ARIB's Activities on Mobile Communications

ARIB, Japan

November 7th, 2002

Outline of the Presentation

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

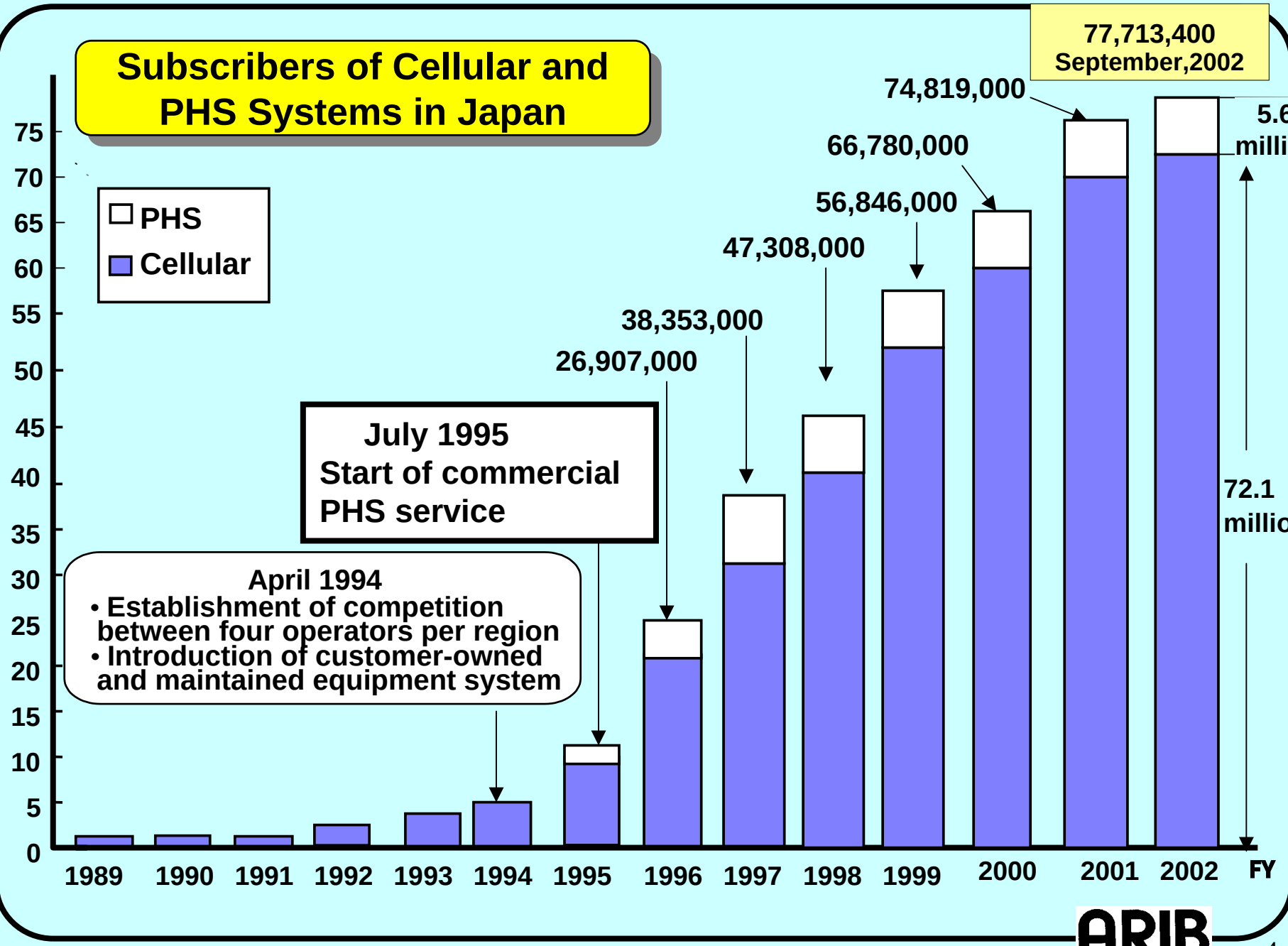
2. Recent Activities in Mobile IT Forum(mITF)
   - Outline of Mobile IT Forum
   - Activities of Fourth Generation Mobile Communications Committee
   - Activities of Mobile Commerce Committee

3. Wireless LAN and Wireless Access

Annex: Telecommunications Council Report

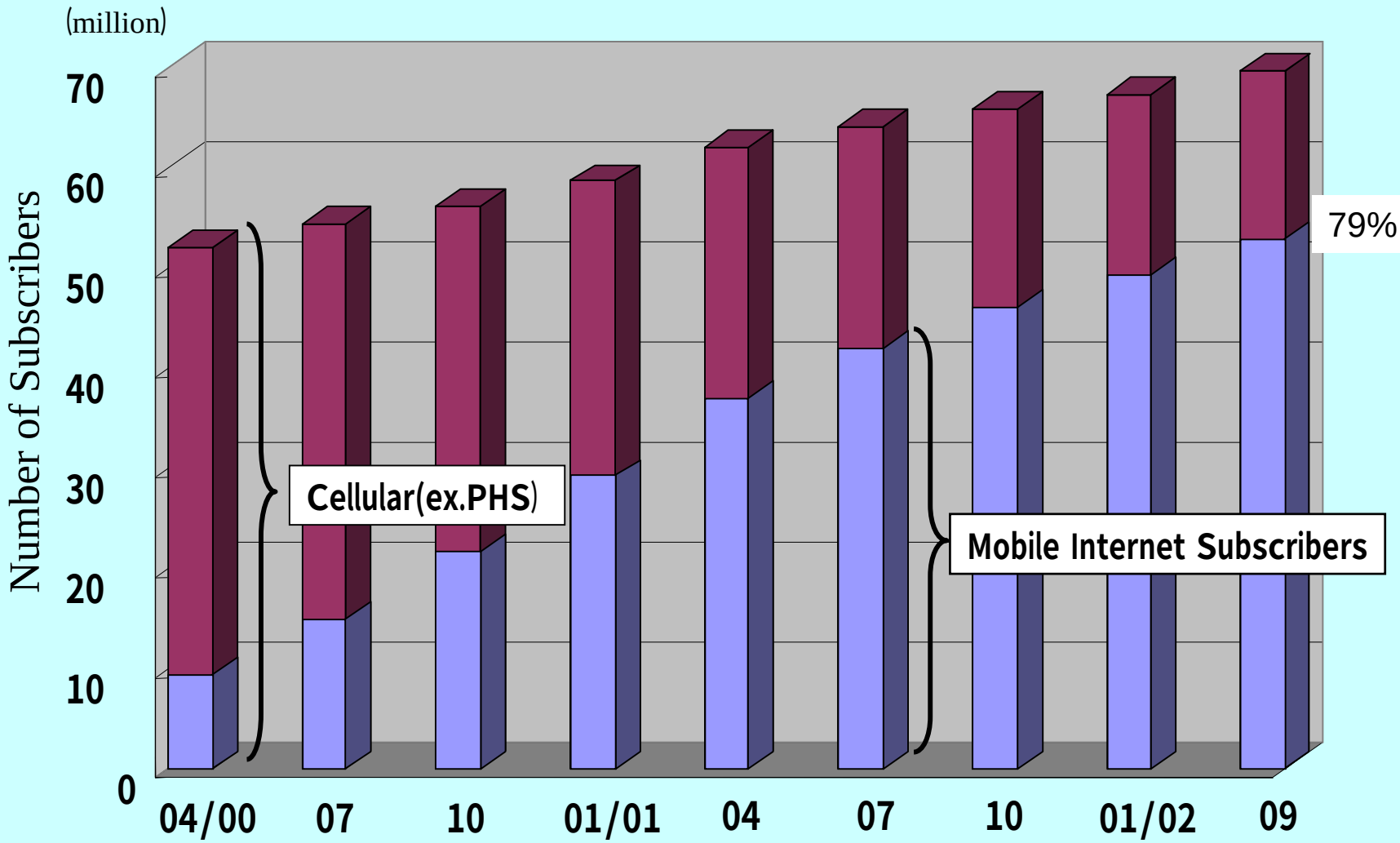
1. Japan's Cellular Market and Current Status of IMT-2000

Subscribers of Cellular and PHS Systems in Japan



ARIB

Mobile Internet 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)
  (CDMA-MC:STD-T64, TR-T13)
- June 2002 Version of Release5 3GPP specifications and ReleaseB Ver.1.0 of 3GPP2 specifications have already been transposed to ARIB standards.(except HSDPA)
- ARIB has transposed 1xEV DO specification in May 2002

IMT-2000 Introduction in Japan

- NTT DoCoMo: 2GHz-band, CDMA-DS (WCDMA)
  - May/2001：Trial Service
    Metropolitan Tokyo Area
  - Oct./2001：Commercial Service
    Up to 30km from the Center of Tokyo
  - April/2002: Major Cities in Nationwide
- KDDI: 800MHz-band, CDMA-MC (CDMA2000 1x)
  - April/2002: Major Cities in Nationwide
- J-Phone: 2GHz-band, CDMA-DS (WCDMA)
  - June/2002: Trial Service
    Metropolitan Tokyo Area
  - Dec./2002: Commercial Service Nationwide

2. Recent Activities on systems beyond IMT-2000

Outline of Mobile IT Forum (mITF)

Mobile IT Forum (mITF)

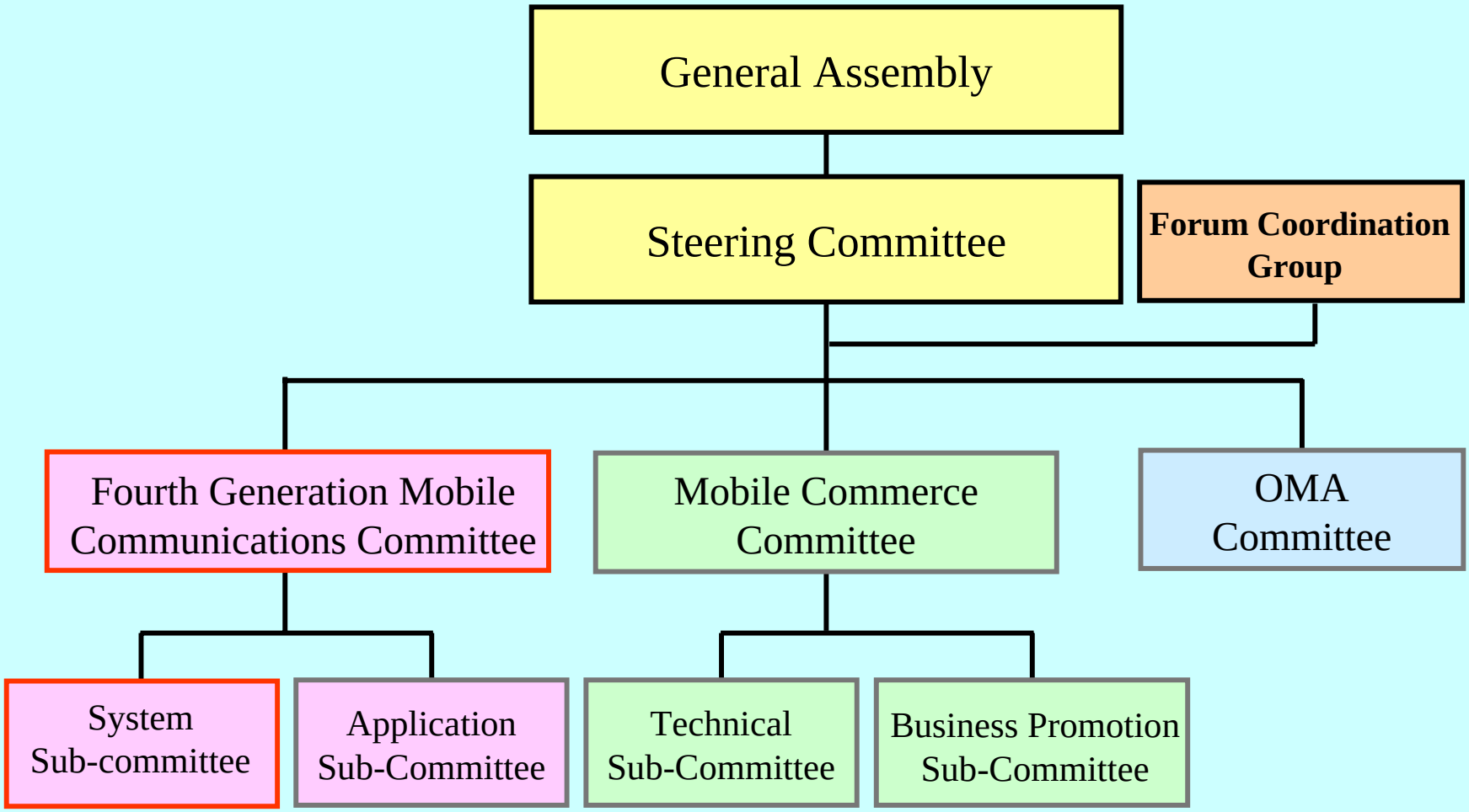
- Objectives:

  To realize an early implementation of Future Mobile Communication Systems including Systems beyond IMT-2000 and mobile commerce, the Forum conducts studies and researches on technologies and standardization.
- Established on June 25, 2001(Secretary:ARIB)
- Members (as of October 2002)
  - General members 119
  - Individual members 10
  - Special members 2
- Current main activities
  - Future Mobile Communications Systems (systems beyond IMT-2000)
  - Mobile Commerce

General Members

ACCESS CO., LTD.,
ALPINE ELECTRONICS,INC.,
ANTEN Corporation,
ANRITSU CORPORATION,
Baltimore Technologies Japan Co.,Ltd.,
BANDAI NETWORKS Co., Ltd.,
CATS CO.,LTD.,
Communications Industry Association of Japan,
Communications Research Laboratory, Independent Administrative Institution,
Commuture Corp.,
Cryodevice Inc.,
DC CARD CO., LTD.,
Denki Kogyo Co., Ltd.,
DENSO CORPORATION,
DENSO IT LABORATORY, INC.,
Dentsu Inc.,
DWANGO Co., Ltd.,
EIDEN Co.,Ltd. ,
Fuji Electric Co., Ltd.,
FUJI TELEVISION,NETWORK,INC.,
FUJITSU LIMITED,
FUJITSU TEN LIMITED,
FURUNO ELECTRIC CO., LTD.,
HAKUHODO Inc.,
Hewlett-Packard Japan,Ltd.,
Hitachi Kokusai Electric Inc.,
Hitachi Ltd.,
Hitachi Metals, Ltd.,
Hitachi Software Engineering Co., Ltd.,
INDEX CORPORATION,
INFOCITY, Inc.,
InterDigital Communications Corporation,
Internet Research Institute, Inc.
ITOCHU Corporation,
JAPAN BROADCASTING CORPORATION (NHK),
Japan Communication Equipment
Japan Radio Co.,Ltd.,
JAPAN TELECOM CO.,LTD.,
JCB CO.,LTD,
J-Phone Co., Ltd,
KANSAI TELECASTING CORPORATION,
KDDI CORPORATION,
Keihin Electric Express Railway Co.,Ltd.,
KENWOOD CORPORATION,
KOZO KEIKAKU ENGINEERING Inc.,
KYOCERA CORPORATION,
KYOWA EXEO CORPORATION,
Liberate Technologies K.K.,
Lucent Technologies Japan Ltd.,
Magic Mail Inc.,
MASPRO DENKOH CORPORATION,
Matsushita Communication Industrial
Matsushita Electric Industrial Co., Ltd.,
Matsushita Electric Works, Ltd.,
Microsoft Product Development Limited,
Mitsubishi Electric Corporation,
MITSUBISHI MATERIALS CORPORATION,
Mobile Internet Services., Inc.,
Mobile Broadcasting Corporation,
Motorola Japan Limited,
Murata Manufacturing Co., Ltd.,
Muzuho Financial Group,
THE FUJI BANK LIMITED,
NEC Corporation,
NEC Engineering,Ltd.,
NEC Infrontia Corporation,
NEC Mobiling ,LTD,
NHK Integrated Technology Inc.,
NIHON DENGYO KOSAKU CO.,LTD.,
Nihon Enterprise Co.,Ltd.,
Nihon Unisys, Ltd.,
NIPPON ANTENNA Co.,Ltd,
Nippon Ericsson K.K.,
Nippon Shinpan Co.,Ltd.,
NIPPON TELEGRAPH AND TELEPHONE CORPORATION,
nippon television netwok corporation,
NISSAN MOTOR CO., LTD.,
NOKIA-JAPAN CO.,LTD.
Nomura Research Institute, Ltd.,
NTT COMMUNICATIONWARE CORPORATION,
NTT DATA CORPORATION,
NTT DoCoMo, Inc.,
Oki Electric Industry Co.,Ltd.,
Orient Corporation,
PIONEER CORPORATION,
QUALCOMM JAPAN Inc.,
RICOH Company, Ltd.,
ROHM CO., LTD.,
Samsung Yokohama Research Institute Co., Ltd,
SANYO Electric Co., Ltd.,
SECOM Trust.net Co.,LTD,
SecuGen Japan, Ltd.,
Seiko Instruments Inc.,
SHARP CORPORATION,
ShibaSoku CO., LTD.,
Siemens K.K.,
SnapTrack Japan, Inc.,
Sony Corporation,
Sony/Tektronix Corporation,
SPC ELECTRONICS CORPORATION,
SUMITOMO MITSUI CARD CO.,LTD.,
SUN CORPORATION,
Sun Microsystems K.K.,
Systems Engineering Consultants Co., LTD.,
Telecom Engineering Center,
The Sanwa Bank Limited,
The Tokyo Electric Power Company,Incorporated,
Tokyo Broadcasting System, Inc.,
TOKYO TELECOMMUNICATION NETWORK CO.,INC.,
Toshiba Corporation,
TOSHIBA TEC CORPORATION,
TOYOTA MOTOR CORPORATION,
TU-KA Cellular Tokyo Inc.,
UC CARD Co.,Ltd.,
UFJ Card., Co Ltd.,
VeriSign Japan K.K.,
VICTOR COMPANY OF JAPAN, LIMITED,
VISA INTERNATIONAL ASIA PACIFIC LTD.,
ZENRIN CO., LTD.,

Organizational Structure of mITF



Activities of Fourth Generation Mobile Communications Committee

Fourth Generation Mobile Communications Committee

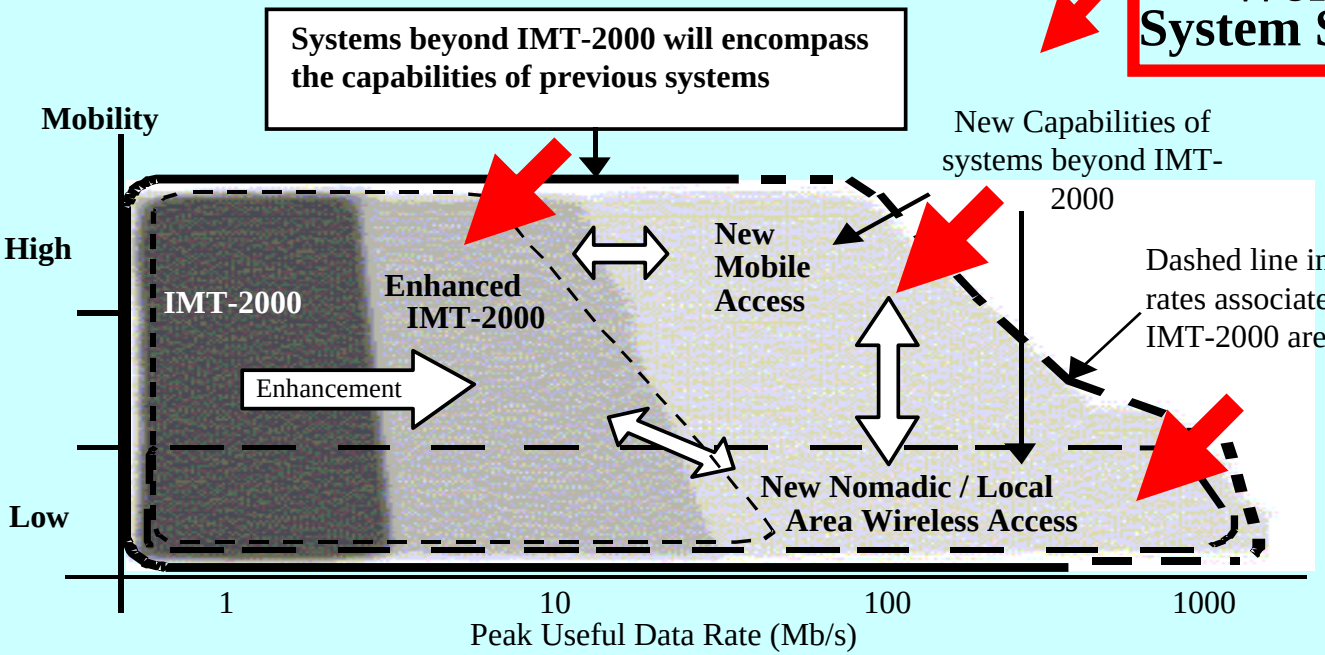
- Objectives:
  - Clarify the system configuration and applications of 4G systems
  - Propose concrete activities envisioning its commercial introduction around 2010
  - Facilitate R&D activities and standardization activities by the industry and academia
- Near-Term Activities:
  - Establish a framework for R&D and standardization, with a view to create new business markets (in 10 years)
  - Study the desired architecture and development scenarios of 4G
  - Select, study and evaluate research themes on new element technologies
  - Coordination with related entities in the world
  - Analyze the business schemes ten years ahead, and clarify the requirements for the mechanisms and tools that enable such schemes

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
- Near-Term Activities
  - Clarify the system configuration for the fourth-generation mobile communications systems which realize advanced mobile IT
  - Survey, study and evaluate required technologies, e.g.
    - Ultra broadband mobile communication technologies,
    - Wireless ad hoc network technologies,
    - Software radio technologies,
    - User oriented application technologies,
    - Mobile platform technologies, etc.
  - Coordinate with related institutes in the world
  - Study possible framework of the standardization
  - Clarify the technical requirements and performance objectives

Scope of System Sub-Committee (1)

Work target of System Sub-Committee



KEY: ⇔ denotes interconnection between systems via networks or the like, which allows flexible use in any environments without making users aware of constituent systems.

Nomadic / Local Area Access Systems

Digital Broadcast Systems

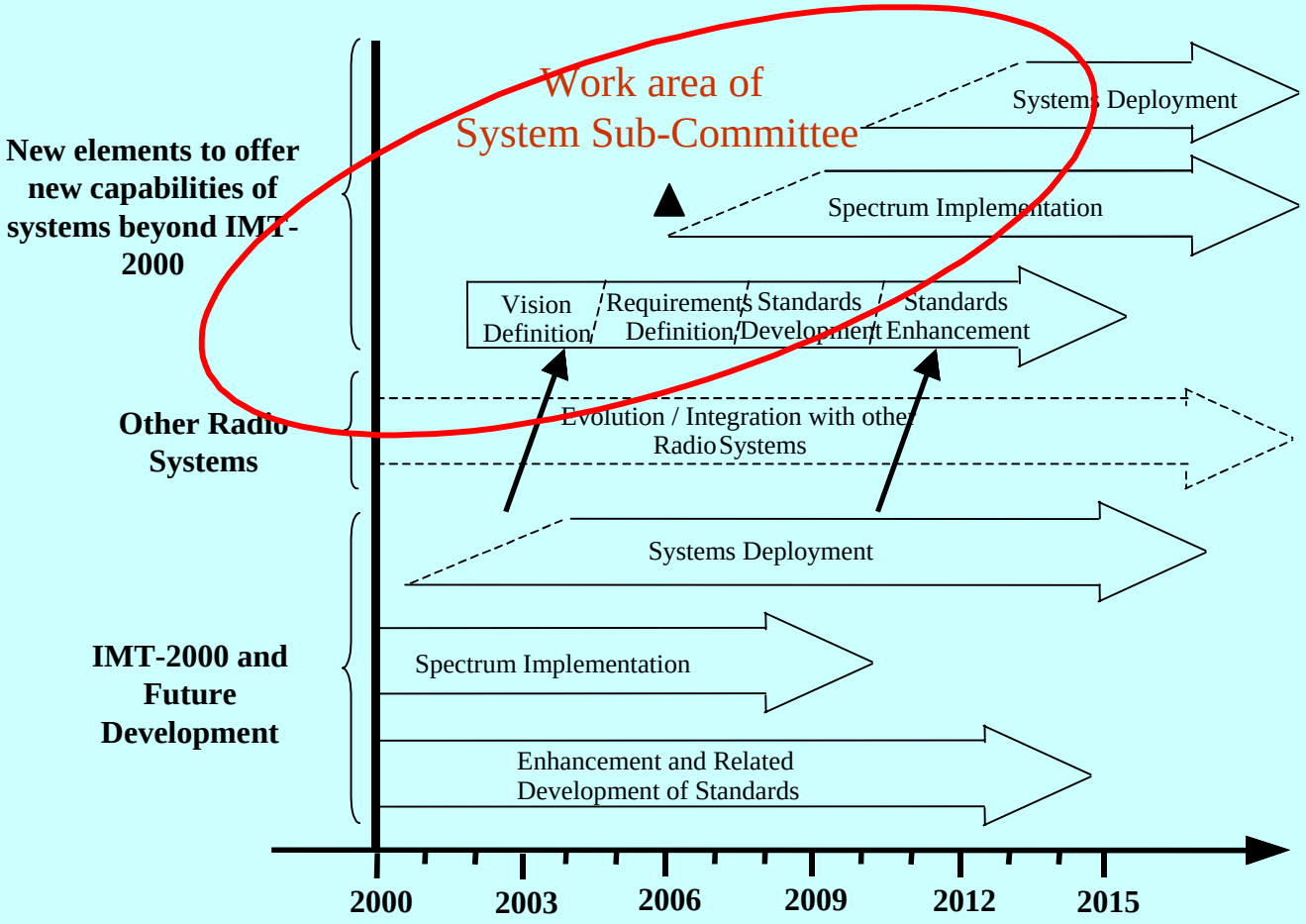
Dark shading indicates existing capabilities, medium shading indicates enhancements to IMT-2000, and the lighter shading indicates new capabilities of Systems Beyond IMT-2000.

The degree of mobility as used in this figure is described as follows: Low mobility covers pedestrian speed, and high mobility covers high speed on highways or fast trains (60 km/h to ~250 km/h, or more).

Illustration of Capabilities of IMT-2000 and systems beyond IMT-2000

(from output document of the 9th meeting of WP8F)

Scope of System Sub-Committee(2)

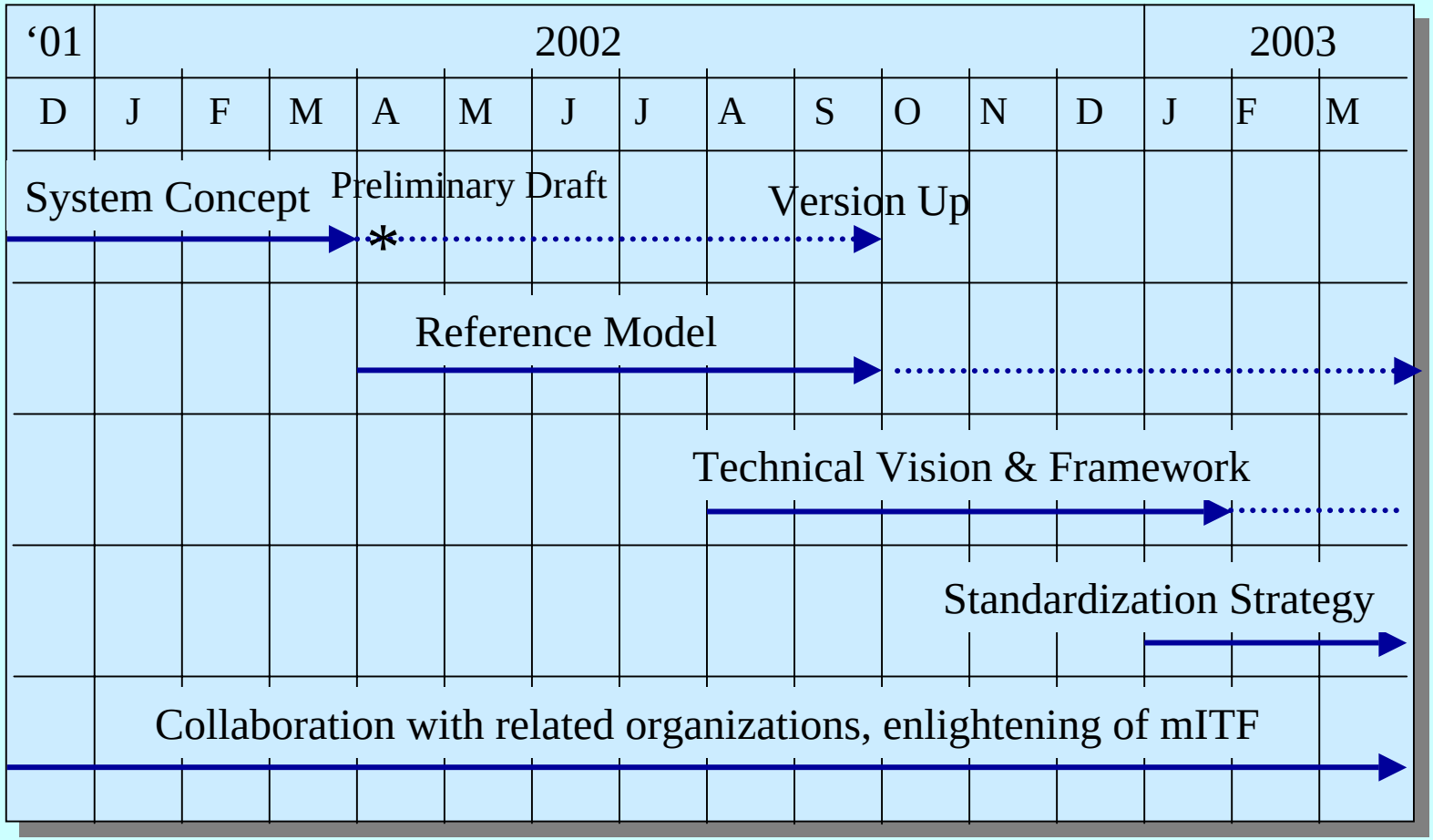


The sloped dotted lines indicate that the exact starting point of the particular subject can not yet be fixed.

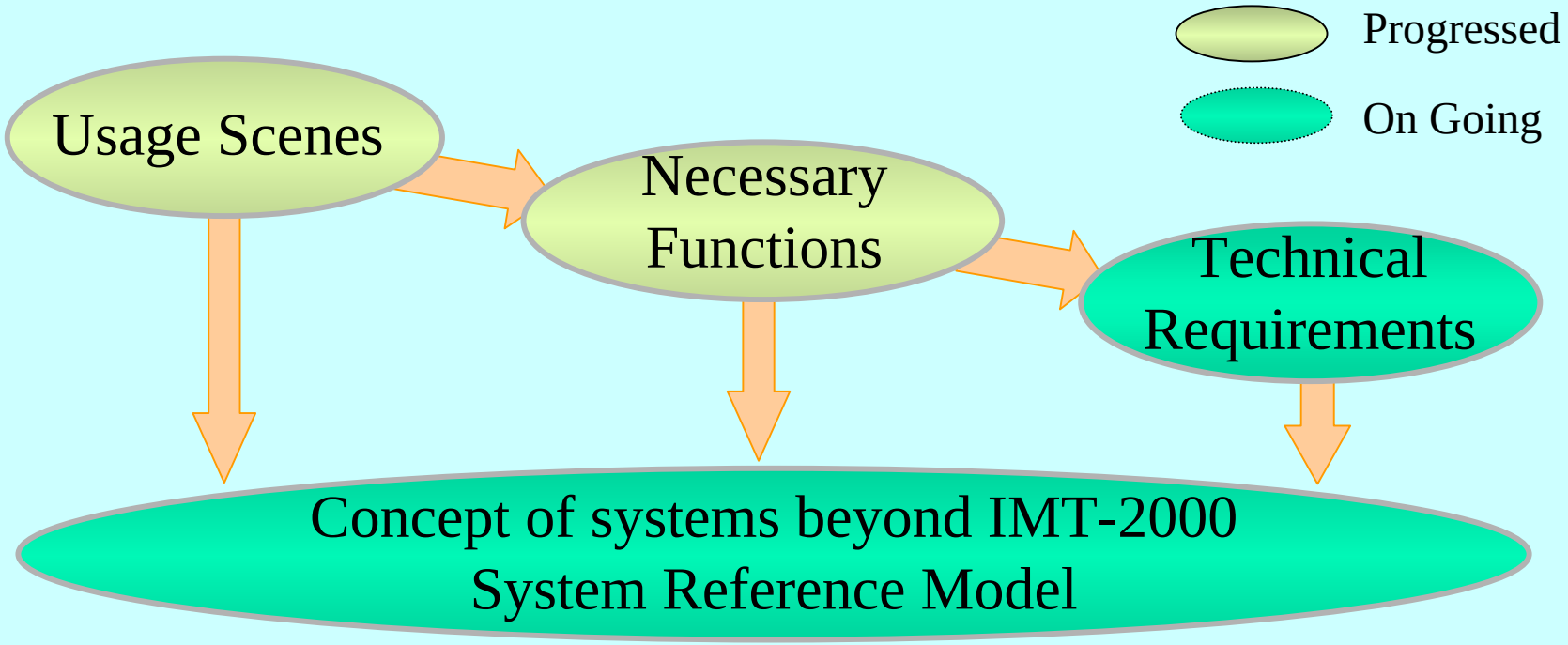
▲ : Spectrum identification assuming that WRC03 approves WRC06 agenda and WRC06 identifies the spectrum

(from output document of the 9th meeting of WP8F)

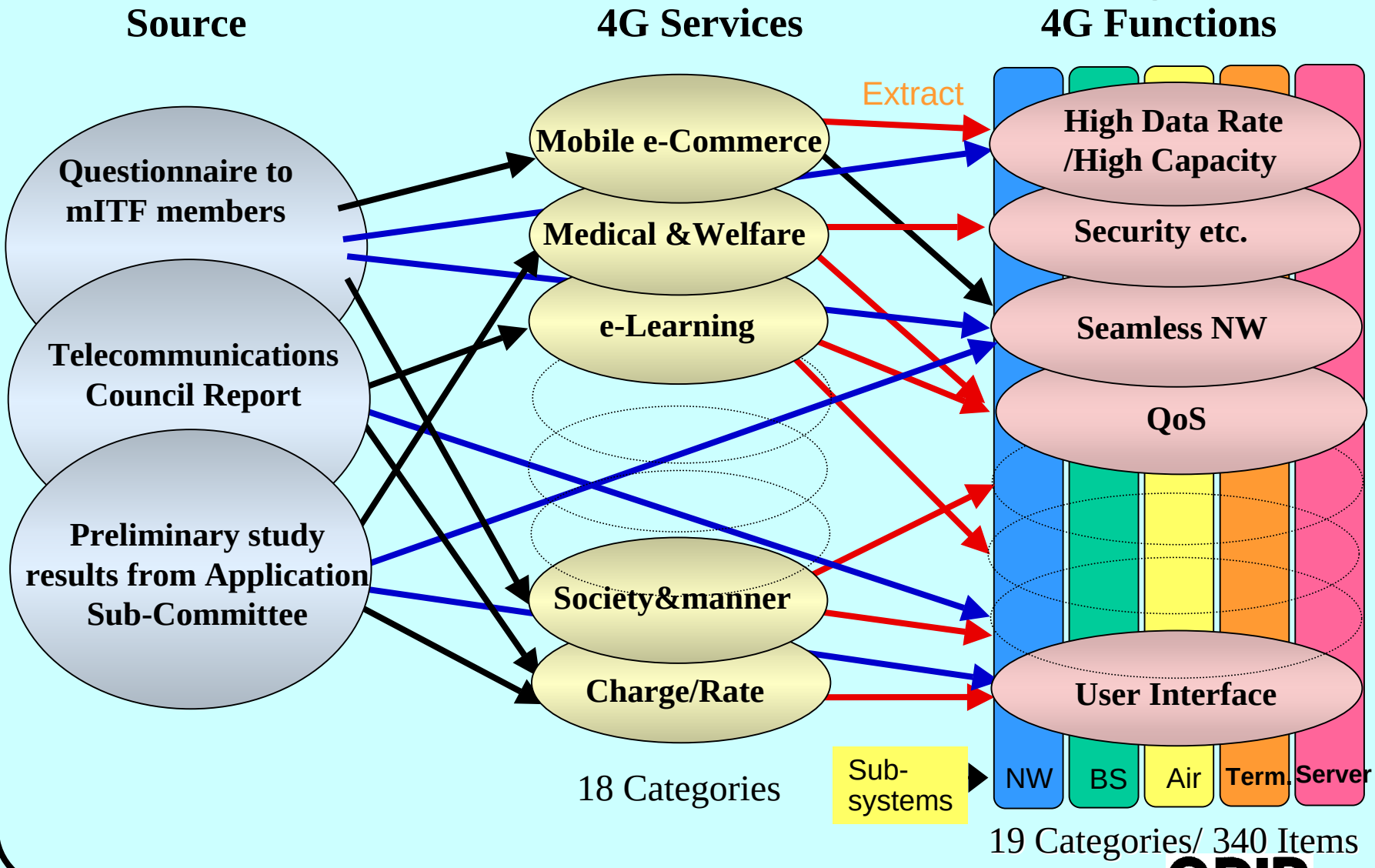
Near-term activities of System Sub-Committee



Work Procedure in the System Sub-Committee



Services and Function Analysis



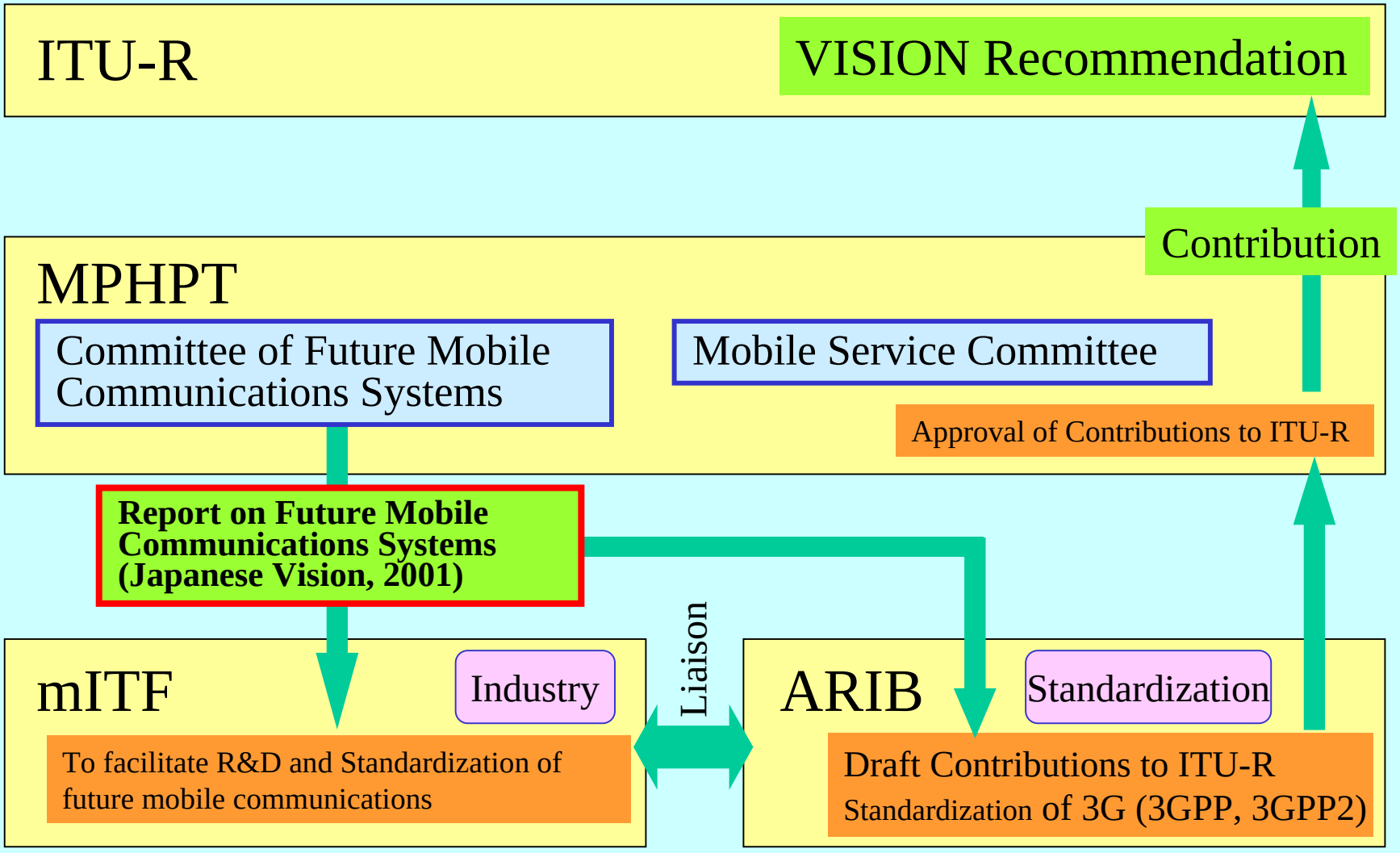
Service Categories

- Mobile E-Commerce
- Medical & welfare
- E-Learning
- Home Security
- Agent/ Personalization
- Business/SOMO
- Translation
- Media/Broadcasting
- Location
- Visual
- Intelligent Communication
- Seamless Network
- Internet Access
- Database/Contents
- E-mail
- Public Works/Manners
- Pricing
- Others

Function Categories

- Security/Authentication/Charge
- User Interface
- Seamless Network
- QoS
- Multi-mode Operation
- Positioning/Navigation
- Remote Database/Server
- High Data-rate/ High Capacity
- High Quality Multimedia
- Input Devices (Camera/Sensor/Microphone)
- Remote Sensing/Control
- Agent
- Terminal Capability/ Ext. IF
- Reconfigurability
- Ad-Hoc NW
- Social/Environmental Adaptability
- Network Installation/Deployment
- Multicast
- Others

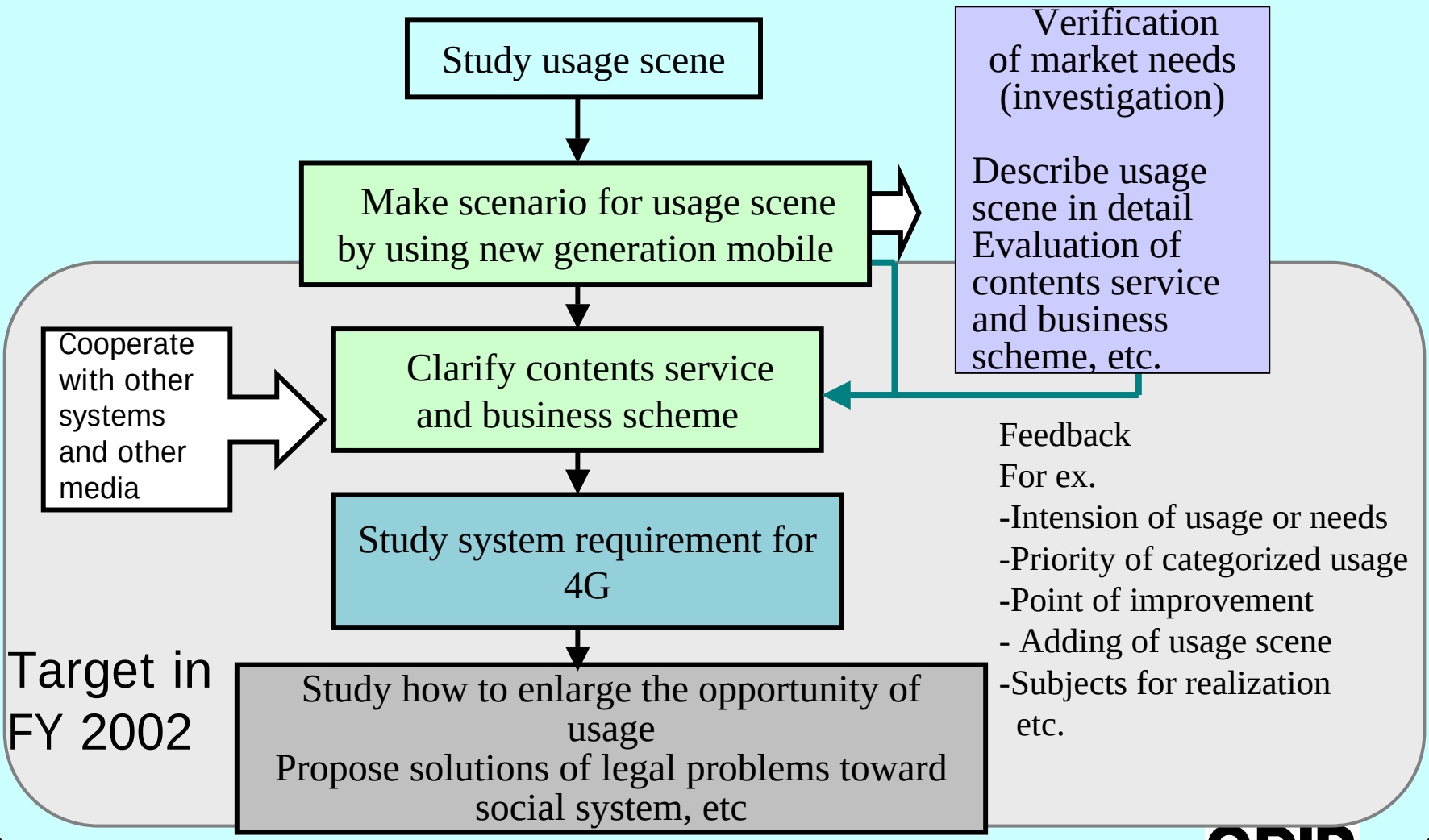
Vision Study



Application Sub-Committee

- Goals of Activities
  - Analyze the business schemes surrounding the mobile industry ten years ahead
  - Clarify the requirements for the system models and required functions, etc. to contribute to creating new business markets
- Near-Term Activities
  - Depict “dreams” indicating usage scenes and visions to push challenges toward new world of mobile communications
  - Study and analysis on content services and business schemes
  - Study to expand usage opportunities
  - Study the requirements for the new-generation mobile communication systems

Activities and Plan of Application Sub-Committee



Preliminary study results

- Analysis of usage scene described in the Telecommunication Council Report by market research
  - find general acceptance for each usage scene
  - find apparent needs for “safety”, “health”and “convenience”.
- Interview to well-informed sources
  - Wider bandwidth does not mean more fun nor more convenient.
  - User’s merits of 4G except for higher bit-rate should be clarified.
  - Acceptance of new services will depend upon cost/price.
  - Real communications between people, that capable to transmit sensitivity and feeling of users, will be most promising. Not a high resolution display nor a high bit-rate motion picture is to be “Real”.
  - “Agent” function will be essential.

Concluding Remarks

- The future mobile communications systems beyond IMT-2000, which create an ultra fast-speed mobile Internet environment and enables seamless communications services, hold the key to realize a world's leading mobile IT environment.
- To achieve this goal, it is strongly required to promote research and development activities capitalizing on technologies and knowledge accumulated in various areas.
- To facilitate the R&D and standardization of future mobile communications systems and services in a smooth and efficient manner, it is indispensable for the concerned parties to work closely with one another, so that they can share information, and promote R&D and standardization activities.
- ➢ mITF is pleased to have this opportunity to exchange information on Systems beyond IMT-2000. mITF would like to seek a way to collaborate with other organizations and academia.

http://www.mitf.org/

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Activities of Mobile Commerce Committee

Mobile Commerce Committee

- Objectives
  - To contribute to the promotion and dissemination of mobile commerce by creating an industry standard at an early date
- Near-term Activities
  - Perform studies on the necessity of standardization particularly for mobile EC, and conduct profiling based on standard technologies
  - Development and standardization of mobile commerce services

FY 2001 Activities of the Committee(1/2)

- Focus Area in year 2001
  - Remote environment (commerce on mobile internet)
- Business Promotion Sub-Committee
  - Identify common requirements applicable regardless of payment and settlement methods
  - Identify requirements depending on payment and/or settlement methods

FY 2001 Activities of the Committee(2/2)

- Technical Sub-Committee
  - Develop reference model based on the requirements identified by Business Promotion Sub-Committee
  - Identify interfaces in the reference model to be studied
  - Study how to apply PKI technology, taking the study results of reference model into account
  - Study technical requirements for credit card payment, and payment through mobile operator

Current and Planned Activities of the Committee

- Studies on local environment (commerce at real retailers)
- Consideration on various payment method
- Business model investigation and analysis
- Studies on plat form type technologies in view of future
- Studies on legal and contractual aspects

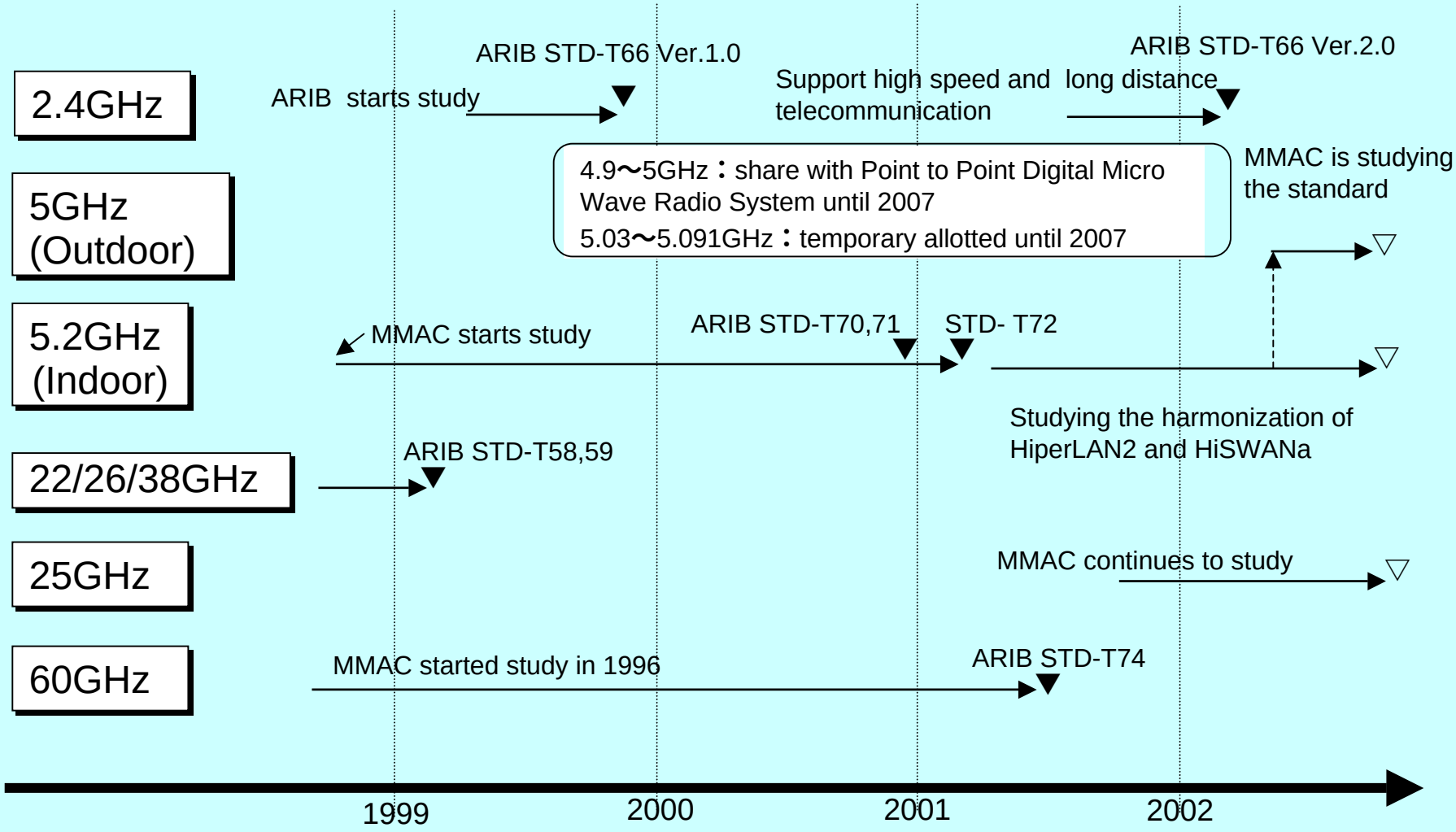
3. Wireless LAN and Wireless Access

Wireless LAN, Access System

Frequency Band	Principal Use	Data Rate	Standardization Status	Current Status	Standardization Organization
2.4GHz	Wireless LAN Wireless access	20Mbit/s	ARIB STD-T66	In Service	ARIB/ IEEE802.11
5GHz (Outdoor)	Wireless access	36Mbit/s	Under consideration in MMAC (*2)	Ministerial ordinance of MPHPT(*1) has been revised on Sept. 19,2002.	MMAC(*2)
5.2GHz (Indoor)	Wireless access Wireless LAN Wireless home link	36Mbit/s	ARIB STD-T70 (HiSWANa) ARIB STD-T71 (CSMA) ARIB STD-T72 (Wireless 1394)	Products started to be on the market	HiSWANa:MMAC /ETSI-BRAN(*3) CSMA:MMAC/ IEEE802.11 Wireless 1394: MMAC (*2)
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	100Mbit/s 400Mbit/s (short range)	Under consideration in MMAC (*2)	Ministerial ordinance of MPHPT has been revised on Feb. 28, 2002.	MMAC (*2)
60GHz	Wireless access Wireless LAN Wireless home link	156Mbit/s	ARIB STD-T74	Some products available	MMAC (*2)

*1 MPHPT: Ministry of Public Management, Home Affairs, Posts and Telecommunications
*2 MMAC:Multimedia Mobile Access Communication Systems Promotion Council
*3 ETSI-BRAN, H2GF(Highper LAN2 Global Forum) and MMAC established Joint Task Force collaboratively

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



Annex: Telecommunications Council Report

- Outlook for Future Mobile Communications System -

TC Report on Future Mobile Communications Systems(1/2)

- **TC (Telecommunications Council) issued a report on Future Mobile Communications Systems on June 25, 2001**
- **Image of Future Mobile Communications Systems**

  - Capability to handle high speed multimedia
  - Service portability, seamlessness among networks
  - Ability to support highly advanced application such as mobile EC
  - The Systems are collective entities, consisting of Systems beyond IMT-2000, Enhanced IMT-2000, High-speed wireless access, etc.
  - The above systems interworks to provide seamless environment to user.
  - Phased development(about 30Mbps(down link) around 2005, 50-100Mbps around 2010)

http://www.arib.or.jp/IMT-2000/docs/Committee-Report.pdf

TC Report on Future Mobile Communications Systems(2/2)

- Areas of Future Mobile Communication Systems (2010)