

COST

annual report

2004



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science





COST

European **CO**operation in the field of
Scientific and Technical Research

Annual Report 2004

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Foreword

During 2004, COST has experienced a “renaissance” following the rather difficult times of the preceding two years and I am pleased to see a renewed confidence and enthusiasm in the research community which uses COST.

The Committee of Senior Officials (CSO) is now operating fully as the highest strategic and decision-making body of COST. This includes taking policy positions on behalf of COST as it has done in response to the communication from the European Commission on the future policy for research in the European Union. The ties and connections with the three main actors in developing future European policy for research – the European Parliament, the Council of the European Union and the European Commission – have been further developed and strengthened.

Thanks to the reforms already introduced, COST has become a much more efficient decision-making body in which the proactive role of the COST Office is of paramount importance. The role of the COST Technical Committees has been reinforced and the devolution of the scientific and managerial responsibilities to these Committees has been introduced. Our Technical Committees have the particular responsibility for the quality control of proposals and of the subsequent COST Actions.

Over the past year, the CSO has approved 32 new Actions and the participation in COST Actions of 17 Institutions from non-COST countries. Following reforms introduced by the CSO, there has been a reduction of the lead time for starting new Actions so that they are now able to hold their “kick off” meetings within two months of the CSO decision.

The COST tradition of “equality of access”, i.e. the possibility of participation in COST Actions without any restriction to countries not belonging to the European Union and COST’s ability to anticipate the evolving European political situation thus constituting a “bridge” towards the scientific communities of countries across the whole of Europe, has been openly recognised. COST has also introduced a “near neighbours” policy in order to support the involvement of research institutions from countries to the east (the NIS countries) and to the south in the Mediterranean Basin.

COST has generally increased its visibility in the ERA. The success of the COST DAY, held in Brussels in November 2004, and of the many COST Information Days which have been organised are examples of this newly - acquired visibility.

COST is developing a very effective synergy with the other two European networking structures, namely EUREKA and ESF. Synergy with the ESF is already well under way, beyond the close relationships created by ESF acting as the implementing agent for COST. There is an ongoing dialogue between COST and EUREKA which is leading to the development of links between EUREKA activities and the COST Technical Committees and Actions.

The fact that “if COST did not exist it should be necessary to invent it” has been underlined over the past year. COST has shown itself fully able to justify an enhanced role in the ERA, remaining as “a fast, efficient, effective, flexible framework to bring European researchers together, under light strategic guidance, to let them work out their ideas”. With this in mind, we look forward to continue to improve COST in the year 2005 to be at the best service of the European scientific community.

Professor Dr Ing Francesco Fedi
President COST Committee of Senior Officials



A view from the General Secretariat of the Council of the European Union

On the way to modernizing the European Economics, be it by way of the Lisbon programme or by measures of the Competitiveness Council, cross-border research cooperation has become increasingly important. Against this backdrop COST is gaining significance.

I have noticed with pleasure and satisfaction that the synergy envisaged by bringing the European Science Foundation to a cooperation with COST has started to yield a lot of very fruitful results. The newly created COST Office has - so far - succeeded in living up to the high expectations laid down in the 2003 MoU.

The Council's General Secretariat and its Directorate-General C has assumed the role of supporting COST's CSO and its horizontal committees since its foundation back in 1971, a task that was reconfirmed at COST's latest Ministerial Conference in May 2003. The form and function of that support can be best described as COST's "political and legal secretariat": Not only providing the Council's legal service advice on legal issues, the Council's Secretariat also functions through the operations of its Agreements Office as the collector and depository of the numerous signatures of the Memoranda of Understanding that COST partners conclude to animate a COST Action. A unit in my directorate, which also manages the inter-governmental COST fund, oversees the day-to-day activities of COST and serves as the permanent counsellor to the CSO President, who is elected by the Committee for a three-year mandate.

After a remarkable stint of six years as COST President by the Finnish Gösta Diehl (the first COST Chair to be re-elected), the COST Presidency is now in the reliable and active hands of Italy's Prof. Francesco Fedi, who was elected unanimously to that post in mid-2004. This contribution to the COST 2004 Annual Report is also meant to honour both gentlemen: Gösta Diehl for his brinkmanship in leading COST through stormy waters to a new flourishing future and Francesco Fedi for the dynamic enthusiasm with which he continuously positions COST as an active and important player in the landscape of the European Research Area.

His active stance is indispensable, since it is in terms of outside visibility that COST, although highly recognised for its value within the European Scientific Community, may have to do more: The Council's General Secretariat has already reinforced its efforts with regard to promoting COST.

We have just completed an update of a film on COST (available as a video or CD-ROM) including statements from the new CSO President and the new RTD Commissioner, Dr. Janez Potocnik. The film also contains a supportive statement by the Council's Secretary-General/High Representative for the Common Foreign and Security Policy (CFSP), Dr. Javier Solana. Moreover, many COST Actions may substantially contribute to our everyday work to make European policies tick.

Trying to achieve the Lisbon agenda, it is my strong belief that COST, by its original concept of a "hybrid" between the Community-method and inter-governmental cooperation, continues to be, by the invigorating reactivity of its production of results of research actions, a significant contribution to our challenge to become "the most dynamic and competitive knowledge-based economy in the world by 2010".

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



COST and the Commission: towards a new partnership

As we all know, COST is one of the longest-running European initiatives for cooperation amongst scientists and researchers across Europe. It was set up some 33 years ago by 19 countries, together with the European Communities. Over the years, COST has nearly doubled in size, bringing together 34 member countries from all over Europe. At its inception, COST aimed at extending research cooperation in Europe both to countries neighbouring the Community, and to research topics beyond those covered by Community research programmes of that time.

But the landscape of European research has changed dramatically since the establishment of COST. To begin with, the Framework Programme covers more technological fields than before. Moreover, we now have a European Research Area that improves co-ordination of national research programmes and policies, whilst helping to overcome fragmentation and creating an "internal market" for research. As such, the ERA is a key component of the Lisbon Strategy.

In this new dynamic context, COST has a lot to offer: it is a flexible intergovernmental mechanism that enhances research synergies between research teams. As such, it is instrumental to the strengthening of the European Research Area and the implementation of the Lisbon objectives. It is worth bearing in mind that, without funding research itself and with just 15-25 million € per year, COST facilitates research activities 100 times the value of the annual investment, not to mention the 25,000 European researchers that are involved.

Over the years, the Commission has had a very special relationship with COST. We were one of the founding fathers of COST and we provided the scientific and administrative secretariat for COST for a considerable number of years.

A couple of years ago, an independent assessment panel called for reforms in COST making several recommendations regarding the governance and organisational structures of COST.

In this context, the Commission took the stance that the secretariat of COST could be more usefully and more efficiently provided outside the Commission. Consequently, the COST Committee of Senior Officials designated the European Science Foundation as its implementing agent. Following a contract between the ESF and the Commission, the ESF set up the COST Office in Brussels which became fully operational in January 2004.

We welcome the proactive approach that has been adopted by the COST Office in



designing and implementing further reforms in the management and governance of COST.

A new era has begun regarding the relationship between COST and the Commission, the essence being the establishment of a new partnership between the two parties. The Council of Ministers welcomed the Commission's intention to become a partner of COST with a view to further developing synergy between the Framework Programme and COST.

This partnership is guided by the ultimate objective of integrating COST into the European Research Area through closer linkage and reinforced co-ordination between the Framework Programme and COST.

Being a partner in COST means that the Commission can bring the activities of the Framework Programme closer to COST – just as the COST Member Countries bring their own national activities more in harmony with the Framework Programme.

The partnership should be perceived as strategically beneficial for both partners. We are confident that the partnership will be further developed to the benefit of COST, the Commission and the European scientific Community as a whole.

Robert-Jan SMITS
Acting Director
European Commission
Research Directorate General
Directorate B – Structuring ERA

Report from the COST Office

The past year has been one of intense activity for the COST Office. Although the contract between the European Commission and the European Science Foundation (ESF) technically started on 1 July 2003, a number of complex administrative issues remained to be resolved. Consequently, the COST Office did not open until 5 January 2004. At that time, while most of the Science Officers had transferred from the Commission to the new COST Office, this was not the case on the administrative side. Therefore, in January, we opened the COST Office with not all our staff appointed, still waiting for some of our equipment to arrive and with much building conversion work still remaining to be finished.

By 31 December 2004, we had achieved the highest annual level of spending on COST activities, principally the Actions, in the history of COST. During 2004, the COST Office supported the networking of scientists by organising 930 meetings with 29700 participating scientists and reimbursing over 15300 scientists from the COST Actions. In addition, 800 Short Term Scientific Missions (exchange visits mainly for younger researchers) were organised by the COST Office. The cooperation with institutions from non-COST countries was further enhanced and 43 new partnerships have been created with scientific groups from all over the world.

These are impressive figures and show that COST has now recovered from the downturn of the preceding years and that the COST community has certainly renewed its enthusiasm. They are also a tribute to the very hard work and dedication of the my colleagues in the COST Office who have supported the Actions, the Technical Committees and advised and assisted proposers of new COST Actions. In this respect, the CSO approved 31 new Actions, of which 19 were submitted to and approved by the CSO at its December meeting. All these Actions need preparation, review through the Technical Committees, revision and then preparation in the form required by the COST system – again a major workload for the Office.

Soon after the COST Office opened, it quickly became clear that the number of meetings to be held in Brussels was overwhelming our meeting room capacity. Fortunately, additional space became available in Tour Louise and was taken and converted into a flexible meeting space. We can now host and simultaneously support many meetings with a range of sizes at our premises in Brussels. This additional meeting space was partly paid for by the ESF's own budget and our colleagues in ESF are also users of this meetings space, a simple case of the synergy between COST and ESF paying off.

The staffing of the COST Office is now up to its planned strength, as envisaged in the contract, and we can now expect that there will be the usual recruitments and resignations customary within a stable situation. We are now a very multicultural and multilingual team which is also necessary when supporting a pan-European endeavour such as COST.

We must not forget the support received from the ESF in Strasbourg, most particularly in the areas of finance (all payments are made through Strasbourg), human resources, buildings and equipment, and IT. Without this dedicated support, we would not have achieved such a successful year.

The handing of nearly 20000 payments during 2004 was only possible by the development of an IT based project control tool which enabled us to master a workload that is nearly double that previously experienced by ESF. We have also achieved this with a reduced staffing when compared with the past. In addition, all rules and procedures for the operation of the Office had to be established together with balanced reimbursement rules for all COST instruments (serving the customers and the need to have a "lean" administration).

I also wish to records my gratitude to the staff of DG Research, concerned with the COST operations who have provided input advice and guidance, and to our colleagues of the COST Secretariat of the Council who work closely with us, especially in assisting the CSO.

The terms of the Memorandum of Understanding between the CSO and the ESF envisaged that the COST Office would have a pro-active role in the development of the COST system, especially the modernisation required by the Busch Assessment Report of 2002 and the Mid Term Review of the EC-ESF contract for COST. In this capacity, the COST Office has put forward many proposals which have been debated and accepted by the CSO. These have included, most importantly, a new procedure for reducing the time between recommendation and approval of a proposal and the launch of the Action. This now takes around 4 months from the final Technical Committee recommendation to the "kick-off" meeting and this is doing much to retain and capture the enthusiasm of the researchers involved.

We have been able to develop and enhance the instruments at our disposal. During the year, emphasis was placed on the Short Term Scientific Mission (STSM) scheme as it is of especial benefit to the younger researchers in COST Actions. The scheme itself has been extended to a 3 months upper limit for missions at a value of €2500. COST has now introduced Training Schools within the Actions, and there has been an enthusiastic uptake of this instrument, and has given Actions the ability to jointly support High Level Research Conferences with the ESF. We now provide support for Action Chairs at a level of €2000, which may be used to support Action Web site development, this latter very much in response to the demand from the Actions. Of particular significance in terms of the "bridging" role of COST has been the initiation of a "near Neighbours" allocation to support researchers involved in COST Actions from institutions in the Balkan countries not yet in COST, in the Newly Independent States of the former Soviet Union and from the countries of the Mediterranean Basin.

On the policy front, COST has introduced a new statement on conflict of interest and is also monitoring the gender participation in COST Technical and Management Committees. This is not particularly good and COST will need to address this issue in the future. COST has now introduced a profile for a typical member of a Technical Committee. These are key committees in the COST structure and have the vital task of quality control both in assessing new proposals and in monitoring and evaluating approved Actions. They are an important part of COST

and nomination to these committees should be a matter of considerable national prestige. The COST Office is now able to reimburse one member per country of Technical Committees and also to support strategic meetings and workshops taking place under the auspices of the Technical Committees.

In terms of quality control, we not only seek external reviewers for proposers but consult widely on the proposals for new Actions, including with the European Commission, the ESF and other appropriate bodies.

The first of the sequence of domain reviews was initiated covering the area of chemistry, materials and physics and the independent review Panel reported to the CSO at the end of the year. A particularly important conclusion of the Panel was very positive in terms of the assessment of the research conducted in the domains reviewed and that "the networks engage some of the best researchers in their respective fields". The Panel concluded by saying that "From the present review, the Panel considers that COST's modus operandi, is an effective networking operation that engages large and important parts of the relevant scientific communities and is inherently cost-effective, providing very high 'leverage' to the modest amount of money invested. It provides a major contribution to the Lisbon process and the construction of the European Research Area. Despite this, COST's spending on science has stagnated in recent years. Taking into account both the science and the new administrative arrangement, the Panel strongly recommends that, at least in the reviewed areas, the budget be substantially increased."

The COST Office is also encouraging inter-disciplinarity between the COST domains and the Technical Committees are now appointing liaisons members between the various committees.

COST sees itself very much in a "web" of links with other organisations and in developing synergetic activities which will be of mutual benefit. Perhaps, most importantly, there is an effective partnership arrangement with the European Commission. Representatives of DG Research and other DGs regularly attend Technical Committee meetings and also follow ongoing Actions. The collaboration between ESF and EUREKA continues and there is a good dialogue between the organisations and exchanges between COST Technical

Committees and EUREKA “clusters”. Naturally, the close links now established between COST and ESF in operations also goes into research collaboration between the COST Technical Committees and the ESF’s Standing Committees and Expert Committees. There are regular meetings, both formal and informal, to discuss collaborative ventures and a number of joint workshops have been held. COST researchers contribute to the ESF’s Scientific Forward Looks and ESF researchers are becoming involved in COST’s Actions. The staffs of both the COST Office and ESF in Strasbourg work together to ensure that the research community gets the best possible advice in developing their networking proposals and guidance to address their requests to the most appropriate body. The COST Office is also in discussion with CEN-STAR, the European standardisation body, with INTAS and with NATO.

During the year, we devoted a lot of effort to dissemination. This has not only involved COST supported publications (we maintain a central fund for this on which the Actions can draw), and the list of publications given in this report is impressive, but we have tried to increase COST visibility. All domains have been encouraged to produce corporate brochures and leaflets. Staff from the COST Office have attended many conferences and information days to present COST to new research communities. Of particular note was the COST presence at the EuroScience Open Forum 2004, held in Stockholm; the London conference on Cultural Heritage and IST 2004 in Den Haag, both organised by the European Commission, the FoodMicro conference in Portoroz, Slovenia, the European Meteorological Society annual conference in Nice and the European Transport Conference in Strasbourg. The COST Office was also deeply involved in the support for the COST Day in Brussels in November. In Brussels, we have introduced a COST Office Seminar series in which we hosted a series of talks delivered by senior people from various institutions to which we invited colleagues from the Council, the European Commission, IGLO and other research organisations based in Brussels. In 2004, we held seminars on EUREKA, the NEST Programme (FP6), INTAS, the Japan Society for the Promotion of Science (JSPS) Cooperation Initiatives, NATO – security through science, Canada – Europe links in S & T, and ERA-NET within FP6. Considerable effort was also given to the improvement of the Web site in content and design which should bear fruit early in 2005.

In summary, 2004 has been an intensely active and exciting year for COST and for the COST Office. For us all in the Office, we have taken satisfaction from seeing our efforts help COST in regaining its impetus which will lead, in turn, to an enhanced role for COST in the European Research Area.

For myself, I am proud to have been associated with this most exciting time.

Tony Mayer
Director, COST Office



The COST Day

On 30 November 2004 the COST DAY was held in Brussels in order to present COST past and current achievements in a wide variety of research activities and to discuss future plans and the role of research networking, in general, and of COST, in particular, in the development of the European Research Area (ERA).

The welcome address was given by Mr. Philippe Busquin, former European Commissioner for research and now a member of the European Parliament, who highlighted the need for the scientific community to get its voice heard in the political world with initiatives like the COST DAY, promised COST researchers to be their spokesperson at the European Parliament and expressed the conviction that the barriers between the Commission and organisations such as COST should be removed.

Professor Francesco Fedi, President of the COST Committee of Senior Officials - the highest strategic and decision-making body of COST- illustrated "30 years of European success of COST in Science and Technology" underlining the evolution, the peculiar characteristics, the structure and the role that COST can play in the future research policy of the European Union. Professor Fedi said that "COST is one of the cornerstones of the European Research Area. Its extensive researcher-driven networks have had an enviable record of success for more than 30 years. It leverages huge research investment in Europe and brings together several tens of thousands of researchers. COST will demonstrate its success on the COST Day. I believe very strongly that COST has to continue and that it must receive strengthened financial support from the EU Framework Programme in the future in order to fulfil its role in the ERA, as recognised recently by the Competitiveness Council of Ministers of the EU".

Professor Bertil Andersson, Chief Executive Officer of the European Science Foundation (ESF), presented his views on the synergy between COST and ESF, the two most important scientific inter-governmental and inter-agency networks at the disposal of the European scientific community. Both organisations are changing in order to reflect the changing needs of the research community. It was also based on a three way partnership between COST, ESF and the European Commission. COST needed an assurance of strong and continuing funding in order to meet the requirements for research networking across the wider Europe.

Eminent speakers from across Europe who have been involved in COST research networks presented a sample of the COST outstanding achievements in various fields illustrating the breadth of COST's activities. In the session on "COST Advances Science", new developments in molecular chemistry giving new molecules for green chemistry to ensure a sustainable development were shown. Such basic research also has an economic side as companies respond to these developments. The second aspect of basic research within COST illustrated work on brain repair, bearing in mind the impact of Alzheimer's and Parkinson's diseases on our demographically ageing society. The second session on "COST Working for Society" included long running work on policy and standardisation for access to transport for the impaired and encumbered. A second presentation in this session illustrated the multi-disciplinary aspect of COST in the use of new, advanced chemical and physical techniques in analysis and restoration of art works and museum objects. This provides a bridge between chemists and physicists and conservators. It is particularly relevant given the renewed emphasis across Europe in cultural heritage. This was followed by a session on "COST supporting industry". The first talk demonstrated the role of COST in setting standards for the GSM system – a European industrial success. The second theme demonstrated new bio-control methods in agriculture. This is not only important economically for the farming industry, but is more environmentally friendly and, through links with SMEs, is providing support for the development of new industries in Europe. Finally, the session on "COST helping the environment" demonstrated previous work which had led to the establishment of the European Centre for Medium-range Weather Forecasting (EMCWF), one of the key developments resulting from a COST Action. EMCWF now provides forecasts for many days ahead for the benefit of European industry and society. The final talk again showed the inter-disciplinary nature of COST in applying industrial economic methods in the life cycle analysis to forestry.

The concluding remarks were given by Ms Pia Elda Locatelli, Rapporteur for the Committee on Industry, Research and Energy (IRE) of the European Parliament on the Commission's communication of June 2004 concerning the future EU policy to support research. In her conclusions, Ms Locatelli, who represented the Chairman of the IRE Committee, Mr Giles Chichester, noted that COST had already submitted its comments on the Commission's Communication and that these comments will not only form an

important input to the Commission but also a valuable document for the report of the European Parliament; that the ERA needs to be consolidated by the networking of active researchers across the whole of the "new" Europe and that COST has to continue and intensify its activities, especially with its flexible and, more importantly, open approach; that competition and excellence at a continental level can only succeed if we have strong community of researchers across Europe and that this means not only an increased national investment but a real strengthening and consolidation of the research base, for which the research networking provided by COST is essential; that COST clearly needs to be adequately supported in proportion to the proposed increase for the Framework Programme; that the COST Day has demonstrated the strength of COST and its vitality and importance for the achievement of the ERA; and

that COST has a strong future in the new vision of research in Europe and that European Parliamentarians welcome this.

The COST DAY, which also included general exhibition material on the work of COST, was attended by over 170 participants, among whom were several eminent representatives from the Council of the European Union, the European Commission, The European Committee of the Regions, the permanent representations to the EU, from EUREKA, ESF, the European Environment Agency and other scientific bodies and by the members of the COST Committee of Senior Officials and of the COST Technical Committees.



Programme

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09.30	Registration and Coffee	
10.00	Introduction to COST - Session Chair: Professor Francesco Fedi	
	<ul style="list-style-type: none"> ■ Professor Francesco Fedi President COST Committee of Senior Officials (CSO) 	"COST: 30 years of European success in Science and Technology"
10.30	Professor Bertil Andersson Chief Executive, ESF	"COST and the European Science Foundation"
10.45	Coffee break	
11.15	Mr. Philippe Busquin Member of the European Parliament and former European Commissioner for Research	"Special Address"
11.30	COST: Advances in Science - Session Chair: Professor Francesco Fedi	
	<ul style="list-style-type: none"> ■ Professor Martyn Poliakoff: University of Nottingham, United Kingdom ■ Professor Thomas Herdegen: University of Kiel, Germany 	"Green Chemistry" "Brain Repair"
12.15	COST: Working for Society - Session Chair: Mr Miloslav Ransdorf, Vice-Chair, Committee for Industry, Research & Energy, European Parliament	
	<ul style="list-style-type: none"> ■ Ms. Ann Frye: Dept. for Transport, UK Mobility and Inclusion Unit 	"Accessibility of Public transport for disabled people"
12.45	■ Professor Mieke Adriaens: University of Ghent, Belgium	"Cultural heritage"
13.15	Lunch	
14.30	COST: Supporting industry - Session Chair: Mr Miloslav Ransdorf	
	<ul style="list-style-type: none"> ■ Professor Luis Correia: Technical University of Lisbon, Portugal ■ Dr. Ralf-Udo Ehlers: University of Kiel, Germany 	"GSM-Setting European Standards" "Bio-control symbioses for Agriculture"
15.30	COST: Helping the environment - Session Chair: Professor Bertil Andersson	
	<ul style="list-style-type: none"> ■ Dr. Jean Labrousse: Ex-Director Météo-France, France 	"European medium-range weather forecasting"
16.00	Tea Break	
16.45	■ Professor Arno Frühwald: Federal Research Centre for Forestry and Wood Economics, Germany	"Life cycle analysis for Forestry"
17.15	Signora Pia Locatelli Rapporteur, Committee for Industry, Research & Energy, European Parliament	"Concluding Remarks"
	Professor Francesco Fedi	"Closing"
17.45	Press Conference	
18.00	Reception	



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Actions completed in 2004

Telecommunications and Information Science and Technology

■ Action 263 - Quality of Future Internet Services

1998 - 2004 Chair: Pr Mihail Smirnow (DE)

Signatories: BE, CH, DE, ES, FI, FR, GR, HU, IT, NL, PT, RO, SE, SI, UK

The main objectives of the Action were to:

co-ordinate and provide appropriate focus, from a European perspective, to concerted actions among European organisations and research groups active in the field of the Quality of Services (QoS) for the Internet. This included support for existing events and the establishment and maintenance of a programme in this area, aiming at research, technical and engineering improvements of the quality of existing and emerging Internet services.

The Action successfully established a very strong European network of research organisations involved in Internet QoS research and the participating groups have achieved a global recognition for their collective work in the field. In particular, the Action provided Europe with the opportunity to take the lead in standardization in the context of the Internet Engineering Task Force (IETF) working groups on QoS.

The Action also established a recurring series of conferences on the topic, which has brought together global expertise in the field for exchange of results and consensus making. In turn, this has provided more critical mass and contributed to dissemination of emerging results to industry for exploitation in these emerging services.

The publication of the final report of the Action as a book by Springer further contributed to the dissemination and impact from the work. The work of the Action continues within the IST Network of Excellence, eNext, in FP 6.

In conclusion, the Action succeeded in both achieving its objectives and successfully transforming itself into a Network of Excellence under FP6 (together with Action 264). This is a very good achievement for COST in general and the Action in particular, and demonstrates the added value of COST as a framework for building up strong networks of researchers in Europe.

■ Action 269 - User Aspects of Information and Communications Technology

1999 - 2004 Chair: Ms Annevi Kant (SE)

Signatories: AT, BE, CH, DK, ES, FI, FR, IE, IT, NL, NO, RO, SE, SI, UK

The main objectives of the Action were to study and analyse ICTs usage and users, with emphasis on communication, in order to increase knowledge of how and why a person incorporates or rejects ICT products and services into his/her daily life.

The Action coordinated a high level of multidisciplinary activity in this area. It has brought together an eclectic group from different disciplines in the social sciences and engineering.

A specific highlight was the conference "Good Bad Irrelevant", held on 3-5 September 2003 in Helsinki, with around 150 attendees. It brought together a range of researchers from around the world, who as well as delivering their own work,

were challenged to identify the priorities for future research (see <http://goodbad.uiah.fi>). In the discussion forum a delegate concluded: "the Good Bad Irrelevant is one of most interesting events I attended ... I hope the good, the bad, and the irrelevant in information systems would remain a concern for the conference. If future conferences should help to enhance the good of information systems, transform the bad of the information systems, and drop the irrelevant, it will be wonderful".

Throughout the Action dissemination activity was high and a number of papers were published (see www.cost269.org). The final report of the Action will comprise the publication of at least two books, now under preparation.

■ Action 271 - Effects of Upper Atmosphere on Terrestrial and Earth-Space Communications

2000 - 2004 Chair: Pr Bruno Zolesi (IT)

Signatories: AT, BE, BG, CS, CZ, DE, ES, FI, FR, GR, HU, IT, LV, PL, PT, TR, UK

This Action's objectives were to perform studies to influence the technical development and the implementation of new communication services, to develop methods and algorithms to predict and to minimize the effects of ionospheric perturbations and variations on communications and to ensure that the best models over Europe are made available to the ITU-R, to collect additional and new ionospheric and plasmaspheric data for now-casting and forecasting purposes and to stimulate further cooperation in the domain of ionospheric and plasmaspheric prediction and forecasting for terrestrial and Earth-space communications, including interactive repercussions on the corresponding standards in this field, taking into account users present and future need.

COST Action 271 was the third in a series of very successful actions in the field of radio wave propagation in the ionosphere. The expanding need for new communications services, especially those involving ionospheric HF communications, satellite communications and navigational systems, imposes increasing demands for the continuous monitoring and better understanding of propagation effects imposed by the Earth's upper atmosphere that play important roles in determining the characteristics and reliability of radio systems.

In this respect, specific needs have been identified and dealt with in detail, the results include:

Development of several databases and real-time, near real-time and historical broadcasting data facilities (EISCAT at the University of Grenoble, France, ionospheric forecasting and nowcasting at the regional Warning Centers at Warsaw and RAL, United Kingdom, TECADA at DLR, Germany, etc.).

Development of models for other communities of users (Ionospheric model developed by DLR for the GNSS EGNOS Test Bed, NeQuick model developed by the University of Graz, Austria, and the Abdus-Salam Institute of Trieste, Italy, for Galileo ionospheric corrections, and others).

The occurrence of gravitational waves due to in-situ effects (such as those with solar terminator origin) follows a relatively regular pattern and could be included in future prediction models for users.

The transmission of information, such as images, using the ionospheric channel has been significantly improved and tested.

An important part of the work dealt with the relevant, i.e. ionospheric, aspects of Space Weather. As a consequence, close contact has been maintained with Action 724 of the COST Meteorology domain (Developing the scientific basis for monitoring, modelling and predicting Space Weather), in order to avoid duplication and, at the same time, to use the obvious synergy effects.

The results have been widely disseminated. More than 150 scientific papers have been published in international journals with impact factor. The proceedings of three international workshops have been published separately. The Final Report of the Action has been printed as a supplement to the key Journal "Annals of Geophysics" with a wide distribution.

In summary, COST Action 271 provided very useful results for the entire field of ionospheric radio wave propagation. Moreover, by means of its collaborative studies it has been very successful in keeping together a large group of researchers who collectively represent most of the available European expertise on upper atmosphere effects with respect to radio systems.

Transport

■ Action 347 - Improvements in Pavement Research with Accelerated Load Testing

2000 - 2004 Chair: Mr Gregers Hildebrand (DK)

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

The main objective of the Action was to develop a European code of good practice to optimise the use of Accelerated Load Testing [ALT] facilities and improve the application of results from these facilities.

There are only about 40 ALT facilities around the world. Many of the ones located in Europe are owned by the member organisations of FEHRL (Forum of European Highway Research Laboratories), which can influence and enhance coordination of their use and cooperation in the application of results.

COST Action 347 successfully developed a common code of good practice, which can be applied universally, improve the efficiency and quality of ALT work and harmonise the use of obtained results. Experts defined new fields for future application of ALT in the pavement research.

The main form of dissemination of the COST 347 results was a regular (twice a year) published newsletter, accessible via internet (address <http://www.pave-test.org/public.htm>) to all interested experts.

Close cooperation was established with the Transportation Research Board (research programme supported by the U.S. government), which enabled the COST experts to participate in the TRB Committee AFD40. Thanks to this collaboration, the COST results were presented several times at the annual TRB Conferences, the world's most prestigious transport research event.

Materials

■ Action 523 - Nano-structured Materials

1998-2004 Chair: Pr Heinrich Hofmann (CH)

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

The main objective of the COST Action 523 was the development of nanostructured materials with new and unique structural and functional properties in European industries, combined with fundamental research in order to solve technological problems which are at the origin of the present limited commercial diffusion of these materials.

These very broad aims were encapsulated in a single task that can be seen as attempt "to enhance scientific understanding of nanostructured materials". The term "nano" was strictly defined as applying to materials whose novel properties are determined by features between 1 and 100nm.

This COST Action was created from a group of researchers who worked in the field of nanomaterial (European Consortium for Nano-Materials, ECNM) and which was the first organised group in the field of nanomaterials.

This Action was the first research programme at European level in nanomaterials. Later, substantial activities were initiated in the 5th and 6th EU Framework Programmes using the Action as an incubator and in the ESF EUROCORES Programme.

In view of the fundamental nature of the approach in this Action, the main outcome has been the strengthening of scientific foundations for understanding nanomaterials. One such example was the demonstration of self-organised growth.

Environment

■ Action 622 - Soil Resources of European Volcanic Systems

1998-2004 Chair: Dr François Bartoli (FR)

Signatories: BE, DE, ES, FR, GR, HU, IS, IT, NL, PT, SK, UK

Soil belongs to most valuable natural resources and they are much more vulnerable to environmental hazards than air or water resources. Although the soil degradation is usually a rather slow process and it does not have direct effect on human health, its impacts are long lasting and often practically irreversible in time scale of man's life. Due to their more dynamic character, air or water can be contaminated quickly. In turn, they can also be cleaned up quicker than soil when the polluting factor is eliminated. The cleaning of contaminated soils usually needs many decades and the remediation of soils destroyed by processes such as erosion and salinisation is normally almost impossible. Millions of hectares of soils have been completely destroyed and abandoned by man during the relatively "short" history of human civilisation. This catastrophic process especially affected the Middle East and Mediterranean Region and, thus, it is one of the most important environmental problems affecting the EU. Soils of volcanic areas are those most endangered by degradation, due to their unique characteristics. On the one hand, they occur in mountainous areas, on the other hand they are very fertile and intensively utilised even if located on slopes where forests would usually occur in non-volcanic areas.

Soils result from very complex and long lasting developments in which many processes take part with many mutually interfering factors. As a result, soils are geographically very variable. This variability was not fully understood as many

countries in Europe still use national and locally based soil classifications. It enables them to express the local soil variability much better than any international classification, but on the other hand it makes international comparison difficult. The understanding of volcanic soils is even more difficult as the volcanic areas are isolated and each such region has very unique conditions. Thus, land management of volcanic areas is one of the most crucial problems of land management in many European countries. COST Action 622 was a very important initiative at this field. It started from basic research and elementary understanding of the volcanic soils at the level of soil morphology, soil genesis and soil classification, continued with applied aspects of land evaluation, vulnerability and risk assessment, conservation and amelioration measures and finished with overall land management strategy and practical recommendations for policy makers. The main scientific output of the COST Action 622 is the first international inventory of the knowledge on volcanic soils at a European level, transforming the national information to a compatible form with verification of its validity. This inventory of knowledge will be presented in a book "Volcanic soils in Europe" which is in preparation and will be published by Springer Verlag. Another important output is the first map of volcanic soils of Europe. Two special issues of the international journals *Catena* and *Geoderma* provide the results presented at workshops of COST Action 622 (in total 24 scientific papers) and many other papers with international authorship emerging from the network of COST Action 622 were published in the scientific literature. Finally, a land management strategy for volcanic areas with practical recommendation for land use policy which will be published as a comprehensive guidebook.

■ **Action 624 - Optimal Management of Wastewater Systems**

1998-2004 **Chair: Pr Mogens Henze (DK)**
Signatories: AT, BE, CH, CY, DE, DK, ES, FI, FR, GR, HU, IE, IT, LU, LV, NL, NO, PT, RO, SE, SI, TR, UK

Water resources, together with air quality, are two of the most important environmental issues. Water is most vulnerable to contamination by pollutants and its contamination has a direct effect on human health. Improved management of water resources may bring a positive effect rather quickly.

Many COST Actions have been dedicated to various environmental aspects of water resources management since the beginning of COST. Action 624 was one of the largest. Its importance is demonstrated by the exceptional interest shown by participating scientists. Wastewater treatment is an important and most demanding issue of water resources management in most European countries. Therefore, coordination at international level is very important. It helps to avoid duplicity in research, increases its efficiency and improves the balance of coverage of all relevant research aspects of wastewater treatment.

COST Action 624 focused on the optimisation of wastewater management by increasing the knowledge of microbial processes and by implementation of integrated plant wide control based on a description of the entire wastewater system. This provides new concepts for dealing with wastewater in the future and moves society on its way towards sustainable society development.

COST Action 624 created a unique network in Europe within its topic. Almost all major research institutes and universities have participated. More than 300 scientists from 23 countries have attended 33 scientific events organised in the frame of the Action. The results presented at these meetings were published in various international journals. In total 29 papers with international authorship resulting from Action 624 have been

published. The results achieved within COST Action 624 had a significant influence at a global scale and helped European scientists to achieve the world leadership at the field of the optimal management of integrated wastewater systems. The research network created by COST Action 624 is sustainable. A follow up of these activities is reflected in the new COST Action 636 "Xenobiotics in Urban Water Cycle".

Meteorology

■ **Action 715 - Urban meteorology applied to air pollution problems**

1998-2004 **Chair : Pr Bernard Fisher (UK)**
Signatories: AT, BE, BG, CH, CZ, DE, DK, ES, FI, FR, GR, HU, IE, IT, LT, NO, PL, PT, UK

Urban pollution meteorology is characterized by a number of fundamental parameters (wind speed, mixing layer depth etc.) and their evolution in time. Action 715 increased the knowledge of, and the accessibility to, the main meteorological parameters which determine urban pollution levels. It concluded with recommendations on the best way of using routine meteorological information in air pollution assessments. The focus on the European aspects of urban areas problems is new. Valuable scientific information can now be added to the models for European cities. In the past such models were not always applicable to European conditions. The Action stimulated very important scientific programmes and experiments including FUMAPEX, which is a successful FP5 project. Finally, Action 715 addressed one of the key issues of urban policy in Europe which has formed the basis for the follow up in two further COST Actions. The Final Report of the Action is in print and should be available in May 2005.

■ **Action 716 - Exploitation of ground-based GPS for climate and numerical weather prediction applications**

1998-2004 **Chair : Pr Gunnar Elgered (SE)**
Signatories: AT, BE, CH, CZ, DE, DK, ES, FI, FR, HU, IT, NL, NO, SE, UK

Action 716 dealt with the assessment of the operational potential on an international scale of the exploitation of a ground-based network of GPS receivers to provide near real time observations for Numerical Weather Prediction and climate applications. The Action succeeded in developing and demonstrating a prototype system with a data exploitation scheme for Numerical Weather Prediction models and analysis of data exploitation techniques needed for climatic applications. An implementation of BUFR format for GPS data was developed for data communication, and was approved by World Meteorological Organisation. A further proposal was prepared for a European Meteorological Network Programme for operational use of GPS data.

The Final Report of the Action is in print and should be available in May 2005.

■ **Action 717 - Use of radar observations in hydrological and NWP models**

1999-2004 Chair : Dr Andrea Rossa (CH)
 Signatories: AT, BE, CH, CY, CZ, DE, DK, ES, FI, FR, GR, HU, IE, IT, NL, NO, PL, PT, SE, SI, UK

The general objective of the Action – to examine and define the requirements on European radar data for their use in Numerical Weather Prediction and hydrological models, in order to increase the level of management of river flow in rural and urban catchments brought together radar engineers, meteorologists and hydrologists. They initiated a European-wide action to homogenise procedures related to radar data. This effort continues beyond the duration of the Action in EUMETNET's OPERA initiative. The Action acted as a nucleus for follow on work in COST Action 731, which is focused more on the quality and uncertainty of meteorological observations, along with their impacts on hydro-meteorological outputs from advanced forecast systems. The Action also made a major contribution to the genesis of series of European Conferences on Radar Meteorology, which became one of the main channels of the dissemination of the results.

Agriculture and Biotechnology

■ **Action 839 - Immunosuppressive viral diseases in poultry**

1998-2004 Chair: Dr Thierry van den Berg (BE)
 Signatories: AT, BE, CY, CZ, DE, DK, ES, FI, FR, HR, HU, IE, IL, IS, IT, NL, NO, PL, SE, SI, UK

This Action focused on Infectious Bursal Diseases (IBDV) and Chicken Anaemia (CAV), two important viral diseases in poultry production.

An evaluation of the economic impact of these viral diseases on the poultry industry in the participating countries was performed but complicated by the multifaceted nature of the infection and by lack of tools, for example, serology can not differentiate between infected and healthy (vaccinated) flocks.

Recommendations and guidelines concerning vaccines were developed for the European Agency for the Evaluation of Medicinal Products (EMA) in London. These recommendations were key factors in the recent update and changes of the monographs of IBDV and CAV.

The scientists participating in this Action produced a handbook with state-of-the-art knowledge and recommendations for future research and current practices, providing guidelines for the Office International de Epizooties-Paris (OIE) and the EU.

The network resulted in standardisation of tools and nomenclature. One of the results is an annual ring trial for serological tests with 96 laboratories participating. In addition, one ring test on bursal lesions scoring was completed in all the participating countries in the Action.

Attention was paid to the transfer of knowledge and technology, especially to the poultry industry. A total 14 companies participated in this Action.

■ **Action 840 - Bioencapsulation Innovations and Technologies**

1999-2004 Chair: Pr Denis Poncelet (FR)
 Signatories: AT, BE, CH, CS, CZ, DE, ES, FI, FR, GR, IE, IL, IS, IT, NL, NO, PL, SE, SI, SK, UK

The main objective of the Action was to develop the bioencapsulation methods in view of their transfer and development in agricultural and industrial applications. Implementing new bioencapsulation methods and processes requires vast interdisciplinary knowledge and expertise and consequently collaboration among laboratories is essential. The results of this Action have mainly been gathered and spread through their website. The website was developed to collect datasheets on different materials and bibliographical references.

Round robins were organised to send to the participants microcapsules, prepared in different research groups, to evaluate the microcapsules in function on their permeability and mechanical resistance.

All the information obtained via the website and in the round robins was brought together and unified and then rules were defined to apply realistically and efficiently bioencapsulation to agriculture and industrial applications. This includes classification of microencapsulation technologies.

Spreading of the information and results was through the website by giving access to protocols and datasheets as a sort of Technological Encyclopedia on bioencapsulation.

The members realised in cooperation 42 papers on different subjects of the COST Action and 9 EU-projects were approved and were started up by the participants during this COST Action.

Food Sciences

■ **Action 919 - Melanoidins in food and health**

1999-2004 Chair: Pr Jennifer Ames (UK)
 Signatories: AT, BE, BG, CZ, DE, DK, ES, FR, IT, NL, NO, RO, SE, SI, UK

The main objective of the Action was to increase the knowledge regarding the structure of melanoidins and related molecules in different food systems and to develop knowledge concerning the function of melanoidins and related molecules in food.

The past five years showed substantial scientific progress in all areas of the Action. Many participants in the Action have shifted their research over the last 5 years from traditional food science towards research with health drivers (in line with FP6 priorities) and the COST network has facilitated this shift. The Action has resulted in increased scientific cooperation across Europe, including non-EU countries.

The activities in this Action were focused mainly on the standardisation of methods and in finding best procedures. A large number of methods were evaluated for assessment of the antioxidant capacity of standard melanoidins and foods. A procedure for the preparation of standard melanoidins from glucose and glycine was developed and laboratories involved looked for the best procedure to separate the standard and food melanoidins.

The main products studied were coffee, beer and bread crust. Many companies, especially coffee companies, showed their interest in this Action and participated actively.

Four volumes of proceedings of this COST Action have been published; scientists participating in this Action were invited to the International Maillard Symposium, held every 3-4 years, to present their activities. In these international Symposia,

held in both the USA and Japan, the COST Action created considerable interest.

Social Sciences and Humanities

■ Action A15 - Reforming social protection systems in Europe

1999-2004 Chair : Pr Denis Bouget (FR)
Signatories : AT, BE, CH, CZ, DE, DK, ES, FI, FR, GR, HR, HU, IE, IT, LT, NL, NO, SE, 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)

■ Action A16 - Policy and regulatory responses to the use of electronic communication technologies by transnational communities in Europe

1999-2004 Chair : Dr Bart Cammaerts (BE)
Signatories : AT, BE, DK, ES, FI, HU, IE, NL, NO, SI, UK

The main objective of the Action was to increase understanding of how internet-based media and communication technologies affect the formation and proliferation of transnational communities, and how public policies and regulation enable, or hinder, this process.

The Action successfully provided a platform for continuous communication and co-operation between researchers who already knew each other or who were getting in contact for the first time. It brought together different perspectives and led to better understanding of transnational communities and their relationship with media and policy. In this way, it created a more coherent and interconnected group of European researchers and research units in the field.

Over time, the Action developed from a predominantly legal perspective to embrace a sociological and social science based approach. It also proceeded from nationally and conceptually disparate analyses to common projects with a strong emphasis on generalising, comparing and theorising.

The Action has published significantly on such topics as civil society participation in international decision-making and the media cultures of diasporic and migrant minorities in the West. A forthcoming book will feature papers by Action members organised around the two main research themes of

“transnational civil society communities” and “transnational diasporic communities”.

A successful final conference by the Action in Helsinki in May 2004 further contributed to future European research co-operation in the field.

Medicine and Health

■ Action B10 - Brain Damage Repair

1998 - 2004 Chair: Pr Roland Pochet (BE)
Signatories: AT, BE, CH, CS, CZ, DE, DK, ES, FI, FR, HR, HU, IE, IS, IT, NL, NO, PL, PT, SE, SI, SK

The main objective is to increase knowledge of the processes of successful repair of deficits or inflicted damage to the central nervous system to a level which will allow repair, or significant improvement, especially in relation to human cognitive and mental functions.

The principal output of this Action has been the publication of a book on Functional Recovery which was distributed to 300 major European laboratories. It is anticipated that this may become the standard reference text in this field.

This book on brain damage and repair bridges between clinically oriented neurobiology and clinical neurology. And is addressed to both, scientists and doctors, students and professors. The novelty of the book is based on its coherence and the undertaking of various aspects on neurodegeneration and neuroregeneration. There is a straightforward logic which guides the reader from molecular particularities of the brain to the molecular scenarios of points of resistenciae minoris. These molecular aspects are integrated into their position within an acute or chronic neurological disease. The Action also addressed juridical problems of transplantation, patentation and genetic analysis, on the harmonisation of neurological research and on the summing up of relevant multicentre studies.

In addition, Action B10 launched two pilot experiments:

a. DATABASE/THESAURUS containing names and full coordinates of 572 European researchers within Neurosciences linked to 42.941 scientific articles with abstract and full references. This instrument may be used as “real time” bibliometric instrument. Accessible on the web page; <http://braindamagerepair.hiim.hr>.

b. Dictionary for neurosciences in 15 different European languages

34 Short Term Scientific Missions were performed by young scientists assuring an active exchange of information and experience between the European laboratories participating in the network and stimulating the development of a new cadre of researchers.

■ Action B13 - Low Back Pain: Guidelines for its Management

1999 - 2004 Chair: Dr Mauritz van Tulder (NL)
Signatories: AT, BE, CH, DE, DK, ES, FI, FR, IL, IT, NL, NO, SE, UK

Common low back pain (LBP) is the pain between the costal margins and the inferior gluteal folds; it is influenced by physical activities and postures, usually accompanied by painful limitation of motion, frequently associated with referred pain and not related to fractures, spondylitis, direct trauma or systemic conditions (neoplastic, infectious, vascular, metabolic or endocrine-related).

The LBP has a wide range of possible causes (discal protrusion or strains, sprains, joint degeneration, etc.) and in most cases has unknown origins.

The social and economical impact of LBP is enormous, since it affects more than 70% of the general population sometime in their life; 17-31% of general population are suffering from LBP at any one time. LBP has an important economic impact, because it is associated with high rates of sick leave and disability pensions.

However, over the last 20 years, the frequency of LBP has stabilised; the Action has assisted in the quality and quantity of LBP research and useful results for LBP management have been obtained:

- Misconceptions have been identified (bed rest is deleterious, activity is useful, prognosis is influenced by duration –not severity- of pain, fear worsens disability more than pain);
- Some traditional treatments have shown to be useless or deleterious (bed rest, traction, surgery when not strictly necessary);
- New treatments have been developed and have shown to be effective and safe (keeping as active as possible, treatments aiming at changing beliefs and attitudes)

At the same time results obtained at research level have generally not been transferred to clinical practice.

Therefore, it is hard for a clinician to remain correctly updated since too many papers, most of them of bad quality, with contradictory results are published especially in relation to non-clinical aspects (statistics, epidemiological design)

The development of the pan-European Clinical Guidelines for LBP resulting from this Action are aimed at helping clinicians to make their decisions and such “evidence based” clinical guidelines will promote the transfer of research into clinical practice by:

- Giving recommendations that should be clear and applicable (i.e. clinically meaningful; “do” or “do not” for a specific scenario)
- Basing those clinical recommendations on the best available evidence (and identifying those recommendations for which no evidence is available and have been based on consensus)
- Using standards on how a clinical guideline should be developed (“agree collaboration”)
- Covering all the spectrum (prevention, acute and chronic patients)
- Having available updated and evidence based guidelines , with no language biases (including evidence in several COST languages)
- Being of a multidisciplinary and multinational character (better prepared to resist local, national or professional biases)
- Being nationally or locally adaptable: It defines the “gold standard management” in ideal conditions and health authorities can apply the recommendations to local or national available resources.
- Including “state of art” recommendations (identifying those based on “strong”, “moderate” or “limited” evidence, and those based on consensus because no evidence was available)

An English version is now available on COST B13 Website <http://www.lowbackpainEurope.org>.

National working groups have been encouraged to translate the guidelines into their own languages and adapt them to their specific setting, offer them for endorsement to local and national health authorities and professional bodies, and work to implement their use in practice.

■ Action B15 - Modelling during drug development

1998 - 2004 Chair: Pr Luc Balant (CH)

Signatories: AT, BE, CH, CZ, DE, DK, ES, FI, FR, GR, IL, IT, MT, NL, NO, PT, RO, SE, SK, TR, UK

The aim of this Action was to improve the accuracy of predictions based on the scientific information gathered during the development of new drugs to ensure that they are both efficacious and safe and are also sustainable

A position paper was published in the European Journal of Pharmaceutical Sciences about modelling in phase I studies and simulation in clinical drug development. This particularly underlined the interest of the topic within the pharmaceutical industry.

An expert meeting on “In vitro Prediction of Gastrointestinal Absorption and Bioavailability” discussed the state of the art, problem areas and future directions in predicting the absorption of drugs and other chemicals following exposure via the oral route. Invited experts from industry demonstrated the importance of this topic in pharmaceutical R & D and the Action produced a consensus paper which has been published in the European Journal of Clinical Pharmacology.

An expert meeting on “In silico Prediction of Pharmacokinetics” demonstrated, and evaluated six software packages used by various producers. This resulted in a position paper which has been published in European Journal of Pharmaceutical Sciences.

A debate took place on “In vitro approaches to predict kinetics and dynamics in vivo with input Molecular Approaches to the Identification of Biomarkers of Exposure and Effect” extensively covered the use of the main ‘omics’ approaches to identification, selection, and validation of biomarkers.

The Action also addressed the topic of “Validation of in Silico Approaches to the Prediction of Gastrointestinal Absorption and Drug Metabolism” and outlined potential and promising prerequisites and approaches to the validation of in silico methods from points of view of drug and chemical industry, regulatory agencies and academia. All participants, whether from academia, regulatory bodies or drug or chemical industry, were of the opinion that the meeting was timely and useful. A draft position paper was prepared.

The final output of the Action B15 will be the publication of a special issue of the basic and clinical pharmacology and toxicology in 2005 in which the main results obtained by the network will be published.

Urban Civil Engineering

■ Action C8 - Best practices in Sustainable Urban Infrastructure

Duration: 1998-2004

Chair: Mr Pekka Lahti (FI)

Signatories: AT, BE, CH, CY, DE, DK, ES, FI, FR, IT, NL, NO, PT, SE, SI, UK

The Action’s main objective was to develop better solutions for sustainable urban infrastructure by exchanging experience, assessing different solutions, developing methods to assess various solutions and promoting the diffusion of best practices concerning sustainable urban infrastructure.

The secondary objective was to achieve a common understanding on sustainability and related criteria for decision-making in urban planning and design dealing with infrastructure.

The beneficiaries of the Action results were local authorities, urban planners and designers and other urban practitioners from all European countries, who were provided with new

information, visions and insights concerning sustainable solutions in urban infrastructure.

The Action organised or participated at several major workshops (20-22 Sept. 1999, Stockholm; COST UCE Conference "The Future of the City, New Quality for Life", Bled, Slovenia, 14-15 Sept. 2001; C8 Final Conference, 6-8 November 2003, Trento, Italy), which were also opened to experts from non-participating countries. The importance of the papers was recognised by their publication in a special issue of the international scientific journal *The Environmental Impact Assessment Review* (Elsevier). The Action was promoted at a worldwide level at the 20th Annual Meeting of the International Association for Impact Assessment (IAIA) in Hong Kong in June 2000.

The final scientific report as a handbook gives an overview of the theories, methods and tools used and includes a selection of some 50 case studies representing the best practices in sustainable urban infrastructure with recommendations emerging from these studies.

■ Action C9 - Processes to Reach Urban Quality

1999 - 2004 Chair: Pr Tom Muir (UK)

Signatories: AT, BE, CH, CY, DE, DK, ES, FI, FR, IT, LV, NO, SE, UK

The objective of this Action was the development and diffusion of knowledge about the establishment of major urban projects with the proper interaction with economic and social actors.

The Action's approach to the definition of "urban quality" led to a set of case studies, which might give an appropriate response in different situations. It was a successful strategy, as it allowed the Action to have considerable freedom in accepting a wide variety of issues without having an artificially contrived 'straight jacket' within which they had to be fitted.

The quality of the urban environments substantially reflects the unique set of circumstances with which they exist. Any definition of this kind would be a degree of conflict between those who preferred a more physical, design-orientated approach as opposed to those with a more process, socio/economic/political approach.

One conclusion of the Action was that quality therefore becomes a negotiated element, where the interests of all those concerned are taken into consideration and the inevitable result will be exactly what might be expected, a compromise which incorporates something of everyone's wishes, but no-one gets all they wish for.

Public administrations as well as architects, planners and engineers are aware that in order to achieve quality of environmental and living conditions in large new urban projects, the traditional planning tools need to be reconsidered, particularly using: new methods of interdisciplinary work and interaction amongst sectors within the public administration, innovative models of cooperation between the public and private sector, new ways of involving the stakeholders in the process, flexible ways for adapting process and project to the ever-changing context.

■ Action C10 - Outskirts of European Cities: Understand Better, Govern Better

1999 - 2004 Chair: Ms Genevieve Dubois-Taine (FR)

Signatories: AT, BE, CH, CY, DE, DK, ES, FI, FR, IT, NO, SE, SI, UK

The primary goal of the Action C10 was to foster the understanding of the processes of "outskirtisation" through case studies in eleven agglomerations and the understanding

of the relation between urban growth and urbanization. In all cities urban growth reorganised the geography, the functions and the management of agglomerations. The centre of cities (generally studied in many researches on European cities) decreases in importance and all the functions are redistributed throughout the periphery.

The main concept was the interaction between hubs, nodes, neighbourhoods, infrastructures, green areas in evolving cities. Confronted with this urban explosion, the Action showed new attitudes, new perceptions and new governance which proved the necessity for a change in planning policies. Outskirts found their own identities and shape in the networked urban regions.

The Action showed that a complete rethinking of urban management was necessary, based on coherent strategies and coordination. This form of management requires better information systems in a network based society and a system of evaluation.

The Action results are very well evaluated by the professionals working in this field. However a need for further Europe-wide research, dealing mainly with the social aspects of the urban outskirts, has been recognised and the group of C10 experts is now preparing a project with such focus.

■ Action C11 - Green structure and urban planning

2000 - 2004 Chair: Mr. Bernhard Duhem (FR)

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

The main objective of the Action was to reach a better understanding of the role played by planning, design and management in the interactions between green and built-up areas, improving the way green areas contribute to the quality of life of urban citizen, to the quality of habitats as a basis for biodiversity and to other aspects of sustainable urban development.

This topic needed a multidisciplinary approach, due to the diverse qualities and uses of green-structures, for human leisure, habitats for plants and animals, microclimate conditions, flows control, space organisation.

Each meeting was an opportunity for technical visits and open seminars with local experts. The Final Seminar in Ceske Budejovice (CZ) in December 2004 gave the opportunity to discuss these results with new experts, some of them coming from the cities, which had hosted previous meetings. This seminar was also a starting point for dissemination.

Participants to the Final Seminar recognised a number of concrete gaps (mainly linked to lack of legislative tools for the use of urban and suburban green structures for citizens' well-being) in the existing planning schemes and decided to use the established network for preparation of a new proposal for a research project, either within the EU Framework Programme or in COST, focused on solutions of these problems.

■ Action C14 - Impact of wind and storm on city life and built environment

2000 - 2004 Chair: Pr Claudio Borri (IT)

Signatories: BE, CZ, DE, DK, ES, FI, FR, GR, IE, IS, IT, NL, NO, PL, SE, UK

The overall objective of the Action was to evaluate and quantify wind effects in dense urban areas with a European wind climate with a view to improving the quality of the urban environment and mitigating windstorm impacts and reducing wind induced failure.

The first theme was the study of the urban wind climate itself, which involved developing an understanding of how wind

speeds and turbulence characteristics vary with different urban forms. The second theme was the effect of wind on people (pedestrians, building ventilation, effects on transport). The third theme was the role of wind in transport of gases and particles in the urban atmosphere (pollutants, rain, snow). The final theme mainly considered a number of fundamental problems related to building behaviour in high winds.

The main task was to carry out an audit of wind effects in the urban environment, based on the above mentioned four themes. Recommendations emerging from this task were specified in specific techniques, used for study of each of these themes, particularly for modelling and testing methods. These techniques were entitled “CFD techniques”, “Large scale facilities and full scale measurement” and “Analytical and numerical techniques”.

The C14 findings were disseminated on various occasions:

- AWAS '02 (Advances in Wind and Structures, Pusan, Korea, August 2002); EUODYN '02 (5th European Conference on Structural Dynamics, Munich, Sept. 2002);
- C14 members were invited to organise an own session at the 11th International Conference on Wind Engineering (June 2003, Lubbock, Texas, U.S.A.), the world most prestigious conference on the wind engineering

The Action C14 was finalised by its Final Conference, held in May 2004, in cooperation with the Von Karmann Institute (research establishment of NATO) in Brussels.

One of the most significant achievements was the launch of the European-African co-operation frame, which consists of C14 experts. This activity is supported by the EU Sustainable Energy and several national research programmes, aiding the development countries. Certain C14 results were implemented to the PERBRISK FP6 project.

Chemistry

■ Action D13 - New Molecules towards Human Health Care 1999-2004 Chair: Pr Gerrit Jan Koomen (NL)

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

The COST Chemistry Action D13 was conceived with the aim of creating a European network to promote interdisciplinary research with a focus on molecular drug development. The Action brought together chemists, biochemists, biologists and pharmacologists in order to increase the knowledge of relationships between molecular structure and biological activity. The research carried out within the Action has provided ample opportunities to generate new concepts leading to advanced fundamental knowledge and to new applications. Novel designs and syntheses of biologically active compounds have been delivered, and new properties of such compounds have been elucidated. The results have been disseminated via hundreds of publications in international journals, issued during the course of the Action. Amongst the numerous patents accepted or submitted, topics such as “New analogs of nitrobenzylthioinosine” (EP 1 352 910, accepted in 2003) or “2-Substituted-1-deaza-purine Derivatives with Adenosine Receptor Modulating Activity” (EP 04 104345.6) can be mentioned here as examples. The fundamental research within the D13 Action has provided possibilities for improved drugs, optimized for well-specified applications, which was a benefit for the pharmaceutical industry. As an example, the close cooperation of working group 009 with “Solvay Pharmaceuticals” required monthly meetings to finalize patents, before publications could be issued. Furthermore, the Action has provided European added value, by creating an

extensive and impressive network through the connection of 17 working groups with 97 research teams from 23 countries, consisting of approximately 200 scientists. The overall manpower of the Action for its five years of activities was roughly estimated at more than 1100 person-years.

An important added value of the Action is the fact that less established research groups with limited resources have had the possibility to participate and profit from scientific interactions with groups of high international reputation, for instance via STSM's, which contributed to the broad scientific competence of the working groups in a European context.

■ Action D15 - Interfacial chemistry and catalysis

1998-2004 Chair: Pr Magali Boutonnet (SE)

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

The COST Chemistry Action D15 was aimed at preparing new materials with pre-designed properties including new heterogeneous catalysts and new colloidal systems; new methods for characterisation of surfaces and interfaces at atomic and molecular resolution; relationships between structure and composition of the surfaces/interfaces on one hand and their chemical/physical properties on the other hand; atom-by-atom and molecule-by-molecule manipulation techniques for the synthesis of nanomaterials. The work programme entailed the combined efforts of chemists, physicists and engineers through an interdisciplinary approach even for industrially-oriented research projects in order to increase the fundamental understanding of the chemistry occurring at surfaces and interfaces. The difficulty was for scientists from very different fields such as colloid chemistry, surface science, catalysis, polymer chemistry, and electrocatalysis to be able to understand each other in a meaningful way. This has been achieved as exemplified by the cooperations established between the Working Groups of the Action.

Due to highly efficient characterization techniques such as scanning tunnelling microscopy (STM), atomic force microscopy (AFM), non-contact atomic-force microscopy (NC-AFM), field ion microscopy, EXAFS, etc together with a substantial set of scientific exchanges, mostly through STSMs, the research carried out within the Action has clearly benefited from the European coordination and led to significant achievements as follows:

- the development and application of the Operando methodology (determination by advanced in situ spectroscopic techniques, run under genuine reaction conditions, of the structures and changes of catalytic materials with simultaneous activity measurement);
- the application of protein-protected organometallic complexes for analytical purposes (especially in the clinical praxis) leads to the development of low-cost electrochemical immunoassay (in collaboration with COST Chemistry Action D20). Formation of molecular films at electrodes greatly enhances the detection limit (two orders of magnitude more sensitive compared to spectroscopic methods);
- the design of a new fast electronic device enabling voltametric experiments with voltage scan rates up to 200 000 V/s (typical commercial instruments operate to 50 V/s) allows the detection of intermediates with very short lifetimes (electron transfer in coordination compounds);
- applications in pollutants abatement (new gold-vanadia catalysts supported on different metal oxides for complete hydrocarbon and diesel soot oxidation, selective catalytic reduction of NO with hydrocarbons, modelling real exhaust gases of combustion processes, new promising supports for Au nanoparticles in CO oxidation, etc);

- the current building of an ultrafast time-resolved sum-frequency generation set-up, the most powerful tool to investigate chemical reactions on the molecular level and on the picosecond time scale that should permit "movies" to be made of chemical reactions on surfaces or at interfaces, leading to unprecedented information on surface chemistry. The Action has created a large network through the coordination of 11 Working Groups consisting of 69 Research Institutions with more than 200 scientists and engineers from 21 countries. The overall manpower of the Action for its six years of activities was estimated at 900 person-years. The results have been disseminated in the genesis of the International Congresses on Operando Methodology, numerous scientific contributions to symposia, congresses and conferences, more than 60 PhD partly or fully related to the Action topics and more than 300 publications in peer-reviewed international journals.

Forests and Forestry Products

■ Action E15 - Advances in the drying of wood

1998 – 2004 Chair: Pr Alpo Ranta-Maunus (FI)

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

COST Action E15, aimed at a further development of industrial applications in wood drying, has successfully contributed to a better understanding of physics controlling the moisture transport through wood cell structure by developing new physical models and numerical simulation on various levels of sophistication both in fundamentals and in industrial applications.

A Working Group of the Action has successfully developed new simulation models for the optimisation of kiln drying processes. An active information transfer from research to industry resulted in the development of computer programmes building on these models. These programmes are already widely used by leading kiln operators and have led to a considerable improvement of the drying processes and, consequently, to a reduction of energy consumption and waste. In this context, the development of new types of adaptive control systems for kiln drying by COST Action E15, building on more effective temperature measurements of the circulating air, has raised the efficiency of the systems in use.

The improvement of numerical simulations by COST Action E15 has facilitated the development and implementation of new technologies, such as high frequency drying, allowing the drying of certain timber species to be up to 15 times faster in comparison with traditional technologies.

The stimulation of the use of X-ray CT-scanning by COST Action E15 has led to successful results in the monitoring of moisture profiles allowing the development of further advanced moisture transport models necessary for future improvement of drying processes.

Furthermore, COST Action E15 has been successful in compiling the widely scattered information on timber drying in the form of a comprehensive reference book for practitioners in the field.

■ Action E17 - Microbiology in paper making

1999-2004 Chair: Mr Gilles Lenon (FR)

Signatories: AT, BE, CS, DE, ES, FI, FR, IT, NL, NO, RO, SE, SI, UK

The main objective of the action was to provide pulp, paper and board industries with tools to manage problems arising from microbiological activity.

The Action has resulted in an improvement in the management of problems experienced in industry associated with microbial activity, better competence in the pulp, paper and board industry for buying chemicals for microbiological control and reduced impacts on the environment by adoption of Best Practicable Environmental Option (BPEO) techniques, e.g. water management, biocide-free control etc.

As a result of this Action, rapid detection techniques for process management, process control and good manufacturing practice was adopted by the industry and tools to comply with future EC guidelines regarding water discharges and product hygiene were also developed.

There was an extensive very good co-operation with industry. Sampling and measurement methods exchanged in the Action were incorporated rapidly in a number of mills.

■ Action E18 - High performance in wood coating

1999 – 2004 Chair: Mr Peter Svane (DK)

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

The main objective of COST Action E18 was to improve the performance, durability and environmental properties of coated wood structures and products. Within this COST Action a comprehensive overview of organic coatings for wood - interior and exterior - has been established, research initiated and recommendations for further research given. Particular emphasis has been devoted to interaction between wood and finish and the performance of exterior as well as interior finishes.

The level of the various achievements of the Action ranges from sophisticated mathematical calculation models for prediction of service life and durability to practically applicable methods for the determination of key properties of coatings in production lines. Building on time series forecasting, reliability models and Bayesian statistics the close cooperation of researchers in this Action resulted in improved European understanding and the introduction of predictive techniques. At the technical level, the Action has stimulated the development of cost-efficient test methods such as testing tools for scratch resistance of furniture finishes, chemical analysis for detection of uncured acrylic monomers as well as a method for the quick quantification of microvoid defects in coatings procedures already applicable in the production process.

In the light of the European legislation on VOC's (Volatile Organic Compounds), the Action has also addressed environmental issues relevant to the furniture industry by promoting the development of more environmental friendly finishes and the improvement of the durability of exterior coating systems, particularly with regard to resistance against fungal colonisation, especially as limitations in the use of biocides are becoming an increasing challenge.

The results of COST Action E18 have been transmitted to industry in the frame of the 4th International Woodcoatings Congress held on 25-27 October 2004 in The Hague, Netherlands; by a very well attended Conference on EU's VOC-directive in Udine, Italy, 25-26 November 2004; and by industrial participation in the different workshops, seminars and conferences of the Action.

■ **Action E19 - National Forest Programmes in a European context**

1999-2003 Chair: Mr Peter Glück (AU)

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

The main objective of the COST Action was to provide policy makers in Europe with improved means for formulating and implementing national forest programmes (NFP).

The Action provided policy makers in Europe with improved means for the formulation and implementation of National Forest Programmes. The knowledge gained resulted in a large number of papers published as seminar proceedings and a book on country reports relating to national forest programmes. The most significant contributions are published in the Interim Report "Making NFPs Work" (2003) which can serve as a basis for codes of conduct of national and sub-national forest programme processes. In summary, the Action contributed to increased common understanding about sustainable forest management (SFM) and national forest programmes (NFPs) as well as contributing to the European body of knowledge on political science in Europe.

■ **Action E20 - Advances in wood fibre cell wall research**

1999 – 2004 Chair: Dr Paul Ander (SE)

Signatories: AT, BE, CH, DE, DK, FI, FR, GR, HU, IE, IT, LV, NL, NO, PL, PT, SE, UK

The main objective of COST Action E20 has been to provide academia, applied researchers, forest breeders and wood processing industries with an improved understanding of the chemistry and ultrastructure of wood fibre cell walls to ensure that Europe will maintain its position at the forefront of knowledge in this field and thereby retain the competitiveness of European forest industries.

After comprehensively reviewing the existing information and techniques in the frame of several workshops, the Action developed new knowledge about cellulose and lignin structure and biosynthesis. Lignin structure was found to vary within the different cell wall layers and new specific tools were developed to recognise this variation. A comprehensive survey has been carried out on the variation of microfibril angle (MFA) in fibre wall and the relation MFA to the stiffness of wood and fibres. Variation of cellulose and lignin structure and chemistry are main properties affecting pulping processes as well as paper properties and thus a better control leads to a more uniform product quality. The information is also important for future innovations and uses of cellulose and lignin derivatives.

One of the purposes of the Action was to activate information transfer from research to industry. A large number of industry representatives attended the last workshop of the Action, in which state of the art reports were delivered.

Furthermore, COST Action E20 has been successful in compiling the widely scattered information on methods to study wood fibre cell walls. This was published in December 2004 in the COST Action E20 Book "Wood Fibre Cell Walls: Methods to Study their Formation, Structure and Properties". Researchers cooperating in COST Action E20 have now been successful in proposing two new Actions, one on wood micromechanics (COST E35), and one on cell wall macromolecules and reaction wood (COST E50).

■ **Action E21 - Contribution of forests and forestry to the mitigation of greenhouse effects**

1999 – 2004 Chair: Pr Timo Karjalainen (FI)

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

The objective of COST Action E21 has been to develop a commonly agreed carbon accounting strategy concerning the contribution of European forests in achieving the commitments taken in the Kyoto Protocol.

After comprehensively reviewing the existing national reporting systems, a Working Group of COST Action E21 has successfully developed a strategy allowing the comparison, as well as the harmonisation of the data provided by the very divergent national carbon stock inventory methods used in the forest/wood products sectors. This strategy has been recognised as an established method by the IPCC and will be used by the member countries in reporting for the Kyoto Protocol. Particular improvements have been achieved on a European level in the estimation of the stem volume and the biomass of different tree species as well as the assessment of the soil carbon content.

Furthermore, the Action successfully reviewed the effects of forest management on carbon sequestration in order to identify forest management strategies that could enhance carbon mitigation. Potentials for sequestration management in European forests have been assessed and the impacts of various forest management activities have been examined. By analyzing the CO₂ reduction potential of wood arising from the substitution of other materials as well as studying the economic and social implications of carbon mitigation strategies in forest management COST Action E21 has contributed actively to the ongoing policy processes at national, regional and global level.

Researchers cooperating in COST Action E21 have been successful in launching a large research project on Multi-source inventory methods for quantifying carbon stocks and stock changes in European forests (CarboInvent) under FP5. By providing European wide harmonised data COST Action E21 has also erected networks with several other EU funded projects, such as CarboAge, Forcast, Carboeuroflux, Aerocarb, and CarboEurope.

■ **Action E22 - Environmental optimisation of wood protection**

1999 – 2004 Chair: Dr Tony Bravery (UK)

Signatories: AT, BE, CH, DE, DK, ES, FI, FR, GR, HR, IE, IT, LT, LV, NL, NO, PT, RO, SE, SI, UK

The general objective of COST Action E22 was to support and encourage the development and implementation of environmentally optimised technologies for wood protection. Its first achievement was to compile and publish a comprehensive State of the Art review of the scientific research and technological development of relevant new technologies in this field throughout the 21 participating member countries.

Among key scientific achievements were Workshop presentations leading to a review of 'Heat treatments for wood' through which the processing parameters critical for effective and optimum improvement in durability properties could be defined, together with techniques for classifying the conferred durability and defining the limits of effectiveness for particular end uses. A similar review was also published in respect of oils and resins for wood treatment providing scientific evidence for the effectiveness of such treatments and for the scope of the service situations where they might be appropriate. In the context of these studies the Action also provided information and guidance on the disposal and

remediation of such treated wood at the end of life. Information on the biological mechanisms of protection and of eventual breakdown was also presented.

COST Action E22 made substantial progress in developing a Europe wide approach to the testing and evaluation of wood protection technologies using out of ground exposure techniques to predict durability performance and fitness for purpose. These studies are likely to find application and exploitation through the development of new and improved European standards.

An important issue in the environmental optimisation of wood protection is the disposal of preservative wastes and treated wood at the end of life, as well as the remediation of soils contaminated by wood preservatives. COST Action E22 has published the results of studies reviewing and collating the latest technologies for soil remediation, including providing scientific evidence and support for systems capable of early commercial exploitation.

Insect attack of wooden structures and commodities has a major economic impact in certain regions of Europe. In the southern countries termites are especially serious causes of damage. COST Action E22 reviewed new techniques for termite control based on various forms of biological rather than chemical mechanisms and published independent evaluations of the potential and efficacy of baiting systems in particular.

Because the implementation of new technologies for environmentally improved wood protection depend critically on commercial exploitation and industry take up, the scientific success of E22 was greatly enhanced by its achievements in attracting strong industrial participation.

An informative web-site was established (<http://www.bfafh.de/cost22.htm>) which continues, following the ending of the Action, through the good offices of BfH, Lohbrugge, Hamburg. Apart from full publication of the proceedings of all Workshops and Meetings on the web-site, five hard copy publications have been prepared covering a 'State of the Art Review', a 'Review of heat treatments for wood', 'Oils and Water repellents in wood preservation', 'Remediation of soils contaminated with wood preservatives' and the 'Proceedings of the Final Workshop'.

at low magnetic Reynolds numbers. Research has been implementing various techniques: numerical, analytical, semi-analytical, and experimental. An example of continuing, post-COST-Action collaboration is the forthcoming MFD Turbulence Summer Research Programme (Brussels, July 3-16, 2005), which is being organised by Université Libre de Bruxelles and the University of Cyprus, and which attracted funding from EURATOM Association, as well as other organisations. This is a good example of sustainable networking which is stimulated by COST Actions.

Significant progress has been made in measurement techniques for liquid metal flows and visualization of MFD experiments. As a result, a reliable experimental tool exists in reconstruction of interfaces in non-transparent fluid (such as liquid metals) using the non-intrusive measurement of the induced magnetic field outside the liquid metal pools. The use of transparent fluids (e.g. electrolytes) in very high magnetic fields allows to visualize the flow pattern, and to draw conclusions about flows in non-transparent liquid metals. None of these techniques was available 5 years ago.

A culmination of the Action is the forthcoming book "Magnetohydrodynamics: Evolution of Ideas and Trends" (Springer, 2005). The book, sponsored by COST, is based on presentations at a "COST Workshop on MHD History" (Coventry, UK, May, 2004). It will contain reviews on the state-of-art in the field, and will give an outlook into the future. The workshop itself was, probably the first of its kind, gathering experts from various branches of magneto-fluid-dynamics.

Physics

■ Action P6 - Magneto-fluid-dynamics

2000-2004 Chair: Pr André Thess (DE)

Signatories: BE, DE, ES, FR, GR, IE, IL, IT, LV, SE, UK

This Action addressed fundamental issues related to the interaction of the electric and magnetic fields with the flow of electrically conducting media. As a result of COST Action P6 collaboration between European groups has been elevated to a new level. Significant advances have been made in both theoretical and applied research in semiconductor crystal growth, magneto-fluid-dynamics (MFD), turbulence, applications of high magnetic field, measurement techniques, etc.

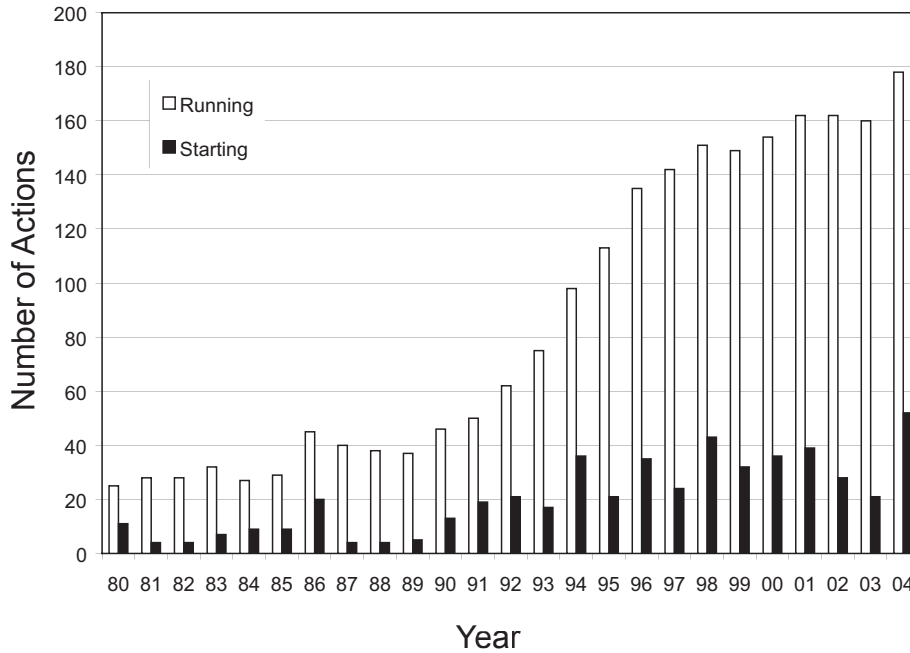
MFD studies the interaction between the flow of an electrically conducting fluid and the magnetic fields. It involves such diverse topics as the evolution and dynamics of stars, planets and entire galaxies, thermonuclear fusion, metallurgy and semiconductor crystal growth, electromagnetic processing of materials, Z-pinch, etc.

Action P6 established a core group of laboratories (Brussels, Ilmenau, Grenoble - later joined by Coventry), which focused on the very important long-standing issue of MFD turbulence

COST Actions Statistics

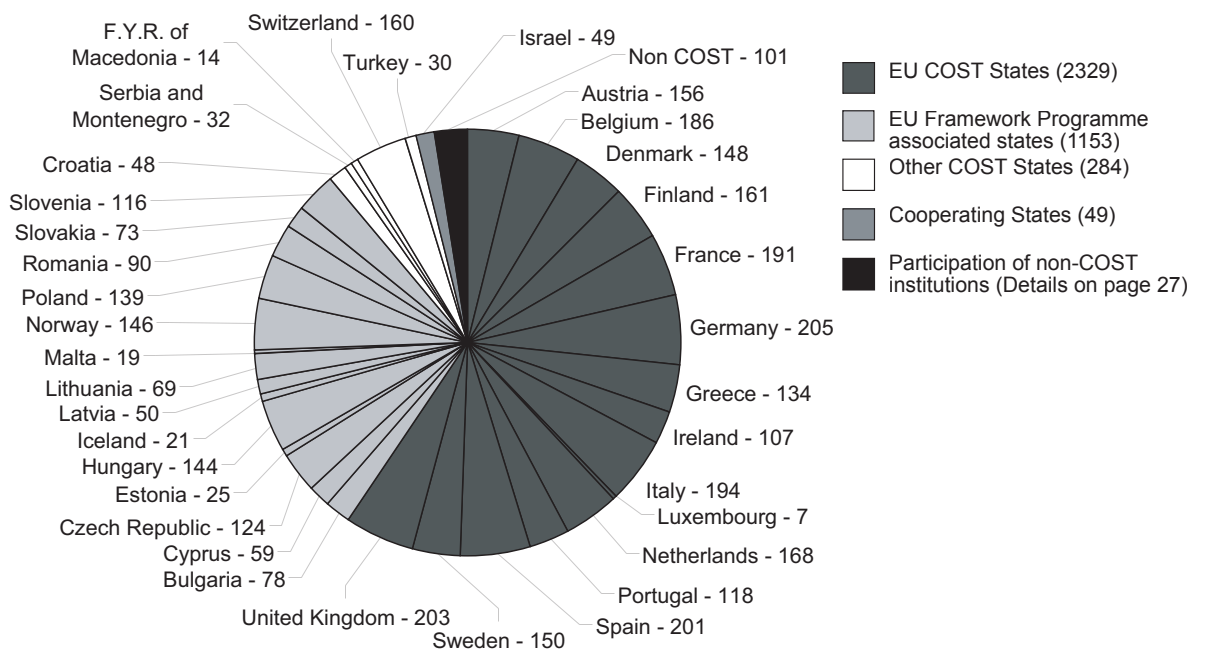
Yearly evolution of the Running and Started COST Actions up to 2004

(Status on 31st December)

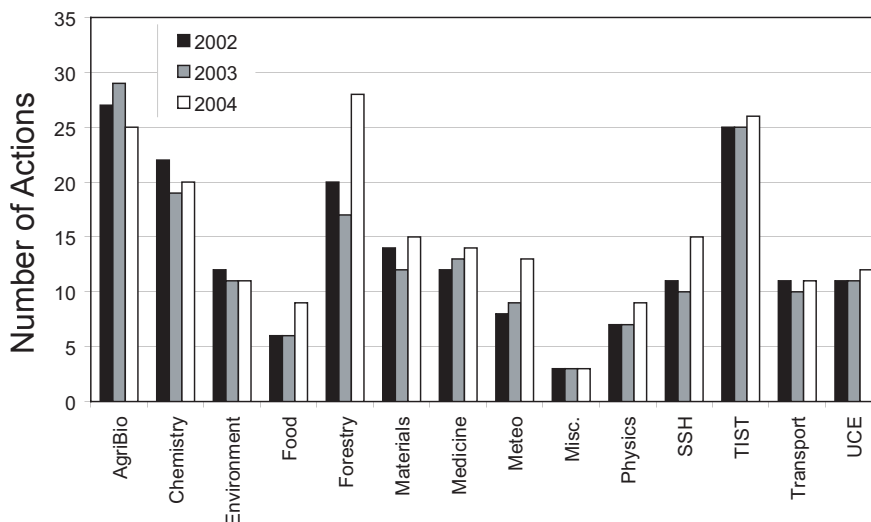


COST Country Participation 2004

(Total number of signatories: 3916)



Number of COST Actions by Domain 2002 - 2004



Number of Actions Running any time of the year

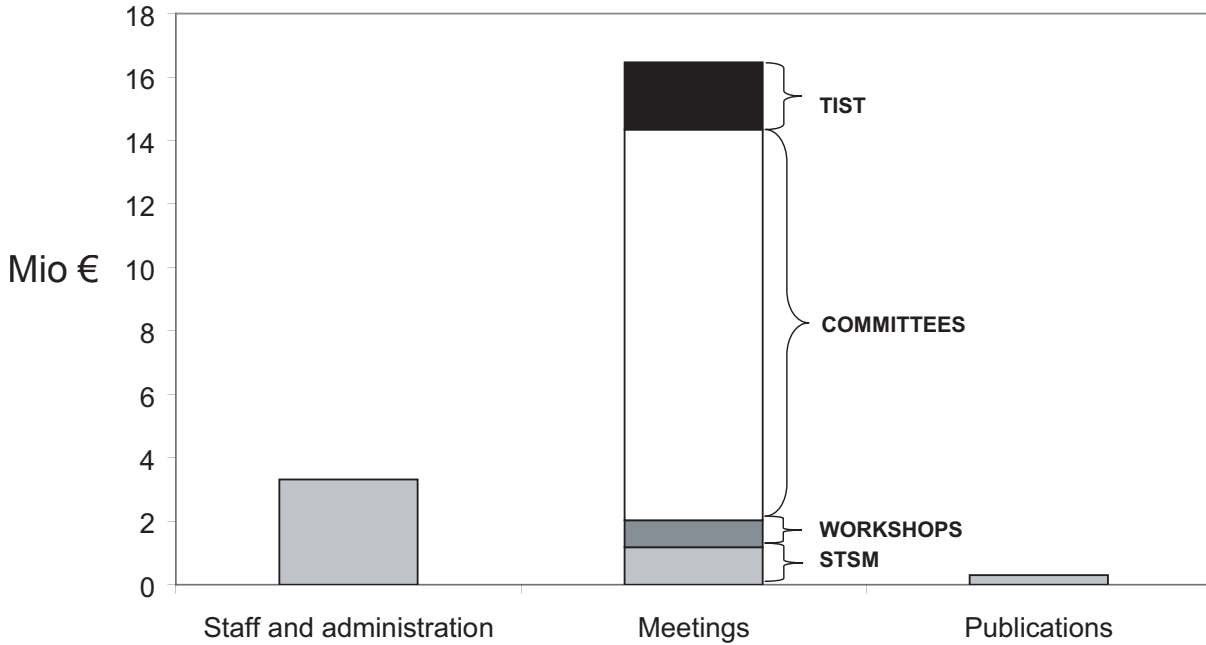
Year	2002	2003	2004
Agriculture and Biotechnology	27	29	25
Chemistry	22	19	20
Environment	12	11	11
Fluid dynamics	1	1	1
Food Sciences	6	6	9
Forests and Forestry Products	20	17	28
Materials	14	12	15
Medicine and Health	12	13	14
Meteorology	8	9	13
Miscellaneous	3	3	3
Physics	7	7	9
Social Sciences and Humanities	11	10	15
TIST	25	25	26
Transport	11	10	11
Urban Civil Engineering	11	11	12
TOTAL	190	183	212

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

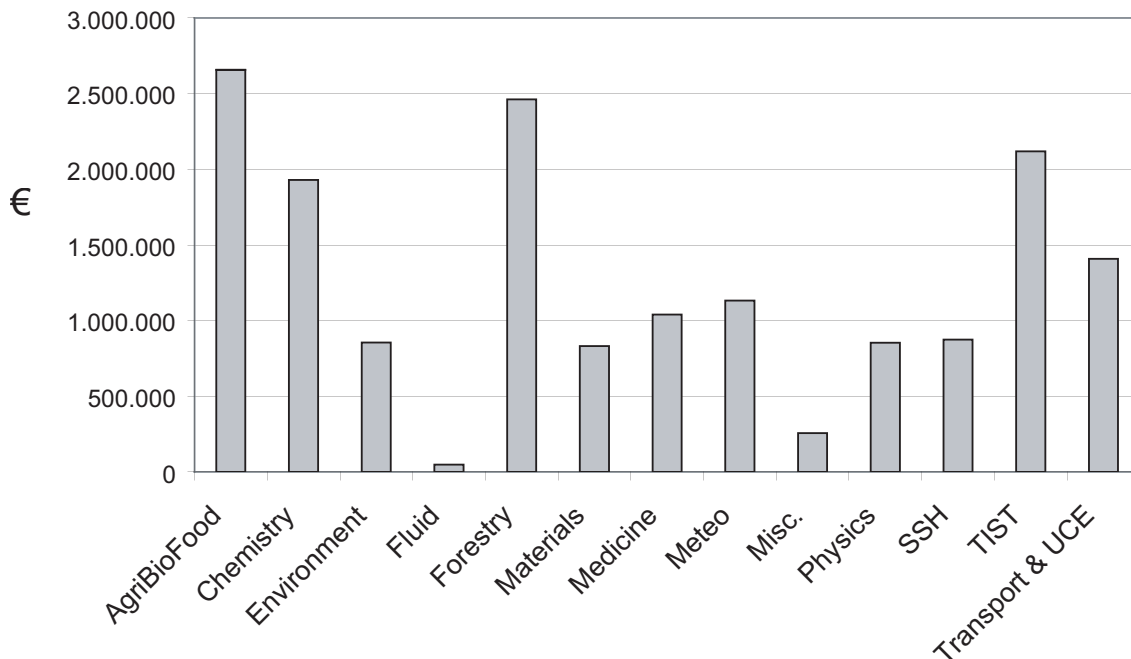
Year	2002	2003	2004
Agriculture and Biotechnology	25,1	23,4	22,4
Chemistry	19,1	18,0	19,1
Environment	10,8	9,6	9,1
Fluid dynamics	1,0	1,0	0,3
Food Sciences	5,0	5,5	8,0
Forests and Forestry Products	15,9	15,6	21,8
Materials	10,8	10,9	12,2
Medicine and Health	10,9	10,2	12,4
Meteorology	7,3	8,1	9,5
Miscellaneous	3,0	3,0	3,0
Physics	3,6	3,3	7,6
Social Sciences and Humanities	8,8	8,0	11,3
TIST	23,0	22,0	21,9
Transport	10,2	7,2	9,7
Urban Civil Engineering	9,2	10,8	9,5
TOTAL	163,7	156,7	177,8



COST Expenditure Distribution 2004 by spending line



COST Expenditure Distribution 2004 by Domain



Participation of Non-COST Country institutions

ACTION	COUNTRY	INSTITUTION NAME
219 ter	Australia	<i>GSA Information Consultant - Ascot</i>
	United States	<i>Trace R&D Center - Madison</i>
273	Canada	<i>Communication Research Center</i>
	Japan	<i>Tokyo Institute of Technology and National Institute of Information & Communications Technology</i>
	China - Taiwan	<i>National Chiao Tung University</i>
	United States	<i>Lucent Technologies</i>
274	Canada	<i>Brock University</i>
		<i>St. Francis Xavier University</i>
		<i>Université de Montréal</i>
		<i>Université Laval</i>
277	Canada	<i>Université de Sherbrooke</i>
280	Canada	<i>Communication Research Center</i>
	Russian Federation	<i>Ministry of Telecommunication and Informatisation of the Russian Federation</i>
		<i>Russian Academy of Sciences</i>
		<i>Vladimir State University</i>
287	Canada	<i>McGill University</i>
346	Russian Federation	<i>Technical University of Moscow</i>
347	Australia	<i>ARRB Transport Research</i>
348	United States	<i>Montana State University</i>
531	Canada	<i>Materials and Manufacturing Ontario</i>
	China - Taiwan	<i>National Cheng Kung University</i>
532	Ukraine	<i>Institute for Problems of Materials Science</i>
534	China	<i>Jiatong University</i>
		<i>School of Civil Engineering and Architecture</i>
625	Albania	<i>Seismological Institute</i>
	Bosnia and Herzegovina	<i>University of Sarajevo</i>
635	Ukraine	<i>National Academy of Sciences of Ukraine</i>
		<i>Odessa National University</i>
715	Macao	<i>Meteorological and Geophysical Service of Macao</i>
719	Ukraine	<i>Scientific & Industrial Enterprise "Ecomedservice"</i>
720	Macao	<i>Meteorological and Geophysical Service of Macao</i>
	Ukraine	<i>Innovation Center "Magic Solutions"</i>
722	Canada	<i>Canadian Meteorological Service</i>
724	Armenia	<i>Cosmic Ray Division - Yerevan Physics Institute</i>
	Russian Federation	<i>Moscow State University</i>
		<i>Space Research Institute, Russian Academy of Sciences</i>
Ukraine	<i>Lviv Centre of Institute of Space Research</i>	
727	Japan	<i>Kaganawa Institute of Technology</i>
838	Russian Federation	<i>Institute for Agricultural Microbiology</i>
		<i>Research Institute of Microbiology</i>

ACTION	COUNTRY	INSTITUTION NAME
841	Japan	<i>Institute of Technology of Tokyo</i>
		<i>University of Kyoto</i>
		<i>Waseda University</i>
	Russian Federation	<i>Russian Academy of Sciences</i>
	United States	<i>Basic Sciences Center</i>
<i>University of Georgia - Athens</i>		
845	Argentina	<i>Instituto Nacional do Tecnologia Agropecuarias - INTA</i>
	Eritrea	<i>University of Asmara</i>
	NGO	<i>World Organisation for Animal Health</i>
850	NGO	<i>UNESCO</i>
	Russian Federation	<i>Russian Academy of Sciences</i>
852	Australia	<i>Pastoral and Veterinary Institute</i>
B10	Canada	<i>Université Laval</i>
		<i>University McGill</i>
B12	Russian Federation	<i>Russian Academy of Sciences</i>
B16	Canada	<i>Sainte-Anne-de-Bellevue QC</i>
		<i>University of Toronto</i>
B17	Canada	<i>Hospital for Sick Children</i>
		<i>University of Guelph</i>
	New Zealand	<i>University of Auckland</i>
B18	Canada	<i>Kingston General Hospital</i>
		<i>SJHC</i>
B19	Canada	<i>Children's and Women's Health Center of British Columbia</i>
		<i>Ontario Cancer Institute - Princess Margaret Hospital</i>
		<i>University of British Columbia</i>
B20	Canada	<i>University of Western Ontario</i>
B21	Canada	<i>National Research Council of Canada - NRCC</i>
		<i>Neurological Institute Montreal</i>
B22	Canada	<i>CHUL - Centre de Recherche en Infectiologie</i>
B23	Canada	<i>Université de Montréal</i>
		<i>University Halifax</i>
		<i>University of Toronto</i>
C8	Canada	<i>National Research Council of Canada - NRCC</i>
	United States	<i>US Environmental Protection Agency</i>
C13	United States	<i>Lawrence Berkeley National Laboratory</i>
C14	Canada	<i>Concordia University</i>
	NGO	<i>Von Karmann Institute</i>
D15	Ukraine	<i>National Academy of Sciences of Ukraine</i>
D17	United States	<i>Stanford University</i>
D18	Russian Federation	<i>Joint Institute for Nuclear Research at Dubna</i>
	United States	<i>University of California, Berkeley</i>
		<i>University of Illinois</i>
		<i>University of Texas at Dallas</i>
D20	Ukraine	<i>Kyiv National Taras Shevchenko University</i>
	South Africa	<i>Rhodes University at Grahamstown</i>
D21	Russian Federation	<i>Russian Academy of Sciences</i>
	Ukraine	<i>National Academy of Sciences of Ukraine</i>
D27	Australia	<i>Queensland University of Technology at Brisbane</i>
	Russian Federation	<i>Semenov Institute of Chemical Physics</i>

ACTION	COUNTRY	INSTITUTION NAME
D29	Russian Federation	<i>Moscow State University</i>
	Ukraine	<i>National Academy of Sciences of Ukraine</i>
D30	China	<i>Institute of Biophysics - Chinese Academy of Sciences</i>
		<i>Institute of Biochemistry and Cell Biology - Chinese Academy of Sciences</i>
	Russian Federation	<i>Moscow State University</i>
E15	Canada	<i>University of British Columbia</i>
E27		<i>Ministerial Conference on the Protection of Forests in Europe</i>
F2	Algeria	<i>University of Boumerdes</i>
	Russian Federation	<i>A.N. Frumkin Institute of Electrochemistry RAS</i>
		<i>Russian Academy of Sciences, Siberian Branch</i>
P6	Ukraine	<i>Technical University of Ukraine</i>
P7	Russian Federation	<i>Rostov State University</i>
		<i>Russian Academy of Sciences</i>
P10	Australia	<i>Australian National University</i>
P11	New Zealand	<i>Victoria University of Wellington</i>
	Russian Federation	<i>Moscow State University</i>

Major decisions of the CSO in 2004

158 th Meeting, Skopje, F.Y.R. of Macedonia • 16-17 February

- *Election of Professor Francesco Fedi as the new President of the CSO as from 1 June 2004*
- *4 New Actions approved*
- *Mandate of the Technical Committee for Medicine & Health extended to 31 December 2006*
- *Revised Working Methods of the CSO approved*

159 th Meeting, Bergen, Norway • 27-28 May

- *Election of Mr Stefan Cairen as the new Vice-President of the CSO as from 1 October 2004*
- *Composition of the new JAF Group agreed*
- *European Commission document "Towards a New Partnership between COST and the Commission" presented and accepted*
- *9 New Actions approved*
- *Procedure for shortening the lead time between Action recommendation, approval and launch approved*
- *New instruments for Training Schools and for joint COST/ESF High Level Research Conferences agreed*
- *Budget allocation for 2005 agreed*
- *Working Methods of the new JAF Group approved*

160 th Meeting, Brussels, Belgium • 1-2 December

- *Position Statement of COST on the European Commission*
- *Communication on "The Future EU Policy for Research Support" approved*
- *Revised Procedure for appointing members of JAF approved*
- *Coordination of COST promotional activities agreed*
- *COST Code of Conduct approved*
- *Special support for researchers from the Balkans and "near neighbours" to the East and South of Europe approved*
- *New sub-instruments for providing support for Action Management Committee Chairs (including for Action Web sites) and for extending Short Term Scientific Missions approved*
- *Mandates of the Technical Committees for Agriculture, Biotechnology and Food Science, Chemistry, Forests and Forestry Products, Telecommunications, Information Science and Technology, and Urban Civil Engineering extended until 31 December 2007*
- *17 New Actions approved*

Statement from COST: Position of COST on the future EU policy for research support

RESPONSE TO THE EUROPEAN COMMISSION'S CONSULTATION PAPER: "SCIENCE AND TECHNOLOGY, THE KEY TO EUROPE'S FUTURE – GUIDELINES FOR FUTURE EU POLICY TO SUPPORT RESEARCH" - COM (2004) 353.

1. INTRODUCTION

COST (European COoperation in the Scientific and Technical Field) is the oldest and widest European intergovernmental networking system for cooperation in research. It is a cornerstone for the development of the European Research Area (ERA) and instrumental for achieving the ambitious objectives set by the European Councils of Lisbon and Barcelona.

COST brings together national research activities across the "wider" Europe and serves the needs of many thousands of European researchers and is particularly well placed to contribute to the debate on the development of the EU policy for research as set out in the European Commission's Communication published in June 2004 ("Science and technology, the key to Europe's future – Guidelines for future EU policy to support research" - COM (2004) 353).

2. COST POSITION WITH REGARD TO THE COMMISSION PAPER

The Committee of Senior Officials - the highest decision-making body of COST - representing the Ministers of Research and Science of the 34 COST member countries, welcomes the Commission's document and endorses the importance of research as a key to Europe's development and prosperity. It is particularly important that effective European policies for research are developed, especially in order to make Europe more competitive in a rapidly changing global market.

The European Commission's intention of using the Communication to stimulate debate within the research community is also endorsed by COST. Such a debate will make it possible for future Framework Programmes to reflect the needs of the Member States and of the views of the European research community, thus providing stronger feeling of "ownership" by all stakeholders, an important factor for success.

While welcoming the Commission's Communication,

COST finds it important to make some comments of a general nature.

From the COST viewpoint, not enough emphasis is given to the need for the networking of researchers across Europe and to the added value that can be achieved by integration and synthesis of otherwise independent research. As the Framework Programmes (FPs) become bigger, the integrated projects (IPs) and Networks of Excellence (NoEs) become larger and more orientated towards large-scale facilities, the contact with the "growth layer" and the possibility of detecting both emerging needs and emerging research areas are reduced. Furthermore, coordination not only brings together the researchers and their research groups, but it also levers mobility through exchanges, especially for the younger generation of researchers, and links the various national research support mechanisms. This is not the same as the coordination of national programmes. Linking of the researchers themselves is an essential "bottom up" element which should be sustained. In this regard, Europe has established an enviable lead in research networking, due, in no small measure, to COST and similar mechanisms. The Framework Programmes represent some 6% or so of total public funding of European research, so any mechanisms that may increase the effectiveness and impact of this R&D investment and help to ensure critical mass in research must be sustained, not least in the light of the Lisbon and Barcelona objectives.

It is the opinion of COST that research networking is fundamental to the success of most of the aims set out in the Commission's Communication and supports large parts of the six axes of activities which have been described. Consequently, the COST Committee of Senior Officials particularly welcomed the conclusions reached by the Council of the European Union when in its Competitiveness meeting of 24 September 2004 it: "recognised the important role of the Framework Programme in furthering the development of the European Research Area (ERA) and in this context stressed the importance of reinforcing the ties between it and European intergovernmental organisations such as EUREKA and COST".

The continuous increase and dynamism of COST's

activities and the important role that COST has to play in the European Research Area (as highlighted in this document) calls for an adequate budget for COST.

COST will formulate concrete proposals for activities that will contribute to ERA in the period covered by FP7 and will indicate the budget necessary to implement those proposals.

3. COST RELEVANCE FOR EU RESEARCH OBJECTIVES

Established by the Ministerial Conference in November 1971, COST now includes 34 European countries. The Ministerial Conferences that followed after 1971 (Vienna in 1991, Prague in 1997, Dubrovnik in 2003) confirmed the continuing commitment to COST as a valuable and flexible instrument for promotion of European research and technological development by means of coordinated Actions among a large number of participants.

COST, as a precursor of advanced multidisciplinary research, plays an important role for the establishment of the European Research Area anticipating and complementing the activities of the Framework Programmes, constituting a "bridge" towards the scientific communities of countries across the whole of Europe, increasing the mobility of researchers across Europe and fostering cooperation in key scientific domains, such as: Physics, Materials, Chemistry, Telecommunications and Information Science, Nanotechnologies, Meteorology, Environment, Medicine and Health, Forestry and Forest Products, Agriculture and Biotechnology, Transport, Urban Engineering as well as Social Sciences and Humanities.

The COST "multiplier effect" must be underlined. The funds provided to the scientific community by COST are less than 1% of the total value of the projects coordinated through COST. With only about €20 M per year, COST provides networking of more than 30.000 European scientists for research activities whose total value exceeds some €2 billion per year

COST is instrumental in achieving the objectives established by the Council of the European Union in R&D: to increase European competitiveness by investing in research and stimulating innovation; to increase R&D investment in the Union with the aim of approaching 3% of GDP by 2010; to stimulate a more effective use of various public financing instruments at EU and national level; to encourage new initiatives aimed at intensifying co-operation between industry and public research by the promotion of networks of expertise and the transfer of knowledge with particular attention to the needs of SME's; to increase the cooperation in research among the EU and the Balkan and Mediterranean countries. COST primarily addresses research activities outside the FPs' activities that to a significant extent are funded by the 95% of the public research budget provided by the Member States at the national level. The success of the ERA concept will depend heavily on how convincingly nationally funded research can be coordinated and made to cooperate smoothly.

4. CONTRIBUTION OF COST TO THE EUROPEAN RESEARCH AREA

In the Commission's Communication six major objectives have been identified. COST- with its defining characteristics- can make a substantial contribution to most of these objectives.

1. **"Creating European centres of excellence through collaboration between laboratories"**. COST can continue to make a substantial contribution to this objective. Precursor of advanced multidisciplinary research, COST has had a very important role in anticipating and complementing the activities of the Framework Programmes and in fostering the establishment of "Networks of Excellence" in many key scientific domains. In the field of Telecommunications and Information Science alone, six Networks of Excellence in the Sixth Framework Programme derived directly from COST Actions.
2. **"Launching European technological initiatives"**. In key areas like transport, mobile communications and nanoelectronics already identified by the Commission COST has had an active presence for a number of years. The contribution of COST to the standardisation of the GSM mobile system- a European technological success- the transfer of results to the antennas industry or the development of a number of SMEs originating from COST Actions are only a few examples. COST will continue to involve industry in its activities also developing increased synergy with the industrial participants in networks of EUREKA projects. Although launching technology platforms is not something COST is particularly well suited to do, COST intends to contribute to the long-term planning with the aim of setting up a strategic roadmap in specific areas as, for instance, forestry, chemistry or information/communication technologies. In this respect, COST will explore suitable opportunities to contribute to the work of those technology platforms where its experience and expertise is most relevant.
3. **"Stimulating the creativity of basic research through competition between teams at European level"**. COST could be a natural partner in developing basic research through networking. The proposed ERC has still to find its place, role, objectives and interrelations within ERA, but since COST has always contributed to basic science, COST's experience and instruments should be considered when, once established, the ERC will find it necessary to seek support for networking objectives and procedures. It has to be noted that COST is a true all-European cooperation mechanism that

offers opportunities both for science-driven and society-driven research and that is unique in cooperating also with non-EU countries.

4. **“Making Europe more attractive to the best researchers”.** COST has been at the forefront of this approach by: (a) creating a high-level stimulating scientific environment (b) encouraging the mobility of researchers across Europe through “Short-Term Scientific Missions”, primarily used by young researchers, and “training schools” and “high-level research conferences”, used by senior and junior researchers for forefront research discussions. European research is “showcased” on the international arena through active collaboration with major international research programmes, e.g. the International Geosphere-Biosphere Programme (IGBP).
5. **“Developing research infrastructure of European interest”.** Although not focused directly on infrastructure development, COST initiatives have led to such developments (e.g., the European Centre for Medium-Range Weather Forecasts).
6. **“Improving the coordination of national research programmes”.** It is the mission of COST to provide networking for research supported by national funds and this is what COST has been doing for more than 30 years. In this respect COST has anticipated many European RTD collaborative mechanisms. The role of COST should be developed and strengthened in the perspective of the ERA and FP7. It is important that research networking at a European level – for which the COST mechanism is excellent – be properly recognised and funded within this axis. Taking into account that an essential part of all national research activities in Europe are not included in programmes, this axis shall not be limited to coordination of formal, national research programmes but should include the networking of researchers. Thus, ERA-NET and Art.169 on one side and COST on the other side cannot be considered as overlapping, but are complementary as COST coordinates at researcher level while ERA-NET and Art.169 act at programme level. One might envisage that COST Actions could generate ERA-NETs on topics/issues where a critical mass and interest has been gathered through a large number of countries through various COST activities. Similarly, COST Actions could be also very helpful in implementing research and application activities addressing identified strategic cross-national topics and issues by established ERA-NETs, not to speak of fully opened national R&D programmes. Consequently, contacts between COST and ERA-NETs in appropriate fields in order to establish a mutual information flow should be established.

5. COST AND THE OTHER EUROPEAN NETWORKS

COST is not confined to the particular objectives of the Framework Programmes (FPs). On the contrary, COST’s value to the Framework Programmes lies to a large extent in its possibility of acting both within and outside the confines of the FPs. On the other hand, COST is funded through the FP and should thereby have its specific position and role.

The horizontal networking efforts in support of ERA have their base in FP6 under “Strengthening the Foundations of the European Research Area”. ERA must have tools that are outside the Framework Programmes for its effective and rapid development. COST, ERA-NET, EUROCORES, EUREKA, and INTAS are examples of such tools. COST should be viewed in this context and it seems reasonable to see future EU funding for COST as coming from this horizontal line of activities. In any future strategy for ERA, however, COST should maintain its particular characteristics: a fast, efficient, effective and flexible framework to get brilliant scientists together under light strategic guidance and to let them work out their ideas.

COST considers that there has to be some rationalisation within Europe’s research support mechanisms. This is not to argue for a monolithic approach, as researchers need to have the opportunity to seek support from a variety of sources. Nevertheless, there has to be a reversal of the fragmentation tendencies of the past and the avoidance of unnecessary duplication. The systems that remain have to have adequate resources.

COST is also an excellent example and frontrunner of “devolved management” in that COST until the end of 2003, was supported by a scientific secretariat operating within the European Commission but, following negotiations with the ESF, a Memorandum of Understanding was agreed and, on the basis of this, ESF became the implementing agent for COST and administers the funds provided from the Sixth Framework Programme for COST and supports the scientific, technical and administrative secretariat of COST Technical Committees and Actions.

Clearly, the new relationship with ESF provides an opportunity for a clearer “division of labour” with the functions and responsibilities of both structures being considered as complementary. In fact, both bring together national research investment through an inter-governmental structure (COST) and an inter-agency/research Councils structure (ESF). Both are, of course, coordinating national research investments. From the COST viewpoint, a scenario could be envisaged where the bulk of “networking” is placed under COST allowing ESF to develop scientific perspectives and policies, through its scientific Forward Looks, the exploration of new forefront issues and the coordination of new major programmes and agencies in the ERA-NET and EUROCORES approaches. At the same time, the extension of COST eastwards, which is inevitable as a means of involving the additional human resources of such countries as Russia and Ukraine, will require

a closer and more rational collaboration between COST and INTAS, with its consequent funding implications.

Such developments, plus the deepening of COST Actions (currently deploying an average of only €80K per Action per annum) will make a significant increase in the European funding for COST a justifiable ambition.

6. CONCLUSIONS

During the past 33 years the COST framework has been of paramount 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, an 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.

Appendix

COST CHARACTERISTICS, OBJECTIVES AND CHANGES

1. COST CHARACTERISTICS

COST has several essential characteristics that have contributed to its success and which are not all encountered together in other European scientific frameworks.

Bottom-up approach.

The initiative of launching a COST Action comes from the scientists and technical experts themselves. This approach has proven to be particularly suited to promote research of a pre-competitive nature or of societal importance, to meet a growing demand from the scientific community and to anticipate and usefully complement the other research programmes of the European Union. COST is based on the coordination of national research initiatives funded through national funds. Duplications and gaps are therefore avoided and the consequent synergy and work sharing allows a more efficient use of the national resources. The sole purpose of COST central funding - usually less than 1% of the national funds necessary to carry out an Action - is to establish the research "network" and to provide the organisational and operational basis for cooperation.

"A la carte" participation.

(i.e. participation by COST member countries)

Only the countries interested in the Action

agree to participate by signing the relevant "Memorandum of Understanding" to establish the research network (COST Action). A minimum number of 5 signatures are needed to start a COST Action, thereby ensuring a European dimension.

Equality of access

Participation is open without any restriction also to countries not belonging to the European Union. COST has therefore the ability to anticipate the evolving European political situation constituting a "bridge" towards the scientific communities of countries belonging to the whole of Europe.

Flexibility and light management

Easy implementation and agile management of research Actions through a simple structure. The Committee of Senior Officials (CSO) is the main decision-making body and is made up of representatives of all COST member countries. It formulates the general strategy of COST, appoints the various Technical Committees, approves the research Actions to be launched and endorses the relevant Memorandum of Understanding to be signed by the interested countries. The Technical Committees (TC) are responsible for a particular research domain and are formed by representatives of the COST countries. They evaluate the proposals for new Actions, monitor the Actions in progress and

evaluate the results obtained by completed Actions. When necessary, they act as a catalyst to promote proposals for new Actions in particular areas and liaise with relevant other international organisations or committees. The Management Committees (MC) (one for each Action), formed by national experts of the signatory countries, coordinate and implement the activities of the Action (duration 4-5 years), disseminate the results of the Action and report to the relevant Technical Committee.

The secretariat to the CSO is provided by the Secretariat General of the Council of the European Union. Until 2003, the scientific secretariat to the COST scientific advisory structure, the Technical Committees, and to the Actions was provided by the European Commission. Starting from 2003 the scientific, administrative and technical Secretariat to the COST Technical Committees and to the Actions is provided by the European Science Foundation (ESF) through a COST Office located in Brussels. The ESF is the implementing Agent of COST and receives from the European Commission the operational funds for COST which for the four year period of the Sixth Framework Programme should be at a final level of €80 M. Thus, COST is a significant example of developing synergies in a multi-level partnership between COST, the General Secretariat of the EU Council, the European Commission and the ESF and of devolved management by the Commission.

Quality control

The quality control in COST is ensured by the COST Technical Committees (TC) which follow the established "COST Guidelines" for the assessment of new Actions, the monitoring of Actions in progress and the evaluation of completed Actions.

The assessment of proposals for new Actions is usually performed by a Panel including a "Rapporteur", appointed by the TC, and external experts. A wide consultation is also performed to ensure maximum synergy and minimum duplication between the Action and related activities in Europe. This consultation includes the European Commission in relation to the Framework Programme and other activities across the various Directorates-General; with other European agencies (e.g. the European Environment Agency –EEA); the ESF; EUREKA and others, including industrial groupings and standards bodies. The Panel prepares an "Assessment Report", which, after the approval of the Committee, is sent to the CSO together with the relevant MoU of the Action.

The monitoring of Actions in progress is based on the annual "Progress Report" prepared by

the MC of the Action and usually presented by its Chair during the yearly meeting with the relevant TC. The evaluation of completed Actions is performed by a Panel composed by the TC Rapporteur, and external experts. The Panel prepares the "Final Evaluation Report" which is presented to the TC by the Rapporteur and which, after TC approval, is given a wide circulation so that its impact is known and can be assessed.

Impact of COST results

Scientific importance and relevance: This is testified by the very high number of papers published in excellent scientific and technical journals or presented in the most important international Conferences. COST is also well recognised by the scientific communities outside Europe and, in particular, in the USA, in Canada and in Asia.

Contribution to European competitiveness in the global market: Testified by the many contributions to normative and standardisation bodies where COST results, COST models, COST methods are commonly referred to and recommended. It is also testified by the many Small Enterprises originating in Europe from COST activities at the frontiers of modern technology and by the many examples of transfer of results to the European industry. The COST contribution to the standardisation of the GSM system - a European success - or the European Centre for Medium-Range Weather Forecasting (ECMWF) in Reading, UK, grown out of an early COST Action in the meteorology domain are only two of many examples.

Societal importance: This is the case of delicate issues arising from new technologies. With COST, the public is reassured that the solution of these issues is not restricted to individual countries and that it is obtained in a high-standard, industry-independent, environment. The establishment of the exposure limits to base stations for mobile communications by a COST Action is one example in this direction. COST has relations with a series of International and European bodies such as World Meteorological Organisation, (WMO), World Health Organisation (WHO), International Telecommunications Union (ITU), European Standardisation Telecommunications Institute (ETSI), etc.

Contribution to the Framework Programmes: Shown by the many research projects in the framework programmes derived from ideas originated in COST and by the considerable number of Networks of Excellence deriving from COST Actions in the Sixth Framework Programme.

2. COST OBJECTIVES AND CHANGES

For the immediate future, especially over the coming triennium, COST will be facing a number of challenges to which it is responding with ambitious objectives. It recognises that European research is evolving and the needs of researchers are changing. Furthermore, COST itself must operate with an increasingly devolved and "lighter" touch.

The first objective concerns the correct positioning of COST in European Research Policy. COST should be considered as an underpinning of and a precursor for future Framework Programmes that should, in turn, continue to provide adequate financial resources for the future. Through its networks, COST provides a very efficient mechanism for the training of researchers and for the interchange of ideas and people between participating institutions in Europe. COST seeks research excellence of world class quality in Europe in a wide range of sectors and disciplines and achieves this through peer review conducted by its Technical Committees of national experts. The exploitation of results of basic research through the transfer of knowledge between researchers, centres of excellence and enterprises has always been a characteristic of COST. COST Actions link laboratories from all parts of the research spectrum and involve universities, national research organisations and industry.

The second important objective is to promote the participation of the European Commission (EC) in COST activities and to increase the synergy with the European Science Foundation (ESF). This three-way partnership is already proving its effectiveness for the parties concerned and in the service provided to the research community. An important part of this second objective is the strengthening of the ties with EUREKA, the other European intergovernmental network which focuses principally on industrial research and with INTAS, developing research links with "near neighbours" to the east.

In April 2004 the Commission Services produced a discussion paper "Towards a new partnership between COST and the Commission" in which the Commission Services expresses the views that COST has strong contributions to make towards the objectives of ERA and the Lisbon Strategy, and that the development of ERA requires a strategic relationship between COST and the Commission. The paper emphasises the Commission's will to become an active partner in COST, to take on the development of synergy and complementarity between the Framework Programme and COST, and to reflect on possible ways to strengthen

its linkages to individual COST Actions. It acknowledges that, although COST is a bottom-up research-networking framework, in which individual scientists can initiate actions in any subject, and the Framework Programme is driven by the objectives set out in its programmes, the two frameworks could usefully increase the coherence and synergy between their activities. The paper also points out that, due to its flexibility in launching Actions, COST is well suited to act as a precursor and "Exploratorium" of ideas, that the COST Technical Committees should provide inputs regarding Community thematic research, that COST should provide inputs on horizontal European research policy issues, e.g. basic research, mobility of researchers, and that the Commission looks forward to COST placing the development of links with the Framework Programme high on its agenda. The paper is being rapidly implemented. Active involvement of representatives of the different departments of the European Commission – DG Research, in particular, but also other DGs, for instance, DG Environment and Enterprise and DG Agriculture and Fisheries – in the work of the Technical Committees are expected to follow the existing highly valued participation of DG Information Society in the relevant COST Technical Committee.

Synergy with the ESF is already underway: since 2003 the ESF has become the implementing agent for COST and provides the scientific secretariat to COST Technical Committees and Actions through the newly created COST Office located in Brussels. The European research community has much to gain from this collaboration which, with adequate and enhanced funding, should create a really solid basis for the advance of the ERA, bringing together, as it does, the two principal research networking support mechanisms. Already, this is bearing fruit as COST Technical Committees and ESF Scientific Standing Committees come together to plan and implement collaborative strategic science workshops. COST Technical Committees are also contributing with their considerable expertise to ESF's scientific Forward Looks. ESF has traditionally supported research networking, especially within more basic research, using funding from national research councils. Synergy could be based on a division of "instruments": in view of possible changes in ESF's priorities, it may be advantageous to both parties for research networking in ESF to be placed within the COST competence.

The ties between COST and EUREKA are strengthening. The Vice President of the COST Committee of Senior Officials (CSO), has been recently nominated member of the Executive Group of the High Level Group of EUREKA and in his new position he will in the future play an active role in improving the

COST-EUREKA synergy. An ongoing dialogue between COST and EUREKA Officials has been established and this has led to a joint presence at key conferences and, more recently, the development of links between EUREKA activities and the COST Technical Committees. The COST-EUREKA synergy will also be facilitated by the fact that many other members of the COST CSO take part in the activities of EUREKA either as members of the High Level Group or as National Project Coordinators. This seems particularly important in view of the joint contribution of COST and EUREKA to the European Research Area. In key areas such as transport, mobile communications and nano-electronics, already identified by the Commission, COST and EUREKA have had an active presence for a number of years. Bearing in mind the characteristics of COST and of EUREKA, COST, as a precursor of scientific ideas, may endeavour to develop its role, in many specific cases, in terms of transferring these ideas to the industrially oriented networks of EUREKA and so contribute to European Competitiveness.

A third objective is to follow COST traditions in stimulating international cooperation in science and technology at the borders of Europe, particularly with the newly Independent States in the East and with the Mediterranean and Middle East Countries in the South and South East. In this respect, the General Secretariat of the Council of the EU, which provides the secretariat to the COST governing body, the Committee of Senior Officials, will play a crucial role especially in legal and political issues. This is vital if we are to develop an open Europe attracting the best brains from wherever in the World and avoiding the "Fortress Europe" mentality. In particular, COST is strengthening its links with INTAS, which operates in a similar legal framework and has a similar contractual relationship with the European Commission in FP6. Discussions are underway at the official level to investigate how best to develop synergies in enabling researchers from the INTAS partner countries in the former Soviet Union to play their full part in European research networking via COST.

All research organisations need to look at their objectives and methodologies and COST has always been open to such independent scrutiny. Following on from the last assessment performed by a panel of independent experts before the last Ministerial Conference held in Dubrovnik in 2003, the fourth important objective is to introduce a number of reforms in COST and in particular: to increase the strategic role and the efficiency of the COST Committee of Senior Officials, to optimise the structure of the research domains, to maximise the potentialities of the COST Technical Committees and of the COST Office and to

improve the impact of the results of its Actions. Many of the reforms are already under way. A new executive group has been formed in the Committee of Senior Officials and the work of this Committee is being developed so that it really does become the main governance and strategic body on behalf of the COST Ministers. Domain reviews are now being put in hand, the first addressing chemical and physical sciences. The new COST Office, is introducing much more flexibility into the system. Ways in which the period of delay between approval of Actions and their initiation can be substantially reduced and simplified in order to avoid "bureaucratic overheads", while still preserving the inter-governmental nature of the cooperation have been already introduced. Considerable attention is presently devoted to informing the research community about COST and the opportunity which it offers and, at the same time, to increasing the visibility of COST with policy and decision makers.

Publications supported by COST in 2004 resulting from COST Actions

ACTION	TITLE	EDITORS
271	Annals of Geophysics- Effects of the Upper Atmosphere on Terrestrial and Earth-Space Communications - Final Report Supplement to Volume 47, N 2/3, 2004	Bruno Zolesi, Ljiljana R. Cander
273/284	Joint Workshop on Antennas and Related System Aspects in Wireless Communications June 7 – 10, 2004	Chalmers University of Technology, Gothenburg, Sweden
275	Biometrics on the Internet Workshop - CD-ROM	
276	CD Rom - Proceedings of the 6th Workshop on Information and Knowledge Management for Integrated Media Communications May 6-7, 2004, Thessaloniki, Greece	Michael G. Strintzis, Ioannis Kompatsiaris, Vasileios Mezaris
281	CD Rom - Report on Workshop The Blood-Brain Barrier (BBB) Can it be influenced by RF-field interactions ?	
289	CD Rom Seminar on Spectrum and Power Efficient Broadband Communications 7-9 July, 2004, Budapest, Hungary	
341	Habitat Fragmentation due to Transportation Infrastructure- Wildlife and Traffic: An European Handbook for Identifying Conflicts & Designing Solutions	Iuell, Bjorn (N) Co-ordinator
527	International Workshop on plasma polymers&related materials 7-9 October 2004, Antalya, Turkey	
625	Special Issue: Studi Geologici Camerti, Universita Degli Studi di Camerino – Active Faults: Analysis Processes and Monitoring	
717	Use of radar observation in hydrological and NWP models	M. Salek, J.L. Ceze, J. Handwerker, L. Delobbe, R. Uijlenhoet
836	Proceedings of the Euro Berry Symposium COST 836 Final Workshop. Published as Acta Horticulturae Number 649	D.W.Simpson
837	Phytoremediation Inventory COST 837 View	Tomas Vanek and Jean-Paul Schwitzguebel
840	COST 840 and Biochemical Engineering Society, Belgrade published Chemical Industry, 6a, Volume 58 XIIIth International workshop on Bioencapsulation	
A14	Public sector information in the digital age: Between markets, public management and citizens' rights	Georg Aichholzer and Herbert Burkert
A19	Children's welfare in ageing Europe	Ann-Magritt Jensen et al.
A20	TV and interactivity in Europe: Mythologies, theoretical perspectives and real experiences	Fausto Columbo
B10	Brain Damage and Repair: From Molecular Research to Clinical Therapy	T Herdegen and J Delgado-Garcia

ACTION	TITLE	EDITORS
B14	Final meeting of the COST B14 Action "Hyperbaric Oxygen Therapy" Lille, 3-4 December 2004, Lille, France	Daniel Mathieu
	7th European Consensus Conference on Hyperbaric Medicine Lille, 3-4 December 2004, Lille, France	Daniel Mathieu
	European Journal of Underwater and Hyperbaric Medicine. A European Code of Good Practice for Hyperbaric Oxygen Therapy Volume 5 Supplement 1, December 2004	Peter HJ Mueller
B15	Final Conference: In silico driven drug discovery and development – the integration of modelling and simulation throughout the discovery and development processes. Programme and Abstracts 26 – 28 May, Geneva , Switzerland	Kim Brosen
B19	Report of meeting published in Nowotory Journal of Oncology (in Polish) on Meeting of B19 – Molecular Cytogenetics of Solid Tumours	Thomasz Motyl
	9th European Workshop on Cytogenetics and Molecular Genetics of Human Solid Tumours, Brno	Pavel Cejpek, Ivo Hanke
B20	Physiology and Pathology of Mammary Cell Proliferation and Death. Abstracts of a European Scientific Conference 18-19 June, Warsaw, Poland	Thomasz Motyl
B22	Drug Development for Parasitic Diseases, 1st COST B22 Congress 22-24 November 2004, Antwerp, Belgium	Fred Opperdoes
B23	Oral facial development and regeneration. Eighth International Conference on Tooth Morphogenesis and Differentiation	Paul Sharp
	Working Group 2 and 4 Meeting of COST B23 Programme Hungary, Debrecen, 28-31 October 2004	Szabolcs Felszeghy
C10	Insights on Outskirts - Volume 1 From Helsinki to Nicosia: Eleven Case studies and Synthesis	Ed G Dubois-Taine
	Insights on Outskirts - Volume 2 Governance	Ed M McEldowney
	Insights on Outskirts - Volume 3 Structures	Ed A Borsdorf and P Zembri
	Insights on Outskirts - Volume 4 Dynamics	Ed M Franzén and J-M Halleux
	Report published by the French Ministry of Transport	
C12	Final Report "Improvement of Buildings' Structural Quality by New Technologies September 2004	
C14	Impact of Wind and Storm on City Life and Built Environment COST Action C14 Proceedings of an International Conference on Urban Wind Engineering and Building Aerodynamics. 5 to 7 May	Ed. J.P.A.G. van Beek, Rhode-Saint-Genèse, Belgium
D20	Metal compounds in the treatment of cancer and viral diseases: Proceedings of COST D20 Conference	
E18	High Performance Wood Coatings – exterior and interior performance: Final Seminar	
E19	Forests for the Future-National Forest Programmes in Europe	David Humphreys
E20	Wood Fibre Cell Walls: Methods to Study their Information, Structure and Properties	U. Schmitt, P. Ander, J.R. Barnett, A.M.C. Emons, G. Jeronimidis, P. Saranpää, S. Tschegg
E22	Final Workshop on Environmental Optimisation of Wood Protection and Final Management Committee Meeting Lisboa, Portugal, 22-23 March 2004	

ACTION	TITLE	EDITORS
E31	Proceedings of COST Action E31 Conference: Management of Recovered Wood: Recycling, Bioenergy and other Options	Ed. C Gallis
E34	Proceedings of Conference on Innovations in Wood Adhesives. Overview of the Innovations and trends in wood adhesives, with an emphasis on the market and environment Thursday, November 04, 2004, HSB, Biel - Switzerland	M. Properzi, F. Pichelin, and M. Lehmann
E35	Report on Training Course (Max-Planck-Institute, Golm, 7-9 Oct. 2004) on Micromechanical and ultrastructural characterization of wood'	
	Proceedings of 2nd International Symposium on Wood Machining, Vienna	
G8	New Lights on Ancient Materials The first European training school on the synchrotron analysis of ancient materials 14-18 December 2004, Soleil, St. Aubin	
	Final report of the Training school on Innovative tools for exhibition purposes : environmental and damage assessment 29 October - 03 November 2004, Kalkara, Malta	
	Final Report of the training school on "Archaeometry and Ceramics" Bordighera, Italy, 18-24 October 2004	
P11	Proceedings of 2004 6th International Conference on Transparent Optical Networks and 3rd European Symposium on Photonic Crystals: Volumes 1 and 2	
P12	Structuring of Polymers - First Workshop - Book of Abstracts-October 27-30, 2004 - Hotel Club Cala Moresca, Capo Miseno, Bacoli -(Naples) - Italy	
COST OFFICE	COST – NSF Workshop on Exchanges and Trends in Networking (July 2004) published as e-article (http://www.di.uoa.gr/~NeXtworking)	
CHEMISTRY	Stereocat 2004 Workshop: Book of Abstracts of workshop on sustainable chemical processes – stereoselective transition metal-catalyzed reactions	
	Chemical Communications, 21 August 2004, Number 16	Peter J. Sadler
MEDICINE	Eufebs 2004-New Safe Medicines:Towards mechanistic prediction Final Report 17-20 October 2004, Brussels	Luc Balant
	Lasers in Medical Science. Abstracts and Final Programme 19th International Congress on Laser Medicine Florence 28-30 October 2004	Leonardo Longo
	Cellular Dysfunction in Atherosclerosis and Diabetes	Maya Simionescu, Anca Sima, Doina Popov
TRANSPORT	Unconnected Transport Networks-European Intermodal Traffic Junctions 1800-2000	Hans - Liudger Dienel

The COST Office Seminar series in 2004

- **EUREKA**

8 July - Speakers: Christine Simeone (EUREKA Secretariat) and Robert Verbruggen (National Coordinator, Belgium)

- **The NEST Programme within FP6**

7 September - Speaker: William Cannell (European Commission)

- **INTAS**

28 September - Speaker: Richard Burger (INTAS)

- **New JSPS International Cooperation Initiatives**

15 October - Speaker: Yuko Furukawa, Director International Program Department, Japan Society for the Promotion of Science (JSPS)

- **NATO: Security Through Science**

19 October - Speaker: Susanne Michaelis (NATO)

- **Canada-Europe links in S&T**

9 November - Speaker: - Paola de Rose (Science & Technology Counsellor, Mission of Canada to the European Union)

- **ERA-NET within FP6**

9 December - Speaker: Wolfgang Wittke (European Commission) on behalf of Robert-Jan Smits

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