Tutorials and Short Courses

**Tutorial Mo A0**
**Life Cycle of a Project** chaired by Enrico BANFI (Pirelli)
Monday, March 29th, 2004
11:00 – 12:30
Room: Camille Blanc

The Tutorial aims at providing inputs on all aspects of submarine cable projects, from their genesis to their operation. It will detail, step by step, actions and tasks required from a cable promoter to turn its initial concept into a robust and cost effective project and leading edge submarine cable system.

The most frequent project structures will be reviewed, from the “Consortium Cable” to the “Private Cable” emphasizing the aspects specific to each structure. Key issues such as competition, technology, risks, cable route, landing sites, system configuration, contract negotiation, construction & maintenance agreements and financing aspects will also be discussed together with more practical considerations such as work permits and authorizations-to-land-a-cable, station construction, commissioning and acceptance, maintenance, NOC and system upgrades.

**Alain Paul Leclerc** is a well known figure in the submarine cable business, as he has developed and built some of the largest submarine cable systems ever deployed. He has an initial experience as a scientist in theoretical physics and research engineer, followed by 15 years with France Telecom in telecommunication projects development, implementation and management. Alain has promoted and built many global submarine cable infrastructures, including SEA-ME-WE 3: the largest telecommunication network ever deployed in the world, with a total length of 40,000 km, connections to 33 countries, over 90 signatories and 5 suppliers and was instrumental in SAT3/WASC/SAFE system, linking South Asia, Africa and Europe.

**Jean-Baptiste Thomine** has been involved for more than 15 years in many technological and technical aspects of submarine cable systems. From 1988 to 1998 he developed the latest generations of optical submarine systems for France Telecom R&D, focussing on the computer modelling of long-haul WDM optical transmission system consisting of optical amplifiers, including soliton technology. Jean-Baptiste was instrumental in the technological and technical design of SEA-ME-WE 3, where he chaired several working groups while managing the QA team.

**Loic Le Fur** has about 10 years experience in the submarine cable business, on both carriers and supplier sides. He has spent the first part of his career as a member of France Telecom/FCR team in charge of cable ships and submarine cable project development. He was instrumental in the system design, procurement negotiation and implementation management of several long-haul systems such as SEA-ME-WE 3, Atlantis 2 and SAFE projects. Loic then moved to the Paris marketing office of TSSL where he was in charge of marketing and sales matters.
For the last 5 years, Alain, Jean-Baptiste and Loic have been associates in Axiom, a consultancy firm specialised in submarine cable systems, providing strategic consultancy services and technological, technical and commercial support and advice to key players. Alain is CEO of Axiom.

**Tutorial Mo A1**  
**Optical Transmission** chaired by David ROBLES (Tyco Telecommunications)  
Author: Olivier Gautheron (Alcatel)

This tutorial will outline the recent progress which has enabled high capacity transmission submarine optical networks relying on the well known dense Wavelength Division Multiplexing (WDM) technique. The presentation will first go through the enabling technologies for wide bandwidth optical amplifier schemes based on erbium doped fiber or distributed Raman amplification. Then, the different types of fiber and associated features – with first of all the chromatic dispersion – will be discussed and illustrated through long haul transmission experiments. In a third part, this tutorial will report on the efficiency of various signal processing techniques such as modulation formats and forward error correction codes. Finally, some technologies specific to the unrepeatered systems will be presented.

**Olivier Gautheron** graduated from the Ecole Polytechnique in 1986 and Ecole Nationale Supérieure des Télécommunications de Paris in 1988. He then joined Alcatel to work on optical coherent systems and wavelength division multiplexing techniques. In 1994 he moved to Alcatel Submarine Networks where he is currently manager of the System Design Department.

**Tutorial Mo B1**  
**Marine Survey & Cable Routing** chaired by Peter MOLE (GMS)  
Authors: the Submarine Cable Improvement Group (SCIG): Ronald Rapp (Tyco Telecommunications), Mark Lawrence (Alcatel Submarine Networks), Dick Borwick (Global Marine Systems Limited), Takuo Kuwabara (KDDI Submarine Cable Systems)

This tutorial covers all aspects of the marine route planning, route engineering and cable engineering for undersea fiber optic cable systems. It is intended for an audience with some familiarity with undersea cable projects and with marine route planning and survey. The course includes: 1) an overview of how route engineering fits into the overall project cycle; 2) the importance and aspects of cable route planning and Desktop Studies; 3) general guidelines and rules for landing site selection, route selection and cable armoring; 4) specific engineering aspects (alter courses, slack, cable crossings, cable touchdown etc.) from the perspective of the installer and maintainer 5) documentation and charting and GIS tools used in route engineering. Details of marine survey are not covered and are left to other tutorials. Although this is a broad overview of many relevant topics, discussion of any special topic of interest with SCIG is encouraged.
The SCIG is an informal forum of several major industry suppliers which places emphasis on installation and maintenance. Its mission is to develop cost-effective approaches and solutions to improve cable reliability and to communicate these to relevant international parties.

**Dr. Ronald Rapp**, Director of Cable Engineering and Technology at Tyco Telecommunications has 27 years experience in Oceanography and Ocean Engineering projects for oil terminals, ship building, sonars, undersea vehicles, telecommunication cable engineering. PhD from Massachusetts Institute of Technology in Hydrodynamics.

**Mr. Mark Lawrence**, Route Survey and Engineering Manager, Alcatel Submarine Networks Ltd, Degree in Geography, and Post Graduate Diploma in Cartography 26 years in survey, - of which 11 were in aerial survey, and 15 in marine survey Fellow of Royal Geographical Society, Associate Fellow Of the Remote Sensing and Photogrammetric Society, Member of the British Cartographic Society, Member of Hydrographic Society

**Mr. Dick Borwick**, Manager Construction Services, for Global Marine Systems Ltd., Dick has over 22 years experience in the submarine cable industry, joining BT (Marine) Ltd in 1981 as a Navigating officer on the cable ships. Since then his career has focused on the installation of submarine telecommunication and power cables in various roles including General Manager Projects, and Product Services Manager. At present he heads up the engineering and solutions team for cable installation projects.

**Mr. Takuo Kuwabara**, Project Management and Marine Engineering of Submarine Cable System Construction. Graduated from Maebashi Technical School, Electric course, Japan

**Commissioning and Acceptance** chaired by Peter MOLE (GMS)

**Author : Corrado Rocca (Pirelli)**

The commissioning and acceptance phase is a fundamental step in the supplying of submarine cable systems. The tutorial will show how this phase is typically performed for repeatered systems, exploiting recent international submarine tenders and contracts to describe the acceptance period concept and the main goals that have to be achieved within the contractual plan of work for the successful commissioning of a system. Some basic concepts related to power budget, main measurement techniques and relevant system parameters are also introduced and discussed.

**Dr. Corrado Rocca** was born in 1966 and graduated cum laude in electronic engineering at Genoa University, Italy in 1990. After 5 years with GEC Marconi, working in the design of optically amplified and SDH systems, he joined Pirelli and is now heading the R&D and manufacturing departments of the submarine business. He is author of several papers and patents in the field of optical communications.
This tutorial is intended to be an introduction to optical transport network architectures. It is not aimed at providing a set of architectural solutions for typical situations an operator may face today. It rather puts the emphasis on the generic issues an operator has to address when defining or redefining the architecture of its transport network(s). These issues are common to all types of optical transport networks: terrestrial long distance and metropolitan networks as well as submarine networks. The tutorial describes a general methodology to tackle these issues. Nevertheless, the description is illustrated with a series of examples borrowed from the long distance terrestrial, metropolitan and submarine domains. A brief presentation of the networks that are beginning to take shape will be given through illustrations.

Yannick Le Louédec was born in Rennes, France, in 1977. He received the Engineering degree in Telecommunications from ENST de Bretagne, France, in 2001. He has been employed by France Telecom R&D since 2001. He has worked on all-optical transport technologies and contributed to studies on the advisability of their introduction in France Telecom's transport networks. He is presently in charge of activities aiming at improving France Telecom's long distance service offer. He is also involved in R&D activities on transport network control plane and on interactions between transport networks and their client networks, as well as in the follow-up of these issues in the standardization bodies.

Like a gourmet meal, a good undersea cable project is a heady mix of ingredients which, when collected, presented and shared in the right way, go to make up a memorable experience. But what are the secret ingredients and how can flare-ups in the kitchen be avoided?

This interactive tutorial aims to answer fundamental questions surrounding project collaboration and economics in today's environment: What makes the difference between project success and failure? What part can your organisation play in the new marketplace? How can project, commercial and engineering risk be shared out in the most cost effective way? How does my project partner's behaviour affect my chances of success?

The dire times faced by the industry over the last 3 years has changed the ingredients. Take a look at what is now needed to build a successful project and how these ingredients are integrated and inter-relate. You will find plenty of new gems, and some spirited debate, on what makes a successful economic basis for cable projects of the future. Old hands and novices will be equally welcome.
Katherine Edwards has been with Cable & Wireless for over 12 years. During this time she has been responsible for managing and implementing satellite engineering projects, privatisation of Cable & Wireless's Inmarsat satellite interests, and more recently responsible for submarine cable projects. She was project director for Apollo, the world's most advanced transatlantic system linking Europe to the USA, and currently runs the Submarine Systems Engineering group in Cable & Wireless Network Services.

After a spell at STC, Keith Schofield joined Cable & Wireless in 1990 where he has worked in engineering, project management and most recently as Director, Client/Account Management in Cable & Wireless Network Services. In his 22-year career he has worked across development, manufacturing, engineering and project management advisory, including the development of a successful transpacific cable project and various regional projects.

**Tutorial Tu C1**  
**Network Management** chaired by Peter BOLAND (Flag Telecom)  
Author: **Jim Baroni (Tyco Telecommunications)**

This tutorial will define the role of Network Management and the basics of acquisition, processing and management of information in accordance with existing Network Management standards. The function and importance of an available and reliable Data Communication Network will be described. The structure and functions of an integrated Operations Support System (OSS) will be addressed, supported by an example of an in-service OSS. Finally but perhaps most importantly, the basics of disaster recovery are described.

The objective of this tutorial is to not only describe the technological fundamentals and standards but also the various aspects of Network Management that highlight its importance from a Network Operator’s perspective.

Jim Baroni received a BSEE from Rutgers University and an MSEE from Drexel University. After RCA Laboratories and AT&T Bell Laboratories he joined AT&T Submarine Systems Inc. in 1992. He has extensive experience in the design of global and regional undersea networks as a Project Engineer and then Director of the Sales Engineering Group at Tyco Telecommunications. Jim is currently Managing Director of the Network/OSS Design, Test & IT departments at Tyco Telecommunications.

**Tutorial Tu C2**  
**Marine Operations** chaired by Keith BROOKS (BT)  
Author: **Chris Lisher (Global Marine Systems Limited)**

A top level view of Marine Operations that reflects on the current environment, the customer base and their service requirements. Having identified the space in which the marine organisation is operating we will discuss the tools and systems in place and some of the issues facing the marine operations team. In the final section we will take a brief
look at the challenges facing a marine operator in the new world, with a particular focus on the future regional market.

**Chris Lisher** is Director of Operations for Global Marine. He is responsible for the supervision of all Global Marine's fleet commanders and offshore superintendents. His role involves all operational functions, which include marine facilities, project management and maintenance operations. He holds a remit for training and development across all levels of the company, as well as mainstream human resources functions including recruitment, policies, employment law, fleet manning and employee communications. Chris has ten years' experience in human resources, having learned many of his skills at first hand. Before coming ashore, Chris spent 19 years at sea, much of it as an installations project manager for BT Marine.

**Tutorial We C1**  **Network Availability** chaired by Dave SHIRT (C&W)
Wednesday, March 31st, 2004
11:00 – 12:30 H
Room : Genevoix

Author : **Dr Patrick R. Trischitta (KDDI-SCS America Inc.)**

This tutorial will focus on the key aspects of Network Availability as it relates to undersea systems contained within global networks. Terms such as outage, unavailable time, and percent available will be defined and methods for their calculation will be given. Using these metrics, the network availability of various network topologies such as unprotected lines, diverse paths, ring networks and mesh networks will be discussed and compared. Methods for keeping network availability high and reducing network outages will be discussed concentrating on backhaul protection, undersea system topology and maintenance as well as higher level diverse routing of traffic.

**Patrick Trischitta** is Vice President and CTO of KDDI-SCS America. For the past 24 years he has worked on most of the major fiber optic undersea systems that have been deployed worldwide including TAT-8 through 14 as well as several systems across the Pacific and to South America. He received the Bachelor’s and Master’s degrees in Electrical Engineering from Georgia Tech and a PhD in Optical Communications from Rutgers University. In 1980 he joined the technical staff of Bell Labs' undersea systems division. In 1995 he was named a distinguished member of the technical staff of AT&T Bell Labs. In 1997 he joined Tyco Telecommunications and held various management positions including Technology Managing Director and CEO of a terrestrial long haul startup company. In 2002, he joined KDDI-SCS America. He holds several patents in the area of fiber optic systems and has numerous publications on the subject. He was elected Fellow of the IEEE for contributions to the design and worldwide deployment of undersea fiber optic communication systems.
Reliability is one of the most important and essential issues for the construction of optical submarine cable systems. Highly reliable systems can be achieved by (a) designing a system with sufficient reliability for the requirements, (b) selecting potentially reliable components, (c) improving the reliability of the components high enough for submarine applications, (d) confirming the reliability of the components and (e) quality control of the production line. These issues are closely related to each other, and none of them can be neglected.

In this tutorial an overview of the above reliability issues will be presented with some actual examples such as laser diodes, WDM components as well as repeaters.

Dr. Yuichi Matsushima graduated from a doctorate course at Waseda University in 1978 and joined KDD R&D Laboratories where he engaged in the research of semiconductor optical devices including reliability. He was appointed Executive Vice President of KDDI R&D Labs. in 2000. In 2003 he became Executive Director of Communication Research Laboratories, Incorporated Administrative Agency, Japan.

Fibre Non Linearity chaired by Corrado ROCCA (Pirelli)

This short course will introduce the subject of modeling optical fiber communication systems, with an emphasis on long-haul systems. The key fiber transmission impairments are chromatic dispersion, non-linearity, and polarization effects. We describe these effects and how they are modeled. In particular the now-widely-used mathematical tool of stochastic differential equations is explained from a simplified, engineering perspective, and the long-widely-used computational split-step Fourier transform technique for solving the fiber propagation equations is reviewed.

Professor Curtis Menyuk is a faculty member at the University of Maryland Baltimore County (UMBC) in the Computer Science and Electrical Engineering Department. He has been at UMBC for more than 16 years. He has published over 170 archival journal articles as well as numerous conference papers. He has co-edited two books. He consults for the US government and the telecommunications industry.

Financing chaired by Fiona BECK (Southern Cross)

The collapse of capacity pricing and the scarcity of investment capital have together led to unprecedented pressure on the cost optimisation and robustness of business plans for new networks. This tutorial will approach the problem from both sides - how to minimise
the cost of a new network, and how to raise the funds to build it. In the first part, Steven Wells (Datawave Limited) will review the key cost elements and their minimisation in the light of clearly defined availability and performance objectives. In the second part, Basil Demerouitis (Central European Trust Company Limited) will address the process of raising capital, how investors analyse proposals, the key elements of a good business plan and some examples of what is currently going on in the market.

**Steve Wells** is a founding Director and CEO of Datawave Limited with over 30 years in the submarine cable industry. Prior to Datawave, Steve was Director of Global Fibre Networks at Price Water House Coopers in London where he was instrumental in developing the line of business, integrating the technical and financial aspects of projects. Steve studied Mechanical Engineering and holds a MBA.

**Basil Demerouitis** is a partner at Central European Trust Company in London specialising in Telecoms and is head of Corporate Finance. Before joining CET he was a director at ING Barings, as banker to the telecom, media and technology sectors. Before that, he was a part of the Bear Stearns corporate finance team in the US. He is a graduate of Cornell University.

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**Short Course Th C2**  
**Raman Amplification** chaired by Veluppillai CHANDRAKUMAR (FT R&D)

**Author:** Dr **Fabrizio Di Pasquale** (Scuola Superiore Sant’Anna)

After a brief introduction on the physical mechanisms governing Raman amplification in silica fibers, this short course will cover the following topics: static and dynamic modelling for designing discrete and distributed Raman amplifiers; noise sources and their impact on amplifier performances; advanced techniques for improved performances in distributed Raman amplifiers including effective reduction of pump-signal four-wave-mixing interactions in co-pumped amplifiers, suppression of penalties induced by parametric nonlinear interaction in counter-pumped amplifiers, time-division-multiplexed pumping schemes and higher order pumping configurations. An all-Raman based ultra-long-haul transmission experiment will be described in which both DCF based discrete amplifiers and bi-directionally pumped distributed Raman amplifiers are used.

**Fabrizio Di Pasquale** was born in Italy in 1963. From march 2002 he is Associate Professor in Telecommunications at the Scuola Superiore Sant’Anna, in Pisa, Italy. He hold a Ph.D in Information Technology from the University of Parma and a five-year Laurea degree in Electrical Engineering from the University of Bologna, Italy. After five years at University College London, he has spent four years in industry as senior optical researcher (Pirelli Optical Systems and Cisco Photonics Italy). His current research interests include Raman and Erbium amplifiers. He has filed 13 international patents and he is the author of over 60 articles.
Oral Sessions

Oral Tu A1  
**Market Consolidation** chaired by Michael RUDDY (Terabit 2004 Consulting)

Tu A1.1. **New Opportunities in Undersea Cable Networks - The Successful Acquisition of Existing Assets**  
William B. Carter, Jr. (Dorado Development Group, LLC)

Tu A1.2. **Healing the Market Through Rational Consolidation**  
Elaine Knickmeyer Stafford, Charles Gerald O’Neill, Robert Martin Price, David Gene Ross (The David Ross Group, Inc.)

Tu A1.3. **Network Linking: An Attractive Use for Existing Infrastructures**  
David Robles, Marsha Spalding and Travis Kassay (Tyco Telecommunications)

Tu A1.4. **Future Demand and the Industry Structure to Supply it**  
Georges Krebs and Leigh Frame (Alcatel)

Tu A1.5. **The Future of the Supply Industry**  
Geoffrey Thornton, Jean Devos and Teijiro (Ted) Kitamura (Don Quixote),

Oral Tu B1  
**Line Design** chaired by Suyama MASUA (Fujitsu)

Tu B1.1. **The Importance of System Research in the Undersea Cable Industry**  
Neal S. Bergano, Morten Nissov and Alexei Pilipetskii (Tyco Telecommunications)

Tu B1.2. **Expansion of Submarine Networks by Alternative Suppliers**  
Colin Anderson (Fujitsu Limited)

Tu B1.3. **Unrepeatered Systems - When to Switch to a Different Technology**  
Eric Brandon, Ludivine Moirot, Marc Fullenbaum, Christophe Drion and Jean-Louis Boussois (Alcatel)
Tu B1.4. **Demonstrations of RZ-DPSK and RZ-DQPSK as Alternative Modulation Formats for Next Generation Submarine Cable Systems**
Katsuhiro Shimizu, Takashi Mizuochi, Kazuyuki Ishida, Tatsuya Kobayashi, Jun’ichi Abe, Kaoru Kinjo and Kuniaki Motoshima
(Mitsubishi Electric Corporation)

Tu B1.5. **Over Tera B/s Capacity 10GB/s-DWDM Transmission Systems with DMF and their Upgradeability Study by 40GB/s Technology**
Ryu Yokoyama, Ryuji Aida, Katsuyuki Mino, Yoshihisa Inada, Rintaro Kurebayashi, Toshiharu Ito, Kenichi Yoneyama, Takaaki Ogata, Shuji Yamashita, Yasuhiro Aoki (NEC Corporation)

Oral Tu A2
**Environment & Commercial** chaired by Georges KREBS
(Alcatel)

Tu A2.1. **Is there a Silver Lining to Environmental Permit Requirements?**
Denise Marie Toombs (Environmental Resources Management), Paul Betts (Global Crossing)

Tu A2.2. **Environmental Considerations for Cable Installation Approvals**
*Case Study: EU Habitats Directive 1992 / Natura2000*
Mark Critchley (Fugro Survey Ltd)

Tu A2.3. **Shore Ends to Re-Use or Not to Re-Use**
Stephen Dawe (Cable & Wireless), Tony Frisch (formerly Alcatel), Barbara O’Dwyer (Level 3) and Denise Toombs (Communications & Environmental Resources Management)

Tu A2.4. **Cable Operators & International Wholesale Network Providers: Collaborative Cost Control and Market Opportunities**
Michael Costin (Reach Ltd)

Tu A2.5. **Insurance Approach for the Undersea Maintenance Markets**
Lawrence Edward Cahill (Lawrence E. Cahill & Co.)

Tu A2.6. **Risk Management**
Rick Cook (Alcatel)
Oral Tu B2  Equipment & Component chaired by Koji GOTO (KDDI-Submarine Cable Systems Inc.)

Tu B2.1. The Impact of Block Turbo Code FEC on Submarine Cable Systems
Katsuhiro Shimizu, Takashi Mizuochi, Kazuhide Ouchi, Tatsuya Kobayashi, Yoshikuni Miyata, Kazuo Kubo, Masashi Akita, Hitoyuki Tagami, Hideo Yoshida and Kuniaki Motoshima (Mitsubishi Electric Corporation)

Tu B2.2. System Powering - How to Make Operation Easier
Alain Cordier, Thierry Verhaege, Nadine Hervé, Emmanuel Bourgninaud, Gérard Vila, Patrick Méjasson, Tom Shirley (Alcatel) and Tony Frisch (formerly Alcatel)

Tu B2.3. Optical Amplifier Technologies for Long Span Submarine Cable Systems
Yoko Kurosawa, Noriyuki Takeda, Hidenori Taga and Koji Goto (KDDI-Submarine Cable Systems Inc.), Toshiyuki Tokura (Mitsubishi Electric Corporation),

Tu B2.4. The 980 nm Pump Laser Experience: Prediction and Practice
Jeff Gardner, Barbara Dean and Anna Shadagopan (Tyco Telecommunications)

Tu B2.5. A Design Concept for a 40 GBit/s CS-RZ DPSK Transponder with Stable Performance
Kenkichi Shimomura, Kazuyuki Ishida, Takashi Mizuochi, Katsuhiro Shimizu, Junichi Abe and Kuniaki Motoshima (Mitsubishi Electric Corporation)

Stefano Faralli, Giovanni Sacchi, Gabriele Bolognini and Fabrizio Di Pasquale (Scuola Superiore Sant'Anna), Simone Sugliani (Photonic Networks National Laboratory, CNIT)
Oral We A1  Marine Operations  chaired by Mick GREEN (BT)
Wednesday, March 31\textsuperscript{st}, 2004
11:00 - 12:30 H
Room Prince Pierre

We A1.1.  Polarnet – Engineering a Cable System Through the Arctic
Charles Jeremy Brown, Amad Purtow and Oleg Malov (Polarnet Project Ltd.)

We A1.2.  Risk Assessment Methodology and Optimisation of Cable Protection for Existing and Future Projects
Peter Allan and Robin Comrie (SEtech Limited)

We A1.3.  Advanced 3m Burial System and Application into Heavy Fishing Area
Makoto Saitoh (NEC Corporation), Keith Dicker (Global Marine Systems Limited), Noriyuki Fujiwara, Yutaka Kiuchi and Tomohisa Nishiyama (NEC Telnetworx Limited)

We A1.4.  Post-Lay Inspection and Burial : C2C Case Study
Robert Munoz (Tyco Telecommunications)

We A1.5.  Controlling Cableship People Operating Costs
Chris Lisher (Global Marine Systems Limited)

Oral We B1  Emerging Markets  chaired by Stéphane SOULIE (France Telecom)
Wednesday, March 31\textsuperscript{st}, 2004
11:00 - 12:30 H
Room : Camille Blanc

We B1.1.  The Future of the Submarine Cable Systems Market : The Rise of Regional Systems
Thomas A. Soja, John Manock and S. Hansen Long (T Soja & Associates, Inc.)

We B1.2.  Fat Pipes for Thin Routes
A Silver Lining to the Depressed Undersea Market
Robert S. C. Munier and Mark G. McGilvray (Tyco Telecommunications)

We B1.3.  The Long and the Short of Regional Submarine Networks
Jan Stringer (Global Marine Systems Limited)

We B1.4.  Cheaper at any Cost – What are the Pros and Cons?
Pierre Tremblay (Alcatel) and Tony Frisch (formerly Alcatel)
We B1.5. **The Middle East - A Case Study on the Connection Between Telecommunications and International Relations**
Amos Lasker (Mediterranean Nautilus Limited)

Oral We A2 **Network Operations** chaired by Wallace DAWSO N (Dorado Development Group)

Wednesday, March 31st, 2004
14:00 – 15:30 H
Room : Prince Pierre

We A2.1. **Network Management System - How far Should it go?**
Christophe Drion, Graeme Thain, Richard Cruau and Emmanuel Delanoue (Alcatel)

We A2.2. **“Your Global Network On A Screen Near You Now!” The Future Of Operating Submarine Networks**
Philip Playford and Edward West (Cable & Wireless)

We A2.3. **Web-based Operation Support System with Flexible Scalability For Global Submarine Cable Network**
Norio Yanagi, Asuka Manki, Naoyuki Iwashita, Midori Suwaki and Kenichi Nomura (NEC Corporation)

We A2.4. **Service Availability : From Sensitivity Studies to Performance Improvement**
Marco Villa, Tiziana Tomasi and Corrado Rocca (Pirelli Submarine Telecom Systems), Massimo Tornatore (Dept. of Electronics and Information), Guido Maier and Aldo Righetti (Corecom)

We A2.5. **Worldwide Trends in Submarine Cable System Faults**
Submarine Cable Improvement Group (SCIG) : Maurice E. Kordahi, PhD and Seymour Shapiro (Tyco Telecommunications)

Oral We B2 **Legal & Finance** chaired by Robert L. DRAKE (Macquarie Bank Limited)

Wednesday, March 31st, 2004
14:00 – 15:30 H
Room : Camille Blanc

We B2.1. **Network Financing and the Impact on Industry Directions**
Robin Russell (Australia-Japan Cable)

We B2.2. **The new Realities of Financing Submarine Fiber Optic Networks**
Glenn S. Gerstell (Milbank)

We B2.3. **How to React When Your Company faces Chapter 11**
Phil Metcalf (Global Crossing)
We B2.4. **IRUs, Leases, Hybrids**  
*Capacity Solutions for the New Era of Telecom*  
Andrew Kowalik (Tyco Telecommunications)

We B2.5. **Submarine Fibre and the Law**  
Mike Conradi (Baker & McKenzie)

**Oral Th A1**  
*Network Architecture* chaired by Volkmar RO EMPKE (T-Systems)

**Th A1.1.** **Benefits of Mesh Type Architectures in Meeting the Needs of Todays Transatlantic Networks**  
Josephine Conroy, Bob Kelly and Stephen Wills (Level 3 Communications Limited)

**Th A1.2.** **Converting Ring-Based Architectures to Mesh**  
Michael Gemelos and Matthew Ma (Tyco Telecommunications)

**Th A1.3.** **Intelligent Protection and Restoration for Submarine Networks**  
Laurence-Patrick Doyle, Gert Grammel and Thibault Burdin de St. Martin (Alcatel)

**Th A1.4.** **Submarine Systems in Modern end-to-end Optical Solutions**  
Matthias Meyer and Bernd Hildebrandt (Siemens AG)

**Th A1.5.** **Operator's View on the Technology Evolution for Optical Transport Networks**  
Hisao Nakajima (France Telecom R&D)

**Oral Th B1**  
*Cable Design* chaired by Marsha SPALDING (Tyco Telecommunications)

**Th B1.1.** **International Standards for Undersea Cable System Testing**  
Submarine Cable Improvement Group (SCIG) : Maurice E. Kordahi, PhD and Seymour Shapiro (Tyco Telecommunications), Gordon Lucas and Kelvin Moore (Alcatel)

**Th B1.2.** **Dispersion Managed Fibre Spans Optimised for Submarine Links**  
Lars Grüner-Nielsen, David Peckham, Robert Lingle and Ole A. Levring (OFS)
Th B1.3. **Cable Robustness**  
Trevor Taylor (BT Global Services) and Andrew Levins (Ocean Cable Technologies Limited)

Th B1.4. **Optimization of Effective Area Managed 350km Unrepeated Transmission Lines Using Pure Silica Core Fibers with Distributed Raman Amplification and their Reliability**  
Toshiyuki Miyamoto and Masayuki Shigematsu (Sumitomo Electric Industries Limited)

Th B1.5. **Undersea Cable Jointing Time Analysis - Worldwide**  
Universal Jointing Consortium (UJC) : Maurice E. Kordahi, PhD, Jeremiah Mendez, Robert K. Stix (Tyco Telecommunications), Sergio Walter Grassi (Pirelli Submarine Telecom System), Stewart Ash and Craig Beech (Global Marine Systems Limited)

Oral Th A2  
**Reliability & Availability** chaired by Dr Yasuhiro AOKI (NEC)

Th A2.1. **Submarine Network Reliability - from Equipment to end-to-end Network**  
Yu Rong Zhou, Paul Delve and Andrew Lord (BT), Tony Frisch (formerly Alcatel)

Th A2.2. **Importance of Operational Reliability in Submarine Systems**  
Isabelle Boyer Heard, Suzanne Salaün and Chandrakumar Veluppillai (France Telecom R&D)

Th A2.3. **Network Availability and Disaster Recovery: Operational & Design Considerations**  
Jacques Gros, Peter Barletto, Mounir Merhi, Linda Adams, James Baroni (Tyco Telecommunications)

Th A2.4. **Reliability - When is a Failure significant?**  
Constantinos Dimopoulos, Martin Guy (Alcatel) and Christopher Little (formerly Alcatel)

Th A2.5. **Impact of High Optical Power on Fibre Reliability**  
Edmund Sikora, Dave McCartney, Kristan Farrow, Russell Davey (BT)
Non Telecom Applications chaired by Phil METCALF (Global Marine Systems Limited)

Gene Massion (Monterey Bay Aquarium Research Institute), Kenichi Asakawa (JAMSTEC), Alan D. Chave (Woods Hole Oceanographic Institution), Bruce Howe and Tim McGinnis (University of Washington), Peter Phibbs (Mallin Consultants Limited), Dave Rodgers (Jet Propulsion Laboratory), Yuichi Shirasaki (JAMSTEC) Hitoshi Mikada and Katsuyoshi Kawaguchi (The University of Tokyo)

Th B2.2. A New Challenge and Opportunity for the Submarine Telecommunications Industry - Ocean Observatory Networks
Alan Chave (Woods Hole Oceanographic Institution) and Gary Waterworth (Alcatel)

Th B2.3. Friend or Foe: Working with the Offshore Renewable Energy Market
Dick Borwick (Global Marine Systems Limited), Chris Butler (Cable & Wireless PLC)

Th B2.4. Wet Plant Trends and Challenges for Offshore Applications
Marc Fullenbaum, Yves Mayolle, Yves Charles (Alcatel), Jean-Pierre Odier (Alda Marine)

Th B2.5. Leveraging Cableships 24 X 7 Capability
Philip Footman-Williams (Tyco Marine S.A.)
**Poster Sessions**
Wednesday, March 31\textsuperscript{st}, 2004 : 15:30 H - 18:30 H
Room : Diaghilev

**Poster We 1  Reshaping the System Supply Industry**

**Poster We 1.1.** The Northwestern Pacific Telecommunication Market  
Hisao Imada (Dokai Marine Systems Limited)

**Poster We 1.2.** Structural Change in Submarine Telecomms and the Potential for Cable Maintenance  
Murray Eldridge (Global Marine Systems Limited)

**Poster We 1.3.** The Market for Marine Maintenance and Installation  
Ove Smidt (Alcatel)

**Poster We 1.4.** Restarting the Crank : Realigning Submarine Systems Manufacturing While Preparing for Future Demand  
Patrick Laverty, Barbara Dean and Jonathan Dufour (Tyco Telecommunications)

**Poster We 2  Market Horizon : The Nature of New Projects**

**Poster We 2.1.** Cost Effective Capacity Enhancement  
Lynsey Jane Swatton (Cable & Wireless)

**Poster We 2.2.** Will the Private Systems Sector Revive or was it a one-time Phenomenon of the Dot.Com era?  
Zvika Caspy (Mediterranean Nautilus Limited)

**Poster We 2.3.** Consortiums. Coming Back to the Future?  
Angel Martín (Telefónica de España S.A.U.)

**Poster We 2.4.** Stretching the Commercial Viability of Amplified Cable Systems  
Jeffrey Farrington and Michael Hynes (Azea Networks Ltd)

**Poster We 3  Bandwidth Markets & Underlying Demand**

**Poster We 3.1.** The Role of the Wholesale Bandwidth Provider - After the Dust Settles  
Andrew Kowalik (Tyco Telecommunications)
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Wholesale Markets: Dormant or Gone Forever?
Anne D. LeBoutillier, S. Hansen Long, John Manock and
Thomas A. Soja (T Soja & Associates, Inc.)

Poster We 3.3. Charting the Telecom Boom: Comparative Analysis of
Network Industries
Nikos Nikolopoulos (Tyco Telecommunications)

Poster We 4 Risk Management and Commercial

Poster We 4.1. Securing Submarine Systems
Jonathan Avital (Cable & Wireless)

Poster We 4.2. Key Factors of Differentiated Services for Transport
Networks
Yannick Le Louedec (France Telecom R&D)

Poster We 4.3. Evolving Cable Maintenance Agreements
Keith Brooks and Bob Greenfield (BT Global Services)

Poster We 5 Costing, Budgeting and Planning

Poster We 5.1. Suggestions for Cooperatively Reducing System
Construction Costs
Debra Brask and Bill Meiners (Tyco Telecommunications)

Poster We 5.2. Project Management for a Complex and Evolving
Industry - Creating a Value Added Proposition
Richard C. Mondello (Dorado Development Group, LLC)

Poster We 5.3. Improved O&M Budget Management
Dec Wallace (BT Global Services)

Poster We 5.4. Permit Delays - Bad Luck or bad Management?
Roy Carryer (Alcatel)

Poster We 6 Financing and Legal

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Cable Industry
Robert L. Drake (Macquarie Bank Limited)
**Poster We 6.2.**  **Project Financing Trends in the Post Crash Telecom World**  
Nikos Nikolopoulos (Tyco Telecommunications) and Bill Delphos (Delphos International)

**Poster We 6.3.**  **Chapter 11 Bankruptcy: Shield or Sword?**  
Richard Nilsson (Alcatel)

**Poster We 7**  **Improving Line Performances**

**Poster We 7.1.**  **64x20 Gb/s DQPSK Transmission Experiment over 2000 KM**  
Roberto Cigliutti, Diego Mottarella, Andrea Pozzi and Corrado Rocca (Pirelli Submarine Telecom Systems), Aldo Righetti, Pierpaolo Boffi, Lucia Marazzi, Livio Paradiso, Paola Parolari, Dario Setti, Rocco Siano and Mario Martinelli (CoreCom)

**Poster We 7.2.**  **Comparison of Transmission Performance Between DMF and NZDSF**  
Eiichi Shibano, Akira Higisawa, Yuuichi Yamada, Hidenori Taga and Koji Goto (KDDI Submarine Cable Systems Inc.)

**Poster We 7.3.**  **A Novel Model of Cross Phase Modulation in Long-Haul WDM Optical Systems**  
Andrea Carena (1,2), Paolo Cobetto Ghiggia (1), Vittori Curri(1,2),  
(1) Optical Communications Group, Politecnico di Torino,  
(2) Alps Telecommunications Software

**Poster We 7.4.**  **Best Optical Filtering for Duobinary Transmission in ASE Noise-Limited Optical Systems**  
Gabriella Bosco(1), Andrea Carena (1,2), Vittori Curri (1,2), P. Poggiolini(1,2),  
(1) Optical Communications Group, Politecnico di Torino,  
(2) Alps Telecommunications Software

**Poster We 7.5.**  **The Benefits of DPSK Modulation Formats for Submarine Long Haul Systems**  
Loic Becouarn, Ghislaine Vareille and Jean-François Marcerou (Alcatel)

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Mark Enright, Seymour Shapiro and Rong Zhu (Tyco Telecommunications)
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Alexei Pilipetskii, Alan Lucero, Bill Anderson, Yi Cai, Li Liu and Neal S. Bergano (Tyco Telecommunications)

Poster We 7.8. **Trans-Oceanic 40GB/s-based WDM Transmission Systems with over Tb/s Capacity by Novel Optical Amplifier and Dispersion-Managed-Fiber Technologies**
Yoshihisa Inada, Hiroto Sugahara, Mitsunori Morisaki, Toshiharu Ito, Kiyoshi Fukuchi, Takashi Ono and Takaaki Ogata (NEC Corporation)

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Emilio J. Gualda and Juan P. Torres (Universitat Politecnica de Catalunya), Roberto Cigliutti and Corrado Rocca (Pirelli Submarine Telecom Systems)

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Philip Nibbs and Colin Meaklim (Nortel Networks)

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Hidenori Taga, Yuichi Yamada, Eiichi Shibano, Yoko Kurosawa and Koji Goto (KDDI-SCS), Kazuyuki Ishida, Toshiyuki Tokura and Katsuhiro Shimizu (Mitsubishi Electric Corporation)

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Patrick R. Trischitta and Koji Goto (KDDI-SCS America), Yojiro Osaki (Mitsubishi Electric Corporation)
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Jonathan Nagel, David Cornwell, Henry Edwards, Steven Evangelides, Nigel Taylor, Eric Urruti and Mark Young (Red Sky Systems)

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Vladimir Karpov, Serguei Papernyi, Vladimir Ivanov and Wallace Clements (MPB Communications Inc.), Tetsuaki Araki and Yasushi Koyano (Sumitomo)

Poster We 8.9.  Streamlining Transmission Link Topology for Today’s Markets
Ekaterina A. Golovchenko, Dmitriy I. Kovsh, Michael Vaa and Stuart M. Abbott (Tyco Telecommunications)

Poster We 8.10.  40 Gb/s Technology for Undersea Systems
Morten Nissov, Jin-Xing Cai, Li Liu, Yi Cai, Alan Lucero, Georg Mohs, Alexei N. Pilipetskii and Neal S. Bergano (Tyco Telecommunications)

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Benoit Kowalski (FLAG TELECOM)

Poster We 9.2.  Low Cost in-Service Upgrade Using ASE Dummy Lights
Takanori Inoue, Eiichi Shibano, Hidenori Taga, and Koji Goto (KDDI Submarine Cable Systems Inc.)

Poster We 9.3.  Transmission and System Technologies Enabling Legacy System Upgrades
Joerg Schwartz, Stuart Barnes, Sumudu Edirisinghe, Richard Oberland and Steve Webb (Azea Networks Limited)

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Bamdad Bakhshi, William Patterson, Georg Mohs, Michael Vaa, Dmitriy Kovsh, Ekaterina K. Golovchenko, Morten Nissov and Stuart M. Abbott (Tyco Telecommunications)

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Philip Murphy (Australia-Japan Cable Limited)
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Omar Ait Sab (Alcatel)

Poster We 10.2.  **The Evolution of Terminal Equipment**  
Alice Shelton and Martin Guy (Alcatel)

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Katsuji Yamaguchi, Toru Takahashi, Akizumi Ebisawa, Katsumi Fukumitsu, Colin Anderson (Fujitsu Limited)

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Yasushi Hara, Tadashi Koga, Norio Yanagi, Isao Matsuoka and Kennichi Nomura (NEC Corporation), Katsuya Satoh, Keisuke Watanabe, Yoshitaka Kanno, Toshitaka Shoji (NEC Communication Systems)

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Akihiro Hamaoka, Satoshi Kurahashi, Takuya Nakase and Yojiro O saki (Mitsubishi Electric Corporation)

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Laurent Joulaud, Juliette Mangeney, Paul Crozat et Jean-Michel Lourtioz (Institut d’Electronique Fondamentale)

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Corrado Rocca (Pirelli Submarine Telecom Systems)

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Toshiyuki Tokura, Naoki Suzuki, Katsuhiko Shimizu, Takashi Mizuochi, Kuniaki Motoshima (Mitsubishi Electric Corporation), Yoko Kurosawa (KDDI Submarine Cable Systems Inc.)
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Gérard Gelly, Jean-Claude Bertreux, Mauro Bettati, Michel Biet, Yann Gérard, Josiane Perinet, Christophe Starck, Gilles Ughetto and Jérôme Van de Casteele. (Avanex France)

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Roberto Aldeghi, Roberto Cigliutti (Pirelli Submarine Telecom Systems)

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Tiziana Tomasi, Marco Villa (Pirelli Submarine Telecom Systems)

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Dr. Barbara Dean and Dr. Patrick Laverty (Tyco Telecommunications)

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Dr Annette Lindholm Colton, John Robert Colton and Dr Neil Richard Haigh (Lucid Optical Services Limited), Peter Frost, Craig Beech and Ephraim Tozowonah (Global Marine Systems Limited)

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Peter Jordan (CTC Marine Projects Limited) and David Cathie (Fugro TGS)

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Nancy Poirier, Dave Mason and Todd Nicholls (IT International Telecom Inc.)

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Mark Lawrence, Sasha O’Bow-Hove and Mark Jonkergouw (Alcatel)

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Steve Searle, John Davies and Marc Hermel (Global Marine Systems Limited)
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Submarine Cable Improvement Group (SCIG): Ronald Rapp and Robert Munier (Tyco Telecommunications), Ian Gaitch (Global Marine Systems Limited), Gordon Lucas (Alcatel) and Takuo Kuwabara (KDDI Submarine Cable Systems)

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Scott McMULLEN (CableFish Accords, Inc.)

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Graham Evans, Ian Wright, Neville Laney, Anthony Pyne and Andrew Sharp (EGS Asia Limited)

Poster We 12.8. **An Application of Dynamic Cable Simulation for Design of Cable Laying**  
Yukitoshi Ogasawara (Kokusai Cable Ship Co. Limited), Junichi Kojima (KDDI R&D Laboratories Inc.)

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Ronald Rapp, Travis Kassay, Lisa Morrow, Frank Cuccio, Catherine Creese and Phil Footman-Williams (Tyco Telecommunications)

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Robert Wargo, Chris Fenn and Graham Marle (AT&T)

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Kazunori Mukasa, Iwao Shimotakahara and Takeshi Yagi (Furukawa Electric Co., Limited)

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Dipl.-Ing. Wolfgang Giebel, Dr. Dipl.-Phys. Clemens Unger and Dipl.-Phys. Heiko Dirks (NSW - Norddeutsche Seekabelwerke GmbH & Co KG)
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Hiroaki Hayashi, Yuji Nomura, Nobuaki Matsuda, Yutaka Wada, Yoshihiro Matsueda, Kimiuki Tominaga, and Osamu Nagatomi (OCC Corporation)

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Jean Charra, Ove Smidt and Nathalie Robin (Alcatel)

Poster We 13.5. State of the Art Unrepeatered Cable: How Advanced Fibres and Packaging have Paved the Way to Advanced Systems
Marc Fullenbaum, René-Marc Demont, Jean-Luc Lang and Patrice Le Roux (Alcatel)

Poster We 13.6. Ultra Low Loss Dispersion Flattened Hybrid Transmission Line for Transoceanic Multi-Terabit Transmission Systems
Eiuske Sasaoka, Tomoyuki Yokokawa, Yasushi Koyano, Kazunari Fujimoto and Masashi Oonishi (Sumitomo Electric Industries, Limited)

Poster We 13.7. Low Attenuation GeO2 Doped Optical Fiber for Unrepeatered Transmission Systems
Hiroyoshi Yamamoto, Yasushi Koyano, Toshiyuki Miyamoto, Keisei Morita, Masayuki Shigematsu, Osamu Kasu and Tetsuaki Araki (Sumitomo Electric Industries, Limited)

Poster We 13.8. Impacts of Dispersion Slope-Matched Fiber Technology on the Installation and Maintenance of Undersea Cable Systems
Rong Zhu, Qian Zhong, Seymour Shapiro, Robert Lynch and Michael Sanders (Tyco Telecommunications)

Poster We 14. Network Performance in an Evolving World

Poster We 14.1. System Migration - How to Change Technology
Laurent du Mouza and Garry Elrick (Alcatel)

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Robin Webb (Cable & Wireless)

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Peter Barletto (Tyco Telecommunications)
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Dean Veverka (Southern Cross Cables Limited), Mike Schwarz (Telecom New Zealand Limited) and Derek Cope (Agilent Technologies Limited)

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David Cornwell, Henry Edwards, Steven Evangelides, Jonathan Nagel, Nigel Taylor (Red Sky Systems)

**Poster We 15.3.**  **OSS Integration for Undersea Networks : Benefits & Challenges**  
Mounir Merhi (Tyco Telecommunications)

**Poster We 15.4.**  **Current DC Fault Location Techniques for Submarine Cables**  
Frédéric Broydé and Evelyne Clavelier (Excem)