Cooperation between Broadcasting and Mobile Services

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What is it about?

Make Terrestrial Broadcasting and Mobile networks work together to provide interactive multimedia services to portable or mobile devices.

Why?
Broadcasters and IMT community have common objectives

- Serve users/customers in a best possible way
- Enhance existing services
- Provide attractive new services - multimedia
- Increase service quality
- Emphasise importance of mobility and seemlessness
- Reduce overall cost of production and distribution
- Establish mass market
- Ensure access to everyone
- Spectrum efficiency
Further reason

3rd generation mobile networks (IMT 2000) will not provide sufficient bit rate, at reasonable cost, to provide some of the multimedia services to mobile users or to large audiences.
Example of constraints

- **UMTS (first version, release 99)**
  
  384 Kbps maximal bit rate per user in reduced mobility
  Simultaneous number of users at 384 Kbps: 4 to 5 per cell

- **UMTS (second version, release 00)**
  
  Small coverage in fixed reception mode (“Hot Spots”) will offer 2 Mbps
  Not available before 2005 at best
## What do we get with 384 Kbps?

Bit rate examples for a quality allowing long duration watching of an MPEG4 video program

<table>
<thead>
<tr>
<th>Display size (Diagonal, cm)</th>
<th>Image frequency (Hz)</th>
<th>Image net bit rate (Kb/s)</th>
<th>Sound net bit rate (Kb/s)</th>
<th>Total net bit rate (Kb/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.3</td>
<td>15</td>
<td>60 - 80</td>
<td>20</td>
<td>80 - 100</td>
</tr>
<tr>
<td>8.5</td>
<td>15</td>
<td>130 - 190</td>
<td>30</td>
<td>160 - 220</td>
</tr>
<tr>
<td>11</td>
<td>15</td>
<td>150 - 280</td>
<td>30</td>
<td>180 - 310</td>
</tr>
<tr>
<td>17</td>
<td>15</td>
<td>180 - 350</td>
<td>50</td>
<td>330 - 400</td>
</tr>
</tbody>
</table>
DAB and DVB-T offer more

Bit rate (kb/s)

Stationary

Pedestrian

Mobile

GSM

UMTS

DAB

DVB-S

DVB-T

GPRS
Comparison with fixed systems

Stationary
- PSTN
- ISDN
- xDSL

Pedestrian
- GPRS

Mobile
- GSM
- UMTS
- DAB
- DVB-C
- DVB-S
- DVB-T

Bit rate (kb/s)
Is cooperation a trend ?

- Broadcasters defend there UHF spectrum
  See results of WRC 2000

- The Mobile Community is mainly devoted to
  UMTS Release 99 and 00 development

... Not really!

So, why should we study the question?
There is perhaps no choice ...
...which makes the MHz cost about between 0.2 and 1 billion $
The pressure on broadcasters to give up part of the UHF spectrum will increase.

A way to limit such a pressure might be cooperation between Broadcasting and IMT mobile systems.
Cooperation objective

- Be able, anywhere, anytime, to select the appropriate combination of networks to provide the desired service at the best cost.

- It is the network face of TV and Internet convergence towards Multimedia.
Cooperation is possible

Transport protocols are defined (DVB example):

- Broadcasters
  - Broadcasting networks
  - MPEG 2

- "Internet" Services
  - Internet
  - IP Paquets
  - MP3
  - MPEG4

- Modes
  - DVB-carousel
  - DVB-encapsulated
  - DVB-streaming
Cooperation is possible

Return protocols are defined (DVB example):

- DVB-NIP (Network Independent Protocol)
- DVB-RCG (Return Channel GSM) and others
No major difficulty

Soon on the market

TV (Set Top Boxes) with modem, interactivity engine, MHP, disk storage…

Portables become « organisers » with larger displays

Mobile sets dedicated to Internet arrive

Cars integrate more and more electronics, displays…

...
Mainly around two domains:

- Interactive TV
- Traffic and travel
Interactive TV

- e-commerce
- simplified Internet access (On-Digital, Quiero TV)
- e-mail

IMT would provide

- reliable and high-quality mobile return path
- no dialing (direct access to programme provider)
Traffic and travel

Communication
- Telephone
- E-mail, SMS
- Video phone

Getting somewhere
- Plan a route for me
- Guide me to a place

Being informed
- News
- Traffic situation
- Tourism
- Finance
- Points of interest

Care maintenance
- Getting car info
- Safety reports

Having fun
- Music
- Watching video
- Playing games
- Surfing in internet

Feeling comfortable
- Climate
- Sound

Emergency

Commerce
- Shopping
- Charging toll
- Parking fees
- Booking tickets
Networks exist,
Receivers are almost here,
Services emerge,

…but nothing is simple
Problems to overcome

- Make network cooperation effective
- Complete protocols
- Make data, services and servers able to auto adapt to networks
- Regulatory aspects
Networks (1)

Hand over

Network 1

Service available? If yes, frequency? If no???

Frequency?

Network 2

Has been specified by DVB in the last version of DVB-T spec.

but...
Hand over difficulty is doubled
Mobile networks have their own method
DVB-T has standardised its method
It was already done for DAB and FM

Is further more complicated by the fact that broadcasting does not know how to make retransmission on reception error
Broadcasting and Mobile networks have each one their own management and supervision systems.

These have to be linked to ensure control of the final global service.
Coverage of both networks must be coherent

This does not imply necessarily that network topologies must be the same…

…but this would be eased if DVB-T networks become more cellular type

Propagation characteristics (echoes, indoor penetration…) may impair such a converging process
Network specific protocols exist but Broadcasters are not necessarily familiar with mobile protocols use and knowledge.

Is there a need of additional “metaprotocols” to aggregate various data needed by cooperative networks and services?

Several European projects in this area.
Adapt servers and data (1)

High speed links and bridges to be built to connect networks

Broadcasters

Broadcasting networks

High speed links and servers

“Internet” Services

Internet
Adapt servers and data (2)

Content formats
How can content adapt more or less itself to download on either network and with appropriate quality of service?

Route choice
How to choose between one network or the other to reach the receiver?
Regulatory aspects

- Long term allocation of UHF spectrum
  In the long term (all digital), how much spectrum is needed by Broadcasting?

  Prerequisite before ITU replanning of Stockholm 61 frequency plan (2005/2006)

  TVHD?

- Can mobile and Broadcasting share spectrum?
  Possible topic for WRC 2003
European research projects

DVB Project

DTTB

VALIDATE

MOTIVATE

MEMO

“Multimedia car platform”

MCP

Multi networks hand over and dynamic spectrum management and sharing

DRIVE
Dynamic Radio Networks

Radius Interface Selection

Backbones

DAB, DVB-T

GSM, GPRS, UMTS

Re-configurable Radio Systems

Area 1

Area 2

Area 1

Area 2
October 2000: MCP Draft Specifications for network integration, services and applications as well as the automotive terminal

“First milestone”: 2002 – Hybrid networks with fixed spectrum assignments (e.g. DVB-T/DAB/GSM) and 1 G Car Terminals

“Second milestone”: >2005 – Hybrid networks with dynamic spectrum allocation
Possible synergies

a) Enhance broadcast systems by IMT “return” channel
b) Enhance IMT by using broadcast channel as a “forward” channel

a) provides an extension of interactive TV to mobiles receivers

b) allows IMT systems to reach many people at the same time, with same contents, with excellent service quality
Post conclusion

- Do we really need such wide band multimedia services, especially in our cars?

- Is it a no market, a niche market or a wide market?

And thank you for your attention!