

Guest Editorial

High-Capacity Optical Transport Networks

HIGH-CAPACITY, local, regional, national, and transoceanic optical transport networks utilizing wavelength division multiplexing (WDM) or time division multiplexing (TDM) transmission technologies are emerging at an accelerated rate around the globe. The networking (e.g., switching, configuration, and restoration) functions in such networks are traditionally expected to be performed by large electronic SDH/SONET and ATM switches and cross-connects. The continuing demand for increased bandwidth, flexibility, and reliability is underscoring the need to improve the performance and economy of both the transmission and switching technologies in these networks. Several major research, forward-looking-development, and advanced implementation programs and thrusts in this area are currently taking place throughout the world. A wide range of competing and complementary transport technologies are being aggressively pursued, e.g., optical transmission using very dense WDM or high-speed TDM, including packet techniques, and networking in the optical domain using wavelength routing and reconfigurability (e.g., in optical add-drop multiplexers and cross-connects). Novel network control, management, operations, and restoration techniques are also being considered. Several large-scale testbeds, field demonstrations, and advanced commercial systems are being built to demonstrate, advance, and utilize these technologies and concepts. This issue of the IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS attempts to capture a representative cross section of these ongoing efforts. The issue is divided into four sections. The first, entitled general optical networking, covers network architecture, performance, and control and management. The second section covers network protection and survivability. Ongoing large-scale testbeds, demonstrations, and implementations of

optical transport networks are included in the third section. Finally, two papers on optical transmission and switching are included in the last section.

ACKNOWLEDGMENT

A totally fair presentation of a subject as complex, important, and timely as high-capacity optical transport networks would have required an issue several times as large as this one, which, unfortunately, was not practical. For this reason, a large number of excellent papers submitted for presentation in this issue were, regrettably, rejected. The Guest Editors hope that the papers included in the issue cover a representative sample of important ongoing work in this exciting area, which hopefully will help accelerate its advancement. They thank all authors, of both included and rejected papers, and all reviewers for their valuable efforts that made this issue a reality. Acknowledgments are also due to the JSAC Editorial Board for their suggestions and trust. Last, but not least, we thank S. McDonald and G. Krolin for their support and patience, which were invaluable in realizing this issue.

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Publisher Item Identifier S 0733-8716(98)08841-6.



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Dr. Hill is a C.Phys., M.Inst.P, and cofounder and Fellow of the Cybernetics Society. He was awarded the IEE Prize in 1973.



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programs on optical networking, including the AON, MONET, ORAN and NGI ONRAMP Programs.

Dr. Saleh received the AT&T Bell Laboratories Distinguished Technical Staff Award for Sustained Achievement in 1985. He has served as the Chair of the Subcommittee on Networks, Switching, and Access for OFC'98 and is the Technical Program Cochair for OFC'99. He has been elected to serve as a General Program Cochair for OFC'01. He is a member of the Optical Society of America.



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