

CONTRIBUTORS TO THIS ISSUE

Frederick T. Andrews, Jr., B.S. (Electrical Engineering) 1948, Pennsylvania State University; Bell Laboratories, 1948—. After joining Bell Laboratories, Mr. Andrews participated in the Communication Development Training Program. His early work was in the field of switching circuits and systems, and he supervised part of the early development effort on the first commercial PCM system for exchange trunk applications. In 1958, he became Head, Systems Engineering Department, responsible for transmission objectives and maintenance procedures for both telephone and data transmission. In 1962, he was named a Director and served successively on assignments related to telephone transmission systems, military communications, and the development of electronic systems for subscriber loops. Presently, he is Executive Director, Switching Systems Engineering Division, and has responsibility for planning the evolution of the Bell System network of stored program controlled switching systems.

Robert G. Barrere, University of Florida; Southern Bell, 1959–1978; AT&T, 1978—. Mr. Barrere works in the Operator Services Planning and Facilities Group at AT&T and is responsible for AIS and No. 5 ACD. He has been involved with the mechanized Calling Card Service project since 1978. He is chairman of the Calling Card Service Data Base Administration Committee and is responsible for overall Calling Card Service data base implementation and administration.

Ronald G. Basinger, B.S.M.E., 1966, Ohio Northern University; M.S.M.E., 1967, Purdue University; Bell Laboratories, 1966—. Mr. Basinger was initially involved in the physical design of electronic equipment for various switching systems. In 1976, he was promoted to supervisor of a group responsible for the physical design of equipment for the Traffic Service Position System. He then supervised groups responsible for TSPS project coordination, system testing, and operational software development. In 1981, he became Head of the No. 5 ESS System Laboratories Department. Member, Tau Beta Pi, Pi Tau Sigma.

Melvin Berger, B.E.E., 1964, City University of New York; M.S.E.E., 1968, Polytechnic Institute of Brooklyn; Airborne Instruments Laboratory, 1964–7; Sperry Systems Management Division, 1967–69; New Jersey Bell, 1972–74; Bell Laboratories, 1969–72, 1974—. At Bell Laboratories, Mr. Berger was initially involved in developing improved trunk engineering and administrative methods

for metropolitan areas. In 1972, under a plan to give selected Bell Laboratories staff experience in the Bell Operating Companies, he joined New Jersey Bell and was responsible for planning and administering the facilities of a Traffic Service Position System (TSPS). He returned to Bell Laboratories in 1974, and was engaged in engineering and planning studies of new features of TSPS. From 1976 to 1982, he supervised groups conducting planning studies and formulating requirements for operator number services systems, operator toll systems, and for operations systems that support new services that will use Direct Services Dialing capabilities. Currently, he is Supervisor of the Software Defined Network (SDN) Planning group formulating requirements for adding SDN capabilities to the Public Switched Network. Member, IEEE.

Daniel E. Confalone, B.S. (Mathematical Engineering), 1959, University of Rhode Island, M.S.E.E., 1961, New York University; Bell Laboratories, 1959—. Mr. Confalone's work at Bell Laboratories included circuit design in electromechanical common systems, circuit design for Automatic Intercept System, operational and maintenance software for the Automatic Intercept System, firmware design for operational and maintenance programs for Automated Coin Toll Service. Following this assignment, he was appointed supervisor in charge of maintenance programming in the TSPS processor department where he had responsibility for 1BT1 Announcement Store Diagnostics, Announcement Store Load and Verify, and the Peripheral System Interface diagnostics. Mr. Confalone's group also designed the operational and diagnostic firmware for Calling Card Service. He is presently Supervisor of the Transmission and Circuit Design Group in the Operator Services Subsystem Design Department.

Edward A. Davis, B.S.E.E., Michigan State University; M.S.E.E., Northwestern University; Bell Laboratories, 1968—. Upon joining Bell Laboratories, Mr. Davis began designing an automatic billing circuit for the No. 1 ESS. He later worked on an experimental wideband network for *Picturephone*® service signals. In 1972, he worked on the design of the Input/Output circuit for the 1A Processor. Two years later, he became involved in the development of the No. 4 ESS growth procedures. In 1976, he was promoted to assistant engineering manager on a rotational assignment with the AT&T Technical Policy Studies Group. In 1978, he returned to Bell Laboratories, supervising the No. 4 ESS System Growth and Project Coordination Group. In 1980, Mr. Davis became Supervisor of the No. 4 ESS Field System Evaluation Group, which is responsible for analyzing the performance of the No. 4 ESS, solving field problems, and participating in the design of features

aimed at improving its performance. He is currently Supervisor of the No. 4 ESS System Test and Planning Group which is responsible for introducing new system software. Member, IEEE, Tau Beta Pi, Eta Kappa Nu, Phi Eta Sigma, Tau Sigma.

John P. Delatore, B.A. (Mathematics), 1963, College of Steubenville; M.A. (Mathematics), 1965, Bowling Green University; Bell Laboratories, 1965—. Mr. Delatore has worked on TSPS program design and TSPS test evaluation. He worked at AT&T from 1973 to 1975 providing computer-aided service cost methodologies. In 1975, he became Supervisor of the TSPS Growth and Field Support Group, and in 1977, became Supervisor of the TSPS Planning Group. In 1979, he was appointed Head of the Operator Services Operational Software Design Department (formerly the Data Base Administration System Department). His department is presently responsible for the development of TSPS operational programs.

Daryl J. Eigen, B.A. (Psychology), 1972, University of Wisconsin, Milwaukee; M.S. (Electrical Engineering), 1973, University of Wisconsin, Milwaukee; Ph.D. (Industrial Engineering), 1981, Northwestern University; Bell Laboratories, 1973—. At Bell Laboratories, Mr. Eigen initially worked in the Human Performance Technology Center. He then was involved in feature and service planning for the Traffic Service Position System and, later, the No. 4 ESS. He is currently Supervisor of the System Analysis and Human Factors Group for No. 4 ESS. Member, IEEE, Human Factors Society, APA, Tau Beta Pi.

Roland F. Frerking, B.A. (Mathematics), 1966, University of South Carolina; M.S. (Applied Mathematics), 1968, University of Colorado; M.S. (Operations Research), 1976, University of California at Los Angeles; Bell Laboratories, 1976—1982; AT&T, 1982—. At Bell Laboratories Mr. Frerking has worked on CCIS network performance. More recently, he worked on the new common-channel signaling protocol that is compatible with CCITT Signaling System No. 7 and on the performance of new SPC network services. At AT&T, he is presently District Manager, Traffic Network Planning. Member, Pi Mu Epsilon, Omicron Delta Kappa, Mathematical Association of America.

Charles J. Funk, AT&T, 1943–1959; Bell Laboratories, 1959—. Mr. Funk was initially engaged in common control circuit development to increase the capacity of the No. 4 Toll Crossbar Switching System. Since 1966, he has supervised a circuit design group responsible for development of switching hardware required for introduction of the

Electronic Translator System, CCIS, and Improved 800 Service to the No. 4 Toll Crossbar Switching System. He is currently a consultant in the SPC Network Design Department at Columbus.

Lawrence J. Gawron, B.S.I.E., 1968, M.S. (Computer Science), 1969, Pennsylvania State University; Bell Laboratories, 1969—. Mr. Gawron's initial work at Bell Laboratories involved development of operating system software for the SAFEGUARD Ballistic Missile Defense System. He was later engaged in development of toll and local common-channel interoffice signaling features and planning of SPC network capabilities for No. 1/1A ESS. Subsequently, he participated in developing a training program for No. 1A ESS software developers. Currently, he is a data network system architect. Member, Phi Kappa Phi, Tau Beta Pi.

Charles W. Haas, B.S. (Mathematics), 1958, St. Francis College; AT&T Long Lines, 1953—. Mr. Haas joined the Long Lines Department in 1953 as a Communications Technician. He held various management assignments in the Long Lines Operations and Engineering organizations until 1964, when he transferred to the AT&T General Departments. There he was involved in the development of mechanized equipment ordering procedures and the development of Bell System Common Language. In 1966, he joined Bell Laboratories as a supervisor in the Business Informations Systems area. While with Bell Laboratories, he managed groups responsible for the development of mechanized equipment selection processes, development of mechanized circuit record data bases, and development of record purification and conversion processes. In 1974, he returned to Long Lines as the Methods Engineer—EDP Procedures, where he was responsible for the development of various engineering support systems. In 1978, Mr. Haas assumed his current position as Engineering Manager of the New Services Support Division at AT&T Long Lines in Piscataway, New Jersey. This group is responsible for the design and development of Operations Support Systems that are used by the Long Lines Department to operate, administer, and maintain new services and new technologies in the Bell System. Member, IEEE.

Sheldon Horing, B.E.E., 1957, City College of New York; M.E.E., 1960, New York University; Ph.D., 1962, Brooklyn Polytechnic Institute; Bell Laboratories, 1957—. Mr. Horing's initial assignment involved the evaluation of inertial navigation systems and the design and development of an optical electromechanical radar tracker. After spending two years at Polytechnic Institute of Brooklyn as an Assistant

Professor, he returned to Bell Laboratories where he was concerned with systems studies, the design and analysis of guidance systems, the analysis of radar tracking accuracy, and control theory research. In 1970, he became Head of the Performance Analysis Department and was responsible for the study of Demand Assignment of satellite capacity, as well as applications of traffic theory to a wide variety of problems. He was appointed Director of the Stored Program Controlled (SPC) Network Systems Engineering Center in 1979. In this position, he was responsible for planning and systems engineering for toll switching, operator services, and for the optimal utilization of the capabilities made possible by common-channel interoffice signaling and computer-based SPC switching systems. In 1981, he was appointed Executive Director of the Transmission Systems Engineering Division, with responsibilities for planning new transmission capabilities and for creating operating company planning tools to support facility engineering and modernization programs. In 1982, he became Executive Director of the Structure Planning Division with responsibility for assessing the opportunities for, and planning the structure of, research and development to support the future AT&T and Bell Operating Companies. Member, IEEE, Eta Kappa Nu, Tau Beta Pi, Sigma Xi.

John J. Lawser, B.S.E.E., 1963, M.S.E.E., 1964, Ph.D., 1970, University of Michigan; A. C. Electronics, 1964-1965; Bell Laboratories, 1970-1977; AT&T 1977-1978; Bell Laboratories, 1978—. Mr. Lawser has been involved in economic and technical planning studies for the Stored Program Controlled (SPC) Network, including toll modernization studies, CCIS implementation studies and SPC network planning studies.

Richard E. LeCronier, B.S.E.E., 1958, Michigan State University; M.S.E.E., 1961, New York University; B.S. (Liberal Arts), 1964, Central Michigan University; M.S. (Management Science), 1973, Fairleigh Dickinson University; M.B.A., 1979, Fairleigh Dickinson University; Bell Laboratories 1958—. Mr. LeCronier is Supervisor of the SPC Network Planning Studies Group. His present responsibilities in this area have focused on the economic analyses of SPC network alternatives. His prior work was on systems engineering studies of the Nike-Zeus project, DDD improvement studies, and local switching studies and requirements. Member Eta Kappa Nu, Tau Beta Pi, Kappa Mu Epsilon, Delta Mu Delta.

Susan J. Lueders, B.S. (Computer Science and Mathematics), 1977, Iowa State University; M.S. (Computer Science), 1979, Northwestern University; Bell Laboratories, 1977—. Ms. Lueders' first assignment was in call-processing software design for AUTOSEVOCOM

II. In 1978, she joined the SPC Network Features Department, working on software design for the Busy/Idle Status Indicator feature for No. 1 and 1A ESS. Currently, Ms. Lueders is involved in direct services dialing capabilities feature development for 1A ESS.

John W. Lurtz, B.S.E.E., 1969, Michigan State University; M.S.E.E., 1971, Northwestern University; Bell Laboratories, 1969—. Mr. Lurtz worked on various aspects of hardware and software design for the No. 4 ESS network until 1976. Subsequently, he assumed supervisory responsibility for Automatic Intercept System program development and field support. He now has responsibility for coordination and system testing for the Data Base Administration System.

Karl E. Martersteck, Jr., B.S. (Physics), 1956, University of Notre Dame; M.S. (Electrical Engineering), 1961, New York University; Bellcom, Inc., 1964-1972; Bell Laboratories, 1959-1964, 1973—. From 1959 to 1964, Mr. Martersteck developed silicon devices and integrated circuits. At Bellcomm, Inc., he was engaged in systems engineering for various manned spaceflight projects, including mission planning and analysis for the Apollo lunar landing and the Skylab projects. At Bell Laboratories in 1973, he worked on systems engineering design, and development of business information systems. In 1977, he was appointed Director, AUTOSEVOCOM Laboratory; in 1978, he became Director of the Toll Digital Switching Laboratory and in 1980, he assumed his present position as Executive Director, Network Switching Services Development Division. Member, IEEE.

Michael A. McGrew, B.S.E.E., 1963, Lafayette College; M.S.E.E., 1966, Ohio State University; Bell Laboratories, 1976—. Mr. McGrew worked on a circuit design for the No. 4A Electronic Translator System. More recently, he was engaged in program design for CCIS, especially for the system's signal transfer point. He also worked on new signaling protocols and on the development of a higher capacity signal transfer point. Member, Tau Beta Pi, Eta Kappa Nu.

James Z. Menard, B.S. (Physical Science), Arkansas State Teachers College, 1941; Bell Laboratories, 1946-1965; Bellcomm, 1965-1971; Bell Laboratories, 1971-1981. Mr. Menard's early work at Bell Laboratories, following military service with the Signal Corps, was on magnetic recording systems for voice announcement services, and later, on the development of military sonar systems for Project Caesar and Project Jezebel. At Bellcomm, which carried out systems engineering work for the Apollo program, he was Director of the Systems Configuration Division. Since his return to Bell Laboratories he has

been the Director of the Toll Crossbar Switching Laboratory, which has been engaged in the development of Common-Channel Interoffice Signaling.

Ken L. Moeller, A.A.S. (Electronics) 1969, North Iowa Area Community College; Bell Laboratories, 1969—. At the beginning of his career, Mr. Moeller was engaged in No. 1 ESS capacity evaluation and improvement. From 1975 to 1978, he developed the No. 1/1A ESS call-processing software for the toll common-channel interoffice signaling (ccis) feature, and from 1978 to 1980, he developed the No. 1/1A ESS call-processing software for the local ccis feature. Currently, he is engaged in the No. 1/1A ESS call-processing development for the interexchange carrier interconnection feature.

Richard J. Piereth, B.S.E.E., 1967, Newark College of Engineering; M.S.E.E., 1969, Rutgers University; Bell Laboratories, 1961-1971; AT&T, 1971-1975; Bell Laboratories, 1975—. Mr. Piereth worked on the No. 101 ESS, No. 1 ESS, No. 2 ESS, Automatic Intercept System, and Traffic Measurements at Bell Laboratories before transferring to AT&T in 1971, where his responsibilities included traffic measurement and force administration systems and equipment. Currently, he supervises a group planning and setting requirements for a new Operator Services Position System, based upon the No. 5 ESS, intended for the export market. Member, Eta Kappa Nu, Tau Beta Pi, IEEE.

Edward M. Prell, B.S.E.E., 1962, University of Kentucky; M.S.E.E., 1964 Columbia University; M.S. (Management Science), 1969, Stevens Institute of Technology; Bell Laboratories, 1962—. Until 1980, Mr. Prell worked on various aspects of hardware and software associated with the Traffic Service Position System, Data Base Administration System, and the Automatic Intercept System. In 1980, he transferred to the local digital switching area, where he directed work on system design, system testing, and first application. He is now Director of the Local Digital Switching Software Laboratory. Member, Eta Kappa Nu, Tau Beta Pi.

Victor L. Ransom, B.S.E.E., 1948, Massachusetts Institute of Technology; M.S.E.E., 1952, Case Institute of Technology; National Advisory Committee for Aeronautics, 1948-53; Bell Laboratories, 1953—. Mr. Ransom was first engaged in the design of a special-purpose digital computer for collecting and processing telephone traffic data. He worked briefly on the operational program for No. 1 ESS arranged for data features. He subsequently supervised a group con-

cerned with planning for traffic measuring and service evaluation systems. In 1970, his efforts were shifted to planning for operator services systems. At present, he is Head of a department responsible for systems engineering planning for operator services. Senior Member, IEEE; member, American Association for the Advancement of Science.

Barry W. Rogers, B.S.E.E., 1970, University of Illinois; M.S.E.E., 1972, Columbia University; Bell Laboratories, 1970—. From 1970 to 1974, Mr. Rogers performed evaluation and system planning studies for *Picturephone*® videotelephone service. In 1974, he became involved in TSPS circuit design and system testing for Automated Coin Toll Service. In 1978, he was appointed Supervisor of the group responsible for TSPS transmission and signaling performance, and later assumed responsibility for TSPS maintenance software development. Mr. Rogers is presently Supervisor of the TSPS No. 1 Field Support Group. Member, Eta Kappa Nu, Tau Beta Pi.

Cyrenus M. Rubald, B.A. (Mathematics), 1968, B.A. (Economics), 1968, St. Johns University, Minnesota; Ph.D. (Computer Sciences), 1973, University of Wisconsin, Madison; Bell Laboratories, 1973—. Mr. Rubald's initial assignment was working on system analysis for the Traffic Service Position System (TSPS). In 1975, he began working on audit program design for TSPS in the Automated Coin Toll Service Department; he later transferred to the TSPS Feature Planning Department, where he had feature design and overall planning responsibilities for Calling Card Service and related features. In 1979, he joined the Operational Software Design Department, working on Data Base Administration System (DBAS) software design and analysis. Later that year, he began supervising a group responsible for improving the Automatic Intercept System. His group was also involved in design and architecture studies of DBAS software and TSPS software for the Data Management System. In 1981, he transferred to the Operator Systems Evaluation and Field Support Department, where he is responsible for software test and integration for TSPS Generic Program 1BT2.

Donald C. Salerno, AT&T 1956—; Mr. Salerno has had various assignments at AT&T Long Lines in the Operations, Sales, Marketing, and Engineering Planning departments. He assumed his current assignment as District Manager in the Network Design division at AT&T in February, 1979, where he is responsible for managing the design of features and new capabilities in the CCIS network and the first application implementation of SPC network capabilities.

Sidney F. Sampson, B.S.E.E, M.S.E.E, New York University; M.B.A., Roosevelt University; Bell Laboratories 1953—. Mr. Sampson has developed a wide variety of components, circuits, processor, and peripheral subsystems for several types of electronic switching systems, as well as equipment for electromechanical switching systems. This included the development of computerized test facilities for development and factory test purposes. He was the Bell Laboratories field representative at Illinois Bell, and during the DBAS development was the Supervisor of the DBAS Data Base Management Group. Member, Tau Beta Pi, Eta Kappa Nu.

John M. Sebeson, B.S. (Physics), 1969, Michigan State University; M.S.E.E., 1971, and M.S. (Materials Science), 1973, Northwestern University; Bell Laboratories, 1969—. Mr. Sebeson has worked on the development of optical memories, hybrid integrated circuits, and high-capacity magnetic bubble memories. From 1975 to 1979, he was engaged in the physical design of control processors for electronic switching applications. In 1979 he began work on the development of systems used in the CCIS network, including studies of network reliability and performance. He is presently Supervisor of the Data Switching Physical Design Group at Columbus.

Daniel Sheinbein, B.S.E.E., 1967, City College; M.S. (Electrical Engineering), 1968, Ph.D (Electrical Engineering), 1972, New York University; Bell Laboratories, 1968—. Upon joining Bell Laboratories, Mr. Sheinbein worked on new switching system capabilities. He helped to define the Stored Program Controlled (SPC) Network concept and its capabilities. In 1978, he was assigned to AT&T as an assistant engineering manager to coordinate the implementation of a new mode of operation for 800 Service using the SPC network. In 1979, he returned to Bell Laboratories, supervising the Direct Services Dialing (DSD) Feature Planning group, which is responsible for defining the DSD capabilities, architecture, and requirements. In 1981, Mr. Sheinbein took on his current AT&T assignment as Manager of Network Services Planning. Member, IEEE, Tau Beta Pi, Eta Kappa Nu.

Robert L. Simms, B.E.E., 1953, M. Eng., 1972, University of Louisville; M.E.E., 1960, New York University; M.S. (Statistics), 1972, Rutgers; Bell Laboratories, 1956—. Upon joining Bell Laboratories, Mr. Simms worked on development of electronic switching systems. Moving to systems engineering in 1961, he was associated with a variety of commercial and military network and switching projects. Since 1970, he has been involved with studies and planning for the Stored Program Controlled (SPC) Network. He is currently Head, SPC

Network Planning Department; Member, Tau Beta Pi, Omicron Delta Kappa, Phi Kappa Phi; Senior member, IEEE.

R. E. Staehler, B.S.E.E., 1947, The College of the City of New York; M.S.E.E., 1948, Polytechnic Institute of Brooklyn; Bell Laboratories, 1948—. Mr. Staehler's early work was on No. 5 crossbar, toll signaling systems, and trainers for guided missile systems. In 1953, he worked on the development of electronic switching systems, specifically, the processor memory for the experimental central office in Morris, Illinois, and the processor logic and call memory for No. 1 ESS. He was appointed Director of the Electronic Switching Projects Laboratory in 1964 with responsibility for special applications for No. 1 ESS to military and data networks, including No. 1 ESS AUTOVON. In 1968, he became Director of the Electronic Systems Design Laboratory with responsibility for development of the 1A Processor. In 1976, he became Director of the Network Operator Services Laboratory with responsibility for developing operator services for both domestic and international applications. Senior member, IEEE. Member, Eta Kappa Nu, Tau Beta Pi, Sigma Xi.

Robert J. Thornberry, Jr., B.S.E.E., 1972, University of Maryland, M.S.E. (E.E./C.S.), 1973, University of California, Berkeley; Bell Laboratories, 1972—. Since joining Bell Laboratories, Mr. Thornberry has been involved in design, system integration, and testing of fault-tolerant systems for TSPS. In 1978, he became Supervisor of the TSPS Field Support and Test Group and later assumed responsibility for TSPS signaling software development. Mr. Thornberry is presently Supervisor of the TSPS Maintenance Software Development Group. Member, IEEE, Tau Beta Pi, Eta Kappa Nu.

Douglas W. Tietz, B.S., 1972, M.S., 1974 (Electrical and Computer Engineering), University of Wisconsin; Bell Laboratories, 1974—. Mr. Tietz originally did current engineering work on No. 1 AIOD, followed by software development work on the No. 1A Service Evaluation System. He presently supervises a group developing software for the No. 5 Electronic Switching System.

Roy P. Weber, B.S. (Mathematics), 1967, Polytechnic Institute of Brooklyn; M.S. (Operations Research), 1968, PhD. (Computer Science), 1971, Cornell University; Bell Laboratories, 1967—. Mr. Weber is the Head of the Data Networks Department and is responsible for the planning and systems engineering for switching capabilities needed to support basic network data services. He previously worked on the Safeguard radar system, on CCIS system design, on SPC network services

and was on a rotational assignment at AT&T in the Network Planning organization. Mr. Weber is the holder of several patents dealing with SPC network capabilities.

John R. Williams, B.S.E.E., 1960, Vanderbilt University; M.S.E.E., 1961, University of Illinois; U. S. Navy Submarine Service, 1961-1964; Bell Laboratories, 1964—. Mr. Williams has had a variety of assignments in Electronic Switching System development. His early work included assignments in system design, test system development, and operational software design for No. 1 ESS ADF, a store-and-forward-message switching system. In 1969, he became involved in maintenance planning and hardware design for No. 4 ESS. Later assignments included responsibilities in the area of No. 4 ESS maintenance and call processing software development. In 1977, he became responsible for No. 5 ESS maintenance planning, and in 1979, joined the TSPS project with responsibilities in the areas of operational software development and project planning. Currently, Mr. Williams is Head of the No. 5 ESS Maintenance and Control Department, responsible for the development of maintenance software for No. 5 ESS. Member, Tau Beta Pi.

Bernard J. Yokelson, B.S. (Electrical Engineering), 1948, Columbia University; M.S. (Electrical Engineering), Brooklyn Polytechnic Institute, 1954; Bell Laboratories, 1948—. When Mr. Yokelson joined Bell Laboratories in 1948, he was concerned with one of the first coaxial cable transmission systems, microwave propagation studies, the development of a new multifrequency telephone receiver, and defense projects. In 1961, he became Head of the Electronic Switching System Design Department which was responsible for system development requirements and programming for electronic switching systems. In 1966, he was promoted to Director of the Operator Systems Laboratory, where he had project responsibilities for the development of the Traffic Service Position System No. 1, a system to automate operator functions. From 1974 to 1976, he was Director of the Electronic Power Systems Laboratory. From 1977 to 1980, he was Director of the Local Digital Switching Systems Laboratory. He assumed his present position as Director of the Toll Digital Switching Laboratory in 1980, and he is responsible for the development of the No. 4 ESS and advanced development for future electronic toll switching systems. Fellow, IEEE; member, Tau Beta Pi, Sigma Xi.

Edward A. Youngs, B.A. (Psychology), 1964, Dartmouth College; M.A., 1968, Ph.D., 1969 (Psychology with minor in Computer and Information Science), University of North Carolina, Chapel Hill; Bell Laboratories, 1969—. At Bell Laboratories, Mr. Youngs is working in many facets of human engineering in the Bell System.