ARIB's Activities On Mobile Communications

March 29th, 2005

Association of Radio Industries and Businesses (ARIB)

Outline of the Presentation

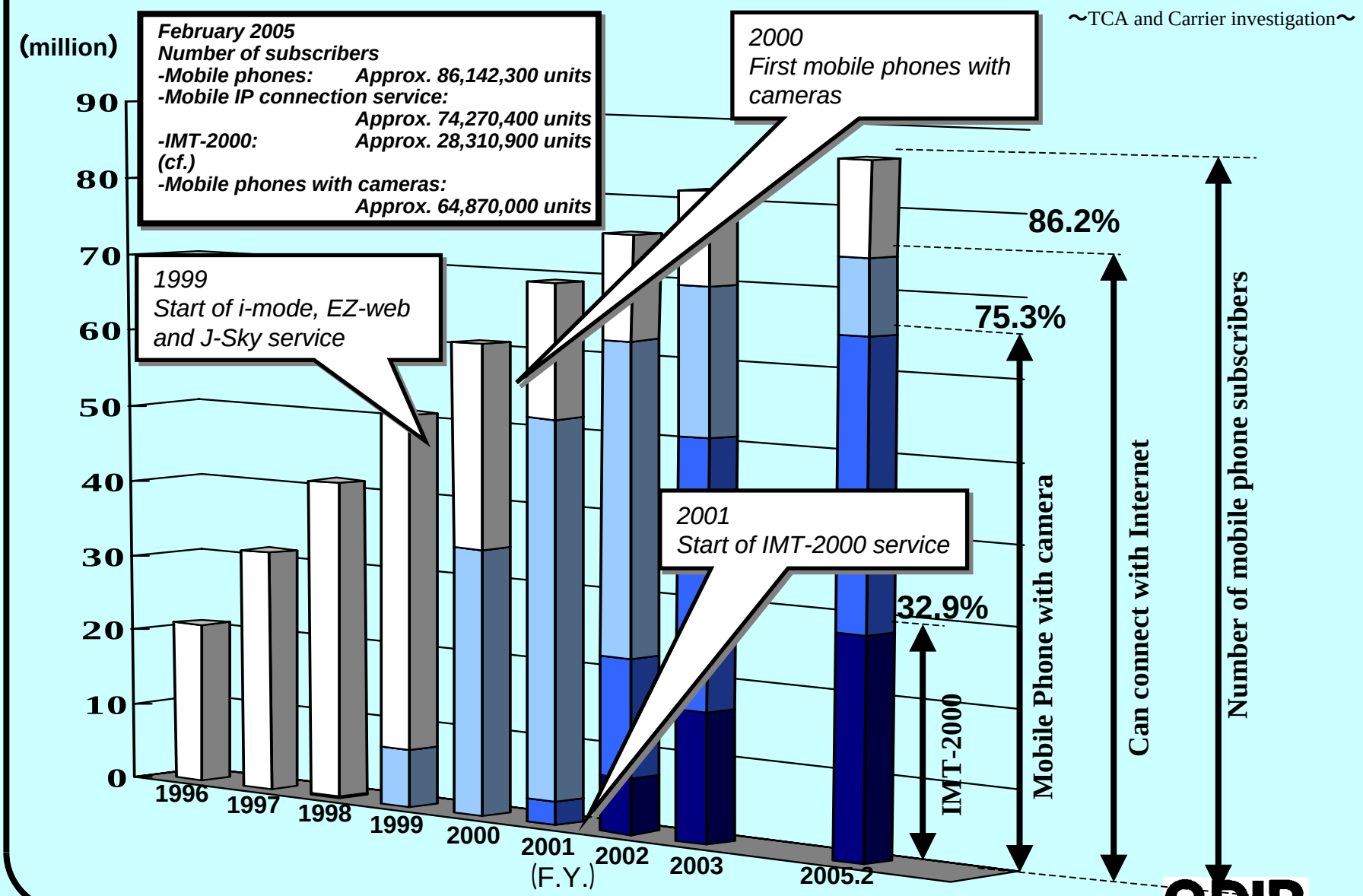
1. Japan's Cellular Market and Current Status of IMT-2000

2. Recent Activities on systems beyond IMT-2000
   - Outline of Mobile IT Forum
   - Activities of Fourth Generation Mobile Communications Committee

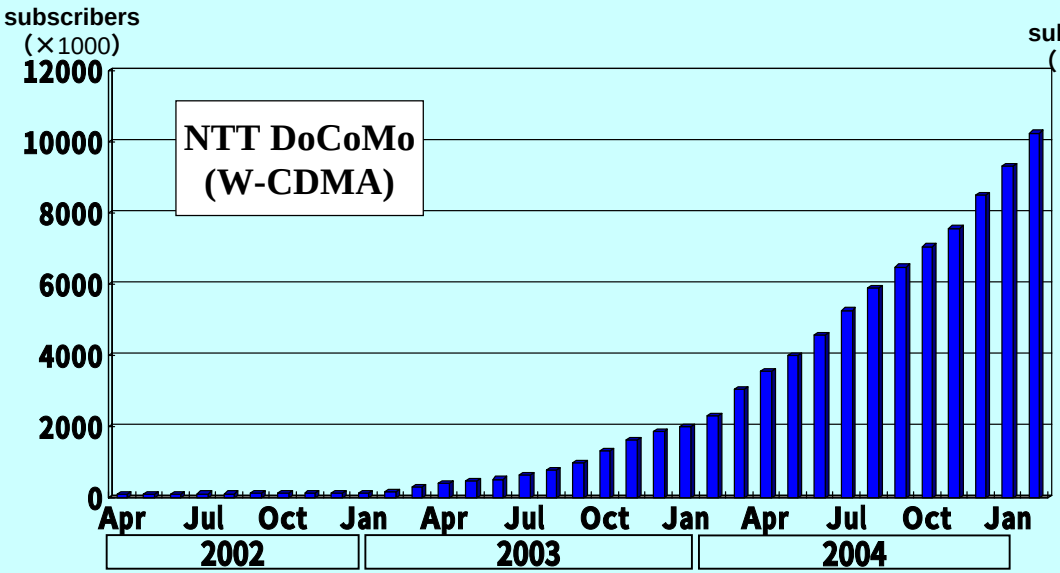
3. Wireless LAN and Wireless Access

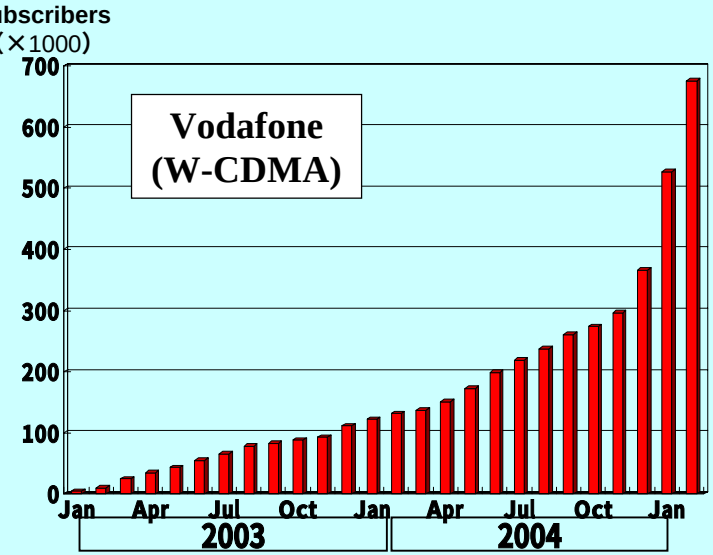
1. Japan's Cellular Market and Current Status of IMT-2000

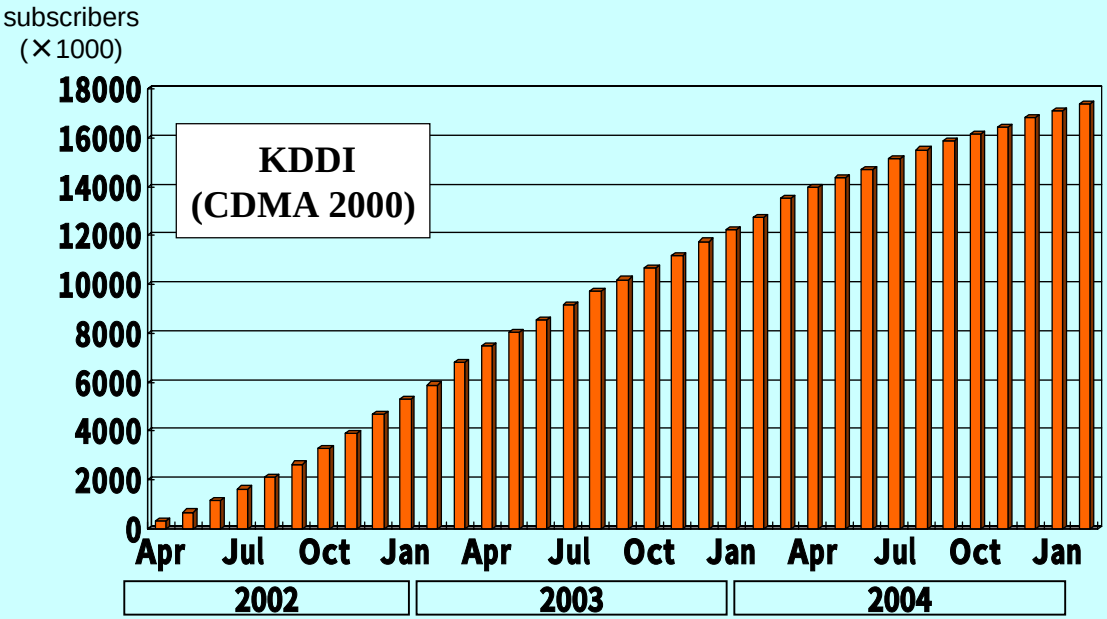
Mobile phone subscribers in Japan



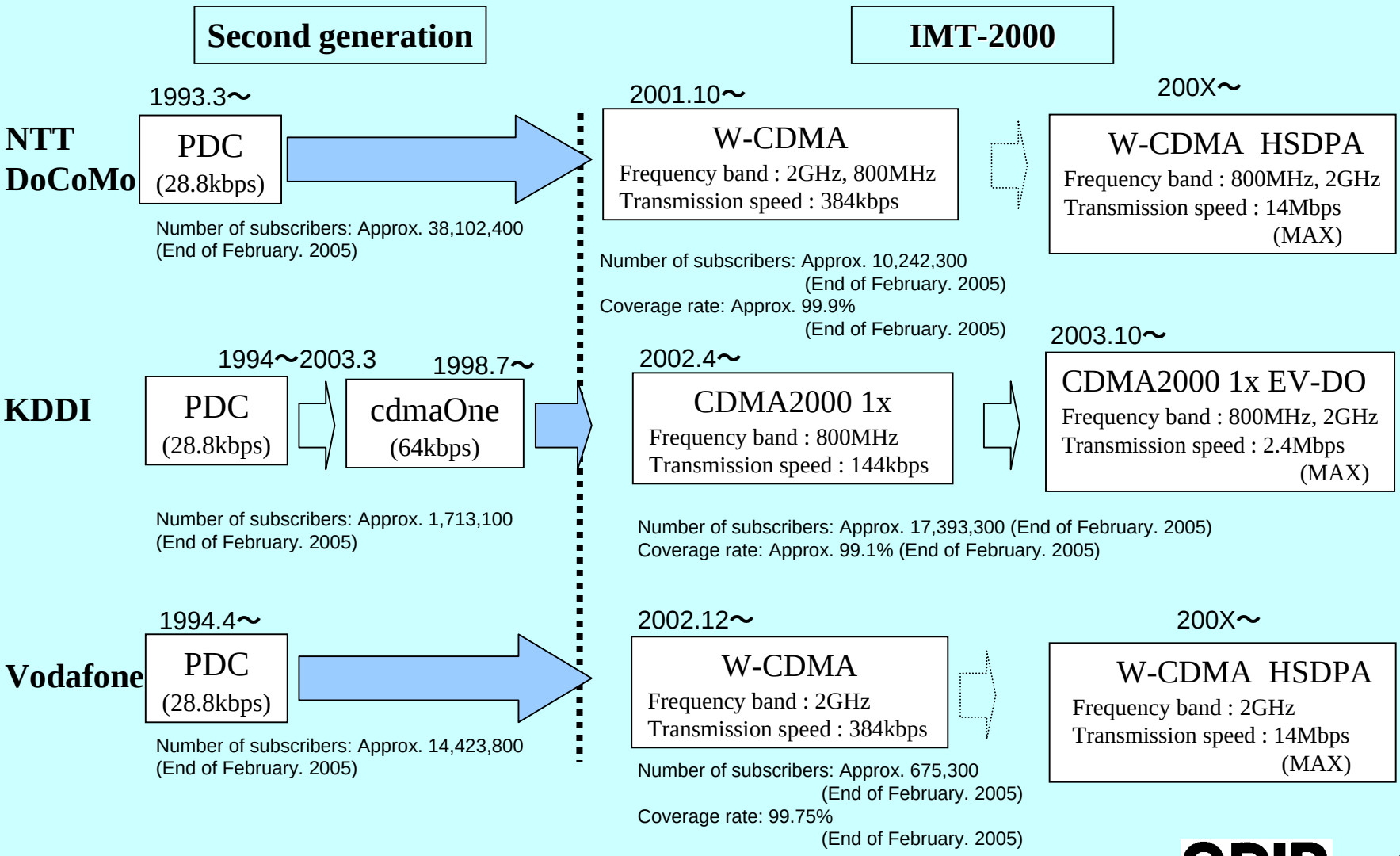
Growth of IMT-2000 subscribers







Deployment of IMT-2000 in Japan



IMT-2000 Standardization Activities in ARIB

- ARIB establishes its standards on CDMA-DS and CDMA-MC based on 3GPPs specifications around every 3-4 months.

  (CDMA-DS: STD-T63, TR-T12 Ver.4.40)

  (CDMA-MC:STD-T64, TR-T13 Ver.3.30)

- December 2004 Version of Release 6 3GPP specifications and January 2005 of Release D 3GPP2 specifications have already been transposed to ARIB standards.

2. Recent Activities on systems beyond IMT-2000

Outline of Mobile IT Forum (mITF)

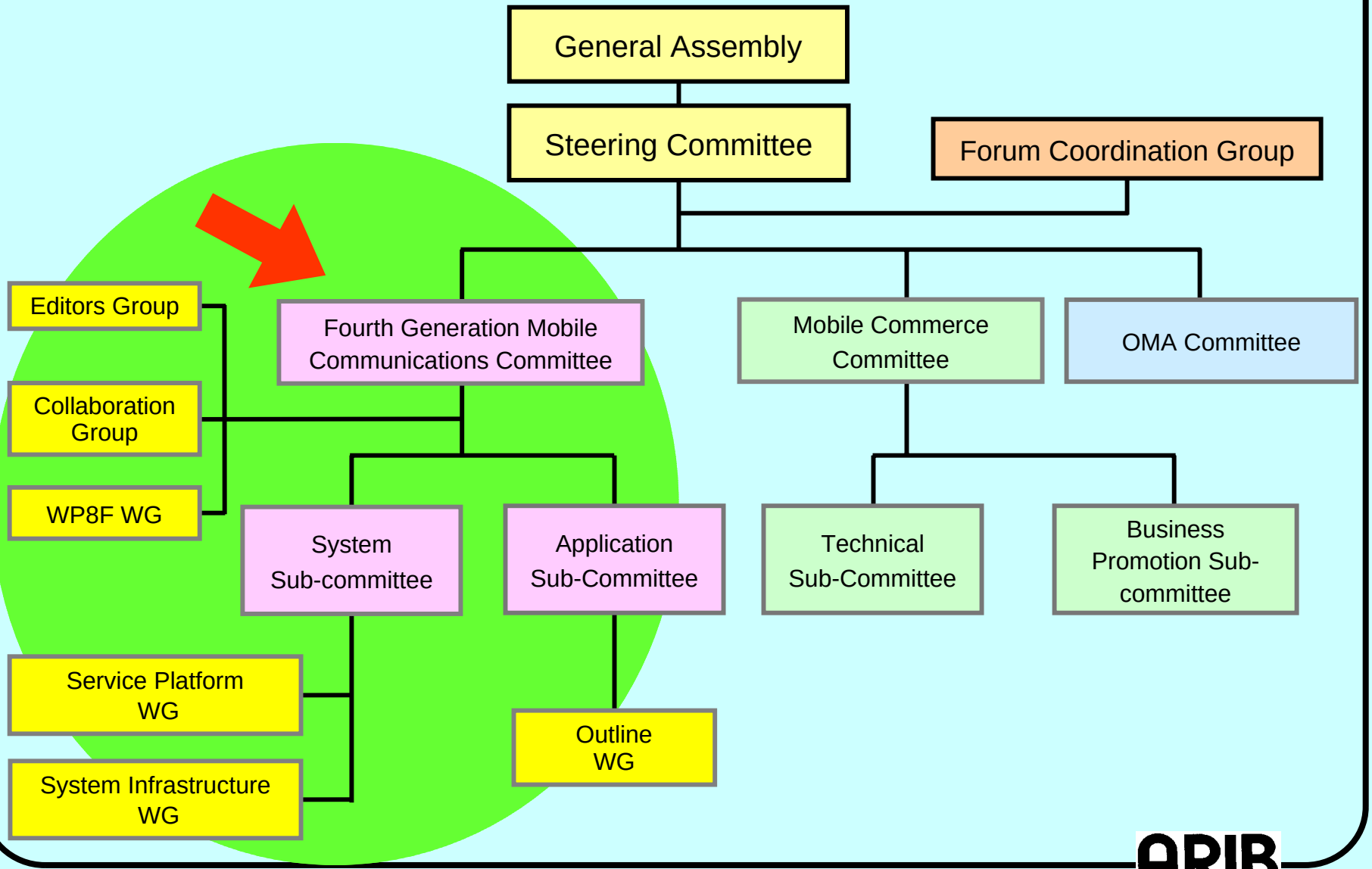
Mobile IT Forum (mITF)

- **Objectives**:

  To realize Future Mobile Communications Systems and Services such as the forth-generation mobile communications systems and mobile commerce services, at an early date by performing research and development activities, making studies on standardization, conducting coordination with related bodies, collecting information, and carrying out promotional and educational activities, and thereby contribute to a healthy utilization of radio spectrum.

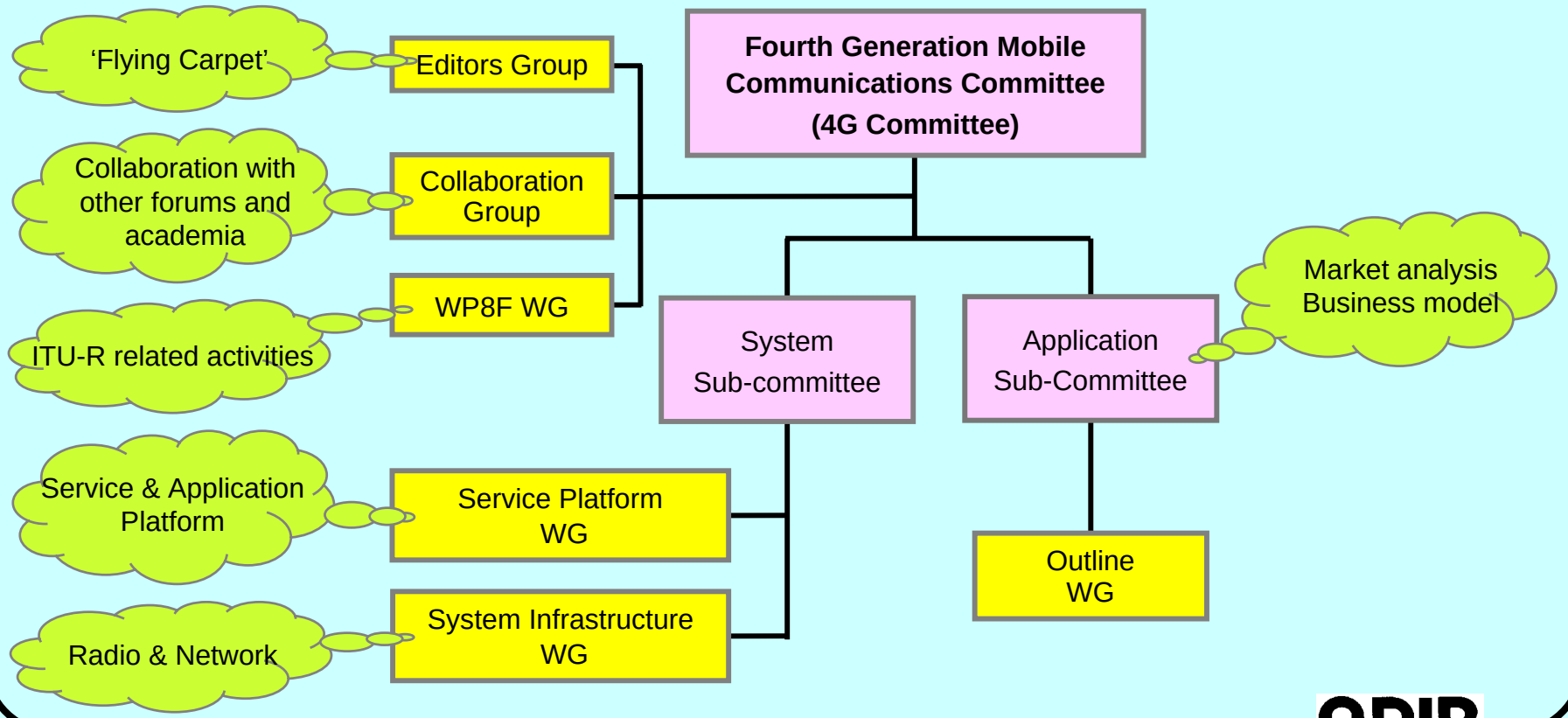
- **Establishment** : June 25, 2001 (Secretariat :ARIB)
- **Members** (as of February, 2005)
  - General members : 94
  - Individual members : 11
  - Special members : 2 (ARIB and TTC)
- **Current main activities**
  - Future Mobile Communications Systems (systems beyond IMT-2000)
  - Mobile Commerce

Organizational Structure of mITF

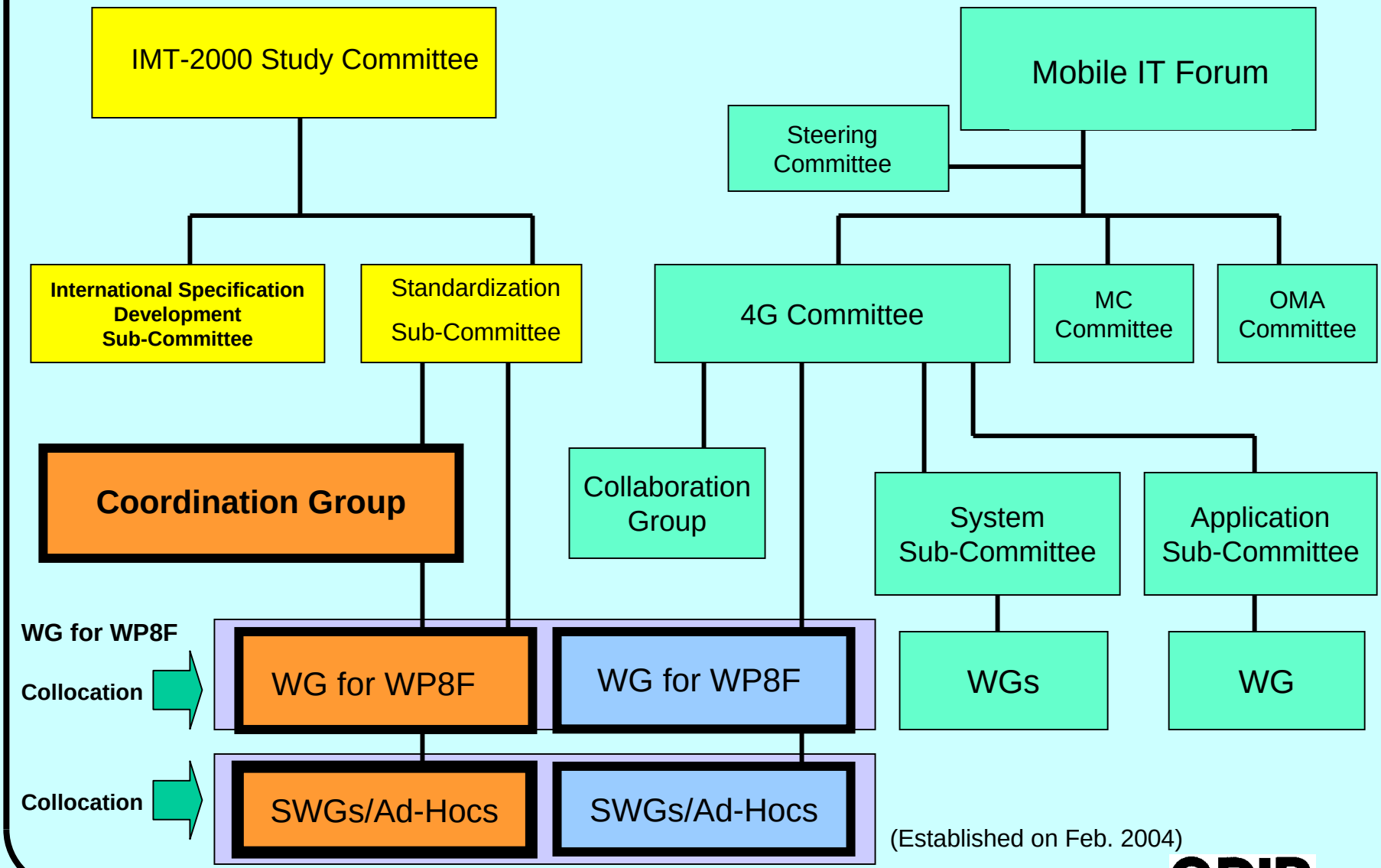


Objectives and Activities of 4G Committee

- Objectives
  - Clarify the system configuration and applications of 4G systems
  - Propose concrete activities envisioning 4G commercial introduction around 2010
  - Facilitate R&D activities and standardization activities by the industry and academia



Working Group for ITU-R WP8F



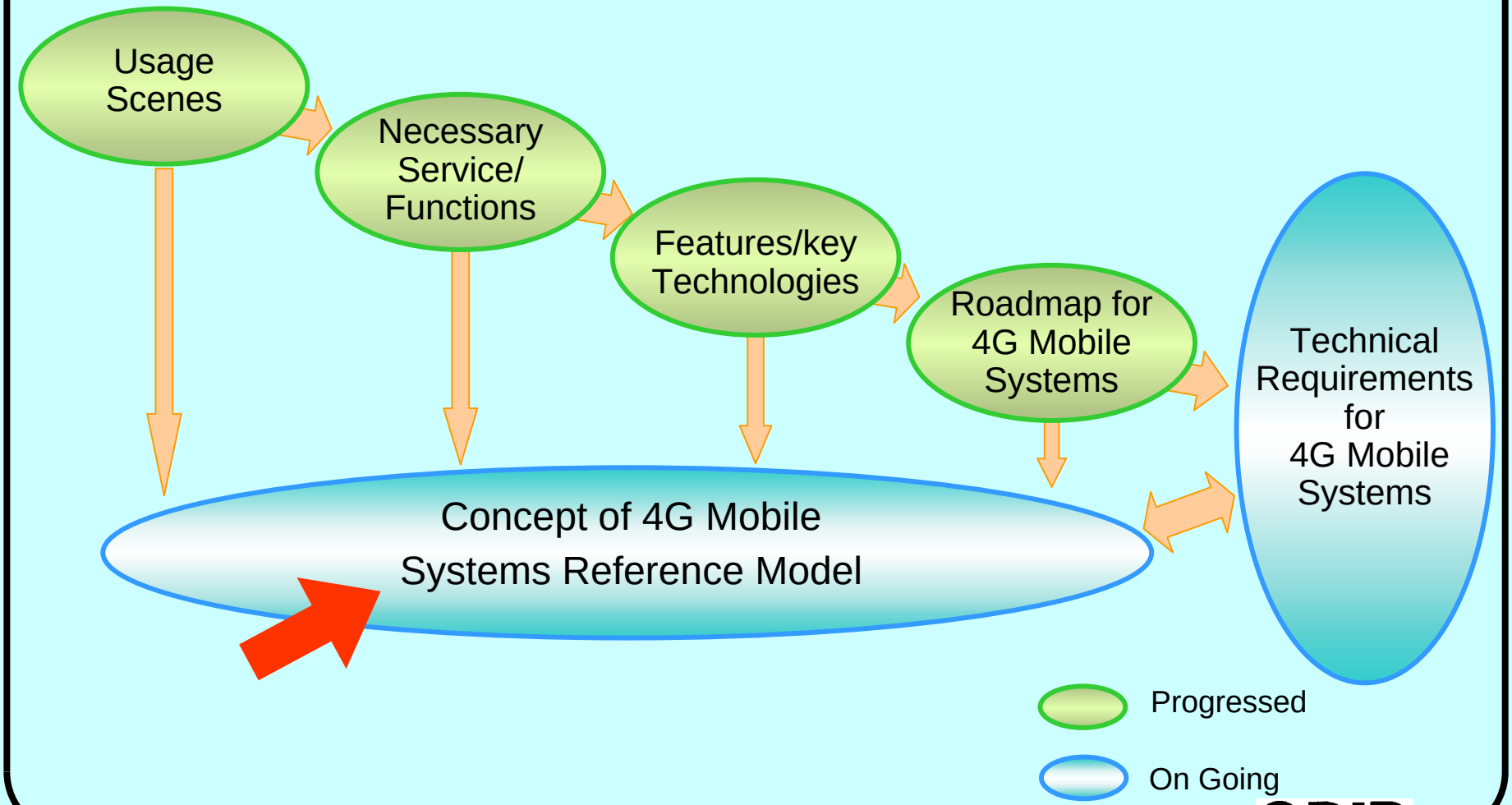
Activities of Fourth Generation Mobile Communications Committee

ARIB

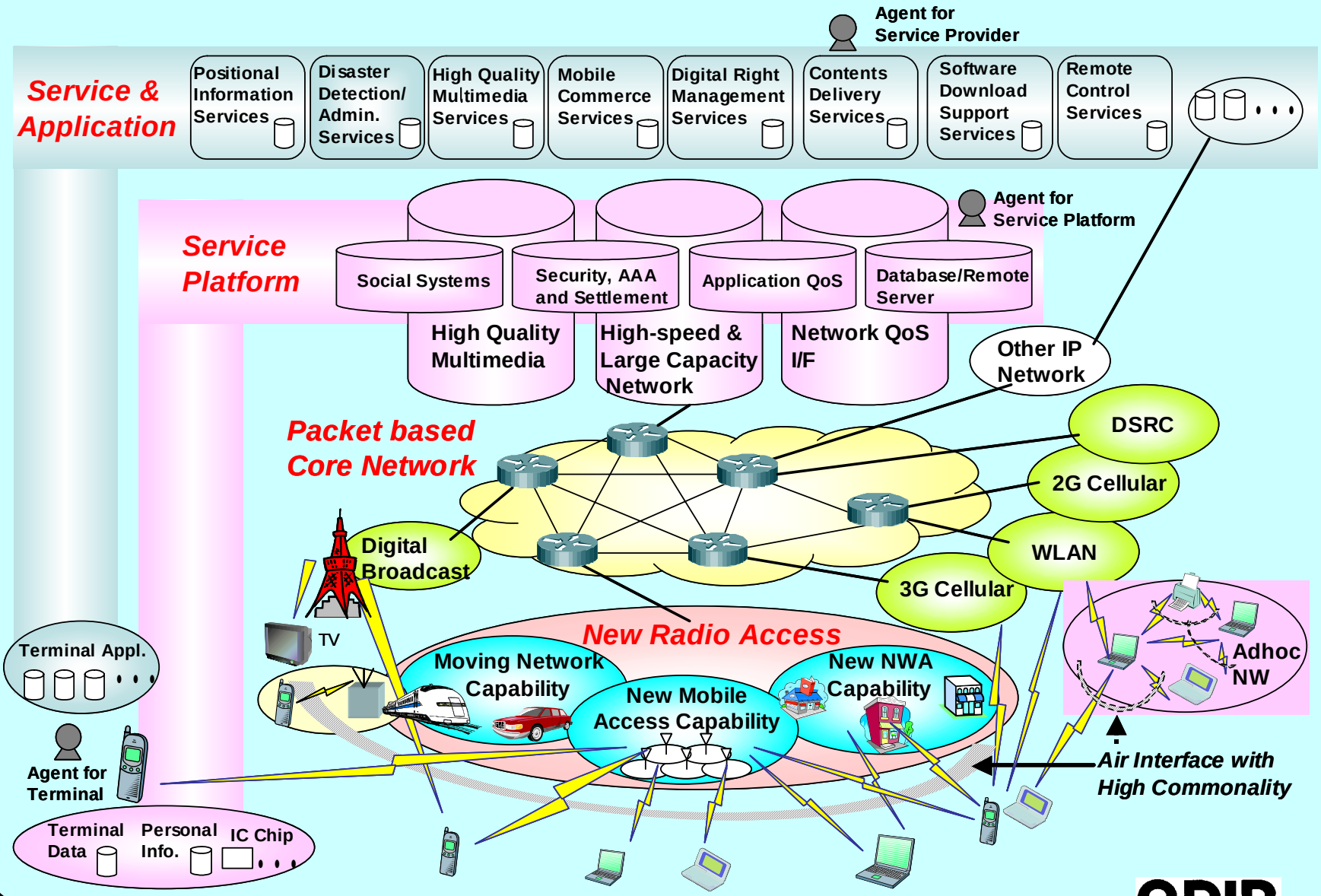
System Sub-Committee

- Goals of Activities
  - Facilitate the R&D and standardization of the 4G systems to realize a world's leading mobile IT
  - Contribute to creating mobile business markets ten years ahead
- FY2004 Work Items
  - Draft "Requirement document"
  - Technical feasibility study
  - Update the reference model
  - Update the feature table
  - Liaison with other forum and contribute ITU-R WP8F

Work Procedure in the System Sub-Committee



Reference Model of 4G Mobile System



Four Domains of Reference Model

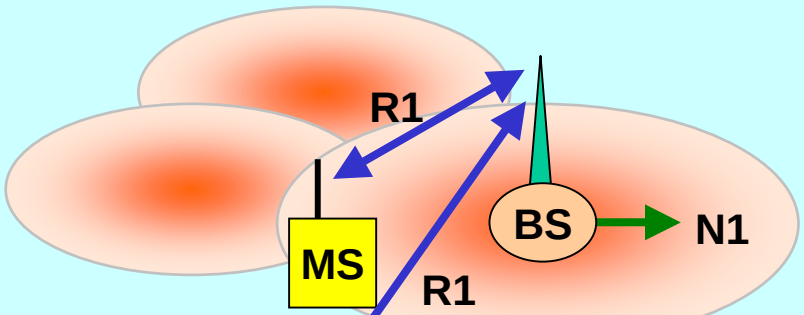
1. Service & Application
   - Commonly accessible both from the New and existing access systems
   - Agent supports smooth provisioning of services and applications
2. Service Platform
   - Provides the service foundation to help realize the services and applications offered by Service & Application Domain
   - multimedia features
   - high-speed/large-capacity network features
   - network QoS features
3. Packet-based Core Network
   - Independent from the access systems
   - Enables interconnection between 4G mobile systems as well as other access systems (e.g., 2G/3G cellular, W-LAN, DSRC, digital broadcasting, and other IP networks, etc.), to provide uses with seamless access
4. New Radio Access
   - New Mobile Access Capability
   - New Nomadic Wireless Access Capability
   - Moving Network Capability

Three Categories of Service Platform Reference Model

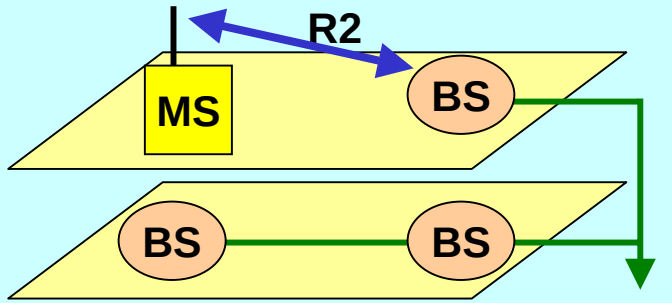
1. User Convenience
   - User interface
   - Agent
   - Terminal processing capability / usable hours / external interface
   - Terminal reconfigurability
2. Advanced Service
   - High-quality multimedia
   - Information input
   - Location/navigation
   - Remote sensing/control
3. System Management
   - QoS
   - Security / authentication / authorization / accounting
   - Database / remote server
   - Society / environment adaptation feature

System Infrastructure Reference model

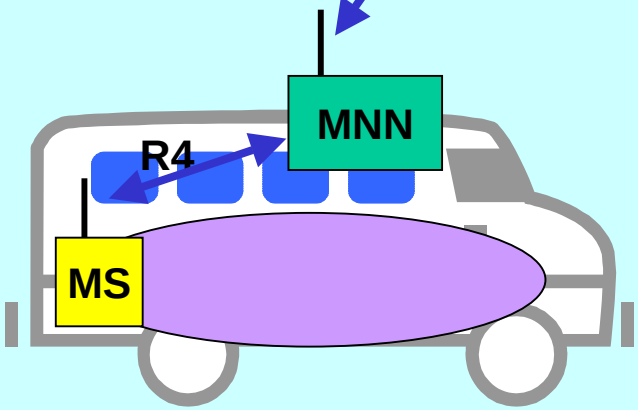
5 Scenarios for Radio Access (example)



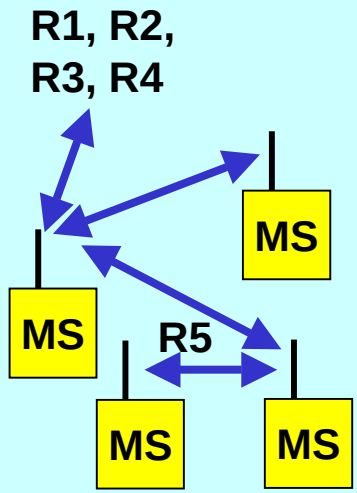
1. Mobile Access (Outdoor)



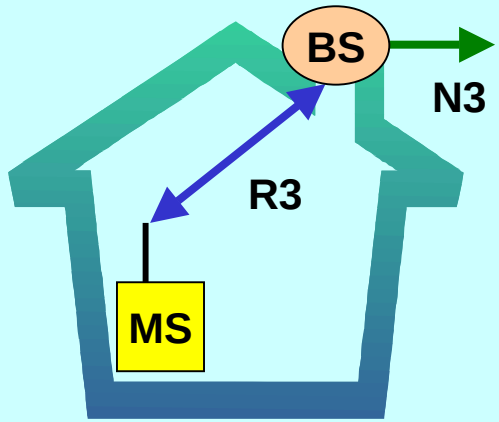
2. Mobile Access (Indoor) / Nomadic Wireless Access



4. Moving Network



5. Ad Hoc Network



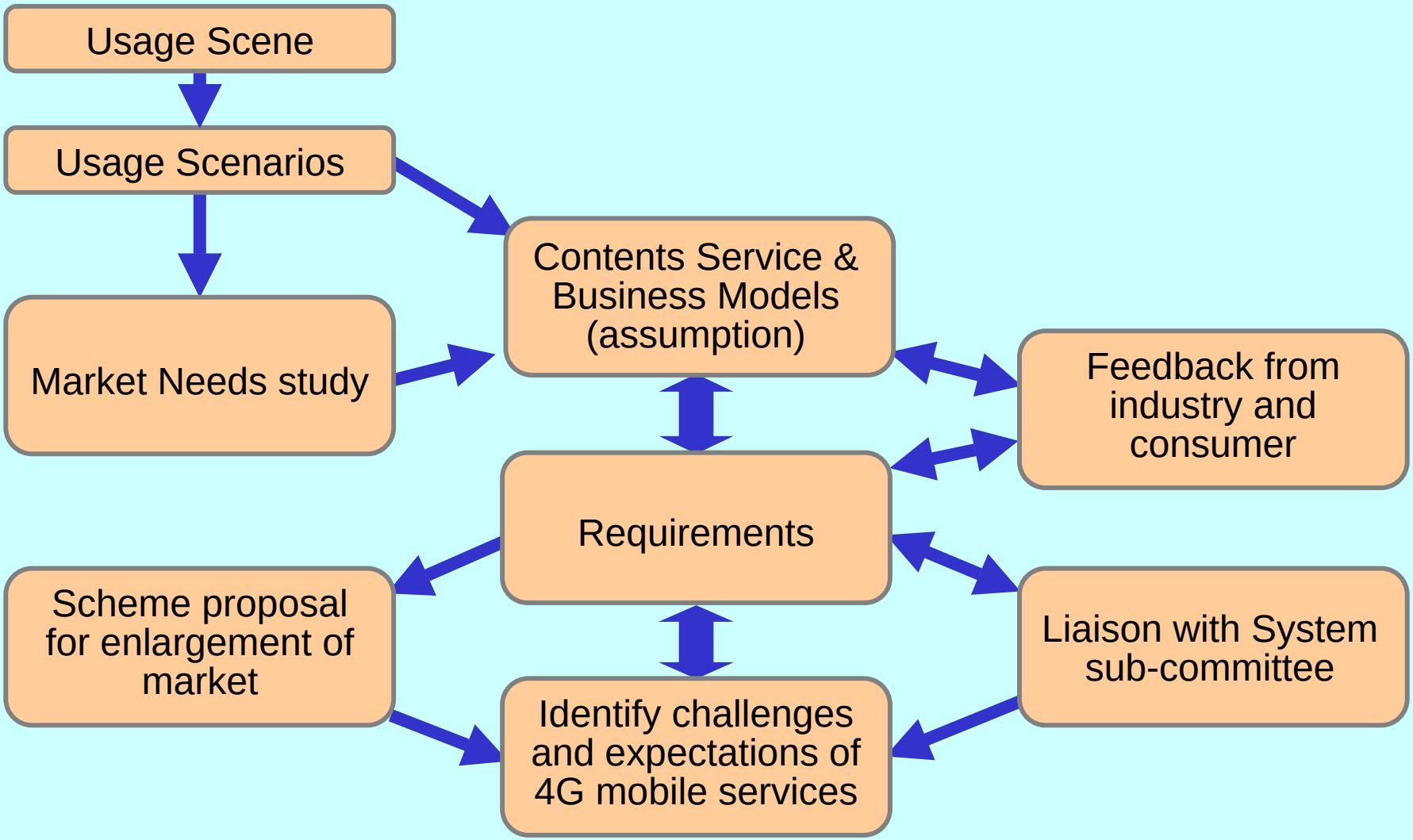
3. Nomadic Wireless Access

MNN: Moving Network Node
Rn: Radio Interface
Nn: Network Interface

Application Sub-Committee

- Goals of Activities
  - Analyze the business surrounding the 4G system ten years ahead, envisioning mobile life style from users' point of view
  - Clarify requirements for system, functions and other aspects
- FY2004 Work Items
  - Update the illustrations of 4G mobile services
  - Clarify demand of 4G mobile services
  - Promote 4G application research seminar
  - Update the document proposing how enlarge the market

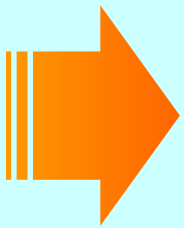
Application Sub-committee Work Flow



User's Expectations for 4G Mobile Systems

Service and features expected for 4G Mobile

- **Freedom in Time**
- **Freedom in Space**
- **Freedom in Use of Features**

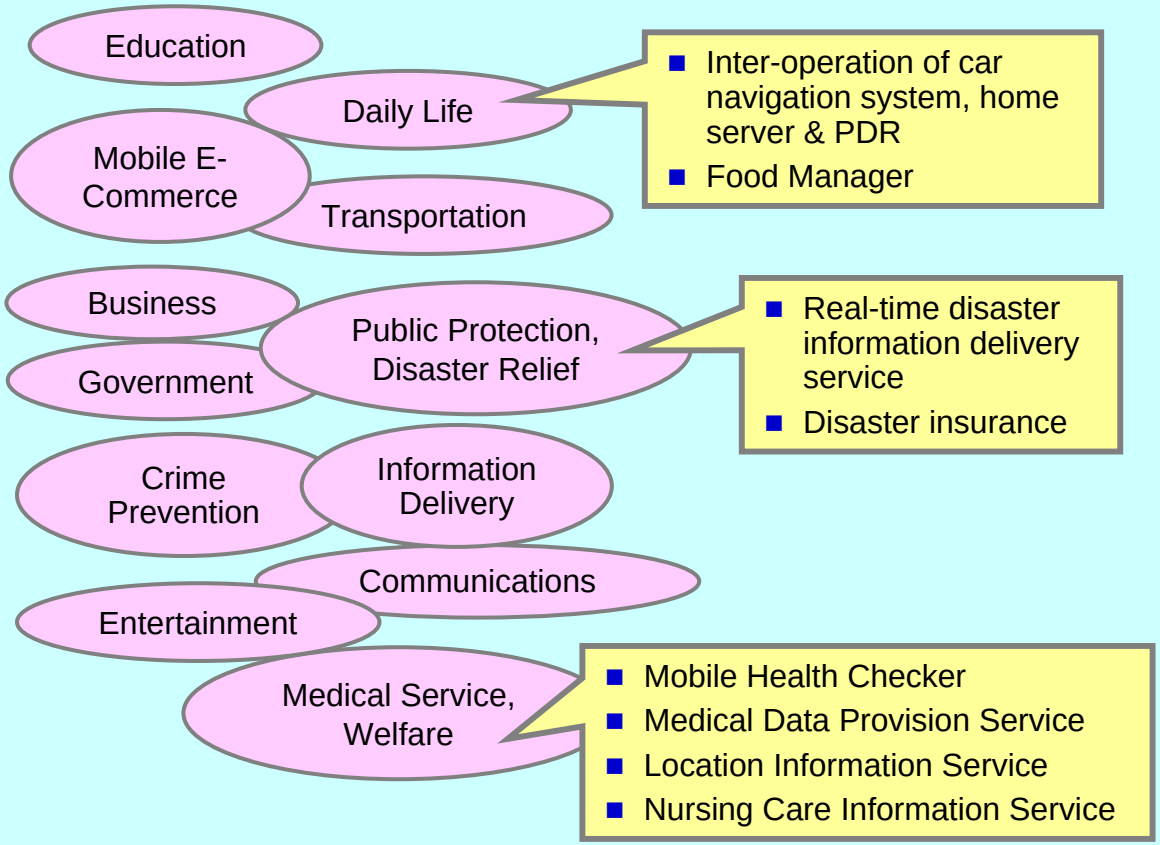


New Lifestyles Realized by 4G Mobile

- Enriched and Cultural Life
  - Enriched life – able to communicate with friends and families anytime
  - A cultural life – able to receive information of your choice and easily obtain the right entertainment anytime you like
- More Flexible and Diversified Life
  - Flexible and Diversified Life – able to work regardless of home circumstances
  - Environment that enables various people to freely participate in social activities
- More Comfortable and Safer Life
  - More Comfortable and Safer Life – safety is ensured anytime, anywhere
  - Convenient and Comfortable Life – able to access services on highly convenient networks in a secure manner
- More Personal and Convenient Life
  - Personal Life – possible to freely select from a wide range of services based on individual preferences
  - Extremely convenient life – what you want to do now can be done right away

Application and Business Model Study

Social Activities → Application Models → Business Models



1. Medical Data Provision
2. Ultimate Content Player
3. Navigation System
4. Mobile Ordering
5. Food Manager
6. Disaster Insurance
7. Mobile Administration

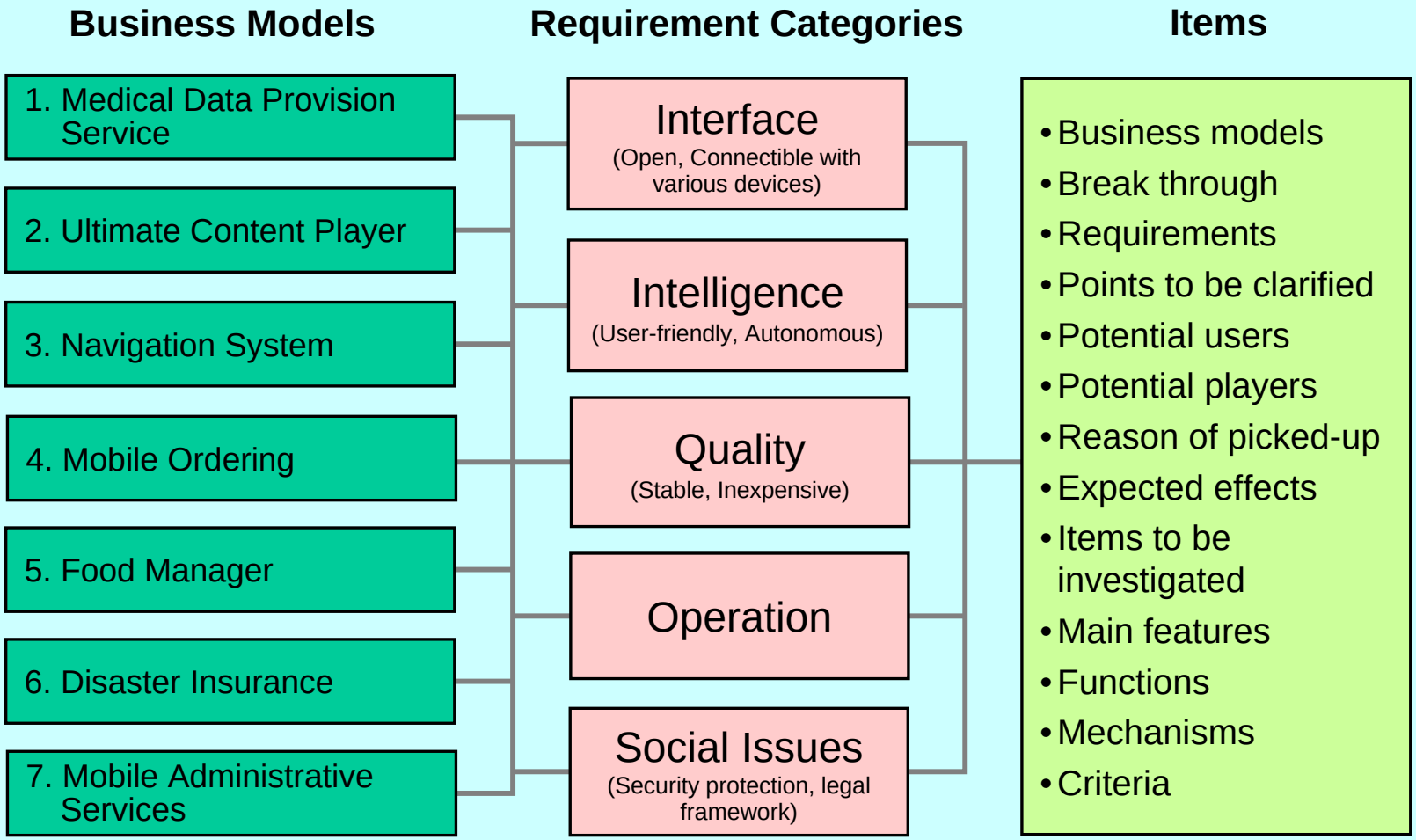
12 areas

22 application models

7 models (sample)

Studies on Requirements to Realize Applications

- **Requirements from the Perspective of Business Models**



2004 Report of the Committee
Flying Carpet II

-Towards the 4th Generation Mobile Communications Systems-

This brochure was named “Flying Carpet” because we thought with its magical power to fly the sky, we might be able to foresee our new lives and the underlying mobile technologies in a decade from now.

http://www.mitf.org/public_e/archives/index.html

3. Wireless LAN and Wireless Access

Wireless LAN, Access System

Frequency Band	Principal Use	Data Rate	Standardization Status	Current Status	Standardization Organization
2.4GHz	Wireless LAN Wireless access	54Mbit/s	ARIB STD-T66	In Service	ARIB/ IEEE802.11
5GHz (Outdoor)	Wireless access	54Mbit/s	ARIB STD-T70 ARIB STD-T71	In Service	ARIB/MMAC (*1)
5.2GHz (Indoor)	Wireless access Wireless LAN Wireless home link	54Mbit/s	ARIB STD-T70 (HiSWANa) ARIB STD-T71 (CSMA) ARIB STD-T72 (Wireless 1394)	In Service	ARIB HiSWANa:MMAC /ETSI-BRAN(*2) CSMA:MMAC/ IEEE802.11 Wireless 1394: MMAC (*1)
22/26/38 GHz	FWA	156Mbit/s(P-P) 10Mbit/s(P-MP)	ARIB STD-T58 ARIB STD-T59	In Service	ARIB
25GHz	Wireless access Wireless LAN Wireless home link	54Mbit/s	ARIB STD-T83 (HiSWANb)	Trial	ARIB HiSWANb:MMAC /ETSI-BRAN(*2)
60GHz	Wireless access Wireless LAN Wireless home link	156Mbit/s	ARIB STD-T74	Some products available	ARIB

*1 MMAC:Multimedia Mobile Access Communication Systems Forum
*2 ETSI-BRAN, H2GF(Highper LAN2 Global Forum) and MMAC established Joint Task Force collaboratively

Standardization Activities of Wireless Access, Wireless LAN, Wireless Home Link