Total budget 2004-2011: 1 billion euro

Celtic core members:

Alcatel
Deutsche Telekom
Ericsson
Eurescom
France Télécom
Italtel
Nokia
RAD
Telefónica
Thomson

For European leadership in telecommunications

Celtic – The only European R&D programme fully dedicated to end-to-end telecommunication solutions

CELTIC
Telecommunication Solutions
www.celtic-initiative.org

EUREKA

Scope and objectives

Celtic encompasses pre-competitive research and development as well as experimentation of technologies in broadband and multimedia services, applications over fixed and mobile networks, and related systems and equipment. The programme brings the necessary support to the European telecommunications arena so that it successfully achieves the needed transition from an infrastructure and connection driven industry to a services and applications driven industry.

The objective is to design and perform experimentation on integrated system solutions, which complements the traditional segmented technology trial approach. This concept is at the core of the Pan-European Laboratory (Panlab), currently running as an EU-funded Specific Support Action (SSA). This activity, which is strongly supported by Celtic, will enable the trial and evaluation of service concepts, technologies and system solutions. Celtic intends to deliver results that will be directly transferable into products, services and applications.

Major technical domains constituting the core of the Celtic programme are described in the “Celtic Purple Book”, which is available for download on the Celtic website. Celtic has established close links with the European Technology Platforms NEM, eMobility, NESSI, and ISI to coordinate work programmes and research topics.

Work areas

Services and applications

Pre-competitive R&D and testing of services, content and applications are central in Celtic. The challenge of this part of the programme is to develop and realise new services and applications, including design and methodologies, including early testing and validation of the new services. The focus is particularly on broadband and mobile multimedia services. In the multimedia domain, many changes are coming from the distributed networked media, the broadcasting of content over broadband networks, the advent of home networking and connectivity as well as from the possible access to content for nomadic users through wireless networks.

Broadband infrastructures

An integrated approach to fixed and mobile broadband infrastructures, including their control, operation, administration and management, is being considered. Pre-development of fixed and mobile terminals and Customer Premises Equipment (CPE) will need to address a wide spectrum of technologies. This will have to be addressed from an integrated system and service perspective to provide comprehensive terminal and CPE solutions. From the network standpoint (access, edge, metropolitan, core), a wide variety of vertical technologies are to be addressed with the objective of providing full system solutions, capable of integrating various kinds of technologies and of supporting the evolving broadband services and applications. Enabling technologies to drive new mobile and wireless services beyond 3G are needed: the existing network and radio technologies will become seamless and secure, and advanced network configurations and air interfaces will emerge.

The emphasis will be on a fully integrated system solution as opposed to the existing segmented network management approach. Services, of course, would also be managed over full network solutions and platforms.

Security

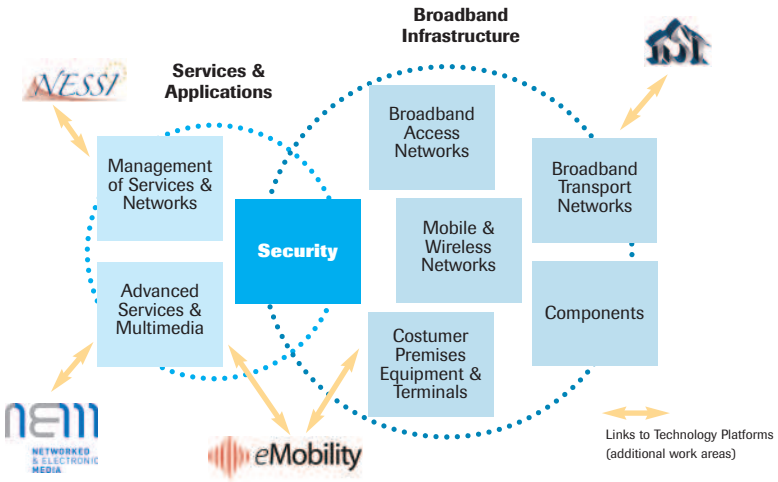
Security is a horizontal category which applies to practically all products and technologies. Validating the security aspects in system solutions will require a full-system approach. This includes testing end-to-end security solutions, covering networks, services and applications.

New challenges and strategies

With the new EU Framework Programme 7 and the establishment of several European Technology Platforms (ETPs) in the ICT area, new challenges and new strategies have arisen that deserve special attention in Celtic's future work. Of particular interest for cooperation are the Networked and Electronic Media Initiative (NEM), the Mobile and Wireless Communications Technology Platform (eMobility), the Networked European Software and Services Initiative (NESSI), and the Integral Satcom Initiative (ISI).

Amongst the many new technology challenges are:

- New telecommunications scenarios, ubiquitous, all-IP services and networks, or new access technologies.
- New scenarios for media and content, including production tools, storage and personalisation of content.
- New challenges for mobility including seamless service delivery and new mobile form factors.



Celtic work areas and links to European Technology Platforms

Celtic project highlights

The following four exemplary projects highlight the main working areas of Celtic: broadband infrastructure, broadband services, optical networks, security, and mobile services.

BANITS (CP1-032): Shaping the future of today's Access Networks

This project ran from 2004 to 2006, and it is followed by the BANITS-2 project. The main motivation of the project was to help network operators to safeguard their huge access and metropolitan network investments while extending its use for new advanced multimedia services, mainly related to video content over existing infrastructure. BANITS focused on extended usability to increase revenues in existing networks through new technological solutions and to develop a full service testbed to enable multi-service offerings to business and residential users, including multimedia services. Main achievements were real products for optimised access networks for Ethernet traffic and for multimedia services. BANITS had important influence on new, innovative standard solutions for the European market.

The BANITS project has generated a number of new products that are close to the market. With the testbed, a range of services running over different Ethernet access technologies, including business and residential scenarios, can be run.

Firm (CP1-028) Field trial with Integrated ROADMs and GMPLS compliance

FIRM aimed to deploy a field trial consisting of an optical transport network based on ROADMs (Reconfigurable-Optical Add/Drop Multiplexer) with GMPLS (Generalized Multi-Protocol Label Switching) compliance to set up and tear down light paths dynamically under an Automatically Switched Optical Network. The control plane that triggers the ROADMs is designed based on the requirements of ITU standards. It enables unprecedented flexibility for the network management. The network is reconfigurable on the fly, allowing frequent changes in network connectivity, multicasting and broadcasting. FIRM developed technologies and architectures that allow a generalized availability of broadband access by defining network node architectures, concepts and solutions for all optical transport networks for increased bandwidth capacity in the underlying optical core and metro networks.

Fidelity (CP2-013) Federated Identity Management based on LIBERTY

This project aimed to overcome the current identity management nightmare on the Internet, where a user has to identify himself for each registered service over and over again, spreading his personal information around without clear control. The targeted solution focuses on identifying the providers and establishing a Circle of Trust (CoT), i.e. business relationships and operational agree-

ments with service providers, with whom users can transact business in a secure and seamless environment. Approaches and solutions for the identity information and authentication information have already been standardised by the Liberty Alliance. The demonstrations enabled federated authentication functionalities using realistic applications based on the four Circles of Trust (CoT) that have been built by the operators in Finland, France, Norway and Spain. The CoTs have been realised with equipment from different suppliers, a fact that is important for testing interoperability. For the demonstrations the identification of a Finnish user for a hotel booking application in France had been performed using two different authentication methods. A SIM card based authentication is implemented between Finland and Norway, and a strong authentication method also based on SIM card was further shown.

Wing-TV (CP2-032): DVB-H Broadcasting TV services to handheld terminals

This project concentrates on DVB-H technology for mobile broadcasting and aims to speed up the worldwide adoption of the DVB-H standard by validating the technology and providing adequate inputs to forums and standardization bodies. The validation of the DVB-H suite of standards is done by means of laboratory tests and field trials in different countries using the WING TV Reference Receiver model developed in the project. This allowed characterising more than 2,000 transmission channels in a reasonable time. Contributions are targeted to "DVB-H Implementation Guidelines", to DVB-H Measurement Guidelines, and to ITU and EBU.

Some statistics

(based on Call 1 to Call 3)

Ongoing projects, budgets and effort involved

In 2006, 38 Celtic projects were labelled and ongoing, invoking an investment of 438 million euro and 4,500 person years. On average, 13 new projects per call have been labelled and launched. Annually about 110 million euro and 1,100 person years are invested by about 300 participating companies.

Types of organisations involved in Celtic

Roughly half of the project participants in Call 1 to Call 3 were coming from large companies, another 22% from small and medium-sized enterprises (SME). This distribution indicates that two thirds of Celtic participants are from the industry while one third is from research institutes and universities.

Work areas coverage

About half of the project's main focus is on broadband infrastructure and about one third is on services and applications, while 13% are mainly focusing on security issues.

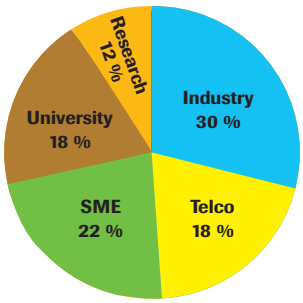
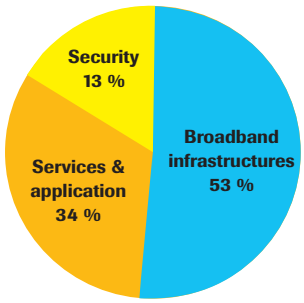


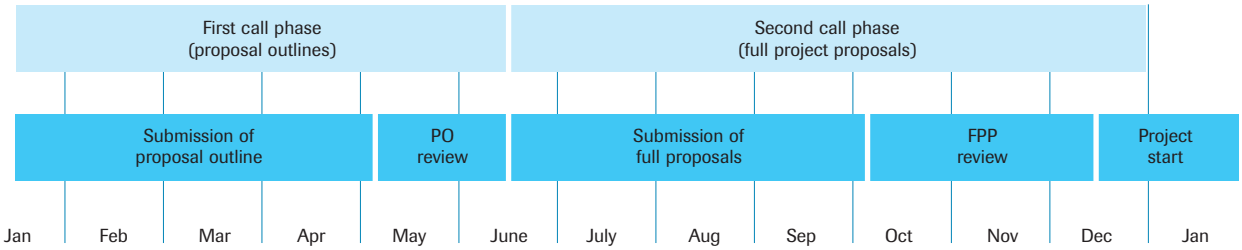
Figure based on numbers of participants



Celtic domains

Celtic Calls for Proposals

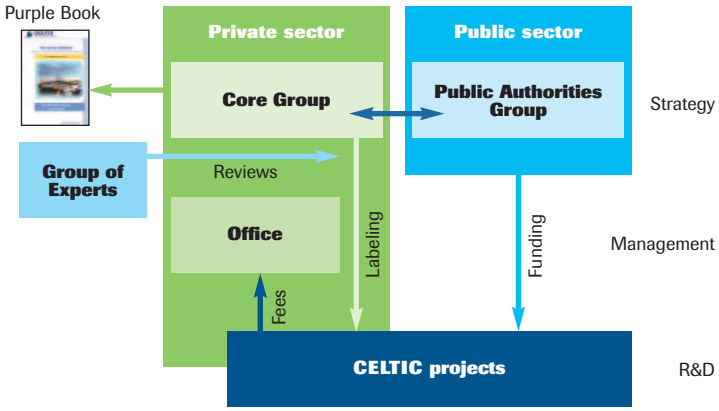
Celtic launches annual calls for proposals that follow the general timeline below. Proposals have to be submitted in two subsequent stages. At the first stage, a concise proposal outline (PO) is requested. If it has successfully passed the review and selection process, a full project proposal (FPP) is requested for the second stage. All successful proposals receive a Celtic label and are then entitled to start as a Celtic project within the Eureka framework.



General timeline of the annual call for proposals

Public-private research

Celtic, as all Eureka Clusters and projects, is a bottom-up, industry-driven approach to run collaborative, pre-competitive research and development projects in Europe. The basic principle of Celtic is that the projects are jointly funded by the public and the private sector. The public sector (i.e. the national Public Authorities) and the private sector (i.e. the companies involved in the Celtic Core Group) jointly agree on the common strategy, important research items, and the acceptance (labelling) of proposals that are suitable and likely to receive public funding. The overall management, the evaluation of proposals, and the general Celtic policy is taken care of by the Core Group, assisted by the Celtic Office. The Celtic Office is responsible for the day-by-day management and project support.



Celtic structure

The operation of the Celtic support network is assured by a fee that is paid by the ongoing projects depending on the individual effort spent in a project.

Celtic and Eureka

Eureka is a pan-European network for market-oriented, industry-driven R&D. Eureka supports the competitiveness of European companies through international collaboration in creating links and networks of innovation. The objective is to bring high quality research and development efforts to the market and to use the multiplying effects of co-operation. Eureka Clusters are industrial initiatives aimed at developing technologies of key importance for European competitiveness. They bring together small and large companies along with universities and research institutes, sharing both risks and benefits. Each Eureka Cluster has a technological roadmap defining the evolutionary path of the most important strategic domains.

Public funding and country involvements

Proposals accepted as a Celtic project will receive a Celtic label. This label entitles the project partners to apply for national funding. Depending on the national funding rules, the Public Authorities decide, which project they will accept and provide public funding. The funding can be in the form of grants or loans. It varies between 25% and 50% of the total budget, depending on country, company and circumstances. In many countries there are additional possibilities for small and medium-sized enterprises (SMEs) for an easier access to public funding.

Currently, 20 Eureka countries support Celtic and are involved in Celtic projects. With regard to the applied project budget, the participating companies with the most significant budget indications are coming from France, Spain, Germany, Italy, Finland, Belgium, Sweden, Israel, Norway, Ireland and The Netherlands.

The ”typical” Celtic project

- From 3 to 15 participants coming from 3 to 6 countries (average: 8 participants from 4 countries)
- A total budget from 2 to 20 million euro (average: 7 million euro)
- Duration from 18 to 36 months (average: 2 years)

About Celtic

Celtic is a European research and development programme, established as a Eureka cluster, 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. Launched in November 2003, Celtic (Cooperation for a sustained European Leadership in Telecommunications) was founded and has been supported by major European telecommunication players, both vendors and operators. Celtic fills the gap between public R&D programmes not specifically focused on telecoms and short-term R&D efforts by the telecoms industry.

Key facts about Celtic

- **Timeframe:**
  8 years, from 2004 to 2011.
- **Total budget:**
  in the range of 1 billion euro, shared between governments and private participants.
- **Participants:**
  companies from the telecommunications industry (small, medium and large), universities, research institutes, and local authorities from all 35 Eureka countries may participate in Celtic projects.

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