PRESENTATION AT TELECOM 99

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IMT-2000 STANDARDIZATION

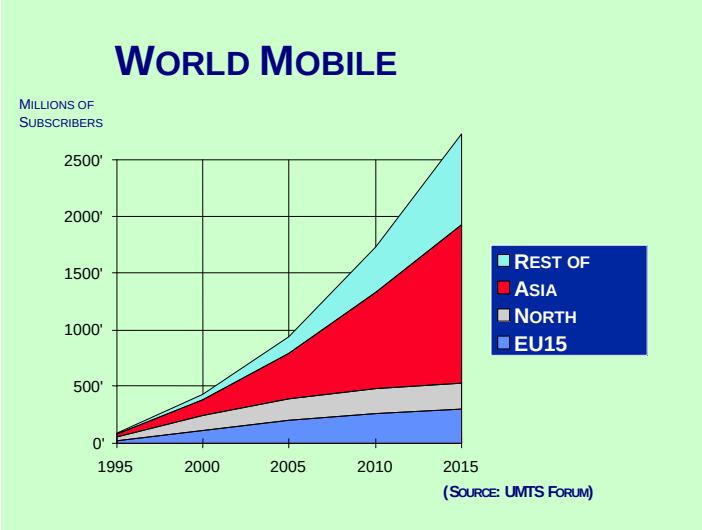
I greatly appreciate the opportunity to present details of the ITU standardization work on IMT-2000. It has been very encouraging to hear presentations at TELECOM 99, by leaders of both the telecommunications and computer industries, emphasizing the dominant role of wireless access to the Internet in the 21st century.

The ITU became involved in global mobile standards more than **10 years** ago when cellular mobile was in its infancy and **hand-held** cellular phones were just starting to appear. Most mobile phones at that time were vehicular but some ITU-R delegates believed that eventually hand-held "**personal communicators**" would dominate future telecommunications. Initial work focussed on IMT-2000 spectrum requirements in preparation for the **1992 World Radio Conference** at which **230 MHz** was identified for IMT-2000 on a global basis.

IMT-2000 aims to encourage **global service provision** and **convergence** of the many essentially competing wired and wireless access technologies. The IMT-2000 global standard provides the inherent flexibility necessary for today's' operators to **seamlessly evolve their networks** towards the needs of the information age.

This talk provides some general **background** on ITU standards activities associated with IMT-2000 and an update on current work, particularly that of Task Group 8/1 on the **radio aspects** of IMT-2000.

We have all witnessed the dramatic growth of mobile and Internet services over the last 10 years, well beyond even the most optimistic projections some years ago. This very strong mobile **growth** is predicted by the UMTS Forum to continue, with almost 3 billion mobile users now estimated by 2015. These predictions also show that future mobile growth will be predominantly in Asia and the **developing** world. Wireless is predicted to exceed wired access some time between **2005** and **2010.**



A growing area, not covered by this slide, is inter-device communications with no human involvement, e.g. **smart agents** gathering and sorting information. These devices could well significantly exceed "human" communicators in the 21st century.

Wireless will clearly be the primary technology for improving worldwide access to the future global information infrastructure. It will not be long before we ask:

"PHONES USED TO HAVE WIRES - WHY?"

IMT-2000 encompasses most of today's radio scenarios including both **satellite** and terrestrial components. **Fixed** and **mobile** together with **public** and **private** systems are included, incorporating a much **wider range** of services and mobile terminals than any of today's radio systems.

The primary ITU **objectives** for IMT-2000 are:

- Flexible/seamless global service provision,
- Improved operational **efficiencies**, particularly for data and **multimedia** services,
- Suitable technology for reducing the telecommunications "gap", i.e. offers cost effective access for the more than **4 billion** people who do not presently have a phone.

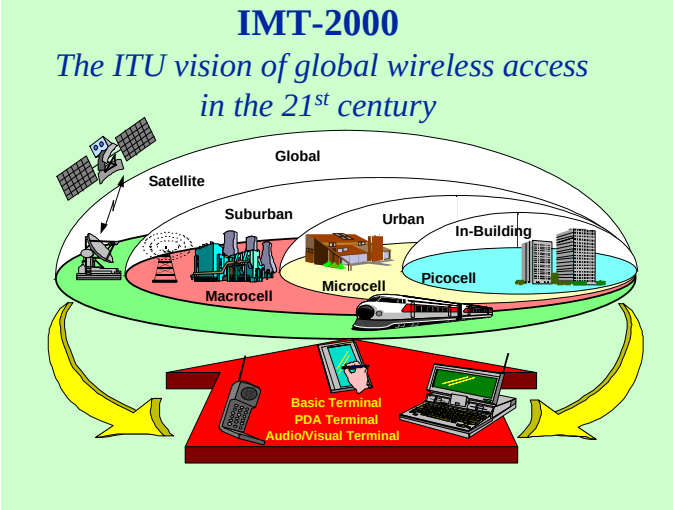
The phenomenal growth of **mobile** systems and the **Internet** have clearly indicated customers needs: **Interactive asymmetrical multimedia** services, in addition to **voice**, **anywhere - anytime.**

A major requirement of future wireless multimedia services will be the need to offer a **range of quality levels** to match the differing needs of the various multimedia service components.

IMT-2000, a **strategic priority** of the ITU, offers great potential for improving future access to the global telecommunications infrastructure.

Many different member organizations are currently involved in the ITU's IMT-2000 standardization activities including: **regulators, standards development organizations (SDOs), operators** and **manufacturers.**

The ITU has taken a "**top down**" approach to the definition of IMT-2000, in close cooperation with

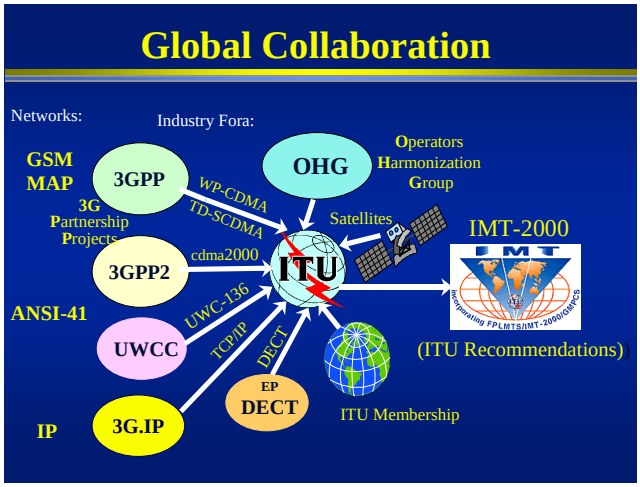


the wide range of telecommunications industry representatives who form the ITU membership.

The ITU has also taken steps to facilitate the availability of adequate spectrum on a global basis for IMT-2000. Developments since the 1992 **World Radio Conference,** e.g. higher bit rate services and very strong mobile growth, have resulted in the need for additional IMT-2000 spectrum. This will be dealt with at the radio conference in the year **2000.**

A recommendation to facilitate **free circulation** of mobile terminals is currently being developed. Over **20** other IMT-2000 recommendations have been produced to date.

Licensing of **IPR** according to ITU patent policy will ensure open global standards.



IMT-2000 standards development involves extensive global collaboration between many different organizations.

Today's operators need **seamless evolution from** their various **2G** networks**.**

Many **focus groups** have been established by **industry:**

- Technology-based **2G** operator associations (e.g. **GSM** association, **CDG**, **UWCC**, **DECT** forum).
- A number of **3G** groups have also been established:
  - ☞ UMTS forum
  - ☞ Operators have formed a group to harmonize their requirements for IMT-2000 (**OHG**).
  - ☞ Focus group for **IP**-based 3G architecture (**3G.IP**).

SDOs have created **3G partnership projects** to harmonize regional requirements.

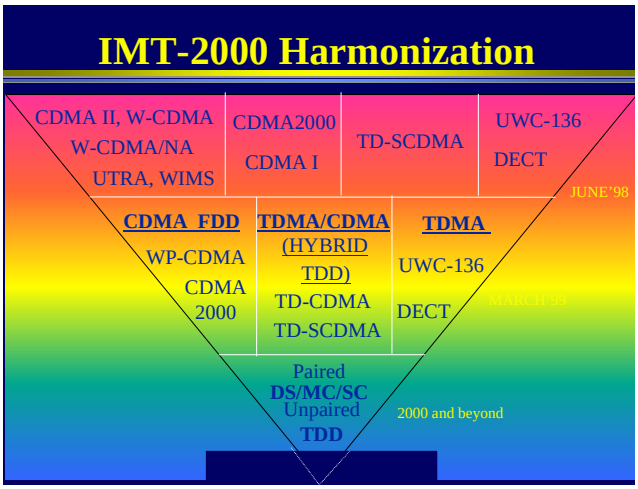
Satellite radio interface proponents, who are generally not SDOs, provide complementary coverage to terrestrial systems and ensure that IMT-2000 provides services "anywhere - any time" .

Standardization of IMT-2000 involves a **team approach** with the ITU, 3GPPs, SDOs and other related organizations. **Contributions** from members drive the **ITU** process.

I would now like to focus on the **radio** aspects:

10 **terrestrial** radio technology proposals, plus 6 **satellite** ones, were received in June 1998.

The slide shows the terrestrial proposals received by the ITU and their progressive consolidation into the **key** characteristic recommendation in March 1999.



Further **harmonization** is ongoing, under the guidance of the operator harmonization group (**OHG**), to maximize commonality amongst the **building blocks** within IMT-2000 and to simplify their digital implementation in a hand-held mobile phone.

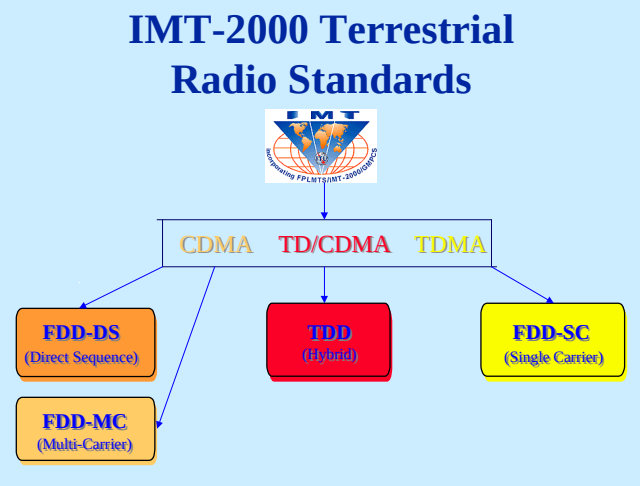
Satellite proposals, which represent essentially the first generation of mobile communications to a hand-held device, can be expected to offer increasing levels of harmonization with terrestrial radio interfaces as they evolve into future generations over the operational life of IMT-2000.

IMT-2000 offers significant **flexibility** within a single standard.

This has proven to be necessary because today's **operators** have many different starting points for their evolution towards IMT-2000, because of their various operational scenarios:

Some operators, including those who already operate 2G systems, will deploy IMT-2000 in **clear/new spectrum.** While others, e.g. some existing operators will want to **overlay** IMT-2000 and pre-IMT-2000 (**2G**) systems in a common band.

The slide shows a **simplified** view of a possible final outcome of the ongoing imt-2000 harmonization process.



FDD choices include options which have been specifically optimized for evolution from **TDMA** or **CDMA** 2G systems sharing common bands as well as for deployment in new/cleared spectrum.

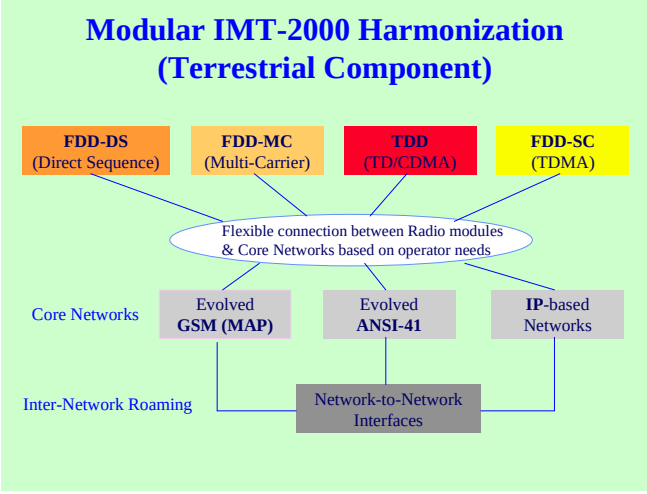
TDD, which is still being actively harmonized**,** enables use of unpaired spectrum. Present options include **hybrid CDMA/TDMA** as well as **TDMA only** proposals.

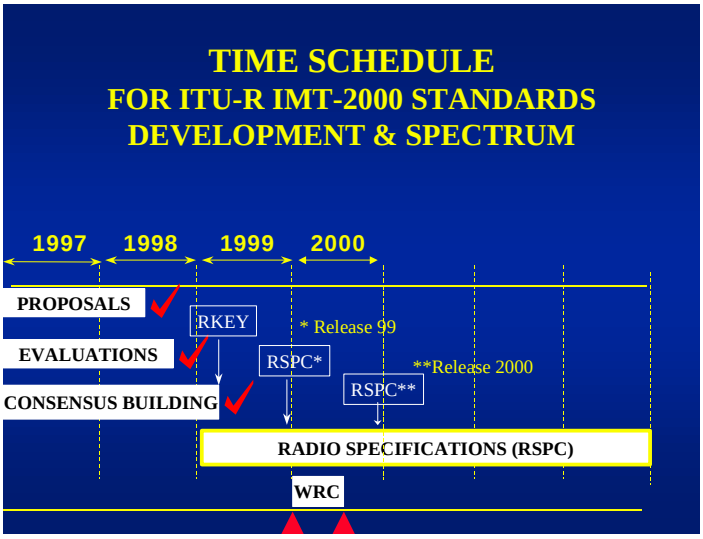
Operators can choose the best way to **evolve** their specific network structures towards full IMT-2000 capabilities.

A basic ITU objective is to ensure seamless **roaming** across all IMT-2000 networks. A modular approach allows **IMT-2000** radio access **building blocks,** and in principle also pre-IMT-2000 radio accesses modules, to be mixed and matched with various core networks.

Flexibility within the imt-2000 standard must, however, be **transparent to users**, i.e. One mobile phone works everywhere **without significant penalties in size, cost or battery life. Software-defined radio** technologies can be expected to allow progressively increasing flexibility without incurring significant penalties in hand-held mobile units.

A major objective of harmonization within the IMT-2000 standard is to allow operators the flexibility they need while at the same time facilitating digital implementation of these various options. It is expected that with the digital technologies available early in the next century and with careful choice of the various parameter options, a future mobile unit will be able to readily adapt to the specific needs of its chosen access network.





Future milestones:

Radio interface specifications. (**RSPC-1999**) Nov. **1999**

Additional IMT-2000 spectrum (**WRC-2000**) June **2000**

Further specification releases (**RSPC-2000+**) **2000+**

Ongoing ITU studies **(IMT-2000 enhancements) 2000+**

Ongoing ITU studies **(systems beyond IMT-2000) 2000+**

A very **aggressive ITU standardization schedule** has been adopted to meet industry needs.

Maximum use has been made of **electronic working methods**, e.g. the global evaluation of 16 RTT proposals by 12 independent groups in only 3 months. (It would have been challenging just to distribute the mass of paper, i.e. proposals and evaluation reports, in this time scale!) Electronic versions of proposals were posted on the **ITU IMT-2000 web site**, as received, allowing evaluators around the world maximum time for their work.

The **key characteristics** of IMT-2000 radio interfaces (recommendation **RKEY**) were defined by Task Group 8/1 in March 1999 and will be presented to Study Group 8 in November 1999.

The **first release** of the IMT-2000 radio specifications (**RSPC-99**) will be defined in November 1999, with final ITU approval at the radiocommunication assembly in May 2000. A decision on additional **spectrum** for IMT-2000 will be made at the world radio conference in June 2000.

Ongoing ITU studies on enhancements to IMT-2000 leading to further releases of **updated** IMT-2000 radio specifications from 2000 onwards.

Preliminary ITU studies on systems beyond IMT-2000.

The **Beijing** TG 8/1 meeting in June 1999:

- Establish-ed the basic radio interface specification (**RSPC**) **structure** and the cooperative **working methods** with 3GPPs & SDOs.

- It was agreed that RSPC would include **references** to 3GPP and SDO material but that ITU members would have transparent access to all RSPC text, whether directly incorporated or referenced, so that the ITU would become a " **one stop shop**" for IMT-2000 recommendations.

- The meeting also approved a new question on **future ITU-R studies** on IMT-2000 and systems beyond IMT-2000.

A recent meeting in Geneva (**Sept. 20-21st**) between the ITU and 3GPPs and SDOs discussed many IMT-2000 process, publication and time scale matters and agreed on "one stop shop" issues such as copyright.

The **Helsinki** meeting of TG 8/1 in October/November will develop the first release of the IMT-2000 radio specifications (**RSPC-99**).

SG 8 meeting in Geneva, later in November, will consider recommendations **RKEY** and **RSPC-99** and decide how future work on IMT-2000 and systems beyond IMT-2000 will be organized in ITU-R.

The IMT-2000 standard will provide the **flexibility** industry needs for 21st century telecommunications.

CONCLUSIONS

ITU STUDIES ON IMT-2000 AIM TO ENSURE:

- SEAMLESS WIRED/WIRELESS NETWORKS
- HARMONIZED SPECTRUM AND STANDARDS
- SEAMLESS SERVICE EVOLUTION
- FLEXIBLE ACCESS FOR THE 21ST CENTURY
- FOLLOW IMT-2000 STANDARDS PROGRESS

The ITU has effectively **two** customers for the IMT-2000 standard: **operators**, who will deploy imt-2000 networks, and **users** who will pay for imt-2000 services.

Remember that **users** see services not the technologies that deliver them! **2G** systems competed on technologies but hopefully **3G** will compete on the basis of services.

Multi-mode handsets can, I believe, provide seamless service evolution to IMT-2000 from all today's 2G footprints.

Future users will want to move effortlessly through both wired and wireless access.

The **ITU**, its 3GPP and SDO **partners** and the global telecommunications industry all have a **common interest** in seamless **wired/wireless** telecommunications worldwide.

ITU recommendations enable **global economies** thus facilitating economic access to information for both developed and developing countries and contributing towards improved communications around the world.