described in a 32-page illustrated catalog available upon request from Calvin Cinequip, Inc., 1105 Truman Rd., Kansas City, Mo. 64106. Equipments include 16mm and 35mm cameras and accessories, lights, editing machines, projectors, and sound equipment. Available laboratory and producer services are also listed in the catalog.

Optical printers and special effects equipments and accessories are illustrated and described in data sheets available from Research Products, Inc., 716 North La Brea Ave., Hollywood, Calif. 90038. Available equipments include the Aerial Image Model 1002 Optical Printer designed to provide a complete optical printing system in either 35mm or 16mm or a combination of the two for color or black-and-white.

The High and Mighty, a brochure describing television transmitting antennas, is available upon request from General Electric, Visual Communications Dept., Electronics Park, Syracuse, N.Y. 13201. The brochure is illustrated in color.

Slide projectors, spotlights and accessories are illustrated and described in Catalog G6808 available from Genarco, Inc., subsidiary of Ribons Industries Corp., 15-58 127th St., College Point (Flushing), N.Y. 11356. The projectors have 3,000-W lamps (3,150 K) and operate from 115-V, 60 Hz, 30-A power. They are used for outdoor advertising, commercial art and stage settings, background effects for theaters and television, special lighting effects, and the like.

Sweep generators for testing TV tuners and cricuits in the IF, VHF and UHF frequency regions are described in a 28-page illustrated catalog available from Telonic Instruments, 60 N. First Ave., Beech Grove, Ind. 46107. The catalog (No. 82) contains descriptions and specifications on basic sweep generator series, 1006, 1010 and 1011. Also described and illustrated are attenuators, birdy frequency markers, pulse frequency markers and several control systems including Telonic's Autotrack Automatic Tuning system.

The NC Flasher catalog lists hundreds of special-purpose items for technicians and hobbyists. Subscription price is $1.00 a year (four issues) but a sample copy (Summer 1968 issue) is available without charge from National Camera, Inc., Dept. KR, Englewood, Colo 80110. The 48-page catalog lists electronic gear, optical test instruments, shop accessories and furnishing and numbers of tools and gadgets.

Clearinghouse Publications

The publications listed below are available from Clearinghouse, U.S. Department of Commerce, Springfield, Va. 22151. Unless otherwise noted each report is $3.00 (microfiche 65 cents).

For the convenience of the reader, titles and brief descriptions of the publications have been grouped under nine categories.

Acoustics

AD-663 904, *Growth of Noisiness for Tones and Bands of Noise at Different Frequencies*, J. E. Parnell et al, 88 pp. Presents judgment tests to measure the growth of noisiness for tones and narrow bands of noise under various listening conditions. The growth of noisiness for a 1 kHz tone and an octave band of noise centered at 1 kHz were measured using both the adjustment method and a magnitude estimation method.

Communications

AD-666 540, *A Note on Multiple Access to Tactical Communication Satellites: Nets, Network Control, and Random Access*, T. G. Belden and J. W. Schwartz, 17 pp. Questions importance and desirability of random access for a communication satellite designed to service tactical communications.

AD-667 729, *A Method for Photographing Microwave With a Polaroid Film*, K. Iizuka, 30 pp. Utilizes selective development of film in accordance with the thermal image produced by the electromagnetic field. The method can be useful for preparing microwave holograms, and can be applied to mapping of temperature distribution in space.

N67-36634, *Ople Experiment*, C. Laughlin et al., 33 pp. Omega Position Location Equipment (OPLE) Experiment to demonstrate feasibility of using the Omega Navigational System in conjunction with synchronous satellites to establish a global location and data collection system.

PB-175 603, *Tabulations of VHF Propagation Data Obtained Over Irregular Terrain at 20, 50, and 100 MHz*, M. E. Johnson et al., 401 pp.

AD-653 098, *Antenna Unit and Signal Spectrum Analyzer*, S. N. Smilowitz, 99 pp. Gives design, development, and evaluation of two breadboard models capable of determining the predominant spectral frequency (in the range of 4 KHz to 18 KHz) of transient electromagnetic signals.

N68-10729, *A Space Communications Study*, K. K. Clarke et al., 107 pp. Final report of research conducted during Sept. 1966 through Sept. 1967. Part I discusses results of threshold extension studies; Part II describes development of PIB watertank channel simulator; Part III presents analysis of PSK digital signals transmitted through noisy media; Part IV shows the development of recursive detection, a different formulation of the classical problem of detecting signals in noise; and Part V describes the development of a wideband FM generator, the analysis of limiters for FM signals in SNR, and a statistical approach to multipath.

AD-655 119, *A Quantum Statistical Analysis of a Frequency-Modulated Laser Communication System*, N. F. Ruggieri, 86 pp. Determines the detection statistics for heterodyne and electric field detection of a frequency modulated laser beam. The detection statistics are used to define a measure of the communication system performance in terms of a signal-to-noise ratio.

Control Systems and Instrumentation

N67-37903, *Optical Beam Steering Device Final Report*, 15 pp. Describes an optical beam steering device for use in conjunction with lasers as a means of changing the direction of the laser beam in a controlled manner by an electrical command signal.

Data Processing

AD-665 281, *A Computer Method for the Automatic Reduction of Spectroscopic Data*, E. F. Ditzel and L. E. Giddings, Jr., 86 pp. Develops a computer program to be used with an associated spectral comparator for automatically reducing spectroscopic data.

PB-178 177, *A Multi-Level Computer Organization Designed to Separate Data-Accessing From the Computation*, V. R. Lesser, 23 pp. Describes a computer organization developed to overcome the inflexibility of computers designed around a few fixed data structures and only binary operations. Describes a new language that allows the programmer to define the proceedings for generating the names of the operands for each computation and locating the value of an operand, given its name.

General

PB-174 752, *Audio-Visual Equipment in The United Kingdom*, Comart Research, Ltd., London, England, (1965) 44 pp. Foreign Market Survey conducted to help U.S: firms initiate, develop, and/or expand their exports.

Information Technology

PB-177 050, *Directory of Federally Supported Information Analysis Centers*, 196 pp. A directory of Federally supported information analysis centers has been compiled and published by the Committee on Scientific and Technical Information (COSATI) of the Federal Council for Science and Technology in order to acquaint the public with these valuable information resources. The directory is descriptive and contains an index of subject areas covered by the listed centers, an index of names of center operators or directors, a list of organizations, and a list of locations.

PB-131 634, Russian-English Glossary of Aeronautical and Miscellaneous Technical Terms, Technical Documents Liaison Office, Wright Patterson AFB, Ohio, 705 pp.

PB-177 775, *Research on Machine Aids to an Editor of Scientific Translations*, American Mathematical Society, 79 pp. Discusses the graphical input/output system for handling Chinese characters in their natural form, and describes development of methods for computer manipulation of Chinese text and dictionary materials.

AD-664 596, *Retrieval of Technical Documents*, L. M. Bohnert, 230 pp. Describes the activities usually performed by retrieval services.

Optics

AD-665 033, *Fluorescent Ion Interaction in Laser Crystals*, W. W. Holloway, 41 pp. Investigates factors influencing fluorescence of the neodymium ion in garnet crystals to improve laser characteristics of these materials.

N67-37584, *FE I, CR I and CR II GR-Values From Shock Tubes Measurements*, M. Huber and F. L. Tobey, Jr., 36 pp. Describes measurements of f-values by the absorption technique from a shock-heated gas.

AD-667 189, *Theory of Holography*, J. W. Matthews, 274 pp. Formulates a general analytical method for computing the diffracted fields in terms of initial exposing field, film characteristics, and illumination field, taking into account the entire emulsion volume.

AD-667 475, *Acoustic Self-Trapping of Laser Beams*, E. L. Kerr, 70 pp. Analyzes internal filamentary glass damage caused by high power Q-switched pulse lasers and filamentary trapping in liquids. Several models are proposed and discussed for electrostrictively driven acoustic trapping. An analysis of Kerr effect trapping is given for purposes of comparison.

N68-11594, *Mars: Visible and Near Infrared Studies and the Composition of the Surface*, B. T. O'Leary, 188 pp.

N67-36842, *Development, Fabrication, and Delivery of Neodymium Doped YAG Laser Rods*, H. M. Dess, 26 pp.

AD-664 487, *A Theory of High Frequency Laser-Induced Instabilities in Gases*, P. M. Livingston, 28 pp.

N67-38866, *Development of a 10.6 μ Laser Modulator*, T. Walsh, 14 pp.

LA-3731-MS, *Laser Safety Program*, T. E. Ehrenkranz and H. J. Ettinger, 21 pp. Report includes a summary of laser safety recommendations, tabulation of exposure thresholds, and literature references.

AD-664 148, *High-Power Incoherent Light Sources*, A. Papayoanou and R. G. Buser, 19 pp. Surveys electrical and optical parameters of high-power incoherent light sources and certain problems of optical pumping. Standard flashlamps as well as more recent high power ultraviolet pump lamps are discussed.

Printing, Photographic Arts, Photography

AD-667 386, *Development of a Cranz-Schardin Photographic System Capable of 10^6 Frames Per Second for Study of Bubble Collapse and Liquid Jet Impact*, C. L. Kling, 19 pp.

A Cranz-Schardin Multiple Spark Source Photographic System having a maximum framing rate of 10^6 frames/s is described in a report prepared at the College of Engineering, University of Michigan. The major components of the system are triggerable air-gap spark light sources, a solid state delay network, a converted portrait camera, associated optics, and mounting hardware. The report describes the uses and limitations of the system; the system can be used in the study of such events as bubble collapse and high-velocity liquid impacts, and in schleiren or shadowgraph studies.

AD-667 729, *A Method for Photographing Microwave With a Polaroid Film*, K. Iizuka, 30 pp. Utilizes selective development of film in accordance with the thermal image produced by the electromagnetic field. The method can be useful for preparing microwave holograms, and can be applied to mapping of temperature distribution in space.

N67-37560, *Application of Holography to Microscopic Objects*, G. G. du Bellay, 70 pp. Investigates several methods of recording a hologram of a microscopic object.

PB-176 462, *A Comparative Study of Two-Photo Versus Three-Photo Relative Orientation*, D. E. Moellman, 190 pp. Compares merits of the two methods, with particular emphasis on relative accuracies based on rigidity of the assembled strip.

AD-664 845, *The Design of Equipment for Microphotography*, K. Head, 17 pp. Discusses theoretical considerations and describes specific equipment for microphotography. Report includes detailed description of camera construction and lighting unit.

AD-663 252, *Photogrammetric Film Shrinkage Transformations*, L. U. Bender and J. R. Tremlett, 51 pp. Analyzes five types of film shrinkage transformations: (1) similarity, (2) affine, (3) projective, (4) hyperbolic, and (5) higher.

AD-663 437, *Extended Dynamic Range Processing*, A. Shepp et al., 52 pp. Studies photographic development of overexposed images using developers that reduce flare.

AD-664 096, *Analysis of Errors in the External Orientation of the Photogrammetric Elevation Net With the Use of Previously Adjusted Spot Elevations of Points to be Photographed*, V. I. Pavlov, (translated from Russian) 49 pp. Analyzes distortions of elevations of points in the photogrammetric network.

AD-664 653, *High-Speed Recording on Infrared Film With Gallium Arsenide Light-Emitting Diodes*, M. Green, 24 pp.

Space Technology

N68-14965, *Scientific Satellites*, W. R. Corliss, 828 pp. History of equipment and instrumentation on unmanned spacecraft.

N68-15725, *Lunar Orbiter III Photography*, 129 pp. Describes Mission III planning, its conduct with respect to photography, and an analysis of the photographic results: Data pertinent to analysis and interpretation of the photographs by the user are included.

N67-39645, *The Saint Project*, E. V. Shaparenko, Ed., 173 pp. Preliminary design of an international satellite communication system.

N67-38579, *Space Science and Applications Program, NASA*, 430 pp. Provides, as a single source either on a discipline basis or in an applications area, a summary of space flight investigations and experimental and theoretical supporting research conducted during August 1965 through July 1966.

AD-668 710, *Space Program December 1967*, Space Science Committee, Inst. of Geophysics and Planetary Physics, Univ. of California, Los Angeles, 92 pp. Contains summaries of space related research activities for the period ending December 31, 1967.

N68-16838, *Analysis of Luna 9 Photography*, 89 pp. Discusses nature and specifications of the spacecraft and its instruments, image transmission, and images received, and gives detailed descriptions of image frames, including: scale and panoramic coverage of the frames, azimuth and distances of the image features, size and classification of the surface materials, and size and classification of the visible craters. Report includes procedures and techniques used for calculations as applied to monoscopic panoramas, dihedral mirror images, and steroscopic panoramas.

N67-36064, *Optical Images for the Small Earth Resources Satellite*, S. S. Verner, 29 pp.

N67-26600, *Communications Satellites: A Continuing Bibliography With Indexes*, 97 pp. A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA Information System during the period February 1966 to March 1967.

Technical Translations—Cumulative Indexes

Cumulative indexes to Technical Translations, Vol. 17 (January through June