COST

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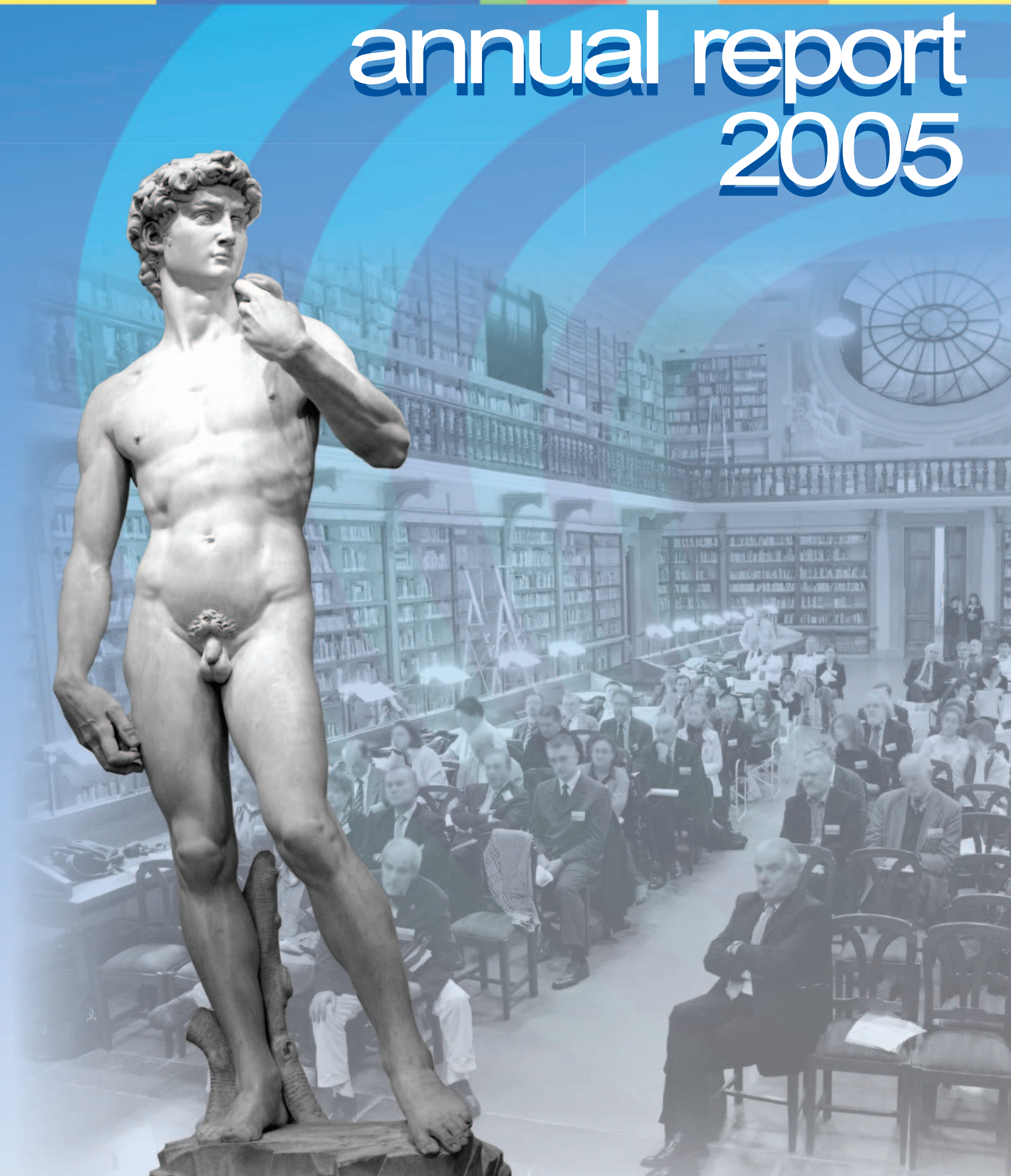
annual report 2005



Cover Page:
COST Strategic Workshop “COST and Cultural Heritage: Crossing Borders”, held in Florence on 20 - 22 October 2005.
Foreground: “David” as symbol for cultural heritage in Florence
Background: the audience in the Galleria degli Uffizi, Biblioteca Magliabechiana

European **CO**operation in the field of
Scientific and **T**echnical Research

Annual Report 2005

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Contents

Foreword

The history of COST in the last four years may be summarised as a rapid transition from the "dark" period of the years 2002 and 2003 - when there had even been some talk of an "honourable funeral" for COST - to the COST "renaissance" of 2004 and 2005. There is now renewed confidence and enthusiasm in the COST research community and the assured support from the Framework Programmes.

This "renaissance" started at the beginning of 2004 with the establishment of the fully operative COST Office in Brussels based on the contract between the European Science Foundation and the European Commission for the support of COST. In particular, the new COST Office has provided, as its principal task, scientific and technical assistance to the COST system and especially to its Technical Committes and Actions.

An intense period of reforms within COST has followed, all of which have contributed to the COST "renaissance".

During 2005, several important decisions were taken by COST. One was the introduction of voting procedures in the Committee of Senior Officials (CSO), based on a simple majority of 3/4 of the COST Member States: a real milestone in the history of COST which, in the past 35 years, was able to decide only by consensus, whatever the issue. This will enable COST to operate with much greater efficiency.

The other milestone concerned the complete and profound restructuring of the COST scientific domains, the first to be introduced after 35 years and a real "Copernican revolution" that has launched COST into the future as a true "exploratorium" of new ideas in the most promising fields of science. The restructuring was not obtained by simply reducing the number of the COST domains - as requested by the COST Ministerial Conference held in Dubrovnik in 2003 - but by starting again from a "tabula rasa" and by building a completely new structure which is now based on 9 new scientific domains. With this decision the CSO showed itself to be a really strategic body for COST by establishing a sound scientific

Professor Dr Ing Francesco Fedi
President COST Committee of Senior Officials

strategy for the future. COST is now a modern network for European cooperation in science and technology at the service of European researchers. It has re-positioned COST so that it can act as a real precursor for the Framework Programme, it can provide an essential collaboration system to underpin the proposed European Research Council and can support the younger generation of researchers. Most importantly, it shows that COST is a key element of the European Research Area and that it can contribute significantly to the achieving the Lisbon and Barcelona objectives.

Interdisciplinarity was a key issue of the reformed scientific domains. Not only are the domains themselves interdisciplinary but this will also be ensured through the " Strategic Workshops" organized by COST on subjects of intrinsic interdisciplinary nature. During 2005, COST organised and held two strategic workshops. The first, held in Brussels on 16 - 18 February 2005 brought together around 100 participants from across Europe and Korea to discuss a wide range of issues on "Environment and Health". The discussion built

on previous activities carried out in the context of the series of meetings of European Ministers of Environment and Health, the research being carried out under the Framework Programme, the ESF/WHO (Europe)/European Commission workshops and also focused on the European Environment and Health Action Plan, 2004 - 2010. The conclusions of these strategic workshops have been published and widely disseminated. The second strategic workshop on "COST and Cultural Heritage: Crossing Borders" was organised in Florence from 20 to 22 October 2005. More than 100 participants from 18 countries from the European Union and also from Lebanon and Egypt participated in the Workshop. Their background and contributions covered an extremely broad variety of topics: members of the European Parliament stressed the responsibility of politicians for the preservation of the common European Cultural Heritage, physicists gave talks on how to analyse a painting or sculpture without damaging it, the so-called "non-destructive" analytical techniques; geologists and archaeologists illustrated investigations below ground; and historians reflected on what artefacts were valuable for preservation. The European Commission, the European Science Foundation, the Italian National Research Council and international organisations dealing with cultural heritage, such as the International Institute for Conservation (IIC) or the International Centre for the Preservation of Monuments and Sites (ICCROM), were also represented at the Workshop. Two new Strategic Workshops on "Food and Health" and on "Nanosciences and Technologies" are in an advanced stage of planning and will be held during 2006.

The third important major reform introduced in COST concerned the introduction of a continuous Open Call for proposals together with a strengthened and consistent use of external peer reviews.

With the continuous Open Call for proposals, based on a two-stage process, the advantages of the COST tradition and the need of rendering the process of presenting proposals for new Actions as transparent as possible are combined. The call is continuous, i.e. the scientific community can present a proposal for a new Action at any time, following the successful tradition of COST. The call is open, that is, it follows the "bottom-up" tradition of COST. The process is based on a call for proposals: the benefits of calls for proposals are generally seen as raising visibility within the research community and creating openness. The call is based on a two-stage process (preliminary proposal and full proposal). Preliminary proposals of maximum three pages length will be sought to enable an initial filter of proposals to be conducted. Only those deemed of sufficient interest, potential intrinsic quality, and European added value will be invited to submit a full proposal. This should avoid the disadvantages with calls such as the problem of oversubscription. That is, a large number of new full proposals, frequently not of sufficient quality, an over-large workload in processing proposals within the COST Office and the review system, and the disillusion which may arise within the research community due to the lack of acceptance of a large number of full proposals.

COST monitoring of the Actions in progress and final evaluation, with external peer reviews of completed Actions, has always been a tradition in COST and a very good example of 'Quality Control' in the European Research Area. Quality control is essential in all research endeavours, whether these be for direct research funding or for networking of researchers. In all these cases, peer review is normally applied to determine the quality of the research being undertaken. COST has guidelines for the assessment, monitoring and evaluation process which will be reviewed as necessary and which are to be followed by all the Domain Committees which will have to involve external reviewers, both in the assessment of new proposals and in the evaluation of completed Actions. In order to obtain the services of top quality reviewers, remuneration for experts has been introduced.

The reform process underway in COST was fully recognized by the High Level Panel established by the European Commission for the Mid-Term Review of the EC-ESF contract for COST. The Panel recognized COST's efficiency as an important instrument available to the European scientific community in the European Research Area and the important role of COST for the Lisbon and Barcelona objectives. The Panel also recommended the European Commission to release the entire sum of 80M€, the upper limit of support for COST envisaged in the sixth Framework Programme (FP6), and particularly importantly, to continue to support COST in the future with increased support within FP7.

The European Commission, in its latest proposal for FP7, has stated its intention to enhance the synergy between FP7 and COST and to include financial support for COST and its activities. In addition, a high level group has been created between COST and the European Commission, co-chaired by the Director General of DG Research and the COST CSO President. This is a mark of renewed confidence in COST and has enabled a strong partnership to be developed between COST and the European Commission.

The Competitiveness Council of Ministers of the European Union, in its conclusions in September and November 2004, stressed "the importance of reinforcing the ties between the Framework Programme and European intergovernmental organizations such as COST" and "underlined that European technology initiatives should achieve synergies with existing schemes such as COST taking into account its important contribution to R&D". Such political recognition of COST is especially important in securing future support.

COST has also been building links with the European Parliament. Members of the European Parliament have actively participated in the COST DAY organized in Brussels in November 2004. COST is explicitly mentioned in the Report of the Rapporteur to the European Parliament on the Seventh Framework Programme. A COST exhibition in the European Parliament is being planned from 18 to 21 April 2006 with the expected participation of Commissioner Dr Janos Potočnik, and the Chair of the Committee on Industry, Research and Energy (ITRE) of the European Parliament, Mr Giles Chichester.

COST does not restrict itself serving just the European research community. It endeavours to ensure the wide dissemination of the results of its Actions to 'user' communities, including policy makers at all levels and, where appropriate, to encourage the use of results to aid European commercial and industrial competitiveness. The development and intensification of links with EUREKA is a cornerstone of this approach and there is a continuing consultation between COST and EUREKA.

Neither has COST confined itself geographically. It has always been an open networking system encouraging the participation, on the basis of mutual interest and benefit, of researchers and colleagues from all over the World. This is now expanding. For example, we are seeing this now with China, a country which I visited during 2005 to promote such links. COST has also introduced a policy to support researchers from our "near neighbours" involved in COST Actions.

The European scientific community continues to look to COST as a "fast, efficient, effective flexible framework to bring European researchers together, under light strategic guidance, to let them work out their ideas" and this has been confirmed by a survey which showed that "if COST did not exist it would be necessary to invent it".

The role that COST has had, in the past 35 years, in the development of European scientific endeavours in many key areas at the frontiers of our knowledge, the establishment of networks of thousands of leading Scientists, the increase of mobility of researchers across Europe, the improvement of cooperation in science and technology and the creation of a better understanding among European countries, has been fully recognised.

Consequently, COST can expect a full appreciation of its potential, through increasing support to its activities and the full recognition of its role in the European Research Area.

This gives me great confidence for the future of COST at the service of the European scientific community and for the benefit of the European citizen.

A view from the Council Secretariat

From the very beginning the Council Secretariat has been a partner in the daily operation of COST and we are proud of the modest but effective contribution we have made to the success of this unique and remarkable initiative. It is deeply gratifying to see that, after a challenging period of reorientation, COST has clearly gained momentum in 2005 and is now operating at a most productive level. The new COST Office, based on a specific support action contract between the Commission and the European Science Foundation (ESF), is now fully operational and delivering the expected targeted results.

I am pleased to note that the results of COST Actions are increasingly perceived as a spring board for future projects, be they within the Union's Framework Programme or indeed within other European research fora. This clearly affirms the role of COST as a catalyst for European research co-operation: In September 2004 the Competitiveness Council encouraged co-operation between COST and Eureka as decentralised forms of research promotion. As a case in point being COST Action 529 on "Efficient Lighting for the 21st Century", which seeks new concepts and materials for the lighting industry whilst avoiding the use of substances known to be environmentally harmful, has been identified as a prime example of research initiated in a COST Action and which may indeed have a successful continuation as a Eureka project. In recognition of COST's overall success and achievements, the amount of € 80 million in financial support for COST under the sixth Research Framework Programme has been released in full. This also acknowledges a number of reforms which are aimed at more efficient scientific management and therefore simplification of procedures in COST's decision-making process. Furthermore, it should be noted that the Mid-Term Review Panel has recommended an increase in COST funding under the 7th Framework Programme.

At a time where research and innovation have become the cornerstones for European economic policy and development, and when Europe is facing the challenge of "activating knowledge all over the place", it goes without saying that COST should be supported in continuing its invaluable activities. On the basis of the excellent results it has produced over a number of years and more recently its noteworthy achievements, it certainly contributes substantially to significant progress in European research and innovation. Accordingly it will receive all the support it deserves. I can assure you that it will be a privilege for the Council Secretariat to assist in any way possible in order to ensure the continued success of COST.

March 2006

Professor Dr Klaus Gretschmann
Director-General
General Secretariat of the Council
of the European Union

COST and the Commission: review of COST at mid-term

Year 2005 was a crucial moment to take stock of the reforms of COST. The contract between the Commission and the European Science Foundation, which had been concluded in mid-2003, reached halfway. Through this contract the ESF, the implementing agent designated by COST, provides the secretariat for COST science activities under the 6th Framework Programme.

At the time when this new management approach was discussed, the need for COST to reform was high on the agenda. These expressed needs were firmly rooted in the conclusions of an independent assessment panel ("Busch report"), which called for reforms in COST scientific management and governance. In particular, many then envisaged that a partnership between the three stakeholders – the Commission, COST and the ESF – would represent high potential added value for the European Research Area.

The proposal that the ESF submitted to the Commission in 2003 for the provision of the scientific, technical and administrative management of COST, was found by independent experts and by the Commission very solid and visionary, and would in an ambitious fashion address the reform needs through concrete measures. The experts, who evaluated the proposal however, advised the Commission to closely monitor the implementation of these steps via a Mid-Term Review in 2005.

In 2005 the Commission, therefore, convened an external panel, chaired by Prof. Raoul Kneucker involving high-level experts with diverse experience, from the scientific community to industry, to take stock of the reforms and to make recommendations.

The outcome of the review was positive, and Commissioner Janez Potočnik expressed his satisfaction, in particular since: "We now have good evidence that the reform of COST is well advanced." This is particularly the case in "science management", where measures following best scientific practice have been decided upon, in order to increase efficiency. In the area of governance some positive steps have also been taken.

Dr Robert-Jan Smits
Director
European Commission
Research Directorate General
Directorate B – Structuring ERA

Clearly, the decision to profoundly restructure the COST scientific domains and reduce their number, as well as those of the respective Domain Committees, is a significant step to modernizing COST with a view to facing the challenges of the 21st century.

The COST Mid-Term Review Panel recommended to grant ESF the full 80M€ Community support, which was foreseen, if the reforms of COST were successful. Consequently, the contract amendment was negotiated and the Commission has now allocated the maximum possible funding from the FP6 to the ESF to support the COST scientific community.

This should not, however, be grounds for complacency for any of the stakeholders, but rather a signal that determined efforts pay off. In this vein, the Panel also recommended that COST pursue the reform process, a view which the Commission fully shares. The Commission looks forward to further reforms in COST at governance level, including the objective to further speed up and simplify the processes.

It should be borne in mind that a key feature of the 7th Framework Programme is a significant simplification of its operations compared with its predecessors. Therefore it is justified to expect similar efforts of COST, for which financial support is foreseen under FP7 for its administration and coordination activities. In this respect, the discussions of the Committee of Senior Officials and its executive JAF group on governance reforms are of key importance.

The value and the competitiveness of the COST instrument under the European Research Area crucially depend upon the efficiency of COST at all levels.

Moreover, the COST Mid-Term Review Panel recommended that a full assessment is to be made at the end of the FP6 contract in 2007. This would indeed be the moment to take stock of the role of a reformed COST and its potential to contribute to the achievement of the objectives of the European Research Area and to the Lisbon and Barcelona goals.

We look forward to continuing efforts to further modernise COST so that it is ready to assume its role as a flexible way of enhancing cooperation and coordination of research activities in Europe, providing strong added value to realising the European Research Area. In this context, the dedication and the enthusiasm of Professor Francesco Fedi, President of the COST Committee of Senior Officials, is a potential key to success.

Report from the COST Office

The past year saw stable operations and brought many changes to the COST system at the same time. An expert panel reviewed the activities of COST to support the future developments. The report states that COST is a suitable mechanism for contributing to the Lisbon and Barcelona goals, due to its role in assisting the co-ordination of national research. Fundamental reforms of the governance of COST were decided. The CSO approved three major changes to foster the role of COST for the future: the adoption of majority voting to speed decisions, a new Domain structure to provide up to date advice, and a completely new competitive Open Call system to ensure the highest quality of the COST Actions.
Since these changes in the COST system successfully build trust and confidence the European Commission felt able to release the maximum amount of €80m for COST in the FP6 contract with the European Science Foundation.

The Mid Term Review of the COST contract between the European Commission and the ESF defined the boundary conditions for the future operations of the COST Office. The Panel also felt that experience shows that most Actions need to be "driven" to meet both activity and budget planned targets. It felt that efficiency could be improved by more widespread uptake of the system of annual grants, and that this should become, in the future, the rule and not the exception. This would devolve the management of Actions to a lower level and increase their flexibility though giving Actions control over their activities. It would, of course, involve moving some of the administrative costs which would still be incurred, but could lead to a more effective use of resources.
The Panel also supports funding COST continuously under future Framework programmes. In doing so, it suggests that increased funding should be considered, subject to continuing the strengthening of science management and strategic reform work to be continued.
A full assessment of the COST contract should be carried out in 2007.

The CSO decided on a complete Domain restructuring on it's meeting in Reading, UK, 23 - 24 November 2005. This decision has started a new era for COST including a strategic reorientation on the "raison d'être" of COST.
The Domain restructuring was regarded as a prerequisite to deal with the recommendations of the Mid-Term Review panel. The 9 new Domains, while meeting many bottom-up needs of the research community, will be addressing crucial strategic areas in research:

- Biomedicine and Molecular Biosciences
- Food and Agriculture
- Forests, their Products and Services
- Materials, Physical and Nanosciences
- Chemistry and Molecular Sciences and Technologies
- Earth System Science and Environmental Management
- Information and Communication Technologies
- Transport and Urban Development
- Individuals, Society, Culture and Health

Nanosciences and Physics are interdisciplinary issues that will be addressed in all Domains, in particular in Biomedicine and Molecular Biosciences, Chemistry and Molecular Sciences and Technologies and Information and Communication Technologies.
The CSO endorsed the need to enhance interdisciplinarity within COST and to deal with subjects of societal importance or bordering on different COST domains through the creation of "Interdisciplinary Exploratoria". They shall provide for opportunities for potential high gain networking activities complementing the DCs.
The new Domain structure will become operational on 1 June 2006 with mandates of four years and will replace the current Technical Committee (TC) structure. The CSO requested COST CNCs to provide nominations for the members of the newly established DCs by 31

March 2006, on the basis of one representative per COST Member Country. In addition, CNCs are invited to nominate up to two additional experts with complementary expertise, taking gender balance into account, who can replace the appointed member, if he/she is unable to attend the meeting, and who will form a "pool" on which the Domain Committee can draw. Members of this pool may be invited to attend a Domain Committee meeting as invited experts, as appropriate and up to a limit agreed with the COST Office, and may also serve as reviewers.
The CSO decided to ask COST Office to prepare a proposal for a continuous and thematically Open Call and the respective selection criteria for new COST Actions starting from 2007 onwards. The Open Call shall foster the foundations for developing scientific excellence in the European Research Area through a fair competition. This process will imply significant changes to the traditional procedures in the COST system so far.

The COST Office faced a period of rapid learning and intensive activity, too. In its second year of operation the avenues to the future became clearer and the administrative procedures were streamlined. New synergies with the ESF emerged and new joint initiatives were started. The Domain restructuring process induced a whole series of changes in the administrative support of the Committees and the COST Actions.
The recruitment of COST Office staff to its full strength was completed in 2005. A new director was appointed and thematic cluster working introduced. Both Science Officers and Administrative Officers are now working within 3 clusters, as a means of strengthening management and in ensuring a greater degree of information exchange and inter-disciplinarity between domains. Management tools including Personal Business Objectives and Annual Performance Reviews have also been put in place.

The clusters are presently composed as follows:

Cluster 1 - Natural and Molecules Sciences and Materials (coordinator: Dr Piotr Swiatek), covering the Domains Chemistry; Physics and Materials

Cluster 2 - Natural resources and Environment (coordinator: Dr Günter Siegel), covering the Domains Agriculture, Biotechnology and Food Science; Forests and Forestry Products; Environment and Meteorology

Cluster 3 - Science Technology and Society (coordinator: Dr Afonso Ferreira), covering the domains Medicine and Health; Social Sciences and Humanities; Telecommunications and Information Science and Technology; Transport and Urban Civil Engineering

The new Director, Dr Martin Grabert, took office on 1 September. There was one month of overlap with the Tony Mayer as outgoing Director to secure a smooth transition in the management.
Quick start meetings for Actions approved at the March 2005 CSO meeting have been held alongside the ongoing support for Actions. The demand for STSMs and training schools has been especially high. The on-line systems for COST networking support have been developed and installed.
More and more Domains are moving to the annual grant system, which is expected to become mandatory for all Actions in the course of the year 2007.
Dissemination has been an active area in terms of participation in important science events and in publications.
In relation to strengthening of external links, including the Commission, ESF and EUREKA real progress was made.
As one example of strategic initiatives the COST Cultural Heritage Interest Group, representing COST Actions involved in Restoration and Preservation of European Heritage was presented at ICOM-CC (the Conservation Committee of The International Council of Museums), 12 - 16 September 2005 in The Hague. The meeting gathered around 1000 experts.
The COST Office supported limited attendance of participants throughout 2005 in COST MCs by approved non-COST institutions from designated "near neighbour" countries, in accordance with the CSO decision.

Europe has a long standing tradition of excellence in research and innovation, and European teams continue to lead progress in many fields of science and technology. However research centres in Europe are scattered across the whole continent and all too often their efforts fail because of the absence of adequate networking and cooperation opportunities. That is why COST has an important role to play. It brings together research teams from all over Europe and enables scientists to collaborate in a wide spectrum of activities in research and technology. COST is a cornerstone for the

development of the European Research Area and instrumental for achieving the ambitious objectives set by the European Council of Lisbon.

In the future COST will play an even more active role in coordinating national efforts to support the Lisbon objectives. COST has a proven record of being an "enabling" agent to support European integration. Young researchers are the future of European Science. COST has always tried to support their scientific exchanges between laboratories. New ideas generated by young teams, in particular from the new member states, shall be endorsed in order to enable them to gain experience and recognition. Developing even stronger cooperation among European scientists is paramount to building the European Research Area. COST activities are carried by the enthusiasm and commitment of the participating researchers. Presently more than 200 of these project oriented networks are supported. Every year approximately 45 new activities are approved and started. In summer 2006 COST is planning a pilot project and organising an call for proposals in particular of young scientists working in all scientific fields. Young Investigators Networks "YINs" will address exclusively scientists at postdoc level, who were granted their PHD less than 5 years ago.

People's perceptions of science are complex and constantly shifting. In order to enhance the science-society interface, public perceptions need to be constantly canvassed and monitored. Communication and visibility are two challenges that confront COST. The dissemination and transfer of knowledge is a key value of COST and the use of results by industry, policy makers and society needs to be increased. Therefore COST will strengthen its efforts to communicate science. In spring 2006 COST organises an exhibition in the European Parliament "COST – a vision for European Science" that will provide the opportunity to increase the general awareness of COST especially in a political environment. It will address European policymakers and convince them of the high importance of COST as a vital and complementary instrument within the European research activities. In addition to this event several national/regional COST days are planned and COST press activities will be enforced.

It is vital to realise that knowledge is Europe's greatest resource. Stronger emphasis than in the past has to be put on research that is relevant to the needs of Europe, to help it compete internationally, and develop its role as a world leader in certain sectors. Bringing the best brains from around the world to Europe offering them attractive career perspectives and networking opportunities is the challenge. The added value to scientific work from improving contacts and developing collaboration among researchers from across Europe cannot be underestimated. The extent of their participation shows the value European scientists place on COST. COST is of great importance for the founding in Europe of consolidated scientific traditions in many key areas at the frontiers of scientific knowledge, for the establishment of networks of thousands of leading scientists, for the increase of mobility of researchers in Europe and for the improvement both of cooperation in science and technology and of a better understanding among European countries.

On the basis of the outstanding results obtained by COST it may be expected that, in the future, a full appreciation of COST potentialities, and increasing support to COST activities and the full recognition of the role of COST in the European Research Area will be accorded by the EU in its Framework programme.

Dr Martin Grabert
Director, COST Office

Actions completed in 2005

Telecommunications and Information Science and Technology

Action 272 - Packet-oriented service delivery via satellite

2001 - 2005 Chair: Dr Erina FERRO (IT)
Signatories: BE, DE, ES, FR, GR, HR, IT, NO, SI, SK, UK

The main objectives of COST Action 272 were to contribute to the identification of key requirements, analysis, performance comparison, architectural design, and protocol specification of future packet-oriented satellite communication systems, with a clear focus on Internet-type system concepts, applications, and protocols/techniques on the various layers. The work within the Action focused on satellite-specific market segments and potential at an early stage and came up with a clearly defined set of reference scenarios (global/regional, EO/non-GEO, broadcast/ multicast/interactive, QoS/best-effort, all-IP/hybrid, ...). Additional benefits of setting up the proposed research activities within the COST framework were met because of multidisciplinary character of research in various areas such as traffic characterization and modelling, satellite communications, etc.

The strategic theme of COST 272 allowed researchers of 11 European countries to concentrate on the domain, and to obtain results in the difficult area of cross-layer interoperability. Some new interesting approaches were led in the fields of cross-layer technologies, global platform, global scalable traffic modelling, and routing, such as:

• Identification of technologies supporting IP over satellites and enabling new services and QoS guarantees;

• Study of suitability to implement IP switching in the sky;

• Adaptation of protocols and algorithms initially developed for the fixed and mobile terrestrial networks, to make them suitable for the use in satellite segment;

• Development of new algorithms, designed deliberately for the satellite segment;

• Evaluation of the suitability of using various optical technologies in the space segment.

COST 272 was the crossroads of many active people in the satellite networking area. It was the place for many instructive presentations that have contributed to distribute the acquired knowledge to the different actors. This cooperation delivered major improvements to the modelling of satellite traffic flows, inter-satellite link networking, and efficient resource management. Much work in the field was carried out within COST 272 and its predecessor Actions, and this was very valuable preparation for setting up SatNEx, which is now a Network of Excellence for the field of satellite communication in FP6.

Action 273 - Towards Mobile Broadband Multimedia Networks

2001 - 2005 Chair: Pr Luis CORREIA (PT)
Signatories: AT, BE, BG, CH, CS, CY, CZ, DE, DK, ES, FI, FR, GR, HR, HU, IE, IT, NL, NO, PL, PT, SE, SI, SK, UK

The objectives of this Action were as follows:

• To increase the knowledge on the radio aspects of mobile broadband multimedia networks by exploring and developing new methods, models, techniques;

• To play a supporting role in the mobile communication area;

• To contribute to the deployment of systems which are very close to the completion of their standardisation phase.

Results were achieved in the areas of Radio System Aspects, Propagation and Antennas, and Radio Network Aspects. The management effort required for directing such a large and wide-ranging project is substantial. In fact, it would be a worthwhile effort to try and analyze the management of the project, which could be used as the management model for many other virtual organisations. It is also impressive that the various reports and papers produced by the consortium were amalgamated in a coherent treatise, ultimately leading to a well-focused book, published by Elsevier, which compiles a whole host of valuable ideas and hence substantially contributes towards the international scientific debate on the next generation of wireless systems.

In particular, the Action introduced new analytical MIMO channel models (as input to ITU, ETSI and 3GPP). Similarly to the now classic COST 207 channel models, this COST 273 MIMO model is likely to find its way into numerous future studies. This single result alone would have justified the modest cost of this comprehensive research programme.

Further achievements realised by Working Groups and also by the Sub-Working Groups were:

• Handset measurements (as input to ITU, ETSI and 3GPP);

• Channel measurements;

• Mobile radio access network reference scenarios;

• Exchange of information, models and measured data among participating institutes.

The research activities carried out in the Action contributed to the keeping of the European leading role in mobile and wireless communications. The Action had impact on maintaining, and even increasing, the industrial competitiveness of European industry in the mobile communication area.

Action 274 - Theory and Application of Relational Structures as Knowledge Instruments

2001 - 2005 Chair: Pr Gunther SCHMIDT (DE)
Signatories: AT, BE, BG, CH, CZ, DE, ES, FI, FR, HU, IT, LU, NL, PL, SE, SK, UK

The main objective of the Action was to advance the understanding and use of relational structures in applicable object domains. This included the following sub–objectives:

• To study the semantic and syntactic aspects of relational structures arising from real world situations.

• To investigate automated inference for relational systems, and, where possible or feasible, develop deductive systems which can be implemented into industrial applications such as diagnostic systems.

• To develop non-invasive scaling methods for the prediction of relational data, and to compare and possibly integrate a nominal scaling approach with numerical methods such as fuzzy relations, Bayesian networks etc.

• To study and enhance current methods of relational qualitative reasoning about physical systems.

Semantic and syntactical aspects of relational structures have been extensively studied in the Action with a considerable degree of cooperation among the members. The evidence seen

of "real world situations" is successful considering the starting point and available time. For instance, the work on voting systems stands out as a successful collaboration between most of the participants. The work on relational preferences has acted as a focal point for work in other areas, bringing together groups who might otherwise not have collaborated with each other.

The main and important outcome of the Action was to focus on really new combinations of diverse disciplines. There was a high degree of interaction between individuals from different member states resulting in an extensive list of publications.

In future, relational structures will be pervasive in many application areas. This Action established a new and wide cooperating network that in future can make significant progress in unifying diverse existing approaches.

Action 275 - Biometrics-Based Recognition of People over the Internet

2001 - 2005 Chair: Dr. A. ARIYAEEINIA (UK)

Signatories: BE, CH, ES, FR, GR, HR, IE, IT, PL, PT, SE, SI, SK, UK

The main objective of the Action was to investigate effective methods for the recognition of people over the Internet, based primarily on voice and facial characteristics in order to facilitate, protect, and promote financial and other services over this growing telecommunication medium.

In order to facilitate progress towards achieving individual objectives as well as the overall aims, the activities were divided into four main areas, which corresponded to the four working groups organized by Management Committee of COST 275. These were Speaker Recognition, Face Recognition/ other image-based biometrics, Applications and Data Fusion, and Assessment methods.

The Action proposed pioneering work on:

• The delivery of voice biometrics over the Internet, covering such issues as packet loss, compact encoding, and data security.

• The provision of a speech database degraded, by simulating the adverse effects in real applications, including transmission over the internet.

• The extensive investigations into face localisation and recognition, signature, palm, hand-geometry, and fingerprint

• The development of a Windows-based software toolkit for introducing various types of degradation into images, this degraded image database, which is considered another important output of the Action, covers a range of effects including packet loss, compression, noise, background variation etc.

The activities within COST 275 also led to the development of a protocol for integrating three well-known European databases into a single multimodal database. The protocol defines a large cohort of virtual individuals based on five classes of biometrics. This is beneficial for further enhancing both investigative work and assessment of biometric authentication systems. The protocol also includes guidelines for biometric authentication evaluation. These guidelines detail different structures for training and testing data, and also incorporate different fusion strategies.

The main impact of the Action COST 275 was in creating of a new official framework for common support of investigation of biometrics-based recognition of people over the Internet, which did not exist in Europe at the beginning of this Action. During the operation of this Action, new scientific projects in the area were initiated both on national level and in Europe. The best example of this is a Network of Excellence in FP6.

Action 276 - Information and Knowledge Management for Integrated Media Communication Systems

2001 - 2005 Chair: Pr Jurij TASIC (SI)

Signatories: AT, BG, CH, CS, CY, CZ, ES, FR, GR, HR, HU, IE, IT, MK, NO, RO, SI, SK, TR

The main objective of the Action was to develop advanced multimedia data and knowledge management technologies for personal multimedia communication systems and services, including specific signal processing and implementation techniques for users' personal terminals. In addition, some critical system features were examined, like system integration and personification of services, enhanced by implementation trials and demonstrations of advanced personal services.

The Action provided opportunities for active exchange of ideas and solutions among the experts from many different research areas: information and computer science, telecommunications, fundamental signal processing, and VLSI hardware design. From the achievements reached it can be expected that many of them will be realized in future communication systems.

The Action's achievements were documented and disseminated through publishing in journals, in proceedings of conferences and workshops and also through a book issued by Kluwer Academic Publishers.

Action 276 was a rather unique network of scientists and research institutions, not only from Europe but also from other parts of the world showing strong ambitions. Their influence on the future development of smart multimedia communication systems in Europe will be substantial and will undoubtedly help to improve the industrial competitiveness of European industry in this area.

Action 277 - Nonlinear Speech Processing

2001 - 2005 Chair: Dr Marcos FAUNDEZ (ES)

Signatories: AT, BE, CH, CZ, DE, ES, FR, GR, IE, IT, LT, PT, SE, SI, SK, UK

As stated in the Memorandum of Understanding, the main objective of the Action was to improve the voice services in telecommunication systems, through the development of new nonlinear speech processing techniques.

To achieve its main goal, the Action initially split the work into four directions, namely:

• Speech Coding;

• Speech Synthesis;

• Speaker Identification and Verification;

• Speech Recognition.

Furthermore, Voice Analysis and Conversion as well as Speech Enhancement also received partial coverage during the Action.

The main results are as follows. Within the speech synthesis area two key approaches have been described, both based around a nonlinear oscillator approach. In addition, discussions have taken place to try and decide which sort of phonemic database would be most appropriate. In the analysis area, a new analysis model which is likely to have impact on the synthesis area was proposed. In the coding area, the development of techniques suitable for packet based systems started, and an approach trying to apply speaker recognition techniques to speech coding also started. In the speaker recognition field, the relevance of Bandwidth extension algorithms, blind inversion of nonlinear distortions, new non-linear parameterizations based on neural networks, and the relevance of watermarking on speaker recognizer systems were all tested and reported in mainstream journals and conferences.

A short selection of the areas where the methods studied by the Action can benefit international science and technology are:

• Security, Crime investigation (Speaker identification/ verification);

• Interactive multimedia services on packet-switched networks such as the evolving mobile radio networks or the Internet, Voice over IP (Speech coding);

• Human-Computer Interfaces (Speech Synthesis/Speech Recognition);

• Applications for the Blind (Speech Synthesis/Speech Recognition);

• Educational Applications (Speech Synthesis/Speech Recognition);

• Clinical Phonetics Applications (Voice Analysis and Conversion);

• Mobile Telephony, Voice transmission over noisy channels (Speech enhancement).

Action 278 - Spoken Language Interaction in Telecommunication

2001 - 2005 Chair: Mr Borge LINDBERG (DK)

Signatories: AT, BE, CH, CY, CZ, DE, DK, ES, FI, FR, GR, HU, IT, LT, NL, NO, PT, SE, SI, SK, TR, UK

The objectives of the Action were summarized in 5 points:

• To improve the knowledge of the issues and problems involved in general in spoken language interaction in telecommunication.

• To achieve knowledge of issues related to robustness and multi-linguality within spoken language processing.

• To achieve knowledge of spoken language interaction in the context of multimodal communication.

• To achieve knowledge of human-computer dialogue theories, models and systems and associated tools for the establishment of such systems.

• To achieve knowledge of and evaluate telecommunication applications, which apply spoken language as one out of more input or output modalities.

A multilingual Broadcast News database covering 9 languages was established by the Action. Software to enable uniform evaluation of front-end algorithms from various groups was developed. Also, segmentation and classification algorithms from 5 groups were evaluated.

Short term scientific missions have taken place in connection with the annotation, segmentation and evaluation of the recorded database, fostering collaboration among research groups across several countries. A consortium was established in order to continue collaboration on Broadcast News after the end of the COST278. Furthermore, collaborative work between seven research groups was performed within cross-lingual and multi-lingual speech recognition. Specific results on using acoustic data for one language in the acoustic modelling of another language were reported. Here, a data-driven and expert-driven method were compared in obtaining the best acoustic model for the Slovenian language, based on speech data for the German, Spanish, Hungarian, and Slovak languages.

Action 279 - Analysis and Design of Advanced Multiservice Networks supporting Mobility, Multimedia and Internetworking

2001 - 2005 Chair: Pr José BRAZIO (PT)

Signatories: AT, BE, CS, CY, DE, DK, ES, FI, FR, HR, HU, IT, NL, NO, PL, PT, SE, SI, SK, TR, UK

The main objectives defined in the MoU were to develop techniques for the analysis, design and control of advanced multiservice networks supporting mobility, multimedia, and interworking. Principal results concern queuing models, traffic measurement, characterization and modelling in the context of core networks (mostly IP based networks and optical networks) and wireless network (mostly cellular), and also peer-to-peer services and applications. The details of obtained results are well documented in publications in peer-reviewed literature and conference proceedings, a comprehensive book, and also in numerous internal documents.

The main achievements of the Action consist in the development of analytical techniques, algorithms, computer tools and traffic measurement methods, pertaining to:

• network performance, especially with respect to quality of service QoS,

• network protocols,

• network topologies and architectures,

• traffic modelling for peer-to-peer applications,

• economic aspects such as pricing principles and network cost estimation.

The results obtained allow for better understanding of network and traffic behaviour and also network/services analysis, planning, design, and optimisation. All major results of the Action, which were first published in journals, conference proceedings (over 150) and temporary documents (over 170), are summarised in a well structured, solid and complete book, published by Springer.

An important achievement of the Action is the organisation of two successful Summer Schools targeted for PhD students and young scientists. Considering the objectives of the Action, also the Mid-Term and Final Seminar were very successful.

The results of the Action will have a very positive influence on the development of future generation networks and services, especially with respect to methodological aspects. The COST 279 scientific community, which inherited and developed the achievements of previous COST Actions, was an excellent example of benefits of international scientific co-operation within the COST framework. The achievements of COST 279 were outstanding and that, thanks to the action the European research community, may be still considered as the leader in the area of fundamental research pertaining to network modelling, design methodology and performance evaluation, as witnessed by their setting up of Network of Excellence in FP6.

Action 280 - Channel Modelling and Propagation Impairment Mitigation for Millimetre Wave Radio Systems

2001 - 2005 Chair: Dr Misha FILIP (UK)

Signatories: BE, CZ, DE, ES, FI, FR, GR, HU, IT, LU, NL, NO, PL, PT, RO, SE, UK

The objectives of COST 280 were to improve the design and planning of present and future millimetre wave broadband telecommunication systems (including broadcast) and services (especially multimedia) through the development of knowledge and tools for a refined evaluation of their performance.

Many important and not well-known issues associated with the generation of attenuation time-series channel models, were critically evaluated. A number of flexible approaches to SHF/EHF earth-space attenuation channel modelling were developed, as was a framework for their evaluation against real data. The Action considered the systems aspects of fade mitigation in SHF/EHF radio systems. This work was set against a number of so-called “generic systems”, meaning that the work was not limited to GEO slant-path, Earth-space propagation. The application of fade mitigation techniques to terrestrial fixed-access systems, high-altitude platform systems and slant-path LEO systems were all considered.

The main outcomes and achievements of the Action were the results and procedures for the design and implementation of

fade mitigation systems. The research and associated results of the Action provide guidance and a framework for the design of future low-margin millimetre-wave communication systems, both terrestrial and satellite.

In particular, the channel modelling work developed a number of channel simulators capable of producing simulated fade signals with various characteristics on-demand. Simulators of this type will be invaluable not only in the design-phase of fade mitigation techniques and sub-systems but one can also envisage their use in the manufacture and test phases of millimetre-wave communications systems (hardware-in-the-loop testing and verification).

Until relatively recently the dynamic behaviour of the millimetre wave propagation was not well understood. COST 280 was successful in filling this knowledge void which is essential to the efficient use of Ka-band and higher frequency allocations. In addition to merely understanding the dynamics of the channel behaviour, systems modelling carried out in the Action provided insights on how this new information may actually be used in real systems.

These results and many others were presented at numerous conferences and workshops. Many of the results have been formally presented in learned professional journals e.g., IEEE Transactions on Antennas and Propagation. Results and models from this Action are being considered for incorporation in ITU-R Recommendations.

Action 283 - Computational and Information Infrastructure in the Astronomical Datagrid

2001 - 2005 Chair: Pr Fionn MURTAGH (UK)

Signatories: BG, CH, DE, ES, FR, GR, HU, IE, IT, UK

There were three main themes addressed by the Action:

• Data centres and data curation for the Data Grid, including metadata operability standards, textual summarization, and user profiling.

• Visualization, including display, data fusion and data mining.

• Multimedia data handling, including multiband and hyper spectral data analysis.

COST 283 had very extensive linkages with national projects and other international projects (NVO in the US, RVO in Russia, etc.). The plate digitization work has been a unique contribution to these virtual observatory and data grid activities.

This Action was a bridge between middleware and related system activities; and application specialists. There has been extensive work (funded nationally or through FP6) in the former area. This Action provided very productive linkages between computer software infrastructure and high level applications, which were not provided by other means. It can be noted that the middleware and related system activities were sometimes led by Action 283 members (in the cases of UK, F, IRL, D, for example).

This Action contributed significantly to further both the data Grid and the virtual observatory (leading to the generic, virtual organisation) tools and technology developments. In specific advanced conceptual and methodological development – advanced algorithm development – (cf. areas mentioned above under 9.2), significant progress was achieved, as witnessed by the number and quality of publications stemming from the Action. A number of spin-off projects (at FP6 and national level) were generated. Some results (eg. the plate digitization work) can be considered as a direct impact of the Action as they would probably not have been obtained without this Action.

Transport

Action 340 - Towards a Trans-European Intermodal Transport Network: Lessons from History

2000 - 2005 Chair: Dr Michèle MERGER (FR)

Signatories: AT, BE, CH, CZ, DE, DK, ES, FI, FR, GR, IT, LV, NL, PT, RO, SE, SI, UK

The main objective of the Action was to provide a framework of analysis that could act as a decision aid in transport policies and a set of recommendations that would help, thanks to lessons learnt from history, to establish the priorities to be given to different projects involving trans-European connections and intermodal transport.

The Action brought together experts from countries covering all different geographical and political regions of Europe. Based on the experience gained during two centuries of the European transport development, they identified a number of barriers to the creation of efficient intermodal transport networks.

COST 340 organised its Final Conference with keynote speeches given by the transport policy experts of the European Commission and several national Ministries of Transport. Presented papers recognised the interaction between transport and economic development and impact of transport policy and infrastructure on development of different regions. This Conference allowed underlining the necessity for historic approach to dealing with European transport and European transport policy.

The Action established not only the European network of specialists, but led to the creation of T2M Association of scholars and practitioners linked to the history of transport and economics both from Europe and the USA.

Action 346 - Emissions and Fuel Consumption from Heavy Duty Vehicles

1999 - 2005 Chair: Dr Peter STURM (AT)

Signatories: AT, BE, CH, CZ, DE, DK, ES, FI, FR, GR, HU, IL, IT, LT, NL, RO, SE, UK

The primary objective of the Action was to develop an improved methodology for estimating pollutant emissions and fuel consumption from commercial road transport operated with Heavy Duty Vehicles in Europe.

Motivation of setting up this Action was the poor database on emissions for particular types and engines of heavy duty vehicles.

Action results were presented at the 14th Transport & Air Pollution 05 conference in Graz, which provided solid bases for information exchange on a high scientific level, being attended by some 175 participants from 27 countries, representing research and scientific institutions, industry and governments.

COST 346 produced the emission models, which allow to calculate emission and fuel consumption indicators for vehicle fleet as well for individual vehicles taking into account the driving performances and conditions, vehicle age and other factors.

Findings of this Action were also compared with and incorporated into deliverables other EU research projects dealing with transport emissions.

Action 349 - Accessibility of Coaches and Long Distance Buses for People with Reduced Mobility

2001 - 2005 Chair: Mr Ad van Herk (NL) / Mr Donald Macdonald (UK)

Signatories: AT, BE, CZ, DE, ES, FI, FR, HU, IE, IT, LT, NL, NO, SE, UK

The main objective was to produce a concept providing guidance on the construction and design of interurban and international coach and bus systems in respect of the needs of people with reduced mobility in order to assist operators, passenger and authorities when developing plans for accessible and high quality transport systems. Action results cover all aspects of the public transport accessibility for disabled users and are of considerable relevance in the development of the EU legislative or regulatory acts, similarly to previous two Actions dealing with accessibility of urban buses and railways. Results were presented to the professional public at the COST 349 Final Seminar organised during the "Busworld" Exhibition in Kortrijk. This seminar was attended by 120 experts from both the operating and manufacturing sectors of the bus industry and representatives of organisations of disabled people and press. The keynote speeches to the conference delegates were delivered by high level policy makers of the European Commission and Flemish government.

Materials

Action 525 - Advanced Electroceramics: Grain Boundary Engineering

1999 - 2005 Chair: Pr Robert FREER (UK)

Signatories: AT, BE, CH, CZ, DE, DK, ES, FR, IE, IT, LT, LV, NO, PL, PT, RO, SE, SI, TR, UK

The main objective of the COST Action 525 was to understand the role played by grain boundaries in controlling the manufacture, microstructure and properties of electronic ceramics. Components made out such materials have enhanced properties, improved stability and reduced unit cost. The Action revealed also new opportunities for existing and developing ceramics. The activities of the Action were mainly concerned with dielectrics, sensors and semiconducting ceramics one side and ionic and mixed ionic-electronic conductors on the other. The Action studied the fundamental issues from a structural point of view defining pore and grain size distributions, extended/bulk defects, multiphase structures. Also structural and chemical stability has been studied. A generalized brick – wall model was for the first time developed and suggested for calculating the effective dc and ac dielectric response of granular materials (i.e. ceramics and polycrystalline films) for the case of grain boundary layers with sharp boundaries, whose dielectric response differs from that of grain bulk. This model is valid for arbitrary grain form and size. A strong activity was the fabrication and characterisation of dense perovskites of mixed conductivity used in gas separation (e.g. pure oxygen production).

Significant success of the Action was the development of novel ionic conducting ceramics including layered potassium antimonates as novel cation conductors (for battery and sensor applications) and $BaMO_3$ protonic conductors where M = Ce, Zr. Hf (with hafnates being addressed for the first time).

Also the membrane materials of the $La_{1-x}Sr_xFeO_3$ family were synthesized and characterised. The effect of grain size and calcination/sintering temperature in this material was studied. $LaSrFeO_3$ perovskite electrodes were applied in sensors for automotive emission control (NOx and CO reduction) in conjunction with a lambda probe. The sensor has been tested in real conditions in an engine test bench.

Action 526 - Automatic Process Optimization in Materials Technology

2000 - 2005 Chair: Dr Fredy HEDIGER (DE)

Signatories: BE, CH, CZ, DE, DK, FI, FR, HU, PL, SI, UK

The main objective of the Action was to develop and to apply numerical optimization methodologies to automatic process design in material technologies, i.e. casting, injection moulding, forging, sheet metal forming, heat treatment, welding, coating and chemical processes. Applied methodologies were based on quantified product quality, related to process targets and constraints and included economic aspects.

In response to the market-driven pressure for reducing time-to-manufacture, numerical analysis has become state-of-the art in material science and processing. There is a whole range of different virtual processing models and software codes for that purpose available on the market. A substantial upgrade of them is to combine virtual models with numerical optimization techniques. The logical connection of them is so-called quality, cost or objective function which allows for automatic quantitative quality assessment of the simulation results. Typically, the quality function relates a set of process parameters to a number of quantitative material laws describing the specific material properties emerging from a specific process step. The Action worked on that development through high-level interdisciplinary cooperation of material scientists, process engineers and computer scientists.

The key outcome of the Action was the formulation of quantitative material qualities based on appropriate material laws for quality function design. The Action dealt with high-dimensional, nonlinear optimization problems and provided accurate and high performance process simulation software. For example, ViewCASTS has demonstrated the feasibility of a web based service for distributed visualising casting simulation superior over existing systems having limitations in terms of accessibility and information handling. The Action developed also An Open Source optimisation toolbox for the investment casting project.

Action 527 - Plasma polymers and related materials

2000 - 2005 Chair: Pr Hynek BIEDERMAN (CZ)

Signatories: AT, BE, CH, CZ, DE, ES, FR, IE, IT, LT, NL, PL, RO, SI, TR, UK

The Action studied the plasma polymerisation process in relation to the desired physical and chemical properties of resulting plasma polymers with special regard to the understanding and suppression of ageing processes of plasma polymers at ambient and extreme conditions. The Action studied in detail the plasma deposits identifying the active spieces on thin films produced by that method. The mechanical, optical and electrical properties of polymer layers obtained by plasma deposition have been characterised. Fundamental investigations considering the growth of ultra-thin oxide films and the deposition of ultra-thin gradient plasma polymers on zinc substrates have been performed. These films led to excellent adhesion of organic coatings to the underlying metal substrate. Further research was focused on very high deposition rates (over 1 micron/min) and uniform plasmas polymer deposition as regard the thickness and property on 3-D substrate. Also application of glow discharge to modify the quartz crystal sensor surfaces intended for antibody immobilization and preparation of infection-free biomaterials by plasma polymerization technique was investigated. This led to the development of immunosensors (glass surfaces modified by plasma polymerization) for determination of aflatoxins B1). It was found, that plasma polymerization technique is useful in preparation of infection-free biomaterials. It lowers for instance the attachment tendency of the Staphylococcus

epidermidis onto cerebrospinal fluid shunts.

It should be stressed that the Action applied the environmental friendly technologies with extremely low waste (especially solid plasma polymer and gases) that may replace presently used wet-chemistry-rich-waste-technologies. It is to note here that the waste from plasma polymer process is several orders of magnitude lower than the waste from the conventional chemistry based process used for the same function product

The Action designed and constructed the Typical Modular Reactor in order to compare results between individual labs in the early stages of new plasma polymerization processes.

Action 528 - Chemical solution deposition of thin films

2000 - 2005 Chair: Pr Marija KOSEC (SI)

Signatories: AT, BE, CH, CS, CZ, DE, ES, FI, FR, HU, IE, IT, LT, PT, RO, SI, SK, UK

The main objective of the Action was to improve the physical and electronic properties of thin films (< 20 micrometer) made by chemical solution deposition techniques, focusing on the sol-gel, liquid source CVD and spray pyrolysis methods. Possible application are the high quality thin films required for the microelectronics, optoelectronics, and microsystems.

In order to improve the quality of such a thin films, better knowledge of the precursor chemistry and processing, microstructure and nanostructure, and also the physics was required. The Action worked on thin films and multi-layer structures of a variety of electroactive materials (dielectrics, ferroelectrics, conductors, optically active materials. Process parameters were optimized, reducing number of defects (pores, pinholes, cracks, impurities, stoichiometry deviations, excess charge in the film, poor transparency) in thin films produced by chemical solution deposition techniques. Furthermore, chemical solution deposition processes have been developed for large area substrates and the thermal budget required for specific chemical solution deposition processes has been reduced. As an example of application can be CSD-derived K(Ta, Nb)O3 films for the tunable microwave devices and the organic films growth by surface ATRP (Atom Transfer Radical Polymerization) in water for biocompatible materials, biosensors and optics. Also low temperature processing of ferroelectric films for computer memories and piezoelectric applications and nanosize ferroelectric structures obtained via chemical solution routes has been studied. The Action worked on new photo-assisted chemical deposition processes.

One of the important aspects of the work was the improvement the environmental compatibility of chemical solution deposition processes in order to meet environment, safety, and health requirements.

Environment

Action 626 - European aquatic habitat modelling

2000 - 2005 Chair: Dr Atle HARBY (NO)

Signatories: AT, BE, CH, CY, DE, DK, EL, FI, FR, ES, HU, IL, LV, LU, NL, NO, SI, SE, UK

The main objective of the proposed Action was to define and develop integrated methods and models of assessing the interactions between aquatic flora and fauna and riverine habitats on reach scale and provide transferability to a catchments scale.

The ecologically sensitive management of river corridors and freshwater resources is one of the key issues being addressed by hydrological and ecological scientists throughout the world. In Europe in particular, past river and water resource management practices have resulted in widespread impacts on the ecology of streams and rivers. Increasing concern over the human impacts on the flora and fauna of European rivers has produced a strong demand for operational tools and assessment frameworks to assess these issues and to develop mitigation procedures. Many recent publications have shown the urgent need for ecologically sound river management practices to maintain the natural environment within future resource development projects. The Action has given an insight in how biotic and abiotic data are sampled for habitat models. State-of-the-art physical habitat measurement techniques and instrumentation are described. Special focus is given to collecting fish data for micro- and mesohabitat modelling, community orientated models, experimental channel studies, bioenergetic and population models. It also includes a comprehensive description of modelling techniques in use for habitat modelling. An inventory of the most important research needs was carried out. The results included a summary of how and to whom river habitat models are useful. A handbook for good modelling practise was published. More information can be found on the Action web page www.eamn.org.

Action 628 - Life Cycle Assessment of Textile Products, Eco-efficiency and Definition of Best Available Technology (BAT) of Textile Processing

2001 - 2005 Chair: Pr Eija NIEMINEN (FI)

Signatories: BE, BG, CH, CZ, DE, DK, EL, ES, FI, FR, LT, PL, PT, RO, SI, SE, TR, UK

The main objectives of the Action were to expand multi disciplinary life cycle assessments to cover the whole fibre production and textile product chain, as well as to develop eco efficiency indicators for the different phases in the textile product chain. Organisations for the European textile industry, as well as separate textile companies, have been involved when defining the objectives of the Action.

The research within the COST Action 628 has produced a suggestion for technology indicators for the ISO (Type III) environmental declaration for textile products. The suggestion is based on Life Cycle Inventories, which have been carried out by participating nations, for textile products by textile industries in different European countries. It was further developed a wide, high quality environmental data base on fibre and textile production, a product specific environmental impact assessments. The Action also submitted an environmental product declaration development to ISO and an eco-efficiency evaluation on economic consequences of replacing present technologies with cleaner ones, was carried out. More details can be found on the Action web page www.tut.fi/units/ms/teva/projects/cost628.html.

Meteorology

Action 718 - Meteorological Applications for Agriculture

1999 - 2005 Chair : Pr Giampiero MARACCHI (IT)

Signatories: BE, BG, CY, DE, DK, ES, FI, GR, HU, IE, IT, NL, NO, PL, PT, RO, SE, SI, SK, UK

The main objectives of the Action were to improve the meteorological applications to agriculture. In order to meet this objective, the Action dealt with three broad topics: data requirements and availability of meteorological data for agrometeorological models; the scope and application of crop and disease and pest models; and the dissemination of

agrometeorological information to the end-users. The Action succeeded in bringing methods for using numerical weather prediction outputs as inputs into agrometeorological models. The Action has brought an on line web based version of an agrometeorological model for practical use with the links from the Action's web site. During the course of the Action, it was added a topic on the use of agrometeorological models to study the impact of climate change. The work on the use of agrometeorological models to study the impact of climate change is very significant in today's world. How climate change will potentially impact real world problems in agriculture such as controlling pest and diseases is one of the most important issues and most commonly asked by farmers and decision-makers. The Action has succeeded to set a close cooperation with the Commission of Agriculture Meteorology of World Meteorological Organization in some coordinated activities.

Agriculture and Biotechnology

Action 838 - Managing arbuscular mycorrhizal fungi for improving soil quality and health in agriculture

1998 - 2005 Chair: Mr Silvio GIANINAZZI (FR)

Signatories: AT, BE, CH, CY, CZ, DE, DK, EE, ES, FI, FR, HU, IE, IL, IS, IT, LV, NL, PL, PT, SE, SI, TR, UK

The main objective of this COST Action was to gain pre-competative theoretical and applied knowledge essential for the use of arbuscular mycorrhiza (AM) fungi in improving plant health and fitness, production of high quality food, and in conservation of natural resources.

The most important output of this Action is a book on "Mycorrhizal Technology: in Agriculture from Genes to Bioproducts", edited by COST 838 and published in 2002.

The content of this book is not limited to basic knowledge on the genetics, physiology and ecology of AM, but also analyses the impact of this symbiosis on agroecosystems dynamics, discusses the possibilities of technology transfer into commercial practices, emphasises problems concerning the quality of inoculum production and its proper use and presents examples of succesfull introduction of AM fungi into plant production systems. As a general goal the book demonstrates that AM symbiosis are an essential component to sustain soil quality, plant health and productivity.

This book is geared towards post graduate students, teachers and researchers in the field, and more generally to all professionals wishing to promote the use of biological tools in plant production, land restoration, land management and more widely, in sustainable development.

This Action also had a very important impact on the development of the International Bank for Glomeromycota (http://www.kent.ac.uk/bio/beg/) and a determinant input in the creation of the Federation of European Mycorrhizal Fungi Producers (FEMFiP). The Action ended in June 2005 with a very succesfull final workshop and a training week for young researchers in "Sampling and evaluation strategies for AM fungi diversity characterisation".

Action 841 - Biological and Biochemical diversity of hydrogen metabolism

1999 - 2005 Chair: Pr Wilfried HAGEN (NL)

Signatories: CH, DE, DK, ES, FR, HU, IT, NL, PT, SE, TR, UK

The present energy crisis due to the use of petrol and the main fuel, led to the stimulation of research networks aiming at alternatives. The energy sources that are needed to be offered to the consumer should meet environmental issues, i.e. the development of clean fuels is required.

The production of hydrogen by biological systems has been considered as a promising approach. Therefore the better knowledge of hydrogen metabolism, namely the function and structure of hydrogenases from different organisms is important. The use of hydrogenases from microorganisms has been under study in several laboratories in the EU, USA and Japan. Indeed, R&D programs currently supported by the governments dealing with the fundamental knowledge of hydrogen metabolism to its application has been carried out for years. The importance can be highlighted by the fact that the next 7th Framework Programme has a special program , the European Hydrogen and Fuel Cell Technology Platform

A recent trial of vehicles - buses – moved using the hydrogen-powered electric engines, which emit water vapor as a by-product was a clear indication of the key role of hydrogen. The use of hydrogen can cut greenhouse gas emissions substantially, however the main obstacle is the cost and trouble associated with producing a suitable supply of hydrogen.

During the last few years COST has been playing a major role the research on hydrogen metabolism by sponsoring networks of laboratories working in different research lines within this common topic.

The output of the Action 841 is clear from the novel results obtained, namely (a) the role of structural units in hydrogen activation by hydrogenases at molecular level (b) on the biodiversity of hydrogen producing systems, (c) on the genetic and physiological basis of hydrogenases function and (d) new technical development for the exploitation of hydrogen production.

The results from the different aims could be achieved and integrated by bringing together skills in microbiology, biochemistry, molecular biology and biotechnology.

This building of networks and the merging of different knowledge led to answer questions in a coherent form.

Action 842 - Biological control of pest insects and mites with special reference to Entomophthorales

1999 - 2005 Chair: Dr Siegfried KELLER (CH)

Signatories: AT, CH, CY, CZ, DE, DK, ES, FR, GR, IT, LV, NL, NO, PL, PT, SK, UK

This Action focused on developing strategies for the biological control of insect pests and mites with Entomophthorales. Chemical insecticides have undergone improvements over the last decade. Nevertheless, problems relating to insect resistance and disruption of equilibria between arthropods and natural antagonists remain. Mycoinsecticides offer solutions in this respect. The core objective of this Action was to prepare the ground for the field application of mycoinsecticides, based in particular on Entomophthoralean fungi by increasing the knowledge of their biological and ecological features and host-pathogen interactions, to develop formulations for the storage and application of fungal biomass and to establish methods for field monitoring. COST 842 markedly contributed to the fact that Europe became the center of research on Entomophthorales. A strong network with close collaborations was established which is expressed by many inter-institutional publications. The participation in this COST Action initiated several new research projects. Publication of workshop documents on the identification of Entomophthorales, on ecological work, on modelling host-Entomophthorales-interactions and on bioassays, summarised information which was widely scattered. To disseminate results to a wider audience several meetings/ workshops including the final workshop were combined with meetings of COST 850 on Biocontrol Symbiosis and with workshops of the International Organisation for BioControl (IOBC).

Action 843 - Quality enhacement of plant production through tissue culture

1999 - 2005 Chair: Dr Sergio OCHATT (FR)

Signatories: AT, BE, BG, CH, CS, CY, CZ, DE, ES, FI, FR, GR, HU, IE, IL, IT, LU, NL, NO, PL, PT, RO, SE, SK, UK

By propagation through tissue culture (in vitro), new plants can be propagated with far greater speed than through traditional methods. Additionally, micropropagation produces high quality plants that may be free from viral and bacterial diseases and that have an increased cropping capacity. In vitro culture is therefore a cornerstone for a sustainable crop-based agricultural industry across Europe.

This Action focused on the development of potentially faster techniques such as somatic embryogenesis, propagation in liquid medium or automated culture propagation/ handling systems.

The Action started with making an inventory of European Plant Tissue Culture Laboratories. Many publications in scientific journals followed and the most important publication was a COST book on “Liquid Culture Systems for in vitro Plant Propagation”.

Very succesfull was a training course on Plant Flow Cytometry organised by COST 843, which turned out to be the first ever European Post-Graduate course on this subject. This training course was organised together with a German company Partec GmbH, who lent during the course several flow cytometers for the demonstrations, permitting the participants to use the equipment with their own plant material. The three lecturers of the course are finalising a Manuel on Plant Flow Cytometry which will be published.

COST 843 was also the basis for many research proposals to the EU-INCO programme and FAO-IAEA.

Another clear example of the result of collaborations initiated or continued thanks to Action 843 has been the publication of a number of joint articles in peer-reviewed journals by a number of experts participating. Interestingly, some of these articles are the outcome of work undertaken during STSMs that were thereafter pursued in the participating laboratories.

Action 844 - Apoptosis and programmed cell death: molecular mechanisms and applications in Biotechnology and Agriculture

1999 - 2005 Chair: Pr László FÉSÜS (HU)

Signatories: AT, BE, BG, CH, CZ, DE, DK, ES, FR, GR, HU, IE, IT, NL, NO, PL, RO, SE, SK, UK

In apoptosis and in programmed cell death, specific groups of cells within a larger population of living cells are triggered to die.

The main objective of the Action was to combine interrelated European expertise to understand the molecular mechanism of apoptosis and to use this increased knowledge in the development of new approaches in biotechnology, agriculture, food industry, pharmaceutical industry and novel strategies in the prevention of environmental toxicity.

One of the main achievements of the Action is that it has brought together two, so far independently working and communicating fields of apoptose research, namely the mammalian apoptosis researchers (the more established and traditional area of cell death research) and the plant apoptosis people who have started to do apoptosis research during the time frame of the Action.

Several interesting new results came from the interactions among the laboratories of the two groups, including studies of metacaspases in plants, interrelated aspects of oxidative stress in cell death, characterisation and cloning of the plant transglutaminase.

Action 847 - Textile quality and biotechnology

2000 - 2005 Chair: Pr Johanna BUCHERT (FI)

Signatories: AT, BE, BG, CS, CZ, DE, DK, ES, FI, FR, GR, HU, IE, IT, LT, NL, PL, PT, RO, SI, UK

The textile industry is often identified as a key sector where opportunities available for adapting biotechnology are high but current awareness of is very low. This is mainly due to the large number of SMEs manufacturing textiles. This Action was focused on a specilised area of textile processing, i.e. on the quality of fibres and on the biotechnical and environmental-friendly applications by using enzymatic processes. By using these biotechnical methods energy or chemicals could be saved or, alternatively, the final product quality could be improved.

During the Action know-how about enzymatic processes and fibre assessment techniques has been delivered to the textile companies through annual workshops and scientific publications and via contacts of individual researchers with the industry. Over 35% of the participants of the 2004 annual conference participants came from industry. Some examples: A coherent methodology for flax fibre assessment has been developed; the flax fibre extraction has been improved; enzym and microorganisms based processes for textile effluent treatment have been established.

Textile knowledge has also been transferred to experts on enzymology thus leading to potential development of novel enzyme systems for textile purposes. The COST Action has provided exchange of information between research institutes specialised either in biotechnology or textile processing thus resulting improvement of the entire area of textile biotechnology. The knowledge created has been utilised in several different processes for textile industry. During the Action several patents have been filed in projects involved.

The COST 847 network has also resulted in several joint EU (STREP/ IP/ NEST/ CRAFT/ EUREKA) and national research projects.

Action 848 - Multi-facetted research in rabbits: a model to develop a healthy and safe production in respect with animal welfare

2000 - 2005 Chair: Dr Luc MAERTENS (BE)

Signatories: AT, BE, CH, CZ, DE, ES, FR, GR, HU, IT, NL, PL, PT, SI

The main objective of the Action was to create a multidisciplinary model to improve the fundamental and applied knowledge about rabbits in commercial rabbitries. It would propose production and prevention methods at the European level, in order to guarantee a regular, secure and economical production. Natural, sustainable methods respecting animal welfare and delivering a quality product adapted to the actual wishes of the European consumer would be used.

Several harmonisation procedures developed during the COST Action were adapted by the “World Rabbit Science Association” and published in their journal (3 guidelines: semen handling, reproduction trials, and nutrition experiments)

Several overview publications were made to transfer in a clear way the results to the industry: tables with the nutritive value of raw materials for rabbits; role of fibres in rabbit feeding for digestive troubles prevention; nutritional quality of rabbit meat). Many results of COST 848 were used by the EFSA panel to prepare their scientific report entitled:”The impact of the current housing and husbandry systems on health and welfare of farmed domestic rabbits”.

As final dissemination of the results, a book is in progress and will be published in 2006. All the relevant achievements will be included in this book titled: “Advances in rabbit research in framework of COST 848”.

Social Sciences and Humanities

Action A17 - Small and medium enterprises, economics development and regional convergence in Europe

2000 - 2005 Chair : Pr Jordi SURIÑACH (ES)

Signatories : AT, CH, CY, CZ, DE, DK, ES, FI, GR, HR, HU, IE, IT, LT, LV, NL, NO, PL, SE, SK, TR, UK

The main objective of the Action was to increase knowledge and understanding on the topic of reform and transformation of the social welfare systems of Europe, set in the context of globalisation and European integration.

The Action entailed a novel approach to the study of national welfare systems performed at an internationally comparative level of analysis. Working Groups analysed different aspects of the interaction between national social welfare systems, European integration and the process of globalisation. A successful Final Conference was held in Nantes in May 2004.

The Action has made an important contribution to connecting the various relevant national research programmes and integrating new perspectives into European social research. A number of important publications have come out of the Action, notably the special issues of academic journals:

"Making a European Welfare State? Convergences and Conflicts over European Social Policy" (Social Policy and Administration, December 2003)

"Globalization, Europeanization and the Welfare State" (Global Social Policy, August 2003)

"EU Enlargement, Europeanization and Social Policy" (Journal of European Social Policy, August 2004)

Medicine and Health

Action B12 - Development of new radiotracers for the in-vivo assessment of biological functions and drug interactions

1999 - 2005 Chair: Pr Bernard MAZIERE (FR)

Signatories: AT, BE, CH, CZ, DE, DK, ES, FI, FR, GR, HU, IT, NL, NO, PL, PT, SE, SI, UK

The main objective of this Action is to promote co-operation in the development of radiotracers for in-vivo biomedical investigations (making use of diverse European resources for this purpose). This comprises: the synthesis of precursor molecules suitable for labelling with □ or □+ -emitting radionuclides; the labelling of these precursors with these radionuclides; the evaluation of the biological effectiveness in experimental animal models; performing clinical trials and evaluation of the benefit of the new radiopharmaceuticals; providing pharmaceutical standards of preparation for safe application of the radiotracers (quality assurance programme); collaboration between university and pharmaceutical industry with respect to the utilisation of nuclear medicine probes in drug development. The scientific programme focus on a five important and challenging areas:

1. Radioligands for brain receptors

Neuropsychiatric disorders such as depression, dementia, Alzheimer's disease, schizophrenia, drug abuse - are all of great socio-economic impact but still very poorly understood with respect to brain chemistry and physiology. PET and SPECT are unique techniques for the investigation of these aspects of disease in vivo, provided that suitable radiotracers can be developed.

2. Radioligands for heart receptors

Cardiac disease is of obvious socio-economic impact. There is substantial evidence for sympathetic drive in the aetiology of cardiac dysfunction. However, direct observation of the changes occurring in the sympathetic nervous system during disease progression is hampered by a lack of radioligands for measurements on pre- and postsynaptic adrenoceptors in living human subjects with PET or SPECT. The focus of the Action is on developing radioligands for post-synaptic adrenoceptors, such as □1 and □1. These might be expected to yield valuable clinical information and complementary to the information obtainable with presynaptic radioligands.

3. Radiolabelled biological active peptides

Many properties of peptides make them attractive vectors for targeting cancer, a strategy already explored successfully for somatostatin. However since many frequently occurring and devastating tumours (small cell lung carcinoma, colon carcinoma or mengioma) do not express somatostatin receptors, it is imperative to search for alternative neuropeptide receptors expressed by these tumours. Recent evidence reports that such malignant lesions, like small cell lung cancer, colon carcinoma and certain mengiomas, express high affinity and density bombesin and neurotensin receptors on the tumour cell membrane. For this purpose, peptide-based analogues with prolonged plasma life and preserved biological action are properly modified to incorporate the radionuclide of choice. Tagging with 18F, 11C and 123I (or 99mTc) useful for PET and SPET respectively are pursued.

4. Radiolabelled Enzyme [Inhibitors and substrates] function tracers

Enzyme inhibition frequently constitutes the molecular basis for the effectiveness of powerful therapeutic agents. Progressively, new more powerful and more specific enzyme inhibitors are designed and with them new therapeutic agents and consequently new radiotracers also for diagnostic purposes could be developed. The Action is focusing on adrenal 11□-hydroxylase and its visualisation using endocrine radiopharmaceutical such as 11C-metyrapone and 11C-etomidate.

5. Technetium chelates

About 85% of nuclear medical diagnoses are performed with Tc labelled pharmaceuticals. Whereas the research was mainly concerned with biological properties which allow relatively unspecific functional imaging as in brain or myocardium perfusion studies, nuclear medicine is now requiring more and more physiological information on low capacity, high specific molecular targets. To meet the requirements of new technetiurn-based compounds called the "third generation" of Tc radiopharmaceuticals, there is a demand for Tc tracers able to undergo molecular interactions with the target tissue.

The work involve synthesis of new chelating systems having optimal properties, complexation with technetium and rhenium as well as studies of relationships between physico-chemical parameters and biodistribution in animals.

Action B14 - Hyperbaric Oxygen Therapy

1998 - 2005 Chair: Pr Daniel MATHIEU (FR)

Signatories: AT, BE, CH, CY, CZ, DE, DK, ES, FI, FR, GR, IL, IT, NL, PO, PT, SI, SE, UK

The main objective is to improve the knowledge required for a rational use of HBOT, to a level making it possible to set out specific guidelines for the implementation and development of clinical HBOT centres and to provide scientifically sound recommendations for HBOT treatment of various diseases and conditions.

The main results of the COST Action B14 are :

In research: Consensus documents on methods and ethical aspects of clinical research in HBO;Implementation of a research network in Europe. The work done in this network

attracted the participation of South Africa, Australia and Canada; 6 clinical randomised controlled studies going on in Europe

In education : Structuration of initial and continuous medical education in Europe has been achieved and a common syllabus for each level of education in hyperbaric medicine has been agreed; An European textbook has been published, reflecting the view and contribution of European teams;

In quality and safety of clinical care: A code of good practice has been elaborated and disseminated to every HBO centre in Europe; COST Action has been the initiator of the elaboration of an harmonized European norm (pr EN 14 931, prepared by the CEN TF 127)

In communication: A web site has been implemented (www.oxynet.org) and is used by the HBO community for its exchange.

Action B17 - Insulin resistance, obesity and diabetes mellitus in the elderly

1999 - 2005 Chair: Pr Peter CSERMELY (HU)

Signatories: AT, BE, CH, CS, CY, CZ, DK, DE, ES, FR, GR, HU, IE, IL, IT, LT, LX, NL, NO, PL, RO, SE, SL, SI, UK

The general objectives of the Action were dedicated to the diabetes mellitus of aged people which is a considerable health burden of western societies. No widely established screening method is available to detect the persons who are predisposed in the population and due to the incomplete knowledge on the molecular mechanisms leading to NIDDM there are very few means to influence the onset and development of this diverse disease. Various steps of insulin action were studied starting from the insulin receptor and following insulin action till it reaches the cell nucleus with special emphasis on the investigation of pathological changes of the molecular mechanism of insulin action in insulin resistance, obesity and NIDDM of the aged people. This research activity is thought to lead to the development of new drug-candidates for the curing-easing of the consequences of this diverse disease.

The secondary objectives were dedicated to the following steps of insulin action:

- Identification of diabetogenes: examination of candidate genes; utilization of various differential screening methods; possible links of diabetes-related genes to insulin signalling; search for diabetes-related obesity genes; age-dependent analysis of critical genes.

- Studies on the intracellular mechanism of insulin action in normal and pathological states: mechanism of the interactions between insulin receptor and its substrates, analysis of tissue-specificity of insulin signaling pathways; molecular characterization of glucose transport in normal and insulin-resistant states; molecular analysis of insulin signaling and action during the whole lifespan; interrelationships of insulin resistance and leptin action; development of insulin- and leptin-related signaling molecules as potential drug candidates.

The Action made a significant advance in four key areas of the molecular mechanism of diabetes, obesity and aging:

1. Glucose transport mechanism. Key elements of insulin-dependent and –independent glucose transport mechanisms were identified, such as the role of GLUT isoforms, Rabs, SUMO-ylation and kinase cascades.

2. Role of exercise to prevent the metabolic syndrome. Important elements of exercise induced changes of muscle metabolism and signaling have been uncovered, such as the role of kinase cascades, IRS, calcineurin, lipid metabolism, and muscle energetics.

3. Novel understanding of insulin action. Key elements of insulin signaling were discovered, such as the role of SHIP2 in insulin sensitivity, novel insulin receptor substrates, the role of AMP-kinase, and the insulinome in adipocytes.

4. Novel therapeutic approaches. As a scientifically outstanding part of the results detailed in point C, novel insulino-mimetic and insulin analogue have been developed and D36 has been proposed as a diabetic marker.

Action B18 - Corpus cavernosum EMG in erectile dysfunction

2000 - 2005 Chairs: Dr Hessel WIJKSTRA (NL) / Pr Eric MEULEMAN (NL)

Signatories: AT, BE, BG, DE, DK, ES, GR, IL, IT, NL, NO, UK

The main objective of the Action is to determine the value of cc EMG in the investigation and management of erectile dysfunction and to increase the knowledge of corpus cavernosum EMG (cc-EMG). The action improved the clinical significance of ccEMG as a non-invasive test in erectile dysfunction and the resulting objective was to make the ccEMG test available for (pharmaceutical) research and daily routine clinical use. The secondary objectives are: Basic understanding of ccEMG; Standardisation of ccEMG measurement; Interpretation of ccEMG; Role of ccEMG in diagnosis and treatment monitoring.

The main conclusions of the scientific networking were:

1. CC-EMG signals reflect electrical activity of the cavernous smooth muscles. Further basic electrophysiological studies are needed to elucidate the underlying mechanisms of the recorded signals.

2. Cross-correlation analysis is a promising method for a qualitative analysis of the CC-EMG recordings. A method to fix the interelectrode distance should be explored, in order to calculate reliable propagation velocity.

3. The influence of different temperature on the harmonic frequency of CC-potentials should be tested, in order to elucidate if the harmonic frequency gradients of CC-potentials from the proximal to distal parts of the penis are caused by the temperature difference.

4.The application program for correlation analysis of CC potentials holds the promise to be a comprehensive and easily applicable method to analyze CC-EMG recordings. By calculating the parameters including Amplitude (A), Duration (D), Dominant Frequency (DF), number of dominant frequency periods (DFP) DFP and squared maximum cross-correlation coefficient (Rmax) CC potentials can be characterized adequately. However, the link between the recorded CC-potentials and cavernosal electropathophysiology need further elucidation.

Urban Civil Engineering

Action C12 - Improvement of Buildings Structural Quality by New Technologies

2000 - 2005 Chair: Pr Jean-Pierre JASPART (BE)

Signatories: AT, BE, CH, CZ, DE, DK, ES, FI, FR, GR, IE, IT, LT, LV, MK, NL, PL, PT, RO, SI, UK

The main objective of this Action was to develop, combine and disseminate new engineering technologies, to improve the quality of urban buildings, to propose new technical solutions to architects and planners, to reduce the disturbances of the construction process in urban areas and finally to improve the quality of living in the urban habitat.

Action results bring significant benefits to all partners involved in the construction processes. It focuses not only at the building design and construction itself, but by use of new methods and improved materials supports also higher efficiency, increased safety and energy savings and recycling of the materials.

COST C12 initiated further networking which led to the proposals of 3 new COST Actions. Number of C12 participates also in other EU and international research activities.

Action C13 - Glass and Interactive Building Envelopes

2000 - 2005 Chair: Dr Stephen LEDBETTER (UK)
Signatories: AT, BE, CH, CZ, DE, DK, ES, FI, FR, GR, IE, IT, LT, NL, NO, SI, UK

The main objective of the Action was to increase the knowledge of properties and possibilities of glazing in order to increase the performance of building envelopes, to reduce energy consumption and to improve the quality of life with respect to interior space, impact on the environment and human welfare. The Action made optimal use of existing and currently developing knowledge, and aimed to function as a source of valuable information to national and international Standards organisations. The results were disseminated to the broad professional public at its Final Conference, attended by number of participants from the construction industry and design.

Chemistry

Action D14 - Functional Molecular Materials

1999 - 2005 Chair: Pr Antonin VLCEK (UK)
Signatories: AT, BE, CH, CZ, DE, DK, ES, FI, FR, GR, HU, IE, IT, NL, PL, PT, SE, TR, UK

The COST Chemistry Action D14 was conceived with the aim to increase the fundamental understanding of the chemistry of functional molecular materials. The work programme of this Action entailed the combined efforts of chemists and physicists interested in developing and evaluating novel molecularly based systems that order in two or three dimensions, and as a result of this order, exhibit novel properties. It was the aim of this Action to develop novel functional molecular and supramolecular systems, to understand the forces driving their formation and higher organisation, to develop methods to investigate, address, and manipulate these systems and, finally, to exploit their specific properties in new 'smart materials'.

In everyday life, we are using materials usually without thinking of their origin, manufacturing or structure. Materials are so important for mankind that we even name periods of human history according to them: there was a stone, bronze and iron age. What kind of materials do we need for the present, so called, information age? Of course, semiconductors, which are the backbone of modern electronics. However, as electronic components become even smaller and more densely packed, we will approach physical limits of the semiconductor technology. Molecules, molecular assemblies or nanoparticles are suitable candidates for technologies of the future. Development of functional molecules requires highly interdisciplinary research at frontiers of chemistry, physics and, in part, biology. It is not enough to design and synthesize new molecules and explore their physical properties. Careful organization of functional molecules in 2 or 3 dimensions into genuine molecular materials is crucial to achieve the desired behaviour. In fact, some functions emerge only from higher molecular organization.

All these aspects were addressed by COST Action D14, which involved 62 research teams from 20 COST countries, that is ca. 180 European scientists. New functional molecules were made and studied by advanced physical techniques, building up the enabling knowledge for rational development of molecular materials. Higher organization of active molecular units has produced, for example, materials whose conductivity can be controlled magnetically, or special liquid crystals, composed of banana-shaped molecules, for electroptical applications.

Very interesting functional molecules were developed in one of the D14 Working Groups, which can probe the 3-dimensional arrangement of biomolecules, such as DNA or oligopeptides. A special ruthenium complex is used, whose light-emission depends strongly on the immediate molecular environment, reporting thus on the secondary structure of investigated biomolecules. Photonics is another promising technology, which encompasses, for example, optical imaging, recording or holography. Collaborative research carried out within D14 produced special molecules which can absorb two photons of light at once. Under irradiation, they induce spatially precise polymerization and create well-defined 3D microstructures. This technique was developed for optical recording and for making optical waveguides, a photonic analogy to wires known from electronics. Efficient light-energy conversion is one of the biggest challenges and a great opportunity to our civilization. Every second, the Sun delivers to the Earth more energy then we can ever use, if only we knew how to harness it economically. One of the D14 Working Groups has worked exactly on this problem, developing new hybrid molecular-semiconductor systems to convert solar energy to electrical energy. The D14 research has thus advanced the field of photoelectrochemical devices for solar energy conversion by improving their three main components: the semiconducting films of titania, the molecular sensitizers and the electrolyte.

These examples are but a few of the scientific accomplishments of the collaborations that flourished under the COST D14 umbrella. Development of new molecules and nanoparticles with special physical properties and organizing them into functional materials already produce useful devices and underlie new technologies which address imminent and arising societal needs, while new functional molecular systems exhibiting novel types of behaviour emerge. Research on molecular materials thus ventures toward yet unexpected applications and technologies, making us ready to meet the challenges to come.

Action D23 - Metachem

1998-2004 Chair: Pr Hans Peter LÜTHI (CH)
Signatories : AT, BE, CH, CZ, DE, DK, ES, FR, GR, HU, IL, IT, NL, NO, PL, PT, SI, SK, UK

The main objective of D23 was the exploitation of the potentialities of meta and grid computing for developing computational applications, connecting the know how distributed among several research laboratories and sharing the related computer resources, which would not be possible otherwise, due to the complexity and innovative content of this task. The sharing of machines on the network has been boosted by the dramatic development of grid technologies in recent years and by the emphasis given by the 6th European Framework Programme. The further added value of D23 is to be seen in the use of grid computer systems to build the so called European Meta Laboratories (clusters of geographically distributed Laboratories working in a co-ordinated way on a common project by sharing manpower, hardware and software), fostering innovative solutions for chemical applications and a new paradigm for collaborative research. This made it feasible to develop new a priori realistic simulations for several scientific, technological and environmental applications. Likewise, the extension of traditional quantum chemical schemes to the four

component regime, although straightforward in principle, was still posing major technical difficulties which could be overcome in the last years thanks to the contribution of this Action. One of the working groups addressed a serious problem that arises when different quantum chemical codes are used on the same target, namely when the internal representation of quantum chemical data is largely incompatible. A standard database format has been developed to solve this, which is accessible by a set of library routines. As an additional benefit the emphasis given to e-learning has to be mentioned. Metacomputing in computational chemistry is still at its beginning. COST Action D23 has put the initial momentum into this development, which will become increasingly important in the future.

This COST Action has allowed the collaboration between 46 research groups from 19 different countries. Deepening these links within Europe is particularly important to establish a competitive scientific landscape which is not hampered by national borders. The scientific results have been presented in a multitude of research papers in refereed journals and are thus publicly accessible.

Forests and Forestry Products

Action E23 - Biotechnology in the pulp and paper industry

2000 - 2005 **Chair: Dr Liisa VIIKARI (FI)**

Signatories: AT, BE, DE, ES, FI, HU, IT, NL, PT, SE, SI, SK, UK

The main objective of the Action was to promote the development and application of biotechnical methods in pulping, bleaching and paper and board manufacturing processes by increasing knowledge of biocatalysts and their applications. The aim was furthermore, to critically evaluate the bottlenecks and general applicability of these technologies. Thus, the Action aimed at enhancing the competitiveness of the pulp and paper industry by advancing the use of specific and environmentally benign biotechnical methods.

In the area of discovery of new enzymes and organisms it has been useful to get the scientific communities working with hydrolytic and oxidative enzymes, as well as with the new organisms to exchange information and views with each other. New interesting enzymes (especially oxidoreductases, i.e. laccases and peroxidases) have been identified and their properties evaluated. Significant progress in the area has taken place through better understanding of the oxidative; i.e., electron transfer mechanisms. The general aim was to develop more thermostable enzymes, suitable for mill operation. Successful work on more efficient production systems was also carried out. The major application areas of enzymes in Europe are the pre-treatment technologies for energy and chemical savings, enzyme-aided bleaching systems and de-inking technologies. As part of the discussions during the Action, the needs of the P&P industry was relieved.

Combination of new enzymatic methods with mechanical or chemical process steps can be used to improve the process economy or to upgrade the fibre properties. New products could be developed based on the specific modifications obtained by enzymatic methods. The European activities within the pulp and paper biotechnology area have been highlighted by the high number of European presentations in the two International Conferences on Biotechnology in the Pulp and Paper Industry (ICBPPI) held during the lifetime of the COST E 23 Action (Helsinki, Finland 2001 and Durban, South Africa 2004). European scientists have presented about 60% of the scientific input of the meetings and members of the COST Action E23 have actively participated in organizing the ICBPPI meetings.

Action E24 - Reliability Analysis of Timber Structures

2000 - 2005 **Chair: Dr Patrick CASTERA (FR)**

Signatories: AT, BE, CH, CZ, DE, DK, ES, FI, FR, GR, HU, IR, IT, NL, NO, PT, RO, SI, SE, UK

The main objective of the Action was to extend established statistical methods and structural mechanics models by taking into account the specific properties of wood, wood based materials and joints, allowing an optimised analyse of the reliability of timber structures and structural systems and thus contributing to a technical and economical optimisation of complex timber structures as well as consequently strengthening the competitiveness of the forest industries sector.

Building on its comprehensive state of the art review of the scientific research on probabilistic modelling of timber material, joints and systems, the Action has been able to create a harmonised set of data on material and joint properties by compiling detailed information provided by the signatory countries.

One of the key scientific achievements, and the main outcome of the Action, is the development of a multi-level methodology for the reliability analysis of timber structures. In close cooperation with the Joint Committee of Structural Safety (JCSS) the Probabilistic Model Code, a mathematical tool for the analysis of reliabilities has been written following the existing models for steel and concrete. This methodology taking into account the specific properties of the used raw materials (species, type of grading, information on grading parameters, etc.) is consistent with the concept used for the elaboration of Eurocode 5.

The Final Conference held at the beginning of September 2005 in Arcachon offered a platform to discuss the broad variety of statistical methods and models for graded timber and joints allowing the investigation of the influence of grading on the distributional characteristics of timber. All those procedures have been integrated in the Probabilistic Model Code elaborated by this Action. Furthermore, probabilistic models for the analysis of timber in bending, taking into consideration the aspects related to moisture and the duration of load effects, have been presented.

A huge number of accompanying documents can be found at the highly informative Action Web-site (http://www.km.fgg.uni-lj.si/coste24/coste24.htm) containing also the three main documents: the state of the art report on 'reliability analysis of timber structures', the Probabilistic Model Code (PMC) and the proceedings of the Final Conference.

Action E25 - European Network for a Long-term Forest Ecosystem and Landscape Research Programme (ENFORS)

2000 - 2005 **Chair: Pr Folke ANDERSSON (SE)**

Signatories: AT, BE, BG, CH, CZ, DE, DK, EE, ES, FI, FR, GR, HU, IE, IS, IT, LT, LV, NL, NO, PL, RO, SE, SI, SK, UK

The main objective of the Action was to establish a European network of sites for forest ecosystem and landscape research of relevance to sustainable forest management. A common data bank of European field experiments relevant to sustainable forest management should be be established, containing comparable information about sites, data and appropriate research programmes. The Action strengthened and stimulated this network of sites by means of a common minimum research programme

The COST Action E25, ENFORS had its origin from the Ministerial Conference on the Protection of Forests in Europe (Strasbourg 1990) and later resolutions (Helsinki 1993, Lisbon 1998, Vienna 2003) on sustainable forest management. These resolutions stress the need for better integration of European

forest ecosystem research as well as with other disciplines in forestry. A network – European Forest Ecosystem Research Network, EFERN - was set up 1996. The conclusions about sustainable forestry were presented in a book "Pathways to the wise management of forests in Europe". The need to expand from ecosystem to the landscape was pointed out as well as to include socio-economic aspects. The reaching of a sustainable forestry planning was seen as an essential tool to integrate the dual aims of forestry – production and environment. The Action aimed at developing a European network of field facilities including a variety of long-term ecosystem and landscape experiments. This will be the base for a future collaboration between forest scientists and also a meeting place with stakeholders. EFERN (and ENFORS) is also IUFRO working group 8.01.07.

Approximately 100 research organisations, involving more than 300 researchers from 27 countries participated actively in the activities and the development of the Action.

The main outcomes of the Action was the establishment of a European network of field research facilities that are carrying out or have the potential to develop integrated and multidisciplinary research at the landscape level, the elaboration of a research strategy that makes recommendations for future research and development on sustainable forest management, and the development of a meta-database containing information about field research and monitoring facilities in Europe related to sustainable forest management. Details on the Action can be found on the Action Web-site (http://www.enfors.org).

The Action developed an extensive cooperation with inter-European and international organizations and institutions.

Action E26 - Effective solutions to reduce the impact of waste arising from the papermaking process

2001 - 2005 Chair: Dr Arie HOOIMEIJER (NL)

Signatories: CZ, ES, FI, FR, DE, HU, IT, NL, PL, RO, SK, SI, UK

The objective of the Action was to define and develop the options for the reduction and disposal of waste arising from the paper and board making process. This should be achieved by determining the best approaches to reducing the generation of waste arising in original use or in the mill and assessing the options for reuse of paper mill sludge. The action wanted to provide benefits to the key industrial sector of pulp and paper manufacture and to the wider European community by providing further knowledge to assist the development of an effective European waste management policy.

The Action had a severe slow down in the middle of the life time due to institutional restructuring and a change in the management. It achieved however the objectives in a good manner in spite of the bottlenecks. Meetings, workshops and mills involved, provided potential solutions for the utilisation of the pulp and paper production residuals although the industry participation could have been more extensive. The action probably started too early, the industry is in fact more aware now of the waste problems/challenges than several years ago. The Action was classified as a spearhead as it operated as a pioneer in an area where little knowledge had been accumulated and documented. As a result the Action served as a creator of a new network on waste arising from the papermaking. The Action also created the awareness of the lack of appropriate legislation in an area where common action is required. During the COST Action several universities throughout Europe started research and training programmes related to solid wastes. It was also stated that extensive lobbying is necessary for not considering the pulp and paper residuals as waste. A link was made between COST E26 and COST E46 (Improvements in the understanding and use of de-inking technology) and a very specific link was made with CEPI (European Federation of national papermakers associations in Brussels). Specialists of CEPI participated actively in the Action and output of the action was used as input for policy documents of CEPI. The action contributed to new norms and standards in the area of both characterization of recovered paper via the CEPI Task Force on this matter and to the discussions between commission and industry concerning solid waste definitions.

Miscellaneous

Action G9 - Modelling Real Property Transactions

2001 - 2005 Chair: Pr Erik STUBKJAER (DK)

Signatories: AT, DE, DK, ES, FI, GR, HU, LV, NL, SE, SI, UK

The main objective of the Action was to establish a method for modelling real property transactions, which makes those transactions more transparent, and allows for true comparison of the processes and related costs between European countries. In order to accomplish the modelling work, cadastral domain experts and experts in the field of knowledge engineering and ontologies worked together.

Real property transactions for several European countries have been described as complex sequences of processes. The Action came to those descriptions by breaking up the administrative procedures into smaller units through a method derived from the ontological theory of John Searle.

The Action described in detail the existing transaction processes in several European countries, which allowed for the first time to draw direct comparison between the procedures in the Scandinavian countries, central Europe, the European reform countries as well as England and Wales. It became clearly evident that countries make different choices in which societal goals have to be served during the real property transaction, in addition to the legal security of that transaction in the narrow sense. This greatly influences the process time and costs.

With regard to those costs of transactions, a careful definition of costs is necessary, to be able to identify and especially explain the differences. The Action noted substantial differences related to taxes that were levied on the real property transaction as such. Differences were further found in what part of public planning, procedures and related costs were borne by the parties of a real estate transaction. Furthermore, it has been revealed that general policy issues influence considerably the non-monetary costs of a transaction. In this context the preemption rights are of greatest importance. The question whether the holder of a preemption right (often a neighbor) is taking over the property or not, creates uncertainties, which have to be seen as hidden costs.

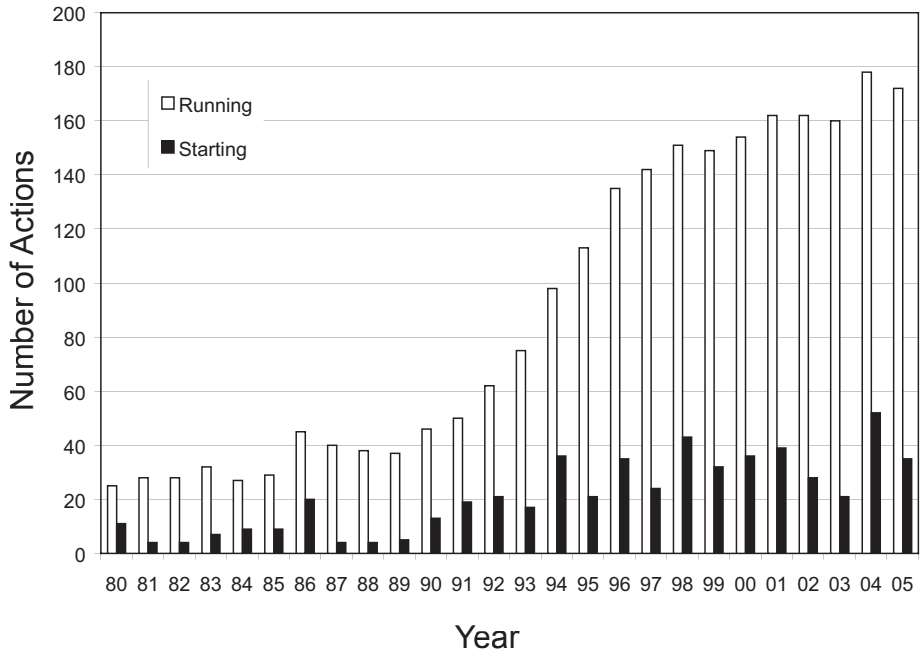
Building on the information available as part of national statistics, the method of satellite accounts of the System of National Accounts was tentatively applied for two countries. This approach allows for another way to determine the transaction costs, taking the related spending in the relevant sectors (both public and private) as the starting point, instead of the price the seller and buyer have to pay for the services.

The Action elaborated a method allowing a transparent description of real property transactions, as well as provided such descriptions for several European countries. It was learned that the outcome of the comparisons depends very much on the point of view taken, therefore, no ideal or optimal transaction system can be recommended. However, the Action's outcome –to be published in a book– allows for formulating critical questions to examine the highly historically grown present-day systems.

COST Actions Statistics

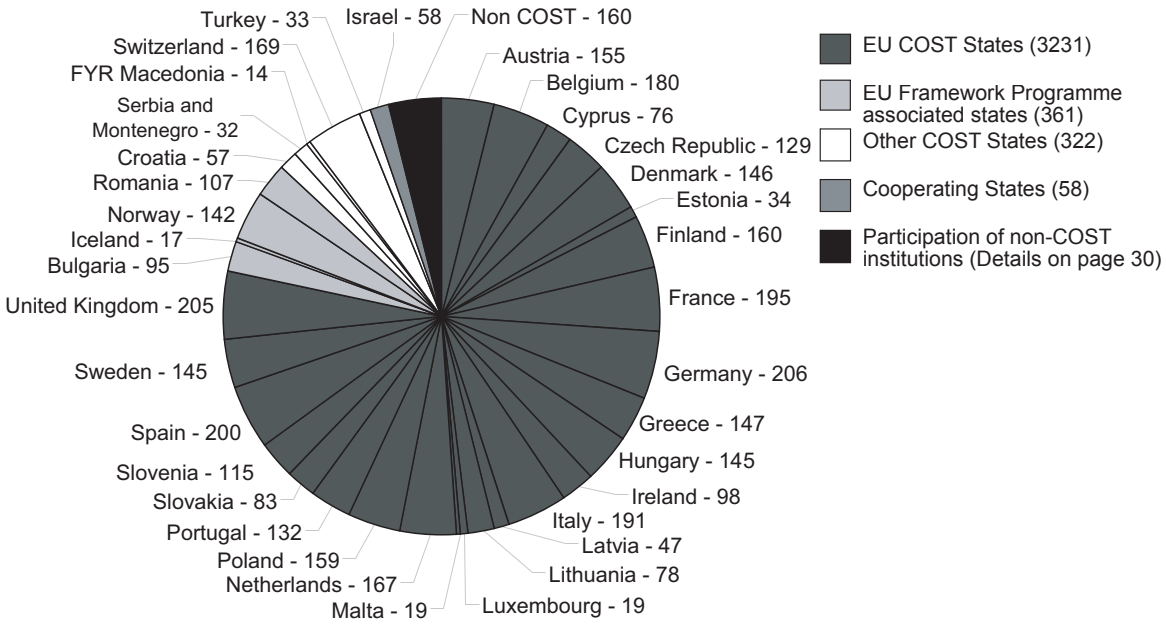
Yearly evolution of the Running and Started COST Actions up to 2005

(Status on 31st December)

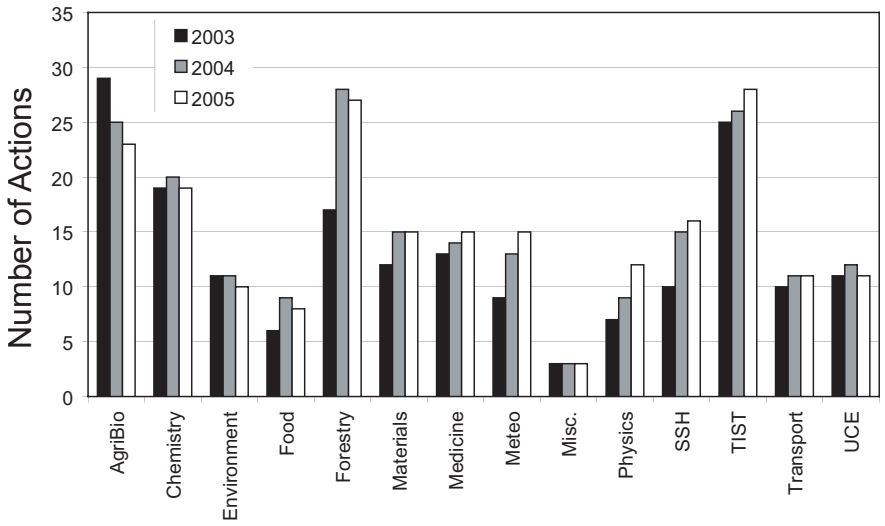


COST Country Participation 2005

(Total number of signatories: 4132)



Number of COST Actions by Domain 2003 - 2005



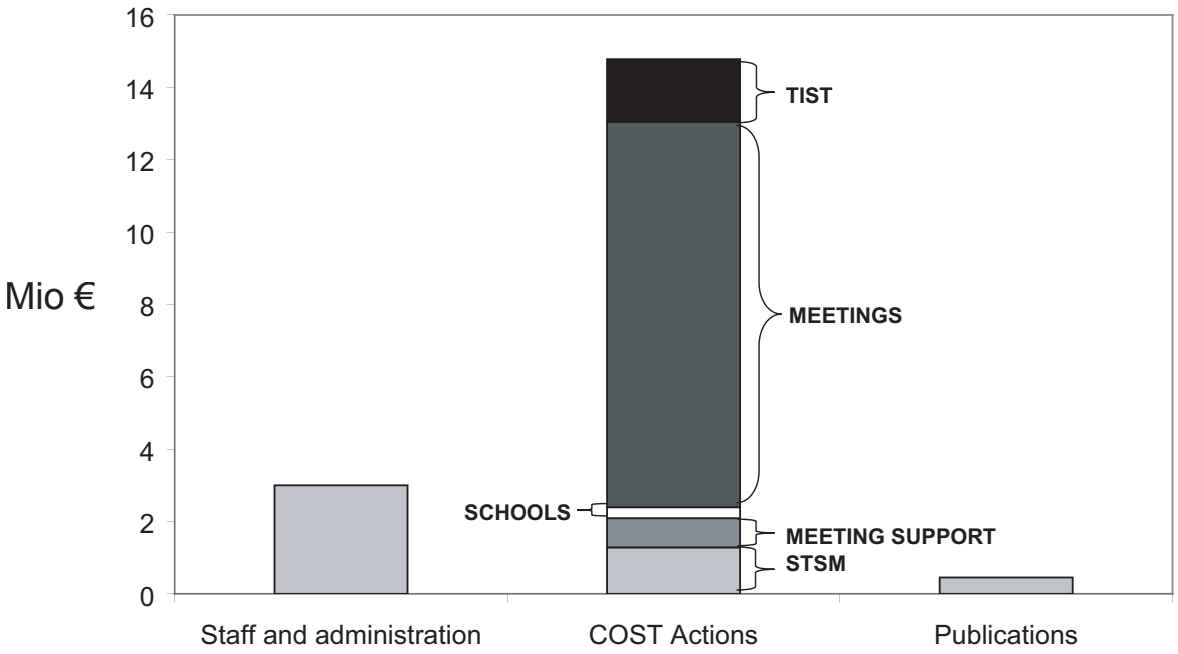
Number of Actions Running any time of the year

YEAR	2003	2004	2005
Agriculture and Biotechnology	29	25	23
Chemistry	19	20	19
Environment	11	11	10
Fluid dynamics	1	1	0
Food Sciences	6	9	8
Forests and Forestry Products	17	28	27
Materials	12	15	15
Medicine and Health	13	14	15
Meteorology	9	13	15
Miscellaneous	3	3	3
Physics	7	9	12
Social Sciences and Humanities	10	15	16
TIST	25	26	28
Transport	10	11	11
Urban Civil Engineering	11	12	11
TOTAL	**183**	**212**	**213**

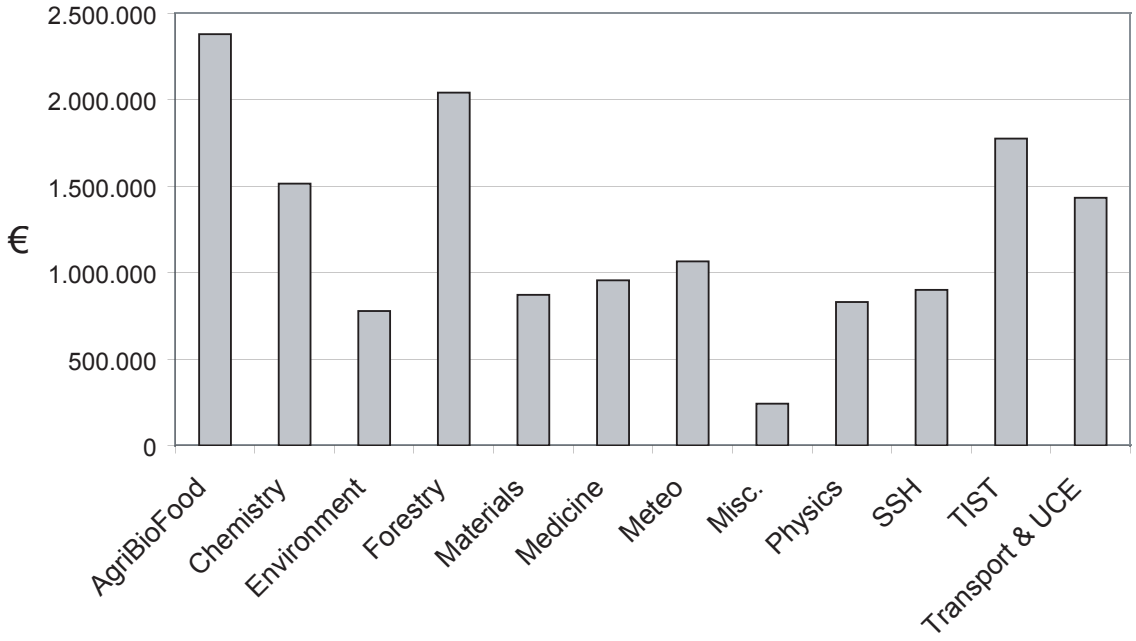
Number of Actions in % year (full year = 1)

YEAR	2003	2004	2005
Agriculture and Biotechnology	23,4	22,4	18,6
Chemistry	18,0	19,1	17,1
Environment	9,6	9,1	9,0
Fluid dynamics	1,0	0,3	0
Food Sciences	5,5	8,0	8,0
Forests and Forestry Products	15,6	21,8	24,4
Materials	10,9	12,2	13,2
Medicine and Health	10,2	12,4	11,6
Meteorology	8,1	9,5	12,9
Miscellaneous	3,0	3,0	2,9
Physics	3,3	7,6	10,7
Social Sciences and Humanities	8,0	11,3	13,7
TIST	22,0	21,9	22,2
Transport	7,2	9,7	9,3
Urban Civil Engineering	10,8	9,5	6,7
TOTAL	**156,7**	**177,8**	**180,4**

COST Expenditure Distribution 2005 by spending line



COST Expenditure Distribution 2005 by Domain



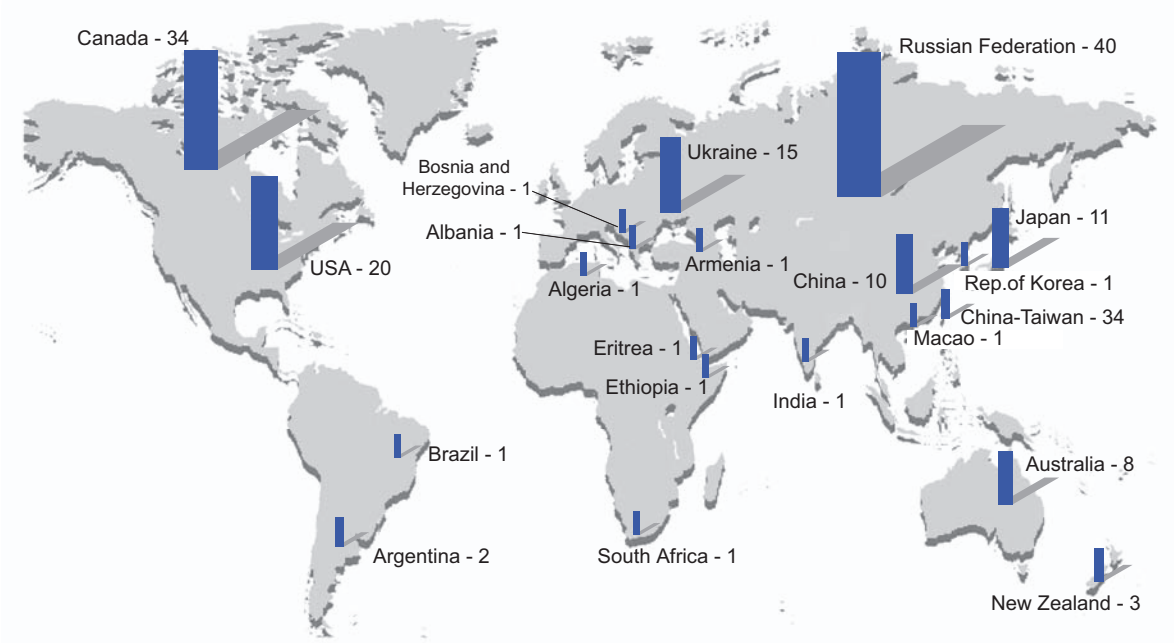
Participation of Non-COST Country institutions

COUNTRY	ACTION	INSTITUTION NAME
Albania *(1)*	625	*Seismological Institute*
Algeria *(1)*	859	*Université Badji Mokhtar de Annaba - Faculté des Sciences de l'Ingénieur*
Argentina *(2)*	845	*Instituto Nacional do Tecnología Agropecuarias - INTA*
	P10	*Universidad de Buenos Aires - Laboratorio Sistemas Complejos*
Armenia *(1)*	724	*Cosmic Ray Division - Yerevan Physics Institute*
Australia *(8)*	219 ter	*GSA Information Consultant - Ascot*
	537	*Graduate School of Biomedical Engineering, University of New South Wales*
	852	*Pastoral and Veterinary Institute*
	859	*The University of Melbourne, School of Botany*
	B22	*University of Technology of Sydney*
	D27	*Queensland University of Technology at Brisbane*
	P10	*Australian National University*
		Royal Adelaide Hospital, Cardiac Electrophysiology, Cardiovascular Investigation Unit, Adelaide
Bosnia and Herzegovina *(1)*	625	*University of Sarajevo*
Brazil *(1)*	530	*Materials Brazilian Institute of Information on Science and Technology (IBICT), Ministry of Science and Technology*
Canada *(34)*	270	*TR Labs, University of Alberta*
	273	*Communication Research Center*
	274	*Brock University*
		St. Francis Xavier University
		Université de Montréal
		Université Laval
	277	*Université de Sherbrooke*
	280	*Communication Research Center*
	287	*McGill University*
	295	*Université du Québec*
	531	*Materials and Manufacturing Ontario*
	722	*Canadian Meteorological Service*
	B16	*Sainte-Anne-de-Bellevue QC*
		University of Toronto
	B17	*Hospital for Sick Children*
		University of Guelph
	B18	*Kingston General Hospital*
		SJHC
	B19	*Children's and Women's Health Center of British Columbia*
		Ontario Cancer Institute - Princess Margaret Hospital
		University of British Columbia
	B20	*University of Western Ontario*

COUNTRY	ACTION	INSTITUTION NAME
Canada *(34)*	B21	*National Research Council of Canada - NRCC*
		Neurological Institute Montreal
	B22	*CHUL - Centre de Recherche en Infectiologie*
	B23	*Faculty of Dentistry, McGill University, Montreal*
		Université de Montréal
		University Halifax
		University of Toronto
	B25	*Health Canada*
	B27	*University of Quebec*
	P18	*McMaster University - Department of Engineering Physics*
		Ryerson University Toronto - Electrical and Computer Engineering Department
		University of Toronto - Department of Electrical and Computer Engineering
China *(10)*	296	*LEME*
		Polar Research Institute
	534	*Design Institute of China*
		Jiatong University
		School of Civil Engineering and Architecture
		The first Highway Survey
	537	*Qindu Hospital*
		Stomatological College
	D30	*Institute of Biochemistry and Cell Biology - Chinese Academy of Sciences*
		Institute of Biophysics - Chinese Academy of Sciences
China - Taiwan *(2)*	273	*National Chiao Tung University*
	531	*National Cheng Kung University*
Eritrea *(1)*	845	*University of Asmara*
Ethiopia *(1)*	D29	*Chemistry Department, Addis Ababa University*
India *(1)*	859	*University of Hyderabad*
Japan *(11)*	273	*Tokyo Institute of Technology*
	727	*Kaganawa Institute of Technology*
	841	*Institute of Technology of Tokyo*
		University of Kyoto
		Waseda University
	859	*Hiroshima University - Graduate School of Science*
	B27	*The Institute of Physical and Chemical Research, RIKEN*
	D30	*Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Yokosuka*
	D32	*Kyushu University - Institute of Materials Chemistry and Engineering & the interdisciplinary Graduate School of Engineering Sciences*
	P14	*Osaka University*
	P18	*Doshisha University - Department of Electrical Engineering*
Macao *(1)*	720	*Meteorological and Geophysical Service of Macao*
New Zealand *(3)*	B17	*University of Auckland*
	B27	*University of Auckland*
	P11	*Victoria University of Wellington*
Republic of Korea *(1)*	P16	*Department of Physics, Sungkyunkwan University, Suwon*
Russian Federation *(40)*	280	*Ministry of Telecommunication and Informatisation of the Russian Federation*
		Russian Academy of Sciences
		Vladimir State University
	290	*Telecommunication Institute (ZNIIS), Moscow*
	296	*IZMIRAN - Russian Academy of Sciences*

COUNTRY	ACTION	INSTITUTION NAME
Russian Federation *(40)*	296	*University of St Petersburg*
	346	*Technical University of Moscow*
	537	*St.-Petersburg State Institute of Technology*
	724	*Moscow State University*
		Space Research Institute, Russian Academy of Sciences
	726	*World Radiation Data Center (WRDC), St. Petersburg*
	728	*Voeikov Main Geophysical Observatory (VMGO), St. Petersburg*
	838	*Institute for Agricultural Microbiolgy*
		Research Institute of Microbiology
	841	*Russian Academy of Sciences*
	850	*Russian Academy of Sciences*
	B12	*Russian Academy of Sciences*
	B27	*Institute of the Human Brain of the Russian Academy of Sciences*
	D18	*Joint Institute for Nuclear Research at Dubna*
	D21	*Russian Academy of Sciences*
	D27	*Semenov Institute of Chemical Physics*
	D29	*Moscow State University*
	D30	*Moscow State University*
	G7	*Research Centre "S.I.Vavilov State Optical Institute"*
	P7	*Institute of Microelectronics Technology and High Purity Materials (IMT RAS), Russian Academy of Sciences, Chernogolovka*
		Rostov State University
		Russian Academy of Sciences
	P11	*Moscow State University*
	P14	*Institute of Mathematical Modelling*
		Institute of Physics of Daghestan
		Joint Institute for Nuclear Research
		Laser Research Institute, St Petersburg State University
		Lebedev Physical Institute
		Multicharged Ions Spectra Data Centre of VNIIFTRI
		Prokhorov General Physics Institute, Russian Academy of Sciences
	P15	*Institute of Organic Chemistry, Siberian Branch of the Russian Academy of Sciences, Novosibirsk*
		Kazan Physical Technical Institute of the Russian Academy of Sciences, Kazan
	P16	*Russian Research Centre "Kurchatov Institute", Moscow*
	P17	*D.V.Efremov Scientific Research Institute of Electrophysical Apparatus*
		Institute of Continuum Media Mechanics
South Africa *(1)*	D20	*Rhodes University at Grahamstown*
Ukraine *(15)*	530	*Materials Institute for Sorption and Problems of Endoecology, National Academy of Sciences of Ukraine*
	531	*Ivan Franko National University, Faculty of Physics, Lviv*
	532	*Institute for Problems of Materials Science*
	635	*National Academy of Sciences of Ukraine*
		Odessa National University
	719	*Scientific and Industrial Enterprise "Ecomedservice"*
	720	*Innovation Center "Magic Solutions"*
	724	*Lviv Centre of Institute of Space Research*
	859	*Institute of Agroecology and Biotechnology of the Ukrainian Academy of Science, Kiev*
		National Agricultural University - Ukrainian Institute of Agricultural Radiology

COUNTRY	ACTION	INSTITUTION NAME
Ukraine *(15)*	D20	*Kyiv National Taras Shevchenko University*
	D21	*National Academy of Sciences of Ukraine*
	D29	*National Academy of Sciences of Ukraine*
	P18	*Kyiv Polytechnic Institute - Department of High Voltage Engineering and Electro-physics*
		Usikov Institute for Radio-Physics and Electronics - Department of Remote Sensing
United States *(20)*	219 ter	*Trace R&D Center - Madison*
	273	*Lucent Technologies*
	296	*University of Massachusetts, Lowell*
	348	*Montana State University*
	532	*Oak Ridge National Laboratory*
	719	*National Center for Atmospheric Research (NCAR), Boulder, Colorado*
	841	*Basic Sciences Center*
		University of Georgia - Athens
	859	*Brookhaven National Laboratory*
	B27	*Institute for Nonlinear Science, University of California*
	C13	*Lawrence Berkeley National Laboratory*
	D17	*Stanford University*
	D18	*University of California, Berkeley*
		University of Illinois
		University of Texas at Dallas
	E41	*Department of Wood and Paper Sciences, North Carolina University, Raleigh*
	P14	*University of Rochester*
	P16	*Tallahassee High Field Laboratory*
	P18	*University of Alaska - Geophysical Institute and Physics Department*
		University of Florida - Department of Electrical and Computer Engineering
NGO *(4)*	845	*World Organisation for Animal Health*
	850	*UNESCO*
	B22	*International Organisation for Chemical Sciences in Development*
	E43	*Joint Research Centre, Institute for Environment and Sustainability*
Other *(1)*	E27	*Ministerial Conference on the Protection of Forests in Europe*



Major decisions of the CSO in 2005

161 st Meeting, Brussels, Belgium · 15-16 March

- *Agreement on the introduction of a system of continuous Open Call based on a two-stage process (preliminary and full proposal)*
- *Reinforcement of the quality control via the use of external peer reviewers in the assessment of full proposals for new Actions*
- *Mandate of an ad hoc working group for restructuring the COST domains with the aim of achieving a reinforced strategic management through a smaller number of Technical Committees with increased interdisciplinary approach*
- *17 New Actions approved*

162 nd Meeting, Bucharest, Romania · 14-15 June

- *Appointment of Dr Martin Grabert as the new Head of the COST Office as from 1 September 2005*
- *Launching of the Mid-term review carried out by a high Level Panel of Experts to analyse reforms of the science management within COST*
- *18 New Actions approved*
- *World-wide interest towards COST: over 20 applications from non-COST institutions approved*

163 rd Meeting, Reading, United Kingdom · 23-24 November

- *Presentation of the Mid-term review as very satisfactory. The Panel of Experts recommends to level the financial support to COST from the sixth RTD Frame work Programme of the Community to the upper-limit of 80 Million € and to continue to reform the scientific management of COST.*
- *Agreement on a new domain structure based on nine fields with an entry into force in the second half of 2006*
- *Revised Procedure for appointing members of JAF approved*
- *Introduction of a new voting procedure by qualified majority (three-quarters of the Member States) in certain cases where no consensus can be reached*
- *Approval of a scheme of prioritisation and financial planning allowing for the launching of some 40 new Actions before the end of 2006*

Publications supported by COST in 2005

ACTION	TITLE
219	Equal Measures - Closing the Accessibility Gap - Tony Shipley and John Gill
	Making Life Easier - How new telecommunication services could benefit people with disabilities - John Gill
269	User aspects of ICTs Work group reports - No 1 of 3 International collaborative research : Cross-cultural differences and cultures of research - November 2004 - EUR 21638 EN ISBN 92-898-0013-5 - OPOCE
	ICT capabilities in action: What people do User Aspects of ICTs. Work group reports – No 2 of 3 - November 2004 - EUR 21637 EN - ISBN 92-898-0011-9 - OPOCE
273	CD Rom - 13th and Final MCM - Technical documents of COST 273 "Towards Mobile Broadband Multimedia Networks" - 6-8 June 2005, Leuven, Belgium - Luis Correia, Ann Deforce, Jozef Lodeweyckx, Dave Trappeniers, Emmanuel Van Lil and Jo Verhaevert
	Final Workshop COST 273 "Towards Mobile Broadband Multimedia Networks" 7 June 2005, Leuven, Belgium
276	8th COST 276 Workshop Proceedings "Information and Knowledge Management for Integrated Media Communication" - 26-28 May 2005, Trondheim, Norway - ISBN 82-997105-0-2
277	Proceedings of the 3th International Conference on "Non-Linear Speech Processing" 05NOLISP 19-22 April 2005, Barcelona, Spain - Publisher : Cargraphics - ISBN 84-267-1365-3 - Virginai Espinosa Duró, Marcos Faúndez Zanuy, Leónard Janer Garcìa, Antonio Satué Villar, Jordi Solé Casals
279	CD Rom - COST 279 "Analysis and Design of Advanced Multiservice Networks Supporting Mobility, Multimedia, and Internetworking" June 2005
	COST Action 279 Final Report - "Analysis and Design of Advanced Multiservice Networks Supporting Mobility, Multimedia, and Internetworking" - Springer, 2006 - ISBN 10 0-387-28172-x - José Brázio, Phuoc Tran-Gia, Nail Akar, Andrzej Beben, Wojciech Burakowski, Markus Fiedler, Ezhan Karasan, Michael Menth, Philippe Olivier, Kurt Tutschku, Sabine Wittevrongel (Eds.)
281	FGF-Workshop (Speakers Manuscripts) 1) Genetic and cytogenetic aspects of RF-field interaction. 24-27/11/2002, Löwenstein, Germany 2) The blood-brain barrier (BBB) – Can it be influenced by RF-field interactions ? 2-6/11/2003, Reisenburg, Germany 3) Can electromagnetic fields used in mobile communications provoke sleep disorders and other cognitive changes ? 8-10/12/2003, Immenstaad, Germany
351	Journal "Wat-Moves" - News about the WATMOVE project Issue 1 – Spring/Summer 2005 - Ake Hermansson VTI
525	CD Rom - COST 525 Training School "Grain-Boundary related phenomena in ceramic materials : from micro-to nano-scale dimensions" - 6-10 June 2005, Genoa, Italy
527	International Workshop on Plasma Polymers and Related Materials...7-9 October 2004, Antalya, Turkey - Book of Abstracts
	Book on Plasma Polymers and Related Materials ISBN : 975-491-194-0 Hacettepe University Press, 2005 - Mehmet Mutlu, George Dinescu, Renate Förch, Jose Miguel Martin-Martinez and Jiri Vyskocil
531	CD Rom - Proceedings of COST Action 531 "Lead-free Solder Materials" Mid-term meeting - Lausanne 2005, Switzerland
	Monatshefte für Chemie Chemical Monthly - An International Journal of Chemistry - Vol. 136/No11, November 2005 - Thermodynamics of Alloys - Springer - One full day was dedicated to a Workshop of COST Action 531 "Lead-free Solder Materials" - Peter Terzieff, Adolf Mikula and Herbert Ipser

ACTION	TITLE
534	Workshop of COST on NTD Assessment and New Systems in Prestressed Concrete Structures - Institute of Terotechnology – NRI, Radom 2005 - ISBN 83-7204-447-3
535	Monatshefte für Chemie Chemical Monthly - An International Journal of Chemistry - Vol. 136/No11, November 2005 - Thermodynamics of Alloys - Springer - One half day was dedicated to a Workshop of COST Action 535 "THALU-Thermodynamics of Alloyed Aluminides" - Peter Terzieff, Adolf Mikula and Herbert Ipser
621	Reprint : Final Report of COST Action 621 "Groundwater management of coastal karstic aquifers" - EUR 21366 EN - OPOCE, 2005 - ISBN 92-898-0015-1 - Luigi Tulipano
624	Optimal management of wastewater systems - Publisher : Office for Official Publications of the European Communities - ISBN 92-898-0006-2 - Marie-Noëlle Pons and Mogens Henze
674	Proceedings of the Third International Symposium on Applications of Modelling as an Innovative Technology in the Agri-Food-Chain Model-IT 2005 - Acta Horticulturae number 674 - May 2005 - ISBN 90 6605 618 5 - 29 May-2 June 2005, Leuven, Belgium - B.M. Nicolaï, M.L.A.T.M. Hertog, L.M.M. Tijskens
714	Measuring and analysing the directional spectra ocean waves EUR 21367 - OPOCE
715	Meteorology applied to urban air pollution problems - Final Report - ISBN 954-9526-30-5 - Demetra Ltd Publishers, 2005 - Bernard Fischer, Sylvain Joffre, Jaakko Kukkonen, Martin Piringer, Mathias Rotach, Michael Schatzmann
716	Final Report: Exploitation of ground-based GPS for operational numerical weather prediction and climate applications - EUR 21639 EN - ISBN 92-898-0012-7 - OPOCE
717	Use of radar observation in hydrological and NWP models - EUR 21525 - OPOCE
718	Use and availability of Meteorological information from different sources as input in agrometeorological models - 2005 - G. Maracchi, A. Mestre, L. Toulios and B. Gozzini
	Irrigation and pest and disease models: Evaluation, in different environments and web-based applications - 2005 - G. Maracchi, L. Kajfez Bogataj, S. Orlandini, F. Rossi and M. Barazutti
718	Leaf wetness duration: Analysis of the agrometeorological requirements and evaluation of new estimation methods - 2005 - G. Maracchi, L. Kajfez Bogataj, S. Orlandini, A. Dalla Marta and F. Rossi
719	Meteorological Applications – a Journal of the Royal Meteorological Society - Special issue on the use of GIS in Climatology and Meteorology - Volume 12, number 1 - March 2005 Published now
722	Workshop on "Short range forecasting methods of fog, visibility and low clouds" - Internal Workshop Abstracts - 20 May 2005, Larnaca, Cyprus - Silas Chr. Michaelides
	Short-range forecasting methods of fog, visibility and low clouds - EUR 21451
723	Data exploitation and modeling for the upper troposphere and lower stratosphere on line publication at Atmospheric Chemistry and Physics - A special issue
724	Book on COST Action 724 "Space Weather, Environment and Societies" - Springer, 2006 - ISBN-10 1-4020-4331-7 (HB) - J. Lilensten and J. Bornarel
	CD ROM COST Action 724 - Proceedings of the Scientific Workshop - 10-14 October 2005, Athens, Greece
819	Book on COST Action 819 - "Quality Control of Entomopathogenic Nematodes" - Jürg M. Grunder
852	Proceedings of the WG 1 and WG 2 Meeting - Sigriour Dalmannsdottir and Aslaug
	Proceedings of the 1st COST 852 Workshop "Adaptation and Management of Forage Legumes – Strategies for Improved Reliability in Mixed Swards" - 20-22/09/2004, Ystad, Sweden ISBN 91-576-6805-01 - B.E. Frankow-Lindberg, R.P. Collins, A. Lüscher, M.T. Sébastia, A. Helgatóttir
854	Workshop for COST 854 working groups - "Reservoirs of protozoan abortifacients in livestock and wildlife" - 30/08-01/09/2005, Warsaw, Poland - Published in "Polskie towarzystwo parazytologiczne", Wiadomosci parazytologiczne - Tom 51, supplement, 2005 - PL IISN 0043-5163 - Polish Parasitological Society
	Conference on "Neospora and Neosporosis: Achievements and Perspectives" - 02/09/2005, Warsaw, Poland - Published in "Polskie towarzystwo parazytologiczne", Wiadomosci parazytologiczne - Tom 51, supplement, 2005 - PL IISN 0043-5163 - Polish Parasitological Society

ACTION	TITLE
855	Proceedings of the 3rd Workshop on "Diagnosis and Pathogenesis of animal chlamydioses" - 22-23 September 2005, Siena, Italy - Bononia University Press, 2005 - ISBN 88-7395-090-6
917	Biogenically active amines in food - Volume VII - Publisher : Office for Official Publications of the European Communities ISBN 92-898-0007-0 - David M.L. Morgan, Friedrich Bauer
927	Journal of Molecular Nutrition Food research (Vol. 49, No 7, July 2005 - IISN 1613-4125 - Thermally Processed Foods : Possible Health Implications - Veronika Somoza
A14	Public sector information in the digital age : Between markets, Public management and citizens' rights Publisher : Edward Elgar - ISBN : 1 84376 383 4
A19	Children's welfare in ageing Europe - Volume I - Publisher : Norwegian Centre for Child Research - ISBN : 82-7816-046-5 - Ann-Magritt Jensen et al. (eds)
	Children's welfare in ageing Europe - Volume II - Publisher : Norwegian Centre for Child Research - ISBN : 82-7816-047-3 - Ann-Magritt Jensen et al. (eds)
A20	TV and interactivity in Europe : Mythodologies, theoretical perspectives - Fausto Columbo (ed)
	Print and Online Newspapers in Europe - A comparative analysis in 16 countries - Het Spinhuis Publishers, 2005 - ISBN 90-5589-238-6 - Richard Van Der Wurff & Edmund Lauf (EDS)
B12	Final Conference, 13th Management Committee and Working Groups meeting - B. Mazière
	PhD-thesis "Synthesis, Characterisation and application of 68Ga-labelled Macromolecules" - Irina Velikyan
B15	Article on "Modelling during drug development" - Review : Basic and Clinical Pharmacology § Toxicology - Volume 96, Number 3, March 2005, 149-150 - Publisher : Nordic Pharmacological Society - Luc Balant
B16	The European COST Action B16 Symposium on "Multidrug Resistance Reversal" (By Inhibition of Trans-membrane Transport) 11th Management Committee and WG1, WG2, WG3, WG4 Meetings of COST B16 Workshop - 13-14 May 2005, Belek, Antalya, Turkey - Abstract Book & Scientific Programme Publisher : TÜBITAK, COST, ESF
B17	APS (Acta Physiologica Scandinavica) - Jan Henriksson et al
B19	Workshop on Fragilome - Chromosomal instability, fragile sites, and cancer - Heidelberg, German Cancer Research Centre, DKFZ - February 17-19, 2005
B22	Drug discovery and development for parasitic diseases, Siena, Italy, 29 September – 1 October 2005 PARASSITOLOGIA, vol.47, Suppl.1, Sept. 2005 - ISSN 0048-2951 - Giuseppe Campiani, Ernesto Fattorusso, Donatella Taramelli
B23	Joint meeting of the 4th Management Committee and Working Groups 1, 2, 3, and 4 - "Genes, Cells and Biomaterials for Oral-Facial Regeneration" 12-15 May 2005, Barcelona, Spain
C11	Final Report on "Green structure and urban planning" OPOCE, 2005 - ISBN 92-898-0014-3 - Ann Caroll Werquin, Bernard Duhem, Gunilla Lindholm, Bettina Oppermann, Stephan Pauleit, Sybrand Tjallingii
C12	Final Conference Proceedings - January 2005 Improvement of buidings'structural quality by new technologies - Publisher : Balkema Publishers - Christian Schaur et al
D14	Final Evaluation Conference of the Chemistry COST Action D14 - "Functional Molecular Materials" - Book of abstracts 9-12 June 2005, San Feliu de Guixols (Spain)
D18	Annual Workshop "Lanthanide Chemistry for Diagnosis and Therapy" - 6-7 September 2005 - Cologne, Germany
D20	Book of abstracts - 1st European Conference on Chemistry for Life Sciences - Understanding the Chemical Mechanisms of Life - 4-8 October 2005, Rimini, Italy
D24	Annual Workshop STEREOCAT 2005 Sustainable Chemical Processes : Stereoselective Transition Metal-Catalyzed Reactions - 15-18 September 2005 - Barcelona, Spain
D27	Prebiotic Chemistry and Early Evolution Midterm evaluation conference Chembiogenesis 2005 - Book of Abstracts - 28/09-01/10 2005 - Venice, Italy
	Working Group 0006/03 meeting Preparation and properties of functionalized vesicles as protocell models 20-21 May 2005 - Zagreb, Croatia

ACTION	TITLE
D32	CD Rom - Workshop on Chemistry in High-Energy Microenvironments
E12	Proceedings No 2 - Urban forests and trees - EUR 21524 EN - ISBN 92-898-0009-7 - OPOCE
E19	Country and regional reports from COST Action E19 - Forests for the future. National forest programmes in Europe - EUR 21364 EN - ISBN 92-898-0001-1 - 2004, RE-PRINT - OPOCE
E24	Proceedings of the International Conference on Probabilistic Models in Timber Engineering - Tests, Models, Applications - Final Conference / Arcachon, France2005 - Association for Research on forestry and forest products in Aquitania, ARBORA
E25	Scientific Issues Related to Sustainable Forest Management in an Ecosystem and Landscape Perspective - Technical Reports 1-2-3-4-5
E29	Design, Construction, Manufacturing and Fire Safety, Proceedings of the International Symposium on Advanced Tilmber and Tilmber-Composite Elements for Buildings, 27-29 October 2004 - Florence, Italy - Ed.by Prof. A Ceccotti - CNR-Ivalsa (Italy)
E30	Acta Silvatica & Lignaria Hungarica An International Journal in Forest, Wood and Environmental Sciences - Special edition 2005 - Volume 1
	Acta Silvatica & Lignaria Hungarica An International Journal in Forest, Wood and Environmental Sciences - Special edition 2005 - Volume 2
E31	Proceedings of the 2nd European COST E31 Conference - Management of Recovered Wood - Strategies Towards a Higher Technical Economical and Environmental Standard in Europe 29/09-01/10/2005, Bordeaux, France ISBN 960-12-1424-0 - University Studio Press - Thessaloniki 2005 - Dr. Christos Gallis
E34	International Conference/Workshop on Green gluing of wood – process – products – market 7-8/04/2005, Boras - Björn Källander
E37-E44	Wood Modification: Processes, Properties and Commercialisation - ECMW 6/7 October 2005, Göttingen (Germany) - Edited by Holger Militz and Callum Hill, ISBN 3-00-017207-6
E39	Proceedings of the 1st European COST E39 Working Group 2 Workshop “Forest Products, Forest Environment and Human Health : Tradition, Reality and Perspectives” - University Studio Press, 2005 - Dr. Christos Gallis
E44	Proceedings of the COST Action E44 Issue 9 / special edition, Lignovisionen - “Broad Spectrum Utilisation of Wood” 14-15 June 2005 - Vienna, Austria - IISN 1681 - 2808
G8	Article on “Innovative tools for exhibition purposes : environmental and damage assessment - Review : Paper Conservation News, Number 112, December 2004 - Yunson Choi and Monica Marchesi
	International Workshop COST G8 “In-situ Non-destructive Analysis and Testing of Museum Objects” - Book of Abstracts 15 April 2005, Bratislava, Slovakia - ISBN 80-967402-9-6 - Miroslav Hain
	Conference on “Innovative Tools for Exhibition Purposes : Environmental and Damage Assessment”, 29/10-03/11/2004, Malta, Italy Published in “Conservation News”, issued in May 2005, P. 17-19
	Benefits of non-destructive analytical techniques for conservation. Papers from a COST Action G8 Workshop held in Kalkara, Malta, on 8 January 2004 - EUR 21636 EN ISBN 92-898-0010-0 - A. Adriaens, C. Degrigny and J. Cassar
	CD Rom - COST Action G8 Training School - Innovative Tools for Exhibition Purposes : Environmental and Damage Assessment - 29 October – 03 November 2004
	Article in review “Spectrochimica Acta Part B 60 - Non-destructive analysis and testing of museum objects: An overview of 5 years of research - Elsevier, 2005 - Annemie Adriaens
P17	CD Rom - Working Group meeting - Reims, France - August 2005

The COST Office Seminars in 2005

• NSF
1 March - Speaker: Mark Suskin (NSF Europe Office in Paris)

• The Role of a Research Liaison Office
12 April - Speaker: Martin Penny (UKRO)

• Networking Instruments of the European Science Foundation
27 April - Speaker: John Marks (ESF)

• Seminar on European Committee for Standardisation - CEN and its Advisory Committee on Standardisation and Research (CEN/STAR)
3 May - Speaker: Gérard Rivière, Council COST Secretariat and André Pirlet, CEN/STAR

• Lobbying for Polish Science
24 May - Speaker: Jan Krzysztof Frackowiak (former Deputy Minister KBN)

• Research activities of the EU Joint Research Centre with special reference to Enlargement
20 June - Speaker: Giancarlo Caratti (European Commission)

• Research in Turkey
5 July - Speaker: Mehmed Gokoz (TURBO-B)

• Human Frontier Science Program
18 July - Speaker: Guntram Bauer, Director of Fellowships

• The European Knowledge-Based Bioeconomy
20 September - Speaker: Christian Patermann (European Commission)

• Human Resources Policy in FP7
22 November - Speaker: Georges Bingen, EC Marie Curie Programme, Head of Unit "Strategy and Policy"

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