

## COST TIST - European Research Cooperation in Telecommunications and Information Science and Technology

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# **COST TIST – European Research Cooperation in Telecommunications and Information Science and Technology**

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## **Introduction**

In 1971, the Ministerial Conference of the European Union opened for 19 European countries the possibility of cooperation in the field of scientific and technical research, by formally establishing the framework of COST (COopération Scientifique et Technique). Until the mid-eighties, COST was the only vehicle for international cooperation in science and technology at the European level and COST Actions paved the way to subsequent initiatives such as the EUREKA Programme.

Throughout the years, the scope and size of the COST programme developed further. From the first 7 Actions of 1971, COST now has an average of 200 Actions each year. Since then, the number of countries associated with the programme has increased from 19 to 35. Further expansion of the number of associated countries is actively explored. European countries interested in the Action sign the relevant “Memorandum of Understanding” through their permanent diplomatic representatives to the EU. The signature does not need parliamentary ratification. A minimum number of 5 signatures is needed to start a COST Action. Since 1975, also the European Space Agency participates in several Actions at the level of signatory to the relevant MOU.

## **The structure of COST**

The initiative of launching a COST Action comes from the scientists and technical experts themselves. This approach has proven to be particularly suited to promote research of pre-competitive nature or of social importance, to meet a growing demand from the scientific community and to anticipate and usefully complement the other research programmes of the European Union.

The Technical Committees (TC) are responsible for a particular research domain and are formed by representatives of the COST countries. They evaluate the proposals for new Actions, monitor the Actions in progress, and evaluate the results obtained by completed Actions. When necessary, they promote proposals for new Actions in particular areas. Presently, there are 12 TC's:

- Agriculture, Food Sciences and Biotechnology
- Chemistry
- Environment

- Forests and Forestry Products
- Materials
- Medicine and Health
- Meteorology
- Physics
- Social Sciences and Humanities
- Telecommunication Information Science and Technology
- Transport
- Urban Civil Engineering

For each Action a Management Committee (MC), formed by national experts of the signatory countries, is responsible for the activities of the Action. Once an Action has been launched, the MC is autonomous in managing the project. The MC prepares annual progress reports and a final report for evaluation by the TC. The MC may (and often does) allow participation in the project by experts of organisations of non-associated countries.

Further information on COST may be found on the website: <http://cost.cordis.lu>

### **The TIST domain**

COST-TIST covers all COST activities in the field of Telecommunications and Information Science and Technology, from fundamental research to services and applications. TIST Actions have successfully contributed to the aims of the European Research Area by bringing a large set of national, industrial, and university research in the field together into a common framework of research objectives.

TIST Actions involve more than 3000 leading scientists from key research institutes and universities, network operators, and technology providers, from the 35 COST countries and from non-COST countries. Detailed information can be found on the TIST website: <http://cost.cordis.lu/src/domain/TIST/main.html> and on the sites of the individual Actions.

TIST Actions are divided over seven sub-domains. Their main focus is shortly summarized here.

#### *Antennas, radio propagation and interference*

This area is one of pioneering areas, dating back to the start of COST in 1971. COST Actions in propagation have developed propagation models for the European area and contributed these to standardisation bodies such as ITU and ETSI. The Actions reviewing and collating experimental propagation data from the OTS, Sirio and Olympus satellites have gained a world-wide reputation. Other examples are the development of high-efficiency and low-cost antennas for millimetre-wave applications and advanced antenna measurement techniques.

Presently the focus is on

- Effects of the upper atmosphere on communications

- Propagation impairment mitigation techniques for millimetre-wave radio systems
- Innovative antennas for emerging applications
- EMC in diffused communication systems

#### *Wireless and Mobile Communications*

Actions in this area have contributed strongly to the development of the current GSM and UMTS systems and associated techniques (e.g. Spread-Spectrum and OFDM). Presently the focus is on

- Traffic and QoS Management in wireless multimedia networks
- Spectrum and power efficient broadband communications
- Contributing to the setting of standards for mobile broadband multimedia

#### *e-Society*

Human aspects of the information society have been studied within COST for some 20 years. Main subjects covered are

- Accessibility of telecommunication services to elderly and disabled people
- Biomedical aspects of EM fields, in particular related to mobile communication systems
- Man-machine interface aspects. Presently an Action is studying gesture analysis, capture and actuation for the control of audio systems

#### *Biometrics, authentication and security*

- Effective methods for the recognition of people over the Internet, based on voice and facial characteristics in order to facilitate, protect, and promote various financial and other services over this growing telecommunication medium
- Issues and problems involved in general in spoken language interaction in telecommunication
- Non-linear speech processing methods for more efficient speech coding, improved speech recognition, and improved speaker identification and verification
- Communicative interfaces that provide a natural human-computer interaction

#### *Knowledge and information management*

- Advanced multimedia data and knowledge management technologies for personal multimedia communication systems and services;
- Systems for extracting previously unknown, non-trivial, and potentially useful knowledge from structurally complex, high-volume, distributed, and fast-changing scientific and R&D databases;
- Semantic and syntactic aspects of relational structures arising from real world situations and develop deductive systems which can be implemented into industrial applications such as diagnostic systems;

#### *Nanotechnologies and optical components*

- Ultrafast nanophotonics to provide high capacity photonic communication infrastructures
- Advanced optical signal processing, optical logic, microwave photonics and exploratory technologies such as quantum communication
- Reliability aspects and parameters of optical fibre components for telecommunications
- Novel network concepts and architectures exploiting the features and properties of photonic technologies

*Network design and analysis*

- Analysis and design of advanced multiservice networks supporting mobility, multimedia and internetworking
- Mathematical modelling, simulation and optimization of the structure of communication networks (architecture, topology, equipment and protocols)
- Development of tools, graphs and algorithms for network management (e.g. congestion control, quality of service, TCP over ATM)

At the Special Session on COST activities, four further papers will highlight some particular recent achievements of this unique framework for international research cooperation.

**Reference:**

- [1] COST Office (2004), *Overview of the Activities in the domain of Telecommunications and Information Science and Technology (TIST)*, ISBN 2-912049-43-1