless systems towards a Wireless World
  - to identify and assess the potential of new technologies and trends for the Wireless World
  - to contribute to the definition of international and national research programmes
- Scope
  - concentrate on the definition of research relevant to the future of mobile and wireless communications, including pre-regulatory impact assessments
  - WWRF is not a standardisation body
  - invite world-wide participation and is open to all actors

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## The 4G context outside WWRF

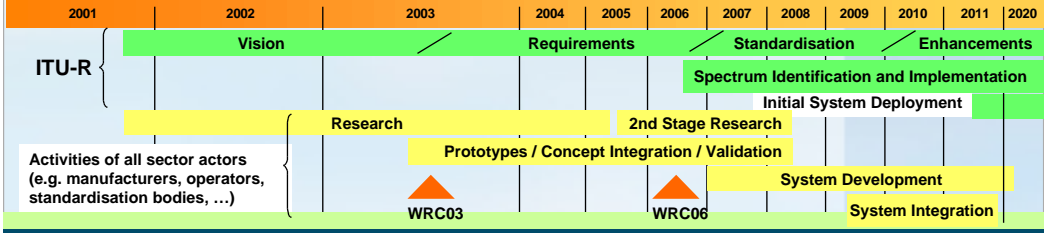
- Relevance of systems beyond 3G is demonstrated by other international bodies
- Bodies, focussing on entire system
  - ITU-R WG8F, ITU-T SSG
  - Japanese TCC report and plans for 4G concept, mITF
  - Cluster on systems beyond 3G (IST)
  - 4G mobile forum in the context of IEEE
- Chinese activities in Research Program 863
- Bodies, focussing on particular technologies (examples)
  - SDR forum
  - OFDM forum
  - IPv6 forum
  - ASMS (advanced satellite mobile systems)

Source: WWRF

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## The Global 4G Context



### WWRF Milestones & Activities for 2001 and Beyond

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2020
Preparation of the BoV 2001	[Bar from 2001 to 2002]											
System Concept & Reference Model Definition	[Bar from 2001 to 2003]											
Definition of Research & Communication Framework / Identification of Interfaces	[Bar from 2001 to 2004]											
Further activities are to be defined ...	[Bar from 2001 to 2006]											

- ◆ 1 • BoV 2001 published
- ◆ 2 • Initial system concept & reference model established for research + publication of specific topic reports
- ◆ = Milestone

- ◆ 3 • Initial WWRF research framework established and communicated to national & international research programmes and relevant standardisation bodies + Publication of specific topic reports

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## Conclusions

Applications are key success factors for 2.5 and 3G and beyond systems

Paradigm shift from 1G to 2G, 3G and beyond from analog voice to digital multi media with better throughput and packet access

- Wide range of services to be supported in all radio environments:
  - voice
  - low rate up to high rate symmetric and asymmetric data services
- Integration of different complementary access systems on common IP-based network including horizontal and vertical handover as system beyond 3G
- Challenges on
  - frequency demand
  - economic deployment
  - signal processing power
  - services and applications
- Global research cooperation needed
- WWRF invites participation from China in these future developments