The Wireless Tidal Wave

EU Research on the move

J.Schwarz da Silva

European Commission, DG INFSO

GLOBAL IPv6 SUMMIT -

Madrid - 29/01/2001-01/02/2001

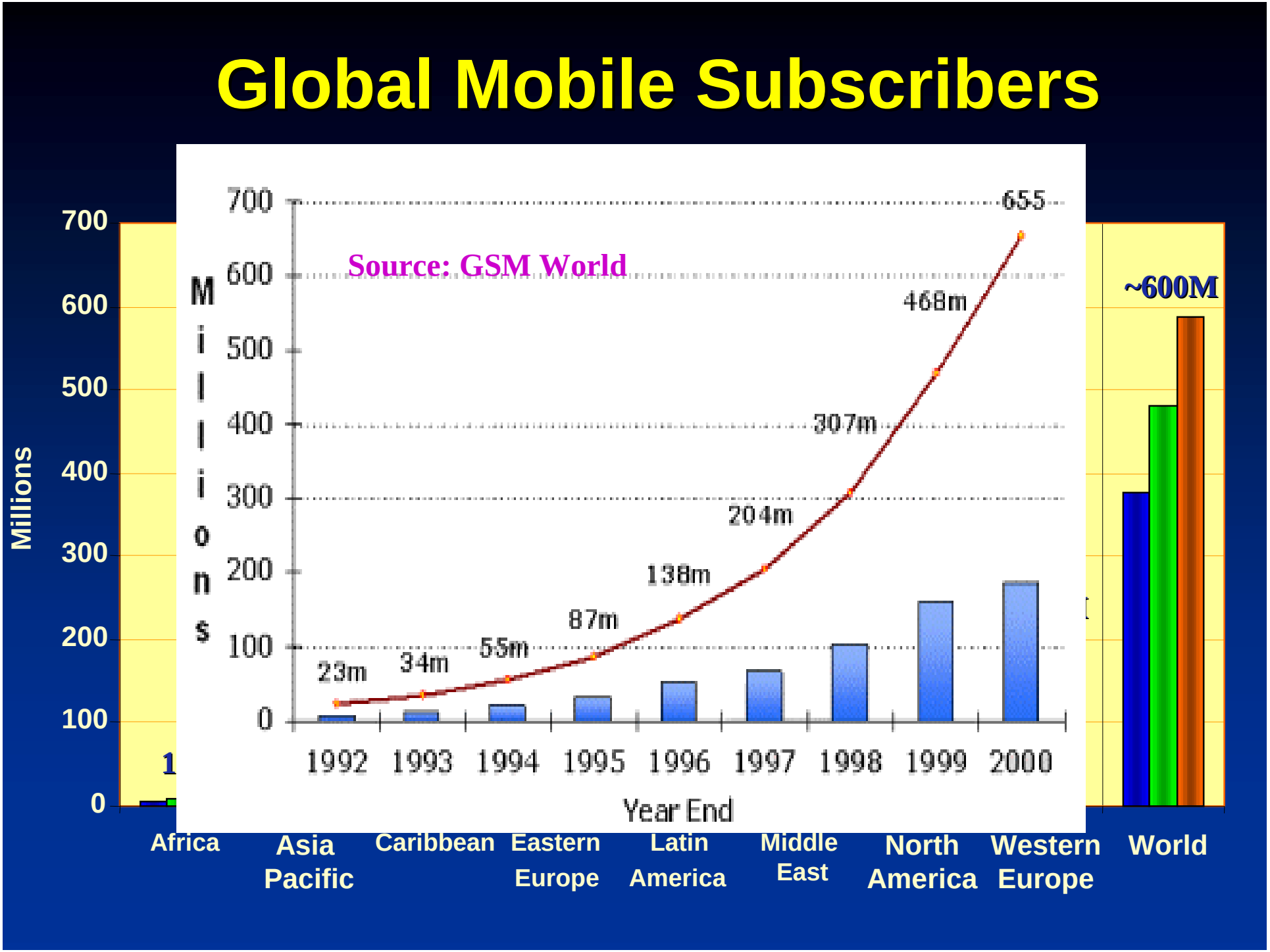
Portulan Charts

Portulan charts were made to get seafarers from home to another place and back again safely. On portulan charts prior to 1500, distance, direction, and coastal features were provided for navigators, with information to enable them to calculate and measure the progress and direction of their vessels during a voyage; mariners still had to rely on experience and common sense, however. Modern sea charts have many of the characteristics that the early portulan charts have–scale, compass, details of coastlines and harbours and little detail in the interior.

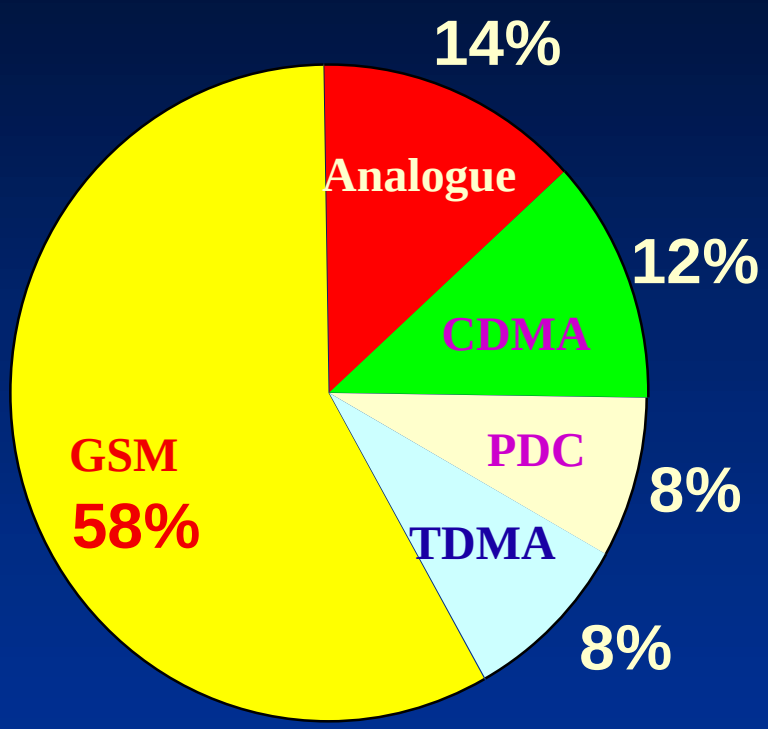
Outline

- The Explosive Growth of Mobile Communications
- EU Investment in IPv6
- The Challenge of the Next Wireless Generation

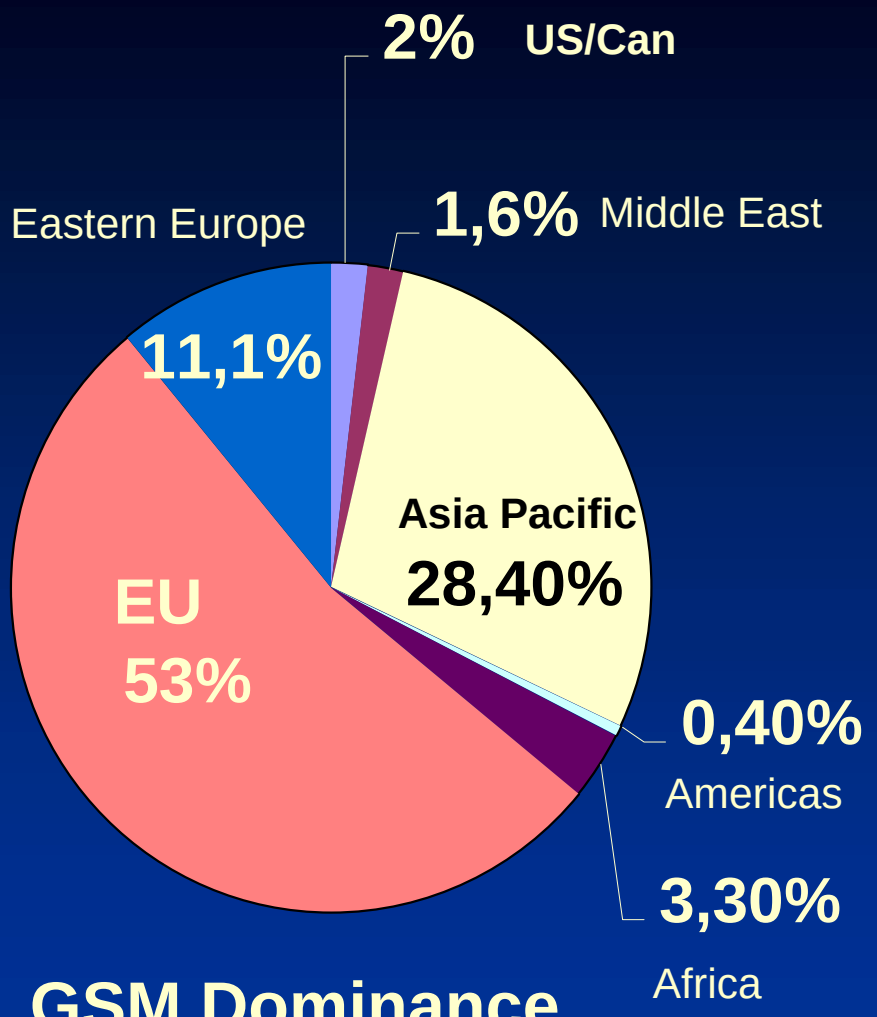
Global Mobile Subscribers



Mobile Market Indicators

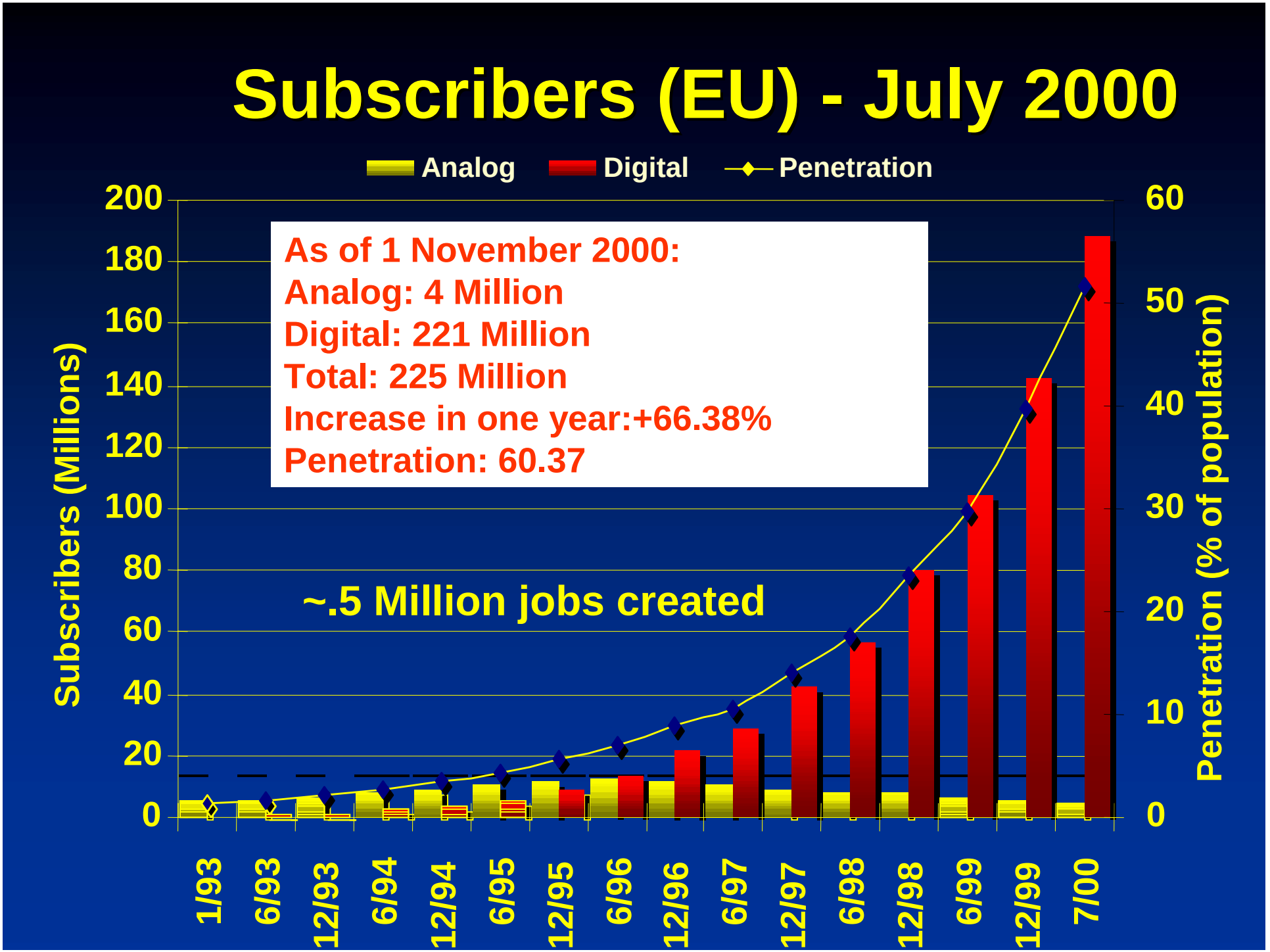


Technologies Market share



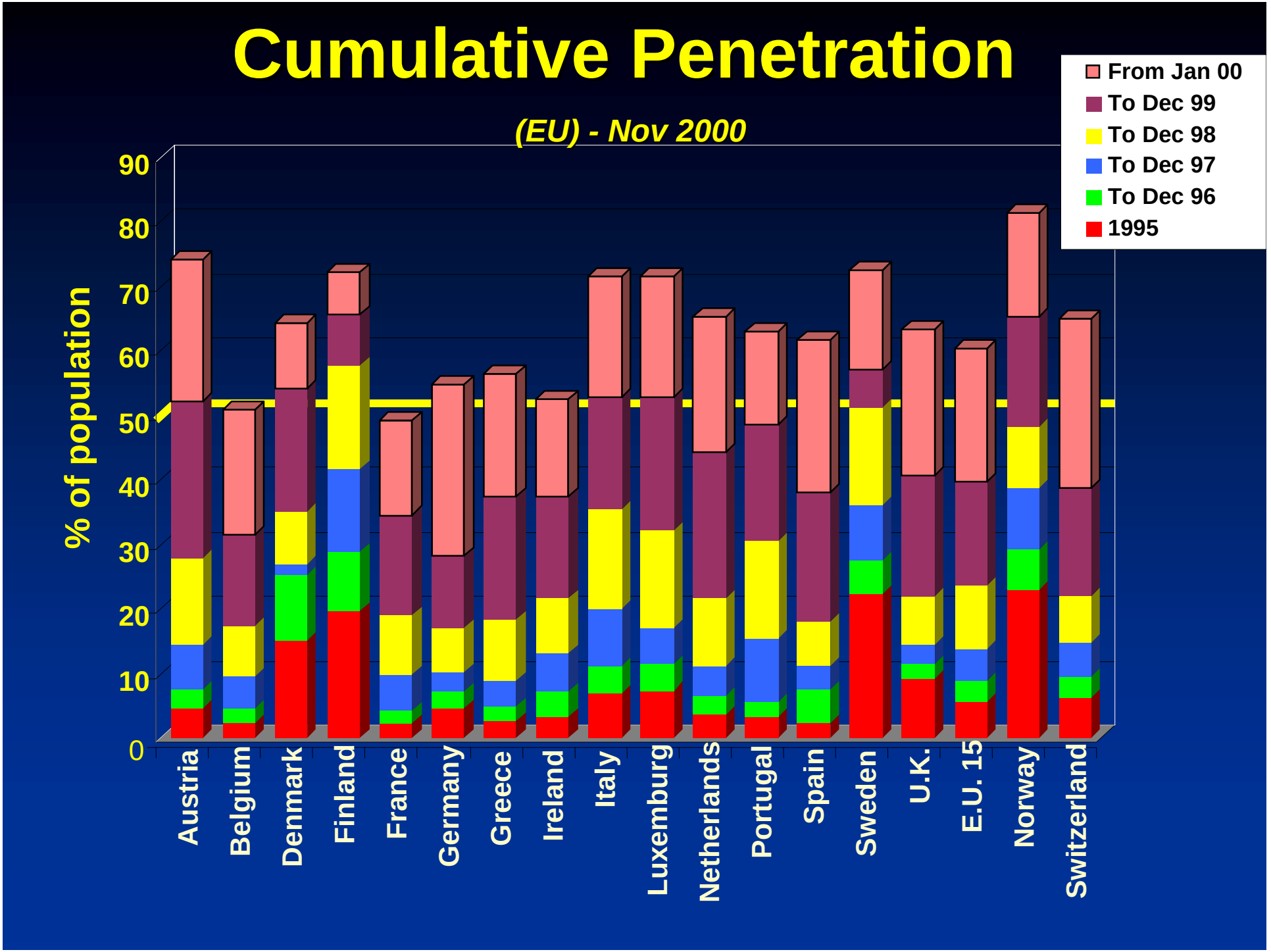
GSM Dominance

Subscribers (EU) - July 2000

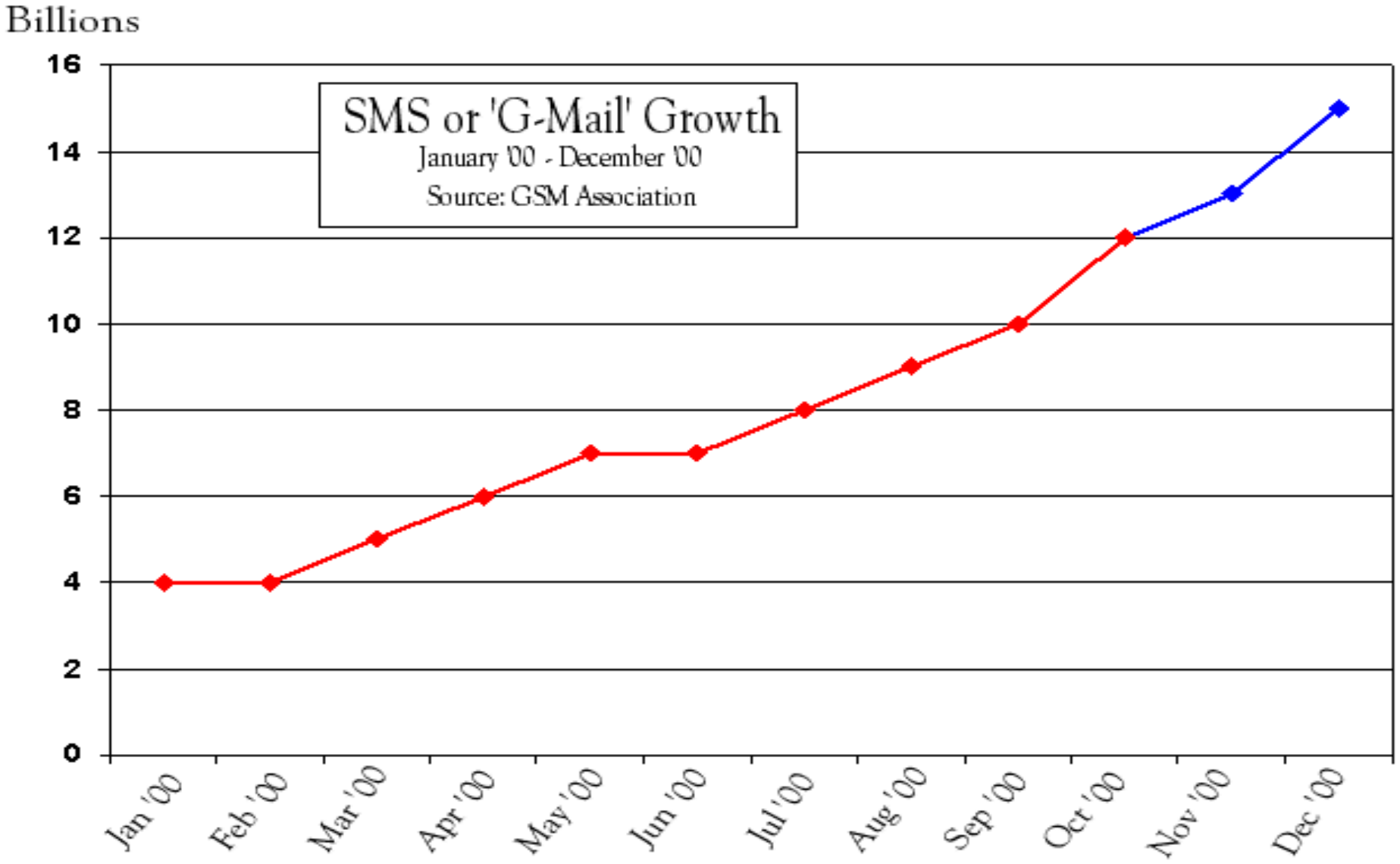


Cumulative Penetration

(EU) - Nov 2000



SMS Mail


Billions
SMS or 'G-Mail' Growth
January '00 - December '00
Source: GSM Association
16
14
12
10
8
6
4
2
0
Jan '00
Feb '00
Mar '00
Apr '00
May '00
Jun '00
Jul '00
Aug '00
Sep '00
Oct '00
Nov '00
Dec '00

Implementation of UMTS

MS	Probable No. Licenses	Probable Method
Austria	4	A(830M€)
Belgium	4	A (early 2001)
Denmark	4	A (mid 2001)
Finland	4	CB(0B€)
France	4	CB(19.6B€)
Netherlands	5	A (2.7B€)
Norway	4	CB(100M€)
Portugal	4	CB (400M€)
Spain	4	CB(500M€)
Switzerland	4	A(135M€)
UK	5	A (38.5B€)

Investment in UMTS infrastructure estimated to be of the order of 200+BEuros (from 1.5 to 7 BEuros/network for 70 networks)
Overall investment ~1.6 the infrastructure

Market value for mobile services ≈ 8 to 10 times the value of infrastructure

Are the recent pessimistic analysis justified?

IPv6 - *is there a problem?*

- IPv4 is a success story?
- IPv4 addresses are far from being exhausted?
- IPv4 routing tables are perfectly manageable?
- Management of networks without IPv6 is already complex?
- Many networks are delighted with IPv4?

Critical Mass is Needed, the EC is working towards a Political initiative during the Swedish Presidency

IPv6 - *the EC action*

- **Within the IST Programme for R&D, thirteen projects are actively working on IPv6 related issues.**
  - **5 focus on fixed networks (6INIT, LONG, AQUILA, SEQUIN, GCAP),**
  - **1 is addressing the interconnection between fixed and wireless platforms (NETGATE).**
  - **7 focus on interconnection/convergence of different radio access platforms (DRiVE, WINE GLASS, MOBY DICK, BRAIN, SUITED, WINE, 6WINIT)**
- **Project Geant can play a major role**
- **e-Europe needs to be strengthened**

http://www.cordis.lu/ist/ka4/mobile/index.htm

CORDIS: IST: KA4: Mobile: What's New? - Microsoft Internet Explorer

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Address http://www.cordis.lu/ist/ka4/mobile/index.htm Links

Introduction to IST

NEWS

What's New?

Events

BACKGROUND

Mission of Unit E4

Areas of current work

ACTS Mobile (4FP)

ACTIVITIES

Reports and presentations from past events

Articles and publications

Projects

Concertation and Cluster

Statistics

LINKS

Fora, Associations, Standard bodies

IST Mobile Summit 2001

Call for papers, 9-12 September 2001, Barcelona

NEW **Wireless IP**. A workshop organised by the European Commission, DG Information Society - E 4, Brussels, 12 March 2001. Have a look at the preliminary

Done Internet

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DRiVE Homepage - Microsoft Internet Explorer

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Address http://www.ist-drive.org/ Links

DRiVE

Dynamic Radio for IP-Services in Vehicular Environments

IST-1999-12515

ist information society technologies

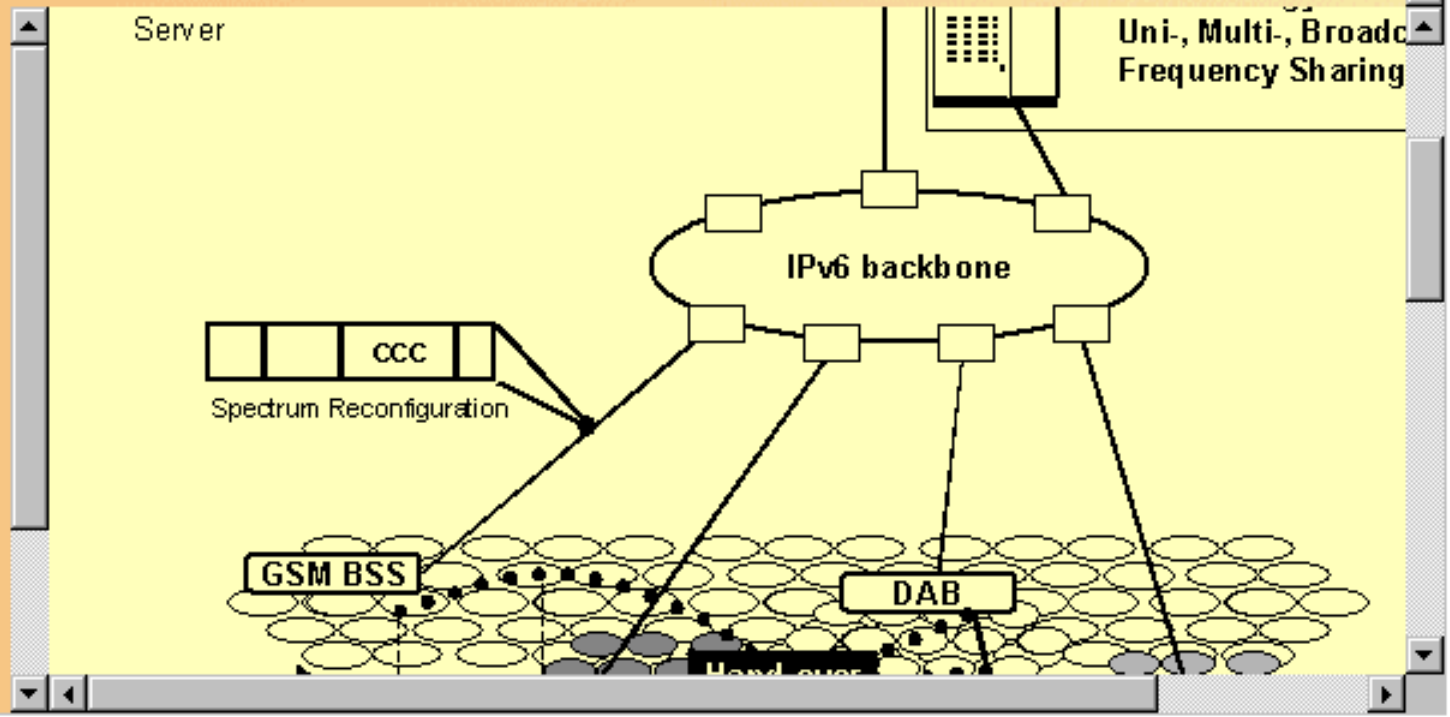
Public Information

Overview
Contact
Documents
Related Links

MMC 2000 Workshop

Internal Information

News/Events
Contacts
DRiVE Documents
Meetings
Bibliography



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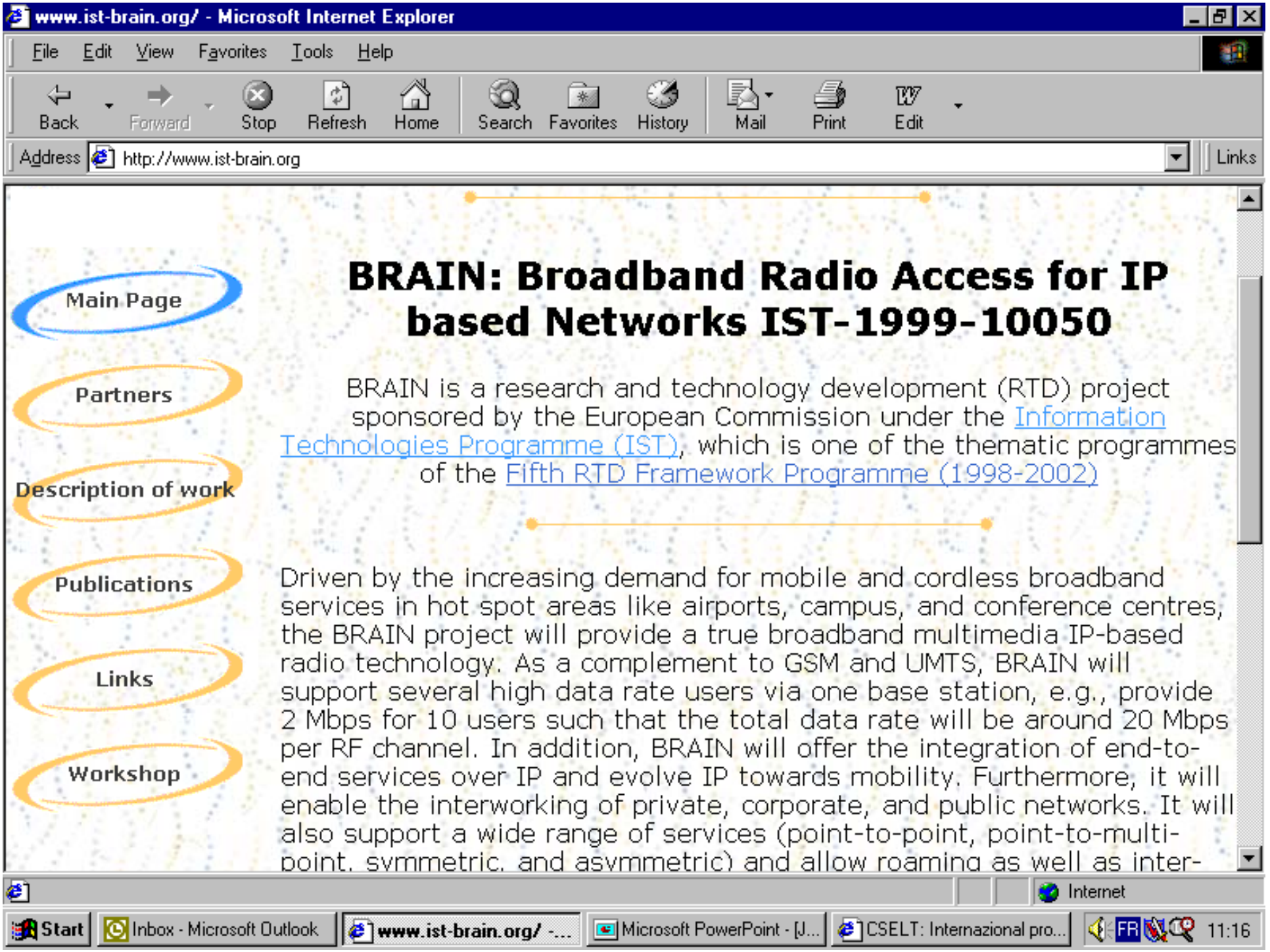
Start Inbox - Microsoft Outlook DRiVE Homepage - M... Microsoft PowerPoint - [Jd... FR 11:04


www.ist-brain.org/ - Microsoft Internet Explorer
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Address http://www.ist-brain.org
Links
Main Page
Partners
Description of work
Publications
Links
Workshop
BRAIN: Broadband Radio Access for IP based Networks IST-1999-10050
BRAIN is a research and technology development (RTD) project sponsored by the European Commission under the Information Technologies Programme (IST), which is one of the thematic programmes of the Fifth RTD Framework Programme (1998-2002)
Driven by the increasing demand for mobile and cordless broadband services in hot spot areas like airports, campus, and conference centres, the BRAIN project will provide a true broadband multimedia IP-based radio technology. As a complement to GSM and UMTS, BRAIN will support several high data rate users via one base station, e.g., provide 2 Mbps for 10 users such that the total data rate will be around 20 Mbps per RF channel. In addition, BRAIN will offer the integration of end-to-end services over IP and evolve IP towards mobility. Furthermore, it will enable the interworking of private, corporate, and public networks. It will also support a wide range of services (point-to-point, point-to-multi-point, symmetric, and asymmetric) and allow roaming as well as inter-
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www.ist-brain.org/ -...
Microsoft PowerPoint - [J...
CSELT: Internazional pro...
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11:16

MOBY DICK - Microsoft Internet Explorer

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Address http://www-int.berkom.de/~mobydick/ Links

Moby Dick - Mobility and Differentiated Services in a Future IP Network

Project duration: 36 months
Key Action: IST 2000 - IV.5.2: "Terrestrial Wireless Systems and Networks"
Clusters: Wireless IP, Mobile services and applications
Project Number: IST-2000-25394

"Such exaltation of thought, while it let a drift the spirit,
and gave it licence in strange airs, ..."
- 'Seven Pillars of Wisdom' -,
Thomas Edward Lawrence,
better known as Lawrence of Arabia

Main Objectives:

- To facilitate the development of seamless access to existing and emerging IP-based applications.
- To propose an architecture for wireless Internet access by developing new mechanisms for seamless hand-over, QoS support after and during hand-over, AAA, and charging

Done Internet

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WINE GLASS - Microsoft Internet Explorer

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Address http://domobili.cselt.it/WineGlass/ Links

WINE GLASS

Wireless IP NEtwork as a Generic platform for Location Aware Service Support

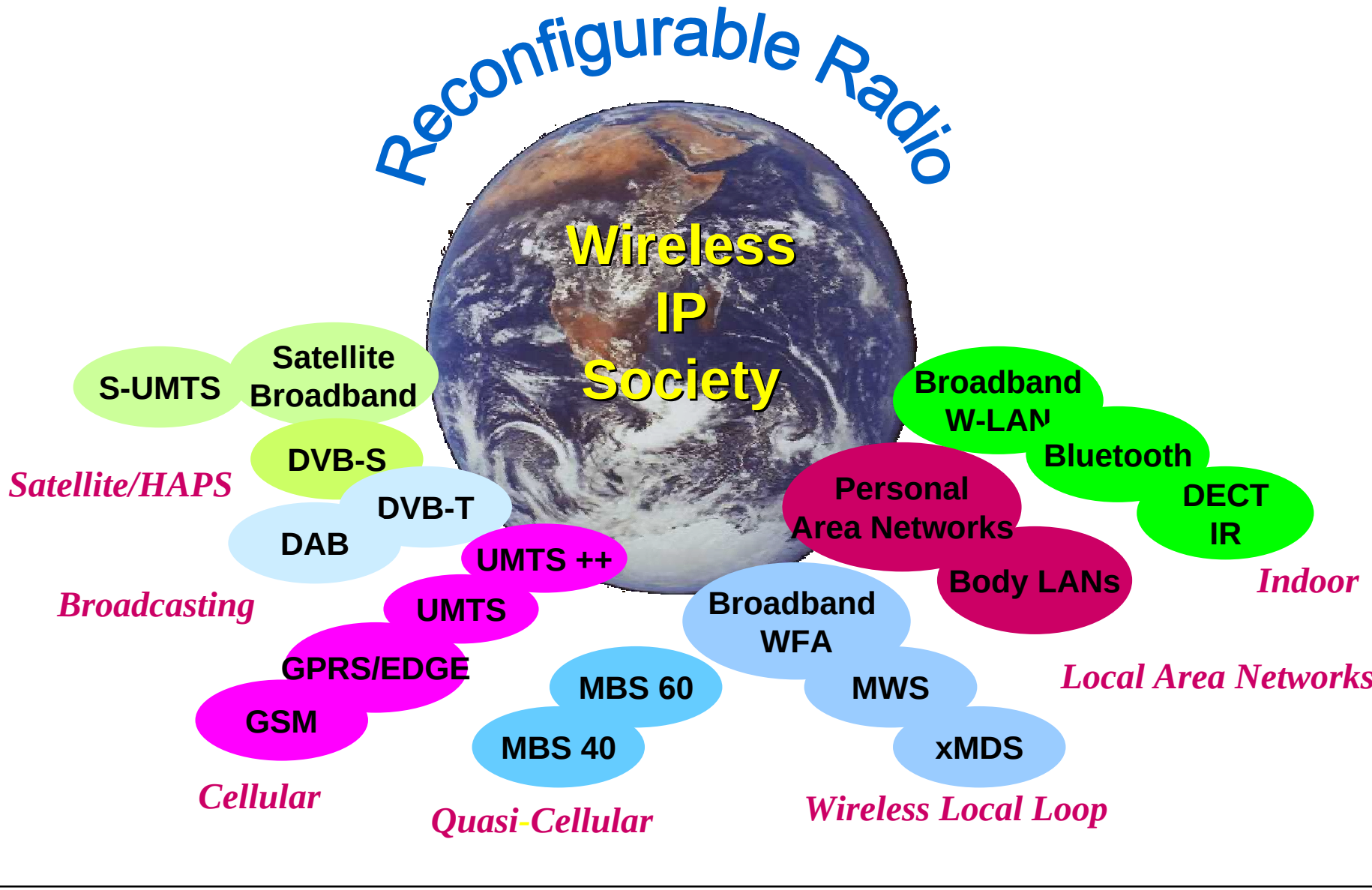
This Project aims to contribute to the technical innovation by exploiting the potential of IP-based wireless mobile multimedia networking with UMTS and WLANs. The objective of the Project is to exploit enhanced and/or new IP-based techniques to support mobility and soft-guaranteed QoS in a wireless Internet architecture based on UMTS and incorporating WLANs, and to explore their

Home
Main Objectives
Tecnical Approach
Partners

Done Internet

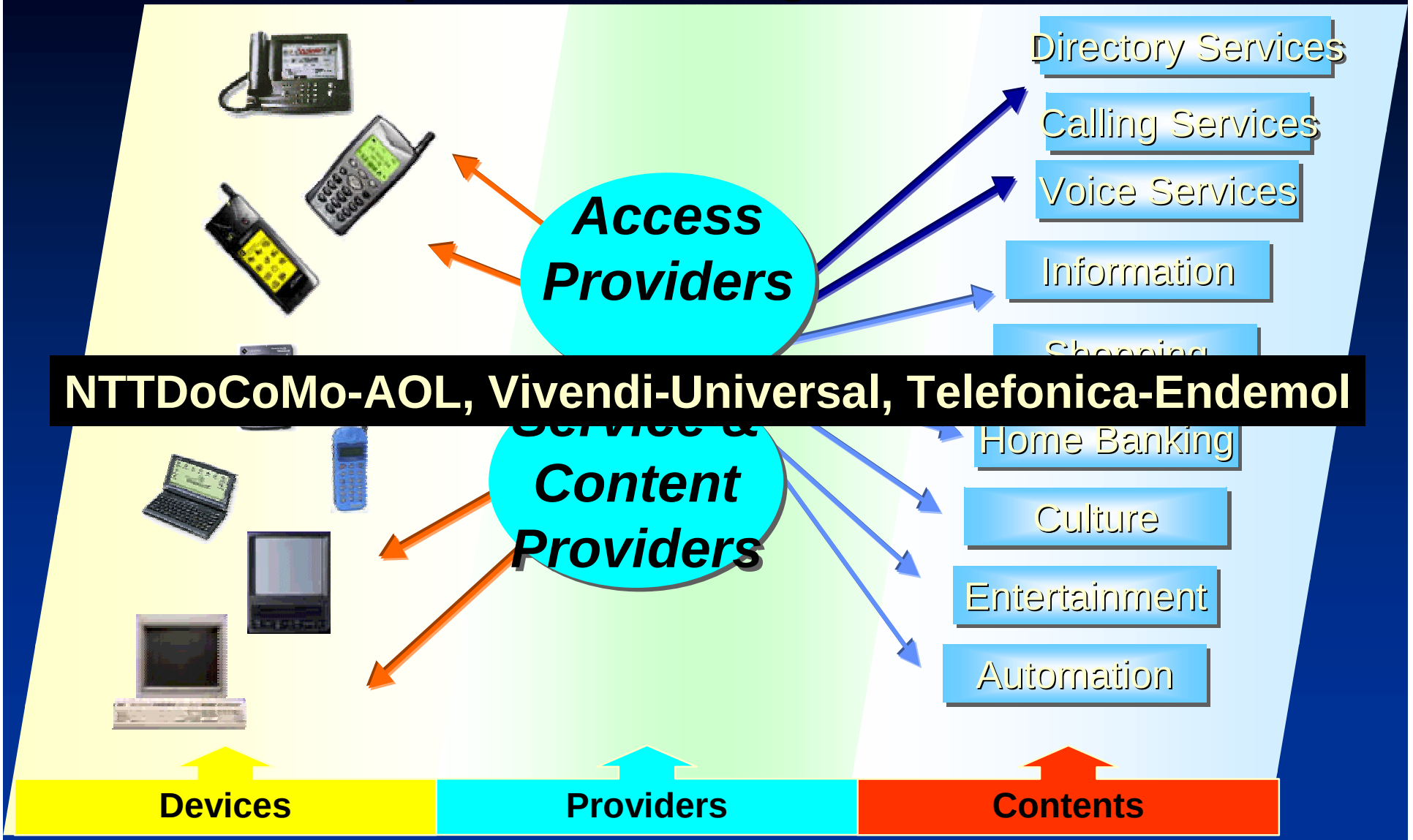
Start Inbox - Microsoft ... WINE GLASS... Microsoft Power... My Computer D:\ FR 13:24

The Next Wireless Generation



Linking contents to all terminals

Consolidation of the broadcasting/telecoms/Internet sector



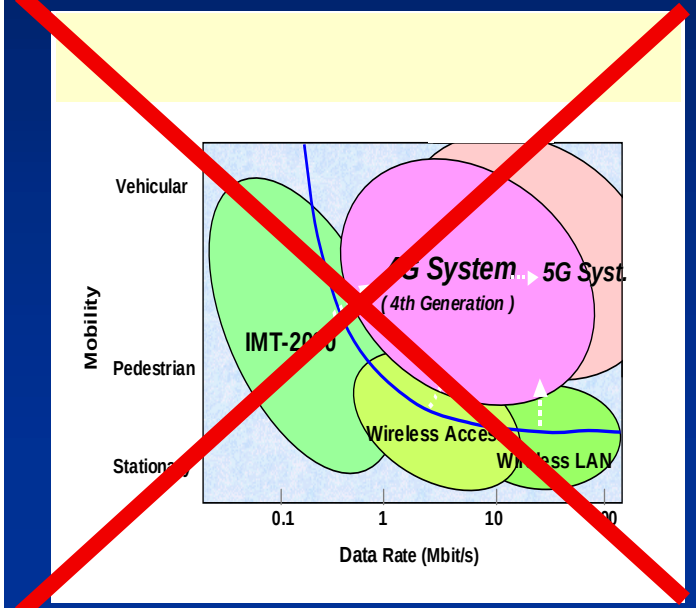
The Future Wireless Generation beyond 3G
It is not simply a matter of

Higher data rates, More Capacity

More Licensed Spectrum

Public Cellular systems

The expression 4G should not be used to imply that UMTS will be superseded like GSM



- A new cellular generation offering a factor of gain in speed in higher spectrum regions is not cost/effective under known technological trends.
- These gains can only be realised in hot/spot areas where the traffic justifies it. But in these areas other technologies (WLAN, BFWA etc) can be used.

The Future Wireless Generation beyond 3G, may be characterised by ...

- User as the focus (User no longer "owned" by anyone)
  - the users, or their smart agents, will select at each instant the best system meeting the required the service and privacy performance,
  - user support in a mobile aware context with the provision of advanced VAS services, across all user environments
- "Integration or convergence" of cellular, broadcasting and WLAN systems
  - from heterogeneous, competing but complementary, broadband networks (public and private, operator driven or ad-hoc, broadcasting)
  - to personal area and ad hoc A2A,D2D,M2M networks
- Spectrum efficiency
  - More intensive use of unlicensed bands, fully asymmetrical traffic, "extensive use of cognitive radio"
- Unlimited availability of user address space

An expanding Personal Communications Space

Wireless WWW presence

Persons

Places

WWWW

Entry point (URL)

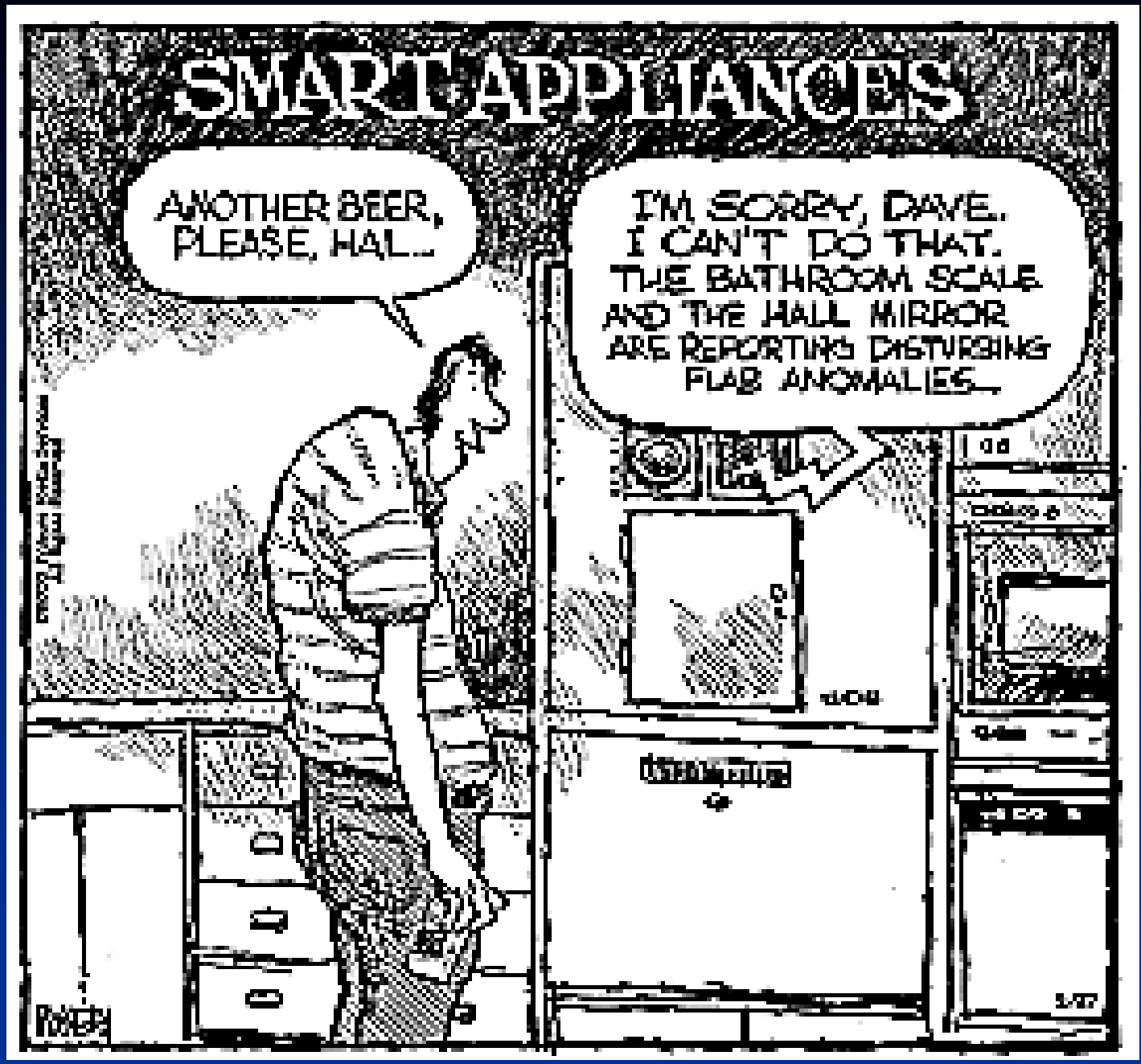
Artifacts

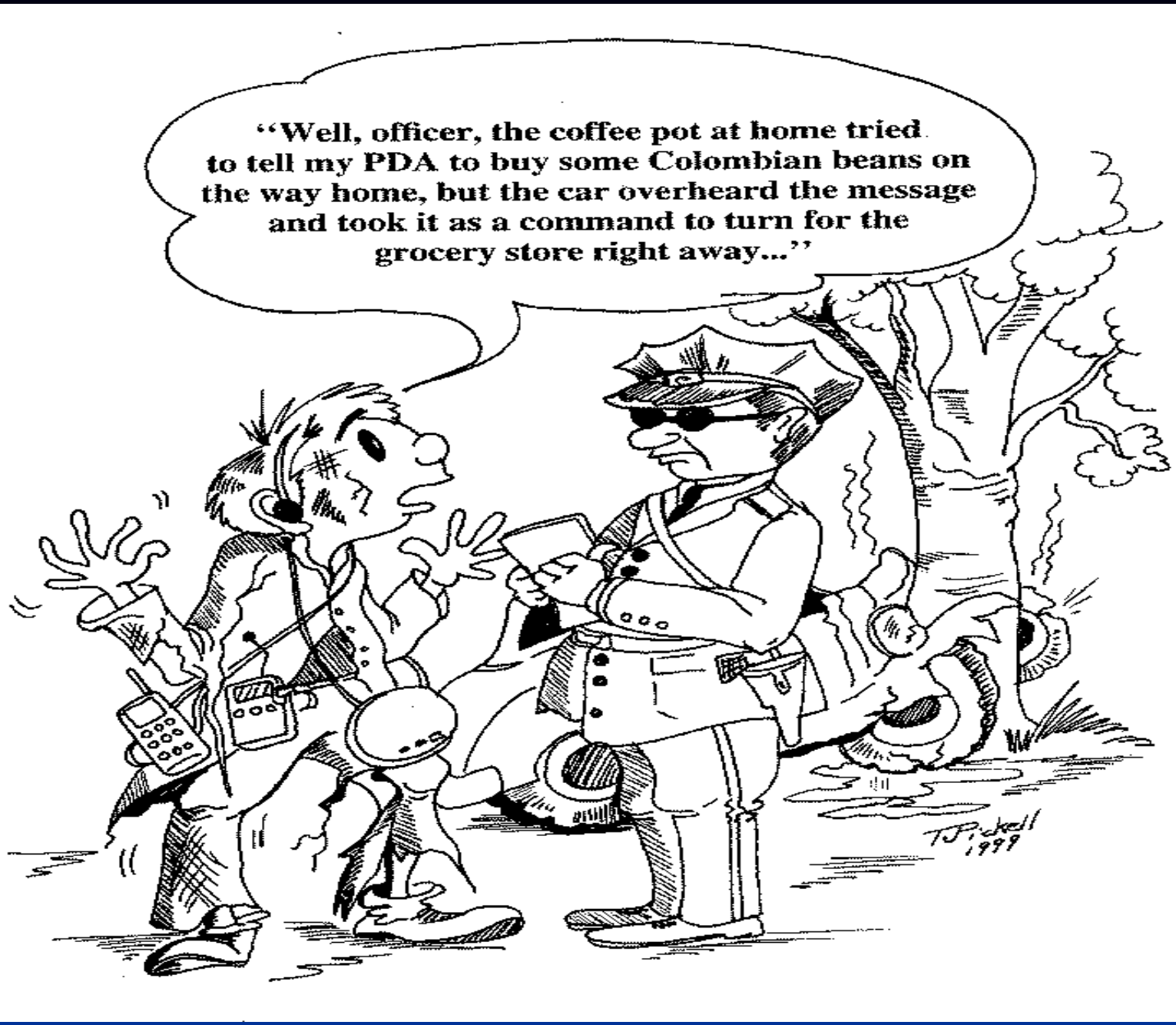
Things

Accessible via HTTP protocol

Networking of "WEB present" wireless devices

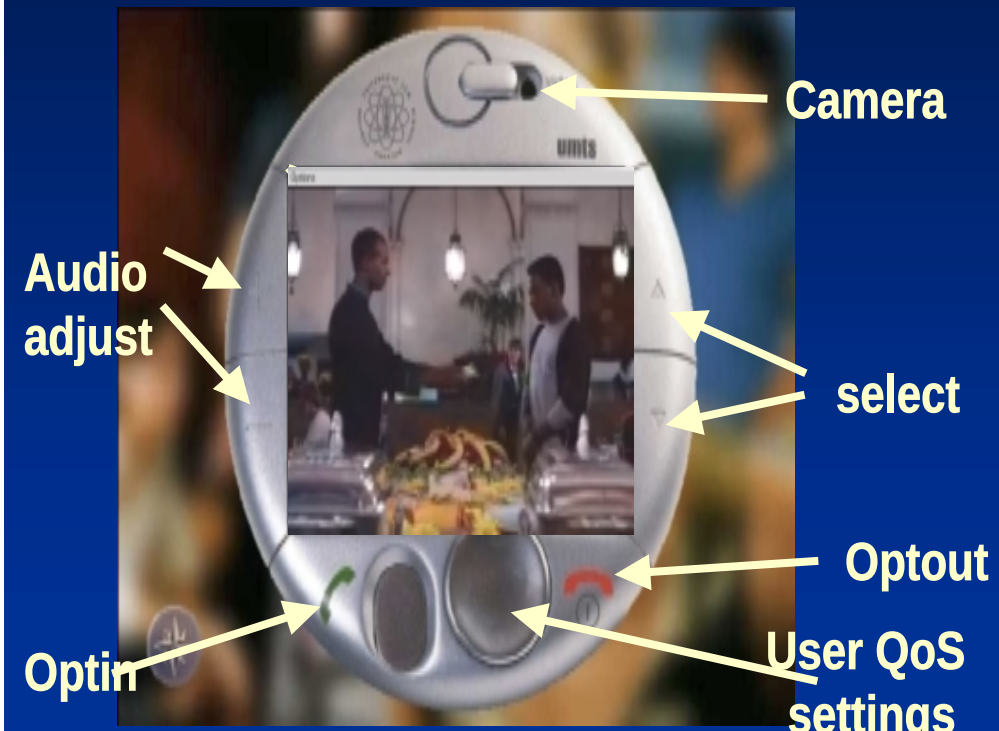
Ad hoc networks of a myriad of smart devices, wireless sensors and actuators embedded in numerous distributed devices, appliances, artefacts as well as in living beings, capable of monitoring and interacting with the physical world


SMART APPLIANCES
ANOTHER BEER, PLEASE, HAL...
I'M SORRY, DAVE. I CAN'T DO THAT. THE BATHROOM SCALE AND THE HALL MIRROR ARE REPORTING DISTURBING FLAB ANOMALIES...


"Well, officer, the coffee pot at home tried to tell my PDA to buy some Colombian beans on the way home, but the car overheard the message and took it as a command to turn for the grocery store right away..."
T.J. Pickell 1999

In Conclusion...

- The wireless tidal wave is coming but spectrum resources will become scarce
- Explosive growth of WEB present devices and A2A, D2D, M2M communications
- Proliferation of competing networked information services,



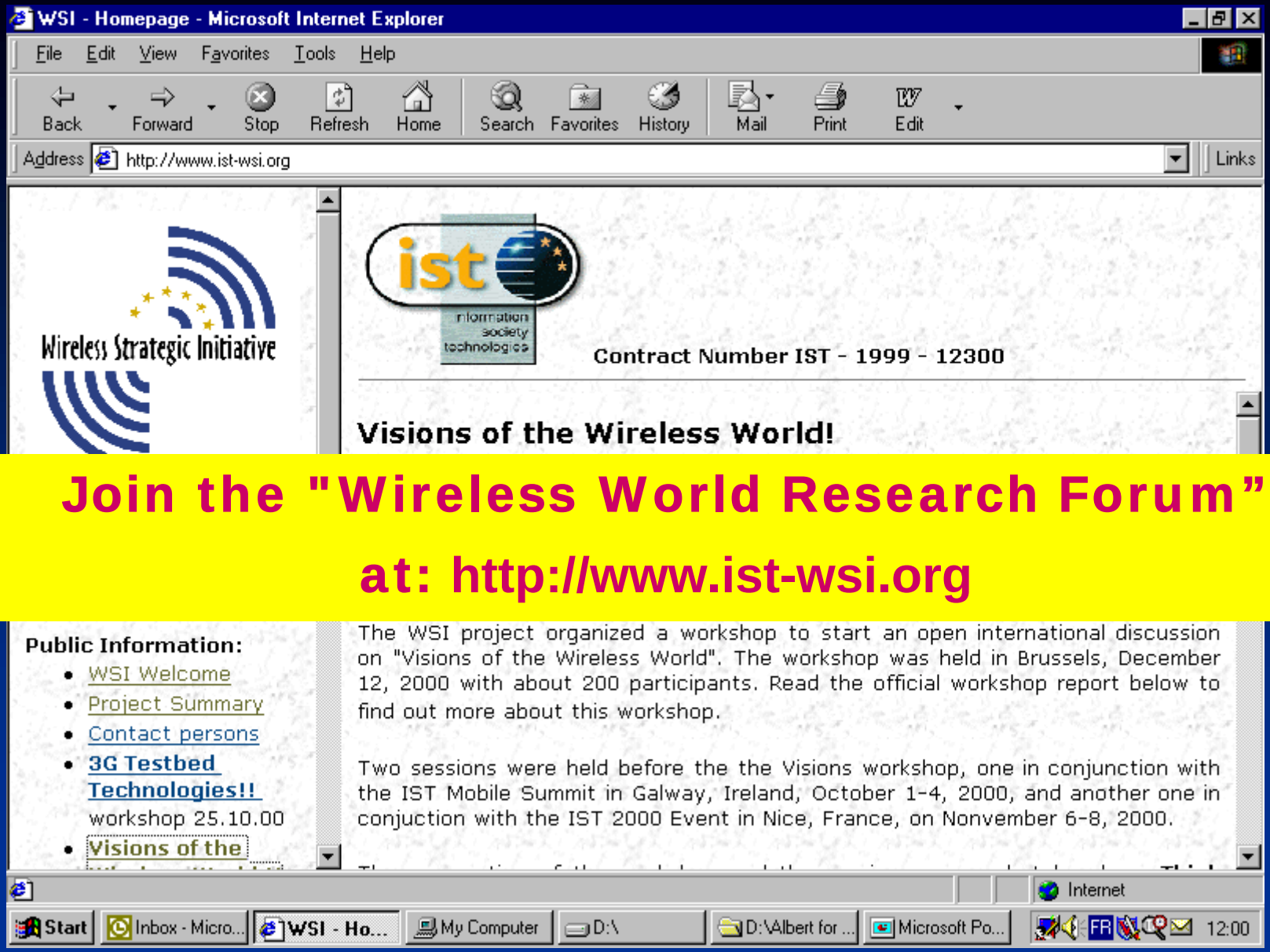
Other key issues:

Quality of Service and reliability, privacy, end-to-end management, address space, vulnerability

Regulatory implications of "cognitive radio technologies" and converged services

Unlicensed Spectrum

Value Chain bound to be drastically modified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Address http://www.ist-wsi.org
Links
Wireless Strategic Initiative
ist
information society technologies
Contract Number IST - 1999 - 12300
Visions of the Wireless World!
Join the "Wireless World Research Forum"
at: http://www.ist-wsi.org
Public Information:
WSI Welcome
Project Summary
Contact persons
3G Testbed Technologies!!
workshop 25.10.00
Visions of the
The WSI project organized a workshop to start an open international discussion on "Visions of the Wireless World". The workshop was held in Brussels, December 12, 2000 with about 200 participants. Read the official workshop report below to find out more about this workshop.
Two sessions were held before the the Visions workshop, one in conjunction with the IST Mobile Summit in Galway, Ireland, October 1-4, 2000, and another one in conjuction with the IST 2000 Event in Nice, France, on Nonvember 6-8, 2000.
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