

PUBLICATIONS (1984)

- F. J. Adrian and A. N. Jette, "Semiempirical Model of the Exchange Polarization Mechanism of Transferred Hyperfine Interactions in Ionic Radicals," *J. Chem. Phys.* **81**, 2415-2419.
- F. J. Adrian and A. N. Jette, "Semiempirical Valence Bond Model of Hyperfine Interactions and Bonding in RbO and CsO," *J. Chem. Phys.* **81**, 2411-2414.
- A. E. Baitis, T. A. Applebee, and T. M. McNamara, "Human Factors Considerations Applied to Operations of the FFG-8 and Lamps Mk III," *Naval Eng. J.* **96**, 191-199.
- W. G. Bath, E. W. David, and J. T. Miller, "Development and Testing of the Gridlock Demonstrations System," in *Record, 30th Tri-Service Radar Symp.*, Environmental Res. Inst. of Michigan, pp. 1-10.
- S. Bockstahler-Brandt and L. Kassoff, "Evolution of an Historical Oceanographic Data Base," in *Proc. Digital Equipment Computer User's Soc. Symp.*, pp. 35-37.
- W. Börsch-Supan (Johannes Gutenberg-Universität) and L. W. Hunter and J. R. Kuttler (APL), "Endothermic Gasification of a Solid by Thermal Radiation Absorbed in Depth," *Int. J. Heat Mass Transfer* **27**, 1171-1182.
- C. A. Boyles, *Acoustic Waveguides: Applications to Oceanic Science*, John Wiley & Sons, New York.
- F. R. Castella and R. E. Thurber, "Experimental Results for a Coherent Radar Digital Data Collector," in *Proc. International Conf. on Radar*, pp. 455-460.
- W. T. Citrin and K. A. Skrivseth, "New Threat Upgrade Combat System, Overview and Test Results," in *Record, 30th Tri-Service Radar Symp.*, Environmental Res. Inst. of Michigan, pp. 89-96.
- R. B. Decker (APL), L. Vlahos (Univ. Maryland), and A. T. Y. Lui (APL), "Predictions of Lithium Interactions with Earth's Bow Shock in the Presence of Wave Activity," *J. Geophys. Res.* **89**, 7331-7337.
- C. de Jager and A. Boelee (Lab. Space Res., Utrecht) and D. M. Rust (APL), "Spatial Development of X-Ray Emission during the Impulsive Phase of a Solar Flare," *Solar Phys.* **92**, 245-258.
- M. J. Engebretson (Augsburg College), L. J. Cahill, Jr. (Univ. Minnesota), T. A. Potemra and L. J. Zanetti (APL), R. L. Arnoldy (Univ. New Hampshire), S. B. Mende (Lockheed), and T. J. Rosenberg (Univ. Maryland), "On the Relationship between Morning Sector Irregular Magnetic Pulsations and Field Aligned Currents," *J. Geophys. Res.* **89**, 1602-1612.
- J. A. Fave (EA Eng., Sci., & Tech.) and D. T. Burton (APL), "Toxicity of Chlorine to Aquatic Life and Its Impact on the Environment," in "Wastewater Disinfection—The Pros and Cons," *Proc. 1984 Water Pollution Control Federation Conf.*, pp. 1-24.
- R. K. Frazer, "Rain Erosion Tests of Full-Size Slip Cast Fused Silica Radomes at M3.5 and M4.8," in *Proc. 17th Symp. on Electromagnetic Windows*, H. L. Bassett, ed., pp. 215-219.
- M. D. Griffin, T. E. Strikwerda, and D. G. Grant, "The Space Telescope Alternate Fine Guidance Sensor," in *AIAA Guidance and Control Conf. Proc.*, pp. 143-153.
- L. W. Hall, Jr., D. T. Burton, W. C. Graves, and S. L. Margrey, "Avoidance Responses of Estuarine Fish Exposed to Heated-Dechlorinated Power Plant Effluents," *Environ. Sci. Tech.* **18**, 561-566.
- L. W. Hall, Jr., D. T. Burton, W. C. Graves, and S. L. Margrey, "Behavioral Modification of Estuarine Fish Exposed to Sulfur Dioxide," *J. Toxicol. Environ. Health* **13**, 969-978.
- T. Iijima (Univ. Tokyo) and T. A. Potemra, L. J. Zanetti, and P. F. Bythrow (APL), "Large-Scale Birkeland Currents in the Dayside Polar Region during Strongly Northward IMF: A New Birkeland Current System," *J. Geophys. Res.* **89**, 7441-7452.
- W. D. Larkin and J. P. Reilly, "Strength/Duration Relationships for Electrocutaneous Sensitivity: Stimulation of Capacitive Discharges," *Percept. Psychophys.* **36**, 68-78.
- J. L. MacArthur and P. V. K. Brown, "Altimeter for the Ocean Topography Experiment (TOPEX)," in *Proc. SPIE: Recent Advances in Civil Space Remote Sensing*, H. W. Yates, ed., pp. 172-180.
- R. H. Maurer, "Dual-In-Line Package Mounting for Space Applications," in *Proc., 34th IEEE Electronic Components Conf.*, 498-510.
- W. McCloskey, "Hard Times on the [Chesapeake] Bay," *National Wildlife* **22**, 7-14.
- A. Metropoulos (National Hellenic Res. Foundation) and D. M. Silver (APL), "Rotationally Inelastic Collisions of LiH with He: Quasiclassical Dynamics of Atom-Rigid Rotor Trajectories," *J. Chem. Phys.* **81**, 1682-1691.
- R. A. Meyer, J. D. Mandell, and M. H. Friedman, "Changes in Aortic Bifurcation Geometry during a Cardiac Cycle," *J. Biomech.* **17**, 637-638.
- L. Monchick, "Boundary Conditions and Reversibility in Diffusion Controlled Reactions. II. A Three State Model for Steady State Evaporation of a Spherical Drop," *J. Chem. Phys.* **81**, 2010-2015.
- L. K. Moore, "IEEE's Congressional Fellows in Action," *Impact* **8**, 5-6, 14-15.
- R. R. Newton, *The Moon's Acceleration and Its Physical Origins*, 2, The Johns Hopkins University Press, Baltimore.
- W. L. Oliver, J. C. Foster, J. M. Holt, and G. B. Loriot (MIT), V. B. Wickwar, J. D. Kelly, and O. de la Beaujardiere (SRI International), P. F. Bythrow, C.-I. Meng, and F. J. Rich (APL), and R. E. Huffman (Air Force Geophysics Lab.), "Initial Millstone Hill, Sondrestrom, and HILAT Observations of Thermospheric Temperatures and Frictional Heating," *Geophys. Res. Lett.* **11**, 911-914.
- D. K. Pace, "A Compendium of Principles for Successful Management of Computer Simulation Development," in *Proc. 5th Conf., American Society for Engineering Management*, pp. 55-59.
- K. Peacock, "The Optical Variability of the Ocean from CZCS Imagery," in *Proc. SPIE Ocean Optics VII* **489**, pp. 208-219.
- R. M. Robinson (Lockheed), D. S. Evans (NOAA), T. A. Potemra (APL), and J. D. Kelly (SRI International), "Radar and Satellite Measurements of an F-Region Ionization Enhancement in the Post-Noon Sector," *Geophys. Res. Lett.* **11**, 899-902.
- W. E. Snelling and J. E. Penn, "A Fully Pipelined, Bit-Sliced, VLSI Correlator," in *Digital Signal Processing—84*, V. Cappellini and A. G. Constantinides, eds., Elsevier Pub., Amsterdam, pp. 313-320.
- J. C. Spall (APL) and K. D. Wall (Univ. Virginia), "Asymptotic Distribution Theory for the Kalman Filter State Estimator," *Commun. Stat. Theory Methods* **13**, 1981-2003.
- W. I. Sternberger, "Temperature-Compensated Thermistor Anemometer," in *Proc. STD Conf. and Workshop*, Marine Technology Soc., San Diego, pp. 112-115.
- K. Strohbehn, M. D. Foust, and G. A. Heyler, "Space Telescope Alternate Fine Guidance Sensor Performance," in *Proc. AIAA Conf.*, pp. 655-665.
- J. W. Thomas, E. L. Brickner, E. P. Lee, and J. Phipps, "The AN/SPS-48C Radar Detection Data Converter," in *Record, 30th Tri-Service Radar Symp.*, Environmental Res. Inst. of Michigan, pp. 31-40.
- M. E. Thomas, "The Electrical Properties of Seawater at Microwave Frequencies," in *Proc. URSI/IEEE Meeting*, p. 108.
- L. J. Zanetti and T. A. Potemra (APL), T. Iijima (Univ. Tokyo), W. Baumjohann (Max-Planck Inst.), and P. F. Bythrow (APL), "Ionospheric and Birkeland Current Distributions for Northward Interplanetary Magnetic Field: Inferred Polar Convection," *J. Geophys. Res.* **89**, 7453-7458.
- P. A. Zucker, "Credible Use of Models for Untested Conditions," in *Proc. 1984 Summer Conf., Soc. for Computer Simulation*, pp. 237-238.

PRESENTATIONS (1984)

- F. S. Billig, "Ramjets with Supersonic Combustion," AGARD-NATO PEP Lecture Series No. 136 on Ramjet and Ramrock-

- et Propulsion Systems for Missiles, Naval Postgraduate School (Sep 5-6), the Royal Aeronautical Society, London, (Sep 10-11), and the German Armed Forces University, Munich (Sep 13-14).
- W. E. Buchanan, "Computer Authoring Systems for Teachers," International Conf., Association for Children with Learning Disabilities, New Orleans (Feb 28).
- D. T. Burton and J. A. Fava, "Toxicity of Chlorine to Aquatic Life and Its Impact on the Environment," 57th Annual Conf., Water Pollution Control Federation, New Orleans (Sep 30).
- D. C. Cetronk, "APL's Hybrid Facility," Spring Meeting, EAI Computer User's Group, Columbia, Md. (Apr).
- M. C. Chiu, M. J. Chandler, and A. G. Bates, "Automated Measurement and Data Recording System for High Resolution Phase Intercomparison for a Set of Precision Clocks," Conf. on Precision Electromagnetic Measurements '84, Delft, The Netherlands (Aug 20-24).
- E. B. Dobson, J. R. Rowland, M. L. Hill, and R. E. Miller, "An Optical Disdrometer to Measure Drops Size Distributions, Visibility, and Liquid Water Content in an Airborne Environment," International Symp., IEEE Antennas and Propagation Soc., Boston (Jun).
- J. Fluss, K. A. Plantz, and D. K. Pace, "FFG-7 Multi-Warfare Analysis," 52nd Symp., Military Operations Research Soc., Ft. Leavenworth (Jun 5-7).
- J. W. Foerster (U.S. Naval Academy) and P. M. Thompson (APL), "Plankton and Whaling Ground Dynamics in the Denmark Strait," International Symp. on Marine Plankton, Tokai Univ., Shimizu, Japan (Jul 23-28).
- H. G. Fox, "Relocation and Refurbishment of the APL Space Simulation Laboratory," 31st Meeting, AIAA Working Group on Space Simulation, Tokyo (Sep 18-21).
- M. H. Friedman, "Fluid Mechanical Factors in Atherogenesis," 9th Hugh Lofland Conf. on Arterial Wall Metabolism, San Antonio (May 24).
- M. H. Friedman, "Fluid Mechanics and Mass Transport in Atherosclerosis," Special Seminar, Chemical Engineering Dept., Crump Inst. for Medical Engineering, UCLA (May 21).
- M. H. Friedman, "A Model of the Thickening of the Arterial Intima under Shear," Workshop on Cardiovascular and Pulmonary Dynamics, Zuoz, Switzerland (Aug 23).
- M. H. Friedman, O. J. Deters, and C. B. Barger (APL), G. M. Hutchins (JHMI), and F. F. Mark (APL), "The Effect of Wall Shear on the Thickening of Human Arterial Intima," 9th Hugh Lofland Conf. on Arterial Wall Metabolism, San Antonio (May 25).
- P. G. Fuechsel, "Field Test to Characterize Submarine-Generated ELF Sources," 52nd Symp. Military Operations Research Soc., Fort Leavenworth (Jun 5-7).
- R. A. Henle, "Microcomputer Technology Applying to Authoring Systems," Joint Convention, JHU/Maryland State Dept. of Education, Baltimore (Jan).
- R. A. Henle, "Personal Computing in Your Organization—Technical and Managerial Issues: Methodologies for Success," IEEE Computer Soc., Laurel, Md. (Jun 27-28).
- R. A. Henle, "Recent Advances in Microcomputer Technology—Impact on the Handicapped," Association for Rehabilitation in Data Processing, Baltimore (Jan).
- R. A. Henle, "Small Computer Systems" (ten-part seminar), IEEE Power Soc., Baltimore (Mar-May).
- R. A. Henle, "The Current Struggle to Aid the Handicapped with Microcomputers," Assoc. for Learning Disabled, New Orleans (Feb 6-7).
- R. A. Henle, "The Trend Towards Distributed Computing," Illinois Inst. of Tech. Res. Facility, Annapolis (Apr 15).
- R. F. Hendrick, J. R. Brannan, and G. P. Forney, "The Uniform WKB Approach Extension to Multiple Channel and Bottom Propagation," 108th Meeting, Acoustical Soc. of America, Minneapolis (Oct 9-12).
- R. E. Hicks, H. K. Charles, and B. M. Romensko, "High Density Interconnects in Biomedical Systems Using Hybrids and Surface Mounted Components," 1984 Microelectronic Interconnect Conf., Welches, Ore. (Jul 31).
- D. E. Irvine, "The Giant Wave Problem," Colloq., National Res. Inst. of Oceanology, Stellenborsch, South Africa (May 26).
- D. E. Irvine, "The Modulation of Short Waves by Long Waves in the Presence of Wind," Symp. on Wave Breaking, Turbulent Mixing, and Radio Probing of the Ocean Surface, Sendai, Japan (Jul 19-25).
- D. E. Irvine, R. C. Beal, A. D. Goldfinger, F. M. Monaldo, and D. G. Tilley, "A Status Report on SAR Ocean Wave Spectra Research at APL," Conf. on Active Microwave Sensing of Oceans, Royal Aircraft Establishment, Farnborough, U.K. (Apr 4).
- R. J. Keenan, "6 DOF Missile Hybrid Computer Simulation," North American Chapter, EAI Computer User's Group, Columbia, Md. (Apr 1).
- W. H. Lambert, "Cooperative AAW Engagements: Trend of the Future for Naval SAM Systems," Symp. on Fire Control, Picatinney Arsenal, N. J. (Apr).
- M. J. Linevsky and R. M. Fristrom (APL) and J. R. Smith (Sandia National Lab.), "Single Eddy Combustion—A New Approach to Turbulent Flames," 20th Symp. on Combustion, Ann Arbor (Aug 12-16).
- F. Marshall (JHMI), J. T. Massey (APL), R. Sanders (JHMI), R. A. Makofski, F. F. Mark, and F. B. Weiskopf, Jr. (APL), F. Leo (JHMI), and W. H. Guier (APL), "Shock Wave Destruction of Renal Calculi: New Technical Modifications," Meeting, American Urological Assoc., New Orleans (May 7).
- L. K. Moore (APL) and D. L. Plung (Westinghouse Idaho Nuclear), "Getting an Anthology Published with the IEEE Press," IEEE Professional Communication Soc., Atlantic City (Oct 10-12).
- V. O'Brien, "Blood Flow in Constricted Arteries," Fluid Dynamics Seminar, CSIRO, Canberra, Australia (Jun 5).
- K. A. Potocki, "HILAT—A First Year Status," HILAT Science Team Meeting, La Jolla (May 30).
- A. J. Pue, "High Precision Pointing Control of Space Telescopes," System Theory Colloq., Univ. Maryland, College Park (Oct 12).
- S. N. Raja and J. N. Campbell (JHMI) and R. A. Meyer (APL), "Effects of General Anesthetics on Response of Nociceptive Primary Afferents in Monkey," 3rd International Conf. on Molecular and Cellular Mechanisms of Anesthesia, Calgary (Jun).
- D. Richards (APL), J. S. Seward (Seward Assoc.), F. B. Weiskopf, Jr. (APL), and E. S. Burcher (DOE), "Study of Utilization and Management of Power Generated by a Pneumatic Wave Energy Conversion System," International Conf. on Alternative Energy Systems: Electrical Integration and Utilization, Coventry, U.K. (Sep 10-12).
- W. Seamone, "Morse Code/Computer Interface for Brainstem Infarction Patients," Summer Computer Simulation Conf., Boston (Jul 23-25).
- J. J. Suter, J. G. Wall, H. D. Black, and T. E. Strikwerda, "Progress Toward Radio-Tracking of Birds via Satellites," Patuxent Wildlife Res. Center, Laurel, Md. (Mar).
- D. P. Vasholz and L. J. Crawford, "Dye Dispersion in the Seasonal Thermocline," Seminar, Woods Hole Oceanographic Institution, Woods Hole, Mass. (Apr 3).
- R. L. Waddell, Jr., "Satellites: Orbits and Operations," Maryland Junior Academy of Science Meeting, Maryland Science Center, Baltimore (Sep 15).
- J. H. Walker, "Teaching Project Management," American Soc. for Engineering Management, Dallas (Sep 23-25).
- D. J. Williams, "Particle Sources, Transport, Storage, and Precipitation," 25th Meeting, COSPAR, Symp. on Achievements of the International Magnetospheric Study, Graz, Austria (Jun 25-Jul 7).
- D. J. Williams and T. A. Fritz, "The Plasmasheet Boundary as Observed by the ISEE Medium Energy Particles Experiment," 25th Meeting, COSPAR, Symp. on Achievements of the International Magnetospheric Study, Graz, Austria (Jun 25-Jul 7).
- P. A. Zucker, "Establishing Credibility for Multidimensional Models," 9th World Congress International Federation of Automatic Control, Budapest (Jul 2-6).

The following papers were presented at Oceans '84, Washington, D. C. (Sep 10-12):

- C. W. Anderson, "Surface-Operated Profiling Paravane;"
- G. J. Farruggia and A. B. Fraser, "Miniature Towed Oceanographic Conductivity Apparatus;"

D. A. Kitchin, A. B. Fraser, R. P. H. Lee, L. A. Meyer, L. E. Karner, and C. S. Best, "Densely Instrumented Towed Sensor Systems."

The following papers were presented at the Workshop on Bank-to-Turn Controlled Terminal Homing Missiles, Laurel, Md. (Sep 19-20):

- A. Arrow, "Influence of Radome-Induced Body Motion Coupling on Bank-to-Turn Controlled Terminal Homing Missiles;"
- P. A. Hawley, "Dynamics of the Airframe and Kinematics of the Seeker for Selected Airframes and Control Policies;"
- A. J. Pue, "Adaptive Radome Error Correction for Homing Missiles;"
- G. B. Stupp, Jr., and A. Arrow, "Influence of Control Policy on Airbreathing Chin Inlet SOJS Missile."

The following papers were presented at the 4th World Congress on Pain, Seattle (Sep):

- J. N. Campbell (JHMI), R. A. Meyer (APL), and S. N. Raja (JHMI), "Hyperalgesia: New Insights;"
- R. A. Meyer (APL) and J. N. Campbell and S. N. Raja (JHMI), "Coupling of Action Potential Activity between Unmyelinated Fibers in the Normal Peripheral Nerve of Monkey;"
- S. N. Raja and J. N. Campbell (JHMI), R. A. Meyer (APL), and S. E. Mackinnon (Univ. Toronto), "Hyperalgesia Following Peripheral Nerve Injury Is Signalled by Myelinated Fibers."

COLLOQUIA

- Oct 5, 1984—"Fiber Composites: A New Era in Design and Manufacture," M. J. Salkind, Air Force Office of Scientific Research.
- Oct 12—"Clinical Information Systems," B. I. Blum, APL.
- Oct 26—"Fundamental Physical Limitations on the Computational Process," R. W. Landauer, IBM Research Center.
- Nov 2—"Fire and Ice: Firestorms and the Nuclear Winter Hypothesis," M. J. Frankel, Defense Nuclear Agency.
- Nov 9—"The Quantum Hall Effect," S. M. Girvin, National Bureau of Standards.

Nov 16—"Geological Rhythms, Mass Extinctions, and Cometary Impacts," M. R. Rampino, NASA Goddard Inst. for Space Studies.

PATENTS (1984)

W. H. Avery, *Open Cycle OTEC Plant*, Patent Number 4,430,861, Feb 14:

A mechanism for deriving electrical power from the thermal differential that exists between the warm surface waters and the deep cold waters of tropical oceans.

R. E. Fischell, G. H. Fountain, and C. M. Blackburn, *Self-Injurious Behavior Inhibiting System*, Patent Number 4,440,160, Apr 3:

A sensor module that detects a self-inflicted blow to the patient's body and transmits a signal to a stimulation module, which then generates a controlled electrical current for aversive stimulation.

C. A. Keller, *Fluid Level Measuring Device with Linear, High Resolution Output*, Patent Number 4,443,699, Apr 17:

A device for measuring ocean waves or other varying fluid levels. The patented device includes a light pipe partially immersed in the fluid, the indices of refraction of the light pipe and the fluid being substantially matched so that the output of the light pipe varies linearly with the length of the pipe immersed in the fluid.

E. P. Irzinski, *Coaxial Waveguide Commutation Feed Network for Use with a Scanning Circular Phased Array Antenna*, Patent Number 4,446,463, May 1:

A structure interfacing a coaxial waveguide commutation feed network to a scanning circular phased array antenna, while maintaining broadband operation and low insertion losses.

S. A. Kahn, R. L. Stewart, and S. G. Tolchin, *Local Area Communication Network*, Patent Number 4,451,827, May 29:

A local area communications network for providing full-duplex data transfer be-

tween any two network interface units on a one-to-all-others contention bus.

W. O. Wilkinson and D. W. Rabenhorst, *High Speed Imaging Television System*, Patent Number 4,453,182, Jun 5:

A television system for observing a rapidly changing dynamic event (such as a spinning flywheel), the system employing a plurality of sequentially triggered video cameras whose output images are multiplexed or interlaced together.

J. C. Murphy and L. C. Aamodt, *Optical Beam Deflection Thermal Imaging*, Patent Number 4,468,136, Aug 28:

A technique for evaluating surface and subsurface properties of a material. An optical excitation beam produces an area of localized heating on the sample surface, resulting in a thermal gradient and the generation of a thermal lens adjacent to the surface. The thermal lens deflects an optical probe beam in accordance with the surface temperature profile to reveal surface and subsurface properties of the material being tested.

J. J. Wozniak, *Sutureless Vascular Anastomosis Means and Method*, Patent Number 4,470,415, Sep 11:

Use of a heat shrinkable polymer sleeve to perform sutureless vascular anastomosis. Also covered is a novel tool for everting the ends of a blood vessel over ferrule members preparatory to application of the heat shrinkable sleeve.

W. H. Avery, *Low Cost Method for Producing Methanol Utilizing OTEC Plantships*, Patent Number 4,476,249, Oct 9:

A low cost method for producing methanol aboard an OTEC plantship, using the hydrogen and oxygen by-products normally generated on board, together with a source of carbon.

C. Philippides, *Missile Identification and Data Entry Apparatus*, Patent Number 4,479,217, Oct 23:

An electronic system for decoding and processing link data independently of internal clocking, particularly where the data comprise bilevel and multilevel commands.

THE AUTHORS



GEORGE C. WEIFFENBACH was born in Newark, N.J., in 1921 and received his Ph.D. in physics from the Catholic University of America in 1958. He was employed at APL in 1951 as an associate physicist in the Research Center. After joining the Space Department in 1958, he held various supervisory positions there, becoming supervisor of the Space Sciences Branch in 1968. Dr. Weiffenbach later became director of geoastronomy programs at the Smithsonian Astrophysical Observatory (1969-73), associate director of the Center for Astrophysics (1973-77), and staff physicist at Lincoln Laboratory (1978-79). Upon rejoining APL in 1979, he was appointed Chief Scientist and Associate Space Department Head. He has been Space Department Head since 1980.

astronomy programs at the Smithsonian Astrophysical Observatory (1969-73), associate director of the Center for Astrophysics (1973-77), and staff physicist at Lincoln Laboratory (1978-79). Upon rejoining APL in 1979, he was appointed Chief Scientist and Associate Space Department Head. He has been Space Department Head since 1980.



ROBERT J. DANCHIK, who was born in Homer City, Pa., is program manager for the Navy Navigation Satellite System (TRANSIT) program at APL. Mr. Danchik has served in many Space Department technical and management roles during his career at APL. In addition to the TRANSIT program management assignment, he supervises the Space Department's Space Electronics Branch. Mr. Danchik obtained an M.S. degree from

Drexel Institute of Technology in 1960.



GLEN E. BAER was born in Pennsylvania in 1950. In 1974, he received an M.S.E.E. degree from Drexel University, where he was also a co-op student with AAI Corp. in Baltimore. After joining APL in 1974, his work included checkout of satellite hardware; digital design; systems engineering; hardware-software interfaces; and the design, implementation, and verification of software. He now is an engineer in the Spacecraft Systems

Group and is the program scientist for the Automated Aids Positioning System under development for the U.S. Coast Guard.



JOSEPH G. WALL, JR., was born in Wilkes-Barre, Pa., in 1932 and earned a B.S.E.E. at the University of Idaho in 1961. After four years with Westinghouse Electric, he went to the Space Systems Division of Fairchild Hiller Corp. as a senior engineer working in the evaluation and design of digital data systems. In 1965, he joined APL as a specialist in digital design, test, and evaluation. Mr. Wall has been program manager for the

Miniature-Shipboard Automatic Data Recording System, the U.S. Coast Guard Precision Intercoastal Loran Translocator, and the Portable Loran Assist Device. He supervises the Space Department Planning and Operations Office, and is program manager for the GEOSAT-A radar altimeter, the U.S. Coast Guard Automated Aids to Navigation Positioning System, the National Science Foundation Polar Projects Airborne Research Program, and the Bird-Borne Transmitter Program, and the NASA Search and Rescue Program.



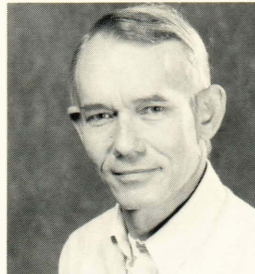
EDWIN E. WESTERFIELD received an M.S. degree from the University of Maryland. After joining APL in 1954, he was active in the design and test of the first TALOS continuous wave interferometer missile. He became a section supervisor in the Space Department in 1960, with responsibility for developing a system for determining the azimuth of a line on the surface of the earth by using signals from the TRANSIT satellite and for

developing techniques for precisely determining the relative position of two locations by means of TRANSIT signals. Mr. Westerfield later became responsible for developing many of SATRACK's system concepts and its hardware simulation system. In 1982, after becoming supervisor of the Space Systems Applications Group, he was responsible for initial development of the GPS/SMILS system, which will be used to determine the impact point of reentry bodies.



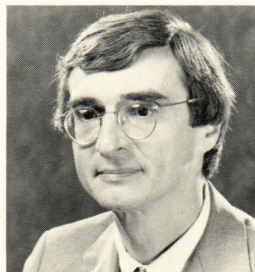
DENNIS J. DUVEN was born in Orange City, Iowa, in 1940 and received a Ph.D. in electrical engineering from Iowa State University in 1971. He was assistant professor of electrical engineering from 1968-73 and specialized in classical and modern control systems courses. Since joining APL in 1973, Dr. Duven has been a member of the Space Systems Applications Group, specializing in systems analysis of satellite-based tracking systems

such as SATRACK and GPS/SMILS. He is the system scientist for the SATRACK II Program.



LARRY L. WARNKE was born in Pawnee City, Neb., in 1936 and completed the course work for an M.S.E.E. degree at the University of Maryland in 1963. He joined APL in 1961 as an engineer. During the 1960s, he worked on the development of various navigation systems that used the Navy's (APL-developed) TRANSIT satellite system. In 1970, Mr. Warnke was involved in the development of a terrain avoidance radar system for use

aboard a surface effect vehicle. Since 1974, his primary responsibility has been the development of tracking systems associated with the Air Force Global Positioning System satellites. He is supervisor of the Digital Systems Design Section in the Space Department.



CHARLES C. KILGUS was born in South Williamsport, Pa., in 1941. He received his Ph.D. in electrical engineering at The Johns Hopkins University in 1970, specializing in communication theory. Since joining APL in 1964, he has worked in the Space Department on various antenna, communications, and systems design projects, including the SEASAT-A remote sensing satellite program. Dr. Kilgus is program manager of the

GEOSAT-A, TOPEX, and NROSS development efforts.



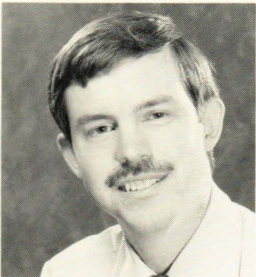
JOHN L. MACARTHUR was born in Columbus, Ohio, in 1927 and received an M.S. degree at the University of Maryland in 1959. In 1957, he joined APL, where his primary specialty is radar system design. After joining the Space Department in 1974, he served as project scientist for radar altimeter development on the SEASAT-A program and is currently performing the same role on the GEOSAT-A, TOPEX, and NROSS

altimetry programs. Other recent involvement includes the GRASAT (later Geopotential Research) and SAGE missions, for which he designed high-precision range-rate measurement instrumentation.

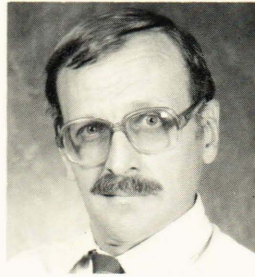


ROBERT C. MOORE was born in Lancaster, Pa., in 1943. He received an M.S.E.E. from The Johns Hopkins University in 1969. In 1965, he joined the Space Digital Applications Group at APL, where he specializes in digital logic design and custom large-scale integration circuit design. At APL, Mr. Moore has worked on the ballistic Loran Assist Device computer, the Ultraviolet Absorption experiment on the Apollo/Soyuz test

project, the SEASAT-A radar altimeter, the Energetic Particles Detector instrument on project GALILEO, and the Medium Energy Particle Analyzer instrument on AMPTE.

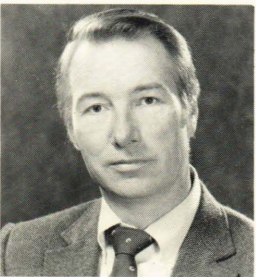


PETER V. K. BROWN was born in Silver Spring, Md., in 1947 and received an M.S.E.E. from the University of Maryland in 1978. After working at The Walter Reed Army Medical Center in independent research, he joined APL's Space Department in 1982, concentrating on system engineering associated with radar altimeter instruments.



ROBERT E. JENKINS was born in Baltimore in 1938 and received an M.S. in physics from the University of Maryland in 1965. He joined APL in 1961, and is currently assistant supervisor of the Space Analysis and Computation Group, a member of APL's Program Review Board, and a member of APL's committee for VLSI. During Mr. Jenkins' Space Department tenure, he helped develop the world's first drag-free spacecraft,

and made the world's first observation of the relativistic Doppler effect using an earth satellite. Recently, he completed development of a biomedical robot vision system and led the development of one of APL's first full custom-designed LSI chips. During 1978, he was visiting scientist at the Defense Mapping Agency. This year he was awarded the Dunning Professorship at the Homewood campus, where he will be researching artificial intelligence techniques in Computer-Aided Design tools.



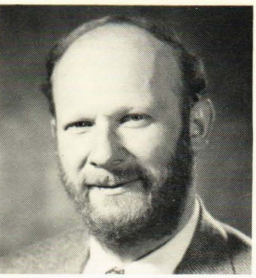
ROBERT C. BEAL was born in Boston in 1940 and received an M.S. in physics from the University of Maryland in 1968. He has been interested in satellite sensors and their scientific applications since 1964. Since 1978, he has been exploring oceanographic applications of synthetic aperture radar. He is a SEASAT and SIR-B principal investigator and is chairman of the SIR-C Ocean Working Group. Mr. Beal is currently assistant group

supervisor of the Space Geophysics Group at APL.



HAROLD D. BLACK was born in North Carolina in 1926 and earned an M.S. in engineering at the Carnegie Institute of Technology in 1952, with postgraduate education in applied mathematics at the Illinois Institute of Technology and the University of Maryland. He worked at Rohm and Haas Co. in Huntsville, Ala., and at the Armour Research Foundation of the Illinois Institute of Technology during 1954-57. Mr. Black joined

APL in 1957 and the Space Department in 1958. During 1970-71, he was a Parsons Fellow in biomedical engineering. He is supervisor of the Space Analysis and Computation Group.



JULIUS GOLDHIRSH was born in Philadelphia in 1935. He obtained his Ph.D. from the University of Pennsylvania in 1964. Between 1964 and 1972, Dr. Goldhirsh was both an assistant and associate professor of electrical engineering, specializing in the area of electromagnetic propagation. Since joining APL in 1972, Dr. Goldhirsh's research is in the area of radar meteorology and in particular the remote sensing of clear air and particulates in the troposphere. Since 1979, he has supervised the Space Geophysics Group in the Space Department. Dr. Goldhirsh is principal investigator of a continuing program involving atmospheric measurements with a multiple-polarization, high-resolution radar located at NASA's Wallops Flight Center.

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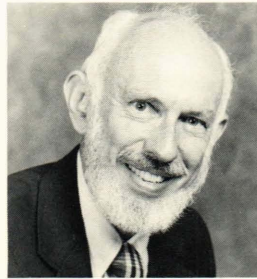
GEORGE GEBEL was born in Boston in 1909 and earned an M.E.E. at Catholic University in 1958. Prior to and during the war, he was an electrical engineer in the (then) Bureau of Ships, working on the design of fire-control switchboards in naval vessels, special power supplies, and switching system design. In 1956, Mr. Gebel joined the Terrier test plan group at APL and later the fire-control test effort for Polaris submarines. In 1964,

he transferred to the Space Department where he worked on geodesy and satellite orbit problems. He received the Navy's Meritorious Civilian Service and Distinguished Civilian Service Awards. He retired in 1975.



ROBERT R. NEWTON is a research physicist in the central office of the Space Department. Born in Chattanooga in 1918, he received his Ph.D. in physics in 1946 at Ohio State University. After two years with Bell Telephone Laboratories and a career in teaching physics at the University of Tennessee and at Tulane University, he joined APL in 1957, devoting his time to the study of the mechanics of flight of satellites and interplanetary

spacecraft. Dr. Newton's recent interests deal with the discovery and use of ancient astronomical measurements to study the behavior of nongravitational forces within the solar system. Several books have resulted from this study. He was supervisor of the Space Physics Branch from its founding until July 1983.



WILLIAM B. McCLOSKEY, JR., was born in Baltimore in 1928, received his B.S. degree from Columbia University in 1951, and served until 1953 with the U.S. Coast Guard in Alaska. After working for the *Baltimore Sun*, the U.S. Information Agency in Madras, and in industrial public relations, he joined APL's External Relations Group in 1962. His responsibilities include federal liaison in Washington. As a freelance writer

and photographer appearing in several national and international publications, he has become increasingly identified with issues involving the water—commercial fishing, marine mammal hunting and protection, ocean politics, and marine environment. His most recent book, *Highliners* (McGraw Hill, 1979), is a novel about Alaskan fishermen.

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