The MoDiS experimental platform for the validation and demonstration of S-DMB functions and services

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Outline

- MoDiS project overview
- S-DMB concept
- MoDiS experimental platform
- Validation approach
- Trials and Results
- Conclusions
The MoDiS project

MoDiS (Mobile Digital Broadcast Satellite) is an IST project partially funded by the European Commission under the FP5 framework

- Started April 2002, duration 30 months
- Co-ordinated by Alcatel Space [F]; Project Manager: Michel Mazzella
- Daimler Chrysler [D], University of Surrey [UK], Agilent Technologies [B], Elitel [I], UDCast [F], Space Hellas [EL], Ercom [F], Alcatel Bell Space [B] and Monaco Telecom [MC]

Expected results

- Proof of S-DMB concept through experimentation of critical issues
  - W-CDMA efficiency in broadcast mode with hybrid satellite/terrestrial transmission
- Harmonisation with 3GPP MBMS standards
- Service demonstration
  - Streaming
  - Push & store with adaptive caching in terminals of video / audio / web-based contents
  - Groupcast (P2P)
**S-DMB concept**

- **3G Mobile Network**
  - **3G Base station**
  - **Satellite distribution link** in IMT2000 mobile satellite band
  - **Interactive link** in IMT2000 mobile terrestrial band

- **MBMS Broadcast/Multicast Service Centre**

- **High power Geo-stationary satellite**

- **7 spots over Europe**

- **3G handset**

- **Local storage**

- **Content providers**

- **Hub based on 3G equipment**

- **Broadcast / multicast layer based on combined satellite and terrestrial repeaters architecture over 3G cellular networks**
MoDiS experimental testbed

Distribution link

Satellite emulator

Terrestrial repeaters (x2)

HUB emulator

MoDiS data server

Multimedia contents

Interactive link

3G network

SGSN

GGSN

SDMB receiver

Content manager + MMI

3G terminal

MoDiS terminal

3GPP air interface

Interactive link
To accelerate the adaptation/development of various components and the validation procedures, the MoDiS testbed was split into two distinct sub-testbeds:

- the application testbed
- the transmission testbed

This approach allows for:

- Simultaneous implementation of the features to be validated and facilitated the assembly of the corresponding subsystems into a single testbed that exhibits the full MoDiS functionality in an integrated manner.
- Various features to be demonstrated by using either of the two sub-testbeds
Transmission testbed
Application testbed

LAN: plays the role of both the uni-directional S-DMB link and the interactive (2.5G/3G) link
Detailed MoDiS testbed configuration
MoDiS data server

Content Provider (ex. LeMonde)
- content upload w or w/o CDD

File Server
- Video files
- Text + images
- audio files
- CDD parsing
- CDD creation
- streaming session scheduling & control

Scheduler and Routing unit
- broadcast scheduling
- content file lock for broadcast

Application server
- content / CDD association
- Emergency notification creation
- CDD creation

Redaction Terminal Streaming server
- streaming session scheduling & control

SDMB Hub

MoDiS T^a^l
- access for not-cached-in-terminal content
- P2P clients contribution + position

Queues Mgmt
- push engine configuration
- Bandwidth allocation

MoDiS Tal

https/sftp/ssh
system call
XML
RTP / WindowsMedia
script
MoDiS terminal - internal interfaces of the application part

GUI: Internet Explorer (HTML/Java) / Multimedia player

- content presentation
  (list, urgent msg)
- user actions

- content access

- access for not cached content
- contribution to P2P server (chat, video, location)

- content access (streamed from server case)

Cache Manager (Java / XML)

- content discarding

- content filtering decision

HDD

Push engine / Network access

- content & CDD storage

SDM transmission layers

2.5G modem
3G modem

XML system call
HTTP
RMI (Java)
RTP
script + method call
or socket

SDM antenna

2.5G phone
3G modem
The trials

- Signal quality
- Macro diversity
- Power consumption
- Reliable transport
- Content delivery
- Conditional access
- Applications
Parameters for trials

- Number of sources
  - due to the choice of the test road
- Power level of the sat emulator
- Power level of IMR
  - same level for both IMRs
- Modes (data rate) and Type of services
  - with simultaneous emergency services
- Terminals
  - trolley alone (with potentially car alongside) and car alone
Monaco trials site

Satellite Emulator
JARDIN EXOTIQUE

Terrestrial repeater
COSTAS

Terrestrial repeater
MINISTERE

Monaco trials site
The satellite...
The MoDiS vehicle
MoDiS car terminal
The user...
Receiver measurements

- TX Power: -90dBm
- Mode: 12K2
Rake visualiser

![Rake visualiser interface](image-url)
Push & Store, Streaming and Emergency Services
This service allows end users to send in a cost efficient way the same content to a group of users.

Ideal for PPDR and SAR applications
Groupcast - Chat

**gkol**: Hello Everybody!
**gkol**: joined P2P service at 9/16/2004 12:54:41 PM
Groupcast - Video/Image messaging
Groupcast - Location mapping
Conclusions

- MoDiS enables the demonstration of the S-DMB proof of concept through experimentation of the system main features and by demonstration of representative multicast/broadcast services.

- Trials are ongoing and final results are expected by mid-October.

- The MoDiS experimental platform is currently being upgraded in the frame of the MAESTRO FP6 IST project.

- More information can be found at:
  - http://www.ist-modis.org