

# Project Achievements



## Broadcast for the 21st Century

The B21C project was setup to support the long term success of the latest and future broadcasting technologies developed by the Digital Video Broadcasting forum, thus contributing to replicate the worldwide success met by the 1st generation of DVB technologies (namely DVB-C, DVB-S, DVB-T).

### Main focus

B21C focused its efforts on the three latest technologies designed by DVB, each having a different level of maturity: **DVB-H** (TV to Handhelds) defined in 2005, **DVB-SH** (Satellite to Handhelds) defined in 2007, **DVB-T2** (2<sup>nd</sup> generation of Terrestrial Digital TV) defined in 2008.

### Approach

With 34 partners from 8 European countries, the B21C consortium constituted a powerful task force involving all recognized experts & players in the Broadcasting arena: academic research laboratories, transmission equipment manufacturers, chipset and consumer equipment manufacturers, network operators. All together covered

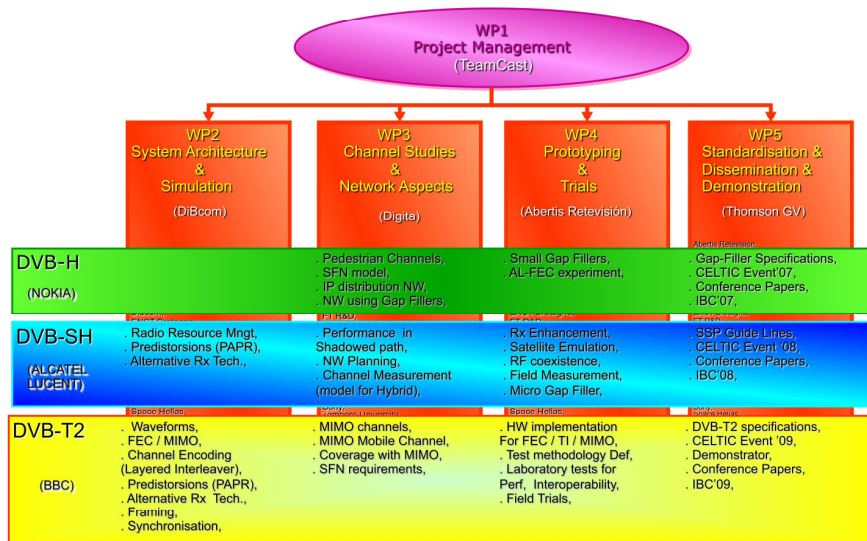
the entire broadcast transmission value chain, bringing a considerable expertise in the domain, and contributing to the DVB consortium's work.

The project organised itself in a matrixed way, with three Work-packages working in different technical domains, for the benefit of three "Activities" directly focused on the three target standards.

### Achieved results

#### Consolidated expertise about DVB-H Mobile TV network deployment

B21C engaged laboratory tests to verify the transmission performance with channel models for pedestrian reception (PI/PO) and verified the results on the field (Helsinki & Turku, Finland). B21C performed also a tremendous work to evaluate & to enhance the behaviour of the DVB-H signalling in adverse receiving situations, especially to improve the terminals' frequency handover. Very precise works were conducted in order to optimize planning of Single Frequency Networks. Finally, technical specifications for "Small gap-Fillers" were designed and a large test campaign –



## B21C

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Start Date: 1 January 2007

Closure date: 31 December 2009

### Partners:

- Abertis Telecom-Retevisión, Spain
- Abo Akademi University Turku, Finland
- Agilent Technologies Belgium, Belgium
- Alcatel - Lucent Bell Labs, France
- British Broadcasting Corporation, UK
- Dibcom, France
- Digita, Finland
- Elektrobit Corporation, Finland
- ENST Bretagne, France
- France Telecom R&D, France
- Fraunhofer (FhG), Germany
- Hispasat, Spain
- INSA / IETR, France
- Mier Communications, Spain
- Nokia, Finland
- NXP Semiconductors, France
- Oralia S.A., Sweden
- RAI (Radiotelevisione Italiana S.p.a.), Italy
- Rohde&Schwarz, Germany
- Robotiker Infotech, Spain
- SIDSA, Spain
- Sony Semiconductor & Electronics Solutions, UK
- TeamCast, France
- Technical University Braunschweig, Germany
- TDF, France
- Telefónica I+D, Spain
- Teracom, Sweden
- Thomson Grass Valley France S.A., France
- Turku University of Applied Sciences, Finland
- TUT-Tampere University of Technology, Finland
- University of Bologna – ARCES, Italy
- University of Surrey, UK
- University of Turku, Finland
- Universitat Ramon Llull, Spain

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### Project Website

www.celtic-initiative.org/projects/b21c

involving the whole DVB community – was organized by the RAI, on behalf of the B21C project, in Torino (Italy).

### **DVB-SH validated through large scale laboratory and field testing**

B21C leveraged practical knowledge about the brand new DVB-SH standard through innovative hybrid channel modelling, laboratory and field testing of early bird equipments. An automatic SH test-bed allowed to perform up to 1500 measurements (representing 2340 hours of test). B21C verified laboratory outcomes through two field campaigns in Barcelona, Spain & Torino, Italy. Such work permitted to confirm the robustness gain provided by the enhanced SH air interface and the global coverage resulting from the combination of satellite and terrestrial broadcast. A “DVB Mobile Calculator” was designed to summarize the findings of the SH activity.

### **Considerable contribution made to the DVB-T2 standardisation**

The project actually contributed strongly to the definition of the second generation Terrestrial system, by providing 17 of the 30 responses to the “DVB’s Call for Technologies” and by obtaining the adoption of many B21C proposed concepts in the T2 standard. B21C’s laboratory and field tests have confirmed the expected performances of the new T2 system and hopefully, a wide acceptance of the T2 system is expected worldwide, as it has been the case for the first generation of the European Terrestrial Digital TV standard: DVB-T.

## **Impact**

### **Technologies to be turned into products for industry**

The project allowed industrial partners producing both professional equipment and consumer products to initiate the development of new products to address the emerging market of T2 Terrestrial TV, with a

expertise in network planning / deployment for the H and SH Mobile Technologies. First steps have been made in understanding network planning for T2.

### **Expertise to be further leveraged for academics**

The project has been the opportunity for academics to explore, evaluate, and propose a wide range of



commercial phase starting first in the UK at the end of 2009. Several prototypes of products were shown at IBC2008 and IBC 2009.

### **Expertise to be turned into optimised infrastructures and new services for operators**

Operators and infrastructure providers increased considerably their

advanced concepts and algorithms, some of them having been adopted in the T2 standard. For some academics, the project has been a first and successful experience in contributing to the DVB work. All of them gained valuable know-how for contributing to other future broadcasting standards.

### **Promotion of DVB technologies**

The project actively disseminated and promoted its technical achievements by a large number of international publications and through its participation to several shows and conferences, including the International Broadcast Convention (IBC) in 2007, 2008, 2009, and the Celtic Event in 2008 and 2010. This contributed to the international visibility of the European broadcast standards.

## **About Celtic**

Celtic is a European research and development programme, designed to strengthen Europe’s competitiveness in telecommunications through short and medium term collaborative R&D projects. Celtic is currently the only European R&D programme fully dedicated to end-to-end telecommunication solutions.

**Timeframe:** 8 years, from 2004 to 2011

**Clusterbudget:** in the range of 1 billion euro, shared between governments and private participants

**Participants:** small, medium and large companies from telecommunications industry, universities, research institutes, and local authorities from all 35 Eureka countries.

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