



Case study

ATHENA: Developing Infrastructures for Broadband Access using the Digital TV Switchover

In June 2002 during the Sevilla European Council [1], Europe indicated that two major problems (among the others) have to be solved towards eEurope 2005 and beyond. The two targeted issues are (as they appear in the Sevilla document) the “**Digital Switchover**” (i.e. the transition from analogue to digital television broadcasting), and the “**Broadband access for all European citizens**” (i.e. the reduction of the digital divide between western and newly-joining eastern societies) [2].

In this context, a consortium of 12 partners from 7 European countries (France, Germany, England, Italy, Greece, Romania, and Switzerland) from industry and academia has started an ambitious research and development initiative called ATHENA (www.ist-athena.org). The partners are:

- NCSR Demokritos Project Co-ordinator (Greece),
- Ote-plus (Greece)
- Space Engineering (Italy),
- Thales Broadcast and Multimedia (France),
- Rhode & Schwarz (Germany),
- Telscom (Switzerland),
- Rundfunk Berlin-Brandenburg (Germany),
- T-Systems Nova (Germany),
- University Politechnica Bucharest (Romania),
- University of Versailles - CNRS PRISM lab. (France),
- Centre for Technological Research of Crete (Greece),
- University of Bournemouth (United Kingdom)

ATHENA is an R&D project funded by the European Commission under the sixth framework on the Information Society Technologies priority (FP6-507312). It started on the 1st of January 2004 for 30 months duration, and proposes the proper actions to be taken concerning the Digital Switchover (DSO) in UHF, (the transition from analogue television broadcasting to digital TV) to address simultaneously the second issue “Broadband for all”. These actions are of strategic importance for the European Member Countries and most candidate ones, as the DSO arises as a possible and complementary solution towards the deployment of Broadband Access Infrastructures, especially in less favoured regions. A number of EU countries have already disposed broadband networking infrastructures, and commercial interest in satellite and cable networks have been established. However, in many other EU states, and in most Candidate Countries, the digital switchover can arise as a unique opportunity to fill the gap in the deployment of networking infrastructures.



WITFOR 2005 – Building the Infrastructure

The objective of ATHENA is the validation of a low-cost, simple-to-deploy broadband wireless access infrastructure for all citizens based on the proper reuse and upgrade of the analogue TV broadcasting system to digital one. This project will explore and validate, in several cities (i.e. Heraklion-Greece and Bucharest-Romania), the deployment/realisation of the digital switchover jointly with the design, implementation and evaluation of an IT infrastructure, which uses a regenerative DVB-T stream for the interconnection of distribution nodes, enabling access to various IP services, and digital TV programmes.

The existence of such a neutral regenerative infrastructure (DVB-T) in a city, provides not only a bouquet of television programs, but also (and most predominant) creates a powerful broadband IP backbone (the 60 available analogue UHF/VHF channels may be seen as a virtual medium that provides an aggregate bit-rate of about 1.8Gbps that covers a region of 25 kms radius. Such an approach is a possible compromise between TV broadcasters (who want the entire UHF band) and 3G telecommunication operators (who claim part of this bandwidth for exclusive use) [3]. Moreover, businessmen, or governmental bodies who are involved with the provision of IP services (e-business, e-government, e-learning, ...) will be able to set up his activity targeted to IP clients/consumers. A broadcaster will transmit his own "bouquet" of TV programmes (from his studio premises) that will be addressed to television viewers via the common DVB-T downstream, while ignoring the existence of the other service/content provider (e.g. the IP service provider) who has set up a whole IP business that is addressed to another world (IP-world) in the same city and via the same DVB-T stream. Such an infrastructure will not be a competitor to current broadcasting enterprises such as the satellite television industry, which denotes the continental or global aspect of television, but a supplementary one as it sets-off the local and regional aspect of it besides focusing in the IP capabilities that it can offer.

In such configuration, all kind of citizens/providers are co-equal users of the same infrastructure via which they access (or provide) IP services. Such implementation can be used and exploited as common infrastructure by private or public operators from the telecommunication, TV broadcasting, governmental or individual sectors having independent business plans and different users/clients.

Furthermore, this project is not only limiting its scope to individual passive users/citizens, who request predefined content/services and receive them via the UHF/TV beam, but it also provide a solution oriented to the active users/citizens. These active users may create provision and offer their own content and services to a large community by means of the availability of such a wireless metropolitan broadband infrastructure (i.e. spin-off e-businessman, e-government offices, off line and regional IP television and radio, etc.). The use of regenerative DVB-T configurations in conjunction with intermediate distribution nodes (called cell main nodes - CMNs) that utilize various broadband uplinks constitutes a converging environment capable to accommodate such a new active users/citizens.

As depicted in Figure 1, each CMN constitutes the 'physical interface' to the common ATHENA backbone of:



WITFOR 2005 – Building the Infrastructure

- A service/content provider.
- The users/citizens of a local network (intranet) who access the entire network indirectly via the appropriate CMN. This intranet may cover a part of the city (i.e. neighbourhood, outskirts, industrial zone, etc.) or comprise the LAN of a business centre that may be based on the IEEE 802.11x Wireless LAN technology, for example.
- The customers of a mobile network operator making use of 3G and B3G technology (i.e. UMTS).

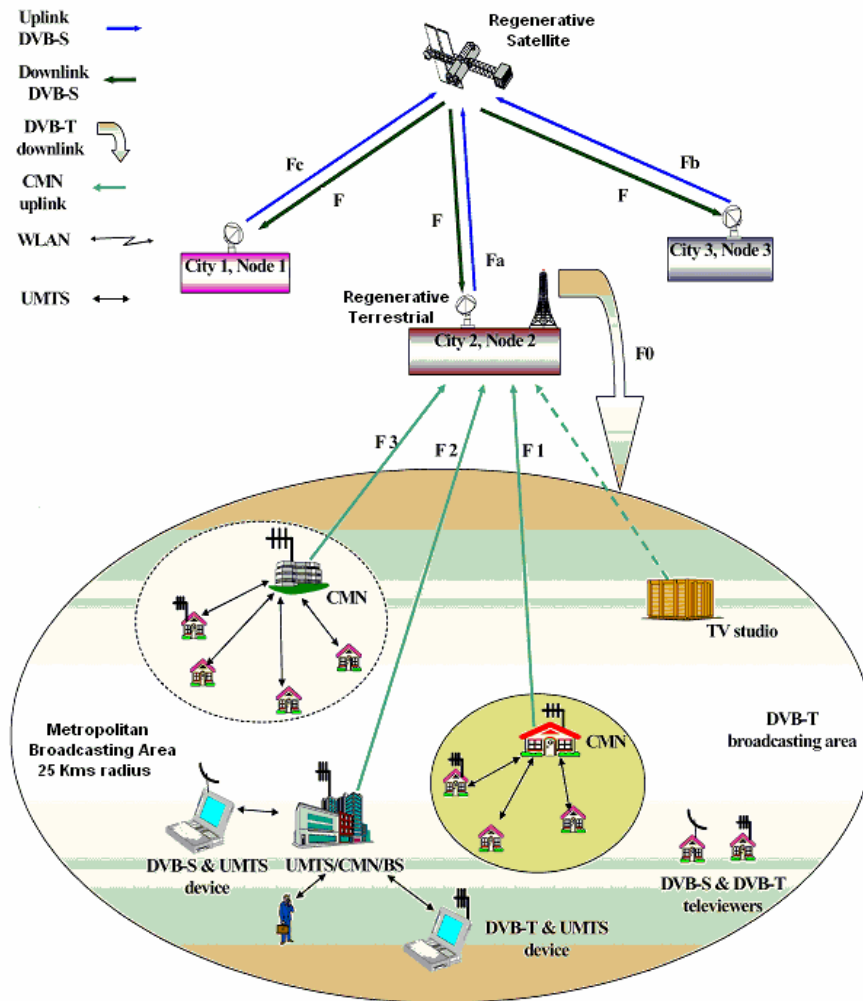


Figure 1: Interconnecting regions and citizens across Europe via the terrestrial and satellite digital television system infrastructure

Real condition trials will be utilised in a medium-sized city of a region/country with many analogue television channels/broadcasters who are investigating a viable solution in the new situation of the 'digital switchover'. Exhaustive performance evaluation tests under real condition environment will provide useful results concerning the networking potentiality of the digital television infrastructure (DVB streams) to the local and



WITFOR 2005 – Building the Infrastructure

political authorities, by notifying them about the networking dimension and the local aspect of the new digital television. Such notification will be essential prior to the decisions to be taken for the digital switchover. Such issues are currently under consideration by all European countries ("the eEurope 2005 Action Plan requires Member States to publish their switchover plans including a possible date for ending analogue television by end 2003"), which are preparing their new laws and the technical issues concerning the digital switchover.

[1] "eEurope 2005: An information society for all. An action plan to be presented in view of the Sevilla European Council, 21/22 June 2002", Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the regions.

http://europa.eu.int/information_society/eeurope/news_library/documents/eeurope2005/eeurope2005_en.pdf

[2] "*Digital switchover in broadcasting*" a document created by BIPE consulting on behalf of the European Commission (Directorate General Information Society) and which was the subject for a public hearing organised by DG A1 (June 2002) provided by BIPE consulting.

http://europa.eu.int/information_society/topics/telecoms/regulatory/studies/documents/final_report_120402.pdf

[3] "Study on conditions and options in introducing secondary trading of radio spectrum in European Community", May 2004, a report carried out for the shake of RSPU by Analysys, DotEcon and Hogan & Hartson, (accessed via the

http://europa.eu.int/information_society/topics/radio_spectrum/useful_info/studies/secondtrad_study/index_en.htm