Wireless World Research Forum

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Conclusions on WWRF

- Global platform to initiate global cooperation towards future wireless world
- Vision from user perspective -> requirements for the enabling technologies
- Unique way of active cooperation within and between industry and academia
- Reduce risk for investment in research
- Ease future standardization through globally harmonizing views
- Proven history of creating large scale research cooperation and facilitating funding
- Open to all actors

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Outline

- **WWRF objectives and workplan**
- WWRF membership and structure
- WWRF vision and approach
- Conclusions

WWRF - Objectives and scope

- Major objectives
  - 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 programs**
- Scope
  - concentrate on the **definition of research items** relevant to the future of mobile and wireless communications, including pre-regulatory impact assessments
  - invite world-wide participation and is **open to all actors**
- WWRF provides a global platform for discussion of results, exchange of views to initiate global cooperation towards systems beyond 3G

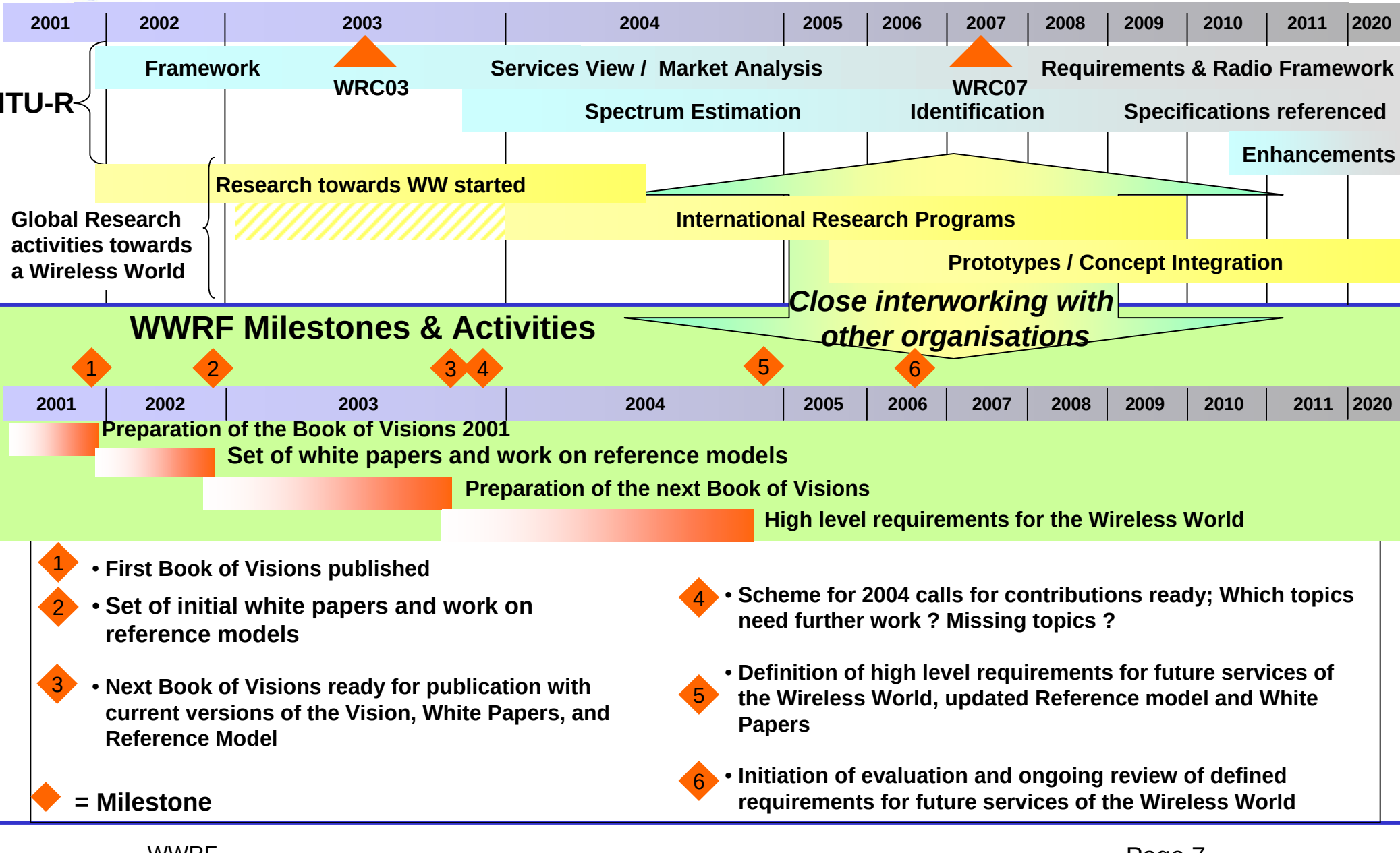
The WWRF Mission

- Our goal is to contribute to making the wireless market a vibrant growing global market, providing new opportunities for success for all sector actors
- Our long term strategy is to ease future standardization and hence develop global markets for products & services, through
  - **harmonizing views** on future market requirements, at the research stage of the process of investigating topics for future systems and services
  - **building collaboration** between academia and industry and between converging industry sectors
  - jointly **developing** commonly agreed research **priorities**
  - **disseminate** and promote that the WWRF results are contributed into relevant input results to standardization bodies
- The Motivators of WWRF for the Academia and Mobile Industry are to
  - define a platform for **publications**
  - act as a platform for **networking**
  - find **funding** opportunities
  - act as platform for exchanging views and promote **consensus prior to standardization -** thereby **reduce risk for investment** in research
  - open exchange of ideas

Deliverables

- Input: Contributions to meetings and working groups
- Output deliverables:
  - White Papers on different topics
  - Book of Visions, new edition submitted for publication
  - IEEE Communication Magazine theme issue
  - Book publications together with e.g. IEEE Press

Global context towards the Wireless World



1 • First Book of Visions published

2 • Set of initial white papers and work on reference models

3 • Next Book of Visions ready for publication with current versions of the Vision, White Papers, and Reference Model

◆ = Milestone

4 • Scheme for 2004 calls for contributions ready; Which topics need further work ? Missing topics ?

5 • Definition of high level requirements for future services of the Wireless World, updated Reference model and White Papers

6 • Initiation of evaluation and ongoing review of defined requirements for future services of the Wireless World

WWRF meeting schedule for 2004

WWRF 8th bis Meeting	February 26-27	Beijing, China MOST/HTRDC Future project
WWRF 11th Meeting	June 10-11	Oslo, Norway Telenor Research

call for trends and visions
scenarios, project posters
theme: services and applications roadmaps in different areas, like automotive

WWRF 12th Meeting	November 4-5	Toronto, Canada Bell Canada, Nortel Networks

International relations

- Liaison agreements with
  - UMTS Forum, signed on January 30, 2003
  - mITF, Japan, signed on May 30, 2003
  - IEEE ComSoc, signed October 29, 2003

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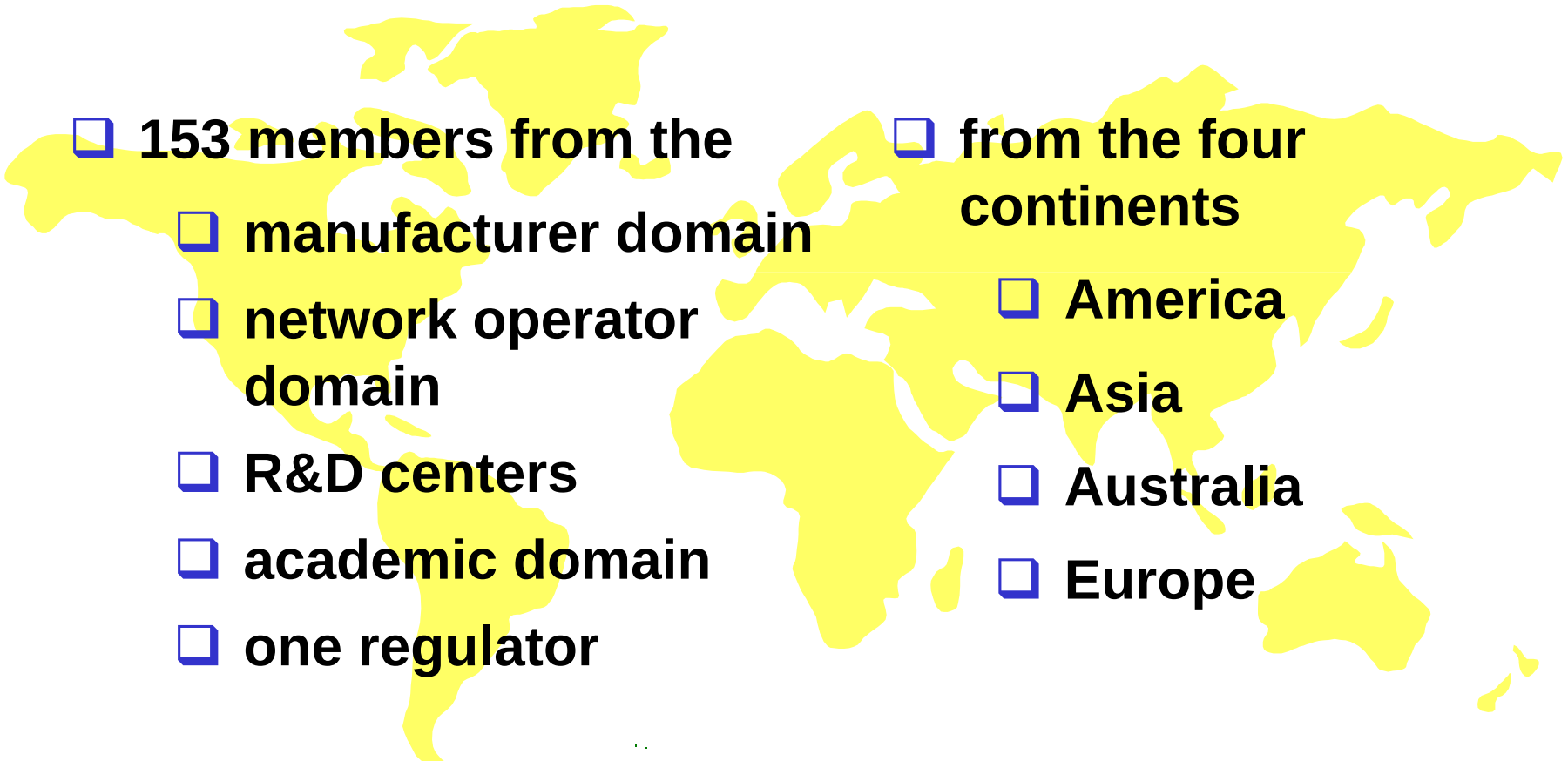
WWRF membership 3/2004

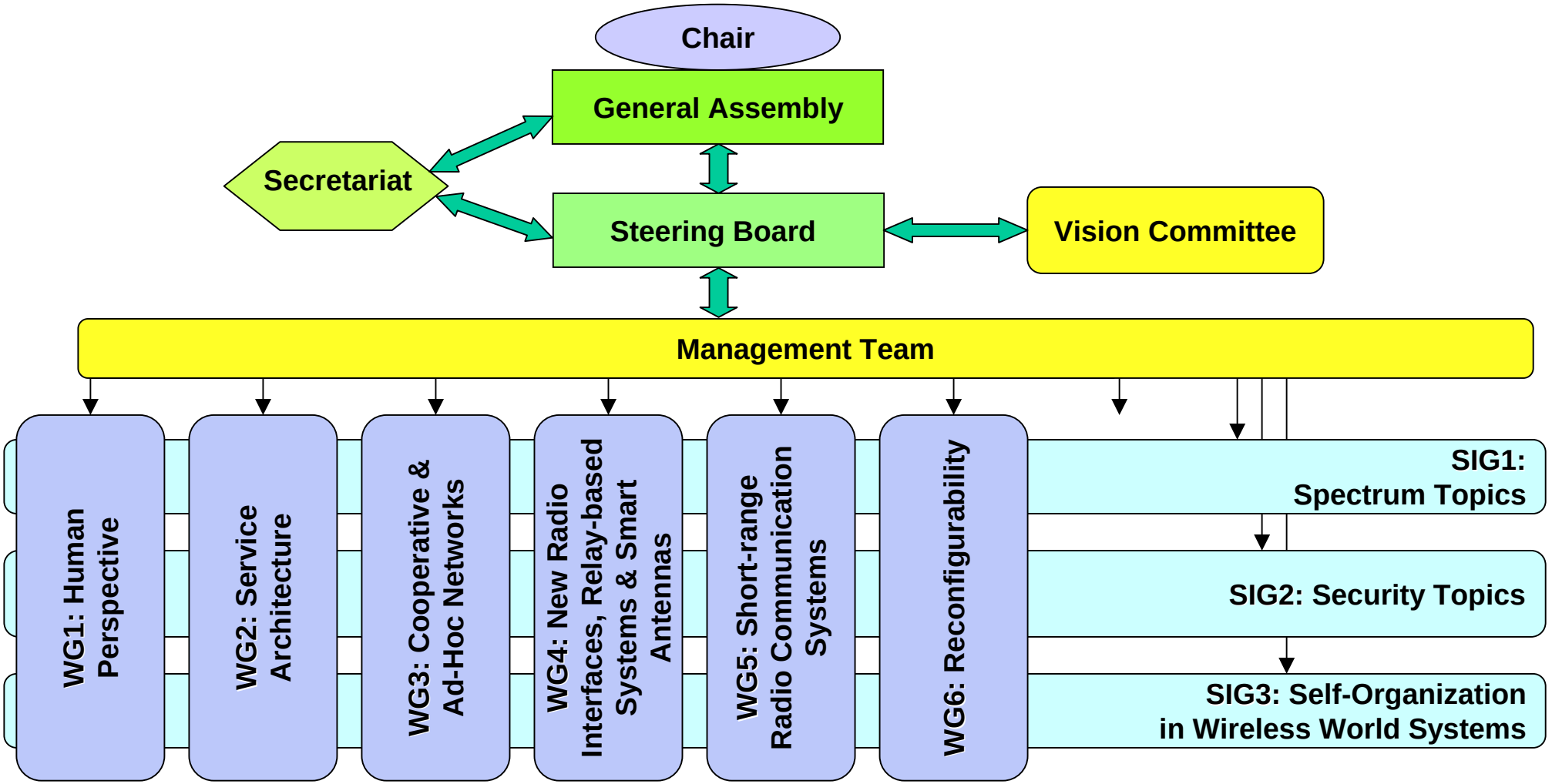


- 153 members from the
  - manufacturer domain
  - network operator domain
  - R&D centers
  - academic domain
  - one regulator
- from the four continents
  - America
  - Asia
  - Australia
  - Europe

Sponsor members and WG Chairs

- Sponsor members:
  - Alcatel
  - Bell Mobility
  - Ericsson
  - EURESCOM
  - France Telecom
  - IBM
  - Intel
  - LGE
  - Lucent
  - Motorola
  - NEC
  - Nokia
  - Nortel
  - Philips
  - Raytheon
  - Samsung
  - Siemens
  - Sony
  - Vodafone
- Working Group Chairs
  - WG1: University College London, UK
  - WG2: Fraunhofer Fokus, Germany
  - WG3: RWTH Aachen, Germany
  - WG4: Carleton University, Canada
  - WG5: University of Dresden, Germany
  - WG6: University of Piraeus, Greece
  - SIG1: Nokia, Finland
  - SIG2: Vodafone, UK
  - SIG3: NEC, Germany

WWRF structure



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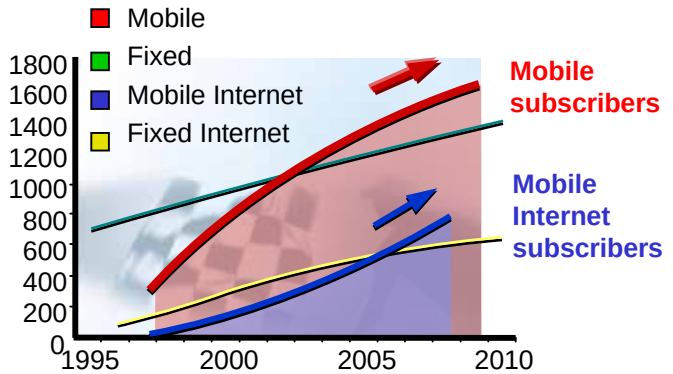
The major trends at a glance

- Advance of the Internet
  The Internet became a mass medium and IP the leading network protocol.
- Advance of mobile communication
  Communication via mobile radio networks is increasing enormously.
- Bandwidth evolution
  The available bandwidth is exploding and the prices for bandwidth decrease dramatically.



Subscriptions worldwide (millions)

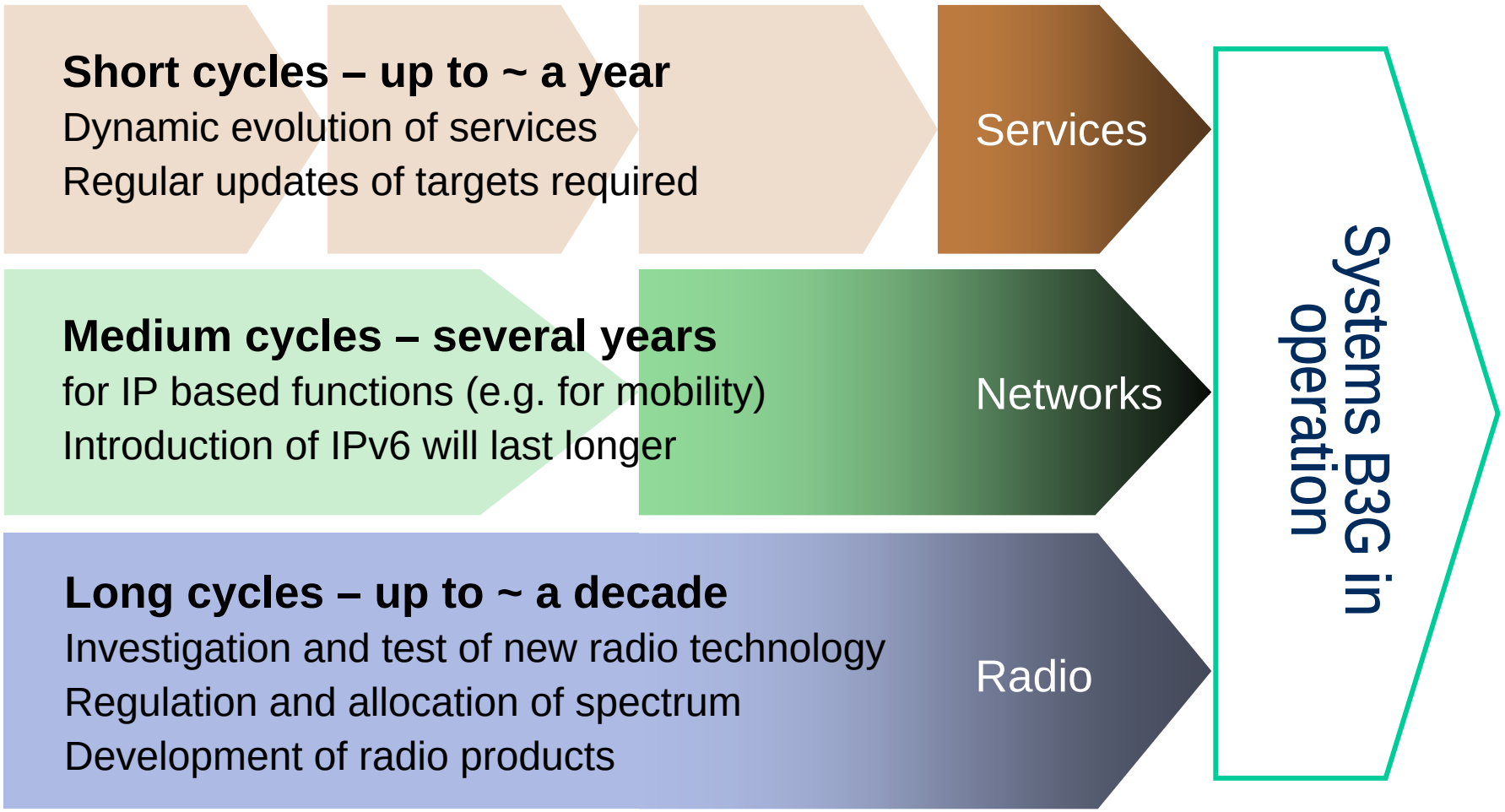
- Convergence of digital industries
  The converging digital industry brings together parts of consumer electronics, communication, information technology, media and entertainment industries.
- Advance of e-commerce
  E-commerce changes and amends business processes tremendously.
- Deregulation and globalization
  The I&C markets move fast.
  Competition and differentiation are driven by deregulation and globalization.
- Services and applications are key
  The end user is interested in services and applications only, the underlying technology is not relevant to him/her.

☞ Reduced cost/bit

Important questions

- WWRF intends to answer these questions:
  - How can advances in technologies be combined consistently in future systems?
  - What essential demand (user needs and market requirements) will a Wireless World address?
  - How can wireless communications become universally available for both people and devices/machines?
  - What business models will drive the Wireless World (what are the fundamental laws)?

Cycles of innovation



MultiSphere Level Concept

Systems beyond 3G will cover different communication relations

① The PAN

② The Immediate Environment

③ Instant Partners

④ Radio Accesses

⑤: Interconnectivity

⑥ CyberWorld

Source: IST WSI Project

Current key principles for WWRF vision

- Users are in control through intuitive interactions with applications, services and devices
- Services and applications are personalized, ambient-aware, and adaptive (I-centric) - ubiquitous from the point of view of the user
- Seamless services to users, groups of users, communities and machines (autonomously communicating devices) irrespective to place and network and with agreed quality of service
- Users, application developers, service and content providers, network operators and manufacturers can create efficiently and flexibly new services and business models based on the component-based architecture of the wireless world

Key aspects of the future wireless world

- Fulfilling user needs and enhancing user experience
- Ultra-high bit rates
- Ubiquitous coverage via heterogeneous access
- Low cost
- Machine-to-machine and sensor networks

Current White Papers

- WG1
  - Scenarios and analysis
  - Reference model
  - UI technologies and techniques
  - UCD process
- WG2
  - Terminology (basic terms for WG2)
  - Business Model
  - Personalization
  - Ambient Awareness
  - Adaptability
  - Generic Service Elements
  - Enabling Technologies
- WG3
  - Vision and Roadmap (cooperative networks)
  - Research Challenges and Priorities
  - Architectural Principles
  - Network Component Technologies for Cooperative Networks
- WG3+4+5
  - Ad Hoc Networking
  - Relay-based Deployment Concepts for Wireless and Mobile Broadband Cellular Radio
- WG4
  - Smart Antennas, MIMO systems
  - New Air Interface requirements and technologies
  - New Air Interface combining 'Broadband Multicarrier' and 'Mixed OFDM plus single-carrier'
- WG5
  - Ultra Wideband
  - Short Range Communications
  - Short range optical wireless communication
  - Wireless Internet
- WG6 (R = reconfigurability)
  - Scenarios, requirements and roadmaps for R
  - Networs supporting functionality for R
  - Network design, resource and spectrum management in R context
  - Element management and R protocols, cognitive radio in R context
- SIG1
  - Spectrum for Future Mobile Communications

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