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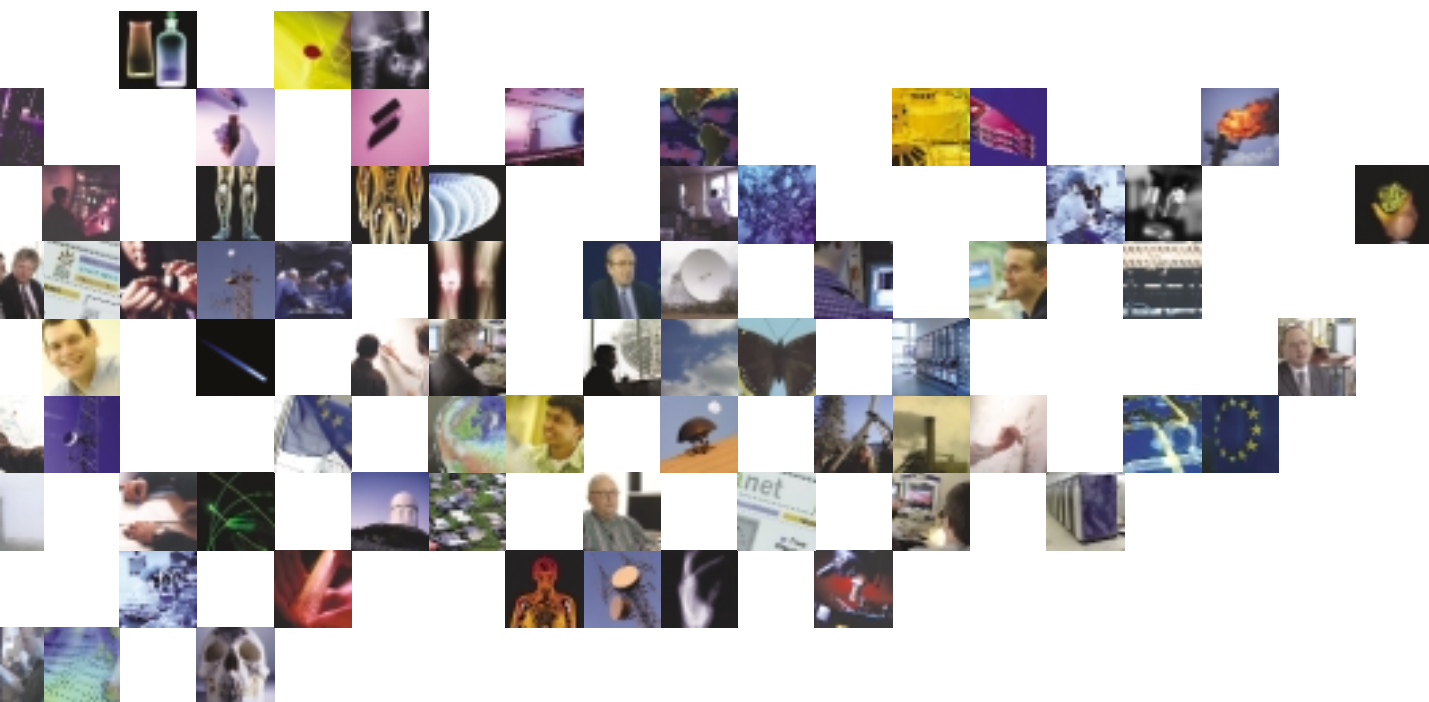
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Annual Review 2004





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Chairman's Report

Welcome to DANTE's annual review for 2004. This new-look publication aims to provide an overview of DANTE's involvement in research networking projects in Europe and across the globe. We have expanded the sections on DANTE's projects, taking an in-depth look at what they have achieved over the past year, and what is planned for 2005.

2004 saw the end of the GÉANT project, which changed the working landscape of research networking in Europe. Providing increased bandwidth and extended geographical coverage, GÉANT transformed the way in which academic research networking was carried out.

On September 2 2004, the European Commission signed a contract worth €93 million, which accounts for 50% of the funding for GÉANT2. The other 50% is provided by European National Research and Education Networks. Since that time, much work has been done on planning and procurement of the new network. With 32 partners in 34 countries, and the potential to reach millions of users, GÉANT2 will further develop the services offered by its predecessor network. GÉANT2's user-focused approach to networks is explained within, with details of the comprehensive programme of joint research activities, which aim to create production services for improved usability.

The ALICE project, co-funded by the European Union, created RedCLARA –the first pan Latin-American network for research and education. The network began successful operation in September 2004. The achievements of the project so far were celebrated at a launch event in Brazil in November. Collaboration amongst researchers in the region is expanding, and the connection to Europe offers new opportunities for research partnerships.

The EUMEDCONNECT network, also co-funded by the EU, began operation in May 2004. Since then the network has continued to develop, with new partners connecting. One of the challenges for the year ahead is addressing the sustainability of the project, and DANTE will be focusing efforts in this area.

Phase 1 of the TEIN2 project was completed. TEIN2 will create a regional research network for South East Asia. A feasibility study was concluded, which surveyed the current state of regional connectivity and assessed user needs. Building on this foundation, phase 2 began with a tender issued for connectivity. Results are currently being analysed, and 2005 will see major progress in planning and creating the network.

Tomaz Kalin, DANTE's General manager retired in 2004. I would especially like to recognise Tomaz's dedication during his time at DANTE, and gratefully thank him for his work. I'd also like to welcome Hans Döbbeling, his successor at DANTE.

2004 also saw the retirement of Directors Robin Arak, CEO of UKERNA and Enzo Valente, Director of the GARR Consortium. I'd like to thank both Robin and Enzo for their work and support during their term of office.

Dany Vandromme retired as DANTE Chairman and was appointed as DANTE Director in January 2005.

At the end of 2004 the Shareholders elected me as Chairman again, a position which I served for some years before 2003. I will do my best to fulfil the obligations of that office and hope that I can contribute to the success of research networking on the European scale. I am confident that working altogether (NRENs, DANTE staff, Board) we will have great success. We are all working for the same goal: bringing European research networking to leading edge quality.

Klaus Ullman



DANTE – Creating the global research village

In the high speed world of research and education networks DANTE stands tall for delivering world leading research networks across Europe and beyond. Operating on an increasingly global scale, DANTE's expertise in planning, managing and operating research networks is well recognised.

Since its inception in 1993, DANTE has designed and implemented a series of increasingly advanced pan-European research networks, the latest of which, GÉANT2, confirms Europe's place as a global leader in terms of research connectivity. Owned by the European National Research and Education Networks (NRENs) and working in cooperation with the European Union, DANTE has been fundamental to the success of pan-European research networking over the past decade.

DANTE's work with European NRENs is fundamental to realising the EU's vision of a European Research Area. The organisation delivers pan-European network connections providing state of the art communications tools for those working in research and education. This allows them to collaborate in pioneering research, producing groundbreaking results for the benefit of Europe. Areas of research supported by these networks include High-Energy Physics, Seismology and Climate Change, and supports applications such as telemedicine, e-learning and high quality video-conferencing.

Research Networking is an increasingly global activity, and DANTE's work contributes to the creation of the global research village. DANTE is currently involved in projects operating in Latin America, Asia, North Africa and the Middle East. The landscape of global research connectivity is evolving, with an increasing number of regions connecting to each other. DANTE's work will help complete the map.

As well as planning and building research networks, DANTE is committed to a comprehensive programme of research, which benefits the research networking community and also the commercial marketplace. Indeed, much of today's consumer communications technology was developed via research networks and DANTE is constantly developing new research technologies and improving the service provided to network users.

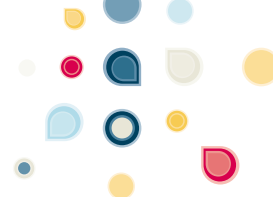
Although DANTE is based in the UK, it is a truly international company, with a global outlook. The company currently has 33 members of staff, many of whom are multi-lingual, representing 13 nationalities from around the world. DANTE has a proven track record in project management and delivery, supported by its expert commercial knowledge of the marketplace and technical understanding. Its international workforce makes for efficient contribution to the collaborative networking projects it participates in across the world.



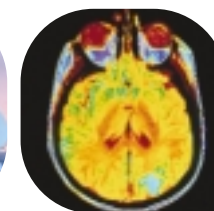
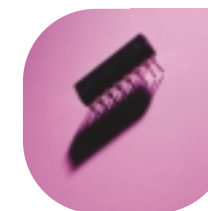
Dai Davies



Hans Döbbeling



Milos Karapandzic



GÉANT: Creating a World-Class Pan-European Network

Research co-operation is becoming an increasingly global activity. Connectivity between researchers across the world is now a basic requirement in support of efficient and innovative research activity. Over the last 5 years, GÉANT- the pan-European multi-gigabit data communications network- created the largest interconnected community of scientists and academics in the world, enabling them to share and distribute research data faster than ever before, delivering exciting benefits that have helped shape the future of science and research methodologies.

Built on behalf of a consortium of National Research and Education Networks (NRENs) with co-funding from the European Commission as part of its 5th Framework Programme, the ambitious GÉANT network provided an infrastructure which supports researchers, as well as providing a research infrastructure for information technology and telecommunications development.

World-leading infrastructure

Marking a step-change on its predecessor network, TEN-155, the GÉANT backbone interconnected more than 3500 research and education institutions in up to 34 countries via 29 NRENs. DANTE built the network and operates it on behalf of the NRENs, working together with partners across Europe to fully utilise the cost-effective capacity available to them.

Since its inception in November 2000, GÉANT has grown to become the fastest and most advanced network of its kind. Representing the 6th generation of pan-European research network infrastructure connecting NRENs across the globe, GÉANT utilised the latest DWDM (Dense Wave Division Multiplexing) technology, operating at some 10 Gbps. The enormous increase in capacity which GÉANT has achieved created a major opportunity for European researchers; the twenty-fold increase in bandwidth has enabled countless new forms of co-operative research, across Europe and beyond, for projects requiring high bandwidth and geographical reach.



Dale Robertson



Rachael Beale



John Chevers



Maarten Buchli

Multi-region connectivity

As an integral part of its service, GÉANT developed and enhanced connectivity with partner networks in other world regions. In this respect, an important development has been the implementation of three circuits between Europe and North America, interconnecting GÉANT with the Abilene, CA*net3 and ESnet research networks. This connectivity represents the first steps towards global co-operation in research networking and complements existing connectivity between Europe and the Japanese network, SINET. GÉANT's international reach has been extended through the ALICE and EUMEDCONNECT projects, with connectivity extending to Latin America, North Africa and the Middle East. The upcoming TEIN2 network will see further growth into the Asia-Pacific region.

A Strategic role

One of the main challenges faced by any network is the number of users that can be connected. As the internet becomes increasingly essential for day-to-day communication, more and more addresses are needed with which to identify the devices which are connected. Internet Protocol version 6 (IPv6) is the solution to this problem, broadening the scope of the Internet and allowing numerous technical improvements, including Plug and Play and Security. Recognising the strategic role for the future of the internet that IPv6 plays, GÉANT provided IPv6 to the research networks it connects- acting as both demonstrator and enabler for IPv6 and ensuring that European researchers are at the forefront of technological progress. GÉANT set new benchmarks in quality of advanced services provided to users, operating premium IP, multi-cast, best efforts and less than best efforts services. The latter provides a low priority data transmission capability that has proved cost effective for some applications. Each of these services operated with no loss of service quality and no interference between services.

GÉANT2: Looking to the successor network

The GÉANT project was succeeded in late 2004 by the GÉANT2 project, which will build and operate a successor network to GÉANT. The first GÉANT network successfully increased bandwidth and performance for pan-European collaboration. Now, with this solid foundation in place, the focus of GÉANT2 is to develop services which will improve the usability, flexibility and transparency of the network. GÉANT2's integrated programme of research activities and production services will interact to offer unrivalled end-to-end service quality and range.

Development of the GÉANT infrastructure and services formed a significant part of the preparation for the successor network, GÉANT2. Overall, technical development focuses on providing services to end-users and establishing and managing these services across a wide range of domains. With GÉANT2 researchers will be able to collaborate on a global scale, and benefit from the advanced services on offer.

Case Study: Real-time eVLBI

Radio astronomy is a powerful tool in the search for answers to some of the Universe's most fundamental questions. Very Long Baseline Interferometry (VLBI) is a radio astronomy technique which harnesses the power of many radio telescopes simultaneously, generating far more detailed images than could be produced by a single observatory. Sensitive VLBI measurements allow astronomers to see further back in time than ever before. GÉANT, together with a number of National Research Networks, has successfully experimented with the connection of European VLBI Network (EVN) telescopes and the Joint Institute for VLBI in Europe (JIVE) supercomputer. The result is a real-time link, utilising the latest fibre-optic network technology. This data can be distributed to users over the GÉANT network, facilitating the entire data supply chain from telescope to scientist.

GÉANT allocates bandwidth to the EVN and information is transferred quickly and reliably from the observatories to the processing computer, facilitating the generation of high-quality images in near-real time. The birth of electronic VLBI (eVLBI) opens up many exciting opportunities: Scientists can assess the astronomical data as it is measured, facilitating rapid error detection and correction at the telescopes; and radio astronomers have the flexibility to follow events as short-lived as Supernovae and Gamma Ray Bursts. This demonstrates the versatility of the network as a vital tool amongst the advanced research community.



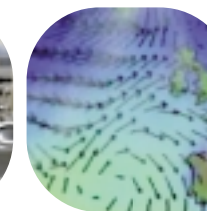
Alex Gosnell



Loukik Kudarimoti



Anton Antonov



GÉANT2: Connect ★ Communicate ★ Collaborate

The GÉANT project created a network and developed services that transformed academic collaboration, and positioned Europe as a global leader in the research connectivity race. GÉANT2, the successor network to GÉANT, provides cutting-edge technologies, improved services and extends its geographical reach, and keeps DANTE at the forefront of the research networking sector.

Building On Solid Foundations

The first GÉANT network successfully increased bandwidth and performance for pan-European collaboration. Now, with this solid foundation in place, the focus of GÉANT2 is to develop services which will improve the usability, flexibility and transparency of the network. The emphasis for this, the 7th generation of pan-European research and education network, is increasingly focused on improving ease of use, convenience of connection and overall end-user satisfaction with the network.

Multiplier Effect

GÉANT2 has enormous potential to shape the future development of research and education across Europe. Past generations of pan-European research networking have clearly demonstrated the "multiplier" effect of high-quality, high-bandwidth networks. Connecting researchers together enables activities that were hitherto impossible or inefficient, and stimulates interest in the development of new research techniques which make full use of networking technologies. The desire to support Europe's researchers with state-of-the-art facilities mean research and education networks are reserved for use by the academic community. This keeps researchers at the forefront of their respective fields, retaining and nurturing academic expertise and ultimately boosting Europe's competitiveness.



Marian Garcia-Vidondo



Anand Patil

Hybrid Network Capabilities

GÉANT2 – which will operate until 2008– connects 34 countries through 30 national research and education networks (NRENs) based on a pool of multiple 10Gbps links interconnecting a set of switches to be deployed at nodes in the network. These will be interconnected to the existing router base to support IP services, but will also offer direct access to other services based on wavelength and gigabit-ethernet technology. Capable of offering point-to-point connectivity, in addition to a standard IP service, this is the first international use of hybrid technology in research networking.

2005: Gearing Up For GÉANT2 Launch

The tender analysis, negotiations, final short-listing and procurement have all now been concluded or nearing completion, whilst designs for the network have been approved and a working topology drawn up. Although procurement activity began towards the beginning of 2004, the implementation of the GÉANT2 network has now gathered full momentum. Two separate tender activities have been implemented: The first dealt with connectivity, including wavelength and dark fibre connectivity as well as more traditional Synchronous Digital Hierarchy (SDH) connectivity. The second tender dealt with switching and transmission equipment. In relation to transmission systems, considerable efforts have been made in understanding the technical detail and the economics of lighting dark fibre. With selected infrastructure and equipment suppliers to be announced imminently, GÉANT2 is gearing up for operation in mid-2005.

Understanding Network Users

With millions of potential GÉANT2 users, the applications of the network are almost limitless. All types of research can make use of the facilities that GÉANT2 offers, from projects with high bandwidth demands to less demanding users keen to make use of GÉANT2's unparalleled geographical reach.

One of the key aims of GÉANT2 is to improve overall customer satisfaction with the network and increase both its usage and profile. Towards this end, a market research survey was commissioned in 2003 which concluded significantly that an increased knowledge of the network and its potential applications would increase usage. Work is currently ongoing in support of these findings. This response is a concrete example of the flexible and user focused approach of the GÉANT2 network.

GÉANT2 Research and Services

GÉANT2's integrated programme of joint research activities and production services will interact to offer unrivalled end-to-end service quality and range. The initiatives are designed to take new networking technologies from concept to production service. The structure utilizes the culture of co-operation among Europe's NRENs.

One of these programmes will focus on the essential issue of Network Security. The GÉANT network made significant advances in addressing security threats. During its lifetime, procedures and tools for detecting, preventing and eliminating attempts to disrupt service to the research communities across Europe developed rapidly. Activities within GÉANT2 will provide improved defence strategies and protection systems. In particular, the project aims to facilitate a joined up approach to network security with a common security policy across multiple networks.

Research into Roaming and Authorisation, will give users the opportunity to work as easily in any institute across Europe as at their own desks. GÉANT2's authorisation infrastructure will act as a bridge to the user's home institution, matching each researcher's normal privileges up against the host network's rights structure. Supported by this web of trust, users can be assured of seamless access to a familiar range of services. This universal system of identification and authorisation will make boundaries disappear, giving Europe's research and education community the freedom to roam anywhere across GÉANT2 and its connected European networks.



Waldemar Zurowski



Toby Rodwell

“The GEANT2 project is a radically different way of looking at networks.”

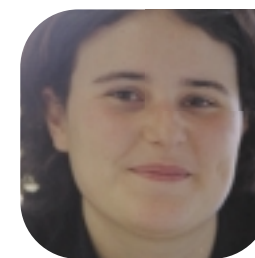
Peter Clarke, Deputy Director, National e-Science Centre, UK.

Troubleshooting Team Launched

A GÉANT2 Performance Enhancement and Response Team (PERT) has been launched, acting as an "investigation service" for network users, troubleshooting performance issues occurring across the different network domains. The PERT consists of cross disciplinary specialists who provide an essential link between user and expert. This virtual team is one of the first achievements of GÉANT2, representing an important step towards a seamless end-to-end research networking service for pan-European users. Despite increased capacity and extended network coverage, network performance problems do still occur which may negatively affect the end-user's experience of the network. Quality and availability are therefore two important requirements against which the success of the network will be measured.

GÉANT2 online

The GÉANT2 website can be found at www.geant2.net. The site provides an overview of work conducted within the project's various activities and highlights initiatives of particular significance to the network. Accommodating the widest audience, the website is transparent, interactive and reflects the project's achievements, providing comprehensive and up-to-date information.



Ana Romero

ALICE: Research and Education Networking in Latin America

Research Internet connectivity is a relatively scarce and expensive commodity in many parts of Latin America. The America Latina InterConectada con Europa (ALICE) project transforms Latin American national research networks into an intra-regional Latin American network and interconnects this to GÉANT, the pan-European research and education network. Fostering the development of cooperative research programmes between Europe and Latin America, whilst developing the Information Society in the region, ALICE has achieved much success in a relatively short period of time and has become one of DANTE's major success stories.

Bridging the Digital Divide

Previously, research collaboration between Latin America and Europe was hindered by the lack of a dedicated connection between the two regions. In just two years, ALICE has achieved in Latin America the technical organisation in research networking that took more than ten years to achieve in Europe. During this period, higher bandwidth became available as providers built new infrastructure. This development, together with substantial EU assistance and the successful application of technologies developed in networking, has provided the catalyst to make this achievement possible.

The results and achievements of ALICE, which is providing real benefits to both researchers and the society at large in Latin America, are concrete examples of how communications technology can directly improve quality of life and help reduce both the digital divide and the gap in living standards experienced in different parts of the continent.

Stimulating development

Researchers in Latin America have benefited from the connection to GÉANT, including the ability to attract funding for new research facilities, develop and retain a pool of academic talent, and stimulate commercial start-ups and knowledge sharing throughout the region. In addition, the launch of the network has stimulated the development of regional NRENs, with many partners investing effort in their national networks in order to more fully benefit from the RedCLARA network.

ALICE and RedCLARA have benefited all levels of science and society, from small local projects, to larger collaborations at a regional level. Of particular note is the research on matters of specific Latin American importance, including the El-Niño effect and the loss of biodiversity in the Amazon region. These both have far-reaching consequences beyond the continent. Research into these fields is clearly enhanced by the presence of ALICE, providing global awareness and research capabilities to regional issues.

Supporting research

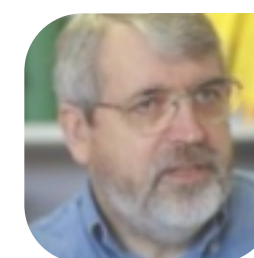
ALICE was granted € 10 million until May 2006 – representing 80% of the total funding – in the framework of the European Commission's @LIS cooperation programme. The remaining 20% has been funded by the project partners. Coordinated by DANTE, supported by its Latin American cousin CLARA and partnered by the National Research and Education Networks (NRENs) of 18 Latin American countries, ALICE began in June 2003 with phase A- Planning and Procurement. Currently underway with phase B- Implementation and Operation- ALICE runs until May 2006. Supported in Europe by 4 NRENs- FCCN (Portugal), GARR (Italy), RedIRIS (Spain) and RENATER (France)- ALICE has created the RedCLARA network, linking together researchers in Latin American countries for the first time, whilst implementing a link between RedCLARA and GÉANT to support collaboration between researchers in Latin America and Europe.



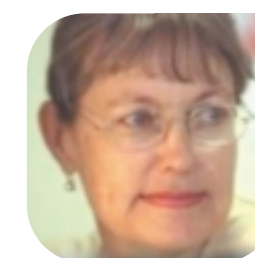
Helga Spitaler



Jean Reynolds



Tim Streater



Susan Taylor

2004: The network goes live!

The first phase of implementation has seen the construction of a 155 Mbps "ring" connecting the national networks of Argentina, Brazil, Chile, Mexico, via CLARA PoPs (Points of Presence) in Buenos Aires, Sao Paulo, Santiago, Panama City and Tijuana. An adjoining network branch connects Venezuela to Sao Paulo at 45 Mbps. The project will ultimately join all 18 Latin American partner NRENs. A 622Mbps transatlantic link from Sao Paulo to Madrid, began operating in September 2004 and provides a connection to GÉANT. This ultimately allows collaboration with over 3500 research and education institutions in up to 34 countries, as well as to other world regions. An upgrade of this link is intended, which would demonstrate the high demand for and successful running of the network.

The coming year: Raising Awareness

2005 will see the connection of additional project partners to the network, including the NRENs of Uruguay, El Salvador, Costa Rica, Guatemala and Nicaragua. Peru recently connected at 10 Mbps. In addition, it is foreseen that the number of users and institutions connected will also be augmented. With the new network providing facilities unavailable until very recently, awareness raising now becomes one of the consortium's major challenges. CLARA will assume responsibility for information dissemination within Latin America, whilst DANTE will continue this role in Europe and other world regions.

Useful Links:

- www.dante.net/alice
- www.redclara.net
- www.alis-telemet.net
- <http://europa.eu.int/alis>



Network applications have a profound effect on the opportunities available to scientists, bridging the 'digital divide' by providing access to essential but often remote facilities throughout our region.

Nelson Simões, President of CLARA

T@lemed: Saving Lives in Rural Locations

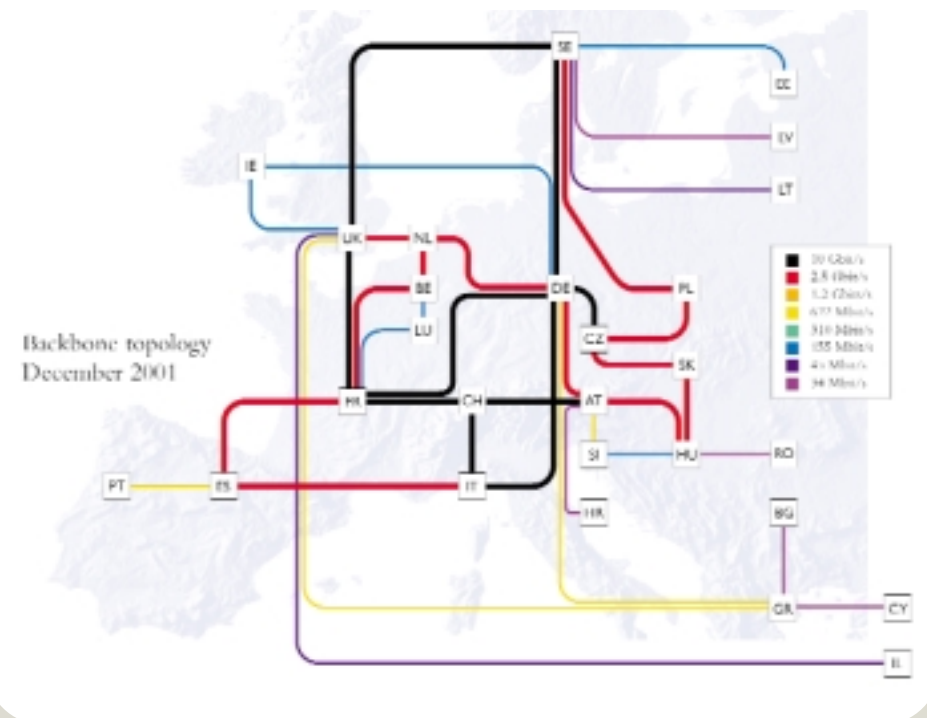


The T@lemed project, brings e-health services to isolated rural locations in Brazil and Colombia, allowing medical specialists to diagnose conditions and prescribe treatments to patients remotely. When doubts arise concerning diagnosis, referrals can be made to metropolitan hospitals for further analysis, or sent to Europe using the transatlantic link to the GÉANT network. The project is currently testing services in the areas of disease prevention, ante-natal care, urology and cardiovascular diagnosis. The project uses RedCLARA and the national networks of Brazil and Colombia, as well as specialist equipment and software developed by Medcom at the Fraunhofer Institute in Germany.

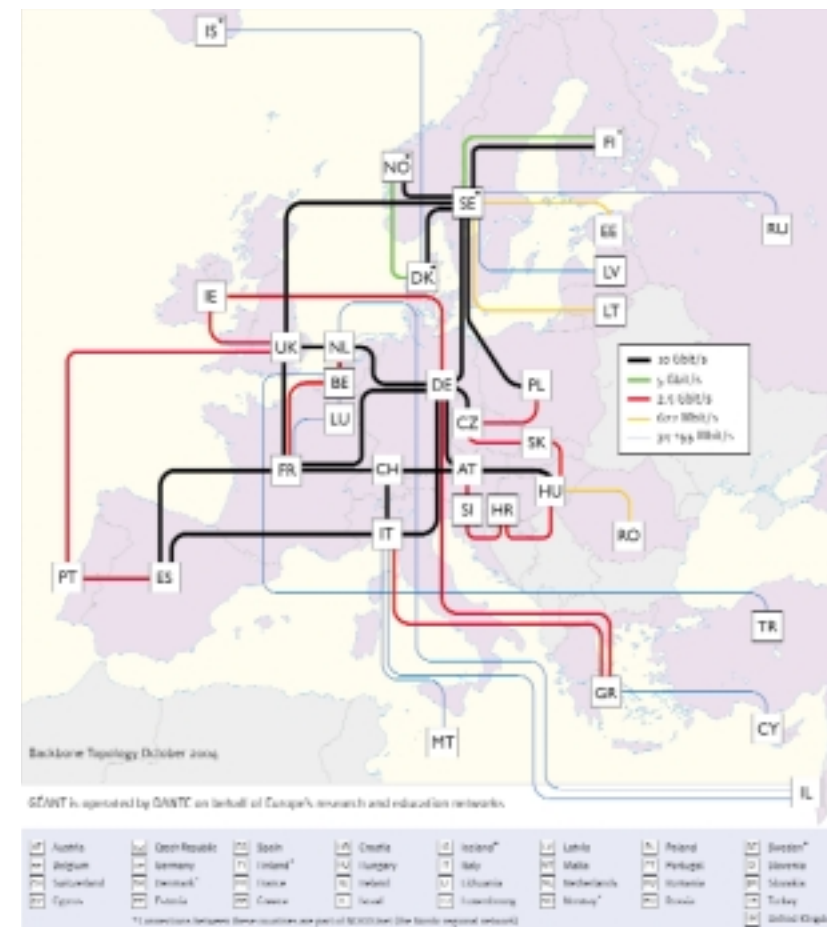
Aside from the direct benefit of saving lives, the project also aids the region in other ways: Local doctors are given greater confidence to act and specialists can reach a far greater number of patients without ever leaving their hospitals. There is also an increase in collaboration between specialists and local doctors, facilitating the dissemination of the latest clinical techniques and diagnostics.

This success story is a concrete example of how the provision of good quality data communication links resonates far beyond the academic environment, improving the quality of service for the end-users and the people who depend on them. The fact that the applications running on RedCLARA are helping to improve medical facilities in Latin America are testament to the network's speed, reliability and commitment to improving the regional communications infrastructure. It is perhaps the greatest demonstration of the success of the ALICE project.

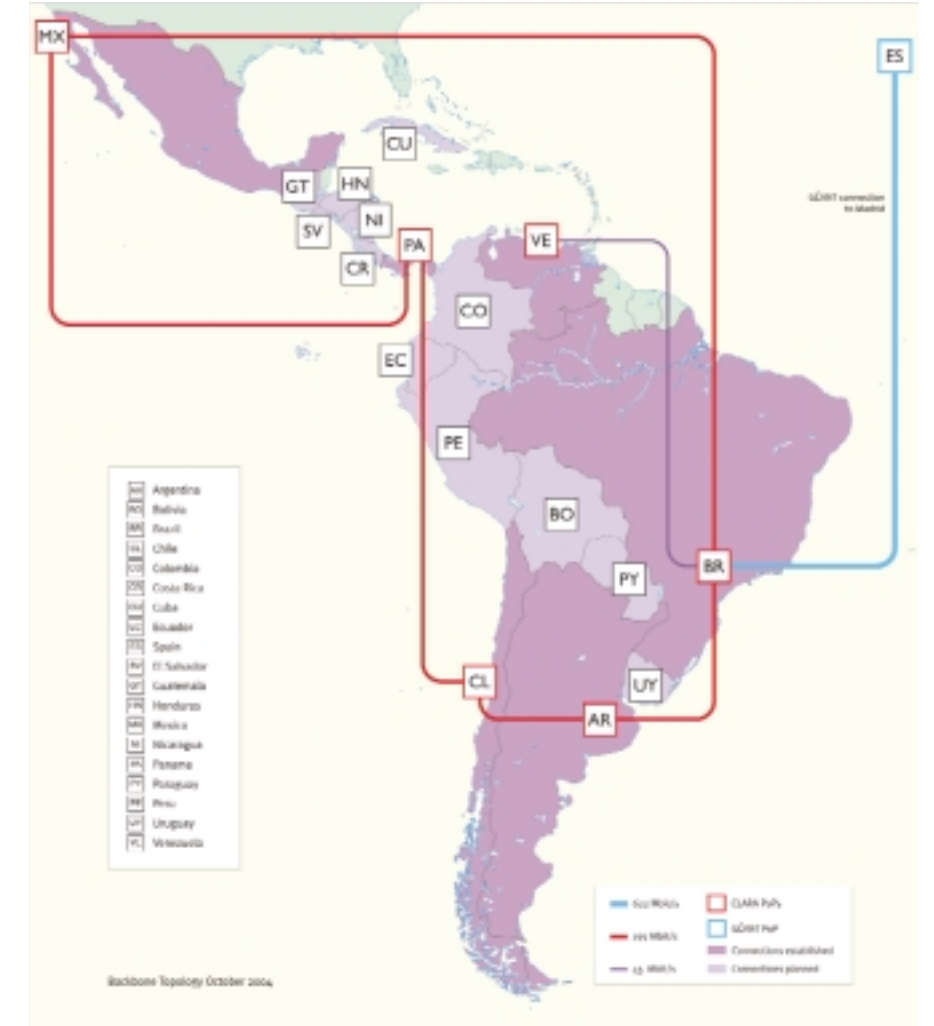
GÉANT Topology December 2001



GÉANT Topology October 2004



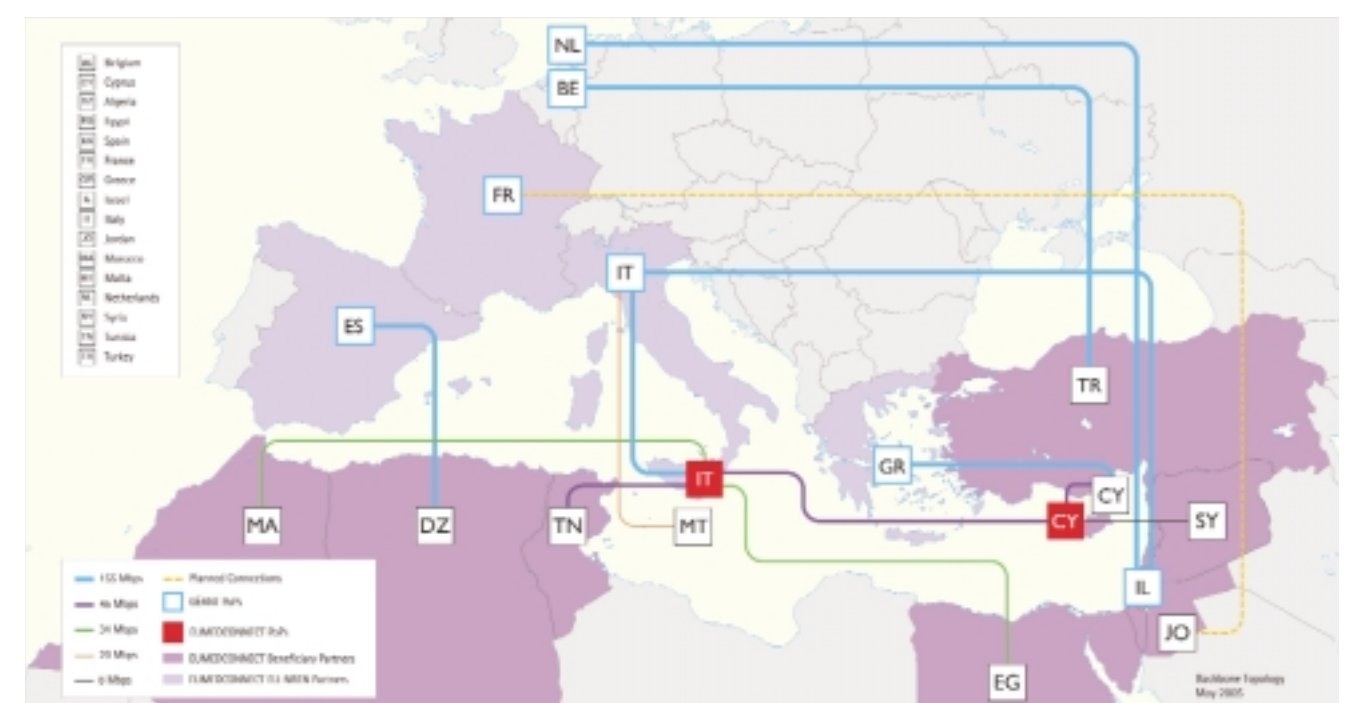
ALICE/RedCLARA Topology October 2004



Global Connectivity October 2004



EUMEDCONNECT Topology May 2005



EUMEDCONNECT

One of the main challenges facing Europe today is how to bridge the digital divide that exists between the continent and its regional neighbours. In the Mediterranean and Middle East region, the development of the Internet Society has been hindered by high prices, little competition and political differences. EUMEDCONNECT has encountered and conquered all these obstacles, to create the first research and education network for the region. The project is providing a catalyst for improving infrastructure and Internet access across the region as a whole.

Bridging the digital divide

EUMEDCONNECT has a direct link to GÉANT2, the pan-European multi-gigabit research and education network. The Mediterranean partners are now able to collaborate with colleagues throughout Europe and beyond. Indeed, with GÉANT2's connections to other world regions such as North America, Latin America, Asia and the Middle East, Mediterranean researchers can now operate on a truly global scale.

The EUMEDCONNECT project is co-ordinated by DANTE, in partnership with the National Research and Education Networks (NRENs) of four European countries. These are France (RENATER), Greece (GRNET), Italy (Consortium GARR) and Spain (RedIRIS). All are experienced in establishing national networks and with working in the region. In addition, the European Commission not only provides project financing but valuable political support and encouragement.

The Mediterranean NREN partners involved in EUMEDCONNECT are Algeria, Cyprus, Egypt, Israel, Jordan, Lebanon, Malta, Morocco, the Palestinian Authority, Syria, Tunisia and Turkey.

The project is currently funded until June 2006 with 10M Euro from the European Commission's EUMEDIS Programme, which aims to promote the information society within the region. This funding represents 80% of the total cost, with the remainder being provided by the project partners. Work is currently ongoing in addressing the sustainability of the network when funding ends.

2004: Creating the network

The first production circuit was installed on 11th May 2004, with a connection to Morocco. This was followed on 28th May by a link to Tunisia, allowing researchers in both countries to collaborate freely for the first time.

The diagram on page 11 shows the current network topology. As of May 2005, ten of the twelve project partners are either successfully connected, or in the process of connecting. Connected partners are now benefiting from a high capacity Internet network dedicated to users of the research and academic community. The first phase of implementation saw the establishment of links to Morocco, Algeria, and Tunisia. Existing GÉANT links to Israel, Cyprus, Malta and Turkey connect these NRENs to the EUMEDCONNECT network.

The most recent phase of development has seen the connection of Egypt to the network and connections to Jordan and Syria are being implemented. Points of Presence have been established in Sicily at Catania, and in Cyprus at Nicosia. A recent upgrade to the Madrid – Algeria connection to 155 Mbps demonstrates that user demand for the network is increasing all the time.



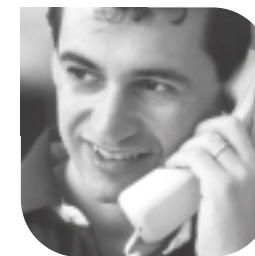
Karin Bane



David West



Martin Mogensen



Roberto Sabatino



Krystyna Owen

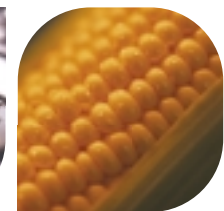
2005: The network expands

The year ahead will focus on connecting new partners, upgrading routes as necessary and raising awareness of the network to potential users. To this end, DANTE and EUMEDCONNECT attended the first EUMEDIS International Conference in Jordan in April 2005. The conference provided a forum for reflection on four years of EUMEDIS activities, whilst at the same time strengthening the visibility of the programme. At the conference stakeholders were able to convene with a group of local and international policy makers, to consolidate achievements and drive future development.

The project has successfully provided cohesion to regional research networking, and acted as a focus for the strengthening of political and working relationships amongst the project partners. With the support of the Mediterranean partners and their governments, DANTE and the NRENs have been able to overcome local difficulties such as poor infrastructure or monopoly providers. Overcoming these regional difficulties makes the creation of the network all the more rewarding. The challenge for the year ahead is to ensure that the benefits achieved so far are sustained and strengthened.

Useful Links:

- www.eumedconnect.net
- www.medforsit.net
- www.strabon.org
- opera-oberta.liceubarcelona.com



Applications

Research networking has benefits that extend far beyond the academic community. The provision of good quality, high capacity telecoms infrastructure can benefit European/Mediterranean collaborative projects in such fields as e-health, e-learning and e-culture.

E-learning

EUMEDCONNECT is available for use by non-commercial applications, including other EUMEDIS projects such as MEDFORIST. This project has recently expressed its interest in using EUMEDCONNECT, and is a Euro-Mediterranean project developing and deploying shared IST learning resources. MEDFORIST is planning to move its data centre to Morocco and will use EUMEDCONNECT.

Plans also currently exist for the connection of Egypt's Alexandria Library to the network allowing the region's rich cultural history to be shared online to a global audience.

E-culture

MEDFORIST will join projects such as Strabon, which are already benefiting from the advanced bandwidth and international connections offered by EUMEDCONNECT. Strabon aims to encourage the expansion of the information society within the region. It will also develop multimedia information systems for cultural heritage and sustainable tourism. Consisting of 19 partners in 12 countries, the project brings together researchers, historians and archaeologists to create a cooperation network.

The Opera Oberta project will utilise the high capacity and international connections that EUMEDCONNECT delivers. The project uses videoconferencing to stream operatic performances and accompanying course instruction to students. The high-bandwidth visual and audio needs of the project are met by the network.

E-health

Regional e-health projects similar to the T@lemmed project in Latin America, can use the network to remotely diagnose patients and prescribe treatments, despite being located hundreds, or even thousands of kilometres apart. Further details on T@lemmed can be found on page 09.

The EUMEDCONNECT network has also been selected to be used for the first EU/MED grid computing project planned to start in late 2005.

TEIN2: East Meets West

Wide disparities are evident in the state of research and education networking in the Asia-Pacific region. Some countries, like Korea have advanced research networks, whilst others such as Indonesia and Vietnam are still in the early stages of development. The current interconnectivity of National Research and Education Networks (NRENs) does not adequately support Research and Education activities at a regional level. The Trans-Eurasia Information Network 2 (TEIN2) project provides a remedy to this by creating an extensive Asian regional research network with connections to Europe.

TEIN2 has three main objectives

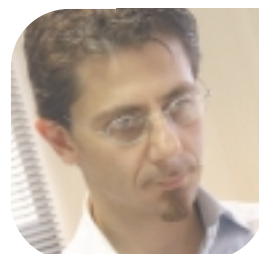
- 1) Increase direct Internet connectivity for research and education between Europe and Asia
- 2) Improve intra-regional connectivity within Asia
- 3) Act as a catalyst for the development of national research networking in the developing countries in the Asia-Pacific region.

The project aims to achieve these objectives by building and operating two key elements in networking between Europe and Asia:

- 1) Asian regional infrastructure connecting TEIN2's Asian partners
- 2) Connectivity between the TEIN2 regional backbone and GEANT.



Boris Mimeur



Maurizio Molina



Nicolas Simar



Otto Kreiter



Simon Watts



Peter Nancollis



Sam Kyakilika



Michael Enrico

2004: Enhancing Potential

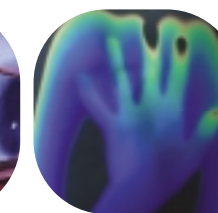
Vital for the development of the region, the project is providing support to both researchers and pedagogues, enhancing the potential for future international research collaboration. With research becoming an increasingly global activity, initiatives such as TEIN2 will ensure Asian researchers are provided with the world's premier facilities and connected to their counterparts across the globe.

Initiated in Spring 2004, TEIN2 will contribute to the further development of the Trans-Eurasia Information Network (TEIN) initiative which has seen Paris and Seoul connected since November 2001 at 2Mbps, then at 34Mbps in November 2003. This was recently upgraded to 155 Mbps. With demand for access to this connection far exceeding supply capabilities, the need for further links to the region with vastly increased capacity is clearly demonstrated. TEIN2 aims to improve research and education IP connectivity between Europe and the Asia-Pacific region- and within the Asia-Pacific region - to benefit developing Asia-Europe Meeting (ASEM) countries and encourage growth in national research networking.

Encouraging Growth

DANTE will achieve TEIN2's objectives by building, managing and operating an Asian regional infrastructure connecting the Asian partners, in addition to facilitating connectivity between the TEIN2 regional backbone and GEANT- the pan-European research and education network which ultimately provides connections to over 3500 research and education institutions in up to 34 countries, as well as to other world regions.

The TEIN2 Technical Committee met for the first time in May 2004 in Malaysia and contributed to a number of feasibility studies which assessed the current state of connectivity in the region and ascertained the requirements of the Asian project partners. The NREN representatives of both European partners- RENATER (France), SURFnet (Netherlands) and UKERNA (U.K.) - and Asian partners now have the important role of ensuring that the organisations and the governments they represent are well informed of the project's progress, as well as acting as the national interface for obtaining support as and when required. The Asian partners are Brunei, China, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Thailand, and Vietnam. Australia is also working closely with the project.



2005: Second Phase Underway

With this first phase now complete, the European Union's EuropeAid Cooperation Office has given the go-ahead to begin implementation of the network. Stimulating the development of the region's national networks and addressing the problems of the 'digital divide', TEIN2 is building upon the successes ably demonstrated by other DANTE initiatives- including EUMEDCONNECT and ALICE- across Europe, Latin America and other world regions. In complementing these and other established initiatives, TEIN2 aims to ensure that best practices are shared and best value for end-users is achieved through the project. In support of this, TEIN2 combines the expertise and experience of both its European and Asian partners in building and managing state-of-the-art research networks.

After a successful invitation for connectivity tenders, DANTE is now evaluating the encouraging responses to the call. TEIN2 is currently in the process of planning a network scheduled to run until the end of 2007, with the first connections in service from late 2005.

Transferring the European Approach

The success of research networking in Europe show that benefits derived by society as a whole are facilitated by supporting innovation and research. The European Union's desire to transfer this working approach to other world regions represents a major opportunity for both the academic and wider communities involved with the TEIN2 network and will stimulate the exchange of ideas and the development of future joint initiatives. In providing a powerful and reliable communications channel, TEIN2 signals an end to the isolation of large communities of academics in both Europe and the Asia-Pacific region.

Useful Links:

- www.tein2.net
- www.apan.net

The full financial statements, directors' report and auditors' report are included in a separate document entitled DANTE Annual Report and Accounts 2004. This is available on request and online at www.dante.net

Income and Expenditure Account

For the year ended 31 December 2004

	Notes*	2004 € '000	2003 € '000
Turnover	2	48,968	48,511
Cost of sales		45,421	45,747
Gross Surplus		3,547	2,764
Administrative expenses	3	(3,758)	(2,747)
Foreign exchange (loss)/profit		(1)	17
Operating (Loss)/Profit	4	(212)	34
Interest receivable		218	140
Surplus On Ordinary Activities Before Taxation		6	174
Tax on surplus on ordinary activities	6	194	(58)
Surplus On Ordinary Activities After Taxation	13	200	116

There are no recognised gains or losses which have not been reflected in the above results for the current or prior period.

* Accompanying notes to the financial statements are published online at www.dante.net

2004 Financial Statements

All 2004 and 2005 Directors

R Arak (retired July 2004)
J Boland
J Gruntorad
E Valente (retired Jan 2005)
K Ullman (appointed Chairman Jan 2005)
D Vandromme (appointed Director 2005. Retired as Chairman Jan 2005)

Secretary

M J Scott

Auditors

Ernst & Young LLP
Compass House
80 Newmarket Road
Cambridge
CB5 8DZ

Bankers

Barclays Bank plc
Bene't Street Branch
P.O. Box 2
Cambridge
CB2 3PZ

Solicitors

Manches
3 Worcester Street
Oxford
OX1 2PZ

Registered Office

3 Worcester Street
Oxford
OX1 2PZ



Matthew Scott

Balance Sheet

As at 31 December 2004

	Notes*	2004 € '000	2003 € '000
Fixed Assets			
Tangible assets	7	2,668	5,365
Current Assets			
Debtors	8	30,670	18,258
Cash at bank and in hand	9	42,469	17,099
		73,138	35,357
Creditors: amounts falling due within one year	10	68,900	34,015
Net Current Assets		4,239	1,342
Total Assets		6,907	6,707
		6,907	6,707
Capital and Reserves			
Called up share capital	12	1,576	1,576
Capital contributions	13	35	35
Income and expenditure account	13	5,296	5,096
Total Shareholders' Funds – Equity:		6,907	6,707

D Vandromme
Director
19th May 2005

*Accompanying notes to the financial statements are published online at www.dante.net

Statement of Cash Flows

For the year ended 31 December 2004

	Notes*	2004 € '000	2003 € '000
Net Cash Inflow From Operating Activities	14(a)	26,780	7,815
Returns on Investments and Servicing of Finance	14(b)	218	140
Taxation	14(b)	(6)	-
Capital Expenditure and Financial Investment	14(b)	(1,620)	(4,431)
Management of Liquid Resources	14(b)	(16,612)	(2,787)
Increase in Cash		8,760	737

A reconciliation of net cash flow to total changes in cash at bank and in hand and short term deposits is given in note 14(c) to the financial statements.

*Accompanying notes to the financial statements are published online at www.dante.net

DANTE Shareholders

Organisation	Country	No. of shares
ARIADNET	Greece	22,000
ARNES	Slovenia	22,000
CESNET	Czech Republic	22,000
DFN	Germany	165,000
FCCN	Portugal	22,000
GARR	Italy	165,000
HEAnet	Ireland	22,000
HEFC-E on behalf of JISC (UKERNA/JANET)	United Kingdom	165,000
HUNGARNET	Hungary	22,000
NORDUnet	Nordic Countries (Denmark, Finland, Iceland Norway, Sweden)	82,500
RedIRIS	Spain	55,000
RENATER	France	165,000
RESTENA	Luxembourg	22,000
SURFnet	Netherlands	110,000
SWITCH	Switzerland	110,000



DANTE Staff (as of May 2005)

Name	Job title	Country
Dai Davies	General Manager	UK
Hans Döbbeling	General Manager	DE
Anton Antonov	Systems Administrator	RU
Karin Bane	Secretary/ Administrator	UK
Rachael Beale	Webmaster	UK
Maarten Büchli	Network Engineer	NL
John Chevers	Project Manager	UK
Michael Enrico	Network Engineering and Planning Manager	UK
Marian Garcia Vidondo	Operations Manager	ES
Alex Gosnell	Secretary/ Administrator	UK
Milos Karapandzic	Project Manager	CS
Otto Kreiter	Network Engineer	RO
Loukik Kudarimoti	Network Engineer	IN
Sam Kyakilika	Network Engineer	ZA
Boris Mimeur	Network Engineer	FR
Martin Mogensen	Network Engineer	DK
Maurizio Molina	Network Engineer	IT
Peter Nancollis	Project Accountant	UK
Krystyna Owen	Project Accountant	UK
Anand Patil	Head of Systems	IN
Jean Reynolds	Secretary/ Administrator (part-time)	UK
Dale Robertson	Public Relations Manager	UK
Toby Rodwell	Network Engineer	UK
Ana Romero Oses	Network Engineer	ES
Roberto Sabatino	Chief Technical Officer	IT
Matthew Scott	Chief Financial Officer	UK
Nicolas Simar	Network Engineer	BE
Helga Spitaler	Public Relations Officer	IT
Tim Streater	Network Engineer	UK
Susan Taylor	Finance Manager	UK
Simon Watts	Public Relations Officer	UK
David West	Project Manager	UK
Waldemar Zurowski	Network Engineer	PL