World Class Standards

Evolution and Globalisation of the GSM/UMTS Standards from 1994 to 2000

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Contributor to GSM from 1984 on

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9 March 2007

GSM…younger than ever

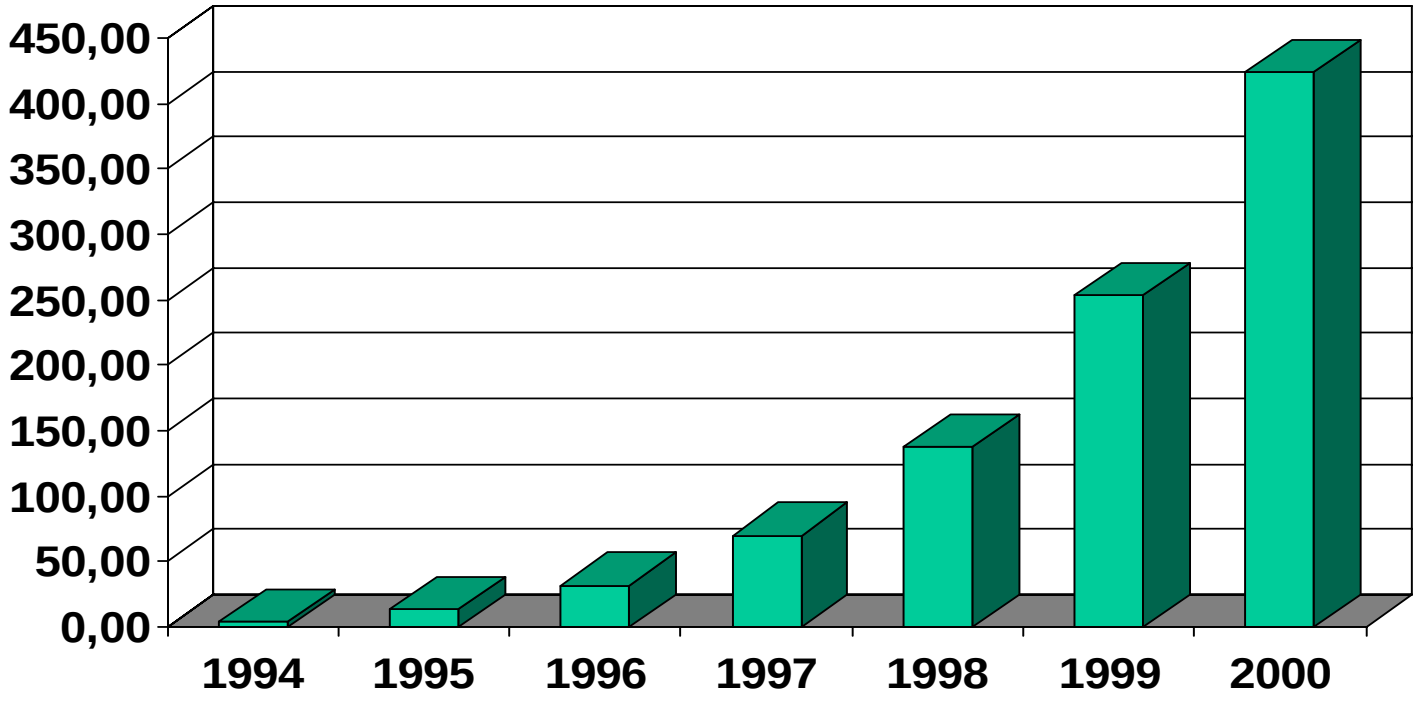
Lemesos, Cyprus

15 – 16 March 2007

(1) Numbers of Subscribers, Countries and Networks mushroomed in 1994 to 2000

GSM Users grew rapidly

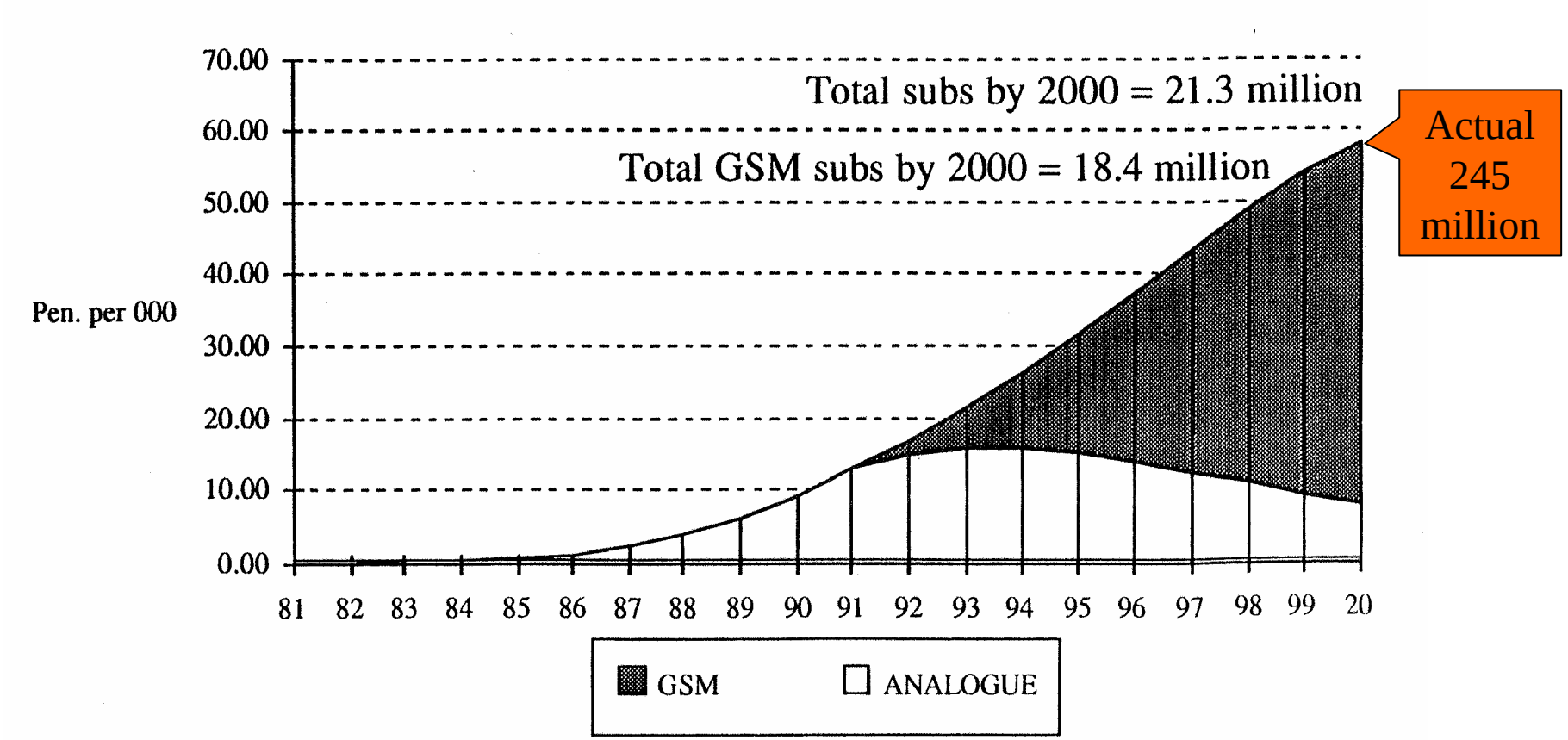
Million users



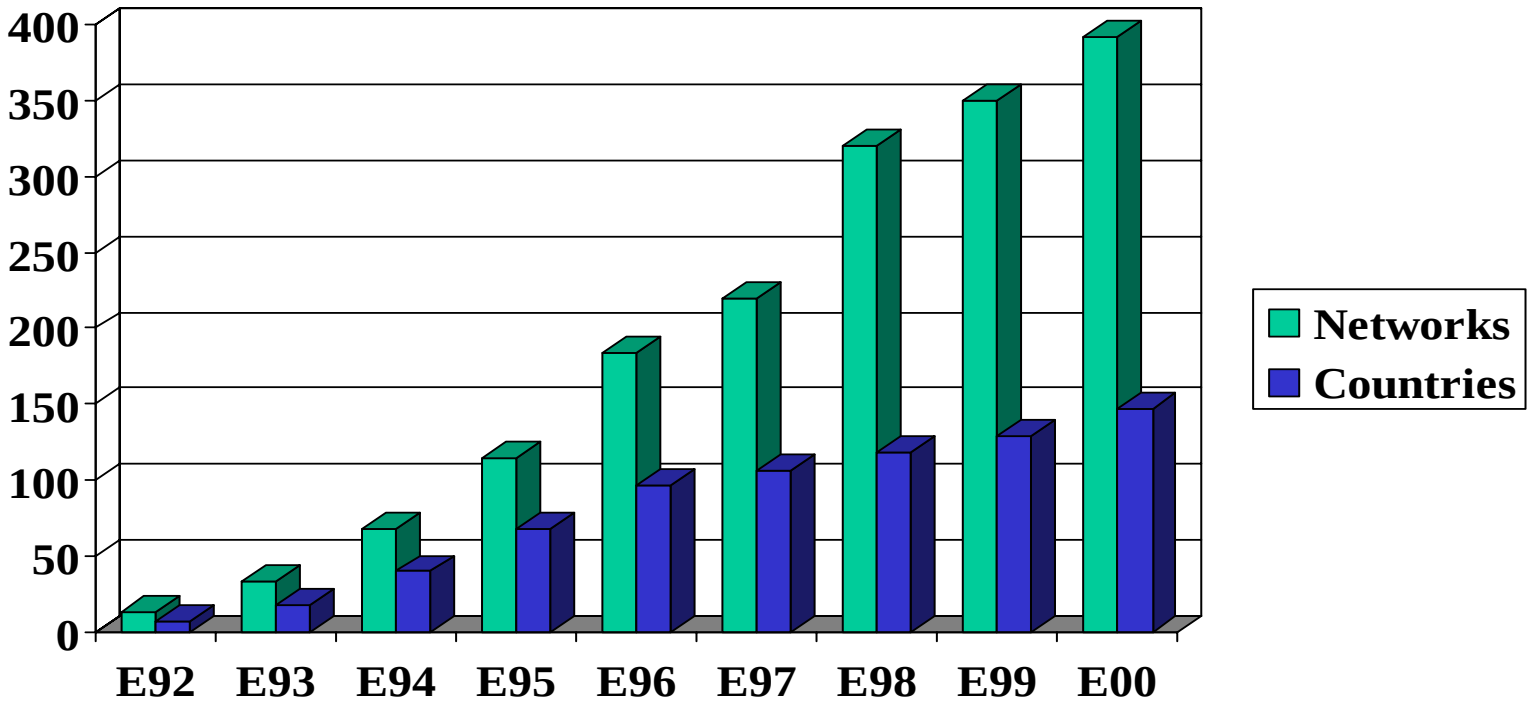
Source: EMC World Cellular Database

Everybody was surprised by the explosive Growth: Forecast for Western Europe made in Sept. 1990

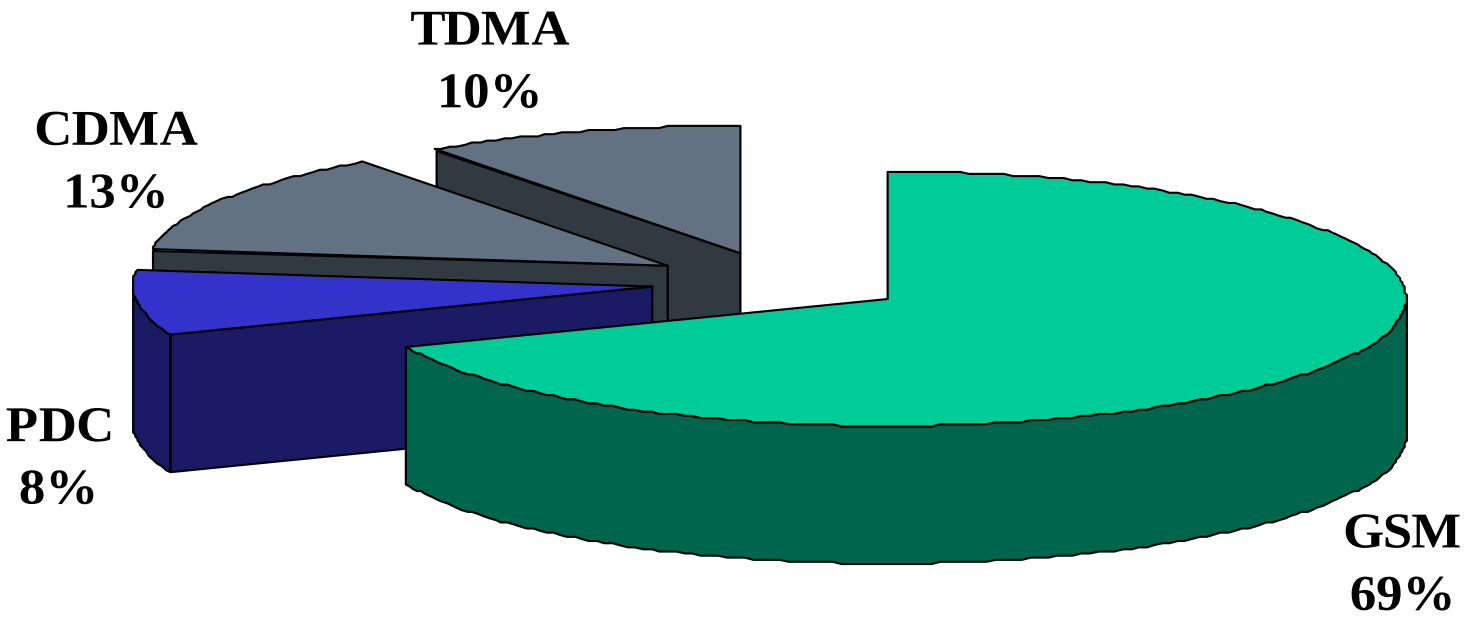
(PA Consulting Study for the CEC)



GSM took the world by storm



GSM became the preferred cellular Standard



Source : EMC World Cellular Database end of 2000

(2) To support the Growth, Standards were evolved by the GSM Phase 2+ Program and the UMTS Concept in 1994 to 2000

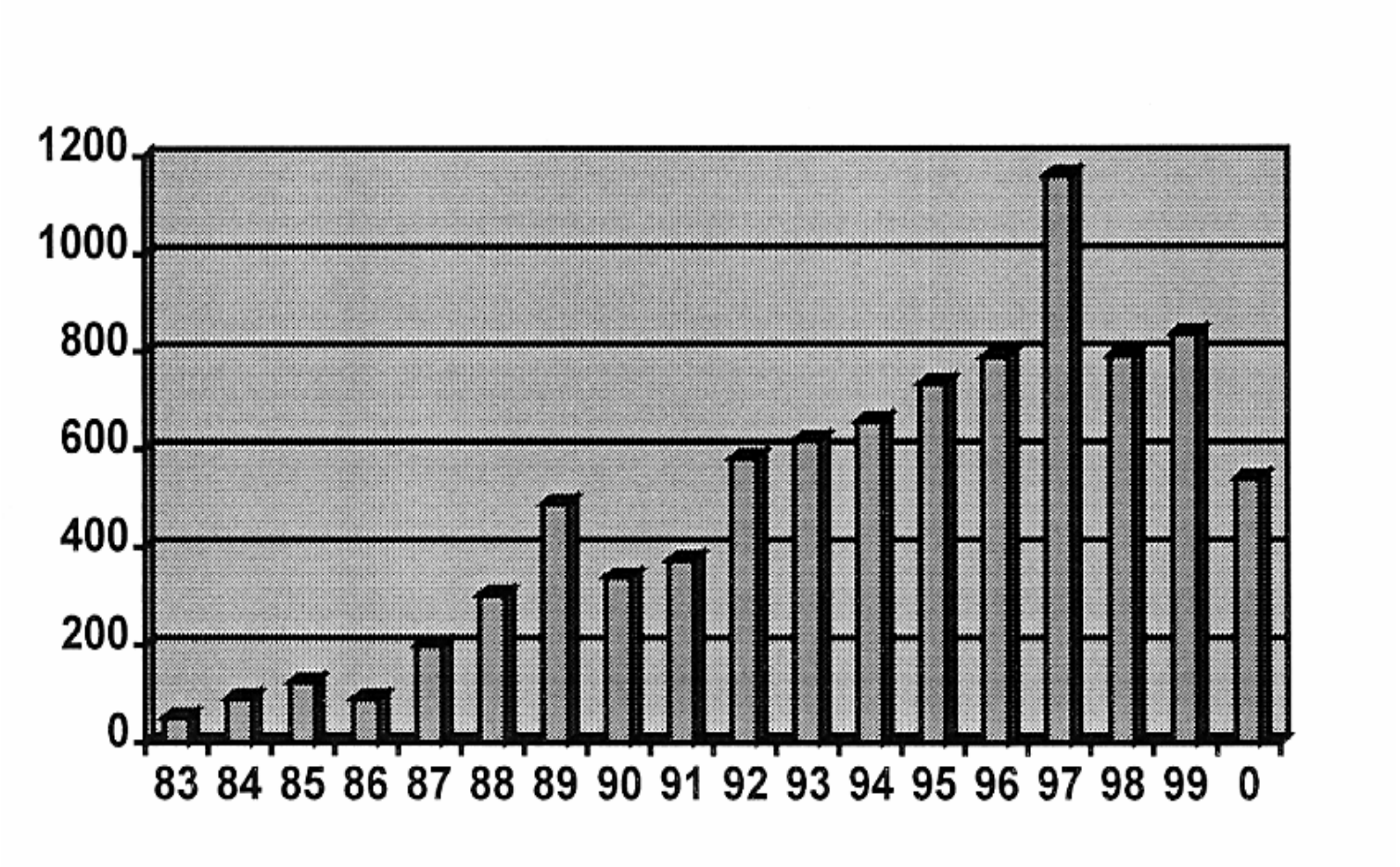
GSM Growth was supported by a feature Evolution in the Phase 2+ Program (Releases 96 to 99)

- New service functions
  - CAMEL
  - SIM/ME personalisation
  - SIM toolkit
  - MNP
  - MEXE
  - LCS
  - CCBS
  - ASCI
  - Interworking with satellite based systems
  - MMS (basic)
- High speed data
  - EDGE
  - HSCSD
  - GPRS
  - WAP
- Better speech quality
  - EFR
  - AMR
  - TFO
- Improved security
  - FIGS
  - A5/1 full key length
  - IMEI security

UMTS Agreements of Concepts and basic Decisions

- Basis of the SMG work were agreements in the UMTS Task Force Report March 96
- Promotion of UMTS, spectrum and regulatory aspects were treated by the UMTS Forum, a close link existed between the UMTS Forum and ETSI SMG
- Agreement on the (GSM based) UMTS strategy was reached in ETSI SMG by Feb. 1997:
  - Services innovation (e.g. VHE concept)
  - Continuity for GSM services and evolution from GSM
  - Specification of one new UMTS radio access network
  - Specification of an evolved core network as first phase and a new core network as second phase
  - Proposal of the IMT-2000 family of systems concept to ITU and agreement that UMTS should be one member of the IFS in spring 97
  - Start of an intensive cooperation with ARIB and TTC in Japan
- Basic concepts of the UMTS standard were agreed by March 1998
  - UMTS services concept)
  - UMTS system architecture
  - UTRA (Universal Terrestrial Radio Access):
    - UTRA definition procedure,
    - agreements on requirements,
    - five concept groups,
    - decision on a single solution in SMG#24bis Jan 98
- UMTS reports and raw specifications February 1999 with large participation from US (ANSI T1P1), Japan and China
- Transition to 3GPP

A tremendous Growth of Temp Docs in Plenaries



Temp docs were unavoidable, but technology breakthroughs were essential for the success

(3) The global Co-operation was re-structured to secure the Integrity and Consistency of Specifications in 1994 to 2000

Cooperation Agreement between ETSI and the GSM MoU Association in 1996

- 1987 to 1989 a very close liaison between the standardisation group CEPT GSM and the GSM MoU Group existed
- During the installation of the GSM networks and the opening years of the GSM service the operators focussed very much on their business and the competition in their markets. There was not much focus on standards.
- In 1994/5 ETSI agreed new models for standardisation work, e.g.: a far reaching autonomy for Technical Committees and the concept of an ETSI Partnership Project . This initiated an interest in GSM MoU to re-vitalise the cooperation with ETSI
- A cooperation agreement was signed in early 1996 which foresaw
  - Recognition of the roles of the organisations: GSM MoU as lead for services requirements and ETSI as responsible for the standards
  - Exchange of documents and of observers from both organisations
  - Better participation possibilities and better access to information for non-European GSM operators
  - Financial contribution of GSM MoU to the technical support team of ETSI GSM
  - to make efforts to maintain the integrity of GSM by close liaison with ANSI
- This agreement formed a stable environment for the work of TC SMG

New working together for GSM between ETSI SMG and ANSI T1P1 introduced in 1996/7

- Before this new methodology two independent sets of specifications existed. This was triggered by regulatory reasons in the US and in Europe
- But there were already the first inconsistencies emerging. And the danger for more was imminent
- But there were also different market needs, e.g. speech quality which led to the acceptance of the US proposal of the EFR codec
- Since a quick remedy was necessary a pragmatic evolutionary approach was agreed between ETSI SMG and ANSI T1P1:
  - To merge the two sets of specifications into one common set
  - And to evolve it using an innovative coordinated working method by both committees
  - Each work item was approved in both committees
  - A lead committee was agreed for the work
  - The other committee accompanied the work by review and comments
  - The results were approved in both committees
- The agreement was made in 1997 and then implemented in steps. It improved the integrity of GSM. But the working process was cumbersome since great efforts were needed for coordination. But it helped for some time. And it brought different worlds together

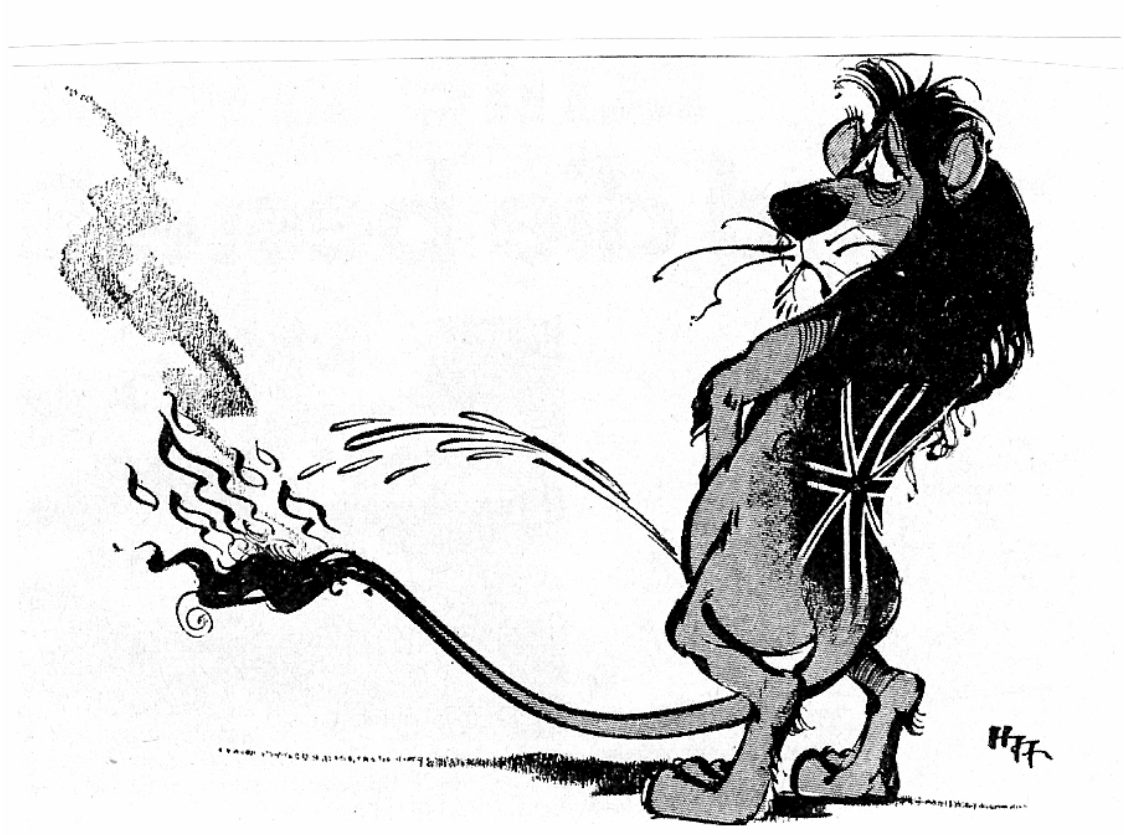
Integration of Chinese Requirements

- In 1994/5 China had accepted GSM as the first national standard for digital cellular and started to implement large networks based on the ETSI specifications.
- In order to get some specific additional requirements fulfilled (e.g. numbering space in MAP for very large networks), they started independent specification work on the GSM MAP. It should be noted that they could not become ETSI members at that time.
- The independent development would have endangered the global integrity of GSM (market volume and roaming). Therefore integration of Chinese requirements into the GSM Specifications was essential, since China would become a very large market
- ETSI SMG took the initiative and agreed with Chinese authorities and operators that they should introduce their requirements fully in the SMG work process and that they could participate fully in the work process based on Chairman's invitations to meetings. The first meeting they participated was SMG#23 in October 97 in Budapest.
- This method was implemented in 1997. It secured the integrity of GSM between China and the rest of the world for some time. Later they became associate members.

Close cooperation with ANSI 136 community to evolve EDGE and GPRS as a common technology

- A close cooperation between the GSM community and the second largest TDMA based community promised some synergy potential.
- In order to enable synergies, the ANSI136 community chose EDGE and GPRS evolution as their solution for a third generation system
- This was enabled and supported by a close cooperation between ETSI SMG and UWCC. A framework agreement was concluded between ETSI and UWCC
- ETSI SMG took the UWCC requirements into consideration in the development of EDGE and GPRS. This included a version EDGE Compact which could be implemented with very little spectrum in the 800 MHz band
- UWCC delegates took part regularly in ETSI SMG meetings
- This method enabled synergies with the UWCC community. It led in the end to an acceptance of GSM in this world.

During the Period from 1994 to 2000
we had often to help ourselves resolving Issues



(4) The Organisation Revolution for the Global Opening of the Standardisation Work in 1998

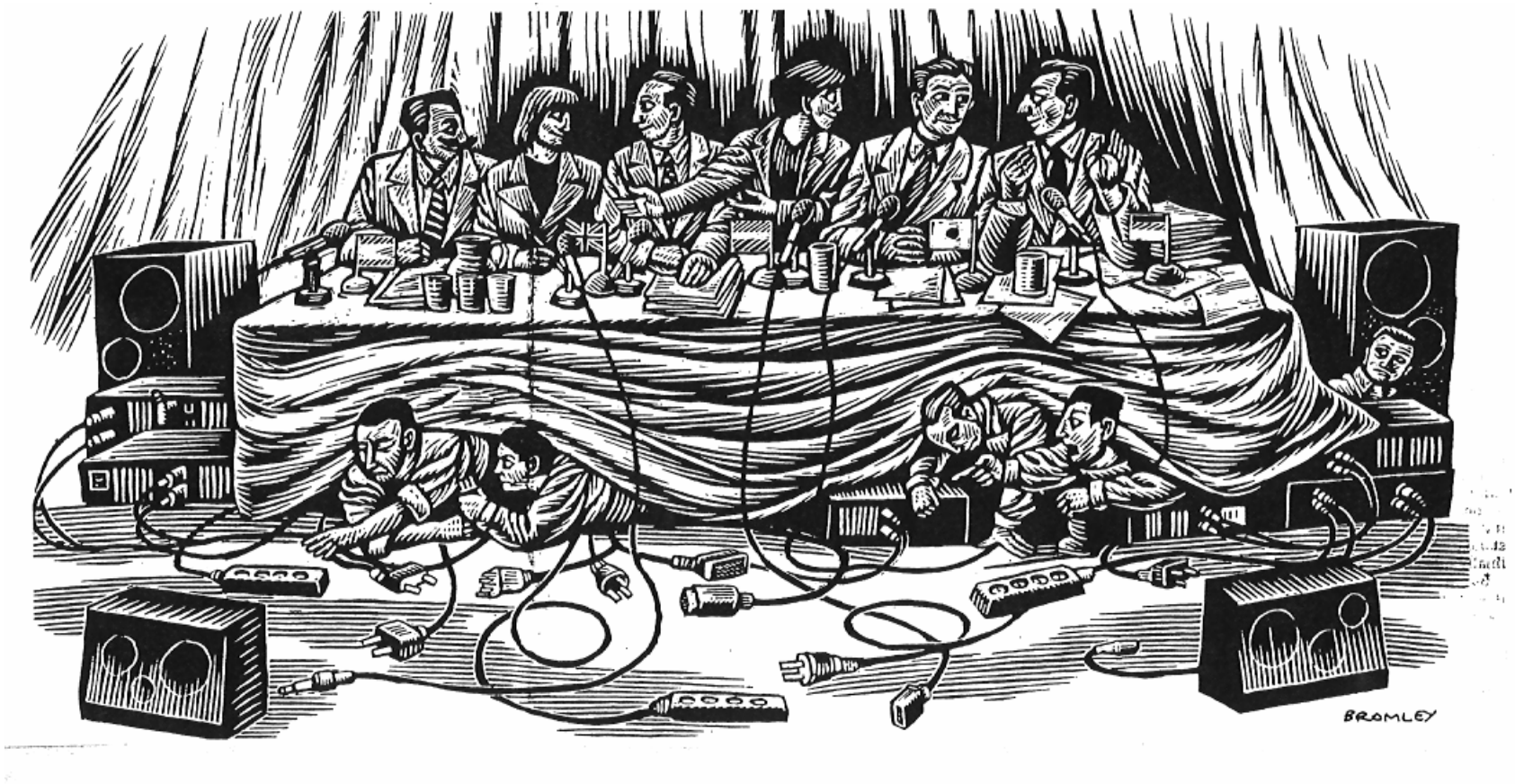
Explosion of the Cooperation Complexity in early 98

- ETSI SMG was the hub of a complex cooperation mechanism
  - GSM: links with US ANSI T1P1 and Chinese parties
  - UMTS basic work: cooperation with ARIB/TTC and ANSI T1P1
- The UTRA decision and the agreement on other UMTS cornerstones opened the way to a a common 3G system in Europe, China, Japan, Korea and US
- For the detailed specification work from January 98 onwards there were announcements that ARIB wanted to do radio specification in parallel with ETSI SMG and TTC wanted to specify in parallel the evolution of the GSM core network evolution. Also ANSI T1P1 wanted to start specification work on 3G. There would have been no overall decision making body.
- This level of complexity was seen as unmanageable. The danger was imminent that the big strategic effort to reach a common global basis for 3G by the UTRA decision would have fallen apart by inconsistent standards elaborated in the different parts of the world

Need for an open global Standardisation Environment for GSM and UMTS, Initiation of 3GPP

- ETSI SMG#24 in December 98 “SMG agreed in principle that a more efficient global co-operation is needed for future GSM and UMTS standardisation. It was felt necessary to enable the full participation of relevant parties outside ETSI and to avoid complex co-operation structures between different standardisation bodies. The SMG Chairman was charged to explore with all relevant parties, whether one joint working structure avoiding parallel work and overhead coordination could be implemented in the framework of an ETSI Partnership Project.“ (SMG#24 meeting report)
- The result of the explorations with ARIB/TTC and ANSI T1P1was:
  - There is an interest to create common specifications
  - It should be further explored whether a common working structure (“the Project”) could be created to produce common specifications
  - Such a Project would need an appropriate relationship to standardisation bodies
  - A transition phase into the full implementation would need to be worked out
- This initial agreement led to the creation of 3GPP. More in tomorrow’s presentation of k. H. Rosenbrock

True global Cooperation: 3GPP at Work



(5) Achievements of the Period 1994 to 2000

- In the world market GSM became the “Global System for Mobile Communication”
- GSM standardization work had a strong feature evolution which made GSM a 2.5 G system
- Strong efforts were needed to preserve the global integrity of the GSM specifications within a complex working structure
- UMTS basic elements were elaborated in an osmotic relation between ETSI SMG, ARIB/TTC and ANSI T1P1
- A consensus on the UMTS (3G) cornerstones was achieved between ETSI, ARIB/TTC, ANSI T1P1 and Chinese and Korean Partners
- A new global working structure was initiated to create one set of globally applicable Technical Specification for GSM and UMTS

Dear Colleagues, you requested some data!

I hope you enjoyed them !