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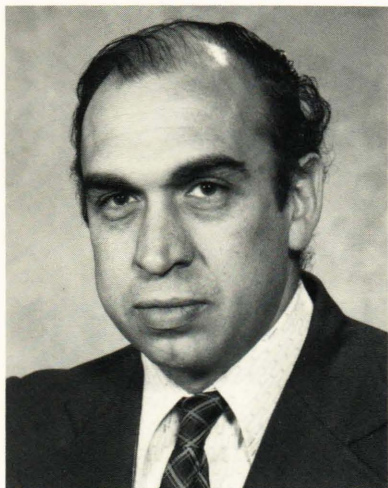
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- L. Monchick, "Anisotropic Forces and Molecular Collisions," Zentrum Interdisziplinäre Forschung, Univ. Bielefeld, FRG, 20 Nov 1979; also presented at Inst. Theoretical Physics, Univ. Erlangen-Nürnberg, 3 Dec 1979.
- K. Moorjani, "Disordered Magnets," Physics Dept. Seminar, Univ. Maryland, College Park, 27 Feb 1980.
- K. Moorjani, "Magnetic Glasses," Groupe de Transition des Phases, C.N.R.S., Grenoble, France, 23 Jul 1979; also presented at 7th AIRAPT International Conf., Le Creusot, France, 30 Jul - 3 Aug 1979.
- K. Moorjani (APL) and S. K. Ghatak (Indian Inst. of Tech., Kharagpur), "Competing Exchange Interactions in Random Magnets," American Physical Society Meeting, Chicago, 20-21 Jan 1980.
- J. C. Murphy, "Time Dependent Processes in Photoacoustic Spectroscopy," Topical Meeting on Photoacoustic Spectroscopy, Univ. Iowa, 1-3 Aug 1979.
- V. O'Brien, "Pulsatile Blood Flow," Bioengineering Seminar, The Johns Hopkins Univ., 22 Oct 1979.
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- V. O'Brien and L. Ehrlich, "Planar Entry Flow of Viscoelastic Fluid," Workshop of VE Flow, Brown Univ., 2 Nov 1979.
- T. O. Poehler, "Infrared Extinction in Organic Compounds and Polymers," CSL Scientific Conf. on Obscuration and Aerosol Research, Aberdeen Proving Ground, Md., 17-21 Sep 1979.
- T. O. Poehler, "Switching and Memory Effects in Organic Semiconducting Charge-Transfer Complexes," Chemistry Div. Symp., Naval Res. Lab., Washington, D.C., 13 Feb 1980.
- R. S. Potember and T. O. Poehler, "Switching Phenomena and Memory in Organic Semiconductors," Chemistry Dept. Colloq., Univ. Pennsylvania, 29 Jan 1980.
- R. S. Potember and T. O. Poehler (APL) and A. Rappa, D. O. Cowan, and A. N. Bloch (JHU), "Electrical Switching and Memory Phenomena in Semiconducting Organic Charge-Transfer Complexes," NATO Advanced Study Inst. on Physics and Chemistry of Low Dimensional Solids, Tomar, Portugal, 27 Aug - 7 Sep 1979.
- R. S. Potember and T. O. Poehler (APL) and D. O. Cowan (JHU), "Switching and Memory Phenomena in Semiconducting Charge-Transfer Complexes," Meeting, American Chemical Society, Washington, D.C., 10-13 Sep 1979.
- J. C. W. Rogers, "Numerical Solution of Systems of Conservation Laws," Colloq., Dept. Mathematics, Univ. Wisconsin, Madison, 1 Apr 1980.
- J. C. W. Rogers, "The Stefan Problem," Analysis Seminar, Univ. Minnesota, 31 Mar 1980.
- J. A. Schetz, F. S. Billig, and S. Favin, "Analysis of Mixing and Combustion in a Scramjet Combustor with Co-Axial Fuel Jet," 16th AIAA/SAE/ASME Joint Propulsion Conf., Hartford, Jun 1980.
- J. A. Schetz, F. S. Billig, and S. Favin, "Approximate Analysis of Base Drag Reduction by Base and/or External Burning for Axisymmetric Supersonic Bodies," 16th AIAA/SAE/ASME Joint Propulsion Conf., Hartford, Jun 1980.
- D. M. Silver, "Electron Correlation in Simple Chemical Systems," Univ. of Electro-Communications, Chofu-shi, Tokyo, 16 Nov 1979.
- D. M. Silver, "Rotational Energy Transfer in LiH-He Collisions: A Comparison between Theory and Experiment," Hebrew Univ., Jerusalem, 23 Dec 1979.
- J. E. Tillman, "Differentiation of Mesozoic Fractures by Fluid Inclusion Analysis," U.S. Geological Survey Seminar, Reston, Va., 7 Feb 1980.
- J. E. Tillman, "Hydrothermal and Uplift Histories of the Northern Appalachian Basin," Eastern Section Meeting, Assoc. of Petroleum Geologists, Morgantown, W. Va., 1-4 Oct 1979.
- J. E. Tillman, "Unraveling the Cenozoic Tectonic History of the Eastern U.S.," Nuclear Regulatory Commission Seminar, Bethesda, Md., 19 Feb 1980.
- P. J. Waltrup, "Observed Pressure Oscillations in Full-Scale Subsonic Dump Combustors," and "Overview of NAVSEA Air Breathing Propulsion Programs," 1979 JANNAF Workshop on Pressure Oscillations in Ramjets, Monterey, 7-8 Sep 1979.
- P. J. Waltrup, F. S. Billig, and M. C. Evans, "Critical Considerations in the Design of Supersonic Combustion Ramjet (Scramjet) Engines," 16th AIAA/SAE/ASME Joint Propulsion Conf., Hartford, 30 Jun - 2 Jul 1980.
- G. P. Warman, J. C. Murphy, and L. C. Aamodt, "Surface Area Effects in Photoacoustic Spectroscopy," Topical Meeting on Photoacoustic Spectroscopy, Univ. Iowa, 1-3 Aug 1979.
- L. B. Weckesser, "DC93-104 Thermal Modeling Efforts," JANNAF Ramjet Combustor Insulator Thermal Modeling Workshop, Monterey, 14 Mar 1980.
- L. B. Weckesser, "Radome Aerodynamic Heating Effects on Boresight Error," 15th Symp. on Electromagnetic Windows, Atlanta, 18-20 Jun 1980.
- L. B. Weckesser and L. L. Perini, "Thermal Modeling of Combustor Insulation DC93-104," JANNAF 1980 Propulsion Meeting, Monterey, 11-13 Mar 1980.
- R. O. Weiss (APL), R. Barr (Hydro-nautics), J. Gianotti (Giannotti and Assoc.), W. Deuchler (Gibbs and Cox), R. Scotti (NOAA), J. Stadter (APL), and J. Walsh (VSE), "Report of the Ad Hoc OTEC CWP Committee: An Assessment of Existing Analytical Tools for Predicting CWP Stresses," 7th Ocean Energy Conf., Washington, D.C., 2-4 Jun 1980.

APL COLLOQUIA

- Jan. 4, 1980—"The Riddle of Tektites," by J. A. O'Keefe, NASA/Goddard Space Flight Center.
- Jan. 11—"Technical-Congressional Interaction on Synthetic Fuel Production," by H. C. Hottel, Massachusetts Inst. of Technology.
- Jan. 18—"An Overview of Our Energy Future," by O. M. Phillips, The Johns Hopkins Univ.
- Jan. 25—"The Acid Rain," by J. N. Galloway, Univ. of Virginia.
- Feb. 1—"Fireplaces and Woodburning Stoves," by R. D. Thulman, Thulman Eastern Corp.
- Feb. 8—"The Physics of Violins," by N. Pickering, Southampton Hospital.
- Feb. 15—"Designing a Global Future: Some Reflections on the New Social Paradigm," by D. Pirages, Univ. of Maryland.
- Feb. 22—"Quarks, Gluons, ... A Walk Through the Garden of Elementary Particles," by A. Pevsner, The Johns Hopkins Univ.
- Feb. 29—"Gas Industry Perspective on Future Energy Resources," by A. C. Eberle, Columbia Gas System Service Corp.
- Mar. 7—"Particle-Beam Weapons," by K. Tsipis, Massachusetts Inst. of Technology.
- Mar. 14—"Electrochemistry of Solid State Batteries," by A. Schneider, Catalyst Research Corp.
- Mar. 21—"Photoacoustics-Principles and Recent Developments," by A. Rosencwaig, Lawrence Livermore Laboratory.
- Mar. 28—"The New Genetics," by D. Nathans, The Johns Hopkins Univ.
- Apr. 4—"Impressions of Soviet Science and Technology," by A. S. Greenberg, U.S. Dept. of State.
- Apr. 11—"A Visit to China," by F. S. Billig, APL.
- Apr. 18—"Godel, Escher, Bach: An Eternal Golden Braid," by D. R. Hofstadter, Univ. of Indiana.
- Apr. 25—"National Laboratories: What Are They? What Do They Do? Who Cares?," by W. E. Massey, Argonne National Lab.
- May 2—"The Automatic Implantable Defibrillator from Inception to Clinical Application," by M. Mirowski, Sinai Hospital and The Johns Hopkins Univ.
- May 9—"The Piltdown Man Hoax: Whodunit?," by J. Weiner, Univ. of London.
- May 16—"The Role of the Oceans in the Earth's Heat Balance," by A. H. Oort, Princeton Univ.
- May 30—"The Role of Oxygen in Retinopathy: A 14-Year APL-Wilmer Institute Cooperative Study," by R. W. Flower, APL.

THE AUTHORS



MARIO H. ACUNA was born in 1940 in Cordoba, Argentina, where he received his undergraduate degree from the University. He earned the M.S.E.E. degree from the University of Tucuman (1967) and the Ph.D. in space science from The Catholic University of America (1974). In 1969, he joined the Goddard Space Flight Center, where his research interests have centered around instrumentation for geophysical and space research as well as studies of magnetic fields and plasmas in interplanetary space and in magnetospheres. Dr. Acuna has been involved with Explorers 47 and 50, Mariner 10, Pioneer 11, Voyagers 1 and 2, Magsat, the International Solar Polar Mission, Project Firewheel, and Ampte as instrument engineer, principal investigator or engineer, or project scientist. He has received many awards in recognition of his contributions to NASA programs.



WALTER E. ALLEN was born in New York City in 1932. He attended Queens College, Indiana Technical Col-

lege, and The Polytechnic Institute of Brooklyn where he obtained the B.S.M.E. degree in 1954. He was an engineering instructor at the U.S. Naval Academy for three years prior to joining the Space Department of APL in 1960. He is a power systems specialist and has been responsible for the design and development of both solar and nuclear power systems for many spacecraft, including Transit, Geos, Triad, Transit Improvement Program, and Magsat. Mr. Allen is supervisor of the Space Power Systems Section and assistant supervisor of the Spacecraft Systems Group.

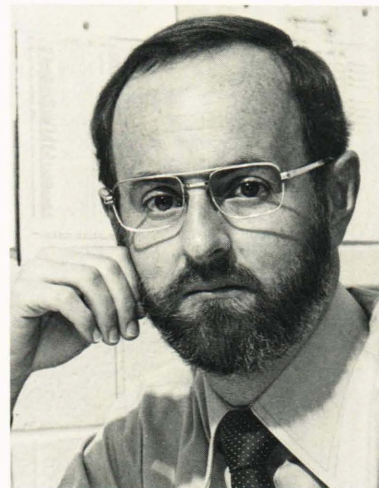
FREDERICK S. BILLIG was born in Pittsburgh in 1933. He did his undergraduate work at The Johns Hopkins University and earned the M.S. (1957) and Ph.D. (1964) degrees in mechanical engineering from the University of Mary-



land. He joined APL in 1955 where he participated in experimental programs involving hypersonic wind tunnels and external burning, and developed theoretical/experimental techniques for analyzing supersonic combustion. Subsequently Dr. Billig studied hypersonic propulsion ramjets, hydrogen and storable liquid fuels, the SCRAM combustor, ignition and combustion of fuels, and the penetration of liquid jets into supersonic streams. Since 1977, he has been assistant supervisor of the Aeronautics Division.

He received the Distinguished Young Scientist Award of the Maryland Academy of Sciences in 1966 and the Silver Combustion Medal of The Combustion Institute in 1970. He is presently a director of the AIAA.

RONALD K. BUREK was born in Detroit in 1940. He received the B.E.E. degree from the University of Detroit



(1964) and has done graduate work at The Johns Hopkins University. In 1964 he joined APL where he has been involved primarily in hardware and software design for digital electronic systems associated with space, shipboard, and ground applications. In particular he contributed to the design of the Seasat radar altimeter and the Transim satellite navigation processor. Mr. Burek designed and programmed the LORAN-C navigation software used in the Hydro and Aries ocean experiments, and has been responsible for the data storage subsystems for several recent spacecraft. He is working on a microprocessor-based data handling system for the Ampte spacecraft and is exploring the potential use of magnetic bubble memories for space applications.

THOMAS B. COUGHLIN was born in Baltimore in 1941. He studied mechanical engineering at the University of Maryland (B.S., 1964) and at Drexel



University (M.S., 1967). He worked in missile dynamics at the Martin Co. during 1964-67 and in the mechanical design and structural analysis of the ATS-6 and Sert spacecraft at Fairchild Industries during 1967-72.

Since joining APL in 1972, Mr. Coughlin participated in the analysis and testing of spacecraft mechanical systems. He is now supervisor of the Structural Analysis and Test Section of the Space Electromechanical Design Group.

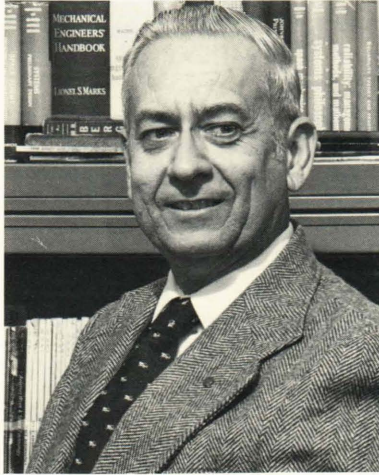
JOHN R. DOZSA was born in Alpha, N.J. He received a B.S.E.E. from Lafayette College in 1963 and has done graduate work at the University of Maryland. Upon joining APL in 1963, he assisted in the installation of the Typhon Radar System aboard the USS *Norton Sound*. From 1964 to 1973 he was involved in the design of electronic flight and ground equipment for space satellite systems including portions of the Dodge satellite TV cameras and



other imaging camera systems, scan converters, and displays. During 1973-78, Mr. Dozsa designed shipboard hardware units for the SEATIPS and AN/SYS-1 automatic detection and tracking radars. In 1978 he became the cognizant engineer for the Magsat standard s-band transponder. At present, he is a design engineer in the Ocean Engineering Program Sensor Evaluation Laboratory of the Strategic Systems Department

LEWIS D. ECKARD, JR. was born in Philadelphia in 1923. He received the B.S.M.E. degree (aeronautical option) in 1949 from the University of Maryland, and has done graduate work in aeronautical engineering at the University of Maryland and in engineering administration at George Washington University.

In 1952 Mr. Eckard started working for the Engineering Research Corporation, where he performed analyses in support of the development of electronic flight simulators. In 1957 he joined APL



where he specialized in thermal analysis of spacecraft. During 1961-63 he served as a branch manager in the Environmental Test Division at the Goddard Space Flight Center. Returning to APL in 1963 as a project engineer, he has been supervisor of the Space Systems Branch since 1967. During 1977-79, he also acted as program manager for the Magsat spacecraft. On January 1, 1981, he will become Assistant Head of the Space Department and Programs Manager.

WINFIELD H. FARTHING was born in North Carolina in 1934. He received his undergraduate education at North Carolina State University, and the Ph.D. from The Catholic University of America. He was employed by the National

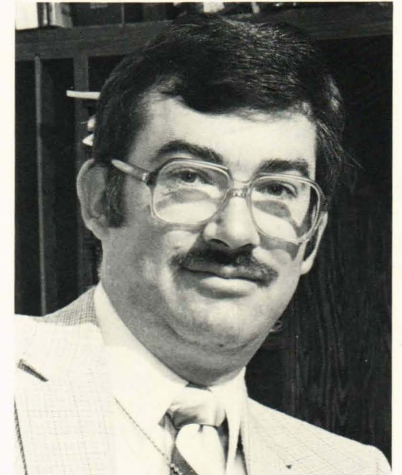


Security Agency before transferring to the Goddard Space Flight Center (GSFC) in 1962.

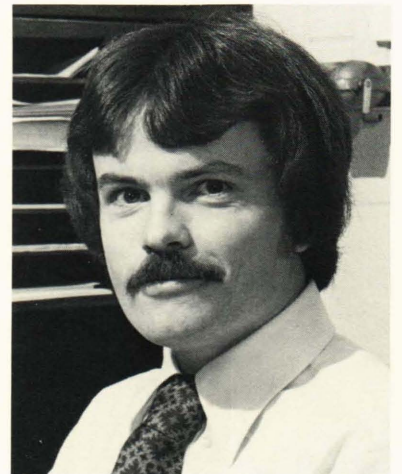
He now is an electronics engineer with GSFC, where he has participated in the design and implementation of a variety of scientific instruments for spaceflight. He was project engineer of the scalar magnetometers flown on the Pogo satellites and participated in the early efforts to bring a follow-on mission such as Magsat into being. In addition to being technical officer for the Magsat scalar

magnetometer, Dr. Farthing is a co-investigator for the magnetic fields experiments on Dynamics Explorer, and is science manager for the Space Environment Monitor onboard Geos.

GLEN H. FOUNTAIN was born in Hutchinson, Kans. in 1942 and received the B.S.E.E. and M.S.E.E. degrees from Kansas State University in 1965 and 1966. Since 1966 he has been employed by APL in the area of satellite attitude control and detection and system instrumentation. He has participated in the design of control systems for a number of satellites including the Small



Astronomy Satellites. Appointed assistant project scientist for Magsat in 1977, Mr. Fountain has been principally concerned with the design of the attitude control and determination subsystems. Other professional interests have included biomedical engineering and the study of coherence of the earth's magnetic noise field.



KEVIN J. HEFFERNAN was born in Bryn Mawr, Pa. in 1952 and received his B.S.E.E. from Drexel University and his M.S.E.E. from The Johns Hopkins Uni-

versity in 1975 and 1980. Specializing in control theory and electronic design, he joined APL's Attitude Control Systems Group in 1977. His principle responsibilities on Magsat were as program sponsor of the IR scanner reaction wheel, co-designer of the microprocessor-based attitude signal processor, and participant in the simulation and analysis of the various pitch control modes for stability purposes.

Mr. Heffernan is currently designing another microprocessor-based system — a magnetometer signal processor — for the Air Force Defense Meteorological Satellite Program.



ROBERT A. LANGEL was born in Pittsburgh in 1937 but spent most of his youth in Ohio. His undergraduate degree was earned at Wheaton College (1959) and his Ph.D. in physics was received from the University of Maryland in 1973. After undergraduate school he worked for three years at the Naval Research Laboratory before going to Goddard Space Flight Center (GSFC) where he is presently a member of the Geophysics Branch. While at GSFC he has participated in the magnetic field experiments on the Ogo and Pogo satellites, including pioneering studies of magnetic disturbances at high latitudes. During his professional career Dr. Langel has authored or co-authored 30 papers and is recognized as an authority in geomagnetism. He is presently project scientist for the Magsat project and a leader in GSFC's research in the area of the earth's main magnetic field and crustal magnetic anomalies.

ARK L. LEW was born in Canton, China, in 1941. He received the B.S.E.E. degree from Case Institute of Technology (1963) and the M.S.E. degree from The Johns Hopkins University in 1968. Since joining APL in 1963, he has worked in the areas of spacecraft systems and electronics design. He has designed electronics for the Explorer,

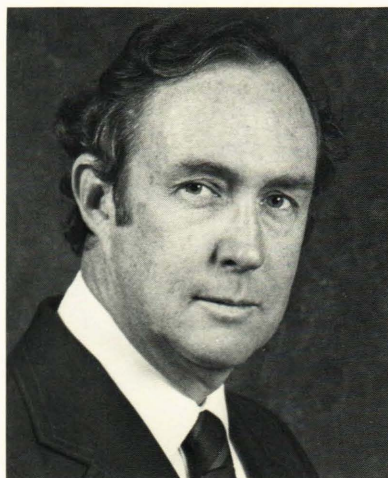


BRUCE C. MOORE was born in Hackensack, N.J., in 1943. He received the B.E.E. from Rensselaer Polytechnic Institute in 1965 and the M.S.E.E. from The Johns Hopkins University in 1978. Prior to joining APL in 1975, he was employed as an engineer by RCA Astro Electronics Division where he worked on such space programs as Tiros, Apollo, and Atmosphere Explorer. At APL he has been involved in the design of command and telemetry hardware on the Transit, Transit Improvement Program, and Magsat satellites. Mr. Moore is a member of the Space Instrumentation Systems Group and is providing technical support to the Fleet Systems Department for telemetry pertaining to the Standard Missile program.

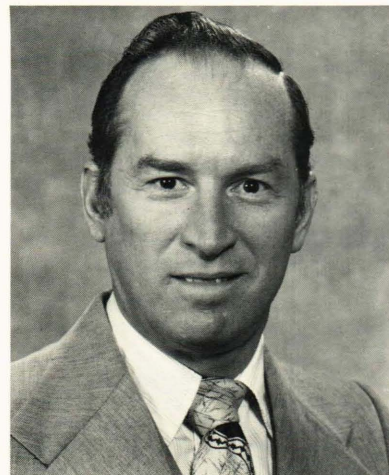
Geos, and Small Astronomy Satellite vehicles. Mr. Lew has been the command system leader for the Triad, Transit Improvement Program, and Magsat spacecraft. Currently, he is working on another microprocessor-based design — the data system for the LAN experiment of the Solar Polar spacecraft. Mr. Lew is supervisor of the Systems Analysis and Development Section of the Space Instrumentation Systems Group.



GILBERT W. OUSLEY received his B.S.M.E. (1954) and M.S.M.E. (1958) from the University of Maryland. In 1959 he joined the NASA Goddard Space Flight Center (GSFC) where he has held several line, staff, and project manager positions. He spent two years in Paris in the mid-1960's as the first representative in Europe of NASA Headquarters. He has been the Magsat project manager from project initiation



FREDERICK F. MOBLEY was born in Atlanta in 1932. He received a B.S. degree from the University of Illinois in 1953 and an M.S. in aeronautical engineering from the Massachusetts Institute of Technology in 1958. He came to APL in 1955. Since 1960 Mr. Mobley has worked on satellite attitude control, including gravity-gradient stabilization of the Transit satellites and the use of magnetic control systems in the Small Astronomy Satellites and Magsat. He was the APL project scientist on Magsat and participated in the overall satellite design and its implementation. Mr. Mobley is supervisor of the Space Attitude Control Systems Group.



through in-orbit mission operations. He is now manager of NASA's Ampte project.

Mr. Ousley is the recipient of the DoD Meritorious Civilian Service Award, the NASA Exceptional Service Medal, the Medaille de Vermeil du CNES, the Bundesverdienstkreuz, as well as GSFC performance and achievement awards.

THOMAS A. POTEMRA was born in Cleveland in 1938. He did both his undergraduate and graduate work in



electrical engineering, receiving the B.S. from Case Institute of Technology (1966), the M.E.E. from New York University (1962) and the Ph.D. from Stanford University (1966).

Since joining APL in 1965 Dr. Potemra has engaged in research in ionosphere and space physics. He was principal investigator for the Triad magnetometer experiment and co-investigator for the Atmospheric Explorer photoelectron spectrometer experiment. He is presently assistant group supervisor of the Space Physics and Instrumentation Group. Among his many activities outside the Laboratory, he is associate editor of the *Journal of Geophysical Research* and secretary of the Aeronomy Section of the American Geophysical Union.

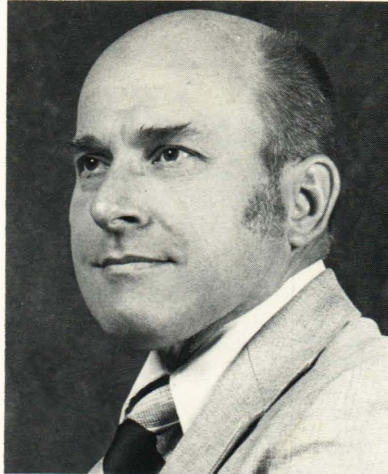
FREDERICK W. SCHENKEL was born in Jersey City in 1932. He earned a B.S.E.E. degree at Fairleigh Dickinson University in 1958, and has done graduate work at Johns Hopkins and the University of Maryland. During 1955-63 he was engaged in physical electronics R&D and engineering with the Allen B. DuMont and CBS Laboratories.

Mr. Schenkel joined APL in 1963 as section supervisor in the Microelectronics Group. Since 1965 he has been with the Space Department, where he has been involved in electro-optic systems design and analysis, including the Dodge satellite's color TV camera system, which secured the first color pictures of the full earth. He was also responsible



for the Small Astronomy Satellite star mappers built at APL and was heavily involved in the development of the Attitude Transfer System and optical metrology for Magsat. He is a senior member of the IEEE.

JAMES F. SMOLA was born in Chicago in 1928 and obtained a B.S.M.E. at the Illinois Institute of Technology in



1951 and an M.S. in numerical science from The Johns Hopkins University in 1969. During 1955-58 he was directly involved in the integration of the Terrier, Tartar, and Talos surface-to-air missiles aboard vessels of the U.S. Navy's surface fleet. During that period he was employed by the Vitro Corp. and the Washington Technological Associates.

In 1958 Mr. Smola joined APL where he has been involved in the design, fabrication and testing of mechanical, electromechanical, and attitude control systems for spacecraft. At present he is an assistant group supervisor and section supervisor in the Space Attitude Systems Group.

BARRY E. TOSSMAN was born in Baltimore in 1940 and received his B.S.M.E. and M.S.M.E. degrees from the University of Maryland in 1961 and

1964. He is currently enrolled in the M.S. program in technical management of the Johns Hopkins Evening College. Since joining APL in 1961, he has spent most of his time in the Space Department where he has been responsible for mechanical and attitude control system design, control system simulations, electronic and electromechanical hardware development, and post-launch operations and analysis. Mr. Tossman has also been responsible for state-of-the-art systems development of magnetic instrumentation for the Strategic Systems Department. He is currently program



manager for the Galileo Energetic Particles Detector Project and the LAN project of the Solar Polar spacecraft.

CLARENCE A. WINGATE was born in 1930 in Charlotte, N.C. He received a B.S.M.E. (1952) and an M.S.M.E. (1958) from North Carolina State University and did graduate work in physics during 1960-64 at the University of Maryland. Upon joining APL in 1958 he worked on ramjet performance analysis until 1967, when he became supervisor of the Thermal Systems Design Section of the Spacecraft Systems Group. Since then he has been directly involved in the design analysis and testing of 12 spacecraft and five spacecraft instruments.

