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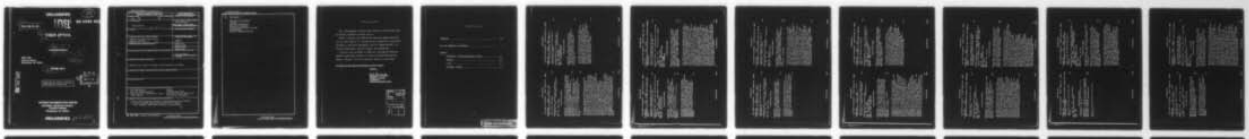

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LEVEL II

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FIBER OPTICS.

A DDC BIBLIOGRAPHY

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Aug 62 - Aug 78.

186p.

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Cameron Station
Alexandria, Va. 22314

MARCH 1979

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* Optical Communications	Cathode Ray Tubes
* Fiber Optics Transmission Lines	Infrared Optical Materials
* Fiber Optics	Television Equipment

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This bibliography contains unclassified and unlimited citations dealing specifically with Fiber Optics. Four computer generated indexes are provided.

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SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

19. Key Words

Facsimile Equipment
Indexes
Optical Waveguides
Recording Systems
Television Display Systems
Photography
Optical Communications

F O R E W O R D

This bibliography contains 242 selective unclassified and unlimited citations on *Fiber Optics*.

These citations are studies and analyses emphasizing the use of Fiber Optics in infrared optical materials, television equipment, facsimile equipment, optical communications, recording techniques, optical images, and waveguides.

Citations are arranged in numerical descending sequence. Computer generated indexes of Corporate Author/Monitoring Agency, Subject, Title and Personal Author are provided.

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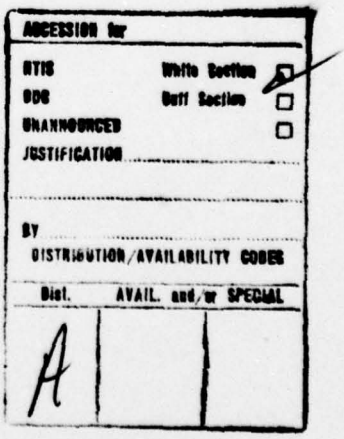

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AD-B025 099 20/6 19/5 1/3
NAVAL WEAPONS CENTER CHINA LAKE CALIF

ALOFT Flight Test Report. (U)

DESCRIPTIVE NOTE: Summary rept. Jan-Oct 76,
OCT 77 113P Ross,James D. ;Johnson,L.
M. ;
REPT. NO. NWC-TP-5954

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Fire control computers, *Attack aircraft, Flight testing, Operational test and evaluation, Signal processing, Weapon delivery, Navigational aids, Bundles, Installation, Electromagnetic interference, Maintainability, Reliability(Electronics) (U)
IDENTIFIERS: A-7 aircraft, ALOFT(Airborne Light Optical Fiber Technology), NWDS(Navigation and Weapon Delivery System), Airborne light optical fiber technology, Navigation and weapon delivery system, LPN-A360-360G/003-C/4W4-1X1-001 (U)

This report documents the results of a test and evaluation program to verify the operational utilization of fiber optic technology in an operational attack aircraft. The program involved configuring an A-7 aircraft with an airborne light optical fiber technology (ALOFT) system consisting of special signal conditioning hardware and fiber optic bundles. In the ALOFT system configuration, fiber optic bundles replaced conventional copper wires as a means of transmitting signals between the A-7 aircraft tactical computer and various components of the Navigation and Weapons Delivery System (NWDS). The flight test and evaluation of the ALOFT system at the Naval Weapons Center (NWC), China Lake, CA, was the first demonstration of the feasibility of using fiber optic technology in a full system application in an operational environment. Qualitative analysis of the test program results indicated that the performance of the ALOFT-configured A-7 aircraft was comparable to that of a fleet-configured A-7 aircraft in both navigation and weapons delivery modes. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-B000 108 20/6 17/2
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

Application of Fiber Optic Technology to Army Aircraft Systems. (U)

DESCRIPTIVE NOTE: Final technical rept.,
NOV 74 61P Parent,Richard D. ;
REPT. NO. ECOM-4271
PROJ: DA-1-F-264201-DC-97
TASK: 1-F-264201-DC-9714

UNCLASSIFIED REPORT

DESCRIPTORS: (*Fiber optics, *Avionics), (*Optical communications, Fiber optics), Airborne, Army aircraft, Aircraft equipment, Fiber optics transmission lines, Light, Interfaces, Costs, Survival(General), Maintainability (U)

This report examines the use of fiber optic technology in Army aircraft systems. Descriptions of the various components (such as sources, detectors, and fiber optic cable) are followed by paragraphs dealing with system applications, survivability, cost, and maintainability. The study utilizes the data base in fiber optic technology established by other Electronics Command Laboratories, Navy and Air Force Laboratories, and Industry. (Author) (U)

AD-A059 241 17/1 17/8
TRW DEFENSE AND SPACE SYSTEMS GROUP REDONDO BEACH CALIF

Feasibility Demonstration of Fiber Optic Detection of Low Frequency Sound. (U)

DESCRIPTIVE NOTE: Annual rept. 28 Feb 77-31 Jun 78 on Phase 2,
JUL 78 35P Cole,James H. ;Johnson, Robert L. ;Bhuta,Pravin G. ;
REPT. NO. AT-ATD-TR-78-3
CONTRACT: N00014-76-C-0490

UNCLASSIFIED REPORT

DESCRIPTORS: *Acoustic detection, *Sonar arrays, *Fiber optics, *Photodetection, *Optical interferometers, *Acoustooptics, Laser beams, Argon lasers, Acoustic waves, Superlow frequency, Ultralow frequency, Feasibility studies, Underwater sound, Self noise (U)
IDENTIFIERS: Differential interferometers, WUNR089117 (U)

A scale-up of the single sensor interferometer previously employed was completed. The expected improvement in acoustic sensitivity was not obtained. Experiments were performed to demonstrate that system noise would not allow attainment of the theoretical sensitivity threshold. Alternate differential interferometer configurations demonstrated reduced system noise and acoustic detection from 100 Hz to 1 KHz was achieved. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A059 016 14/2 20/6
BOEING AEROSPACE CO SEATTLE WA NAVY SYSTEMS AND ADVANCED PROJECTS DIV

Feasibility Demonstration of Fiber Optic Digital Status Monitoring Devices. (U)

DESCRIPTIVE NOTE: Final engineering rept. Jan 77-Mar 78,
MAR 78 137P Miller,Glen E. ;Lindsay, Thomas A. ;
REPT. NO. D296-10048-1
CONTRACT: N00019-77-C-0039
PROJ: F54582
TASK: WF54582603

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Monitors, *Digital systems, *Instrumentation, Liquid level gages, Pressure gages, Strain gages, Temperature measuring instruments, Transducers, Flow rate, Displacement, Fuel gages, Radiation hardening (U)
IDENTIFIERS: Displacement gages, Event counters, PE62762N (U)

This report covers the development and testing of feasibility models of a family of inherently digital fiber optic status-monitoring sensors which sense liquid level, linear displacement, fluid flow rate, strain, pressure and temperature as well as count physical events. In all cases, the sensors are electrically passive. All excitation is in the form of optical power supplied via fiber optics. All response signals are in the form of optical power transmitted via fiber optics. All response signals are inherently digital, i.e. they do not employ analog/digital conversion. Design considerations, performance data and recommendations for further investigation are included. Optical fibers, because of their very small geometry, offer a whole new approach to the precise sensing of small changes in various physical parameters. Sensors employing fiber optics enjoy the many inherent advantages of fiber optics, which include interference immunity, resistance to environmental conditions, small physical size and light weight. Digital fiber optic sensors are a natural adjunct to digital data systems for the above reasons and because no analog/digital conversion is required. (Author) (U)

AD-A058 954 20/6 9/1 1/3
NAVAL OCEAN SYSTEMS CENTER SAN DIEGO CA

Manufacturing Technology for Fiber Optic Bundle Cabling. (U)

DESCRIPTIVE NOTE: Technical rept. Dec 75-Feb 78, JUL 78 58P Holma,G. M. ;Greenwell,R. A. ;
REPT. NO. NOSC/TR-274

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Electric cables, *Aircraft equipment, Bundles, Manufacturing, Specifications, Ruggedized equipment, Industrial production, Cost analysis, Military aircraft, Glass fibers (U)

A manufacturing process was developed for the cabling of bundle optical fibers for use on aircraft. The process produces ruggedized optical fiber in large quantities, achieves production cost reduction, and meets the environmental requirements for military aircraft. Specifications for the process are given. (Author) (U)

AD-A058 694 20/6 17/1
JOHN CARROLL UNIV CLEVELAND OHIO DEPT OF PHYSICS

Acoustically Induced Phase and Intensity Modulation in Optical Fibers. (U)

DESCRIPTIVE NOTE: Technical rept., AUG 78 45P Carome,E. F. ;Satyshur,M. P. ;
REPT. NO. PH-78-2
CONTRACT: N00014-75-C-0247

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Acoustic signals, Acoustooptics, Phase modulation, Intensity, Sonar equipment, Data transmission systems, Electromagnetic fields, Fiber optics transmission lines (U)
IDENTIFIERS: WUNR384309 (U)

Studies have been made on the use of long length, low-loss optical fiber coils as direct acoustic sensors. The theory of optical mode propagation in step index fibers is briefly presented. Phase modulation theory is considered and then applied to a fiber that propagates only the first four optical modes. The results of this theory are then compared to experimental data obtained using such a fiber. When a fiber coil is exposed to a sinusoidal pressure variation in water two phase modulation processes are easily detected. The first is due to interference between directly transmitted and back and forth reflected beams. The second arises because of interference between two propagating modes in the fiber. Data obtained on these two processes are discussed in detail. Experimental data is also presented on intensity modulation effects detected in several different multimode step index fibers. (Author) (U)

AD-A058 359 17/2.1 20/6 13/10.1
NAVAL RESEARCH LAB WASHINGTON D C

Feasibility of a Fiber-Optic Communications Link between a Submarine and a Towed Buoy. (U)

DESCRIPTIVE NOTE: Interim rept.,
JAN 78 24P Althouse,Edwin L. ;
REPT. NO. NRL-8182
PROJ: F21222, D0004SB
TASK: XF21222092, D0004SB
MONITOR: SBIE AD-E000 189

UNCLASSIFIED REPORT

DESCRIPTORS: *Radio links, *Communication buoys, *Towed bodies, *Fiber optics transmission lines, Underwater communications, High frequency, Very high frequency, Ultrahigh frequency, Submarines, Intermediate frequencies, Voice communications, Light emitting diodes, Pin diodes, Glass fibers, Thermal stability (U)
IDENTIFIERS: PE62721N, PE64363N, WUR0I96201, WUR0I09207 (U)

The possibility of replacing the conventional conductive transmission line between a submarine and a towed communications buoy with a fiber-optic transmission line is explored. The general attributes of fiber-optic systems are put into proper perspective for this application. Specific emphasis is placed on the transfer to the submarine of the signals received at the buoy in the HF, VHF, and UHF bands. A system has been proposed that will permit wideband transfer of HF signals at RF and narrowband transfer of VHF/UHF signals at IFs of 70 MHz and below. The necessity of transferring VHF/UHF signals at a reduced frequency results from amplifier gain-stability considerations in the buoy electronics. The major advantages of an optical information-transfer system are wide-bandwidth transfer at HF, simultaneous transfer of HF voice, NAVSAT, SATCOM, and UHF voice, a wideband nonresonant transmission line, less frequency jitter in the coherent-frequency conversions at VHF/UHF, the potential for support of additional buoy functions, and the removal of the presently required frequency synthesizer in the buoy. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A058 236 20/6 17/2
HARRIS CORP MELBOURNE FLA ELECTRONIC SYSTEMS DIV

AN/TTC-38 Fiber-Optic Verification Study. (U)

DESCRIPTIVE NOTE: Final rept. 15 Nov 76-30 Jun 77,
AUG 77 111P Bruce,J. W. ;Cotten,W. W. ;Patisaul,C. R. ;Wyatt,J. C. ;
CONTRACT: DAAB07-77-C-1777
MONITOR: ECOM 77-1777-F

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Telephone equipment, Frequency division multiplexing, Data processing terminals, Automation, Validation, Data links, Duplexers, Schematic diagrams (U)
IDENTIFIERS: AN/TTC-38 (U)

This document is a result of a 12 month verification study to determine the system performance of a 12 channel frequency division multiplex (FDM) fiber optic communication system proposed as a replacement for the CX-4566, 26 pair metallic cable in the AN/TTC-38 automatic telephone central office system. In arriving at this specific approach, substantial performance and hardware trade-off analyses were performed for alternative multiplexing and modulation schemes, involving Time Division Multiplexing (TDM), Frequency Division Multiplexing (FDM), Space Division Multiplexing (SDM), and a hybrid combination of FDM and SDM. (U)

AD-A057 956 9/3
CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN ILL

Potential Uses of Fiber Optics in Army Fixed Facilities. (U)

DESCRIPTIVE NOTE: Special rept.,
JUL 78 46P McCormack,R. G. ;
REPT. NO. CERL-SR-M-241
PROJ: 4A762719AT40
TASK: A1

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Data transmission systems, *Data links, Military facilities, Monitors, Control systems, Multiplexing, Electromagnetic pulses, Radiation hardening, Survival(General), Cost analysis (U)
IDENTIFIERS: PE62719A, AST40, WU002 (U)

This report describes the results of a study performed to identify potential uses of fiber-optic data transmission links in Army fixed facilities. The uses identified are related to monitoring and controlling electrical-mechanical functions of the facility, primarily in Nuclear Electromagnetic Pulse (EMP) hardened facilities, but also nonhardened facilities. As an example, a comparison is made between fiber-optic and conventional wired data links in an automated monitoring and control system for energy control. Examples are given illustrating general cost comparisons between the fiber optic and conventionally wired systems. Conclusions are that fiber-optic data transmission links may be practical for use in Army fixed facilities where such links are advantageous to circumvent particular threats or in large complex systems where data rates are high. (Author) (U)

AD-A057 878 9/3
HONEYWELL INC MINNEAPOLIS MINN SYSTEMS AND RESEARCH CENTER

The Impact of Wideband Multiplex Concepts on Microprocessor-Based Avionic System Architectures. (U)

DESCRIPTIVE NOTE: Final rept. Jun 76-Dec 77,
FEB 78 294P Jensen,E. Douglas ;Marshall, George D. ;Helmbrecht,Wallace F. ;White,James A. ;
REPT. NO. 77SRC90
CONTRACT: F33615-76-C-1285
PROJ: 2003
TASK: 07
MONITOR: AFAL TR-78-4

UNCLASSIFIED REPORT

DESCRIPTORS: *Couplers, *Fiber optics transmission lines, *Avionics, Data processing equipment, Jet fighters, Space shuttles, Bus conductors, Data transmission systems, Multiplexing, Fault tolerant computing, Computer architecture, Control systems (U)
IDENTIFIERS: WUAFAL20030717, PE62204F (U)

This report explores the implications of fiber optic interconnections and intelligent (i.e., microprocessor-based) communication interface units on the architecture of distributed processing systems for future avionics applications. The study consisted of eight technical tasks: Task 1: Survey the F-15, F-16, F-18, B-1, Space Shuttle Orbiter, and AMST Data Multiplex Subsystems; Task 2: Identify Bus Bandwidth-Related Tradeoffs in DAIS, DP/M, GPMS, and HXDP Architectures; Task 3: List Typical Avionic Multiplex Subsystem Requirements; Task 4: Define Requirements Benchmark Scenario; Task 5: Design Candidate Avionic Multiplex Subsystem Architectures; Task 6: Evaluate Candidate Avionic Multiplex Subsystem Architectures; Task 7: Compare Selected Multiplex Subsystem with DAIS, DP/M, GPMS, and HXDP; and Task 8: Project Impact of Higher Interconnection Bandwidth and Intelligent Communication Interfaces on Future Avionic System Designs. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A057 776 20/6
ROME AIR DEVELOPMENT CENTER HANSCOM AFB MASS DEPUTY FOR ELECTRONIC TECHNOLOGY

Fiber Optic Guides of Noncircular Cross Section, (U)

JAN 78 3P Eyges,Leonard ;
REPT. NO. RADC/ETR-78-0063
PROJ: 2306
TASK: J2

UNCLASSIFIED REPORT
Availability: Pub. in Applied Optics, v17 n11 p1673-1674, 1 Jun 78.

DESCRIPTORS: *Fiber optics, *Optical waveguides, Mathematical analysis, Propagation, Computations, Perturbations, Reprints (U)
IDENTIFIERS: PE61102F, WURADC2306J203 (U)

Reprint: Fiber Optic Guides of Noncircular Cross Section.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A055 432 17/5 20/6 9/2
PARKE MATHEMATICAL LABS INC CARLISLE MASS

Topics in Optical Materials and Device Research. (U)

DESCRIPTIVE NOTE: Final technical rept. Sep 76-Sep 77,
MAR 78 139P Bandes,Dean ;Barrett, Theodore B. ;Brule,John J. ;Ryan,Charles E. ;Yukon,Stanford P. ;
CONTRACT: F19628-77-C-0037
PROJ: 2306
TASK: J3
MONITOR: RADC TR-78-61

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Continuation of Contract F19628-74-C-0031. See also Rept. no. RADC-TR-76-344, AD-A037 738.

DESCRIPTORS: *Infrared optical materials, *Fiber optics transmission lines, Lasers, Infrared lasers, Radiation absorption, Absorption coefficients, Charge coupled devices, Data reduction, Computer applications, Fourier spectroscopy, Fourier spectrometers, Research management, Reports (U)
IDENTIFIERS: CDC 6600 computers, PE61102F, WURADC2306J302 (U)

This final report consists of 4 diverse parts: a summary with references of theoretical modeling of multiphonon infrared absorption and modeling of some signal transmission properties of optical fibers; a synopsis of 2 reports which describe and summarize the IR Laser Window Project and IR Imaging Project at RADC/ES; a synopsis of charge coupled devices and related technologies and its significance to some Air Force systems; and a description of CDC6600 software for reduction of Fourier spectrometer measurements from a Digilab, Inc. FTS14. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A053 657 17/2 9/5 20/6
LASER DIODE LABS INC METUCHEN N J

Light Emitting Diodes for Fiber Optic Communications. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 4, 1 Jul-30 Sep 77,
DEC 77 29P Gennaro,Albert ;
CONTRACT: DAAB07-76-C-8135

UNCLASSIFIED REPORT

DESCRIPTORS: *Light emitting diodes, *Fiber optics, Optical communications, Heterojunctions, Aluminum gallium arsenide, Fabrication, Wafers, Liquid phases, Epitaxial growth, Life tests (U)
IDENTIFIERS: LPN-DA-2769778 (U)

The design and fabrication of high speed etched-well light emitting diodes for fiber optic communications is discussed with regard to materials synthesis via LPE, wafer fabrication, and device assembly in a manufacturing environment. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A052 949 20/6 20/1
CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF ELECTRICAL ENGINEERING

Thin-Film Acoustooptic Devices with Applications to Integrated/Fiber Optic Signal Processing and Communications. (U)

DESCRIPTIVE NOTE: Interim rept. no. 1, 1 Jan-31 Dec 77,
FEB 78 12P Tsai,Chen S. ;
CONTRACT: AFOSR-77-3187
PROJ: 2305
TASK: C1
MONITOR: AFOSR TR-78-0626

UNCLASSIFIED REPORT

DESCRIPTORS: *Acoustooptics, *Deflectors, *Fiber optics, *Optical scanning, *Signal processing, Lithium compounds, Niobates, Transducers, Surface waves, Acoustic waves, Apertures (U)
IDENTIFIERS: Integrated optics, Acoustooptic devices, Bragg diffraction, Helium neon lasers, Saw devices, PE61102F, WUAFOSR2305C1 (U)

Research emphasis for the first program year was placed on the utilization of the wideband guided-wave (thin-film) acoustooptic deflector for spectrum analysis and very high scanning-rate light beam deflection/switching using analog mode of operation. For this purpose a very wideband deflector in a Y-cut LiNbO3 Ti-diffused waveguide was designed and fabricated. This deflector employs a three-element tilted-array transducer with the center frequencies of 275, 432 and 648 MHz, and has a measured deflector bandwidth of 500 MHz. This bandwidth represents the largest that has been achieved thus far. A frequency resolution of 1.0 MHz was measured in a spectrum analysis experiment using a He-Ne (6328 A) laser light beam of 4 mm aperture. In the light beam scanning experiment, a scanning rate of 125 x 10 to the 6th power spots/sec for 50 spots has been achieved. This scanning rate is 170 times larger than that obtainable in the digital mode of operation. Some preliminary experimental study on optimized anisotropic Bragg diffraction involving optical modes of orthogonal polarizations was also carried out. (U)

AD-A052 653 20/6 17/2
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF

Survey of Current Technology Related to Fiber Optics. (U)

DESCRIPTIVE NOTE: Master's thesis,
SEP 77 103P Leiceaga,Pedro Mackinlay ;

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Optical communications, Fiber optics transmission lines, Photodetectors, Multiplexing, Connectors, Error analysis, Data links, Economic analysis, Cost effectiveness, Theses (U)

The historical facts that brought today's scientists to use optical communication systems, and the possible advantages or disadvantages of using fiber optic transmission medium were investigated. The requirements and characteristics of the optical links and the problems related to their implementation were studied. Today's applications as well as the future ones are discussed. An economic analysis and an effectiveness analysis was carried out to stablish future trends. (Author) (U)

AD-A052 312 20/6 11/1 19/1
HARRY DIAMOND LABS ADELPHI MD

Fiber Optic Safeguards Sealing System. (U)

DESCRIPTIVE NOTE: Technical rept.,
JAN 78 23P Ulrich,R. R. ;
REPT. NO. HDL-TR-1847
CONTRACT: RA-178, AC6AA709

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Seals(Stoppers), *Antidisturbance devices, Reticles (U)
IDENTIFIERS: *Safing systems, Tamper-resistant seals, LPN-HDL-462643 (U)

The Harry Diamond Laboratories continued development work on a tamper-resistant/tamper-indicating safing system for the U.S. Arms Control and Disarmament Agency. The safing system consists of a fiber optic seal and related equipment that assembles, photographs, and identifies the seals in the field. The seals are intended for field use in international safeguards and arms control applications. The report describes improvements in the fiber optic seal assemblies and in the inspection equipment. The inspection equipment includes a means for seal identification by reticle pattern projection that does not require any photographs to be taken of the seal's fingerprints. Also included are (1) the results of the preliminary environmental tests on the sealing system, and (2) detailed operating procedures for the new fiber optic seal assembly and inspection kits. (Author) (U)

AD-A052 291 9/1 20/2
MASSACHUSETTS INST OF TECH CAMBRIDGE

Liquid Phase Epitaxy of GaAsSb on InP Substrates. (U)

DESCRIPTIVE NOTE: Final rept. 1 Oct-31 Dec 76,
JUL 77 37P Fonstad,Clifton G. ;
CONTRACT: N00019-76-C-0653

UNCLASSIFIED REPORT

DESCRIPTORS: *Semiconductor devices, *Gallium arsenides, *Gallium antimonides, *Epitaxial growth, *Liquid phases, light emitting diodes, Fiber optics, Optical communications, Ternary compounds, Quaternary compounds, Indium phosphides, Substrates, Aluminum gallium arsenide, Heterojunctions (U)

The Ga-As-Sb system is shown to exhibit immiscibility-like behavior, i. e., certain solid compositions do not exist, for growth from ternary melts in spite of the fact that the pseudobinary system is fully miscible. The ternary melt miscibility gap narrows with increasing growth temperature and disappears above a certain temperature but even then the solid composition remains a very sensitive function of the growth temperature. (U)

AD-A052 290 20/6 20/5 13/8
WASHINGTON UNIV SEATTLE DEPT OF ELECTRICAL ENGINEERING

Optical Properties of Single Mode Rectangular Fibers. (U)

DESCRIPTIVE NOTE: Final rept. 1 Jun 76-31 Dec 78,
FEB 78 73P Kohan,Carlos A. ;Mitchell, Gordon L. ;Yee,Sinclair S. ;
REPT. NO. UW-EE-TR-207
CONTRACT: N00123-76-C-1451

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Integrated systems, Rectangular bodies, Coupling(Interaction), Cladding, Cores, Fracture(Mechanics), Laser beams, Near field, Injection lasers, Efficiency (U)
IDENTIFIERS: Rectangular fibers, Numerical apertures, Single Mode fibers, Modes (U)

The optical properties of single-mode rectangular fibers have been studied with the aim of improving past DH laser/fiber coupling efficiency results. By local heating and careful fracturing, short, rectangular-to-round 'transition' fibers can later be obtained for efficient overall laser/round fiber coupling. The power loss due to rounding is known to be as low as 1 dB. A method of general applicability has been developed to measure core dimensions and numerical aperture of fibers. Coupling efficiency measurements were performed by a more reliable procedure for differentiating cladding from core output power than what has been generally used. Laser/rectangular fiber efficiencies of 30% with a maximum of 50% have been obtained. If laser fluorescent power is accounted for to compare with other publications, the above figures become 46% and 71% respectively. (U)

AD-A051 792 9/1 20/5 20/6
LASER DIODE LABS INC METUCHEN N J

Injection Laser Diodes for Fiber Optic Communications. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 3, 1 Jan-31 Mar 77,
JUL 77 31P Adair,Rob ;
CONTRACT: DAAB07-76-C-0040

UNCLASSIFIED REPORT

DESCRIPTORS: *Injection diodes, *Injection lasers, *Fiber optics, Aluminum gallium arsenide, Electrooptics, Heterojunctions, Fabrication, Manufacturing, Chips(Electronics), Wafers, Epitaxial growth, Life tests, Test methods, Reliability(Electronics), Quality control (U)
IDENTIFIERS: Design, LPN-DA-2769778 (U)

The design and fabrication of injection laser diodes for use in fiber optic communications is discussed with regard to material synthesis, chip configuration, and device assembly in manufacturing environment. The opto-electronic source is based on the GaAs-GaAlAs double heterojunction structure and consists of a parallel array of lasers formed by the applications of triple stripe geometry to the surface of the epitaxial wafer. The monolithic triad of discrete lasing elements is mounted in a high frequency package which incorporates a high quality optical window. (Author) (U)

AD-A051 791 9/1 20/6
LASER DIODE LABS INC METUCHEN N J

Light Emitting Diodes for Fiber Optic Communications. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 3, 1 Apr-30 Jun 77,
NOV 77 41P Gennaro,Albert ;
CONTRACT: DAAB07-76-C-8135

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Report on Manufacturing Methods and Technology Engineering.

DESCRIPTORS: *Light emitting diodes, *Fiber optics, Aluminum gallium arsenide, Heterojunctions, Fabrication, Wafers, Epitaxial growth, Liquid phases, Fabrication, Manufacturing, Reliability(Electronics), Quality control, Photolithography (U)
IDENTIFIERS: LPN-DA-2769778 (U)

The design and fabrication of high speed etched-well light emitting diodes for fiber optic communications is discussed with regard to materials synthesis via LPE, wafer fabrication, and device assembly in a manufacturing environment. (Author) (U)

AD-A050 748 20/6 20/6
ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT NEUILLY-SUR-SEINE (FRANCE)

Optical Fibres, Integrated Optics and Their Military Applications. (U)

DESCRIPTIVE NOTE: Conference proceedings, OCT 77 565P Hodara,H. ;
REPT. NO. AGARD-CP-219

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the Electromagnetic Wave Propagation Panel/Avionics Panel Joint Symposium held in London on 16-20 May 77.

DESCRIPTORS: *Fiber optics, *Semiconductor lasers, *Military applications, Fiber optics transmission lines, Electromagnetic compatibility, Optical equipment components, Couplers, Integrated systems, Multimode, Low loss, Refractive index, Profiles, Multiplexing, Data links, Optical communications (U)
IDENTIFIERS: NATO furnished, *Integrated optics (U)

Rapid developments in laser semiconductors and low-loss optical fibres have revealed many new applications. The obvious advantages of a high degree of communication security, freedom from electronic interference, large length-bandwidth product, and system miniaturization possibilities have led to new concepts and applications in military systems. This conference provided a forum to review and discuss the latest developments in fibre and integrated optics, with empnasis on military applications. (Author) (U)

AD-A049 859 20/6 9/3 14/1
ROCKWELL INTERNATIONAL LOS ANGELES CALIF LOS ANGELES AIRCRAFT DIV

Fiber Optics Cost Analysis Program (FOCAP). (U)

DESCRIPTIVE NOTE: Final rept. 30 Jun 76-30 Jun 77, SEP 77 255P Zelon,C. C. ;Cassidy,J. E. ;Shipley,R. G. ;
REPT. NO. NA-77-729
CONTRACT: F33615-76-C-1260
PROJ: 2003
TASK: 07
MONITOR: AFAL TR-77-190

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Avionics, *Cost analysis, Research management, Data links, Data transmission systems, Internal, Aircraft equipment, Life cycle costs, Multiplexing, Bomber aircraft, Comparison, Wire, Computer applications, Trade off analyses, Cost benefits, Weight reduction, Radiation hardening, Electromagnetic susceptibility, Signal to noise ratio (U)
IDENTIFIERS: B-1 aircraft, Design, PE62204F, WUAFAL20030716 (U)

The significance of this research is that it establishes methods for comparing the life cycle cost of fiber optics and wire data transfer systems on large military aircraft, and uses those methods to perform cost analyses on the data transfer subsystems. Using the B-1 as an example, the applicability of fiber optics to the B-1 avionics/electrical systems was identified. Conceptual fiber optics data transfer systems were designed. The present wire and the conceptual fiber optics designs formed a basis for computerized life cycle cost comparisons. Sensitivity analyses and cost trade-offs were performed to determine cost drivers in the application of fiber optics. Results show significance cost benefits can be gained by the implementation of fiber optics in data transfer subsystems having data rates in excess of 2 to 3 megabits per second. (U)

AD-A049 558 20/6 13/8
HUGHES RESEARCH LABS MALIBU CALIF

Diffusion Process for Formation of Single-Mode Waveguide. (U)

DESCRIPTIVE NOTE: Final rept. 18 May-18 Dec 77, JAN 78 34P Chen,Bor-Uei ;
CONTRACT: N00173-77-C-0138

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Integrated systems, *Optical materials, Modes, Manufacturing, Diffusion, Carbon dioxide lasers, Titanium, Lithium, Niobates, Coupling(Interaction), Annealing, Substrates, Controlled atmospheres, Monoxides, Channels, Efficiency (U)
IDENTIFIERS: Integrated optics, Optical channels, Waveguide horns, Horns(Optical), Single mode fibers, Laser diffused impurities, Channel waveguides, Lithium monoxide (U)

The objective of this program is two-fold: (a) study of channel waveguide formation in LiNbO3 and LiTaO3 by Ti metal diffusion including Li2O out-diffusion suppression and lateral diffusion suppression; (b) development of three-dimensional channel waveguide horns designed to provide higher end-fire coupling efficiency to large-core single-mode fibers. As a result of 1976 IR and D effort, we have developed a technique to eliminate Li2O out-diffusion waveguide by annealing the crystal in LiNbO3 powder. Under this program, a series of experiments were carried out to study the temperature and time dependence of this powder treatment. Three significant results were obtained. First, it is confirmed that up to 1% molecular weight of Li2O can be brought into the substrate surface layer through the powder treatment. Second, the compensation process (Li2O in-diffusion) may occur at temperatures 750 C or lower. Third, 80% of the compensation process can be obtained in one-half hour when the annealing temperature is 900 C. The fast reaction rate implies that the powder treatment may not be dominated by the diffusion process. Solid-solid surface reaction may play an important role in this process. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A049 268 17/2 20/6
NAVAL OCEAN SYSTEMS CENTER SAN DIEGO CALIF

Evaluation of Multiport Fiber-Optic Bundle Couplers. (U)

DESCRIPTIVE NOTE: Test and evaluation rept. 1 Jul 76-30 Sep 77, OCT 77 24P Altman,D. E. ;Meador,T. A. ;
REPT. NO. NOSC/TR-171
PROJ: F54583

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Couplers, Data transmission systems, Electrooptics (U)
IDENTIFIERS: *Fiber-optic couplers, Data bus, WUA03A360G003B, PE62762N, WUF227 (U)

Development and evaluation of fiber-optic coupling devices are discussed. (Author) (U)

AD-A049 168 20/6
CATHOLIC UNIV OF AMERICA WASHINGTON D C VITREOUS STATE LAB

Development of a Low Loss Optical Fiber with a Parabolic Profile. (U)

DESCRIPTIVE NOTE: Final rept. 1 Sep 76-30 Apr 77,
NOV 77 67P Mohr,R. K. ;Macedo,P. B. ;Litovitz,T. A. ;
CONTRACT: N00019-76-C-0674, N00019-76-C-0083

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Continuation of contract N00019-75-C-0074.

DESCRIPTORS: *Fiber optics transmission lines, *Fiber optics, Radiation attenuation, Low loss, Refractive index, Profiles, Parabolas, Gradients, Diffusion, Doping, Cesium compounds, Nitrates, Light scattering, Dispersing, Bending, Rayleigh scattering (U)

The objective of this contract was to develop the technique of Molecular Stuffing to produce low-loss parabolic index optical fibers. The concluding work under these contracts consisted of the following: Put into operation experimental profiling procedures to test the theory developed; institute a program for the measurement and characterization of measured index profiles in preforms and fibers in order to determine the modifications needed in the part above; measure physical properties of cesium nitrate solutions for a precise control of unstuffing bath concentration and its variation in time; and measurement of attenuation, dispersion, bending and scattering losses in our fibers. (Author) (U)

AD-A048 201 20/6 9/1 15/4
AIR FORCE AVIONICS LAB WRIGHT-PATTERSON AFB OHIO

A Star Scene Simulator for Test and Evaluation of Imaging Systems Used in Point- Source Detection. (U)

DESCRIPTIVE NOTE: Interim application rept. Jan 73 Apr 75.
AUG 77 39P Manly,Peter L. ;Wiensch, Ronald E. ;
REPT. NO. AFAL-tr-77-151
PROJ: 7660
TASK: 03

UNCLASSIFIED REPORT

DESCRIPTORS: *Space surveillance systems, *Fiber optics, Simulators, Starlight, Guided missile detection, Brightness, Space weapons, Spacecraft, Photometry, Range(Distance), Display systems, Image intensifiers(Electronics) (U)
IDENTIFIERS: WUAFAL76600318 PE62204F (U)

In order to expedite test and evaluation of television and other photoelectronic sensors for space surveillance applications in the detection of faint spacecraft or distant missiles, a star scene simulator was developed which allows the convenient simulation of point sources over a brightness range of 17 stellar magnitudes (Factor of 6,000,000). This report discusses the basis for the simulator, its performance, and provides illustrations of its use. Except for slightly higher-than-expected level of scattered light, improvements in which are discussed, the OPOS simulator gives an excellent analog of stellar fields. (U)

AD-A047 853 6/18 14/2 15/3
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

Fiber-Optics Dosimeter for Civil Defense. (U)

DESCRIPTIVE NOTE: Research and development technical rept.,
NOV 77 11P Kronenberg,Stanley ; Siebentritt,Carl ;
REPT. NO. ECOM-4545

UNCLASSIFIED REPORT

DESCRIPTORS: *Dosimeters, *Fiber optics, *Civil defense, Fallout shelters, Gamma rays, Dosage, Nuclear bombs, Nuclear warfare, Power supplies, Radiation damage, Prototypes, Calibration, Performance(Engineering), Civilian personnel (U)

The Defense Civil Preparedness Agency (DCPA) has a requirement for a shelter dosimeter, a standby instrument for monitoring gamma ray doses in the event of an atomic war or a nuclear disaster. Its most important requirement is dependability without reliance on external components such as power sources. Radiation-induced darkening of optical fiber has been utilized to construct such a dosimeter in which the dose dependent darkening of glass fibers is read visually by means of a dose-calibrated gray scale. (Autnor) (U)

AD-A047 773 20/6 9/3 17/2
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

Design and Evaluation of Couplers for a Multimode Single Fiber Optical Data Bus. (U)

DESCRIPTIVE NOTE: Master's thesis,
OCT 77 85P Ogan,Michael C. ;
REPT. NO. AFIT/GEO/PH/77-2

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Couplers, *Data transmission systems, Multimode, Theses, Avionics, Insertion loss, Transmission loss, Mixers(Electronics), Rods, Air Force research (U)
IDENTIFIERS: Single strand optical fibers, Directional couplers, Star couplers (U)

The fiber optic couplers designed and evaluated in this thesis are intended primarily for use in aircraft avionics systems, and consist of single strand, multimode f.bers with step index profiles. Types of couplers considered are the directional, tee, and star couplers, with emphasis on the latter. Several designs are fabricated and tested, including three kinds of star couplers. The first employed a mixing rod of transparent cement and yielded an average transmission factor of 0.009 (-20.5 dB), with an average insertion loss of -12.83 dB. The second was formed with a solid quartz mixing rod, producing an average transmission factor of 0.003 (-25.2 dB) and an average insertion loss of -18.01 dB. The third star coupler's mixing rod was made by fusing the individual fibers, resulting in an average transmission factor of 0.01 (-20.0 dB) and an average .nsertion loss of -12.35 dB. After theoretical and experimental comparison between performance efficiencies, the third coupler is recommended as an optimum design for a fiber optic data bus system. (Author) (U)

AD-A047 315 20/6
HUGHES RESEARCH LABS MALIBU CALIF

Components for Single Strand Multimode Fiber Systems. (U)

DESCRIPTIVE NOTE: Scientific rept. no. 1, 3 Jan-3 Jul 77,
AUG 77 41P Barnoski,M. ;Chen,B. ; Friedrich,H. R. ;Jensen,S. ;Marom,E. ;
CONTRACT: F19628-77-C-0103
PROJ: 2306
TASK: J2
MONITOR: RADC TR-77-284

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Couplers, *Multimode, Strands, Time domain, Reflectometers, Geometric forms, Taper, Light pulses, Deflection, Iodine compounds, Methane, Air, Resolution, Backscattering, Carbon dioxide lasers (U)
IDENTIFIERS: Diiodomethane, WURADC2306J221, PE61102F (U)

The development of a technique for the determination of the geometrical characteristics of a taper pulled in a fiber is described in this report. This technique uses the deflection of a light beam due to the taper. The insertion loss of a taper has been experimentally investigated as a function of the modal index of the fiber both with the taper immersed in air and a high index fluid (diiodomethane). The results of these experiments show that the higher order modes are more easily out-coupled by the taper than the lower order modes. (U)

AD-A047 224 20/6 9/5
SPERRY RESEARCH CENTER SUDBURY MASS

Multiplexing and Filtering of Optical Signals. (U)

DESCRIPTIVE NOTE: Final rept. 29 Apr 76-29 Apr 77,
JUN 77 99P Nelson,Arthur R. ;
REPT. NO. SCRC-CR-77-40
CONTRACT: DAAB07-76-C-1343
MONITOR: ECOM 1343-F

UNCLASSIFIED REPORT

DESCRIPTORS: *Multiplexing, *Optical filters, *Fiber optics, *Switching circuits, Electrooptics, Data links, Semiconductor lasers, Infrared lasers, Data rate, Digital systems, Lithium tantalates (U)
IDENTIFIERS: *Optical multiplexing, Demultiplexing, Gallium aluminum arsenide, Lithium niobates (U)

The objective of this contract is to develop an optical multiplexing device to combine onto one channel the information carried on several separate fiber optic channels and, subsequently, to perform the demultiplexing operation after transmission over distances of the order of a km. The main research effort is the development of the optical multiplexing/demultiplexing device. This device must be compatible with multimode fibers of relatively large numerical aperture, exhibit total throughput losses less than 15 dB, total signal to crosstalk ratio of more than 20 dB, and a bandwidth capability of 1.3 MHz. This report covers the work performed during a one year effort beginning May, 1976. During the past year a complete multiplexed optical data link that meets nearly all of the criteria outlined above has been constructed and tested. The main effort centered on the development of the actual electro-optic multiplexing device itself, a thin crystal of LiTaO3 that controls the flow of light with the application of appropriate voltages. Several designs were constructed and tested before the final design was chosen. The final multiplexer design exhibited less than 15 db throughput loss, and operates at high frequency with up to .25 numerical aperture fibers. The inherent signal to crosstalk ratio is about 15 dB, 5 dB less than the requested performance. (U)

AD-A047 055 9/1 20/6
ITT CANNON ELECTRIC SANTA ANA CALIF

Connectors for Optical Fiber TDM Cables. (U)

DESCRIPTIVE NOTE: Semi-annual report no. 1, 7 May 76-30 Jun 77,
NOV 77 78P McCartney,Ronald L. ;
CONTRACT: DAAB07-76-C-1357
PROJ: 1S762705AH94
TASK: W2
MONITOR: ECOM 76-1357-1

UNCLASSIFIED REPORT
Availability: Microfiche copies only.

DESCRIPTORS: *Connectors, *Fiber optics, *Optical equipment components, Attenuation, Alignment, Low loss, Optical communications, Fabrication, Strength(Mechanics), Seals(Stoppers) (U)
IDENTIFIERS: Ferrules, PE62705A (U)

This report describes the development of a single fiber alignment system for use in a six-channel hermaphroditic fiber optic connector. The connector will be used to interconnect a strengthened six-channel fiber optic cable. Included in this report are the test results, conclusions and recommendations of all ferrule and alignment designs which have been investigated to date. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMO7

AD-A046 843 17/8 14/3
INTERSTATE ELECTRONICS CORP ANAHEIM CALIF OCEANICS DIV

Feasibility Study of a Fiber Optics Plotter. Volume I. Technical Aspects. (U)

DESCRIPTIVE NOTE: Final development rept. on Phase II,
OCT 67 82P Tucker,Charles T. ;
REPT. NO. IEC-OCEANICS-440-900-Vol-1
CONTRACT: N00024-67-C-1232
PROJ: F1010319
TASK: SF101031908

UNCLASSIFIED REPORT
Availability: Microfiche copies only.
SUPPLEMENTARY NOTE: Includes envelopes with charts.

DESCRIPTORS: *Fiber optics, *Plotters, *Recording systems, Bathythermographs, Analog to digital converters, Breadboard models, Logic circuits, Photographic film, Photographic processing equipment, Simulation, Full scale systems, Feasibility studies, Cost analysis, Systems analysis, Apertures, Recording paper, Reliability (U)
IDENTIFIERS: Most project-3 (U)

This study has established feasibility of a proposed fiber optics plotter system which produces bathythermograms on standard film aperture cards in both analog and digital form. Performance has been verified with a breadboard model. Outstanding features of the design are its all digital nature and the use of a new dry process film. Operational, reliability, production and cost aspects are considered based on a preliminary system design. (Author) (U)

AD-A046 370 1/3 20/6 9/2
AIR FORCE FLIGHT DYNAMICS LAB WRIGHT-PATTERSON AFB OHIO

Simulated Lightning Test on the Navy Airborne Light Optical Fiber Technology (ALOFT) A-7 Aircraft. (U)

DESCRIPTIVE NOTE: Final rept. 1-31 Aug 76,
JUN 77 99P Dijak,Jerome T. ;
REPT. NO. AFFDL-TR-77-54

UNCLASSIFIED REPORT

DESCRIPTORS: *Attack aircraft, *Fiber optics, *Lightning, Vulnerability analysis, Damage control, Avionics, Navigation computers, Fire control computers, Coaxial cables, Data links, Electromagnetic shielding, Transients, Electromagnetic pulse simulators, Threat evaluation, Survival(General) (U)
IDENTIFIERS: *A-7 aircraft, ALOFT(Airborne Light Optical Fiber Technology), Airborne light optical fiber technology (U)

A simulated lightning test was conducted on the Navy A-7 Airborne Light Optical Fiber Technology (ALOFT) aircraft for the purpose of determining the advantage gained in the substitution of fiber optics data links within the Navigation and Weapons Delivery System over conventional wiring in reducing lightning-induced transients experienced by the Navigation and Weapons Delivery Computer (NWDC). A 1.6 x 50 microsecond double-exponentional pulse of 2000 amperes peak current was used for the lightning simulation. Transients on three data circuits, one power supply circuit, and two electooptical circuits were monitored in seven system configurations. The substitution of fiber optics for the signal wiring reduced the induced transients in the data circuits by 85 to 90 per cent over those observed with the hard-wiring in place. Direct electromagnetic coupling of transient energy into the NWDC was found to be only 9 to 16 per cent as great as the combined effects of coupling due to the signal and power wiring. The relative magnitudes of the signal-wiring and power-wiring induced transients were found to vary among the three data circuits. (Author) (U)

AD-A046 284 20/6 9/1 20/12
WASHINGTON UNIV ST LOUIS MO LAB FOR APPLIED ELECTRONIC SCIENCES

Coupling of Single-Mode Optical Fibers to GaAs Waveguides. (U)

DESCRIPTIVE NOTE: Final rept. 1 Feb 76-31 Dec 77,
JUN 77 171P Chang,William S. C. ;
Sopori,Bhushan L. ;Monsees,Thomas L. ;
CONTRACT: F19628-76-C-0032, ARPA Order-3020
MONITOR: RADC TR-77-200

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Optical waveguides, *Waveguide couplers, *Gallium arsenides, Modes, Near infrared radiation, Taper, Coupling(Interaction), Sputtering, Silicon dioxide, Glass, Sodium, Planar structures, Masking, Transitions (U)
IDENTIFIERS: Single mode fibers (U)

The object of this research contract is to find an efficient method to couple a single-mode optical fiber to a GaAs waveguide at near infrared wavelengths. The general approach chosen is to first fabricate a transitional waveguide. The fiber and the transitional waveguide are then coupled together by the tapered velocity coupling method. Technologies were developed and excellent results have been obtained in using the r.f. sputtering process with a cleaved GaAs mask to step-etch the GaAsP waveguides. This process followed by the r.f. deposition of SiO2 buffer layer and by deposition of either BaO2 glass or AZ1350 waveguiding layer on top of the SiO2 layer has led to very high coupling efficiency (80%) between the primary waveguide and the transition waveguide. Research on the deposition of sodium glass was undertaken to obtain the transition from uniform planar waveguide to channel waveguide. These results demonstrated that highly efficient fiber to thin film waveguide coupling can probably be realized by this method. Additional research is needed in order to demonstrate a complete coupling system. (Author) (U)

AD-A046 171 20/6 17/1
NAVAL OCEAN SYSTEMS CENTER SAN DIEGO CALIF

Fiber Optic Sonobuoy Cable Development Fy76. Electro-Optical Components for Data Transfer between Deep Sumberged Acoustic Sensors and Surface Buoys. (U)

DESCRIPTIVE NOTE: Research and development rept., AUG 77 21P Eastley,R. A. ;
REPT. NO. NOSC/TR-148
PROJ: F11121
TASK: WF11121710

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Sonobuoys, *Cables, Electrooptics, Underwater acoustics, Acoustic detectors, Underwater, Ocean surface, Hydrostatic pressure, Attenuation, Data transmission systems (U)
IDENTIFIERS: WUF241600, PE62711N (U)

This document provides a summary of fiber optic sonobuoy development through FY76. Optical fibers were incorporated into developmental sonobuoy cables with attenuations as low as 4.8 dB/km at 0.85 micrometers and 1.8 dB/km at 1.05 micrometers. A 0.5-dB/km attenuation increase was observed at a hydrostatic pressure of 48 MPa (7 kpsi). Less than 1-dB/km attenuation increase was observed for tension and bending stresses. Discussions of cable development; optical, mechanical, and environmental cable tests; fiber and link studies; and measurement techniques are presented. It is recommended that observed deficiencies be reduced to operationally acceptable levels through continued fiber optic sonobuoy cable development. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A045 704 20/6 17/8
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)

Optical Fibers, Integrated Optics and Their Military Applications, London. England, 16-20 May 1977. (U)

DESCRIPTIVE NOTE: Conference rept., AUG 77 14P Smiley,Vern N. ;
REPT. NO. ONRL-C-12-77

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Optical communications, *Optics, *Optical detectors, Symposia, Contracts, Electromagnetic wave propagation, Military operations, Couplers (U)
IDENTIFIERS: Integrated optics, Military applications (U)

A review is given of some of the papers presented at a Conference which was held in London. Emphasis is placed on past, present, and future devices for military applications. The review is organized in the same manner as the Conference format under the subtitles: systems, integrated optics, propagation, sources and detectors, and couplers. (U)

AD-A044 599 9/2
ILLINOIS UNIV AT URBANA-CHAMPAIGN DEPT OF COMPUTER SCIENCE

Optobundle - A Unique Fiber Optic Multiplier. (U)

JUN 77 32P Pitt,Daniel A. ;Poppelbaum, Wolfgang J. ;Xydes,Christ J. ;
REPT. NO. UIUCDCS-R-77-882
CONTRACT: N00014-75-C-0982

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Multiplication, Numbers, Bundles, Processing, Electromagnetic interference, Immunity, Signal processing, Probability, Input, Lines(Geometry), Codi (U)

This paper describes the design and construction of failsoft single digit decimal multiplier that exhibits almost total immunity to electromagnetic interference. Bundles of glass fiber light guides not only carry the numerical information but actually perform the multiplication as well. Nearly trivial hardware requirements make the device both reliable and inexpensive. (Author) (U)

AD-A043 637 20/6 17/2
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)

Colloquium on Optical Fiber Cable, Institution of Electrical Engineers (U.K.). (U)

DESCRIPTIVE NOTE: Conference rept.,
JUL 77 8P Hart,D. A. ;
REPT. NO. ONRL-C-8-77

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Telecommunication, Symposia, Wave propagation, Manufacturing, Great Britain, Strength(Mechanics), Test methods, Installation (U)

This report presents short summaries of papers presented at a colloquium on optical fibers held in London on 17 May 1977. Topics include propagation, cable manufacture, strength, testing and installation of optical fiber cables. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A043 035 20/6
ROME AIR DEVELOPMENT CENTER GRIFFISS AFB N Y

Refractive Index Changes in Optical Fibers Subject to Diametral Stress. (U)

DESCRIPTIVE NOTE: Technical rept.,
APR 77 17P Gianino,Peter D. ;Bendow, Bernard ;
REPT. NO. RADC-TR-77-140
PROJ: 2304
TASK: J1

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Photoelasticity, *Stress analysis, *Refractive index, *Light transmission, Diameters (U)
IDENTIFIERS: Stresses, WURADC2304J101, PE61102F (U)

The changes in refractive index induced by the photoelastic effect when an optical fiber is subjected to a uniformly applied diametral stress are described. For easily achievable values of the force per unit length applied to the fiber, it was found that regions of equal or nigher refractive index than the core may be induced in the outer region of the fiber. Thus the stressed region is capable of acting as a mode converter that affects the transmission characteristics of the fiber. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A042 579 20/6 17/2 18/6
CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN ILL

State of the Art in Fiber Optics Communications and Data Transfer. (U)

DESCRIPTIVE NOTE: Interim rept.,
JUL 77 42P McCormack,R. G. ;Croisant, W. J. ;Lam,P. C. ;
REPT. NO. CERL-IR-E-111
PROJ: 4A762719AT40
TASK: A1

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Optical communications, *Data transmission systems, Radiation hardening, Nuclear radiation, Light emitting diodes, Broadband, Data links, Dielectrics, Interfaces, All weather, Range(Distance), Electromagnetic pulses, Bibliographies (U)
IDENTIFIERS: WU022, AST40, PE62719A (U)

This report addresses the state of the art of fiber optic communications as related to U.S. Army Corps of Engineers military construction. It discusses the general capabilities of commercially available fiber optics and summarizes the research and development work being done in the area by other Department of Defense and U.S. Government agencies. Potential Corps of Engineers usage of fiber optics is discussed, and nuclear radiation hardening aspects are summarized. Interfacing optical fibers with electronics is discussed along with factors which limit the performance of fiber optics data transmission links. (Author) (U)

AD-A042 490 20/5 17/5 20/6 20/12
TEXAS INSTRUMENTS INC DALLAS SEMICONDUCTOR GROUP

Fiber-Optic-Coupled LOC Injection-Laser Array for 8500 Angstroms Room-Temperature Emission. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 72 41P Carr,David L. ;Doerbeck, Friedrich H. ;
REPT. NO. TI-03-72-159
CONTRACT: DAAK02-72-C-0257

UNCLASSIFIED REPORT

DESCRIPTORS: *Injection lasers, *Infrared lasers, *Fiber optics, *Semiconductor diodes, *Semiconductor lasers, Arrays, Electrooptics, Near infrared radiation, Modules(Electronics), Room temperature (U)
IDENTIFIERS: Large Optical Cavity Lasers (U)

The objective of this program was to fabricate a fiber-optic-coupled injection laser array for the wavelength of 8500 A at room temperature. The laser devices used are of the narrow-beam-angle large-optical-cavity (LOC) type. The array emitted 84 watts peak optical power from an emission aperture of 15 mils by 20 mils, with a peak wavelength of 8420 A and a half-intensity beamwidth of 38 deg, when driven with pulses of 50-amps peak current, 150-ns duration, and 5-kHz repetition rate. (Author) (U)

AD-A042 429 18/6 20/6
CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN ILL

The Effects of Fast and Thermal Neutron Flux and Gamma Radiation on the Transmission Characteristics of Optical Fibers. (U)

DESCRIPTIVE NOTE: Interim rept.,
JUL 77 23P Sieber,D. C. ;McCormack, R. G. ;Croisant,W. J. ;
REPT. NO. CERL-IR-E-112
PROJ: 4A762719AT40
TASK: A1

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Radiation damage, *Light transmission, Neutron flux, Fast neutrons, Thermal neutrons, Gamma rays, Flux(Rate), Radiation attenuation, Luminescence, Fused silica, Lead compounds, Silicates, Boron compounds, Cladding, Plastic (U)
IDENTIFIERS: WU022, AST40, PE62719A (U)

This report presents the results of a study of the effects of nuclear radiation on the light transmission characteristics of optical fibers. Two types of radiation were used: 1800-MW pulses of primarily thermal neutrons (10 to the 12th power n/sq.cm.), and a 20-minute exposure of thermal and fast neutrons and gamma radiation. Three representative types of optical fibers were tested: low-loss fused silica, medium-loss lead silicate with borosilicate cladding, and plastic. The fibers' radiation-induced attenuation changes and luminescence were monitored. Thermal neutrons were found to induce both attenuation increases and luminescence in all three fiber types. Fibers made of lead silicate with borosilicate cladding were found to develop a permanent attenuation increase of greater than 300 dB/km, making the fiber useless for most communication systems. (U)

AD-A041 264 20/6
AIR FORCE WEAPONS LAB KIRTLAND AFB N MEX

Preliminary Investigation of Mechanical Responses of Fiber Optics to Nuclear Radiation. (U)

DESCRIPTIVE NOTE: Final rept., JUN 77 35P Tucker,J. C. ;Soda,Kenneth J. ;Mardiguian,A. E. ;
REPT. NO. AFWL-TR-76-291
PROJ: 8809
TASK: 11

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Nuclear radiation, *Radiation damage, Mechanical properties, Flexural properties, Bending, Strength(Mechanics), Thermal cycling tests, Electrooptics, Optical waveguides, Neutrons, Gamma rays, Tensile strength (U)
IDENTIFIERS: WUAFWL88091124, PE62601F (U)

Four generic types of optical fibers which have low optical responses to nuclear radiation were evaluated to detect any significant radiation-induced mechanical changes. Bend radius, flexure, mandrel strength, tensile strength and thermal cycling tests were performed. Fiber responses in tensile and bending qualities were observed, but while the changes should probably be considered in application engineering, they are not significant in disqualifying any fiber from use in radiation environments. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A040 772 20/6 17/2
HARRIS CORP MELBOURNE FLA ELECTRONIC SYSTEMS DIV

Fiber Optics Design Aid Package. (U)

DESCRIPTIVE NOTE: Final technical rept., MAY 77 201P Slayton,I. B. ;Estapa,D. J. ;Jones,J. R. ;Patisaul,C. R. ;
CONTRACT: F30602-76-C-0246
PROJ: 6523
TASK: 11
MONITOR: RADC TR-77-163

UNCLASSIFIED REPORT
Availability: Microfiche copies only.
SUPPLEMENTARY NOTE: Supplement to Rept. no. RADC-TR-75-187 dated Jul 75, AD-A016 846.

DESCRIPTORS: *Fiber optics, *Optical communications, *Computer programs, Data links, Analog systems, Digital systems, Data transmission systems (U)
IDENTIFIERS: WURADC65231104, PE62702F (U)

This report contains a computer based program which will provide for system level and component level performance analysis for point to point fiber optic communication links. It enables the user to optimize various aspects of a fiber optic communication link for either analog or digital transmission. (Author) (U)

AD-A040 717 17/2 20/6
ITT ELECTRO-OPTICS DIV ROANOKE VA

Low Cost Fiber Optic Cable Assemblies for Local Distribution Systems. (U)

DESCRIPTIVE NOTE: Final rept. 1 May 75-1 Oct 76,
APR 77 146P Freiburger,R. J. ;
CONTRACT: DAAB07-75-C-1328
PROJ: 1S762705AH94
TASK: W1
MONITOR: ECOM,GIDEP 75-1328-F,E074-2556

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Also available as Rept. no. GIDEP-951.00.55.21-04-01.

DESCRIPTORS: *Fiber optics, *Cables, Low costs, Optical communications, Optical waveguides, Broadband, Low loss, Ruggedized equipment, Silicon dioxide, Plastic coatings, Fabrication, Moisture, Impact strength, Radiation hardening, Tensile properties, Environmental tests (U)
IDENTIFIERS: ASH94, PE62705A (U)

This report describes the results of one year effort to develop a low cost fiber optic cable using plastic clad silica fibers. As part of the program, silica core and plastic cladding materials were evaluated with respect to optical attenuation, mechanical properties, chemical properties, and radiation hardness. Fabrication techniques were developed and means to minimize excess cable loss evaluated. Uncabled fibers were fabricated with attenuations as low as 5.5 dB/km at .79 micrometers. Three cable designs were developed; one with central strength members, one with external strength members, and one with central strength members and an external braid. These designs, though developed for plastic clad silica fibers, are well suited to use with low loss doped silica fibers as well. The cables were fabricated in two phases. In the first phase, short lengths (1/3 km) of the three designs were fabricated and subjected to optical and mechanical evaluations. Based on the results of these tests, the third design was eliminated since it was more costly and offered no advantages over other designs.

(U)

AD-A040 660 17/2 20/6 9/1
LASER DIODE LABS INC METUCHEN N J

Light Emitting Diodes for Fiber Optic Communications. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 1, 30 Sep-31 Dec 76,
APR 77 79P Stockton,Thomas E. ;
CONTRACT: DAAB07-76-C-8135

UNCLASSIFIED REPORT

DESCRIPTORS: *Light emitting diodes, *Fiber optics, *Optical communications, Gallium arsenides, Aluminum arsenides, Heterojunctions, Fabrication, Manufacturing (U)
IDENTIFIERS: *Fiber optic communications, Double heterojunctions (U)

The design and fabrication of high speed etched-well light emitting diodes for fiber optic communications is discussed with regard to materials synthesis via LPE, wafer fabrication, and device assembly in a manufacturing environment. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A040 481 20/5 17/2 20/6
LASER DIODE LABS INC METUCHEN N J

Injection Laser Diodes for Fiber Optic Communications. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 2, 30 Sep-31 Dec 76,
APR 77 76P Stockton,Thomas E. ;
CONTRACT: DAAB07-76-C-0040

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Report on Manufacturing Methods and Technology Engineering Program.

DESCRIPTORS: *Injection lasers, *Injection diodes, *Fiber optics, *Optical communications, Gallium arsenides, Aluminum arsenides, Heterojunctions, Wafers, Chips(Electronics), Manufacturing (U)
IDENTIFIERS: Gallium aluminum arsenides, Fiber optics communications, *Laser diodes (U)

The design and fabrication of injection laser diodes for use in fiber optic communications is discussed with regard to material synthesis, chip configuration, and device assembly in manufacturing environment. The opto-electronic source is based on the GaAs-GaAlAs double heterojunction structure and consists of a parallel array of lasers formed by the application of triple stripe geometry to the surface of the epitaxial wafer. The monolithic triad of discrete lasing elements is mounted in a high frequency package which incorporates a high quality optical window. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A040 382 17/1 17/8
TRW DEFENSE AND SPACE SYSTEMS GROUP REDONDO BEACH CALIF

Feasibility Demonstration of Fiber Optic Detection of Low Frequency Sound. (U)

DESCRIPTIVE NOTE: Final rept. 1 Apr 76-28 Feb 77,
APR 77 39P Cole,J. H. ;Johnson,R. L. ;Bhuta,P. G. ;
REPT. NO. AT-SSD-TR-77-3
CONTRACT: N00014-76-C-0490

UNCLASSIFIED REPORT

DESCRIPTORS: *Acoustic detection, *Fiber optics, *Acoustooptics, *Acoustic arrays, Interferometers, Photodetection, Low frequency, Acoustic waves, Refractive index, Phase shift, Photodetectors, Sonar, Feasibility studies (U)
IDENTIFIERS: WUNR089117 (U)

The response of an optical fiber in water to low frequency acoustic waves was investigated experimentally and compared with analytical results. A change in the optical index of refraction of the fiber creates an effective path length change for the optical beam which results in a phase shift of the beam with respect to a reference beam unaltered by the acoustic field. By mixing the phase shifted beam with a reference beam of constant phase on a photodetector, the phase variation at the acoustic frequency is detected. Potential Navy applications of this technology for acoustic arrays are discussed. (Author) (U)

AD-A040 068 20/6 17/2 9/4
SPERRY RESEARCH CENTER SUDBURY MASS

Multiplexing and Filtering of Optical Signals. (U)

DESCRIPTIVE NOTE: Semiannual rept. 29 Apr-31 Oct 76,
DEC 76 52P Nelson,Arthur R. ;
REPT. NO. SCRC-CR-76-65
CONTRACT: DAAB07-76-C-1343
MONITOR: ECOM 1343-1

UNCLASSIFIED REPORT

DESCRIPTORS: *Time division multiplexing, *Fiber optics, *Optical communications, Data links, Bandwidth, Crosstalk, Asynchronous systems, Data rate, Optical filters, Lithium tantalates, Gates(Circuits) (U)
IDENTIFIERS: Optical multiplexing, Combiners, Optical combiners (U)

The objective of this contract is to develop an optical multiplexing device to combine onto one channel the information carried on several separate fiber optic channels and, subsequently, to perform the demultiplexing operation after transmission over distances of the order of a km. The main research effort is the development of the optical multiplexing/demultiplexing device. This device must be compatible with multimode fibers of relatively large numerical aperture, exhibit total throughout losses less than 15 dB, total signal to crosstalk ratio of more than 20 dB, and a bandwidth capability of 1.3 MHz. This report covers the work performed during the first six months of this contract, from May through October 1976. During this period the required work on the multiplexer device was nearly completed, and at the point all but one of the criteria outlined above have been met. Specifically, several devices have throughput losses of 10-15 dB are capable of working with large NA fibers, and have bandwidths of 100 MHz have been constructed. At this time only one requirement has not been fully met; that is, 10 dB signal to crosstalk has been obtained as opposed to 20 dB. However, several new devices, which are near completion, have been designed to improve the results in this area. (Author) (U)

AD-A040 024 17/2
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

Fiber-Optic Undersea Tow Cable Optical and Environmental Tests. (U)

DESCRIPTIVE NOTE: Test and evaluation rept. 1 Apr-3 Dec 76,
DEC 76 53P Putnam,W. H. ;
REPT. NO. NELC/TR-2006

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Towing cables, Optical communications, Underwater communications, Environmental tests, Light transmission, Attenuation, Tensile properties, Thermal properties, High pressure, Underwater, Feasibility studies (U)
IDENTIFIERS: Communication cables (U)

Tests of two fiber-optic cables revealed that fibers for communication purposes can be incorporated into two cables with very little excess loss during manufacture. Further development in cable design and fiber buffers is required to eliminate excess loss when cables are subjected to tension, temperature, and pressure. (Author) (U)

AD-A039 992 20/5
RCA LABS PRINCETON N J

Injection Laser for High Data Rate Communications. (U)

DESCRIPTIVE NOTE: Final rept. 1 Mar 76-28 Feb 77, APR 77 49P Wittke,James P. ;Ladany, Ivan ;Kressel,Henry ;
REPT. NO. PRRL-77-CR-13
CONTRACT: N00014-76-C-0709

UNCLASSIFIED REPORT

DESCRIPTORS: *Injection lasers, *Fiber optics, Couplings, Aluminum gallium arsenide, Epoxy resins, Data rate, High rate, Mounts, Laser communications, Bonding, Soldering (U)

Injection lasers of AlGaAs (Lambda(L) approximately 800 nm) have been permanently bonded to single-mode fibers, with power levels up to 600 microwatts being coupled into the fibers. Values over 150 microwatts were consistently obtained under cw operation at room temperature. Very close mechanical alignment tolerances are required to achieve good coupling, with positioning to + or - 1 micrometer being required. This necessitates the use of bonding materials for attaching the fiber to the laser mount that have a high dimensional stability over long time periods, and lasers whose modal patterns do not change with time or operating conditions. An epoxy provided the best bonding material that we found, although there are indications that suitable low-melting solders can also be used. Laser mode changes with drive current level can alter the observed coupling efficiency significantly. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A039 505 17/2 20/6
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

Fiber Optics Applications in the SHIPBOARD Data Multiplex System. (U)

DESCRIPTIVE NOTE: Final rept. Nov 75-Jun 76, AUG 76 61P Altman,D. E. ;
REPT. NO. NELC/TR-1995
PROJ: F21224
TASK: SF21224401

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Optical communications, *Data transmission systems, *Multiplexing, Shipboard, Ships, Couplers, Passive systems, Intercommunication systems (U)
IDENTIFIERS: PE62721N, WUB504 (U)

For a nominal size Shipboard Data Multiplex System (eight area multiplexers) using a passive tee coupler configuration, the connector and coupler excess losses for each coupler must total no more than 1.8 dB, which appears to be well within the state of the art. For a maximum size system (sixteen area multiplexers) the per coupler losses must be reduced to about 0.5 dB or less, which probably can be achieved given sufficient development effort. Two other devices, the passive star coupler and the fail-safe active tee coupler, also appear to have development potential for use in both nominal and maximum size systems. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMO7

AD-A039 073 17/2 20/5
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

The Current State and Future of Optical Information Transmission, (U)

NOV 76 15P Both,W. ;
REPT. NO. FTD-ID(RS)I-1298-76

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Militartechnik (East Germany) n1 p17-19 1976, by K. Bennett Howe.

DESCRIPTORS: *Fiber optics transmission lines, *Optical communications, Data transmission systems, Information transfer, Semiconductor lasers, Cost benefits, Glass, Translations, East Germany (U)
IDENTIFIERS: Laser diodes (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMO7

AD-A038 678 9/1 17/2 20/5
LASER DIODE LABS INC METUCHEN N J

Injection Laser Diodes for Fiber Optic Communications. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 1, 30 Jun-30 Sep 76,
DEC 76 67P Stockton,Thomas E. ;
CONTRACT: DAAB07-76-C-0040

UNCLASSIFIED REPORT

DESCRIPTORS: *Injection diodes, *Fiber optics transmission lines, *Laser communications, *Injection lasers, Electrooptics, Gallium arsenides, Heterojunctions, Substrates, Windows, Epitaxial growth, Manufacturing (U)
IDENTIFIERS: *Laser diodes, Gallium aluminum arsenide, Liquid phase epitaxy (U)

The design and fabrication of injection laser diodes for use in fiber optic communications is discussed with regard to material synthesis, chip configuration, and device assembly in manufacturing environment. The opto-electronic source is based on the GaAs-GaAlAs double heterojunction structure and consists of a parallel array of lasers formed by the application of triple stripe geometry to the surface of the epitaxial wafer. The monolithic triad of discrete lasing elements is mounted in a high frequency package which incorporates a high quality optical window. This report covers progress made during the first quarter of the program and outlines the major steps in the manufacturing sequence of the IL device. (Author) (U)

AD-A038 455 20/6 17/2 1/3
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

A-7 Airborne Light Optical Fiber Technology (ALOFT) Demonstration Project. (U)

DESCRIPTIVE NOTE: Final rept. Mar 74 Jan 77,
FEB 77 47P Harder,R. D. ;Greenwell,R. A. ;Holma,G. H. ;
REPT. NO. NELC/TR-2024

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Signal processing, *Military aircraft, Data transmission systems, Multiplexing, Avionics, Electromagnetic interference, Radiofrequency interference, Lightning, Crosstalk, Short circuits, Glass fibers, Systems engineering, Dielectric properties, Maintainability, Cable assemblies, Cost effectiveness (U)
IDENTIFIERS: *A-7 aloft program, WUF228, PE63791N (U)

A the A-7 ALOFT project successfully demonstrated a fiber-optic signal transmission system can accurately transmit data in the demanding environment of a military aircraft. Included is a summary of the most significant test results, the conclusions reached from the economic analysis, and the compilation of reliability and maintainability data. (Author) (U)

AD-A036 150 20/6
NAVAL TRAINING EQUIPMENT CENTER ORLANDO FLA

Peri-Apollar 360 Degree Lens Distortion Free Linear Mapping. (U)

DESCRIPTIVE NOTE: Interim rept. Nov-Dec 76,
FEB 77 32P McKechnie,John C. ;
REPT. NO. NAVTRAEQUIPC-TN-55
PROJ: F55522
TASK: ZF55522002

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Lenses, Wide angles, Screens(Displays), Mapping, Linearity, Visual signals, Training devices, Image projectors, Distortion (U)
IDENTIFIERS: WU77191, PE62757N (U)

Several methods, including fiber-optics are considered for producing a distortion free linear image transfer at both the optical probe and projection lens image planes of a 360 degree nonprogrammed visual display. A description of five methods is given and each alternative examined analytically. (Author) (U)

AD-A035 867 20/6 9/4
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

Fiber Optics and Integrated Optics Techniques for Signal Processing. (U)

DESCRIPTIVE NOTE: Research and development rept. Apr-Sep 76,
FEB 77 70P Dillard,George M. ;Hunt, Barry R. ;Taylor,Henry F. ;
REPT. NO. NELC/TR-2013
PROJ: F54583
TASK: XF54583005

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Optical circuits, *Signal processing, Analog to Digital converters, Electronic warfare, Radar equipment, Electric filters, Pseudo random systems, Coding, Broadband, Multisensors (U)
IDENTIFIERS: *Integrated optics, WUF225, PE62762N (U)

This report introduces some new device concepts based on the technologies of fiber optics and integrated optics, and discusses the potential uses of these devices in signal processing. Analog-to-digital converters, delay-line devices (including transversal filters), pseudorandom sequence generators, rf spectrum analyzers, and switching networks are described and analyzed in some detail. Applications for these devices in the improvement of signal processing for radar, electronic warfare, communications, and multisensor data collection systems are investigated. It is concluded that the new optical technologies offer the potential for substantial reduction in size, weight, and power and improvement in performance and/or cost over present or alternative techniques for a variety of systems which process broadband (greater than 100-MHz bandwidth) signals. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A035 643 17/2 20/6
CALIFORNIA UNIV LOS ANGELES SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Theoretical Studies of Fiber Optical Waveguides and Integrated Optical Circuits. (U)

DESCRIPTIVE NOTE: Final rept. Mar 73-Feb 76,
JUL 76 18P Yeh,C. ;
REPT. NO. UCLA-ENG-7671
CONTRACT: N00123-73-C-1192

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Optical circuits, *Optical waveguides, *Optical communications, Modes, Thin films, Dielectrics, Synchrotrons, Scattering, Electromagnetic radiation, Cerenkov radiation, Transients, Liquid crystals, Multimode, Diffraction, Light pulses (U)
IDENTIFIERS: *Integrated optical circuits (U)

This report summarizes the results of the research carried out at the Electrical Sciences and Engineering Department of the University of California at Los Angeles under Contract N00123-73-C-1192-00003 with the Naval Electronics Laboratory Center, Department of the Navy. The report covers activities during the period March 1973 to February 1976. The research dealt in general with the theoretical studies of fiber optical waveguides and integrated optical circuits. (Author) (U)

AD-A035 435 20/6 17/2
COMMUNICATIONS RESEARCH CENTRE OTTAWA (ONTARIO)

The CCS-280 Optical-Fiber Link Task. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 76 34P Hara,Elmer H. ;Frayn,H.
Claire ;Watanabe,Akira ;
REPT. NO. CRC-1296
MONITOR: DRB TELS-40

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Command and control systems, Optical waveguides, Electronic equipment, Multiplexing, Destroyer escorts, Connectors, Plug in units, Canadian equipment (U)

The development of an experimental optical-fiber link for the Command and Control System 280 (CCS-280) of the DDH-280 Destroyer Escorts of the Canadian Forces is described. The objective of the task was to demonstrate the application of optical-fiber transmission links in a land-based CCS-280, and thereby alert and inform the armed forces of the advantages of optical-communications technology in military systems. The Task was planned and managed by the Department of Communications on behalf of the Department of National Defence, while the design and implementation of the optical link were accomplished through industrial contracts. All test conditions set by the Directorate of Maritime Combat Systems were satisfied by the experimental optical-fiber link. (Author) (U)

AD-A035 107 9/1
ITT ELECTRO-OPTICS DIV ROANOKE VA

300 Meter Sonobuoy Cable 500 Meter Tow Cable. (U)

DESCRIPTIVE NOTE: Final rept. 25 Jun 75-1 Jun 76,
JUL 76 55P Freiburger,Robert J. ;
CONTRACT: N00123-75-C-1023

UNCLASSIFIED REPORT

DESCRIPTORS: *Electric cables, *Fiber optics transmission lines, Underwater, Sonobuoys, Towed arrays, Sound transmission, High strength, Tensile strength, Protective coatings, Copper, Steel, Plastics, Silicone plastics, Fabrication (U)

The following conclusions have been reached as a result of the efforts of the sonobuoy/tow cable development program: (1) low loss optical fibers can be successfully integrated into undersea cables with low enough attenuation to meet Navy operational requirements; (2) techniques used for the protection of the optical fibers such as plastic jacketing and armoring are applicable to a wide range of cables for both undersea and atmospheric uses; and (3) since the sonobuoy and tow cables were produced by conventional cable manufacturing techniques, it is expected that they can be fabricated in lengths equal to that of conventional cables. (U)

AD-A034 910 20/6
ILLINOIS UNIV AT CHICAGO CIRCLE COMMUNICATIONS LAB

Coupling between Rectangular Optical Waveguides. (U)

DESCRIPTIVE NOTE: Master's thesis, DEC 76 66P Kazkaz,Abdul-Ghaffar ; Uslengni,Piergiorgio L. E. ;
REPT. NO. 76-4
CONTRACT: AF-AFOSR-2263-72
MONITOR: AFOSR TR-77-0007

UNCLASSIFIED REPORT

DESCRIPTORS: *Optical waveguides, *Fiber optics transmission lines, *Waveguide couplers, Optical communications, Data transmission systems, Differential equations, Mathematical analysis, Theses (U)
IDENTIFIERS: Integrated optics (U)

A theory is developed for strong coupling between two rectangular optical waveguides, that contains the Miller-Marcatili result as a limiting case. The theory allows for a more accurate design of a directional coupler than was previously possible. (U)

AD-A034 616 20/6
CALIFORNIA INST OF TECH PASADENA

Three-Dimensional P.ctorial Transmission in Optical Fibers. (U)

DESCRIPTIVE NOTE: Interim rept., SEP 75 3P Yariv,Amnon ;
CONTRACT: AF-AFOSR-2874-76
PROJ: 9768
TASK: 01
MONITOR: AFOSR TR-76-1442

UNCLASSIFIED REPORT
Availability: Pub. .n Applied Physics Letters, v28 n2 p88-89, 15 Jan 76.

DESCRIPTORS: *Optical images, *Fiber optics transmission lines, Three dimensional, Problem areas, Phase distort.on, Dispersions, Modes, Nonlinear systems, M.xing circuits, Phase control devices, Reprints (U)
IDENTIFIERS: WUAFOSR976801, PE61102F (U)

Modal phase dispers.on limits image transmission in optical fibers to d.stances too short to be of general interest. A technique based on nonlinear optical mixing is described for modal phase equalization and recovery of a transmitted image. (Author) (U)

AD-A033 767 17/2 1/3
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

Results of A-7 ALOFT 'Bottoms Up' Model and Weight Sensitivity Analysis. (U)

DESCRIPTIVE NOTE: Research and development rept. Jul 75-Jun 76,
JUL 76 59P Greenwell,R. A. ;
REPT. NO. NELC/TR-1998
PROJ: W41X1
TASK: W41X1001

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Optical communications, *Attack bombers, Data transmission systems, Data links, Life cycle costs, Naval aircraft, Comparison, Weight, Sensitivity, Coaxial cables, Cost analysis, Electric connect (U)
IDENTIFIERS: *A-7 aircraft, Bottoms up model, ALOFT(Airborne Light Optical Fiber Technology), Airborne light optical fiber technology, WUF228, PE63791N (U)

A summary of data collected on fiber-optic and hard-wired communication-channel costs for the A-7 ALOFT is presented with the weight sensitivity to total system costs. (Author) (U)

AD-A033 415 20/5 17/2
RCA LABS PRINCETON N J

Injection Laser for High-Data-Rate Communication. (U)

DESCRIPTIVE NOTE: Progress rept. no. 2,
NOV 76 9P Wittke,J. P. ;Ladany,I. ;
Kressel,H. ;
CONTRACT: N00014-76-C-0709

UNCLASSIFIED REPORT

DESCRIPTORS: *Injection lasers, *Laser communications, *Fiber optics transmission lines, Pulsed lasers, Thermal stability, Junctions, Couplings, Far field, Continuous waves, Data rate, Heat sinks, Copper, Near field, Epoxy compounds (U)
IDENTIFIERS: Waveguide modes (U)

The goal is the development of methods of coupling as much power from an injection laser as possible into a single-mode fiber, with the fiber permanently bonded to the laser in a protective package. Study of the factors controlling laser beam patterns continues. Some evidence of dimensional changes in the epoxy fiber-laser bonding has been seen; new epoxy is being tried. Several laser-fiber sealed packages have been assembled for evaluation. Power levels of about 1 mW have been coupled into the fiber, and long-term stability is being studied. (Author) (U)

AD-A032 465 20/6
NAVAL RESEARCH LAB WASHINGTON D C

Fiber Optics for Naval Applications: An Assessment of Present and Near-Term Capabilities. (U)

DESCRIPTIVE NOTE: Status rept.,
SEP 76 57P Sigel,George H. , Jr;
REPT. NO. NRL-8062
PROJ: NRL-P03-10

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Optical communications, *Reviews, Optical materials, Mechanical properties, Test methods, Fiber optics transmission lines, Cables, Optical detectors, Radiation effects, Optical glass, Plastics, Naval researc (U)

This report provides an overview of the present status and envisioned future role of fiber optics for naval applications. Subjects addressed include state-of-the-art materials and fibers, their optical and mechanical properties, environmental testing, design of fibers and cables, and fiber systems. Present problem areas are outlined as well as their recommended or anticipated solutions. Some specific avionic, undersea, and shipboard applications of fiber-optic systems are discussed along with the advantages and expected payoffs with deployment. A listing of key Navy and industrial laboratories, manufacturers, and principal investigators in the fiber-optic area has also been provided. (U)

AD-A032 126 18/6 9/4 20/6
CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN ILL

Fiber Optic Communications Link Performance in EMP and Intense Light Transient Environments. (U)

DESCRIPTIVE NOTE: Interim rept.,
OCT 76 24P McCormack,Ray G. ;Sieber, David C. ;
REPT. NO. CERL-IR-E-94
PROJ: 4A762719AT40
TASK: A1

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Transient radiation effects, Electromagnetic pulses, Light pulses, Radiation resistance, Radiation hardening, Data transmission systems, Electromagnetic interference, Test methods, Light emitting diodes (U)
IDENTIFIERS: PE62719A, WU022, AST40 (U)

Optical fiber communications links are a possible means for providing voice and data transmission electromagnetic pulse (EMP) hardened facilities. This report describes evaluations of the effects of high-level EMP fields and intense light flashes on fiber links. The results show that neither EMP fields nor light transient have any appreciable effect on the fiber links. Further evaluations, which were performed in EMP fields to compare the data transmission system using an optical fiber with an equivalent system using conventional cabling, showed te conventional system is susceptible to EMP. The optical link is thus superior in the EMP environment. (Author) (U)

AD-A031 839 20/6 14/1 17/2
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF

Life Cycle Costing of an Emerging Technology: The Fiber Optics Case. (U)

DESCRIPTIVE NOTE: Final rept. Mar 75-Mar 76, MAR 76 442P Jones,Carl R. ;Johnson, Ronald L. ;Knobloch,Earle W. ;McGrath,John M. ;Michna,Kenneth R. ;
REPT. NO. NPS-55Js76031

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Life cycle costs, *Optical communications, *Fiber optics transmission lines, Electrooptics, Optical waveguides, Data links, Cost effectiveness, Cost estimates, Cost models, Data transmission systems, Economic analysis (U)
IDENTIFIERS: A-7 aircraft, ALOFT(Airborne light optical fiber technology), Airborne light optical fiber technology, Optical fibers (U)

As significant technological advances in fiber optics and optical data transmission methods are being made, it is necessary to develop appropriate methods for estimating life cycle costs for alternative coaxial/twisted pair wire and optical fiber avionics. In Volume One measures of effectiveness are suggested for each alternative system. An approach, which structures the technological and demand uncertainties of fiber optics, is developed through scenarios as a means of relating cost and effectiveness. It is suggested that Delphi and experience curve techniques be used in conjunction with ordered scenarios as a technological forecasting technique for estimation of life cycle costs of fiber optics. In addition, a review of the historical and technological background of fiber optics and their application to the Naval Electronics Laboratory center (NELC) A-7 Airborne Light Optical Fiber Technology (ALOFT) Program is included. (Author) (U)

AD-A030 184 20/6 11/7 13/8
IIT RESEARCH INST CHICAGO ILL

Optical Couplers for Fiber to Integrated Optics Systems. (U)

DESCRIPTIVE NOTE: Final rept. 1 Jun 75-1 Jun 76, JUL 76 34P Ohlhaber,Ronald L. ;
REPT. NO. IITRI-E6332
CONTRACT: N00014-75-C-1159
PROJ: NR-288-011

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Couplers, *Fusion(Melting), *Optical glass, Refractive index, Near infrared radiation, Light transmission, Dielectric films, Light modulators, Optical switching (U)
IDENTIFIERS: Optical couplers, Integrated optics, Lithium niobates, Mixers(Optical) (U)

An optical coupler for transferring light or near IR radiation between high index integrated optics structures such as LiNbO3 and low loss optical fibers was developed. The design is a flexible glass fiber containing an external ridge guiding region on a larger lower index base material. Ridge dimensions down to 2 micrometers were obtained, indicating that single or multimode designs are possible. Special glasses which had refractive index values in excess of 2.20 at 632.9 nm were developed for the coupler fiber. The design utilizes evanescent wave coupling at the integrated optics structure and end fire coupling at the optical fiber. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A028 043 20/6 17/2
RCA LABS PRINCETON N J

Injection Laser for High-Data-Rate Communication. (U)

DESCRIPTIVE NOTE: Progress rept. no. 1, JUL 76 7P Wittke,J. P. ;Ladany,I. ; Kressel,H. ;
CONTRACT: N00014-76-C-0709

UNCLASSIFIED REPORT

DESCRIPTORS: *Injection lasers, *Fiber optics, *Optical waveguides, *Waveguide couplers, Optical communications, Alignment (U)
IDENTIFIERS: Optical couplers (U)

A major objective of this study is the development of a package in which an injection laser is permanently bonded to a short length of a single-mode fiber, keeping both parts aligned and coupling as much optical power as possible into the single-mode fiber. Such a package had previously been developed for multimode fibers; efforts are now being made to adapt this package to the single-mode case. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A027 937 17/2
CALIFORNIA INST OF TECH PASADENA

Direct Transmission of Pictorial Information in Multimode Optical Fibers, (U)

AUG 75 7P Gover,A. ;Lee,C. P. ; Yariv,A. ;
CONTRACT: AF-AFOSR-2874-76
PROJ: AF-9763
TASK: 976303
MONITOR: AFOSR TR-76-0750

UNCLASSIFIED REPORT
Availability: Pub. in Jnl. of the Optical Society of America, v66 n4 p306-311 Apr 76.

DESCRIPTORS: *Fiber optics, *Image processing, *Optical communications, Data transmission systems, Optical images, Multimode, Distortion, Holography, Signal processing, Reprints (U)

The problem of coherent image transmission through a single multimode optical fiber is discussed. A scheme is presented for recovering the transmitted image after distortions brought about by the fiber modes dispersion. Realization of this scheme by holgraphic techniques and with lens systems is proposed, and its limitations pointed out. The application of this scheme in canceling out temporal signal dispersion in a multimode fiber transmission line is also discussed briefly. (Author) (U)

AD-A027 747 20/6 17/2
CALIFORNIA INST OF TECH PASADENA

On Transmission and Recovery of Three-Dimensional Image Information in Optical Waveguides. (U)

AUG 75 7P Yariv,Amnon ;
CONTRACT: AF-AFOSR-2874-76
PROJ: AF-9763
TASK: 976303
MONITOR: AFOSR TR-76-0752

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of the Optical Society of America, v66 n4 p301-306 Apr 76.

DESCRIPTORS: *Optical waveguides, *Facsimile transmission, *Optical communications, *Fiber optics, Three dimensional, Pictures, Optical images, Propagation, Nonlinear propagation analyses, Reprints (U)
IDENTIFIERS: Optical mixing (U)

The paper considers two questions. The first one is: Is it possible to transmit three-dimensional pictorial information through transparent glass (or other dielectric) fibers. It is found that due to modal dispersion, pictorial information is invariably 'smeared' in transmission. The second question is: Given nature's reluctance to transmit pictures through fibers, is there anything we can do about it. It is suggested that the answer is yes and point to a class of solutions involving nonlinear optical mixing. (U)

AD-A026 206 17/2 14/1
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

A-7 ALOFT Life-Cycle Cost and Measures of Effectiveness Models. (U)

DESCRIPTIVE NOTE: Test and evaluation rept. Jul 75-Mar 76,
MAR 76 49P Greenwell,R. A. ;
REPT. NO. NELC-TR-1982
PROJ: W41X1, NELC-F228
TASK: W41X1001

UNCLASSIFIED REPORT

DESCRIPTORS: *Intercommunication systems, *Life cycle costs, *Cost analysis, *Fiber optics transmission lines, Avionics, Attack aircraft, Effectiveness, Performance, Coaxial cables, Optimization, Models (U)
IDENTIFIERS: A-7 aircraft (U)

Economic analyses are being conducted to determine the measure of effectiveness of fiber-optic and coaxial-cable systems for combat aircraft. Participating are the Naval Electronics Laboratory Center, Naval Postgraduate School, and the McDonnell Aircraft Company. The naval activities have developed a Bottoms Up model and McDonnell Aircraft Company has developed a Top Down model. These two models will be utilized to compare and analyze the optimum system in terms of performance and cost. (Author) (U)

AD-A025 660 20/6 11/2
CATHOLIC UNIV OF AMERICA WASHINGTON D C VITREOUS STATE LAB

Research and Development in Glass Technology Related to Fiber Optic Waveguides. (U)

DESCRIPTIVE NOTE: Final rept.
NOV 75 92P
CONTRACT: N00123-74-C-1411

UNCLASSIFIED REPORT

DESCRIPTORS: *Optical glass, *Glass fibers, *Optical waveguides, *Fiber optics, Phase studies, Manufacturing, Fabrication, Refractive index, Purification, Quality control (U)
IDENTIFIERS: Phasil, Borosilicate glass (U)

It was the purpose of this effort to use certain basic research results which indicated that it was possible to produce from phase separated glasses optical waveguide fibers with attenuations below 20 dB/Km and numerical apertures greater than available by chemical vapor deposition methods. Before the specific NELC applications for this fiber could be realized in commercial production, certain process engineering steps had to be solved. These production problems and the effort on each are discussed in the report. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A025 314 12/1 20/6 9/1 9/5
WASHINGTON UNIV SEATTLE DEPT OF ELECTRICAL ENGINEERING

The Parabolic Cylinder Functions of Miller's Second Kind for Complex Parameter. (U)

DESCRIPTIVE NOTE: Quarterly rept. 1 Sep 75-31 Jan 76 on task 10,
FEB 76 24P Smith,Robert B. ;
CONTRACT: N00123-73-C-1200

UNCLASSIFIED REPORT

DESCRIPTORS: *Special functions(Mathematical), *Fiber optics, *Waveguide couplers, Integrated systems, Complex variables, Transformations(Mathematics), Cylindrical bodies (U)
IDENTIFIERS: Parabolic cylinder functions, Integrated optics (U)

This report describes the derivation of some properties of the Parabolic Cylinder Functions e(a,z) and e*(a,z). These functions are a natural choice for expressing the solutions of the coupled-mode equations for the Tapered Coupler which is important in integrated optics and fiber optics coupling. The parabolic cylinder functions W(a, + or - z), e(a,z) and e*(a,z), originally defined only for real arguments, are considered when a and z are complex. Due to a choice of notation the original defining expressions do not remain valid when the parameter, a, is complex as required for the tapered coupler. Alternative expressions which are generally valid are obtained from the function of the first kind, U(a,z). It is found that these functions of the second kind are not analytic throughout the finite plane of a, as is allowed by the defining differential equation. Rather, thay have multiple branches (four) and the half integer points along the imaginary axis are all branch points. Three-term recurrence relations (of which the couples-mode equations for the tapered coupler are a special case) are obtained for the functions E(a,z), but cannot be uniformly valid throughout the complex a-plane. Within either the right or left half of the complex plane, and on the real axis, (U)

AD-A025 220 17/7 20/6 16/4
OPTELECOM INC GAITHERSBURG MD

Development of an Optical Fiber Video Data Link. (U)

DESCRIPTIVE NOTE: Final rept. Dec 73-Feb 75,
FEB 75 62P Culver,William H. ;Ludwig, Edmund D. ;
CONTRACT: DAAH01-74-C-0417

UNCLASSIFIED REPORT

DESCRIPTORS: *Remotely piloted vehicles, *Fiber optics transmission lines, *Optical communications, *Image processing, Optical images, Optical waveguides, Cost estimates, Winding (U)

Investigations were conducted to develop techniques for paying out optical fibers wound on non-rotating spools. The fibers were payed out off the end of the spool in a manner similar to that employed by a spinning reel or wire guided missile. Payout velocities in excess of 300 feet per second were demonstrated. The upper limit payout velocity is estimated to be at least 600 feet per second. This technique should make possible TV guidance of a missile by transmitting optical signals over the fiber to a remote operator out of line of sight of the missile. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0MO7

AD-A024 569 17/2 17/7 16/4
OPTELECOM INC GAITHERSBURG MD

Out of Line of Sight Missile Link. (U)

DESCRIPTIVE NOTE: Final rept.
APR 76 49P
CONTRACT: DAAH01-75-C-0414

UNCLASSIFIED REPORT

DESCRIPTORS: *Optical communications, *Fiber optics, *Data links, *Command guidance, Fiber optics transmission lines, Data transmission systems, Television tracking, Television guidance, Launching sites, Guided missiles, Indirect fire, Quartz, Fibers (U)

This report describes development aimed at producing an optical fiber communication link between a missile and its launch point for transmission of TV data from the missile to the launch point and command signals in the reverse direction. Optical fibers having a loss of 30 db/km were fabricated that were paid out from a spool at speeds of greater than 300 ft/sec. (U)

AD-A024 302 17/2 20/6
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

ALOFT Fiber Optic Component Tests. (U)

DESCRIPTIVE NOTE: Final rept.,
JAN 76 43P Holma,G. ;Meador,T. ;
REPT. NO. NELC/TD-460
PROJ: W41X1

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Data links, *Fiber optics, Light emitting diodes, Electrooptics, Bulkheads, Connectors, Multiplexing, Interfaces, Airborne, Technology, Cables (U)
IDENTIFIERS: ALOFT(Airborne Light Optical Fiber Technology), A-7 aircraft, Airborne light optical fiber technology (U)

Tests were conducted on fiber optic cables, on fiber optic pressure-bulkhead connectors, and on an electrooptical data link to determine if these components would survive the environments of the A-7 aircraft. Components performed as expected and were shown to withstand the A-7 environments. (Author) (U)

AD-A023 491 20/6 11/5 20/5
WASHINGTON UNIV SEATTLE DEPT OF ELECTRICAL ENGINEERING

Optical Fiber Coupling and Strength Tests. (U)

DESCRIPTIVE NOTE: Semiannual rept. 1 Mar-31 Aug 75,
SEP 75 7P Mitchell,Gordon L. ;Scott, William D. ;
CONTRACT: N00123-73-C-1200

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Glass fibers, Couplings, Fiber optics, Strength(Mechanics), Tensile properties, Polyethylene plastics, Plastic coatings, Semiconductor lasers, Transitions (U)
IDENTIFIERS: Integrated optics (U)

This report summarizes contract research through September 1, 1975, and defines design requirements for an efficient transition fiber to couple the rectangular output aperture of a semiconductor laser to round single mode fiber cores. Fiber strength testing and strength improvement processing work has been completed with results of strength tests on fibers of lengths up to 15 meters. (Author) (U)

AD-A023 034 20/6 9/1
RCA LABS PRINCETON N J

Fiber-Optic Switch Study. (U)

DESCRIPTIVE NOTE: Final rept. 18 Nov 74-17 Sep 75,
FEB 76 63P Hammer,J. M. ;Bartolini,R.
A. ;Miller,A. ;Neil,C. C. ;
REPT. NO. PRRL-75-CR-76
CONTRACT: N00014-75-C-0436

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Optical switching, *Optical waveguides, Coupling(Interaction), Efficiency, Fibers, Thin films, Modulators, Multimode, Planar structures (U)

The principle of operation of fiber-to-planar-waveguide grating couplers has been established experimentally and theoretically. Initial experiments yielded coupling fractions up to 6% and showed the expected angular behavior. Further development of fiber-planar waveguide grating couplers should allow the coupling of single-mode fibers to single-mode planar guides with efficiencies that approach 90%. Multimode fibers may also be coupled but with reduced efficiencies which depend on the acceptable angular spread of the coupled beams. (Author) (U)

AD-A022 651 20/6 11/3
ITT ELECTRO-OPTICAL PRODUCTS DIV ROANOKE VA

Low Cost Fiber Optic Cable Assemblies for Local Distribution Systems. (U)

DESCRIPTIVE NOTE: Semiannual rept. no. 1, 1 May-1 Nov 75,
FEB 76 56P Reed,T. L. ;Asam,A. R. ;
CONTRACT: DAAB07-75-C-1328
PROJ: DA-1-S-762705-AH-94
TASK: 1-S-762705-AH-94-W-1
MONITOR: ECOM,GIDEP 75-1328-1,E052-1342

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Also available as Rept. no. GIDEP-545.00.00.00-04-01.

DESCRIPTORS: *Fiber optics transmission lines, *Cables, Cladding, Plastics, Silica glass, Fabrication, Optical waveguides, Optical properties, Radiation hardening, Coatings, Extrusion, Mechanical properties, Cost analysis (U)
IDENTIFIERS: Design, Chemical vapor deposition (U)

This report describes progress during the first six months of a one year effort to develop a low cost fiber optic cable using plastic clad silica fibers. As part of the program, silica core and plastic cladding materials have been evaluated with respect to optical attenuation, mechanical properties, chemical properties, and radiation hardness. Fabrication techniques have been developed and means to minimize excess cable loss evaluated. Uncabled fibers have been fabricated with attenuations as low as 5.5 dB/km at .79 micrometers. (U)

AD-A022 593 20/6 17/2 20/5
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

DoD/Industry-Wide Integrated Optics and Fiber Optics Communications Conference, 15-17 May 1974. (U)

74 66P

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Fiber optics transmission lines, *Optical communications, Integrated systems, Waveguides, Data transmission systems, Semiconductor lasers, Injection lasers, Semiconductors, Thin films, Ion implantation, Electrooptics, Magnetooptics, Semiconductor diodes, Near infrared radiation (U)
IDENTIFIERS: *Integrated optics, Data bus (U)

New technologies are constantly being investigated and evaluated to determine their value in solving problems and introducing new capabilities in DoD systems. Fiber optics has emerged as one which offers solutions to many of the most significant problems, in terms of equipment performance and cost. Integrated optics technology shows promise of giving additional improvements in fiber optic systems by providing fast, active elements in very compact form. (U)

AD-A022 373 20/6 20/14 17/2
AIR FORCE AERO PROPULSION LAB WRIGHT-PATTERSON AFB OHIO

Sapphire Fiber Transmission at Temperatures up to 1000 F. (U)

DESCRIPTIVE NOTE: Final technical rept. Sep 74-Mar 75,
OCT 75 49P Hamant,James Edward ;
REPT. NO. AFAPL-TR-75-48
PROJ: AF-3048
TASK: 304807

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Sapphire, *Light transmission, High temperature, Transmission loss, Ultraviolet radiation, Visible spectra, Infrared radiation, Aluminum compounds, Oxides (U)

An optically clear sapphire fiber was subjected to increased temperatures up to 1000 F to determine the change in percent transmission. The transmission was measured in two regions of the optical spectrum: the ultraviolet region from 235 nanometers to 365 nanometers, and the visible region from 4100 Angstroms to 6500 Angstroms. The percent transmission of the fiber decreased with increasing temperature. As the wavelength increased the effect of a temperature increase was less. (Author) (U)

AD-A022 273 20/6 17/2 13/8
CATHOLIC UNIV OF AMERICA WASHINGTON D C VITREOUS STATE LAB

Fiber Optic Waveguides by Molecular Stuffing. (U)

DESCRIPTIVE NOTE: PROGRESS REPT., DEC 75 49P Macedo,P. B. ;Litovitz,T. A. ;Moynihan,C. T. ;Montrose,C. J. ;Mohr, R. K. ;
CONTRACT: N00019-75-C-0083

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Optical waveguides, Purification, Manufacturing, Fabrication, Glass, Porous materials, Glass fibers, Doping, Additives, Molecular structure, Refractive inde (U)
IDENTIFIERS: Molecular stuffing technique, Phasil glass, Low loss (U)

The research program to develop low loss glass fiber optic waveguides involves a novel technique called 'Molecular Stuffing', which may be used to produce any desired index profile in a porous glass preform such as the phasil rods developed in our laboratory. The nature of this process is such that relatively inexpensive raw materials may be used as starting materials. The purification steps which result in an ultrapure glass preform are done in such a manner that costly clean room procedures are avoided and glass production and processing can be done at relatively low temperatures. This process thus offers an alternative to ultrapure glass melting or chemical vapor deposition which require costly processing procedures and/or raw materials. A further characteristic of Molecular Stuffing is that it is possible to produce high numerical aperture step or parabolic index profiles. During this year considerable progress has been made in defining the criteria for obtaining dopants to be used in the Molecular Stuffing process. In this respect the results of the work presented in terms of a description of the Molecular Stuffing procedure as it exists at this time. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A022 069 20/5 17/2
WASHINGTON UNIV SEATTLE DEPT OF MINING METALLURGICAL AND CERAMIC ENGINEERING

Fabrication of Low-Loss Optical Waveguides by Post Deposition Microstructure Modification. (U)

DESCRIPTIVE NOTE: Semi-annual progress rept. 3 Jun-3 Dec 74 on Task 6, FEB 75 9P Miller,Alan D. ;Fosmire, George R. ;
CONTRACT: N00123-73-C-1200

UNCLASSIFIED REPORT

DESCRIPTORS: *Optical waveguides, Heat treatment, Linear systems, Fabrication, Deposition, Optical materials, Ferroelectric materials, Fiber optics, Lithium compounds, Tantalates, Dielectric films, Optical communications, Microstructure, Modification (U)
IDENTIFIERS: Electron resist, Low loss, Integrated optics (U)

This report summarizes contract progress of investigations into the effects of heat treatment on linear optical waveguide structures made of ferroelectric materials. It is hypothesized that low-loss polycrystalline waveguides may be produced by orienting grain boundaries perpendicular to the waveguide axis by thermo treatment. Using the Hatzakis lift-off technique with electron resist to obtain linear waveguides, lithium tantalate films on Corning 7059 glass slides have been examined. Presently produced lithium tantalate films are lithium deficient. Techniques for improving the stochiometry are being investigated. (Author) (U)

AD-A021 913 14/1 20/6 1/3 9/3
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF

The A-7 ALOFT Cost Model: A Study of High Technology Cost Estimating. (U)

DESCRIPTIVE NOTE: Master's thesis,
DEC 75 271P Johnson,Ronald Lloyd ;
Knobloch,Earle William ;

UNCLASSIFIED REPORT

DESCRIPTORS: *Life cycle costs, *Fiber optics, *Cost estimates, Economic analysis, Technology, Mathematical models, Naval planning, Circuit interconnections, Avionics, Cost analysis, Attack bombers, Navigation, Aircraft fire control systems, Comparison, Coaxial cables, Data links, Delphi techniques, Economic models, Forecasting, Uncertainty, Theses (U)
IDENTIFIERS: ALOFT(Airborne Light Optical Fiber Technology), Airborne light optical fiber technology, A-7 aircraft (U)

This analytical study contains the development of an appropriate life cycle cost (LCC) model for the A-7 Airbrone Light Optical Fiber Technology (ALOFT) system. The model was developed to support an A-7 ALOFT economic analysis which will compare the total systems costs and performance benefits of an A-7 fiber optic linked navigation and weapons delivery system to existing or proposed wire interconnect designs. Major features of this study include the development of: (1) A process to derive cost estimates of a high technological development in the early conceptual stage; (2) An appropriate LCC model for the A-7 ALOFT economic analysis; and (3) Fiber optic costing methodology to support the LCC analysis. This analysis is a follow-on study to An Approach to the Estimation of Life Cycle Costs of a Fiber Optic Application in Military Aircraft AD-A019 379. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A021 885 20/6 19/5
FRANKFORD ARSENAL PHILADELPHIA PA

Fabrication Techniques for Fiber Optic Fire Control Elements. (U)

DESCRIPTIVE NOTE: Technical research rept.,
APR 75 34P Springfield,Ronald L. ;
REPT. NO. FA-TR-75016
PROJ: DA-6727187, DA-6737187

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Faceplates, *Surface finishing, Polishing, Fire control system components, Optical glass (U)

This report summarizes the results of a project which was conducted to establish improved manufacturing methods and procedures for the processing of fiber optic blanks (plano-plano surfaces) and fiber optic faceplates (plano convex and plano-concave surfaces). Conventional processes for polishing glass frequently produce scratches, pits, and other defects in fiber optic elements. The fiber optic elements were successfully manufactured using the described processes. (U)

AD-A021 257 1/3 17/2
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

Interim Progress Summary and Description of A-7 Aloft System. (U)

DESCRIPTIVE NOTE: Research and development rept. Mar 74-Dec 75,
JAN 76 59P Ellis,J. R. ;
REPT. NO. NELC/TR-1968
PROJ: WF41-X1, NELC-F228
TASK: WF41-X1-001

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Interequipment communication, Avionics, Multiplexing, Data transmission systems, Aircraft control cables, Aircraft equipment, Systems engineering, Connectors, Attack aircraft, Trade off analyses (U)
IDENTIFIERS: A-7 aircraft, ALOFT program (U)

The A-7 Airborne Light Optical-Fiber Technology (ALOFT) Demonstration was established to confirm that fiber-optic technology is sufficiently practical and mature to be used in internal aircraft data-signal transmissions and to demonstrate the feasibility of a full A-7 system application. Included are explanations of design tradeoffs that led to the components used in the design of the system. A description of the tests conducted by the Naval Electronics Laboratory Center upon the ALOFT components is provided with a summary of the most significant test results. Graphic and written descriptions of the ALOFT system are included. The test phases yet to be completed are summarized. The economic analysis, planned in parallel with the test phase of the project, is briefly described. A classification list of the original signals in the A-7 which have been converted from electrical to fiber-optic transmission is provided. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A020 078 9/2 17/2
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF

Experimentation and Design for a Computer to Computer Fiber Optic Data Link. (U)

DESCRIPTIVE NOTE: Master's thesis,
DEC 75 59P Blocksom,Roland Daly , Jr;

UNCLASSIFIED REPORT

DESCRIPTORS: *Microcomputers, *Data links, *Fiber optics, *Input output devices, Multiplexing, Waveforms, Interfaces, Theses (U)
IDENTIFIERS: Intel 8 microcomputer (U)

This project is a survey of current state-of-the-art techniques and describes the design and demonstration of a low speed fiber optics link between a microcomputer and remote peripheral device (ASR-33 teletype). In addition, preliminary design is included for a high speed multiplexed fiber optic link. (U)

AD-A019 898 15/3 20/6 11/1
HARRY DIAMOND LABS ADELPHI MD

Fiber Optic Seals: Glass and Plastic Fiber Optic Safing Systems for International Safeguards and Arms Control Applications. (U)

DESCRIPTIVE NOTE: Technical rept.,
NOV 75 22P Ulrich,R. R. ;
REPT. NO. HDL-TR-1729
PROJ: HDL-462543

UNCLASSIFIED REPORT

DESCRIPTORS: *Seals, Fiber optics, Arms control, Glass fibers, Plastics, Arms control, International relations, Portable equipment, Security, Identification systems, Photography, Signatures, Instrumentation (U)
IDENTIFIERS: *Security seals, *Safing systems, Tamperproof seals (U)

The Harry Diamond Laboratories has developed a tamper-resistant/tamper-indicating safing system for the U.S. Arms Control and Disarmament Agency. The safing system consists of a fiber optic seal and related equipment that assembles, photographs, and identifies the seals in the field. Such seals are needed for the effective use of containment as a safeguards technique and for the protection of unattended instruments used for surveillance at peaceful nuclear facilities. Described are both glass and plastic fiber optic seals that are reliable and simple to assemble in the field. Existing fiber optic seal inspection equipments are evaluated, and a system is proposed for operational use. (U)

AD-A019 859 20/6 17/2 1/3
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

A Theoretical Study of Fiberoptronics for Avionic Applications. (U)

DESCRIPTIVE NOTE: Master's thesis,
DEC 75 118P Gaffney,William Michael ;
REPT. NO. GEO/PH/75-10

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Optical communications, *Avionics, Laser communications, Optical waveguides, Semiconductor devices, Light emitting diodes, Lamps, Light transmission, Optical detectors, Aircraft equipment, State of the art, Multiplexing, Theses (U)
IDENTIFIERS: Optical data processing, Design (U)

This project provides a survey of the current state-of-the-art and considers fiberoptronics in the light of potential avionic applications. Types of fibers, light generators, and light detectors which are suitable for avionic applications are discussed. Fiberoptronic links are viable for use in highly selective areas such as multiplexed data bus and cryptographic systems but components need to be qualified to the environmental conditions of the aircraft. Calculations for a basic fiberoptronic link are discussed. The report contains a 42-item bibliography. (U)

AD-A019 828 20/6 1/3
BUNKER-RAMO CORP BROADVIEW ILL AMPHENOL CONNECTOR DIV

Connectors for Fiber Optics Cable Systems. (U)

DESCRIPTIVE NOTE: Final technical rept. 30 Jun 73-15 May 74,
SEP 75 45P Anderson,Norman R. ;
CONTRACT: N00163-73-C-0530
MONITOR: NAFI TR-2031

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Connectors, Cables, Sealed systems, Light emitting diodes, Military requirements, Aircraft equipment, Heat transfer, Assembly, Data transmission systems, Prototypes (U)
IDENTIFIERS: Design (U)

This report describes the design, development, and manufacture of prototype Optoelectronic Connectors which were developed for the Naval Avionics Facility in Indianapolis, Indiana. The connectors mate with standard Military approved receptacles and have their optical interface located within the contact assemblies of the Optoelectronic plug connector. These connectors are environmentally sealed and are intended to operate in environments with ambient temperatures as high as 125C. The connectors have been designed to minimize the temperature rise caused by heat generated within the connectors by light emitting diodes. The Fiber Optics Connectors described in this report achieve a high degree of interchangeability with standard MS components, are designed for ease of field serviceability, and are rugged in nature to permit them to function reliably in Military aircraft and other comparable environments. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A019 429 9/1 17/2 20/6 1/3
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

Eight-Terminal, Bidirectional, Fiber Optic Trunk Data Bus. (U)

DESCRIPTIVE NOTE: Final rept. Jul 74-Jun 75,
NOV 75 45P Altman,Daniel E. ;
REPT. NO. NELC/TR-1969
PROJ: RF54-545, NELC-F222
TASK: RF54-545-002

UNCLASSIFIED REPORT

DESCRIPTORS: *Bus conductors, *Fiber optics transmission lines, Fiber optics, Data transmission systems, Couplers, Aircraft equipment (U)
IDENTIFIERS: Megabits (U)

Extension of a previously demonstrated fiber optic data transmission system to eight terminals and bidirectional operation is demonstrated to be within the state of the art. At a 5MB/s data rate a worst-case SNR of 5 dB was demonstrated. Improved optical couplers comprising a dual internal mirror mixing block mounted in a low-loss, all-metal holder and integral electronics are described. (U)

AD-A019 379 20/6 1/3
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF

An Approach to the Estimation of Life Cycle Costs of a Fiber-Optic Application in Military Aircraft. (U)

DESCRIPTIVE NOTE: Master's thesis, SEP 75 163P McGrath,Jonn Michael ; Michna,Kenneth Ralph ;

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Optical materials, *Life cycle costs, Military aircraft, Signal processing, Cables, Optical waveguides, Light emitting diodes, Cost effectiveness, Waveguide couplers, Optical glass, Economic analysis, Delphi techniques, Forecasting, Theses, Attack bombers, Jet bombers, Avionics (U)
IDENTIFIERS: Optical fibers, ALOFT program, A-7E aircraft, A-7 aircraft (U)

As significant technological advances in fiber optics and optical data transmission methods are being made, it is necessary to develop appropriate methods for estimating life cycle costs for alternative coaxial/twisted pair wire and optical fiber avionics. Measures of effectiveness are suggested for each alternative system. An approach, which structures the technological and demand uncertainties of fiber optics, is developed through scenarios as a means of relating cost and effectiveness. It is suggested that Delphi and experience curve techniques be used in conjunction with ordered scenarios as a technological forecasting technique for estimation of life cycle costs of fiber optics. In addition, a review of the historical and technological background of fiber optics and their application to the Naval Electronics Laboratory Center (NELC) A-7 Airborne Light Optical Fiber Technology (ALOFT) Program is included. (U)

AD-A018 898 20/6 17/2
HARRIS CORP MELBOURNE FLA ELECTRONIC SYSTEMS DIV

Fiber Optics Commun.cations Link Study. (U)

DESCRIPTIVE NOTE: Final rept. 2 Jan-30 Jul 75, NOV 75 70P Slayton,I. B. ;Pan,J. J. ;Casper,P. W. ;Buchanan,G. L. ;
CONTRACT: F30602-75-C-0087
PROJ: AF-61101F

UNCLASSIFIED REPORT

DESCRIPTORS: *Optical detection, *Fiber optics transmission lines, Cables, Balloons, Optical communications, Optical waveguides, Glass fibers, Connectors, Light em.tting diodes, Integrated circuits, Transmitters, Receivers, Electrooptics, Microwave equipment, Avalanche diodes, Band pass filters, Delay lines, Tethering, Costs, Comparison, Tactical communications, Photodiodes, Data transmission systems, Air Force (U)
IDENTIFIERS: Seek skyhook program, Design (U)

This final report documents the results of a six month program of study which was conducted to establish and evaluate the merits of us:ng fiber optic cables for transmitting sensor data from balloon deployed observation platforms to ground based monitoring stations. The baseline system application analyzed, for the purposes of this study, was the RADAR command and data links associated with the SEEK SKYHOOK program. To establish the advantages of applying fiber optics technology to such an application, a complete optical cable system was designed and compared with the presently deployed microwave communications link, based on cost and performance. Specif.c elements designed as part of the study included an integrated fiber cable and balloon tether, opt.cal transmitter and receiver, and the electro-optical hardware for interfacing with the existing ground and balloon based equipment. (U)

AD-A018 757 20/6 9/1 17/2
RCA LABS PRINCETON N J

High-Speed Light-Emitting Diodes. (U)

DESCRIPTIVE NOTE: Final rept. (Vol. 1), 1 Apr 73-30 May 75,
JUN 75 65P Ettenberg,Michael ;Wittke, James P. ;Kressel,Henry ;
REPT. NO. PRRL-75-CR-37
CONTRACT: N00014-73-C-0335

UNCLASSIFIED REPORT

DESCRIPTORS: *Light emitting diodes, *Optical communications, *Fiber optics, Photodiodes, Optical waveguides, Waveguide couplers, Frequency modulation, Gallium arsenides, Substrates, Epitaxial growth, Aluminum compounds, Arsenides, Doping, Heterojunctions (U)
IDENTIFIERS: Optical modulation, Liquid phase epitaxy, Aluminum arsenides (U)

This report describes the experimental and theoretical results of a program for the development of light-emitting diodes specifically designed for fiber-optic communications. Among the important achievements are the development of a diode capable of efficient operation at modulation frequencies in excess of 200 MHz, and the realization of a novel edge-emitting structure (the REED) which combines the efficiency of the surface-emitting diode with the narrow emission beam width of the edge emitter desirable for coupling into low numerical aperture (NA) fibers. One of the most important results discovered is the strong effect that adding Al to the GaAs in the recombination region has on improving the resistance to gradual degradation. By combining this characteristic with the use of edge-passivated stripe-contact structures, diodes have been demonstrated that operate at 1000 A/sq cm and exhibit no degradation after many thousands of hours. (U)

AD-A017 720 11/5 11/2 11/9 17/2
WASHINGTON UNIV SEATTLE DEPT OF MINING METALLURGICAL AND CERAMIC ENGINEERING

Fiber Strength. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. 1 Nov 74-1 Feb 75,
MAR 75 9P Scott,William D. ;
Achutaramayya,G. ;
CONTRACT: N00123-73-C-1200

UNCLASSIFIED REPORT

DESCRIPTORS: *Glass fibers, *Fiber optics, Strength(General), Sizes(Dimensions), Silica glass, Fibers, Drawing(Forming), Polyethylene, Plastic coatings, Tensile strength, Composite materials (U)

High strength optical fibers communication system construction. This report summarizes an effort to increase fiber strength by coating (sizing) with polymers which reduce surface damage. The polyethylene coating investigated increased the strength of fused silica fibers from 143 MN/sq to 3440 MN/sq for short gage lengths. (Author) (U)

AD-A017 598 20/6 17/2
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

Integrated Optics Components - Fabrication and Testing. (U)

DESCRIPTIVE NOTE: Semiannual rept. 1 Oct 74-31 Mar 75, SEP 75 61P Pavlopoulos,T. G. ;Albares, D. J. ;
REPT. NO. NELC/TR-1964
PROJ: NELC-F215

UNCLASSIFIED REPORT

DESCRIPTORS: *Optical communications, *Fiber optics, *Optical waveguides, Switching, Interferometry, Fabrication, Diodes, Gallium arsenides, Aluminum compounds, Arsenides, Injection lasers, Semiconductor lasers, Waveguide couplers, Military requirements, Test methods, Breadboard models (U)
IDENTIFIERS: *Integrated optics, Optical modulators, Heterojunctions (U)

Integrated optics promises components which will extend the bandwidth and/or switching capabilities of fiber optics communications and provide very rapid information processing for DoD systems. The work on the program that was performed at NELC and under contracts administered by NELC was in the areas of materials for IOC substrates and devices, pattern fabrication, theoretical analysis, system concepts, and breadboard subsystem assembly. This report includes sections on Fabrication Techniques for Integrated Optical Circuits, Diode Sources for Optical Communications, GaAs-GaAlAs Double-Heterostructure Injection Lasers with Distributed Feedback, Experiments with Tapered-Channel Waveguides, Fabrication of Low-Loss Optical Waveguides by Post-Deposition Microstructure Modification, Fabrication of Tapered Waveguides, Testing of University of Washington Tapered Waveguides, Interferometric Waveguide Switch/Modulator, and Breadboard Subsystem Testing. (U)

AD-A016 846 20/6 17/2
HARRIS CORP MELBOURNE FLA ELECTRONIC SYSTEMS DIV

Optical Cable Communications Study. (U)

DESCRIPTIVE NOTE: Final rept. 26 Mar 74-25 Apr 75, JUL 75 426P McDevitt,F. R. ;Slayton, I. B. ;
CONTRACT: F30602-74-C-0193
PROJ: AF-6523
TASK: 652304
MONITOR: RADC TR-75-187

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, Cables, Optical communications, Optical waveguides, Glass fibers, Connectors, Light emitting diodes, Injection lasers, Semiconductor lasers, Gas lasers, YAG lasers, Waveguide couplers, Multiplexing, Circuits, Electrooptics, Bandwidth, Signal to noise ratio, Tactical communications, Acoustooptics, Mathematical analysis, Dielectric waveguides, Photodiodes, Optical detectors, Data transmission systems, Military requirements, Computer applications, Air Force (U)
IDENTIFIERS: Design, Optical modulators, Helium neon lasers (U)

This study Final Report provides a general treatment of the design methodology for applying fiber optics technology to Air Force communications appl.cations. The study was involved with the classification of the Air Force communications requ.rements which are suitable for optics implementation as well as the assessment of the rationale for applying fiber optics communications channels in contrast to the application of conventional cable alternatives. In parallel with this task, this study also involves the development of the analytical expressions for predicting system performance in terms of the design parameters associated with each of the constituent elements of a fiber optics link. Major elements being considered as part of this parameter translation and des.gn methodology task include the application of coherent and noncoherent optical sources, acousto-optic and electro-optic modulators, step index graded index fibers, (U)

AD-A016 633 20/5 9/1 20/6
WASHINGTON UNIV SEATTLE DEPT OF ELECTRICAL ENGINEERING

Fabrication of Linear Waveguides and Horn Shaped Coupling Structures. (U)

DESCRIPTIVE NOTE: Final rept. 15 Jul 73-14 Jul 74, DEC 75 35P Smith,Robert B. ;Dalgoutte , David G. ;Harris, J. H. ;
CONTRACT: N00123-73-C-1290

UNCLASSIFIED REPORT

DESCRIPTORS: *Waveguides, *Fiber optics, *Injection lasers, *Coupling circuits, *Fiber optics transmission lines, Structures, Transitions, Propagation, Dielectrics, Fabrication, Optics, Shape (U)
IDENTIFIERS: *Integrated optics, *Optical coupling (U)

Coupling light from fibers to film for example integrated optic structures requires coupling over some finite length for materials which do not cleave easily. Some form of distributed coupler familiar to microwave circuitry is required. In this sense distributed means coupling over some finite aperture in the direction of propagation typically hundreds or thousands of wavelengths. This report describes a method of generating efficient couplers which do not require precise control of physical parameters and hence relax the tolerances for coupler construction. This crossed-beta coupler requires phase match between the two waveguides at only one point. Typically, this coupler may be realized by two waveguides whose respective propagation constants (beta) change linearly for a short region and cross at the phase match point. Analytical solutions for coupler efficiency and physical dimension are given. (Author) (U)

AD-A016 541 6/12 6/5
BROOKE ARMY MEDICAL CENTER FORT SAM HOUSTON TEX ARMY INST OF SURGICAL RESEARCH

Fiberoptic Bronchoscopy in Acute Inhalation Injury, (U)

75 9P Hunt,John L. ;Agee,Robert N. ;Pruitt,Basil A. , Jr;

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of Trauma, v15 n8 p641-649 Aug 75.
SUPPLEMENTARY NOTE: Presented at the Annual Session of the American Association for the Surgery of Trauma (34th), 17-19 Oct 74, Hot Springs, Va.

DESCRIPTORS: *Bronch., *Fiber optics, Trauma, Inhalation, Smoke, Burns(Injuries), Mucous membranes, Optical scanning, Reprints (U)
IDENTIFIERS: *Bronchoscopy (U)

Fiberoptic bronchoscopy proved to be a simple, safe, and accurate method of diagnosing acute inhalation injury. Both the anatomic level and the severity of large airway injury were easily identified. The identification of a supraglottic and infraglottic component to inhalation injury was not only helpful in determining the appropriate therapy but also in predicting ultimate pulmonary complications. When bronchoscopy was used in conjunction with the Xe 133 scintiphotoscan, both large and small airway injuries could be identified. The only clinical situation where bronchoscopy failed to identify an inhalation injury was in the immediate postburn period if the patient was in hypovolemic shock. Yet if bronchoscopy is performed after hypovolemic shock has been corrected, mucosal changes characteristic of inhalation injury will be seen. (U)

AD-A016 301 20/6 11/2
WASHINGTON UNIV SEATTLE DEPT OF MINING METALLURGICAL AND CERAMIC ENGINEERING

Mechanical Properties of Glass Fiber Waveguides and Fabrication of Special Waveguide Shapes. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. 1 Jan-31 Mar 74 on Task 4,
APR 74 13P Mitchell,Gordon L. ;Scott, William D. ;Achutaramayya,G. ;Matsumoto,Roger L. K. ;
CONTRACT: N00123-73-C-1200

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated 28 Feb 75m AD-A016 300.

DESCRIPTORS: *Glass fibers, *Fiber optics, *Drawing(Forming), *Optical waveguides, Silica glass, Heating, Furnaces, Temperature, Mechanical properties (U)
IDENTIFIERS: Integrated optics (U)

Fiber pulling results for silica fibers with both oxi-hydrogen torches and RF suceptor furnaces are reported. Conventional clad fibers and exposed or externally mounted glass fibers have been drawn with conventional kanthol furnances. (U)

AD-A016 300 20/6 11/2
WASHINGTON UNIV SEATTLE DEPT OF MINING METALLURGICAL AND CERAMIC ENGINEERING

Fabrication of Special Waveguide Shapes and Mechanical Properties of Glass Fiber Waveguides. (U)

DESCRIPTIVE NOTE: Final rept. on Task 4, 27 Nov 73-31 Dec 74,
FEB 75 20P Scott,William D. ;
Achutatamayya,G. ;Matsumoto,Roger L. K. ;
Mitchell,Gordon L. ;
CONTRACT: N00123-73-C-1200

UNCLASSIFIED REPORT

DESCRIPTORS: *Glass fibers, *Fiber optics, *Optical waveguides, Semiconductor lasers, Waveguide couplers, Silica glass, Drawing(Forming), Fabrication, Dielectric waveguides, Tensile strength, Thin films, Polyethylene plastics, Plastic coatings, Optical communications (U)
IDENTIFIERS: Integrated optics, Borosilicate glass (U)

Special optical fibers with exposed waveguides have been constructed for coupling between fibers and (integrated optics) films. They are typically 1 x 35 micrometers rectangular on a low index supporting structure which has a 200 x 1200 micrometer cross section. These externally mounted fibers were produced by pulling microscope slides of various material in a two step process. Measured coupling efficiencies between spuddered waveguides and externally mounted fibers are 70%. Transition fibers whose core cross section tapers from a rectangular (1 x 20 micrometers) to circular (3 micrometers) in a millimeter or two length have been produced for butt joining semiconductor lasers to round waveguides. They have measured transition losses of less than 1 dB and negligible absorption/scattering loss. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A015 319 20/6 20/5 11/2
WASHINGTON UNIV SEATTLE DEPT OF ELECTRICAL ENGINEERING

Optical Coupler Development. (U)

DESCRIPTIVE NOTE: Annual rept. 1 Mar 73-28 Feb 75,
JUN 75 10P Mitchell,Gordon L. ;
CONTRACT: N00123-73-C-1200

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Semiconductor lasers, *Optical waveguides, *Waveguide couplers, Dielectric waveguides, Optical communications, Electrooptics, Lithium compounds, Tantalum compounds, Fibers, Strength(Mechanics), Fabrication, Test methods (U)
IDENTIFIERS: Integrated optics, Optical modulators, Lithium tantalates, Heterojunctions (U)

This report summarizes contract progress and optical coupler development and fiber optic strength improvement programs. Results and fabrication techniques are reported for a transition structure which varies in cross-section from rectangular (matching doubleheterostructure laser active areas) to round geometries similar to single mode fiber cross-sections. Distributed couplers for use with electro-optic modulators produced on substrates which do not cleave easily are also discussed. Preliminary results of long-gauge length fiber strength testing and strength improvement are summarized and lithium tantalate post-deposition microstructure modification results are presented. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A015 318 20/6 20/5
WASHINGTON UNIV SEATTLE DEPT OF ELECTRICAL ENGINEERING

Laser-Waveguide Transition Coupling Structure Fabrication. (U)

DESCRIPTIVE NOTE: Task progress rept. 3 Sep 74-3 Mar 75,
APR 75 51P Matsumoto,Roger L. K. ;
Mitchell,Gordon L. ;
CONTRACT: N00123-73-C-1200

UNCLASSIFIED REPORT

DESCRIPTORS: *Semiconductor lasers, *Optical waveguides, *Waveguide couplers, *Fiber optics, Injection lasers, Dielectric waveguides, Optical communications, Light transmission, Light scattering, Gallium arsenide lasers (U)
IDENTIFIERS: Heterojunctions, Integrated optics, Optical modulators (U)

This report describes the techniques used to fabricate transition structures for coupling heterjunction lasers to II-VI waveguides. The process uses a local heat source to round the core of a rectangular dielectric waveguide producing a smooth transition from a rectangular crossection matching the 1 x 20 micrometer laser output to a round crossection similar to a diffused waveguide. When it is rounded, the transition retains the rectangular guide area, e.g., 1 x 20 micrometers, will round to 5 micrometers. If a smaller diameter is desired, the transition can be tapered during the rounding operation. Total transition loss from scattering, absorption and radiation is typically 1 dB. (U)

AD-A015 017 17/2 20/6
CORNING GLASS WORKS N Y

Research and Development on Ultra-Light-Weight Low-Loss Optical Fiber Communication Cable. (U)

DESCRIPTIVE NOTE: Final rept. 1 Jul 73-1 May 75, JUL 75 85P Frazier,J. F. ;Miller,R. A. ;
CONTRACT: DAAB07-73-C-0348
PROJ: DA-1-S-762705-AH-94
MONITOR: ECOM 73-0348-F

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, Cables, Optical communications, Optical waveguides, Tactical communications, Buffers, Ruggedized equipment (U)

An ultra-lightweight, low-loss optical waveguide communication cable was developed for tactical field army applications. The cable which resulted from this work was an all-dielectric structure, 5 mm (millimeters) in diameter, with an average waveguide attenuation of 7 dB/km (kilometer) at 820 nm (nanometers). It weighed 22 kg/km (kilograms/kilometer) and the waveguides were easily accessible for termination purposes. Evaluation of this cable in terms of its optical, tensile, impact, twist, bend, vibration, moisture resistant and temperature properties shows that, with the exception of impact strength, it meets all the guideline requirements. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A014 655 14/2
UTAH UNIV SALT LAKE CITY

Liquid Crystal Fiberoptic Temperature Probe. (U)

DESCRIPTIVE NOTE: Final rept. 1 Mar 74-28 Feb 75, JUN 75 20P Durney,Carl H. ;Johnson, Curtis C. ;Lords,James L. ;
CONTRACT: N00014-67-A-0325-0011

UNCLASSIFIED REPORT

DESCRIPTORS: *Temperature measuring instruments, Liquid crystals, Fiber optics, Probes, Detectors (U)

The design, construction and testing details of a liquid crystal fiberoptic temperature probe are described. A liquid crystal sensor is attached to the distal tip of a fiberoptic probe. Pulsed light from a red LED illuminates the liquid crystal sensor through the fiberoptics and reflected red light which is strongly temperature dependent is collected. An electronic system provides all the necessary electro-optic components for the unit, including a temperature readout. Probe response data shows sensitivity, stability, hysteresis and reproducibility. A modification of the liquid crystal sensor using a thin coating of resistive material attached to the sensor tip is described by measuring electric field strength in tissues. (U)

AD-A013 786 20/6 18/8
AIR FORCE CAMBRIDGE RESEARCH LABS HANSCOM AFB MASS

Radiation Effects on Fiber Optics. (U)

DESCRIPTIVE NOTE: Physical sciences research papers (Final),
APR 75 54P Wall,James A. ;Bryant,John F. ;
REPT. NO. AFCRL-PSRP-627, AFCRL-TR-75-0190
PROJ: ILIR-3E-01

UNCLASSIFIED REPORT

DESCRIPTORS: *Optical materials, *Fiber optics, *Radiation effects, Optical communications, Glass fibers, Cesium, Doping, Transient radiation effects, X rays, Light transmission, Germanium, Fused silica, Plastics, Fluorescence, Neutron irradiation (U)

Samples representative of most of the optical fibers presently available in lengths of 10 m or more were tested for their responses to energetic radiation. Glass fibers doped with three different levels of cesium were also prepared and tested. Permanent and transient x-radiation effects tests were performed. Neutron effects tests were performed. All of the fibers tested showed decreases in transmission when exposed to radiation. All of the fibers emitted fluorescent light pulses when exposed to intense x-ray pulses. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMO7

AD-A013 221 14/1 9/1 20/6
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

A-7 ALOFT Economic Analysis Development Concept. (U)

DESCRIPTIVE NOTE: Technical document,
JUL 75 70P Ellis,J. R. ;Greenwell,R. A. ;
REPT. NO. NELC/TD-435
PROJ: WF41-X1, NELC-F228
TASK: WF41-X1-001

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Avionics, *Cost analysis, *Cost effectiveness, Fiber optics, Economics, Life cycles, Light emitting diodes, Photodetectors, Attack bombers, Jet bombers, Digital systems, Signals, Multiplexing, Data transmission systems, Transmission lines, Electric cables, Interfaces (U)
IDENTIFIERS: A-7 aircraft, ALOFT project, ALOFT(Avionics light optical fiber technology), Avionics light optical fiber technology, Economic analysis (U)

The economic analysis plan will establish the costs and benefits of applying future fiber optic technology to avionic cabling. Component descriptions, interface requirements, and the signal list for the A-7 (ALOFT) system are included to provide the necessary background to perform the economic analysis. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A013 193 17/2 1/3
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

A-7 Aloft Demonstration. Master Test Plan, (U)

JUL 75 18P Harder,R. D. ;
REPT. NO. NELC/TD-438
PROJ: NELC-F228

UNCLASSIFIED REPORT

DESCRIPTORS: *Data transmission systems, *Fiber optics transmission lines, Fiber optics, Attack aircraft, Multiplexing, Avionics, Airborne, Planning (U)
IDENTIFIERS: A-7 aircraft, ALOFT(Airborne Light Optical Fiber Technology), Airborne light optical fiber technology (U)

The A-7 ALOFT (Airborne Light Optical Fiber Technology) demonstration was organized to display the advantages of fiber optics over conventional technologies in short, point-to-point applications generally; and to confirm the feasibility of using fiber optics specifically for internal information transfer in weapon systems. A multiplexed E-O interface will replace certain wire transmission channels in the navigation/weapons delivery system (N/WDS) of an A-7 aircraft. This document outlines the test efforts required in order to provide complete integration of the demonstration hardware into the A-7 N/WDS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A012 546 17/2 1/3
CONTROL DATA CORP SAN DIEGO CALIF

Program Management Plan. A-7 Aloft. (U)

SEP 74 139P
CONTRACT: N00123-73-C-0141
MONITOR: NELC TD-369

UNCLASSIFIED REPORT

DESCRIPTORS: *Data transmission systems, *Fiber optics transmission lines, Avionics, Fiber optics, Data links, Multiplexing, Optical communications, Attack aircraft, Management planning and control, Feasibility studies (U)
IDENTIFIERS: A-7 ALOFT program, A-7 aircraft (U)

The purpose of the plan is to outline the tasks to be accomplished and the approach for control and management of a feasibility demonstration which will develop, test and evaluate a fiber optic information transfer system using the avionics in the A-7 Navigation/Weapons Deliver System (N/WDS) as the project test bed. The plan presents the development scope and work requirements; it also provides management aids to control key aspects of this project; specifically, tasks and task assignments, schedules, milestones, and costs. (U)

AD-A010 356 9/1 20/6 17/2
SPECTRONICS INC RICHARDSON TEX

Fiber Optic Led. (U)

DESCRIPTIVE NOTE: Final technical rept.,
MAR 75 56P Speer,R. S. ;
CONTRACT: N00123-74-C-2024

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Light emitting diodes, *Gallium arsenides, Data transmission systems, Aluminum compounds, Arsenides, Silicon, Doping, Coupling circuits, Optical equipment, Digital computers, Military applications, Optical communications, Electrooptics, Life tests, Integrated circuits (U)
IDENTIFIERS: *Aluminum arsenides, Integrated optics (U)

This report deals with the electrical, optical and mechanical characteristics of a fiber optic GaAlAs LED developed for the US Navy, Naval Electronics Laboratory Center, San Diego, California. The developed LED is optimized for coupling to 45 mil diameter conventional multimode fiber bundles. Coupling efficiencies to commercial fiber bundles are calculated and compared to experimental results. Life test results on these new LEDs are also presented. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A005 635 20/6 20/2
LITTLE (ARTHUR D) INC CAMBRIDGE MASS

Growth and Characterization of Optical Waveguides for 10.6 micrometer Light. (U)

DESCRIPTIVE NOTE: Annual technical rept. 1 Feb 73-30 Jun 74,
JAN 75 30P Haggerty,John S. ;Robbins, William L. ;
REPT. NO. ADL-C-75519
CONTRACT: N00014-73-C-0263, ARPA Order-2327

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Optical waveguides, *Germanium, *Crystal growth, Fibers, Infrared lasers, Carbon dioxide lasers, Single crystals, Zone melting, Light transmission, Wave propagation, Optical properties, Attenuation, Heating, Laser beams (U)
IDENTIFIERS: Laser heating (U)

The growth and subsequent optical characterization of single crystal Ge fibers for transmission at 10.6 micrometers is described. Single crystal Ge fibers 0.007 to 0.020 inch in diameter were grown by a laser-heated floating zone technique. The technique was shown to be effective for producing optical quality fibers with absorption coefficients as low as 0.06/cm, or 0.26 db/cm at 10.6 micrometers. (U)

AD-A004 019 20/6 17/2
ILLINOIS UNIV URBANA ELECTROMAGNETICS LAB

Excitation of an Optical Fiber by a Gaussian Beam. (U)

DESCRIPTIVE NOTE: Technical rept., DEC 74 81P Mostafavi,Masoud ;Itoh, Tatsuo ;Mittra,Raj ;
REPT. NO. UIEL-74-16, UILU-ENG-74-2559
CONTRACT: DAHC04-74-G-0113
MONITOR: ARO 12049.4-EL

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Laser beams, *Light transmission, Optical waveguides, Electromagnetic fields, Eigenvectors, Wave equations, Excitatio (U)

The problem of excitation of an optical fiber at normal incidence by a Gaussian beam is investigated. The authors have investigated two cases: (1) Neglecting the reflection from the end of the fiber, the guided modal powers and the radiated power are calculated. For the case of a truncated plane wave normally incident at the end of the rod, the modal powers are calculated and the results are compared with those of other authors using asymptotic analysis. Satisfactory agreement is found between the two. (2) The contribution of the reflection from the end of the rod is included in the analysis and the simultaneous set of equations obtained is solved numerically for the reflected, guided and radiated modal coefficients and their corresponding powers. The results, which were found to conform with the previous case, are considered satisfactory. (U)

AD-A003 994 17/2 20/6
ARMY COMMUNICATIONS COMMAND FORT HUACHUCA ARIZ ADVANCED CONCEPTS OFFICE

Design Curves for Optical Waveguide Digital Communication Systems. (U)

DESCRIPTIVE NOTE: Technical rept., DEC 74 177P Gallawa,R. L. ;
REPT. NO. ACC-ACO-12-74
PROJ: ACC-408-74

UNCLASSIFIED REPORT

DESCRIPTORS: *Optical communications, *Fiber optics, Coherent radiation, Light transmission, Light emitting diodes, Optical detectors, Noise(Sound), Optical waveguides, Graphs, Costs, Pulse rate, Military requirements (U)
IDENTIFIERS: Design, Optical modulators (U)

This report contains a series of curves intended to assist the communicator in specifying an optical waveguide digital communication system. The important parameters considered are pulse rate, distance between repeaters and cost. The parameters selected to present specific data are realistic, albeit arbitrary. Both the single mode and multimode fibers are considered; the latter category includes both the step-index and graded-index fibers. Discussion and curves are given to show the transition from dispersion-limited to detector-noise-limited operation. A measure of cost is defined to assist the communicator in specifying values of pulse rate if cost is, in fact, a design parameter. (U)

AD-A002 249 9/1 17/2 17/1
NAVAL UNDERSEA CENTER SAN DIEGO CALIF

Fiber Optic Towed Array. (U)

DESCRIPTIVE NOTE: Research and development rept. Feb 71-Jan 74,
OCT 74 43P Refern,John ;Taylor,Henry ; Eastley,Richard ;Albares,Donald ;
REPT. NO. NUC-TP-414
PROJ: ZF61-212
MONITOR: GIDEP 347.45.00.00-Y3-08

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Towed arrays, Acoustic arrays, Digital systems, Data transmission systems, Towing cables, Bundles, Cables, Fiber optics, Underwater equipment, Errors, Connectors, Multiplexing (U)

The paper describes development of optical signal multiplexing, transmitting, and receiving systems and the difficulties met in attempting to fabricate a fiber optic cable offering low attenutation over lengths of several hundred meters. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD-A002 222 17/2 9/1
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

Fiber Optics Data Bus System (Presents Current State of the Art in the Suitability of Fiber Optics for Multiterminal Data Communications). (U)

DESCRIPTIVE NOTE: Annual technical rept. Feb 73-Aug 74,
AUG 74 28P Taylor,H. F. ;Caton,W. M. ;Lewis,A. L. ;
REPT. NO. NELC/TR-1930
PROJ: RF54-545, NR-288-001
TASK: RF54-545-102

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: *Fiber optics transmission lines, *Bus conductors, *Data transmission systems, Fiber optics, Multiplexing, Optical data, Optical equipment, Couplers, Receivers, Aircraft equipment (U)

Progress is described towards realization of a multiterminal fiber optics data bus capable of handling the information flow requirements of a modern military aircraft. Major accomplishments include development of novel access couplers containing a glass block with an internal mirror, and sensitive optical receivers using a field-effect transistor to amplify the integrated current output from a silicon photodiode. A five-terminal, unidirectional data bus system designed for 5 Mb/s operation was successfully demonstrated. (U)

AD-A001 703 20/6 20/12 18/8
NAVAL RESEARCH LAB WASHINGTON D C

Radiation Effects in Fiber Optic Waveguides. (U)

DESCRIPTIVE NOTE: Final rept., NOV 74 93P Sigel,G. H. , Jr.;Evans, B. D. ;Ginther,R. J. ;Friebele,E. J. ; Griscom,D. L. ;
REPT. NO. NRL-MR-2934
PROJ: NRL-64P03-11, RR022-06
TASK: RR022-06-01

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Optical waveguides, *Radiation effects, Glass, Light emitting diodes, Silicon dioxide, Doping (U)

A comprehensive review is presented on the effects of ionizing radiation on the performance of fiber optic cables, and on the materials used for fabrication of optical fibers. This includes a summary of the permanent and transient radiation-induced losses in optical transmission of state of the art fibers, a detailed discussion of the mechanisms responsible for the losses observed, and a report on innouse materials development to achieve radiation hardened fiber optic glasses. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 922 892 20/6 17/2
CORNING GLASS WORKS N Y

Research and Development on Ultra-Lightweight Low-Loss Optical Fiber Communication Cable. (U)

DESCRIPTIVE NOTE: Interim rept. 1 Jul 73-30 Jun 74, SEP 74 49P Frazier,J. F. ;Miller,R. A. ;
CONTRACT: DAAB07-73-C-0348
PROJ: DA-1-S-762705-A-149
TASK: 1-S-762705-A-1494
MONITOR: ECOM 73-0348-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*Fiber optics transmission lines, Lightweight), Glass, Fibers, Organic coatings, Polyurethane resins, Solutions(General), Powders, Electrostatics, Extrusion, Ruggedized equipment, Broadband, Optical communications, Tactical communications, Fiber optics, Losses (U)
IDENTIFIERS: *Optical cables, Optical waveguides, Kynar, Kelvar, Low losses (U)

This interim report describes the initial phases of the investi-gation to provide ultra-lightweight, low-loss optical fiber communication cables for tactical field army environments. Initial efforts to use low- loss optical waveguides in a cable structure resulted in unacceptable increased in fiber attenuation. These increased losses were attributed to micro-distortions in the low- loss fibers introduced by coatings and/or the cable structure. the program was redirected to seek a solution to this problem which would allow the use of state- of-the-art optical fibers in cable structures. Organic coatings applied by extrusion techniques to the optical fibers are a solution and have permitted cable unit structures without any significant increase in the atten-uation of the individual fibers. An approved cable unit will ultimately be incorporated in a structure designed to provide a rugged cable. (Author-PL) (U)

AD- 919 959 17/2 19/1 20/14
NAVAL WEAPONS LAB DAHLGREN VA

Multichannel Signal Conditioning Unit. (U)

DESCRIPTIVE NOTE: Technical rept.,
JUN 74 23P Caldwell,C. E. ;
REPT. NO. NWL-TR-3111
PROJ: ORD-048-001/090-5/1773

UNCLASSIFIED REPORT

DESCRIPTORS: (*Optical communications, Telemetering data), (*Fiber optics, Transmitter receivers), (*Multichannel communications, Test equipment), (*Electric detonators, Vulnerability), (*Explosives initiators, Electromagnetic compatibility), Hazards, Radiofrequency interference, Thermocouples, Instrumentation, Coding, Decoding (U)
IDENTIFIERS: Hero project, Optical signals, Bridge wires (U)

An instrumentation system composed of a transmitter, receiver, and interconnecting fiber optic light guides to be used in performing HERO tests is described herein. The function of the transmitter is to amplify four thermocouple generated signals and code them for transmission via a fiber optic light guide to a remotely located receiver. Decoding of the transmitter signal is performed in the receiver to recover the four original thermocouple signals. The system is discussed on a functional basis, with typical input/output waveforms. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 917 450 20/6 20/5 9/1 20/14
AIR FORCE AVIONICS LAB WRIGHT-PATTERSON AFB OHIO

Fiber Optics and Related Technology. (U)

DESCRIPTIVE NOTE: Technical rept. 1 Apr 72-1 Jun 73, NOV 73 155P Matulka,Donald D. ;Harris, Robert L. ;Warren,R. E. ;Wille,D. A. ;
REPT. NO. AFAL-TR-73-267-Pt-1
PROJ: AF-2001
TASK: 200104

UNCLASSIFIED REPORT

DESCRIPTORS: (*Fiber optics, Technology), Light emitting diodes, Lasers, Electromagnetic pulses, Multiplexing, Fly by wire control, Waveguides, Electromagnetic interference, Radiation effects, Damage, Interfaces, Detectors, Noise, Dielectrics, Light sources, Couplers, Injection lasers, Semiconductor diodes, Gallium arsenides, Gamma rays, Transients, Security, Semiconductor lasers, Gas lasers (U)
IDENTIFIERS: Coupling, Tempest security (U)

A study was performed to evaluate the applicability of Fiber Optics and Related Technology (FORT) to Air Force requirements, primarily in the area of connections between electrical and electronics functions in aircraft. Numerous reports and articles in professional and trade journals were examined, and many discussions were held. The results of the study clearly show that problems which could be cured or alleviated by the fiber optics approach do exist in aircraft interconnections. Many wiring problems exist because electrical interconnections cause electromagnetic interference. Optical fibers are dielectric, and therefore do not generate and are not susceptible to electromagnetic interference. Existing technology will permit use of FORT in selected point-to-point applications, but research and development is needed to extend the technology so that it can be used for a broader range of applications with high confidence. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 914 009 17/2 20/6 9/5
SPECTRONICS INC RICHARDSON TEX

Optoelectronic Data Bus. (U)

DESCRIPTIVE NOTE: Final rept. 28 Apr 72-28 Feb 73, OCT 73 108P Biard ,James R. ;Stewart, L. L. ;
CONTRACT: F33615-72-C-1911
PROJ: AF-6090
MONITOR: AFAL TR-73-271

UNCLASSIFIED REPORT

DESCRIPTORS: (*DATA TRANSMISSION SYSTEMS, FIBER OPTICS), (*INTERCOMMUNICATION SYSTEMS, ELECTROOPTICS), (*INFRARED COMMUNICATIONS, AIRBORNE), INFRARED PULSES, MULTIPLEXING, DIGITAL SYSTEMS, SEMICONDUCTOR DIODES, ERRORS, ACCURACY, WEIGHT, INTERFACES, JOINTS, LENSES, ELECTRONIC EQUIPMENT, INFRARED RADIATION, GALLIUM ARSENIDES, INFRARED DETECTORS, PHOTODIODES, SILICON, RESPONSE, CLOCKS, TIME SIGNALS (U)
IDENTIFIERS: AVIONICS, LIGHT EMITTING DIODES, CROSSTALK, *OPTOELECTRONICS, DATA BUS (U)

This document is the final report of a development program concerned with the design and fabrication of a ten-channel optoelectronic data bus demonstrator. Airborne avionics systems are moving toward the use of party line multiplex data buses for the transmission of the growing number of digital signals found in modern aircraft. Optoelectronic technology provides a data bus interface system consistent with Military requirements that is potentially superior to wire techniques. The purpose of this program is the development and fabrication of an optoelectronic data bus so that its performance can be compared directly to the performance of systems using twisted pair, coaxial cable and waveguide. The optoelectronic data bus developed on this program uses GaAs light emitting diodes (LEDs), flexible fiber optic bundles, and silicon photodiodes. The report emphasizes the design approach and characteristics of the critical electrical and optical interfaces associated with the LED and photodiode. Overall system rationale and circuit description are also presented. Overall system rationale and circuit description are also presented. The system features ten (10) parallel data transmission channels. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 910 760 20/6 17/2
SPECTRONICS INC RICHARDSON TEX

Optoelectronic Aspects of Avionic Systems. (U)

DESCRIPTIVE NOTE: Final rept. 17 Dec 71-17 Oct 72, JUN 73 161P Biard,James R. ;
CONTRACT: F33615-72-C-1565
PROJ: AF-6090
MONITOR: AFAL TR-73-164

UNCLASSIFIED REPORT

DESCRIPTORS: (*ELECTROOPTICS, *ELECTRON OPTICS), (*DATA TRANSMISSION SYSTEMS, ELECTROOPTICS), (*PHOTODIODES, *FIBER OPTICS), LASERS, INFRARED DETECTORS, MULTIPLEXING, PREAMPLIFIERS, AVALANCHE DIODES, ANALOG SYSTEMS, DIGITAL SYSTEMS, INTERFACES, ATTENUATION, MATCHED FILTERS, EFFICIENCY, SILICON, NIGHT VISION, AIRBORNE, OPTICAL EQUIPMENT (U)
IDENTIFIERS: *AVIONICS, *LIGHT EMITTING DIODES, *OPTOELECTRONICS (U)

This document is the final report of an initial study of the optoelectronic aspects of avionic systems. Airborne avionics systems are moving toward the use of party line multiplex data buses for the transmission of the growing number of digital signals found in modern aircraft. Optoelectronic technology provides a data bus interface system consistent with military requirements that is potentially far superior to wire techniques. The optoelectronic interface is also useful for point-to-point transmission of wide-band analog and digital signals that are not included in the multiplexed data bus system. The primary objective of this program is to study coherent and non-coherent optical components, devices and techniques to determine their applicability to a flexible high-speed data bus. This initial study has emphasized detailed investigation of specific topics within the subject area and has not attempted to treat all aspects of the total problem. Optoelectronic data transmission is based on the use of multimode, low-loss fiber optic bundles with non-coherent light emitting diodes (LEDs) and silicon photodetectors. Analysis and characterization of the individual components are presented along with a description of the physical organization of an optoelectronic data bus. (U)

AD- 903 811 20/5
TEXAS INSTRUMENTS INC DALLAS SEMICONDUCTOR GROUP

Modularized Fiber-Optic-Coupled Laser Arrays. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 1, APR 72 38P Doerbeck,Friedrich H. ;Carr, David L. ;
REPT. NO. TI-03-72-50
CONTRACT: DAAK02-72-C-0173

UNCLASSIFIED REPORT

DESCRIPTORS: (*LASERS, *FIBER OPTICS), SEMICONDUCTOR DEVICES, SEMICONDUCTOR DIODES, ALIGNMENT, COUPLING CIRCUITS, GALLIUM ARSENIDES, EPITAXIAL GROWTH, ALUMINUM, DESIGN, EFFICIENCY, TEMPERATURE, ILLUMINATION (U)
IDENTIFIERS: *INJECTION LASERS, RIBBONS, ROOM TEMPERATURE LASERS (U)

Equipment was built to align fiber optical ribbons in front of the emitting facet of close-confinement lasers. Typically, 70% of the laser power was transmitted through the fiber with an air gap between laser and fiber: approximately 100% was obtained when the gap was filled with an epoxy. Beam-angle data are presented, indicating that a power loss of 30% should be expected for a beam angle of 15 deg cone half-angle (an aperture of f/1.8). First LOC lasers emit into a cone angle too wide (60 to 90 deg) for array applications. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 903 446 20/6 17/2
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

Independent Research and Independent Exploratory Development. (U)

DESCRIPTIVE NOTE: Annual rept. fiscal year 1972. SEP 72 68P
REPT. NO. NELC-TD-194

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color plates: All DDC reproductions will be in black and white.

DESCRIPTORS: (*OPTICS, INTEGRATED SYSTEMS), (*OPTICAL COMMUNICATIONS, FIBER OPTICS), (*LUMINESCENCE, MATERIALS), SCIENTIFIC RESEARCH, WAVEGUIDES, SUBSTRATES, CATHODE RAY TUBES, PHOSPHORESCENT MATERIALS, DIGITAL SYSTEMS, INTEGRATED CIRCUITS, LASERS, CRYSTALS, SONAR, ACOUSTICS, THERMAL RADIATION, PHOTOCATHODES, DISPLAY SYSTEMS, REAL TIME, DATA PROCESSING, MEMORY DEVICES (U)
IDENTIFIERS: CHARGE COUPLED DEVICES, LARGE SCALE INTEGRATION, LIQUID CRYSTALS, METAL OXIDE SEMICONDUCTORS, METAL NITRIDE OXIDE SEMICONDUCTORS, NATURAL LANGUAGE, RAMAN LASERS, ACOUSTIC EQUIPMENT, SURFACE WAVES, WALSH FUNCTIONS (U)

This document is an overview of the NELC IR and IED programs. It summarizes the accomplishments achieved within each project in FY 72. Longer articles are presented on three of the most significant projects-integrated optical circuits, fiber optics communications, and luminescent and electronic materials. (Author) (U)

AD- 881 276 20/6
AMERICAN OPTICAL CORP SOUTHBRIDGE MASS

Exploratory Development of Improved Optical Fiber Bundles. (U)

DESCRIPTIVE NOTE: Final rept. 1 Mar 69-30 Jun 70,
JAN 71 80P Hopkins,Ethan C. ;Siegmund, Walter P. ;Cole,Henry B. ;
CONTRACT: F33615-69-C-1391
PROJ: AF-7320
TASK: 732001
MONITOR: AFML TR-70-279

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIBER OPTICS, MANUFACTURING), (*OPTICAL GLASS, LIGHT TRANSMISSION), TEST METHODS, OPTICAL PROPERTIES (U)

This report discusses exploratory development on materials and techniques to improve glass optical fibers and fiber bundles with particular reference to coherent multifiber fiberscopes. Studies were carried out on improved interface formation, end tip fusing, experimental fiber drawing techniques and evaluation of various component glass, clad rods and fibers. Two basically different approaches to improving core-cladding interface were explored: the use of low melting fluxes with the rod and tube method, and the use of a double crucible to completely melt the core and cladding glasses before drawing. Neither approach provided significantly better interface quality in the resulting clad rods. A method was developed for fusing the end tips of coherent fiberscope bundles. Good results were achieved in bundle size up to 3 x 3mm in cross section but considerable difficulty was encountered when the bundle size was increased to 10 x 10mm. A number of different glass combinations were selected and drawn into clad rods and fibers in a search for improved transmission efficiency. It was concluded that the properties of commercially available glasses presently limit the fiber transmission and that glasses with improved bulk transmittance must be formulated if improved fibers are to be realized. (Author-PL) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 876 995 17/1 20/6 9/2
NAVAL UNDERWATER SYSTEMS CENTER NEW LONDON CONN NEW LONDON LAB

Signal Processing by Fiber Optical Modeling of an Acoustic Array, (U)

SEP 70 29P Green,Eugene L. ;Smith, Luther W. ;Snitzer,Elias ;
REPT. NO. NUSC/NL-3025
PROJ: NUSL-A-035-00-00, ZF20-112-001

UNCLASSIFIED REPORT

DESCRIPTORS: (*SONAR ARRAYS, DATA PROCESSING), (*FIBER OPTICS, MODELS(SIMULATIONS)), HYDROPHONES, DIELECTRICS, WAVEGUIDES, NARROWBAND, ANALOG COMPUTERS (U)
IDENTIFIERS: *ACOUSTIC ARRAYS, FOURIER TRANSFORMATION, *SIGNAL PROCESSING (U)

The concept of optical modeling of acoustic arrays for the purpose of performing Fourier transform signal processing is developed. An optical model is an array of light-emitting elements, usually similar in geometry to an acoustic array, that facilitates reconstruction of a sound field with coherent light. Dielectric waveguides, glass fibers that transmit light signals preserving phase and amplitude, are essential elements in a two-stage processor for a planar array. This processor performs frequency analyses on all hydrophone channels and then, sequentially as a function of frequency, it performs two-dimensional space transforms. In the processor for the planar array, the dielectric waveguide fibers rearrange light signals representing frequency-analyzed hydrophone signals into an optical model of the array. Modeling of certain three-dimensional arrays also may be possible with fibers. A 10-element line array of dielectric waveguides has been constructed to show that a significant number of fibers can be controlled in relative phase. Control of both phase and amplitude in a dielectric waveguide fiber also has been demonstrated. This report suggest the potential inherent in optical Fourier methods that are being developed to provide a basis for the design and construction of new processors for sonar. (Author) (U)

AD- 869 699 20/6
DATA CORP DAYTON OHIO

Optical Fiber Image Evaluation Studies. (U)

DESCRIPTIVE NOTE: Technical rept. 23 Apr 68-28 Feb 69, APR 70 32P Desautels,John E. ;Williams, Arnold C. ;Sanr,Louis E. ;
REPT. NO. DTR-70-4
CONTRACT: F33615-68-C-1625
PROJ: AF-7360
TASK: 736001
MONITOR: AFML TR-70-62

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIBER OPTICS, *OPTICAL IMAGES), DIGITAL SYSTEMS, RESOLUTION, LIGHT TRANSMISSION, DISTORTION, PHOTOGRAPHIC IMAGES (U)

Photographic studies of the imaging properties of multiple fibers were conducted utilizing a point target array. Photographic negatives of the target and image arrays are scanned with a microdensitometer, reducing the images to digital data. The digital data are analyzed on a computer. The output of the programs consists of a map of the error vectors between the positions of the target points and image points, yielding displacement, and various average point spread functions. The error map provides a map of the transmission pattern from which average point spread function maps are derived. The derived average point spread functions of the image are anisotropic due to the fiber patterns and this anistropy is displayed in a three-dimensional projection. With the exception of the standard deviation measure of distortion, no single number result for fiber optic imaging properties has been developed. However, the techniques developed will provide a quantitative measure of point displacement and will provide a statistical analysis of point spread functions. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 867 695 17/2 20/6
AUTONETICS ANAHEIM CALIF

Wideband Fiberoptic Analog Information Link, (U)

SEP 69 20P Churchill,R. A. ;Avicola, K. ;
REPT. NO. X9-1130/601
MONITOR: IDEP 817.60.00.00-C1-02

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at International Telemetering Conference, Washington, D. C. 15-17 Sep 69.

DESCRIPTORS: (*DATA TRANSMISSION SYSTEMS, OPTICAL COMMUNICATIONS), (*OPTICAL COMMUNICATIONS, *FIBER OPTICS), BROADBAND, GALLIUM ARSENIDES, SEMICONDUCTOR DIODES, CRYOGENICS, ANALOG SYSTEMS (U)

A high frequency data transmission system which is unaffected by high energy electromagnetic fields is described. The system utilizes a gallium arsenide (GaAs) infrared light emitting diode as the transmitting source, a glass fiber optic light guide as the transmitting medium, and a photomultiplier tube (PMT) as the optical receiving sensor. The photomultiplier output is displayed on a real-time wideband oscilloscope where it is permanently recorded on film. The overall system concept was chosen and each major component type was evaluated for optimum performance in this application. It was determined during the feasibility phase of the program that cryogenic cooling of the GaAs diode would be necessary to obtain high frequency response and high signal to noise ratio (SNR). The described system results in a 40-ft fiber optic, analog data link with a frequency response of 80 MHz and a dynamic range of 32 db. (Author) (U)

AD- 866 951 20/6
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

New Developments in Fiber Optics, (U)

DEC 69 6P Jacobsen,Alfred ;
REPT. NO. FTD-HT-23-520-69
PROJ: FTD-7230178

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited trans. of Jemna Mechanika a Optika (Czechoslovakia) n11 p348-349 1968, by H. Peck.

DESCRIPTORS: (*FIBER OPTICS, CZECHOSLOVAKIA), LIGHT TRANSMISSION, FLEXIBLE STRUCTURES, MANUFACTURING, COSTS, ULTRAVIOLET RADIATION, MATERIALS, OPTICAL EQUIPMENT (U)
IDENTIFIERS: COLD LIGHT, TRANSLATIONS (U)

The author presents a report on new structural elements of fiber optics and indicates some possibilities of their application. The manufacturer is able to produce light conductors up to 14.5 meters long (compared to the normal 7 meter lengths) made of type B fibers. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 861 175 20/6 9/1
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Fiber Optics for Optical Electron Tubes, (U)

FEB 69 18P Janousek,Ladislav ;
REPT. NO. FTD-HT-23-1235-68

UNCLASSIFIED REPORT
Availability: Microfiche copies only.
SUPPLEMENTARY NOTE: Edited trans. of Sdelovaci Technika (Czechoslovakia) n12 p453-456 1967, by H. Peck.

DESCRIPTORS: (*FIBER OPTICS, *IMAGE TUBES), RESOLUTION, PHOTOCATHODES, TELEVISION EQUIPMENT, HERMETIC SEALS, REFRACTIVE INDEX, OPTICAL GLASS, CZECHOSLOVAKIA (U)
IDENTIFIERS: TRANSLATIONS (U)

It is to be assumed that in the years to come fiber optics will be increasingly developed in connection with optical electron tubes. This article studies the demands on fiber optics resulting from this and defines the relationships between size of optical fiber, definition, and contrast. (U)

AD- 843 963 9/1 20/6
RCA ELECTRONIC COMPONENTS LANCASTER PA INDUSTRIAL TUBE DIV

Development of an Image Isocon with Fiber Optics Faceplate. (U)

DESCRIPTIVE NOTE: Final rept. Sep 67-Jul 68,
OCT 68 37p Musselman,E. M. ;
CONTRACT: F33615-68-C-1014
PROJ: AF-7235
MONITOR: ARL 68-0182

UNCLASSIFIED REPORT

DESCRIPTORS: (*CAMERA TUBES, *FIBER OPTICS), IMAGE INTENSIFIERS(ELECTRONICS), PHOTOCATHODES, ELECTRON GUNS, ELECTRON TUBE TARGETS, COILS, SENSITIVITY, RESPONSE(BIOLOGY), CONTROL SYSTEMS, MAGNETIC FIELDS, FOCUSING, DEFLECTION, ELECTRON BEAMS, DESIGN (U)

The uniform magnetic focus field version of the image isocon was initiated as a fresh approach to the problem of building an image isocon which could be used commercially. This contract had two objectives. The first objective was to develop a sturdy 3 in image isocon with fibre-optic faceplate which could be coupled to an image intensifier with a P20 phosphor screen. The second objective, by extension of the contract, was to provide the same tube structure with a black rise control element added to the image mount structure. This element, designed to extend the lighting range in image orthicon broadcast work, was adapted to improve the highlight handling capability of the image isocon. (Author) (U)

AD- 830 356 20/6
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

A METHOD FOR THE FAST MEASUREMENT OF THE PERMEABILITY OF GLASS FIBERS, (U)

SEP 67 9p Cabak,I. ;
REPT. NO. FTD-HT-23-694-67

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited trans. of Jemna Mechanika a Optika (Czechoslovak,a) n1 p3-4 1966, tr. by H. Peck.

DESCRIPTORS: (*FIBER OPTICS, PERMEABILITY), (*GLASS TEXTILES, PERMEABILITY), TEST METHODS, OPTICAL ANALYSIS, LIGHT TRANSMISSION, PHOTOMULTIPLIER TUBES, CZECHOSLOVAKIA (U)
IDENTIFIERS: TRANSLATIONS (U)

The article describes a method which removes the difficulties hitherto encountered in measuring the transmission of glass fibers, when laborious and lengthy grinding and polishing of the fiber front and protection against damage were necessary. In the new method the upper end of the fiber is cemented with Canada balsam on a ground glass plate, the lower end being dipped in a drop of immersion liquid in the entrance window of the multiplier. The light travels through the fiber from the source at the upper end of the fiber and the transmission is characterized by the multiplier current intensity as a function of the fiber length. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 824 489 9/1
DUMONT ELECTRON TUBES CLIFTON N J

12 IN. DIAMETER CATHODE-RAY TUBE, FIBER OPTIC FACEPLATE. (U)

DESCRIPTIVE NOTE: Final rept., Jun 64-Mar 67,
MAR 67 31P Cawein,Madison ;
CONTRACT: NObsr-91206
PROJ: SF0070501
TASK: 6030

UNCLASSIFIED REPORT

DESCRIPTORS: (*CATHODE RAY TUBES, FIBER OPTICS), (*FIBER OPTICS, *CATHODE RAY TUBE SCREENS), MANUFACTURING (U)

Two developmental models of a 12 in. diameter CRT with fiber optic face plates were fabricated. The tube type designation is KC2474P19, interchangeable electrically with the 12BCP19. Fabrication of the large fiber optic plates was time consuming. The edge fibers on both of the tubes were skewed. The first of the tubes was not useful for photographic purposes due to the vignetting produced by fiber skew. The second tube had a non-reflective glass plate 11 7/8 in. in diameter by .040 in. thick cemented to the face. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 824 045 20/6 11/5
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

MEASURING THE PERMEABILITY OF FIBERS MADE FROM ARTIFICIAL MATTER (MERENI PROPUSTNOSTI VLAKEN Z UMELYCH HMOT). (U)

DESCRIPTIVE NOTE: Unedited rough draft translation,
APR 67 12P Cabak,I. ;Martoch,A. ;
Stupkova,A. ;
REPT. NO. FTD-HT-66-442

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Jemma Mechanika a Optika (Czechoslovakia) n8 p240-243 1964, by L. Marokus.

DESCRIPTORS: (*SYNTHETIC FIBERS, PERMEABILITY), (*FIBER OPTICS, SYNTHETIC FIBERS), OPTICAL PROPERTIES, ILLUMINATION, ABSORPTION, ELECTRON OPTICS, POLYAMIDE PLASTICS, ACRYLIC RESINS, CZECHOSLOVAKIA (U)
IDENTIFIERS: TRANSLATIONS (U)

This report treats of the properties of fiber optics, its use in science and practice and the methods by which the usefulness of macromolecular matter in fiber optics has been realized. In this report the results measured on polymethyl methacrylate and polyamide fibers are compared. (Author) (U)

AD- 809 848 13/12
IIT RESEARCH INST CHICAGO ILL

ULTRAVIOLET FIBER OPTICS FOR FIRE AND EXPLOSION DETECTION. (U)

DESCRIPTIVE NOTE: Final rept. 3 Jan-30 Dec 66,
MAR 67 84P Pontarelli,D. A. ;Ching Li,Pei ;Olson,O. H. ;
CONTRACT: AF 33(615)-3446
PROJ: AF-6075
TASK: 607501
MONITOR: AFAPL TR-67-31

UNCLASSIFIED REPORT

DESCRIPTORS: (*ULTRAVIOLET DETECTORS, *FIRE ALARM SYSTEMS), (*EXPLOSIONS, ULTRAVIOLET DETECTORS), (*FIBER OPTICS, ULTRAVIOLET DETECTORS), HYPERSONIC AIRCRAFT, MAGNESIUM COMPOUNDS, FLUORIDES, LIGHT TRANSMISSION, COATINGS, QUARTZ, REFLECTION, HYPERSONIC FLIGHT, DIELECTRICS, GLASS, ATTENUATION, SILICON COMPOUNDS, POWDERS, AIRCRAFT FIRES (U)

Fiber optics bundles of lengths up to 12 1/2 feet, capable of being used in the middle ultraviolet region (200 nm to 300 nm), were fabricated. The use of Suprasil for the core material and Magnesium Fluoride (MgF2) for the cladding was adopted. Transmission of light above wavelengths of 250 nm appears feasible, but cladding and endface fusing contributed to the overall attenuation of wavelengths shorter than 250 nm. The results of this program have extended long fiber optics bundle short wavelength transmission from 370 nm to below 250 nm and now make it possible to remotely detect flames using ultraviolet sensors. Capability for use at 1000 F in the environment associated with Mach III to Mach VIII vehicles for fire and explosion detection has been established. (Author) (U)

AD- 807 413 20/6 17/5
CHICAGO AERIAL INDUSTRIES INC BARRINGTON ILL

FIBER OPTICS WITH HIGH ULTRAVIOLET TRANSMISSION. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 2, 1 Aug-31 Oct 66,
FEB 67 14P Mueller,Andrew A. ;
REPT. NO. 7521-2
CONTRACT: DA-28-043-AMC-02057(E)
PROJ: DA-1P6-22001-A-055
TASK: 1P6-22001-A-055-03
MONITOR: ECOM 02057-2

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIBER OPTICS, WAVE PROPAGATION), (*OPTICAL GLASS, *ULTRAVIOLET SPECTROSCOPY), LANTHANUM, ULTRAVIOLET RADIATION, CATHODE RAY TUBES, REFRACTION (U)

During this period the development program at Rutgers University was initiated and a series of experimental melts completed. The melts were limited to formulation variations of a lanthanum crown glass which exhibited the most promise of the six experimental melts previously evaluated. The best performance achieved was with melt A25 exhibiting 44.5 percent transmission at 370 millimicrons, expansion of 84.5 over the range of 25 C to 425 C, and an index of refraction of 1.725. A spectrograph has been constructed at CAI to permit measurement of relative transmission of the glass and fiber optic plates. Photographs of the spectrograph are included. (U)

AD- 800 818 11/2 9/1 20/6
CHICAGO AERIAL INDUSTRIES INC BARRINGTON ILL

FIBER OPTICS WITH HIGH ULTRAVIOLET TRANSMISSION. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 1, 29 Mar-31 Jul 66,
OCT 66 13P Mueller,Andrew A. ;
REPT. NO. 7521-1
CONTRACT: DA-28-043-AMC-02057(E)
PROJ: DA-1P622001A055
TASK: 1P622001A05503
MONITOR: ECOM 02057-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIBER OPTICS, ULTRAVIOLET OPTICAL MATERIALS), OPTICAL GLASS, WAVE PROPAGATION, LANTHANUM, LEAD(METAL), ALUMINUM, BORATES, SILICATES, DRAWING(FORMING), CATHODE RAY TUBES, TRANSPARENT PANELS, REFRACTIVE INDEX (U)
IDENTIFIERS: FACEPLATES (U)

Investigations were made leading to the development of an ultraviolet transmitting, high index of refraction optical glass suitable for use as a core material in the fiber optic plates and to six sample glass formulations, selected as the best possibilities for developing the glass from existing formulations. Tests were made on the six glasses to determine the fiberization and compatibility with the fiber production processes. Additional tests on the samples were performed to determine the thermal coefficient of expansion. Tests were completed and all data except that for coefficient of expansion is summarized. Appendix A contains photographs taken of the glass attenuation zones and fibers produced during single fiber draw tests. By referencing these photographs, it is possible to observe several conditions relative to the suitability of the glasses for fiberization. (U)

AD- 785 540 11/1 5/4
HARRY DIAMOND LABS WASHINGTON D C

Fiber Optic Seals: Improved Seal Assemblies and Inspection Equipment for Field Use in International Safeguards and Arms Control Applications. (U)

DESCRIPTIVE NOTE: Technical rept.,
JUL 74 29P Ulrich,R. R. ;
REPT. NO. HDL-TR-1669
MONITOR: GIDEP 361.00.14.00-n3-01

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: *Seals, Fiber optics, Arms control, International relations, Portable equipment, Security, Identification systems, Photography, Signatures, Instrumentation (U)
IDENTIFIERS: *Safing systems, Tamperproof* seals (U)

In 1971 the Harry Diamond Laboratories developed for the US Arms Control and Disarmament Agency a prototype model of a portable safing system that uses fiber optic seals and assembles, photographs, and identifies them in the field. The safing system provides a tamper-resistant/tamper-indicating seal that can be nondestructively identified in the field. Such seals are needed for the effective use of containment as a safeguards technique and for the protection of unattended instruments used for surveillance at peaceful nuclear facilities. This report describes an improved fiber optic seal assembly and associated equipment designed to meet these needs. The improved seal assembly uses both a lead filler and a mechanical support to hold the fibers in place. A 30X handheld viewer was designed for convenient direct viewing of the seal fingerprints. (Modified author abstract) (U)

AD- 783 918 17/2
LTV AEROSPACE CORP DALLAS TEX VOUGHT SYSTEMS DIV

Feasibility Demonstration of Fiber Optics as Applied to the SOSTEL (Solid State Electric Logic) Data Handling System. (U)

DESCRIPTIVE NOTE: Final rept. 27 Mar 73-9 Jan 74, JAN 74 159P Perkins,Jim R. ;Heinzman, Homer W. ;Turnage,W. Tom ;
REPT. NO. 2-57110/4R-3142
CONTRACT: N62269-73-C-0411

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: *Fiber optics transmission lines, *Data links, Time division multiplexing, Optical data, Fiber optics, Feasibility studies, Data processing, Cables, Communication and radio systems, Avionics, Connectors (U)
IDENTIFIERS: SOSTEL(Solid State Electric Logic), Solid state electric logic (U)

The study was conducted to develop requirements and techniques for applying fiber optics to the SOlid State Electric Logic (SOSTEL) system in general and to develop a design for demonstrating the application of fiber optics to the SOSTEL II DHS brassboard system in specific. To achieve both objectives, an assessment was made of the characteristics of optical components as applicable to multiplex systems for military aircraft. Components evaluated include optical fibers, light sources, photodiodes, connectors, scramblers and tees. This assessment considered both functional and installation/environmental aspects. This foundation was then used to evolve a number of approaches for interconnecting a multiplex system consisting of two processors and up to 32 remote terminals. The optimum approach was determined to be a radial system with passive branching devices. (Modified author abstract) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 783 691 20/6
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

The Effects of Contaminants on Fiber Optic Connector Radiation Patterns. (U)

DESCRIPTIVE NOTE: Technical document, JUL 74 19P Kosmos,G. ;
REPT. NO. NELC-TD-349
PROJ: NELC-F228

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, Connectors, Fiber optics transmission lines, Contaminants, Radiation, Intensity, Light transmission, Patterns (U)

The study of how liquid contaminants affect transmission within fiber connectors in installing fiber optic systems has shown that fiber optic connectors which are contaminated by oils and grease generally enhance light transmissions, thus eliminating one of the objections to fiber optic communications. It was found that some of the contaminants that attenuate transmission are opaque and that they can be removed from the connector during normal maintenance. (Author) (U)

AD- 782 661 20/6 17/2 1/3
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

Fiber-Optic Data Bus. (U)

DESCRIPTIVE NOTE: Final rept. Apr 73-Feb 74,
APR 74 37P Howard,E. A. ;Marcus,D. H. ;
REPT. NO. NELC-TR-1921
PROJ: NR-288-001, WF54-545-603

UNCLASSIFIED REPORT

DESCRIPTORS: *Data transmission systems, *Naval aircraft, *Bus conductors, *Fiber optics transmission lines, Fiber optics, Multiplexing, Transmission lines, Avionics, Digital computers, Couplers (U)
IDENTIFIERS: Data bus mulitplexing (U)

Information transfer requirements of three aircraft platforms are investigated to determine the applicability of fiber optics to naval aircraft data bus systems for the 1975-1980 time frame. Multiplex systems and data bus designs proposed for these platforms by industry sources are examined and this data is utilized as a base to project the characteristics of the near future fiber-optic data bus system. The major factors of data bus design, control mechanization, and bus structure or configuration are considered. The control mechanizations of command/response and polling are compared. Techniques for implementing the fiber-optic data bus system and associated problems with the alternative approaches are presented. 'Star' coupler and 'T' coupler configurations are discussed. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 781 867 17/2 20/6
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF

A Wideband RF Application of Fiber Optics. (U)

DESCRIPTIVE NOTE: Master's thesis Jul 73-Jun 74,
JUN 74 73P Ross,Jessie Clarence , Jr;
REPT. NO. NPS-32JR74061

UNCLASSIFIED REPORT

DESCRIPTORS: *Optical communications, *Fiber optics, *Electrooptics, Communication and radio systems, Interfaces, Data transmission systems, Optical data, Light emitting diodes, Photodiodes, Photodetectors, Optical equipment, Transmitters, Receivers, Broadband, Theses (U)

Recent progress in optoelectronic technology makes practical point-to-point optical data transmission systems consistent with military requirements and potentially far superior to wire techniques. This project provides survey of the current state-of-the-art technology and investigates the feasibility of a fiber optic interface between a receiving antenna and radio receiver in the high frequency spectrum. An optoelectronic interface based on the use of conventional multimode fiber optics with a light emitting diode optical source and a hybrid silicon photodiode-preamplifier photodetector was designed, constructed, and tested. Signal reception for the interfaced system was observed throughout the receiver spectrum. (Author) (U)

AD- 777 118 20/6 17/2
CORNING GLASS WORKS N Y

Optimization of Optical Waveguides Strength Studies. (U)

DESCRIPTIVE NOTE: Final technical rept. Feb 73-Mar 74, MAR 74 30P Maurer,R. D. ;Miller,R. A. ;Smith,D. D. ;Trondsen,J. C. ;
CONTRACT: N00014-73-C-0293
PROJ: NR-039-119

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-774 733.

DESCRIPTORS: *Fiber optics transmission lines, *Strength(Mechanics), Test methods, Tensile strength, Stresses, Defects(Materials), Protective coatings, Lubricants (U)

A tensile test and testing procedures were developed and used to evaluate the effects of lubricants, coatings and reeling conditions on glass fiber strength. The results indicated that fiber failure always originated at surface imperfections and that the appropriate lubricants and coatings could preserve fiber strength by affording some degree of protection to the fiber surface. Fiber strength was also found to be a function of the reeling parameters. Attempts to predict the strength of long lengths of fiber from short gage length data were inconclusive. (Author) (U)

AD- 777 029 20/6
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

Waveguide Techniques for Integrated Optics. (U)

DESCRIPTIVE NOTE: Research and development rept. 1 Apr-30 Sep 73, JAN 74 33P Caton,W. M. ;Pavlopoulos, T. G. ;
REPT. NO. NELC-TR-1909
CONTRACT: ARPA Order-2158
PROJ: NELC-F215

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Waveguides, *Electrooptics, Optical equipment, Integrated circuits, Light emitting diodes, Thin films, Semiconductor diodes (U)
IDENTIFIERS: *Optical waveguides (U)

The advancement of integrated optics circuits and fiber optics with a view to their application in Navy and other DoD systems is the objective of this ARPA-sponsored NELC program. This report documents progress in a number of areas. Patterns for direct optical waveguides have been fabricated in different materials by electron beam exposure of electron resist. Studies have been performed on the efficiency of planar horn-shaped regions in waveguides as coupling devices. An electron beam microscope has been used to measure the variation in the concentration of the electrically active impurities in laser diodes and other semiconductor structures. An apparatus has been constructed for the measurement of the refractive index of thin films. Low-loss channel waveguides have been produced by focusing an argon ion cw laser with the aid of a microscopic objective on the surface of a piece of highly absorbing glass. (Modified author abstract) (U)

AD- 775 502 20/6
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

Effect of Neutron- and Gamma-Radiation on Glass Optical Waveguides. (U)

MAY 73 4P Maurer,Robert D. ;Schiel, Ernst J. ;Kronenberg,Stanley ;Lux,Robert A. ;

UNCLASSIFIED REPORT

Availability: Pub. in Applied Optics, v12 n9 p2024-2026 Sep 73.

DESCRIPTORS: *Fiber optics transmission lines, *Glass, *Radiation effects, Light transmission, Infrared radiation, Attenuation, Neutrons, Gamma rays, Nuclear radiation (U)
IDENTIFIERS: *Optical waveguides (U)

Multimode glass optical waveguides with very low attentuation (4 dB/km) have been made by laboratory techniques. Since further research to reduce this already low absorption is no longer of primary interest, efforts have been directed toward other desirable properties of optical waveguides. Among these is the resistance to the environmental hazard of nuclear (neutron and gamma) radiation. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 775 017 20/6
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF

Wide Band Analog Signal Propagation in a Fiber Optic System. (U)

DESCRIPTIVE NOTE: Master's thesis,
MAR 74 41P Stolt,Robert Dean ;

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Light transmission, Light emitting diodes, Photodiodes, Infrared radiation, Semiconductor lasers, Gallium arsenide lasers, Infrared lasers, Analog systems, Broadband, Theses (U)
IDENTIFIERS: Optical waveguides (U)

State of the art advances in fiber optics have reached the point at which modulated light signals can be transmitted by means of a fiber optic bundle and subsequently detected. A system capable of modulating a light emitting diode with wide band analog signals, transmission through a fiber optic bundle, and subsequent detection is investigated. Tests are conducted to determine frequency response, linear dynamic range, saturation levels, minimum discernible signal, noise figure, and spectrum characteristics of the system. As a result of the investigation, it is determined that the system is suitable for transmission of information to tape recorders from receiver systems and is capable of other analog information applications where signal frequencies do not exceed seven megahertz. (Author) (U)

AD- 775 013 17/2
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF

A Video Bandwidth Communications System Utilizing Optical Fiber Transmission. (U)

DESCRIPTIVE NOTE: Master's thesis,
DEC 73 59P Locknart,Gary Michael ;

UNCLASSIFIED REPORT

DESCRIPTORS: *Optical communications, *Fiber optics transmission lines, Broadband, Light emitting diodes, Gallium arsenide lasers, Photodiodes, Theses (U)
IDENTIFIERS: Design (U)

A video bandwidth communications system utilizing optical fiber transmission was designed, constructed, and tested. An amplitude modulated gallium arsenide light emitting diode is driven by a transistor circuit. The output is detected by a wide bandwidth silicon detector-preamplifier hybrid circuit. Properties such as bandwidth and harmonic distortion were measured for the individual system elements and the overall system. A closed circuit television signal was sent through the system and a sharp clear picture was observed on the monitor. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 774 733 20/6
CORNING GLASS WORKS N Y

Optimization of Optical Waveguides--Electro-Optic Studies. (U)

DESCRIPTIVE NOTE: Final technical rept. no. 1, Feb-Dec 73,
DEC 73 30P Maurer,R. D. ;Keck,D. B. ;Todd,B. J. ;
CONTRACT: N00014-73-C-0293
PROJ: NR-039-119

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, *Electrooptics, Optimization, Silica glass, Light transmission, Gallium arsenide lasers, Light scattering, Optical communications (U)
IDENTIFIERS: *Optical waveguides (U)

Experimental measurements of the spatial and temporal transfer of power of a 225 meter length of low-loss optical waveguide have been made. In particular, measurement of the angular attenuation showed substantial loss of the high order modes which reflected itself in an approximately 8.2 nsec/km decrease in measured dispersion. Additionally there was a reduction of the effective numerical aperture from 0.15 to 0.12. Negligible mode coupling was observed in this particular waveguide which allowed a phenomenological calculation of temporal output for an assumed uniform excitation of all modes. This agreed well with experimental measurements. Calculation of this output from knowledge of the index profile is presently not in agreement and some possible reasons are indicated. The first measurements of the temperature dependence of attenuation were made to determine the approximate size of the effect. Only small changes were detected up to about 400C. (Author) (U)

AD- 774 714 20/6
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

Fiber Optic Cable Hardware Test. (U)

DESCRIPTIVE NOTE: Research and development rept. Nov 72-Jun 73,
DEC 73 34P Lebduska,R. L. ;Holma,G. M. ;
REPT. NO. NELC-1900
PROJ: ZF61-212, NELC-Z267
TASK: ZF61-212-001

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics transmission lines, Cable assemblies, Connectors, Test methods, Optical properties, Bending, Water impingement, Flexural properties, Tensile properties, Strength(General), Vibration, Protective coatings, Polyvinyl chloride, Naval equipment, Environmental tests (U)
IDENTIFIERS: Comparison (U)

The work reported here parallels work previously reported in NELC TR 1869, 'Fiber Optic Cable Test,' by R. L. Lebduska, 12 March 1973. These reports conclude that plastic-jacketed cables and related cable hardware of current manufacture meet a wide range of environmental and physical property requirements for Navy equipment application. Low-optical-loss fiber optic cable is found to be inferior in mechanical strength to high-optical-loss cable. Tests of separable, in-line, coaxial cable connectors indicate a need for optical junction environmental sealing at the connector mating interface. Polyvinylchloride materials are found to be much more permeable to water vapor than equivalent Teflon jackets. (Author) (U)

AD- 770 850 20/6 18/8
NAVAL RESEARCH LAB WASHINGTON D C

Radiation Effects in Fiber Optic Waveguides. (U)

DESCRIPTIVE NOTE: Interim rept. 1 Mar-1 Nov 73,
DEC 73 42P Sigel,G. H. , Jr;
REPT. NO. NRL-MR-2704
PROJ: NRL-P03-11, RR022-06
TASK: RR022-06-01

UNCLASSIFIED REPORT

DESCRIPTORS: *Fiber optics, *Optical materials, *Optical glass, *Radiation effects, Radiation hardening, Gamma rays, Electron bombardment, Defects(Materials), Light transmission, Absorption(Physical), Luminescence, Light scattering, Refractive index (U)
IDENTIFIERS: *Optical waveguides (U)

The effects of gamma ray and pulsed electron irradiation on the optical performance of fiber optic waveguides and glasses potentially relevant to fiber systems have been measured. Permanent and transient absorption, luminescence, scattering and index of refraction measurements are reported. The mechanisms responsible for the optical degradation in commercial and low loss fibers have been investigated. Initial attempts at radiation protection of fiber glasses using cerium doping are discussed. (Author) (U)

AD- 767 653 14/2
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF

Fiber Optic and Laser Digital Pressure Transducers. (U)

DESCRIPTIVE NOTE: Master's thesis,
JUN 73 74P Leonard,Jonn Wallis ;

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE GAGES, DESIGN), TRANSDUCERS, FIBER OPTICS, LASERS, DIGITAL SYSTEMS, THESES (U)
IDENTIFIERS: PRESSURE MEASUREMENT (U)

The theory and response of fiber optic pressure transducers were investigated in a continuation of previous research. A 0.125-inch diameter transducer was built and statically tested. A probe consisting of two concentric glass fiber bundles was used to transmit light to and from the transducer diaphragm. Response was linear through 60 inches Hg. Linearity and sensitivity of response were dependent on diaphragm thickness and probe location, respectively. In a separate experiment, a gas laser was externally modulated by means of a moveable mirror. Axial movement of the mirror corresponding to half-wavelengths of laser radiation produced intensity maxima and minima. This modulation concept was extended to pressure measurement by attaching the mirror to a pressure sensing diaphragm. (Author) (U)

AD- 767 544 17/2 20/6
OFFICE OF TELECOMMUNICATIONS BOULDER COLO INST FOR TELECOMMUNICATION SCIENCES

Optical Fiber Links for Telecommunications. Part Two. (U)

DESCRIPTIVE NOTE: Technical rept.,
JUL 73 147P Gallawa,Robert L. ;Hanson, A. G. ;Chadwick,R. B. ;Kayama,M. ;!
PROJ: SCC-418-72
MONITOR: SCC-ACO 1-73

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Dec 72, AD-754 566.

DESCRIPTORS: (*OPTICAL COMMUNICATIONS, FIBER OPTICS), (*FIBER OPTICS, OPTICAL PROPERTIES), COHERENT RADIATION, LIGHT TRANSMISSION, OPTICAL GLASS, LASERS, PHOTODIODES, WAVEGUIDES, MODULATORS, OPTICAL FILTERS, INFRARED COMMUNICATIONS, MILITARY REQUIREMENTS (U)
IDENTIFIERS: LIGHT EMITTING DIODES, MODULATORS, OPTICAL EQUIPMENT, OPTICS, WAVEGUIDES, PHOTODETECTORS, INJECTION LASERS (U)

The report is addressed to the application of glass fiber optical waveguides to military communication systems. The technical depth of the report is not substantial and hence it can serve as an introduction to the subject. The report contains a review of military requirements, a review of the state of the technology, and a list of recommendations for further work. The latter is broken into two time frames, indicating certain tasks which have a bearing on the mid-1980's time frame. The report contains the justification for the recommendations, which suggest work that could provide the interface between the state of the technology and a workable communication system. (Author) (U)

AD- 767 146 20/6
CATHOLIC UNIV OF AMERICA WASHINGTON D C VITREOUS STATE LAB

Equilibrium Compressibilities and Density Fluctuations in K2O-SiO2 Glasses. (U)

DESCRIPTIVE NOTE: Technical rept., SEP 73 6P Laberge,N. L. ;Vasilescu, V. V. ;Montrose,C. J. ;Macedo,P. B. ;
REPT. NO. TR-25
CONTRACT: N00014-68-A-0506-0002
PROJ: NR-032-512

UNCLASSIFIED REPORT
Availability: Pub. in Unidentified Jnl.

DESCRIPTORS: (*FIBER OPTICS, OPTICAL GLASS), (*OPTICAL GLASS, DENSITY), POTASSIUM COMPOUNDS, OXIDES, SILICON DIOXIDE, LIGHT TRANSMISSION, SCATTERING, ULTRASONIC RADIATION (U)
IDENTIFIERS: ULTRASONIC TESTS (U)

The density fluctuations contributing to light scattering in a glass are governed by the fictive temperature of the glass and the equilibrium compressibility of the melt. Using ultrasonic velocity data for K2O-SiO2 melts, these compressibilities were evaluated and the magnitude of the density fluctuations were calculated. In this system, the mean square amplitude of the fluctuations reach a minimum value (about half that of pure SiO2) for a composition of approximately 20 mol% K2O. By extrapolating the equilibrium compressibilities to zero K2O content, the density fluctuations can be calculated for pure SiO2 glass: this calculation agrees well with the result obtained from light scattering measurements. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 767 017 20/6
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

Fiber Optic Cable Test. (U)

DESCRIPTIVE NOTE: Evaluation rept. Feb-Oct 72, MAR 73 89P Lebduska,Robert L. ;
REPT. NO. NELC-TR-1869
PROJ: ZF61-212, NELC-Z242
TASK: ZF61-212-001

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIBER OPTICS, PHYSICAL PROPERTIES), ENVIRONMENTAL TESTS, TRANSMISSION LINES, MECHANICAL PROPERTIES, OPTICAL PROPERTIES, TEST METHODS, TEST EQUIPMENT (U)
IDENTIFIERS: OPTICS, WAVEGUIDES (U)

Over 200 plastic-jacketed, incoherent, fiber-optic cables, primarily Corhing Glass Works types 5010 and 5011, are subjected to 29 different environmental and physical property tests. The tests were specified to evaluate cable performance within the chosen Naval Equipment Category of 'shipboard and shore equipment with air-transportability capability.' Cable property definitions are obtained for bend radius; tensile, terminal, and mandrel strengths; twist; flexure; vibration; shock; and thermal, humidity, and various chemical exposures. Also, a number of original diagnostic methods are developed to assist in evaluating the test-induced capble optical modifications. Test results are found to indicate that these cable types exhibit properties capable of performing within the chosen category and that practical harnesses for certain Navy applications can be readily fabricated. Recommendations are made for future improvement and quality control of these type cables. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 760 847 20/4 20/6
ARNOLD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE STATION TENN

Fiber Optics Particle-Sizing System. (U)

DESCRIPTIVE NOTE: Final rept. Jul 71-Jun 72,
SEP 73 89P Bentley,H. T. ;
REPT. NO. AEDC-TR-73-111
PROJ: ARO-885252

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with ARO, Inc., Tullahoma, Tenn Rept. no ARO-OMD-TR-73-48.

DESCRIPTORS: (*FLOW FIELDS, PARTICLE SIZE), (*OPTICAL INSTRUMENTS, FLOW VISUALIZATION), LASERS, FIBER OPTICS, ELECTROOPTICS, DISTRIBUTION FUNCTIONS, STATISTICAL DISTRIBUTIONS, DESIGN, WIND TUNNELS, COMPUTER PROGRAM(U)
IDENTIFIERS: FORTRAN, FORTRAN 4 PROGRAMMING LANGUAGE (U)

A fiber optics particle-sizing system is discussed with respect to theory of operation and data acquisition and reduction techniques. The system uses a shadow-graphic technique to determine the dimensions and numbers of particles moving in a flow field. The system is digital in nature. Particles pass through a collimated laser beam and are imaged onto a linear array by a coaxial lens. The array is composed of the exposed ends of a fiber optics bundle which serves as a 'link' between the array plane and the sensing photo-detector modules. Being an imaging device, it can measure a wide range of particle sizes through the proper selection of optics. Sizes ranging from 2 to 1500 micrometers have been measured in the course of this project. Comparisons of holographic data of a liquid rocket injector and of water spray nozzles are made with the fiber optics system. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 757 342 17/2 9/1 20/6
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

Integrated Optical Circuits. (U)

DESCRIPTIVE NOTE: Research and development rept. 1 Apr 72-1 Oct 72,
JAN 73 27P Hall,D. B. ;
REPT. NO. NELC-TR-1861
CONTRACT: ARPA Order-2158
PROJ: NELC-F215

UNCLASSIFIED REPORT

DESCRIPTORS: (*OPTICAL COMMUNICATIONS, FIBER OPTICS), (*WAVEGUIDES, SEMICONDUCTING FILMS), (*MODULATORS, *ELECTROOPTICS), (*FIBER OPTICS, WAVEGUIDES), (*LIGHT TRANSMISSION, WAVEGUIDES), MULTIPLEXING, INTEGRATED SYSTEMS, FEASIBILITY STUDIES, GALLIUM ARSENIDES, ZINC COMPOUNDS, ZINC SULFIDES, SELENIDES (U)
IDENTIFIERS: ZINC SELENIDES, *OPTICS, *WAVEGUIDES, THIN FILMS (U)

Work is reported on establishing the feasibility of integrated optics for use in high-capacity (multi-GHz) telecommunications and for implementing a militarily applicable, fiber-optic-transmission-line, multiterminal multiplexing system through low-loss coupling and modulation. More specifically, optical waveguiding in diffused-layer and heteroepitaxial thin-film semiconductor structures, both planar and three-dimensional, is demonstrated, as is electrooptic modulation in diffused-layer and heteroepitaxial thin-film semiconductor structures of high resistivity. In addition, optical propagation in fiber-optic waveguides is theoretically analyzed, and future areas of research and development (particularly pattern delineation and optical coupling) and theoretical analysis are outlined. (Author) (U)

AD- 755 509 9/1
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

An Experimental Analysis of New Ultraviolet Emitting Fiber Optic Faceplate Cathode Ray Tubes. (U)

DESCRIPTIVE NOTE: Research and development technical rept.,
NOV 72 26P Pucilowski,Joseph , Jr.;
Harper,Orville R. ;
REPT. NO. ECOM-4052
PROJ: DA-1-H-662705-A-055
TASK: 1-H-662705-A-05503

UNCLASSIFIED REPORT

DESCRIPTORS: (*CATHODE RAY TUBE SCREENS, *FIBER OPTICS), ULTRAVIOLET OPTICAL MATERIALS, PHOSPHORESCENT MATERIALS, ULTRAVIOLET RADIATION, CATHODE RAY TUBES, ZINC COMPOUNDS, SILICATES, TITANATES, STRONTIUM COMPOUNDS, LEAD(METAL) (U)
IDENTIFIERS: ZINC SILICATES (U)

An experimental analysis of new ultraviolet (UV) emitting, fiber-optic faceplate cathode-ray tubes (CRT) was performed. Detailed studies were carried out for a tube with emission centered near 380 nanometers (nm). Initial data taken on a tube whose emission was centered near 320 nm showed that its radiant output was below expectations, probably due to problems encountered during faceplate manufacture. Consequently, it was not possible to perform a comprehensive analysis on this tube. This study represented the first operational analysis of these CRT, and writing rates on various dry-process, UV sensitive recording media were measured for the 380 nm tube. A comparison has been made with a state-of-the-art 380 nm CRT. Theoretical calculations indicated that the new 380 nm CRT should have at least nine times the energy output of available CRT. Agreement with theoretical calculations was excellent. Results are summarized and performance is discussed. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 754 566 17/2 20/6
ARMY STRATEGIC COMMUNICATIONS COMMAND FORT HUACHUCA ARIZ

Optical Fiber Links for Telecommunications. Part One, (U)

DEC 72 97P Fulghum,Stephen F. , Jr.;
Burke,James J. ;

UNCLASSIFIED REPORT

DESCRIPTORS: (*OPTICAL COMMUNICATIONS, FIBER OPTICS), (*FIBER OPTICS, OPTICAL PROPERTIES), COHERENT RADIATION, LIGHT TRANSMISSION, ATTENUATION, OPTICAL GLASS, REFRACTIVE INDEX, REFLECTION, LASERS, PHOTODIODES, PHOTOMULTIPLIER TUBES (U)
IDENTIFIERS: LIGHT EMITTING DIODES, INJECTION LASERS (U)

The purpose of the report is to provide a physical understanding of fiber optics communications. The report covers the basics of light guidance in optical fibers from both geometrical and waveguide points of view. This includes attenuation and the effects of pulse broadening on information rate. Light sources, detectors and coupling are also covered with an emphasis on semiconductor devices. Finally, the present state and future prospects of integrated optics are discussed. Communication systems using fiber optics have advantages over conventional systems. These advantages are due mainly to the high bandwidths possible at optical frequencies and to the fact that glass fibers are not electrical conductors. Fiber optics may be the answer to problems of electromagnetic interference, electrical isolation and security. These systems will be useful where high bandwidth, small size, cable flexibility and low weight are needed. (Author) (U)

AD- 747 946 20/6 17/2
NAVAL RESEARCH LAB WASHINGTON D C

Development of Optical Information Transfer Technology for Military Applications. (U)

DESCRIPTIVE NOTE: Memorandum rept., JUL 72 32P Milton,A. F. ;Andrews,R. A. ;Giallorenzi,T. G. ;
REPT. NO. NRL-MR-2479
PROJ: NRL-65N01-31, RR014-11-04

UNCLASSIFIED REPORT

DESCRIPTORS: (*OPTICAL COMMUNICATIONS, *FIBER OPTICS), OPTICAL EQUIPMENT, WAVEGUIDES, LIGHT, INFRARED RADIATION, AIRCRAFT EQUIPMENT, MILITARY REQUIREMENTS (U)
IDENTIFIERS: OPTICS, WAVEGUIDES, AVIONICS (U)

Military avionics systems can be expected to benefit from the development of optical data communication systems which use fiber optics. Advantages involving size, weight and freedom from electromagnetic interference can be realized in the near future. Integrated optical circuits can increase the flexibility of such systems as well as perform independent functions in other useful optical devices. The state of the art of optical fibers and integrated optical circuits is reviewed. A strategy for the development of these technologies is recommended. The optical technology requirements for four advanced military systems involving multiterminal data buses, heterodyne detection, tethers, and optical phase front control are described in detail. (Author) (U)

AD- 742 677 14/2
HARRY DIAMOND LABS WASHINGTON D C

The Use of Fiber Optics for Oscilloscope External Triggering. (U)

APR 72 14P Prochazka,Rudolph J. ;
REPT. NO. HDL-TM-72-5
PROJ: HDL-E01E4

UNCLASSIFIED REPORT

DESCRIPTORS: (*OSCILLOSCOPES, TRIGGER CIRCUITS), (*FIBER OPTICS, TRIGGER CIRCUITS), PHOTODIODES, RADIOFREQUENCY INTERFERENCE (U)
IDENTIFIERS: ELECTROMAGNETIC INTERFERENCE (U)

The input to the external trigger circuit of an oscilloscope is normally designed to accept a remotely generated trigger signal via coaxial cable. A photodiode was installed in the input so that it accepts an optical trigger signal via a fiber optic cable. This inexpensive conversion is useful in electromagnetic interference (EMI) studies, where hard wire cable can contaminate shielded environments, and does not interfere with the oscilloscope's other triggering capabilities. The original input can be restored at any time, in the field or in the laboratory. (Author) (U)

AD- 736 613 17/2
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

Transfer of Information on Naval Vessels via Fiber Optics Transmission Lines. (U)

DESCRIPTIVE NOTE: Research and development rept. Jul 70-Jan 71,
JAN 72 54P Taylor,H. F. ;
REPT. NO. NELC-TR-1762-Rev-1
PROJ: ZFXX-512-001, NELC-Z237

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes report dated 3 May 71, AD-885 537L.

DESCRIPTORS: (*INTERCOMMUNICATION SYSTEMS, FIBER OPTICS), (*OPTICAL COMMUNICATIONS, FIBER OPTICS), (*FIBER OPTICS, TRANSMISSION LINES), SHIP AUXILIARY EQUIPMENT, COMMUNICATION EQUIPMENT, INTEGRATED CIRCUITS, PHOTODIODES (U)

Optical and electrical systems of intraship information transfer are compared with respect to cost and performance. Optical systems are shown to offer advantages over electrical for point-to-point links in which security and/or wide bandwidth are required. It is indicated that wide-bandwidth terminals can be built with commercial solid-state components for less than $100. The author recommends continued research in the area of optical integrated circuits and the development of military specifications for optical transmission lines and terminals. (Author) (U)

AD- 736 514 20/6 9/1
IIT RESEARCH INST CHICAGO ILL

Fiber Optics with Extended Ultraviolet Transmission. (U)

DESCRIPTIVE NOTE: Final rept. 1 Jul 67-30 Mar 71,
DEC 71 67P Ali,M. A. ;$chwartz,M. A. ;
CONTRACT: DAAB07-67-C-0542
PROJ: DA-1-H-662705-A-055
TASK: 1-H-662705-A-05503
MONITOR: ECOM 0542-F

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIBER OPTICS, *ULTRAVIOLET OPTICAL MATERIALS), (*CATHODE RAY TUBE SCREENS, FIBER OPTICS), OPTICAL GLASS, MANUFACTURING, CLADDING, OPTICAL PROPERTIES, REFRACTIVE INDEX, THERMAL EXPANSION (U)

This is the final report under the contract for work performed between 1 July 1967 and 30 March 1971. The objective of this project was to develop and fabricate fiber optic faceplates for cathode ray tubes with a high numerical aperture and high transmission in the near and middle ultraviolet spectral regions. New glasses were developed with the required properties and capable of being fabricated into 5-in. fiber optic faceplates. A lanthanum-zinc-borate core glass having an index of refraction of 1.71 and a peak internal transmission of over 80% at 320 nm (1/2-in. thickness) was developed. A matching potassium-alumina-borosilicate cladding glass having a low index of refraction, 1.47, was also developed. Fiber optic faceplates, fabricated from these glasses, had a theoretical numerical aperture in excess of 0.8. Six full-size faceplates were fabricated, mounted in metal flanges, and delivered to the Army for incorporation in CRT's. (Author) (U)

AD- 734 015 20/6
CALIFORNIA UNIV LOS ANGELES SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Guided Waves Along Non-Circular Fibers. (U)

DESCRIPTIVE NOTE: Technical rept., OCT 71 73P Yen,C. ;
REPT. NO. UCLA-ENG-7175
CONTRACT: N00014-69-A-0200-4026

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIBER OPTICS, LIGHT TRANSMISSION), WAVEGUIDES, DIELECTRIC PROPERTIES, PROPAGATION, WAVE FUNCTIONS, ATTENUATION, INTENSITY, LIGHT COMMUNICATION SYSTEMS, ELECTROOPTICS (U)
IDENTIFIERS: WAVE EQUATIONS, MATHIEU FUNCTIONS, *OPTICAL WAVEGUIDES, COMPUTER AIDED ANALYSIS (U)

The advent of integrated optics and the availability of low-loss fibers prompted a renewed urgency in the understanding of the guiding properties of optical fibers. The present presentation is concerned with the propagation characteristics of waves along a non-circular fiber. Three analytical methods in treating this problem will be discussed; one on the exact solution of modes on elliptical fiber, the other on the numerical solution of modes on rectangular fiber and the third on the approximate solution of modes on complex structure of rectangular fibers. Significant differences between guided modes along a circular fiber and those along a flattened fiber are discussed in detail. Theoretical results on dominant modes have also been verified by experiments at microwave frequencies. (Author) (U)

AD- 733 076 20/6 17/2
IBM FEDERAL SYSTEMS DIV OWEGO N Y ELECTRONICS SYSTEMS CENTER

Light Interface Technology Improvement Investigation. (U)

DESCRIPTIVE NOTE: Final rept. 1 Feb-30 Sep 71, SEP 71 115P Clapper,Roy C. ;Stigliani, Daniel J. , Jr.;Bloem,Harold H. ;
REPT. NO. IBM-71-531-007
CONTRACT: N00014-71-C-0012
PROJ: NR-215-166

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also related report, AD-721 085.

DESCRIPTORS: (*FIBER OPTICS, LIGHT TRANSMISSION), (*LIGHT COMMUNICATION SYSTEMS, TRANSMISSION LINES), DIGITAL SYSTEMS, INTERFACES, MULTIPLEX, PHOTODIODES, SIGNAL-TO-NOISE RATIO, REFLECTORS (U)

The report establishes a baseline model for an optical data link utilizing a single fiber bundle. This model is solely concerned with light interface technology (LIT) for digital signal transmission. Data link performance is characterized by the pulse amplitude, pulse rise and fall times, pulse delay, and signal-to-noise ratio of the photodiode output. The LIT link has been analyzed as an entirety considering four major areas; light emitting diodes, fiber optic light guide, fiber optic/diode interface, and photodiode. Fiber optic/diode interface has been investigated with regard to loss mechanisms of coupling light into and out of fiber bundles. Fiber optic light guides have been surveyed and evaluated. The three major types that have been given consideration are total internal reflection fibers, total internal refraction fibers and waveguide mode fibers. Space division multiplexing investigations considering Lambertian sources were completed for the TIR and SELFOC fiber types. Number of channels possible, optical cross coupling of fibers, and sampling effect are the main topics discussed. Analog properties of a typical link were investigated with respect to distortion. Experiments were completed using various wavelength LEDs and at various temperatures. (Author) (U)

AD- 732 851 11/1 5/4
HARRY DIAMOND LABS WASHINGTON D C

Fiber Optic Seals: A Portable System for Field Use in International Safeguards and Arms Control Applications, (U)

OCT 71 27P Ulrich,R. R. ;
REPT. NO. HDL-IR-1571
PROJ: DA-1-W-262301-A-207, HDL-SYS43
TASK: 1-W-262301-A-20700

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEALS, *FIBER OPTICS), (*NUCLEAR WEAPONS, *ARMS CONTROL), SYSTEMS ENGINEERING, PORTABLE, PHOTOGRAPHIC TECHNIQUES, DETECTION, IDENTIFICATION, PATTERN RECOGNITION (U)
IDENTIFIERS: *SAFING SYSTEMS, *INTERNATIONAL RELATIONS (U)

A prototype model of a portable safing system that uses fiber optic seals and assembles, photographs and identifies them in the field has been designed and constructed for the U. S. Arms Control and Disarmament Agency (ACDA). The system is intended for test and evaluation to further develop the procedures and practices for using fiber optic seals and to determine design criteria for improved equipment and systems for operational use. (U)

AD- 729 399 9/1
GENERAL ELECTRIC CO OWENSBORO KY TUBE DEPT

Design, Development, and Fabrication of an Eight Inch Remote View Display Cathode Ray Tube. (U)

DESCRIPTIVE NOTE: Final technical rept. 1 Jul 70-30 Jun 71,
AUG 71 102P Rate,Edward T. ;
CONTRACT: DAAK02-70-C-0503

UNCLASSIFIED REPORT

DESCRIPTORS: (*CATHODE RAY TUBES, FIBER OPTICS), INFRARED SENSORS, DISPLAY SYSTEMS, DESIGN, ELECTRON GUNS (U)
IDENTIFIERS: INFANT(IROQUOIS NIGHT FIGHTER AND NIGHT TRACKER), INFRARED SENSORS, IROQUOIS NIGHT FIGHTER AND NIGHT TRACKER (U)

The objective is to develop an eight inch, retangular, fiber optic faceplate, cathode ray tube having an amplitude response characteristic exceeding 800 TV lines per raster height at 50 per cent response. (Author) (U)

AD- 721 085 20/6 17/2
IBM FEDERAL SYSTEMS DIV OWEGO N Y ELECTRONICS SYSTEMS CENTER

Wavelength Division Multiplexing in Lignt Interface Technology. (U)

DESCRIPTIVE NOTE: Final technical rept. Aug 70-Jan 71, MAR 71 77P Stigliani,Daniel J. , Jr.; Hanna,David W. ;Lynch,Robert J. ;
REPT. NO. IBM-71-531-001
CONTRACT: N00014-71-C-0012
PROJ: NR-215-166

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIBER OPTICS, LIGHT TRANSMISSION), (*OPTICAL COMMUNICATIONS, MULTIPLEXING), OPTICAL FILTERS, BAND PASS FILTERS, ELECTROLUMINESCENCE, GALLIUM ARSENIDES, PHOTODIODES, INFRARED SPECTRA, CIRCUITS, TEST METHODS (U)
IDENTIFIERS: LIGHT EMITTING DIODES, ALUMINUM GALLIUM ARSENIDE, PHOTODETECTORS, GALLIUM PHOSPHIDES (U)

The report describes the investigation and fabrication of a five channel wavelength division multiplex (WDM) optical communication link. The transmitter consists of five different wavelength Ga(1-x)Al(x)As light emitting diodes (LEDs) and the receiver consists of five narrowband photodiodes (PDs). The light is conducted from the transmitter to the receiver by a fiber optic bundle. Various techniques (dichroic filters, furcated fiber bundle, and LED and PD plane arrays) of coupling the light into and out of the fiber bundle are investigated. Measurements of receiver sensitivity, optical efficiency, and optical cross-coupling between channels were made. A theoretical analysis of the link optical efficiency and expected cross-coupling is performed and design information for future WDM optical links is established. It is also determined that fiber bundles which are classified as incoherent are, in general, quasi-coherent. It was necessary to incorporate optical mixing cylinders at the entrance and exit of the bundle to uniformly distribute the light throughout the cross-section. (Author) (U)

UNCLASSIFIED

AD- 720 937 20/6 17/2
SIGNALS RESEARCH AND DEVELOPMENT ESTABLISHMENT CHRISTCHURCH (ENGLAND)

Determination of the Scattering Loss in Optical Glass Fibres, (U)

DEC 70 28P Orsborne,Margaret A. ;
REPT. NO. SRDE-70064
MONITOR: TRC BR-23407

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIBER OPTICS, LIGHT TRANSMISSION), (*OPTICAL COMMUNICATIONS, TRANSMISSION LINES), SCATTERING, GAIN, POWER SPECTRA, TEST METHODS, TEST EQUIPMENT, GREAT BRITAIN (U)

The paper describes the equipment and method used to determine the total loss of power due to all forms of scatter within multimode optical glass fibres. (Author) (U)

AD- 717 838 20/6
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Fiber Optics in Electron-Optical Systems. (U)

DEC 70 76P Lisitsa,M. P. ;Berezhinskii, L. I. ;Valakh,M. Ya. ;
REPT. NO. FTD-HC-23-506-70

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited trans. of mono. Volokannaya Optika, n.p., 1968 p195-264.

DESCRIPTORS: (*FIBER OPTICS, *ELECTRON OPTICS), OPTICAL IMAGES, IMAGE CONVERTERS, CONTROL SYSTEMS, CATHODE RAY TUBE SCREENS, IMAGE INTENSIFIERS(ELECTRONICS), USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

Such electron-optical devices as the cathode-ray tube (CRT), the image convertor (IC), and the multistage image intensifier, all of which are widely used in inspection and control systems and in automation and remote control, have some defects, in addition to their positive qualities. Information fed into these devices is recorded as an optical image on a luminescent screen, which is characterized, as a rule, by a low resolving power and a low luminous efficiency. The development of automation and computer technology requires a considerable increase in the resolving power and an improvement in the quality of the image obtained by these systems. An increase in the resolution of the CRT is particularly important because of its wide possible applications. The amount of information recorded on a CRT screen is determined by the size of the luminous spot of the phosphor. The smaller is the spot, the greater is the resolution of the screen, and the greater is the information that can be transmitted. (Author) (U)

AD- 713 262 20/6 11/2 17/2
SIGNALS RESEARCH AND DEVELOPMENT ESTABLISHMENT CHRISTCHURCH (ENGLAND)

DETERMINATION OF THE ATTENUATION OF OPTICAL GLASS FIBRES, (U)

MAR 70 13P Orsborne,Margaret A. ;
REPT. NO. SRDE-70024
MONITOR: TRC BR-20711

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIBER OPTICS, LIGHT TRANSMISSION), (*OPTICAL GLASS, ATTENUATION), (*OPTICAL COMMUNICATIONS, PERFORMANCE(ENGINEERING)), GAS LASERS, GLASS TEXTILES, SCATTERING, TEST METHODS, CURVE FITTING, GREAT BRITAI (U)
IDENTIFIERS: HELIUM NEON LASERS (U)

The paper describes the equipment and method used to determine the attenuation of multimode optical glass fibres used for optical communications. (Author) (U)

AD- 708 579 20/6 9/1
CHICAGO AERIAL INDUSTRIES INC BARRINGTON ILL

FIBER OPTICS WITH HIGH ULTRAVIOLET TRANSMISSION. (U)

DESCRIPTIVE NOTE: Final rept. 29 Mar 66-30Apr 70,
JUN 70 56P Richter,Louis J. ;
REPT. NO. CAI-7521-F
CONTRACT: DA-28-043-AMC-02057(E)
PROJ: DA-1-H-622001-A-055
TASK: 1-H-622001-A-05508
MONITOR: ECOM 02057-F

UNCLASSIFIED REPORT

DESCRIPTORS: (*CATHODE RAY TUBE SCREENS, FIBER OPTICS), (*FIBER OPTICS, ULTRAVIOLET RADIATION), GLASS, OPTICAL MATERIALS, LANTHANUM COMPOUNDS, LEAD COMPOUNDS, REFRACTIVE INDEX (U)

U. S. Army Electronics Command specified the best effort development of fiber optic faceplates for cathode-ray tubes (CRT's) with high transmission in the 3700 A region. A design goal of 85 percent transmission in the region of interest was established. A glass having high transmission in this region was developed which was satisfactory for drawing into fibers, and faceplates were fabricated from this glass. The faceplates were 1/4-inch thick and exhibited a transmission of 90 percent with the desired wavelength. One faceplate was successfully incorporated into a high resolution, high-UV performance CRT. This tube will far surpass presently existing tubes for annotation of ultra-violet sensitive dry process films. (U)

AD- 705 886 20/6
OPTICS TECHNOLOGY INC PALO ALTO CALIF

THERMALLY INDUCED BEAT PHENOMENON IN COUPLED OPTICAL WAVEGUIDES, (U)

APR 69 3P Kapany,N. S. ;Sawatari,T.
;
CONTRACT: AF 49(638)-1626
PROJ: AF-9767
TASK: 976702
MONITOR: AFOSR 70-1322TR

UNCLASSIFIED REPORT
Availability: Pub. in Jnl. of the Optical Society of America, v60 n1 p135-136, Jan 70.

DESCRIPTORS: (*FIBER OPTICS, THERMAL PROPERTIES), WAVEGUIDES, INTERFERENCE, REFRACTIVE INDEX (U)

Experiments are described on thermally induced beat phenomena in coupled optical wave guides. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 705 885 20/6
OPTICS TECHNOLOGY INC PALO ALTO CALIF

WAVE PROPAGATION ALONG HOLLOW DIELECTRIC WAVEGUIDES. (U)

JUL 69 3P Sawatari,T. ;Kapany,N. S. ;

CONTRACT: AF 49(638)-1626
PROJ: AF-9767
TASK: 976702
MONITOR: AFOSR 70-1321TR

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of the Optical Society of America, v60 n1 p132-133 Jan 70.

DESCRIPTORS: (*FIBER OPTICS, *LIGHT TRANSMISSION), DIELECTRICS, WAVEGUIDES (U)

The propagation of optical waves along hollow dielectric wave guides is discussed. Experimental results are given. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 705 250 20/6
OPTICS TECHNOLOGY INC PALO ALTO CALIF RESEARCH DEPT

DIFFRACTION AND COHERENCE PHENOMENA IN OPTICAL WAVEGUIDES. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 69 15P Kapany,N. S. ;
CONTRACT: AF 49(638)-1626
PROJ: AF-9767
TASK: 976702
MONITOR: AFOSR 70-0140TR

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIBER OPTICS, LIGHT TRANSMISSION), DIFFRACTION, COHERENT RADIATION, DIELECTRICS, OPTICAL IMAGES (U)

The research effort has been a continuation of a theoretical and experimental investigation into problems of diffraction and coherence phenomena in dielectric waveguides. In order to yield a deeper understanding into a number of basic phenomena pertaining to radiation, coherence, and coupling effects in active as well as passive fibers, investigations have been carried through several stages, ranging from studies of small diameter diffraction apertures to waveguide mode propagation in isolated fibers, coupling effects in arrays of fibers, and radiation characteristics of such fibers separately in the active or the passive mode. (Author) (U)

AD- 704 322 11/2 20/6
IIT RESEARCH INST CHICAGO ILL

FIBER OPTICS WITH EXTENDED ULTRAVIOLET TRANSMISSION. (U)

DESCRIPTIVE NOTE: Triannual rept. no. 7, 1 Sep-31 Dec 69,
APR 70 26P Ali,M. A. ;Pincus,A. G. ;Schwartz,M. A. ;
CONTRACT: DAAB07-67-C-0542
PROJ: DA-1-H-662705-A-055
TASK: 1-H-662705-A-05503
MONITOR: ECOM 0542-7

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Triannual rept. no. 6, AD-698 489.

DESCRIPTORS: (*CATHODE RAY TUBE SCREENS, FIBER OPTICS), (*FIBER OPTICS, *ULTRAVIOLET OPTICAL MATERIALS), (*OPTICAL GLASS, LIGHT TRANSMISSION), MELTING, CLADDING, BORIC ACID, LANTHANUM COMPOUNDS, ZINC COMPOUNDS, OPTICAL PROPERTIES (U)
IDENTIFIERS: RARE EARTH GLASS (U)

The objective of this contract is to conduct research and development leading to the fabrication of fiber optic faceplates for cathode ray tubes with high transmission in the near and middle ultraviolet regions. During this period, clad fibers were drawn from the scaled-up meltings of core and clad glasses. Also, a detailed procedure for scaled-up melting was prepared which could be adapted to large scale melting in the fabrication of 5-in. faceplates. Work on compositional adjustment of the clad glass (157K-5) was initiated to develop a clad glass having a lower coefficient of thermal expansion than the core glass (25AT). (Author) (U)

AD- 700 891 9/1 17/7 17/9 20/2
20/12
THOMSON-CSF PARIS (FRANCE)

REVUE TECHNIQUE THOMSON-CSF. VOLUME 1, NUMERO 3, (U)

SEP 69 169P Delagebeaudeuf,D. ;Diamand, F. ;Moulin,M. ;Wendt,G. ;Tien,Tran Duc ;

UNCLASSIFIED REPORT

Availability: Pub. in Revue Technique Thomson CSF, v1 n3 p309-480 Sep 69. No copies furnished.

DESCRIPTORS: (*AVALANCHE DIODES, SIGNALS), (*SEMICONDUCTING FILMS, ULTRASONIC RADIATION), (*CADMIUM SULFIDES, CRYSTAL GROWTH), (*IMAGE TUBES, *FIBER OPTICS), (*ION ACCELERATORS, OPERATION), (*RADAR CROSS SECTIONS, DETECTION), (*NAVIGATION SATELLITES, *NAVIGATIONAL AIDS), FRANCE (U)
IDENTIFIERS: CHEMICALS, VAPOR DEPOSITION, HOLOGRAPHY, TRAVELING WAVES (U)

Contents: Analysis of large-signal operation of avalanche diodes in the transit mode; Theory of the travelling wave amplification in a semiconductor film coupled to an electromagnetic delay line; Study of the growth of cadmium sulfide monocrystals; Problems appearing at measurements of the modulation transfer function of optic fibers for electronic tubes and determination of said function by the edge method; An approach to the calculation of beam loading in an accelerating structure operating under steady-state and transient conditions; Automatic detector of radar echoes with a constant false alarm ratio; and DIOMEDE, optical correlator system for quick distance measurement. (U)

AD- 698 489 11/2 20/6
IIT RESEARCH INST CHICAGO ILL

FIBER OPTICS WITH EXTENDED ULTRAVIOLET TRANSMISSION. (U)

DESCRIPTIVE NOTE: Triannual rept., no. 6, 1 May-31 Aug 69,
DEC 69 25P Ali,M. A. ;Pincus,A. G. ;Schwartz,W. A. ;
CONTRACT: DAAB07-67-C-0542
PROJ: DA-1-H-662705-A-055, IIT-G6018
TASK: 1-H-662705-A-05503
MONITOR: ECOM 0542-6

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Triannual rept. no. 5, AD-693 259.

DESCRIPTORS: (*CATHODE RAY TUBE SCREENS, FIBER OPTICS), (*FIBER OPTICS, *ULTRAVIOLET OPTICAL MATERIALS), (*OPTICAL GLASS, LIGHT TRANSMISSION), BORON COMPOUNDS, LANTHANUM COMPOUNDS, OXIDES, ADDITIVES, ARSENIC COMPOUNDS, LAMINATED GLASS, OPTICAL PROPERTIES, MELTING, BORATES (U)
IDENTIFIERS: BORATES, GLASS, FORMULATIONS, RARE EARTH GLASS, RARE EARTH BORATE GLASS (U)

The objective of this contract is to conduct research and development leading to the fabrication of fiber optic faceplates for catnode ray tubes with high transmission in the near and middle ultraviolet regions. During this period, compositional studies of the effects of redox oxide additives were performed. A clad glass matching the thermal expansion and softening point of the core glass was produced. Scaled-up melting of both the core and clad glasses has been initiated and the processing techniques are being optimized. (Author) (U)

AD- 698 080 20/6 17/2
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C

FEASIBILITY OF APPLYING FIBER OPTICS IN LINEAR MEASUREMENTS BY TELEVISION METHODS, (U)

OCT 69 10P Rabinovich,V. A. ;Zatoka, L. I. ;Zhuravleva,N. V. ;Safyulina,S. S. ; Voronova,L. I. ;
REPT. NO. FSTC-HT-23-008-70

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Optiko-Mekhanicheskaya Promyshlennost (USSR) v35 n11 p4-7 1968.

DESCRIPTORS: (*CAMERA TUBES, *FIBER OPTICS), DIGITAL SYSTEMS, TELEVISION EQUIPMENT, MEASUREMENT, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

Some possibilities of applying fiber optics in linear measurements by television are investigated. An example is presented of constructing a digital optical system the basic element of which is a fiber-optical encoding device. (Author) (U)

AD- 697 036 1/3 20/6 13/12
OPTICS TECHNOLOGY INC PALO ALTO CALIF

FIBER OPTICS HAZARD IDENTIFICATION DEVICE. (U)

DESCRIPTIVE NOTE: Final technical rept. 17 Jan 66-30 Apr 69,
OCT 69 54P Phillips,Brian G. ;
REPT. NO. 11014R
CONTRACT: AF 33(615)-3532
PROJ: AF-3048
TASK: 304807
MONITOR: AFAPL TR-69-78

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIRCRAFT EQUIPMENT, *FIRE ALARM SYSTEMS), (*WARNING SYSTEMS, FIBER OPTICS), AVIATION SAFETY, FIRE SAFETY, OPTICAL GLASS, HEAT RESISTANT GLASS, LIGHT TRANSMISSION, COUPLINGS, INSTALLATION, BENDING, TENSILE PROPERTIES, DETECTION, MANUFACTURING, SIMULATORS, PERFORMANCE(ENGINEERING) (U)
IDENTIFIERS: EVALUATION, FIRE SIMULATORS, VISION (U)

This report describes the work done over a period of three years to develop a fiber optics fire hazard detection system for aircraft installation. The distal end of this system which is located within the engine compartment is capable of withstanding temperatures of 1000F, whereas the rest of the system is capable of withstanding temperatures to 500F. During the course of the program, a number of fabrication techniques were developed and high transmittance glasses were evaluated for transmission and strength. In addition to this work, a fire simulator was developed, and this may be mounted within the engine compartment. (Author) (U)

AD- 694 581 20/6
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C

CHARACTERISTICS OF RADIATION PROPAGATION THROUGH A FIBER-OPTIC ELEMENT, (U)

SEP 69 16P Sattarov,D. K. ;
REPT. NO. FSTC-HT-23-413-69
PROJ: FSTC-0423100

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Optiko-Mekhanicheskaya Promyshlennost (USSR) v35 n6 p18-24 1968.

DESCRIPTORS: (*FIBER OPTICS, LIGHT TRANSMISSION), REFRACTIVE INDEX, REFLECTION, DIFFUSION, OPTICAL GLASS, USSR (U)
IDENTIFIERS: NUMERICAL APERTURE, TRANSLATIONS (U)

The propagation of radiation in a fiber-optic element has been studied. It is shown that radiation is split into six components, each having its own specific aperture characteristics when emerging from the element. Light diffusion at the exit of the element is determined from calculation of the aperture characteristics of the individual components. Theoretical conclusions are confirmed experimentally. (U)

AD- 693 259 11/2 20/6
IIT RESEARCH INST CHICAGO ILL

FIBER OPTICS WITH EXTENDED ULTRAVIOLET TRANSMISSION. (U)

DESCRIPTIVE NOTE: Triannual rept. no. 5, 1 Jan-30 Apr 69,
AUG 69 83P Ali,M. A. ;Pincus,A. G. ;Schwartz,M. A. ;
CONTRACT: DAAB07-67-C-0542
PROJ: DA-1-H-662705-A-055, IIT-G6018
TASK: 1-H-662705-A-05503
MONITOR: ECOM 0542-5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Triannual rept. no. 4, AD-686 338.

DESCRIPTORS: (*CATHODE RAY TUBE SCREENS, FIBER OPTICS), (*FIBER OPTICS, *ULTRAVIOLET OPTICAL MATERIALS), (*OPTICAL GLASS, LIGHT TRANSMISSION), MASS SPECTROSCOPY, ADDITIVES, IRON, IMPURITIES, BORON COMPOUNDS, CALCIUM COMPOUNDS (U)
IDENTIFIERS: NUMERICAL APERTURE (U)

The objective of this contract is to conduct research and development leading to the fabrication of fiber-optic faceplates for cathode ray tubes with high transmission in the near and middle ultraviolet spectral regions. During this period, studies were primarily conducted to further improve the transmission properties of the optical glasses being developed and to gain a better understanding of the fundamental theories relating to uv absorption. Compositional studies included the use of acidity control and redox oxide additions. Processing studies included time, temperature, atmosphere, and stirring effects. Mass spectrographic analyses were conducted to determine impurities in selected glasses. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 691 753 17/2 14/4
IIT RESEARCH INST CHICAGO ILL

CONTINUOUS FACSIMILE SCANNER EMPLOYING FIBER OPTICS. (U)

DESCRIPTIVE NOTE: Final rept. 24 Jun 64-31 Jul 69,
JUL 69 55P Pontarelli,D. A. ;Schwab, R. ;Norikane,K. ;
REPT. NO. IITRI-V6015-55
CONTRACT: DA-28-043-AMC-00164(E)
PROJ: DA-1-E-634301-D-246
TASK: 1-E-634301-D-24603
MONITOR: ECOM 00164-F

UNCLASSIFIED REPORT

DESCRIPTORS: (*FACSIMILE EQUIPMENT, SCANNING), (*CAMERA TUBES, *FIBER OPTICS), DESIGN, DRIVES, MANUFACTURING (U)

Fiber optics was successfully employed to perform the functions of image dissection and scanning in Facsimile Transmission. Two operational models was developed and constructed to incorporate the concept. One was designed to scan copy 8 1/2-inches wide, the other, 18 5/8-inches wide. Both instruments posses the unique capability of continuously scanning copy of any length. (Author) (U)

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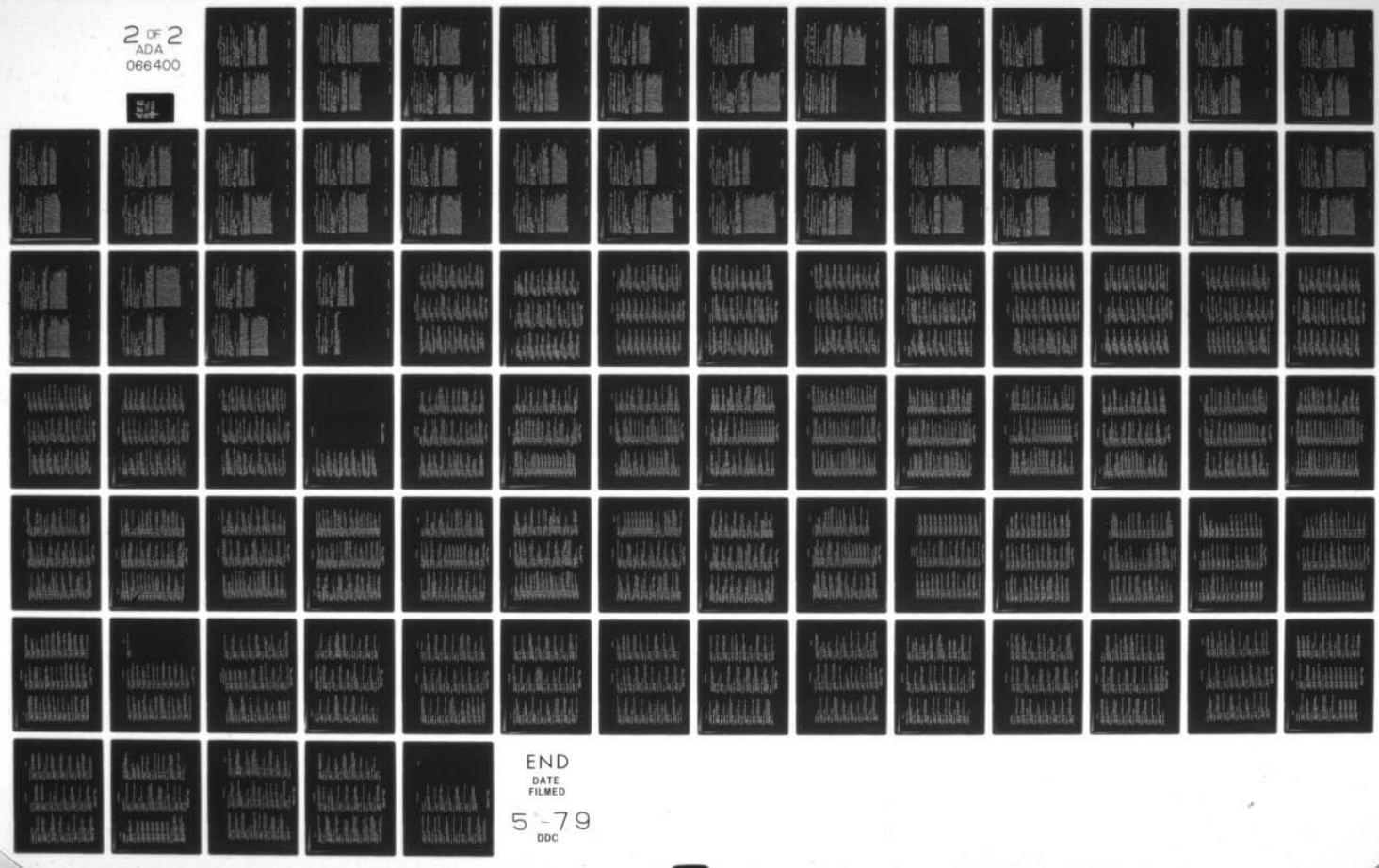

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RCA LABS PRINCETON N J

ADAPTIVE LOGIC ELEMENTS USING NON-GALVANIC MODIFYING INPUTS. (U)

DESCRIPTIVE NOTE: Final rept. 1 Jul 66-30 Sep 68,
OCT 68 35P Lewin,Morton H. ;Wu,Chin T. ;
CONTRACT: AF 19(628)-5930
PROJ: AF-4641
TASK: 464104
MONITOR: AFCRL 68-0557

UNCLASSIFIED REPORT

DESCRIPTORS: (*COMPUTER LOGIC, *FIBER OPTICS), (*LOGIC CIRCUITS, FIBER OPTICS), NETWORKS, INTEGRATED CIRCUITS, FIELD EFFECT TRANSISTORS, CADMIUM SULFIDES, PHOTOELECTRIC MATERIALS, ADAPTIVE SYSTEMS, CIRCUIT INTERCONNECTIONS, PUNCHED TAPE, MANUFACTURING (U)

Completely integrated NOR-gate chips for the iterative logic array consisting of 9 MOS transistors, 1 bipolar transistor, 1 resistor, and 16 CdS photoconductors were made. The processing combined the fabrication of the bipolar and monopolar devices with silicon technology for the first part and the use of thin-film technology for the photoconductors for the second part, thus allowing the integration of all devices on the same substrate. The selective illumination of the photosensors on small areas was implemented by means of flexible optical fibers aligned and fixed on top of the chips. Punched 8-level paper tapes are used as a mask for a predetermined radiation pattern. (Author) (U)

AD- 686 338 11/2 20/6 9/1
IIT RESEARCH INST CHICAGO ILL

FIBER OPTICS WITH EXTENDED ULTRAVIOLET TRANSMISSION. (U)

DESCRIPTIVE NOTE: Triannual rept. no. 4, 1 Sep-31 Dec 68,
JAN 69 46P Bratschun,W. R. ;Ali,M. A. ;Pincus,A. G. ;Schwartz,M. A. ;
CONTRACT: DAAB07-67-C-0542
PROJ: DA-1-H-662705-A-055, IITRI-G6018
TASK: 1-H-662705-A-05503
MONITOR: ECOM 0542-4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Triannual rept. 3, AD-678 490.

DESCRIPTORS: (*CATHODE RAY TUBE SCREENS, FIBER OPTICS), (*FIBER OPTICS, *ULTRAVIOLET OPTICAL MATERIALS), (*OPTICAL GLASS, LIGHT TRANSMISSION), LANTHANUM COMPOUNDS, ZINC COMPOUNDS, BORON COMPOUNDS, BARIUM COMPOUNDS, CALCIUM COMPOUNDS, CLADDING, THERMAL EXPANSION, REFRACTIVE INDEX (U)
IDENTIFIERS: NUMERICAL APERTURE (U)

Thermal expansion and viscosity-temperature measurements were made on candidate cladding and core glasses. Scaling-up processes were initiated and a comprehensive program for increasing uv transmission of lanthanum zinc borate and lanthanum barium calcium borate glasses as developed earlier was started. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 684 795 17/2 20/6 22/2
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB

MODEL II IMAGE DISSECTOR CAMERA SYSTEM. (U)

DESCRIPTIVE NOTE: Technical memo.,
NOV 68 74P Dozsa,John R. ;
REPT. NO. APL-TG-1019
CONTRACT: NOw-62-0604
MONITOR: IDEP 545.80.20.00-S6-02

UNCLASSIFIED REPORT

DESCRIPTORS: (*RECONNAISSANCE SATELLITES, TELEVISION CAMERAS), (*TELEVISION CAMERAS, *FIBER OPTICS), OPTICAL SCANNING, FEASIBILITY STUDIES, LOGIC CIRCUITS, DIGITAL TO ANALOG CONVERTERS, PHOTOGRAPHIC RECTIFIERS (U)

Line scan television cameras offer significant advantages over snapshot cameras for geographically continuous earth observation from an orbiting satellite. A study program has developed a laboratory model of a line scan camera utilizing an image dissector sensor and folded fiber optics for scene rectification. The camera's electronic circuitry design and performance are described in this report. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 684 670 20/5
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

CERTAIN CHARACTERISTICS OF A FIBER OPTICS LASER, (U)

OCT 68 6P Gvatua,Sh. Sh. ;Kukharskii, R. N. ;Mumladze,V. V. ;Khanevichev,V. A. ; Chavchanidze,V. V. ;
REPT. NO. FTD-GT-23-895-68

UNCLASSIFIED REPORT
PORTIONS OF THIS DOCUMENT ARE ILLEGIBLE. SEE INTRODUCTION SECTION OF THIS ANNOUNCEMENT JOURNAL FOR CFSTI ORDERING INSTRUCTIONS.
SUPPLEMENTARY NOTE: Edited trans. of Akademiya Nauk Gruzinskoi SSR, Tifl.s. Soobshcheniya, v49 n3 p557-559 1968, by L. Heenan.

DESCRIPTORS: (*LASERS, *FIBER OPTICS), OPTICAL PUMPING, GLASS, NEODYMIUM, LINE SPECTRA, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

Stimulated emission in fiber bundles containing an arbitrary number of fibers, and the dependence of radiation halfwidth on the pumping energy for both single and bundled fibers, are investigated. It was found that as the pumping energy increases, so do the number of 'spikes,' the emission intensity, and the halfwidth of the emission lines. When individual fibers were assembled into bundles the spikes disappeared. Stimulated emission traces for one fiber and for 8- and 20-fiber bundles displayed a continuous 'flat' line with peaks leveled off; the pumping theshold remained constant and radiation intensity increased in proportion to the number of fibers. For a large bundle of fibers, the rings were washed out and the modes were not resolved, but the halfwidth of the radiation lines remained within the same range. Individual modes could not be resolved even with zero-order interference. It is concluded that the emission from single fibers and from fiber bundles is the same and of a stimulated nature. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 678 490 9/1 11/2 20/6
IIT RESEARCH INST CHICAGO ILL

FIBER OPTICS WITH EXTENDED ULTRAVIOLET TRANSMISSION. (U)

DESCRIPTIVE NOTE: Triannual rept. no. 3, 1 Mar-31 Aug 68,
NOV 68 52P Li,P. C. ;Ali,M. A. ;
Olson,O. H. ;Schwartz,M. A. ;
CONTRACT: DAA807-67-C-0542
PROJ: DA-1-H-622001-A-055, IITRI-G6018
TASK: 1-H-622001-A-05503
MONITOR: ECOM 0542-3

UNCLASSIFIED REPORT

DESCRIPTORS: (*CATHODE RAY TUBE SCREENS, FIBER OPTICS), (*OPTICAL GLASS, PERFORMANCE(ENGINEERING)), REFRACTIVE INDEX, ABSORPTION, ULTRAVIOLET SPECTRA, VISIBLE SPECTRA, OXIDES, LANTHANUM COMPOUNDS, GADOLINIUM COMPOUNDS, YTTERBIUM COMPOUNDS, LUTECIUM COMPOUNDS, RUBIDIUM COMPOUNDS, SAMARIUM, PRASEODYMIUM, COBALT, NICKEL, CHROMIUM, COPPER, IMPURITIES, DENSITY, WAVE PROPAGATION (U)
IDENTIFIERS: EVALUATION, FACEPLATES, GRAPHS(CHARTS) (U)

This is the third triannual report describing the research and development leading to fabrication of fiber-optic faceplates for cathode ray tubes with high transmission in the near- and middle-ultraviolet spectral regions. The current program is, primarily, to evaluate existing optical glasses and develop improved ones suitable for meeting specific performance requirements. Formulation studies of new glasses containing La203, Gd203, Yb203, Lu203 and Rb20 were continued. Raw materials of different grades were investigated and the effect of such impurities as Co, Ni, Cr, Cu, Sm, and Pr on spectral transmission determined. In addition, density, refractive index, softening point and absorption coefficients were measured. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 674 600 20/6
AMERICAN OPTICAL CORP SOUTHBRIDGE MASS RESEARCH GROUP

CYLINDRICAL DIELECTRIC WAVEGUIDE MODES, (U)

APR 61 43P Snitzer,Elias ;
REPT. NO. Scientific-1
CONTRACT: AF 19(604)-7207
MONITOR: AFCRL 196

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIBER OPTICS, *WAVEGUIDES), DIELECTRICS, CYLINDRICAL BODIES, ELECTROMAGNETIC RADIATION, PROPAGATION (U)

The propagation of cylindrical dielectric waveguide modes near cut-off and far from cut-off are considered. The relative amounts of Ez and Hz, and the transverse components of the field are determined for both sets of hybrid modes. With the radial dependence of the z-components of the field in the central dielectric given by (J sub n) (ur/a), the transverse components far from cut-off are given by (J sub n plus or minus 1) (ur/a), where u is a parameter found from the boundary conditions and which fixes the scale of the Bessel function relative to the boundary r=a. The two values n+1 and n-1 correspond to the two sets of modes. The designation of the hybrid modes are discussed. Field plots for the lower order modes are given. (Author) (U)

AD- 673 446 20/6
CHICAGO AERIAL INDUSTRIES INC BARRINGTON ILL

FIBER OPTICS WITH HIGH ULTRA-VIOLET TRANSMISSION. (U)

DESCRIPTIVE NOTE: Final rept.,
JUN 68 46P Deneka,Charles W. ;
CONTRACT: DA-28-043-AMC-02057(E)

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Rutgers - The State Univ., New Brunswick, N.J. School of Ceramics.

DESCRIPTORS: (*ULTRAVIOLET OPTICAL MATERIALS, *FIBER OPTICS), GLASS, CLADDING, OPTICAL PROPERTIES, OPTIMIZATION, PREPARATION (U)

The purpose of the report is to show the development of a glass composition which is suitable for use as a core material in fiber optic devices operated in the near UV portion of the spectrum. The report specifies the required properties of the glass. It also describes the approach used to obtain the optimum combination of these properties, consistent with available time, money and equipment. A short section on the basic theories is presented as background. (Author) (U)

AD- 673 445 17/2 5/9 20/6
GENERAL PRECISION SYSTEMS INC PLEASANTVILLE N Y GPL DIV

WIDE ANGLE TELEVISION PROJECTION. VOLUME II. (APPENDICES D, E, F, G, AND H). (U)

DESCRIPTIVE NOTE: Final engineering rept. on phase 3,
FEB 68 76P Rosen,Estelle ;Washburn, Clayton A. ;Santone,Urban H. ;
CONTRACT: N61339-695
PROJ: 7276
MONITOR: NAVTRADEVCEN 695-2-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-673 444.

DESCRIPTORS: (*TELEVISION DISPLAY SYSTEMS, *PHOTOGRAPHIC PROJECTORS), (*FIBER OPTICS, TELEVISION DISPLAY SYSTEMS), (*TRAINING DEVICES, TELEVISION DISPLAY SYSTEMS), TELEVISION EQUIPMENT, CATHODE RAY TUBES, LENSES, POWER SUPPLIES, CLOSED CIRCUIT TELEVISION, NAVAL TRAINING, DIAGRAMS, MECHANICAL DRAWINGS (U)

This volume contains schematic diagrams, mechanical drawings, and specifications relating to the wide angle television system. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0MO7

AD- 673 444 17/2 5/9 20/6
GENERAL PRECISION SYSTEMS INC PLEASANTVILLE N Y GPL DIV

WIDE ANGLE TELEVISION PROJECTION. VOLUME I. (BASIC AND APPENDICES A, B, AND C). (U)

DESCRIPTIVE NOTE: Final engineering rept. on Phase 3,
FEB 68 98P Rosen,Estelle ;Washburn, Clayton A. ;Santone,Urban H. ;
CONTRACT: N61339-695
PROJ: 7276
MONITOR: NAVTRADEVCEN 695-2-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-673 445.

DESCRIPTORS: (*TELEVISION DISPLAY SYSTEMS, *PHOTOGRAPHIC PROJECTORS), (*FIBER OPTICS, TELEVISION DISPLAY SYSTEMS), (*TRAINING DEVICES, TELEVISION DISPLAY SYSTEMS), TELEVISION EQUIPMENT, CATHODE RAY TUBES, LENSES, POWER SUPPLIES, SCREENS(DISPLAYS), RESOLUTION, CLOSED CIRCUIT TELEVISION, NAVAL TRAINING (U)

The objective of this phase was to design, construct and install the wide angle TV projector. The camera and wide angle lens were developed under Phases I and II, and detailed in NAVTRADEVCEN 695-1. This three segment projector complements the three channel pickup camera, and displays the televised image on a ten foot radius hemispherical screen segment. The angle is 53 degrees in height and 160 degrees in width. It is intended that the entire system will be utilized as a laboratory research tool in connection with training devices that require a visual display for which this television system would be considered appropriate. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0MO7

AD- 673 366 20/6
AMERICAN OPTICAL CO KEENE N H

OBSERVED DIELECTRIC WAVEGUIDE MODES IN THE VISIBLE SPECTRUM, (U)

APR 61 43P Snitzer,Elias ;Osterberg, Harold ;
REPT. NO. Scientific-2
CONTRACT: AF 19(604)-7207
MONITOR: AFCRL 197

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIBER OPTICS, OPTICAL IMAGES), DIELECTRICS, LIGHT TRANSMISSION, WAVEGUIDES, REFRACTIVE INDEX, MOSAICS(LIGHT SENSITIVE) (U)

The direct images and the radiation patterns of the first few lowest order dielectric waveguide modes were observed in the visible region of the spectrum for fibers with core and cladding indices of refraction of 1.56 and 1.52, respectively, and for core diameters from 0.1 to 5.5 microns. The cut-off wavelengths for the observed modes are in reasonably good agreement with theory. Photographs of the modes are shown. (Author) (U)

AD- 670 079 20/6 11/2
IIT RESEARCH INST CHICAGO ILL

FIBER OPTICS WITH EXTENDED ULTRAVIOLET TRANSMISSION. (U)

DESCRIPTIVE NOTE: Triannual rept. no. 2 1 Nov 67-29 Feb 68,
MAY 68 38P Li,P. C. ;Ali,M. A. ;
Olson,O. H. ;Schwartz,M. A. ;
REPT. NO. IITRI-G6018-2
CONTRACT: DAAB07-67-C-0542
PROJ: DA-1-H-622001-A-055
TASK: 1-H-622001-A-05503
MONITOR: ECOM 0542-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-665 410.

DESCRIPTORS: (*FIBER OPTICS, *ULTRAVIOLET OPTICAL MATERIALS), (*OPTICAL GLASS, LIGHT TRANSMISSION), (*CATHODE RAY TUBE SCREENS, FIBER OPTICS), REFRACTIVE INDEX, ABSORPTION, LANTHANUM COMPOUNDS, SCREENS(DISPLAYS), RESOLUTION, IMPURITIES, ULTRAVIOLET SPECTRA, VISIBLE SPECTRA (U)
IDENTIFIERS: NUMERICAL APERTURE (U)

The objective of this contract is to conduct a research and development program leading to the fabrication of fiber-optic faceplates for cathode ray tubes with high transmission in the near- and middle-ultraviolet spectral regions. The first year's study is primarily to evaluate existing optical glasses (phase I) and develop improved ones suitable for meeting the specific performance requirements of the contract (phase II). Screening studies on commercial optical glasses were continued and compositions were analyzed. New multicomponent glasses, having a wide range of compositions were formulated. Spectral transmission, refractive index and absorption coefficient properties were measured. High index glasses in the zinc-lanthanum borate, zinc-calcium-lanthanum borate, and barium-calcium-lanthanum borate systems exhibited high transmission in the spectral region of interest. Exploratory work to further improve the transmission of glasses in these systems is being continued. One of the low index glasses prepared from pure raw materials exhibited excellent uv transmission. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 655 751 20/6
OPTICS TECHNOLOGY INC PALO ALTO CALIF

DIFFRACTION BY FIBER MOSAICS, (U)

OCT 66 3P Wilcox,R. E. ;
CONTRACT: AF 49(638)-1626
PROJ: AF-9767
TASK: 976702
MONITOR: AFOSR 67-1699

UNCLASSIFIED REPORT

Availability: Published in Applied Optics, v6 p582 Mar 1967.

DESCRIPTORS: (*FIBER OPTICS, DIFFRACTION), (*COHERENT RADIATION, FIBER OPTICS), GAS LASERS, SCATTERING, MODELS(SIMULATIONS), PATTERN RECOGNITION (U)

This report describes experiments with arrays of fiber optics elements using coherent light. A model is developed from the diffraction patterns obtained which is directly analagous to ordered antenna arrays for which complete analyses are available from communication sciences. The conclusion is drawn that improvements in random dephasing effects must be made before satisfactory performance is attained before the potential of coherent sources can be obtained with fiber arrays. (Author) (U)

AD- 654 651 20/6 9/2
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

FIBER-OPTIC DIGITAL POSITION DETECTOR, (U)

FEB 67 5P Rabinovich,V. A. ;
REPT. NO. FTD-HT-66-754

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Tsifrovoi Volokonno Opticheskii Datchik, unedited rough draft trans. of Patent (USSR) 179 030, appl. 929146/26-10, 6 Nov 64.

DESCRIPTORS: (*FIBER OPTICS, OPTICAL INSTRUMENTS), DIGITAL SYSTEMS, DETECTION, CODING (U)

The proposed digital position detector employs a fiber-optic matrix. For enhanced speed and accuracy, the ends of the matrix light conductors are binary coded. A diagram is shown in the figure. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 652 210 6/11 17/2.1 20/5 11/9
6/6 6/15 9/1 13/10
6/1 7/2 6/4
LIBRARY OF CONGRESS WASHINGTON D C AEROSPACE TECHNOLOGY DIV

FOREIGN SCIENCE BULLETIN, VOL. 3, NO. 4, 1967. (U)

APR 67 128P
MONITOR: TT 67-61945

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: A Monthly Review of Selected Foreign Scientific and Technical Literature. Also available on subscription, $36.00/yr. See also AD-650 304.

DESCRIPTORS: (*SCIENTIFIC RESEARCH, REVIEWS), (*SPACECRAFT CABINS, *CONTROLLED ATMOSPHERES), (*RADIO TRANSMISSION, TROPOSPHERE), (*LASERS, *FIBER OPTICS), (*HEAT RESISTANT PLASTICS, DEGRADATION), (*METALORGANIC COMPOUNDS, PHYSIOLOGY), PESTICIDES, DRUGS, UNDERWATER VEHICLES, PHOTOELECTRIC CELLS(SEMICONDUCTOR), CHLOROPLASTS, COMPLEX COMPOUNDS, SILANES, BIONICS, US (U)

Contents: Articles: Spacecraft cabin atmospheres (a review of Soviet literature); Recent Soviet research on tropospheric communications; Fiber-optics laser with nonresonant feedback; Thermal and thermal-oxidative degradation of some heat-resistant polymers; Biologically active organotin and organolead compounds and polymeric materials. Science and Technology notes: Bentos-300-new Soviet sealab; Quenching of a laser by a laser; A position-sensitive biphotocell; Process produces ultra-small metal particles; Synthetic lipoprotein complex modeling chloroplast compexes; Infrared spectra of organosiliconfluorophosphorus compounds. Conferences: Seminar on Bionics and Biocybernetics. Science personalities: Valentin Alekseyevich Kargin. Book reviews. (U)

AD- 651 060 1/3 20/6
IIT RESEARCH INST CHICAGO ILL

STUDY OF DETERMINE DESIGN CRITERIA FOR A STEREO FIBER OPTIC PERISCOPE FOR AIRCRAFT APPLICATION. (U)

DESCRIPTIVE NOTE: Final rept., 11 Apr 66-10 Apr 67, APR 67 45P Betz,H. T. ;
CONTRACT: NOw-66-0439
PROJ: IITRI-A6152

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIRCRAFT EQUIPMENT, PERISCOPES), (*PERISCOPES, *FIBER OPTICS), FEASIBILITY STUDIES, STEREOSCOPIC DISPLAY SYSTEMS, TELESCOPES, DEFECTS(MATERIALS), OPTICAL EQUIPMENT COMPONENTS, OPTICAL IMAGES, SPACE PERCEPTION (U)

A program was conducted to investigate the feasibility of substituting a fiber optics periscope system for conventional direct viewing through the windshield in high performance aircraft operation. The requirements for a stereoscopic image presentation possessing time, distance, and spacial relationship are delineated. The stringent specifications imposed on dual fiber bundles by the stereoscopic application led to the successful development of a single-bundle telescope with flicker-free time sharing. A working model to demonstrate the single-bundle, time-shared system was constructed. Methods for providing display systems with long eye relief and large exit pupils are described. A working model incorporating a large spherical mirror was constructed for use with stereo slides to demonstrate these principles. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 650 421 6/3 6/16 20/6
WALTER REED ARMY INST OF RESEARCH WASHINGTON D C

AN IMPROVED TECHNIQUE FOR OBTAINING CORTICAL PHOTOELECTRIC PLETHYSMOGRAMS, (U)

MAY 66 2P Brewington,Hubert H. ; Stecher,Karl , Jr;

UNCLASSIFIED REPORT
Availability: Published in Journal of Applied Physiology v22 n1 p187-8 Jan 1967.

DESCRIPTORS: (*MEDICAL EXAMINATION, *FIBER OPTICS), (*CEREBRAL CORTEX, MEDICAL EXAMINATION), LIGHT PULSES, PHOTOTUBES, QUARTZ, MONKEYS (U)
IDENTIFIERS: PLETHYSMOGRAPHY (U)

An improved technique for obtaining photoelectric plethysmograms from the cortex of unanesthetized monkeys has been developed. Through operative openings in the skull and dura, quartz tubes are sealed in place (closed end against the cortex). A light source and photocell receiver can be freely inserted and removed from the tubes. Acceptable recordings may be obtained for months. Advantages are facility of component interchange, increased light transmission, and durability of the preparation. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 650 234 20/9 20/6
COLUMBIA UNIV NEW YORK ELECTRONICS RESEARCH LABS

A TRANSIENT FIBER OPTICS PROBE FOR SPACE RESOLVED DIAGNOSTICS OF DENSE PLASMAS. (U)

DESCRIPTIVE NOTE: Revised ed.,
FEB 66 10P Stojanoff,Christo G. ;
CONTRACT: AF 49(638)-1395
PROJ: AF-9783
TASK: 978302
MONITOR: AFOSR 67-0834

UNCLASSIFIED REPORT
Availability: Published in AIAA Journal, v4 n10 p1766-72, Oct 1966.
SUPPLEMENTARY NOTE: Revision of manuscript received 2 Jun 1965, Supported in part by TMRL, and ARL.

DESCRIPTORS: (*PLASMA MEDIUM, *PROBES), (*FIBER OPTICS, PLASMA MEDIUM), DENSITY, INTENSITY, HIGH TEMPERATURE (U)
IDENTIFIERS: DIAGNOSIS(GENERAL), PLASMAS(PHYSICS) (U)

A new type of probe for measuring local values of radiant intensity in dense plasmas is presented. The probe consists of a thin tube with blackened interior and is fitted with an end cap that limts the sampled radiation to a plasma volume approx. 1 cu. mm. between cap and tube end. The sampled light is transmitted from the rear end of the tube via a flexible fiber optics bundle to an optical filter, photomultiplier, and associated read-out instrumentation. The measurement is made by driving the probe at high speed (750 cm/sec) through the plasma column by means of a valve-operated pneumatic drive. The adaptation of the instrument to space-resolved temperature measurements by the absolute line intensity method and the line ration method is described and compared to the standard spectrographic technique. Chief advantages of the transient probe method are simplicity in both diagnostic and data processing apparatus and applicability to plasma of arbitrary shape. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 649 185 17/2 20/6
IIT RESEARCH INST CHICAGO ILL

CONTINUOUS FACSIMILE SCANNER EMPLOYING FIBER OPTICS. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 10, 1 Oct-31 Dec 66,
MAR 67 13P Pontarelli,Donald A. ;
REPT. NO. IITRI-A6093-30
CONTRACT: DA-28-043-AMC-00164(E)
PROJ: IITRI-A6093
TASK: 1P6-20501-A448-02-03
MONITOR: ECOM 00164-10

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-644 856.

DESCRIPTORS: (*FIBER OPTICS, *FACSIMILE EQUIPMENT), (*SCANNING, FIBER OPTICS), MODULATORS, DESIGN (U)

The basic mechanical system was fabricated and assembled. The temperature drift previously causing difficulty in the low-level modulator was substantially reduced. Preliminary design of the 18-5/8 inch facsimile transmitter was initiated and a fiber optics array configuration is presented. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 646 856 17/2 20/6
IIT RESEARCH INST CHICAGO ILL

CONTINUOUS FACSIMILE SCANNER EMPLOYING FIBER OPTICS. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 9, 1 Jul-30 Sep 66,
JAN 67 14P Pontarelli,Donald A. ;
REPT. NO. IITRI-A6093-27
CONTRACT: DA-28-043-AMC-00164(E)
PROJ: IITRI-A6093
TASK: 1P6-20501-A448-02-03
MONITOR: ECOM 00164-9

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-644 963.

DESCRIPTORS: (*FACSIMILE EQUIPMENT, *FIBER OPTICS), (*OPTICAL SCANNING, FIBER OPTICS), MODULATORS, CIRCUITS, PERFORMANCE(ENGINEERING), OPTICAL IMAGES, ELECTRICAL PROPERTIES, OPTICAL EQUIPMENT COMPONENTS, EMBEDDING SUBSTANCES, FACSIMILE TRANSMISSION (U)

The objectives of the program are the design and construction of an advanced development model of a continuous facsimile transmitter employing a fiber optics scanner. The performance of the modulator circuit was evaluated and the black-to-white ratio was determined for different lamp and modulator voltage levels. Pertinent design features of the prototype scanner are presented and discussed. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 644 963 17/2 20/6
IIT RESEARCH INST CHICAGO ILL

CONTINUOUS FACSIMILE SCANNER EMPLOYING FIBER OPTICS. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 8, 1 Apr-30 Jun 66,
SEP 66 38P Pontarelli,Donald A. ;
REPT. NO. IITRI-A6093-24
CONTRACT: DA-28-043-AMC-00164(E)
PROJ: IITRI-A6093
TASK: 1P6-20501-A448-02-03
MONITOR: ECOM 00164-8

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-642 675.

DESCRIPTORS: (*FIBER OPTICS, *FACSIMILE EQUIPMENT), (*SCANNING, FIBER OPTICS), MODULATORS, AMPLIFIERS, DESIGN (U)

Design, fabrication, and testing of the modulator and amplifier are discussed in extensive detail. The design approach used has led to an operative equipment. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 643 075 17/2 20/6
IIT RESEARCH INST CHICAGO ILL

CONTINUOUS FACSIMILE SCANNER EMPLOYING FIBER OPTICS. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 7, 1 Jan-31 Mar 66,
JUL 66 16P Pontarelli,Donald A. ;
REPT. NO. IITRI-A6093-21
CONTRACT: DA-28-043-AMC-00164(E)
PROJ: IITRI-A6093
TASK: 1P6-20501-A448-02-03
MONITOR: ECOM 00164-7

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-643 074.

DESCRIPTORS: (*FIBER OPTICS, *FACSIMILE EQUIPMENT), (*SCANNING, FIBER OPTICS), DESIGN, PHOTOELECTRIC CELLS(SEMICONDUCTOR), CIRCUITS, MODULATORS (U)

Mechanical design features of the prototype facsimile scanner are listed and discussed in some detail. This phase of the program is estimated to be approximately 80% completed. The fiber optics detector system, consisting of a light source detector and modulator circuit, is approaching finalization. Problem areas in this phase are discussed. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 643 074 17/2 20/6
IIT RESEARCH INST CHICAGO ILL

CONTINUOUS FACSIMILE SCANNER EMPLOYING FIBER OPTICS. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 6, 1 Oct-31 Dec 65,
MAY 66 13P Pontarelli,Donald A. ;
REPT. NO. IITRI-A6093-18
CONTRACT: DA-28-043-AMC-00164(E)
PROJ: IITRI-A6093
TASK: 1E6-34301-D246-03-06
MONITOR: ECOM 00164-6

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-642 675 and AD-643 075.

DESCRIPTORS: (*FIBER OPTICS, *FACSIMILE EQUIPMENT), (*SCANNING, FIBER OPTICS), DESIGN, PLASTIC COATINGS, HALOCARBON PLASTICS, PRECISION FINISHING, PHOTOELECTRIC CELLS(SEMICONDUCTOR) (U)

Work was continued on the selection, design and construction of the mechanical, electrical and optical components necessary to produce a functional facsimile transmitter. The major accomplishments during the report period were: (1) Design of a unitized prototype facsimile scanner. (2) Acquisition and classification of photodetector data. (Author) (U)

AD- 642 675 17/2 20/6
IIT RESEARCH INST CHICAGO ILL

CONTINUOUS FACSIMILE SCANNER EMPLOYING FIBER OPTICS. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 5, 1 Jul-30 Sep 65,
MAY 66 18P Pontarelli,Donald A. ;
REPT. NO. IITRI-A6093-15
CONTRACT: DA-28-043-AMC-00164(E)
PROJ: DA-1E6-34301-D246
TASK: 1E6-34301-D246-0306
MONITOR: ECOM 00164-5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-624 696.

DESCRIPTORS: (*FIBER OPTICS, *FACSIMILE EQUIPMENT), (*SCANNING, FIBER OPTICS), SURFACE PROPERTIES, DEFECTS(MATERIALS), PHOTOELECTRIC CELLS(SEMICONDUCTOR), PHOTOTUBES, PRECISION FINISHING (U)

The major achievements of the period covered by this report were: (1) Reduction by several orders of magnitude of the defects occurring at the core-coating interface of fibers. (2) Production of a photographic record essentially free of photometric imperfections by means of a 2.5 inch fiber optics facsimile scanner. (3) Identification of grinding and polishing as a phase which requires further detailed study. (4) Accumulation and cataloging of characteristic photodetector data. (Author) (U)

AD- 637 173 6/12 20/6 6/16
SAINT LOUIS UNIV MO DEPT OF PHYSIOLOGY

PHOTOELECTRIC PLETHYSMOGRAPHY USING FIBER OPTICS FOR APPLICATION IN THERMAL PHYSIOLOGY. (U)

DESCRIPTIVE NOTE: Final rept. May 63-Sep 64.
APR 66 14P Hertzmann,Alrick B. ;Flath, Franz ;
CONTRACT: AF 33(657)-11551,PHS-H-4939
PROJ: AF-7164,
TASK: 716409,
MONITOR: AMRL TR-66-31

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Grant PHS-HE-07070.

DESCRIPTORS: (*TEMPERATURE SENSITIVE ELEMENTS, *FIBER OPTICS), (*MEDICAL EQUIPMENT, TEMPERATURE SENSITIVE ELEMENTS), (*HEAT PRODUCTION(BIOLOGY), MEASUREMENT), MOUTH, BODY TEMPERATURE, SKIN(ANATOMY), BLOOD CIRCULATION, MEMBRANES(BIOLOGY), BLOOD VOLUME, TISSUES(BIOLOGY), METABOLISM, ABSORPTION SPECTRA, PHOTOTUBES (U)
IDENTIFIERS: PLETHYSMOGRAPHY (U)

Several designs of photoelectric plethysmographs utilizing fiber optics are described. One arrangement is used for studies on the cutaneous circulation. A modification of this design was applied successfully to the oral mucosa in climate chamber experiments. With a light wire substituted for the photocell, interference filters and multiplier phototubes may be combined for spectrophotometric recording. This arrangement is particulary useful for following changes in blood content of the illuminated tissue during changes in ambient temperature. (Author) (U)

AD- 637 064 20/6
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

LIGHT TRANSMITTING CABLES. (U)

MAY 66 7P Kung,K. Y. ;
REPT. NO. FTD-TT-65-725,
MONITOR: TT 66-62037

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited trans. of K'o Hsueh Ta Chung (Chinese People's Republic) n12 p5 1963.

DESCRIPTORS: (*FIBER OPTICS, GLASS), CHINA, LIGHT TRANSMISSION, REFRACTIVE INDEX, REFLECTION (U)

A light cable is composed of two parts, the fiber center and the thin glass housing. The fiber is made of material of higher refractive index, and the housing of lower refractive index. The housing serves to protect the surface of each individual fiber so that it remains smooth and clean. It also separates one fiber from another in the cable. The main function of the housing is, however, to provide an outside layer of a lower refractive index on the fiber so that the phenomenon of total reflection is produced when a light beams enters a single light fiber. In this way, light can be transmitted through a curved and soft light cable. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 636 807 9/1 20/6
DUMONT ELECTRON TUBES CLIFTON N J

12 INCH DIAMETER CATHODE-RAY TUBE WITH FIBER OPTIC FACEPLATE. (U)

DESCRIPTIVE NOTE: Quarter interim development rept. no. 8, 1 Apr-30 Jun 66.
JUL 66 5P Cawein, Madison ;
CONTRACT: NObsr-91206,
PROJ: SF0070501,
TASK: 6030,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-620 730

DESCRIPTORS: (*CATHODE RAY TUBES, *FIBER OPTICS), MANUFACTURING, MILITARY REQUIREMENTS, SPECIFICATIONS, ELECTRON TUBES, DISPLAY SYSTEMS (U)

In the eighth quarter, A new 12 inch fiber optic faceplate was fabricated, and subjected to a first inspection after rough polish. This preliminary inspection indicated that the plate might be acceptable, though not perfect. (Author) (U)

AD- 627 456 20/5 20/6
OPTICS TECHNOLOGY INC BELMONT CALIF

FIBER OPTICS AND THE LASER. (U)

65 26P Kapany,N. S. ;
CONTRACT: AF 49(638)-1200 ,Nonr-4333(00)
PROJ: AF-9767
TASK: 976702
MONITOR: AFOSR , 65-1977

UNCLASSIFIED REPORT
Availability: Published in Annals of the New York Academy of Sciences v122 p615-37 May 28 1965. Copies to DDC users only.
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*FIBER OPTICS, LASERS), (*LASERS, FIBER), MEDICAL RESEARCH, TISSUES(BIOLOGY), COAGULATION, NEODYMIUM, DOPING, GLASS (U)

The various applications made possible by the combination of the fields of lasers and fiber optics are discussed in some detail. The use of lasers in medicine for the coagulation of tissues accessible to direct observation and of tissues inside the human body inaccessible to direct observation, using laser-fiber optics endoscopes, is discussed. The possibility of using the fiber optics hypodermic probe, capable of ultraviolet excitation as well as laser coagulation in deep regions under the skin, are also discussed. More recent work done on lasing fibers, made possible with the availability of neodymiumdoped glasses, are described along with the output characteristics and potential applications. (U)

AD- 624 696 17/2 20/6
IIT RESEARCH INST CHICAGO ILL

CONTINUOUS FACSIMILE SCANNER EMPLOYING FIBER OPTICS. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 4, 1 Apr-30 Jun 65,
NOV 65 21P Pontarelli,Donald A. ;
REPT. NO. IITRI-A6093-12
CONTRACT: DA-28-043-AMC-00164(E)
PROJ: IITRI-A6093
TASK: 1E6-34301-D246-03-02

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-623 204.

DESCRIPTORS: (*FIBER OPTICS, FACSIMILE EQUIPMENT), (*FACSIMILE EQUIPMENT, FIBER OPTICS), (*SCANNING, FIBER OPTICS), RECORDING PAPER, PHOTOGRAPHIC PAPER, SURFACE PROPERTIES, GLASS, RODS, PHOTOELECTRIC CELLS(SEMICONDUCTOR) (U)

Photometric imperfections occurring in copy exposed through a fiber sheet were reduced by use of bulk glass rods whose surface had been ground and polished to an optical finish. Evaluation of the linearity, temperature characteristics, and sensitivity of a number of light detectors resulted in selection of a type considered best choice for use in the facsimile scanner. Prototype of scanner assembled and functioned satisfactorily except for minor variations in speed of the copy feed belt. (Author) (U)

AD- 624 099 20/5 20/6
TEXAS INSTRUMENTS INC DALLAS APPARATUS RESEARCH AND DEVELOPMENT LAB

LARGE-ANGLE DEFLECTION TECHNIQUE FOR LASER DISPLAY. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 1,
NOV 65 35P Fournier,G. R. ;Parker,H. W. ;
REPT. NO. UI-912008-1
CONTRACT: AF30(602)-3731
PROJ: AF-5597
MONITOR: RADC , TR-65-349

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ELECTROOPTICS, LASERS), (*LASERS, DISPLAY SYSTEMS), (*FIBER OPTICS, LASERS), LIGHT, REFLECTORS, PIEZOELECTRIC TRANSDUCERS, DEFLECTION, ELECTRON OPTICS, TELEVISION DISPLAY SYSTEMS, OPTICAL COMMUNICATIONS, OPTICAL EQUIPMENT (U)

A large angle deflection technique for producing a 945-line T.V. type raster scan in an experimental laser display was developed, since conventional deflection methods could not be used. The horizontal scanner was comprised of a rotating mirror and a piezoelectric cartridge, coupled by a glass resonator shaft. A circular scan was generated and then transformed into a linear scan by a fiber optic converter. The use of the fiber optic bundle allowed zero flyback time. The linear beam was then deflected vertically by a galvanometer driven mirror at a 60 cycle per second rate. After vertical scanning, the light beam was projected through a lens on a screen. Circuitry for error sensing feedback for the scanners is continuing under study. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 623 815 17/2 20/6
GPL DIV GENERAL PRECISION INC PLEASANTVILLE N Y

WIDE ANGLE TELEVISION PROJECTION. VOLUME II, APPENDICES B AND C (SCHEMATICS). (U)

DESCRIPTIVE NOTE: Final engineering rept., phases 1 and 2,
OCT 64 26P Raitiere,Louis P. ;Santone, Urban H. ,Jr.;
CONTRACT: N61339-695
MONITOR: NAVTRADEVCEN 695-1-Vol-2

UNCLASSIFIED REPORT
Distribution: Microfiche only after original copies exhausted.
SUPPLEMENTARY NOTE: See also Volume 1, AD-621 711.

DESCRIPTORS: (*FIBER OPTICS, TELEVISION EQUIPMENT), (*TELEVISION EQUIPMENT, TELEVISION CAMERAS), TESTS, TELEVISION DISPLAY SYSTEMS, ICONOSCOPES, BACKGROUND, VISIBILITY (U)

Contents: Appendix B, Electrical schematic diagrams; Appendix C, Selected details of wide-angle lens. (U)

AD- 623 204
IIT RESEARCH INST CHICAGO ILL

CONTINUOUS FACSIMILE SCANNER EMPLOYING FIBER OPTICS. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 3, 1 Jan-31 Mar 65,
OCT 65 18P Pontarelli,Donald A. ;
REPT. NO. IITRI-A6093-9
CONTRACT: DA28 043AMC00164E
PROJ: IITRI A6093
TASK: 1P6 20501A448 02 03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-615 526.

DESCRIPTORS: (*FIBER OPTICS, FACSIMILE EQUIPMENT), (*FACSIMILE EQUIPMENT, FIBER OPTICS), (*SCANNING, FIBER OPTICS), DRIVES, ELECTRIC MOTORS, PHOTOTUBES, OPTICAL SCANNING, FACSIMILE TRANSMISSION (U)

The major area of effort this quarter concerned the preparation of the design plan which was submitted at the end of February. Research effort in electronics has been concentrated on the motor drive electronics, signal processing, and consideration of photodetectors. Mechanical engineering has continued the design and fabrication of the copy transport drive which is essential to the further study of the fiber optic scanning system and the optical performance of single layers of fiber. In the latter area, intensive study of the causes of photometric defects in copy exposed through a fiber sheet has indicated the necessity of extensive and detailed study of all aspects of fiber drawing and fiber sheet fabrication. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 622 509
GENERAL ATRONICS CORP PHILADELPHIA PA ELECTRONIC TUBES AND INSTRUMENT DIV

THE DESIGN, DEVELOPMENT, AND FABRICATION OF A MINIATURE FIBEROPTIC FACEPLATE CATHODERAY TUBE FOR USE IN MICRO-DISPLAY. (U)

DESCRIPTIVE NOTE: Final development rept. for May 63-31 Oct 65.
NOV 65 60P
CONTRACT: NObsr89280
PROJ: SR0008035
TASK: 9477

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale. See also AD-428 822.

DESCRIPTORS: (*CATHODE RAY TUBE SCREENS, FIBER OPTICS), (*FIBER OPTICS, CATHODE RAY TUBE SCREENS), (*CATHODE RAY TUBES, MINIATURE ELECTRON TUBES), ELECTRON OPTICS, ELECTRON GUNS, PHOSPHORESCENT MATERIALS, DEFLECTION, SENSITIVITY, RESOLUTION, DESIGN (U)

An attempt was made to design, develope, and produce two samples of a short, miniature, high resolution fiber optic face plate cathode-ray tube of high deflection sensitivity and low grid drive for use in a 'micro display'. The use of the 'ballistic' or folded electron optics principle was attempted in order to obtain in a very short tube the equivalent characteristics of a tube at least twice as long. Time and funds ran out before samples of this design could be produced. The tubes produced to implement the production phase of the contract are of the conventional straight line design. (U)

AD- 621 711
GENERAL PRECISION INC PLEASANTVILLE N Y GPL DIV

WIDE ANGLE TELEVISION PROJECTION, VOLUME I. (U)

DESCRIPTIVE NOTE: Final engineering rept., Phases 1 and 2, Vol. 1,
OCT 64 158P Raitiere,Louis P. ;Santone, Urban H. ,Jr.;
CONTRACT: N61339-695
MONITOR: NAVTRADEVCEN 695-1-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-623 815.

DESCRIPTORS: (*FIBER OPTICS, TELEVISION EQUIPMENT), (*TELEVISION EQUIPMENT, TELEVISION CAMERAS), TESTS, TELEVISION DISPLAY SYSTEMS, INCONOSCOPES, BACKGROUND, VISIBILITY (U)

The common objective of Phases I and II of the contract was to design, modify, construct, and arrange television equipments to provide a wide angle television system for viewing target and background information, and to adapt or modify commercially available equipment for electronically inserting the target information into the background. Reported in detail at this time is the development of the camera lens which provides an angle of view of 159 degrees in azimuth, and which is considered a significant achievement, and an examination of Fiber Optic Bundles. Phase III of the contract, presently in the study phase, to be reported upon completion of this Project, will deal with the design and construction of the combined system to project a wide angle TV picture for the realistic presentation of a trainee environment. (Author) (U)

AD- 620 730
DUMONT ELECTRON TUBES CLIFTON N J

12'' DIAMETER CATHODE-RAY TUBE WITH FIBER OPTIC FACEPLATE. (U)

DESCRIPTIVE NOTE: Quarterly interim development rept. no. 4, 1 Apr-30 Jun 65,
AUG 65 11P Cawein,Madison ;
CONTRACT: Nobsr91206
PROJ: SF0070501
TASK: 6030

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-620 729.

DESCRIPTORS: (*CATHODE RAY TUBES, FIBER OPTICS), (*FIBER OPTICS, CATHODE RAY TUBES), MANUFACTURING, MILITARY REQUIREMENTS, SPECIFICATIONS, ELECTRON TUBES, DISPLAY SYSTEMS (U)

Du Mont Electron Tubes Division utilized the fourth quarterly period to process and fabricate a second dummy F.O. tube and start the fabrication of a final, real F.O. tube of type KC2474P19. The second dummy was necessary to test an exhaust schedule cam which had to be fabricated in this quarter for bakeout of the final tubes. A potting fixture was designed and fabricated for potting the dummy and final tubes with RTV around the gold-foil frit seal. The cone and final assembly drawings were revised and up-dated at the start of this period. (Author) (U)

AD- 620 729
DUMONT ELECTRON TUBES CLIFTON N J

12'' DIAMETER CATHODE-RAY TUBE WITH FIBER OPTIC FACEPLATE. (U)

DESCRIPTIVE NOTE: Quarterly interim development rept. no. 3, 1 Jan-31 Mar 65,
JUL 65 9P Cawein,Madison ;
CONTRACT: NObsr91206
PROJ: SF0070501
TASK: 6030

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CATHODE RAY TUBES, FIBER OPTICS), (*FIBER OPTICS, CATHODE RAY TUBES), MANUFACTURING, SPECIFICATIONS, ELECTRON TUBES, DISPLAY SYSTEMS (U)

The purpose of this program is to develop, fabricate and supply two fiber optic faceplate cathode ray tubes, having the electrical characteristics of the 12BCP19. These tubes shall be suitable for testing in the AN/SYA-4(V) Console Data Input Display. Du Mont Electron Tubes Division utilized the third quarterly period to fabricate glass cones for dummy tubes and process and test the first dummy tube. Actually, three dummy tubes were fabricated by the vendor. Two of these were rejected at Du Mont. The third dummy was processed and tested. This third dummy passed all electrical MIL-E-1 specs; and, on the basis of its successful performance the design of the final tube was completed. Four glass cones were delivered to the vendor in this period. (Author) (U)

AD- 615 526
IIT RESEARCH INST CHICAGO ILL

CONTINUOUS FACSIMILE SCANNER EMPLOYING FIBER OPTICS. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 2, 1 Oct-31 Dec 64,
JAN 65 29P Pontarelli,Donald A. ;
REPT. NO. IITRI-A6093-6
CONTRACT: DA28 043AMC00164E
TASK: 1E6 34301D246 03 06
MONITOR: ECOM , 00614-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-613 302.

DESCRIPTORS: (*SCANNING, FIBER OPTICS), (*FIBER OPTICS, SCANNING), (*FACSIMILE EQUIPMENT, FIBER OPTICS), FACSIMILE TRANSMISSION, ILLUMINATION, SURFACE PROPERTIES, BRIGHTNESS, INTERFERENCE, RADIO WAVES, OSCILLATORS, TRANSMITTER RECEIVERS (U)
IDENTIFIERS: AN/GXC-5 (U)

Effort was concentrated primarily towards design and fabrication of a test model to incorporate the fiber optics package suited to the space requirements dictated by the physical configurations of the GXC-5 facsimile transmitter. A copy transport mechanism was designed with a temporary drive attached in order to make it operable for a test program. Continued investigation with extensive consideration being given towards means for increasing copy illumination level. Study initiated to determine susceptibility to radio frequency interference. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 614 448
FAIRCHILD CAMERA AND INSTRUMENT CORP CLIFTON N J ALLEN B DUMONT LABS DIV

12 INCH DIAMETER CATHODE RAY TUBE WITH FIBER OPTIC FACEPLATE. (U)

DESCRIPTIVE NOTE: Revision no. 1 to Quarterly progress rept. no. 1, 1 Jul-30 Sep 64,
JAN 65 14P Cawein,Madison ;
REPT. NO. SI-5874 rev. 1 ,MO-10159 rev. 1
CONTRACT: NOBsr91206
PROJ: SF0070501
TASK: 6030

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Revision to rept. Program to Develop a 12 Inch Diameter Fiber Optic Faceplate Cathode Ray Tube, 20 Nov 64, AD-609 967. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is not available for public sale.

DESCRIPTORS: (*CATHODE RAY TUBES, FIBER OPTICS), (*FIBER OPTICS, CATHODE RAY TUBES), ELECTRON GUNS, GLASS, DESIGN (U)
IDENTIFIERS: FACEPLATES (U)

Du Mont Laboratories finalized basic and component designs and developed a method for pre-testing the electron gun design. Historical test evaluation data indicates that the major cause of rejections of tubes similar to the 12BCP19 are the result of mis-alignment of electron gun components. Electron gun assemblies for this program will be individually tested in 12BCP19 blanks before sealing into a fiber optic tube. Prior to fabrication of the fiber optic faceplate tubes, two experimental units with plain glass dummy faceplates will be processed through all operations, thereby proving reliability of manufacturing operations. Preliminary studies and reviews disclosed limitations were imposed by the fiber optic supplier, also available fixtures for fiber optic faceplate fabrication limit the faceplate diameter to 11-7/8 inches (maximum). (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 613 302
IIT RESEARCH INST CHICAGO ILL

CONTINUOUS FACSIMILE SCANNER EMPLOYING FIBER OPTICS. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 1, 24 Jun-31 Oct 64,
OCT 64 7P Pontarelli,Donald A. ;
REPT. NO. IITRI-A6093-3
CONTRACT: DA28 043AMC00164E
PROJ: A6093
TASK: 1P6 20501A448 02 03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*FACSIMILE EQUIPMENT, FIBER OPTICS), (*FIBER OPTICS, FACSIMILE EQUIPMENT), SURFACE PROPERTIES, BRIGHTNESS, SCANNING (U)
IDENTIFIERS: AN/GXC-5 (U)

Studies of optical and mechanical configurations towards design and placement of a fiber optics scanner within the confines of AN/GXC-5 Facsimile transmitter. Considerations relative to employment of major numbers of mechanical and electrical components now in use in the facsimile transmitter. Investigation and experimentations are being pursued to provide a higher surface brightness, above that obtained by use of large area fluorescent tubes, in the new fiber optics scanner. (Author) (U)

AD- 612 902
OPTICS TECHNOLOGY INC BELMONT CALIF

LONG WAVELENGTH INFRARED FIBER OPTICS. (U)

DESCRIPTIVE NOTE: Interim engineering rept. no. 3, 16 Dec 64-15 Feb 65,
MAR 65 16P Kapany,N. S. ;Simms,R. J. ;
CONTRACT: AF33 615 1952
PROJ: 4056
TASK: 405603

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*FIBER OPTICS, INFRARED OPTICAL MATERIALS), (*INFRARED OPTICAL MATERIALS, FIBER OPTICS), (*GLASS, FIBER OPTICS), CERAMIC FIBERS, LIGHT TRANSMISSION, COATINGS, PIPES, INFRARED RADIATION, ARSENIC COMPOUNDS, SULFIDES (U)

Development work on far infrared transmitting fiber optics is reported. Effort during the third quarter has been concentrated on the following: 1) additional samples of glass were evaluated in fiber draws: 2) techniques were developed to demonstrate the presence of the coating glass on a coated fiber; and 3) transmission profiles and radiation pattern measurements were recorded for two types of coated fibers. The results are included in this report. Furthermore, effort on the development of techniques for fabricating short flexible light pipes was continued and several successful samples have been made using uncoated fibers. Two glass combinations have been used to produce short lengths of good quality coated fibers. Devitrification is still a problem, producing some seeds in long lengths of fiber, but additional draws are scheduled with these glasses in an attempt to minimize this defect. The optical evaluation equipment has proved to be satisfactory for the measurements required and the characteristic curve concept has been demonstrated. Light pipe fabrication techniques have been developed and appear to be satisfactory for the production of short flexible components. (Author) (U)

AD- 612 637
OPTICS TECHNOLOGY INC BELMONT CALIF

ROLE OF FIBER OPTICS IN PHOTOGRAPHY, (U)

64 4P Kapany,N. S. ;
CONTRACT: AF49 638 1200
MONITOR: AFOSR , 65-0445

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Also included in International Commission for Optics, Conference on Photographic and Spectroscopic Optics, 1-8 Sep 64, held at Tokyo and Kyoto.

DESCRIPTORS: (*FIBER OPTICS, PHOTOGRAPHY), (*PHOTOGRAPHY, FIBER OPTICS), IMAGE INTENSIFIERS (ELECTRONICS), RESOLUTION, OPTICAL EQUIPMENT, PHOTOELECTRIC EFFECT (U)

Fiber optics assemblies in the form of field flatteners, image dissectors, image intensifiers, FOCONS, and fiber coupling plates are described for use in various high speed, high resolution photographic systems and photoelectronic devices. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 611 944
STANFORD RESEARCH INST MENLO PARK CALIF POULTER LABS

OPTICAL PROBE TECHNIQUES, (U)

MAY 64 5P Goettelman,R. C. ;Crosby,J. K. ;
CONTRACT: AF08 635 2951

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Review of Scientific Instruments (U. S.) v35 n11 p1546-49 Nov 1964 (Copies not available to DDC or Clearinghouse customers).

DESCRIPTORS: (*PROBES (ELECTROMAGNETIC), FIBER OPTICS), (*FIBER OPTICS, PROBES (ELECTROMAGNETIC)), (*TIMING DEVICES, FIBER OPTICS), ARGON, ENCAPSULATION, LIGHT, SIGNALS, ROTATING-MIRROW CAMERAS, SHOCK WAVES, VELOCITY, MEASUREMENT, HIGH PRESSURE, OPTICAL EQUIPMENT (U)

The application of fiber optics light guides to optical time-of-arrival measurements in the submicrosecond range is described. Methods are given for fabrication of small diameter guides which may be either rigid or flexible. Argon encapsulation techniques are described which make it possible to generate bright optical signals from flying plate arrivals in vacuum. Examples of applications of the techniques used in conjunction with a rotating mirror streak camera are given and the accuracy obtainable is discussed. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 609 967
FAIRCHILD CAMERA AND INSTRUMENT CORP CLIFTON N J ALLEN B DUMONT LABS DIV

PROGRAM TO DEVELOP A 12 INCH DIAMETER FIBER OPTIC FACEPLATE CATHODE RAY TUBE. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 1, 1 Jul-30 Sep 64,
NOV 64 13P Cawein,Madison ;
REPT. NO. SI-5874,MO-10159
CONTRACT: NObsr91206
PROJ: SF0070501
TASK: 6030

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*FIBER OPTICS, CATHODE RAY TUBES), (*CATHODE RAY TUBES, MANUFACTURING), ELECTRON GUNS, ELECTRON TUBE PARTS, GLASS, SPECIFICATIONS, DESIGN (U)
IDENTIFIERS: FACEPLATES (U)

The purpose of this program is to develop, fabricate and supply two fiber optic faceplate cathode-ray tubes, having the electrical characteristics of the 12BCP19. These tubes will be suitable for testing in the AN/SYA-4(V) Console Data Input Display. The basic and component designs were completed and components were ordered. The electron gun design was evaluated for possible difficulties in manufacture and a method for pretesting the electron guns was developed. (U)

AD- 609 842
OPTICS TECHNOLOGY INC BELMONT CALIF

LONG WAVELENGTH INFRARED FIBER OPTICS. (U)

DESCRIPTIVE NOTE: Interim engineering rept. no. 2, 16 Sep-15 Dec 64,
DEC 64 16P Kapany,N. S. ;Simms,R. J. ;
CONTRACT: AF33 615 1952
PROJ: 4056
TASK: 405603

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*FIBER OPTICS, INFRARED RADIATION), (*INFRARED OPTICAL MATERIALS, FIBER OPTICS), GLASS, GERMANIUM, SELENIUM, ARSENIC, ANTIMONY, TELLURIUM, SILICON, LIGHT TRANSMISSION, GLASS TEXTILES, FIBERS, DRAWING (MACHINE PROCESSING), MANUFACTURING (U)

A description is given of the concentric crucible design developed for this contract. The results of several fiber draws are reported. The glasses used have been arsenicsulphur (As-S), arsenic-selenium-tellurium (As-Se-Te) and germanium-arsenic-tellurium (Ge-As-Te) glasses. One As-Se-Te glass was shown to be adequate but shortcomings were found in the stability of the other glasses selected from the last two types. Several flexible bundles have been fabricated using As-S coated fibers and As-Se Te uncoated fibers. Techniques for fabricating short flexible bundles were investigated. During the third quarter, additional glass samples will be drawn and the resultant fibers and components evaluated. (Author) (U)

AD- 609 579
CORNING GLASS WORKS BRADFORD PA

MULTIPLE TAPPED PHOTOELASTIC DELAY LINE. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 64 185P Miller,I. C. ;
CONTRACT: AF30 602 2060
PROJ: 4506
TASK: 450601
MONITOR: RADC , TDR64 434

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*FIBER OPTICS, DELAY LINES), (*DELAY LINES, PHOTOELASTICITY), (*PHOTOELASTICITY, DELAY LINES), CORRELATORS, HIGH FREQUENCY, BANDWIDTH, SIGNAL-TO-NOISE RATIO, PERFORMANCE (ENGINEERING), MATCHED FILTERS, LASERS, TRANSDUCERS, FEASIBILITY STUDIES, ULTRASONIC PROPERTIES, MODELS(SIMULATIONS), ILLUMINATION, POTASSIUM COMPOUNDS, SODIUM COMPOUNDS, NIOBATES, CERAMIC MATERIALS, QUARTZ, DEMODULATORS, DIODES (SEMICONDUCTORS) (U)

The effort covered by this report is concerned primarily with the investigation of methods of improving the performance of the multiple-tapped photoelastic delay line in the areas of higher frequency operation, wider bandwidth, and increased signal-to-noise ratio. The development of the supporting components necessary to provide a practical system capability was also part of this investigation. The design and evaluation of an experimental model of a 10 megabit matched-filter is described. This device represents a practical embodiment of the photoelastic delay line technique. Operating models were produced whenever possible, and when useful information could be obtained from an operating unit. These include, in addition to the correlator mentioned above, a high intensity delay line illuminator (for a 100 usec line), a 100 channel (0.1 microsecond tap spacing) tapping device, a transistorized wideband delay line driver and a photomultiplier receiver-amplifier both operational around 15 mc/s. Designs were also obtained for the 30 mc versions of the delay line driver and receiver amplifiers. A signal-to-noise ratio of 40 db was achieved at 15 mc/s by reimaging and concentrating the arc source, (U)

AD- 607 323
OPTICS TECHNOLOGY INC BELMONT CALIF

LONG WAVELENGTH INFRARED FIBER OPTICS. (U)

DESCRIPTIVE NOTE: Interim engineering rept. no. 1, 15 Jun-15 Sep 64.
SEP 64 4P
CONTRACT: AF33 615 1952
PROJ: 4056
TASK: 405603

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*FIBER OPTICS, INFRARED RADIATION), (*INFRARED OPTICAL MATERIALS, FIBER OPTICS), GLASS, GERMANIUM, SELENIUM, ARSENIC, ANTIMONY, TELLURIUM, SILICON, LIGHT TRANSMISSION, REVIEWS, GLASS TEXTILES, FIBERS, DRAWING (MACHINE PROCESSING) (U)

The results of a literature survey for glasses with longer wavelength infrared transmission than arsenic-sulphur glasses are described in detail. The conclusions of this survey are discussed and samples were obtained of some of the selected glasses. The equipment necessary for this program is described and progress on its fabrication reported. Preliminary attempts to draw fibers with the available samples using existing fiber drawing equipment indicated that closer environmental control is necessary to produce seud-free fibers. This was anticipated, and new equipment is now being built. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 606 636
OPTICS TECHNOLOGY INC BELMONT CALIF

FIBER OPTICS IMAGE DEVICE. (U)

DESCRIPTIVE NOTE: Final rept. for Apr 62-Jul 63,
AUG 64 35P Capellaro,D. F. ;
CONTRACT: AF30 602 2746
PROJ: 5578
TASK: 557803
MONITOR: RADC , TDR64 217

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Legibility of this document is in part unsatisfactory. Reproduction has been made from best available copy.

DESCRIPTORS: (*FIBER OPTICS, IMAGES), OPTICAL EQUIPMENT, MANUFACTURING, FIBERS, BONDING, MACHINES, DESIGN, FEASIBILITY STUDIES, DISPLAY SYSTEMS (U)

The development of a f a fiber optics image device using the 'cylindrr.cal fibers redistribution system' is discussed. The program included the investigation of various fabrication techniques and the construction of equipment for the suitable manipulation of fiber layers to form an image device. Three fabrication techniques, (1) rotating substrate, (2) expanding substrate, and (3) expanding-contracting, were investigated. A machine was designed and constructed for the production of fiber layers which would be close packed at one end and spaced by 12 times the diameters of the fibers at the other end. The basic feasibility of a fiber optics imagee enlargement device and the machinery required for its fabrication was fairly well proven in the program. (Author) (U)

AD- 605 431
AMERICAN OPTICAL CO SOUTHBRIDGE MASS

FIBER OPTIC LASER. (U)

DESCRIPTIVE NOTE: Semiannual rept. no. 2, 1 Nov 62-29 Mar 63,
MAR 63 8P Snitzer,Elias ;
CONTRACT: DA-19-020-ORD-5575
PROJ: 3209

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*LASERS, FIBER OPTICS), (*FIBER OPTICS, LASERS), (*NEODYMIUM, GLASS), SPECTROSCOPY, OSCILLATION, DAMPING, PUMPING (ELECTRONICS), EMISSIVITY, FREQUENCY, CONTROL (U)

Some spectral and time properties of neodymium glass lasers of conventional geometry are described. The spectral output vs. pump power was investigated. The effect of temperature on the spectra and time traces was also looked at. The results of attempts to control the frequency of the laser emission are reported. Work on long single fibers and fused multifiber bundles was carried out. (Author) (U)

AD- 601 572
OPTICS TECHNOLOGY INC BELMONT CALIF

INFRARED FIBER OPTICS INVESTIGATIONS. (U)

DESCRIPTIVE NOTE: Rept. for 15 May 63-15 Apr 64,
JUN 64 84P Kapany,N. S. ;Simms,R. J. ;
CONTRACT: AF 33(657)-11480
PROJ: AF-4030
TASK: 403004
MONITOR: AFAL TDR-64-98

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*FIBER OPTICS, GLASS), (*GLASS, FIBER OPTICS), (*INFRARED OPTICAL MATERIALS, GLASS), FIBERS (SYNTHETIC), LIGHT TRANSMISSION, SPECTRA (INFRARED), RARE EARTH ELEMENTS, ARSENIC, SULFUR, GLASS TEXTILES (U)
IDENTIFIERS: ARSENIC SULFUR GLASS (U)

The development of the fiber optics technology for a lanthanate-soda lime glass combination and for an arsenic sulphur glass combination is reported. The former glasses can be used over the wavelength range of 0.4 to 5 microns and the fiber drawing processes are those normally used for high softening point glasses available in a rod and tube form. The fabrication of fused plates, field flatteners, light pipes, image dissectors and high resolution imaging cones is reported. The arsenic sulphur glasses, for use over the 1 to 12 micron range, are not available in a rod and tube form so a concentric crucible technique was developed for the production of single coated fibers. This process and the processes used for drawing multiple fibers and fabricating components are fully described. These components include high resolution fused plates, field flatteners, light pipes, image dissectors and low resolution imaging cones. A full description is also given of the processes developed to evaluate these fiber optics components at infrared wavelengths and data are presented on the spectral transmission, edge response and detailed optical transfer functions of each component. (Author) (U)

AD- 441 373
NATIONAL CASH REGISTER CO HAWTHORNE CALIF

DATA DISPLAY STUDY. (U)

DESCRIPTIVE NOTE: Interim rept. no. 4, 1 Sep-20 Dec 63,
DEC 63 67P Bjelland,H. L. ;
CONTRACT: DA36 039SC90855

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CATHODE RAY TUBES, PHOTOCHROMISM), (*FIBER OPTICS, CATHODE RAY TUBES), (*PHOTOCHROMISM, CATHODE RAY TUBES), CIRCUITS, POWER SUPPLIES, RESOLUTION, DATA TRANSMISSION SYSTEMS, DIGITAL SYSTEMS, DISPLAY SYSTEMS, THEORY, TEST EQUIPMENT (ELECTRICAL + ELECTRONIC), TRANSISTORS, ELECTRON GUNS, ELECTRON BEAMS, DESIGN, TESTS, FOCUSING, VOLTAGE (U)

In the fourth report period of this contract, and the interim to the start of the follow-on contract, work was concentrated on development of the EPIC or Photochromic/CRT Display System. Two fiber optic CRT's have been received and are being evaluated. Measurements were made on factors affecting photochromic writing speed. Experimental results are compared with calculated results. Additional equipment for CRT-lens writing tests has been fabricated. (Author) (U)

AD- 434 382
IIT RESEARCH INST CHICAGO ILL

STUDY OF FACSIMILE SCANNING AND RECORDING TECHNIQUES EMPLOYING FIBER OPTICS. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 7, 15 July-15 Oct 63,
MAR 64 10P Pontarelli,D. A. ;
REPT. NO. A1203 22
CONTRACT: DA36 039sc88927
PROJ: A203
TASK: 3A99 22 001 02 04

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*FIBER OPTICS, RECORDING SYSTEMS), (*FACSIMILE RECORDING, OPTICAL SCANNING), ANALYSIS, PHOTOMETERS, REPRODUCTION, ILLUMINATION, PHOTOGRAPHIC FILM (U)
IDENTIFIERS: MICRODENSITOMETERS (U)

An investigation has been made of the two types of imperfections present in reproductions made with the fiber optics modified facsimile system. A number of experiments were designed to furnish data which would assist in the analysis of the problem. Improtant concludions have resulted from those experiments which have been performed and it is expected that others will be revealed when the schedule is completed. (Author) (U)

AD- 428 986
NAVAL ORDNANCE LAB WHITE OAK MD

NON-CONDUCTIVE MONITORING OF MISSILE COMPONENTS AND SYSTEMS, (U)

OCT 63 13P Blair,R. H. ;
REPT. NO. NOLTR-63-229

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*GUIDED MISSILE COMPONENTS, CHECKOUT PROCEDURES), (*FIBER OPTICS, CHECKOUT PROCEDURES), (*GUIDED MISSILE WARHEADS, CHECKOUT PROCEDURES), MONITORS, RELIABILITY, TEST METHODS, NONDESTRUCTIVE TESTING, ELECTRICAL PROPERTIES, FAILURE, MODIFICATION KITS, MODELS (SIMULATIONS), SIMULATION, ATTACHMENT (U)

Both the reliability and safety of an adaption kit/warhead system could be increased if nonelectrical monitoring were used. To overcome the disadvantages of electrical monitoring, a new system was designed using fiber optics, or the transmission of light by flexible-glass pipes. No electrical current is used for this monitor system. Induced light is transmitted from component to component, indicating component or subcomponent condition and/or presence. Fiber optics has a further advantage in its adaptability for separating reliability and safety features monitored. Poorly mated or unmated connections will interrupt the light path, thus indicating questionable system reliability. The condition of the components can be monitored by passing a light beam through a prearranged screen or port within each device. A system using this non-conductive method of monitoring requires no special test equipment; only a light source is necessary. (Author) (U)

AD- 428 822
GENERAL ATRONICS CORP PHILADELPHIA PA

DESIGN, DEVELOP AND FABRICATE MINIATURE, FIBER OPTIC FACEPLATE CATHODE RAY TUBES. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 2, Aug-Oct 63,
OCT 63 7P Hilliard,Robert C. ;Barnett, Guy ;Moore,Robert S. ;Pearlman,Sam ;
CONTRACT: NObsr89280
PROJ: SR008035
TASK: 9477

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CATHODE RAY TUBE SCREENS, FIBER OPTICS), (*FIBER OPTICS, CATHODE RAY TUBE SCREENS), (*CATHODE RAY TUBES, MINIATURE ELECTRON TUBES), VACUUM APPARATUS, ELECTRON GUNS, ELECTRON OPTICS, ELECTRON ACCELERATORS, PHOSPHORESCENT MATERIALS, DEFLECTION, SENSITIVITY, DISTORTION, RESOLUTION (U)

Efforts were continued on the development of miniature fiber optic faceplate cathode ray tubes. The bell jar vacuum system demountable setup was completed and one assembly using a stock gun was made to check the electron optics of the ballistic and post acceleration region. A second assembly was made using a stock gun and a graded pitch spiraled post accelerator. A third assembly was made using a gun designed with regard to its electron optical performance. The ballistic and post accelerator of the second setup were used. Two sealed off gun test tubes and three sealed off phosphor test tubes were also made. The conclusions were as follows: (1) a uniform field in the ballistic region was desirable; (2) a graded pitch spiral in the post acceleration region gave divergence which improved the deflection sensitivity as full scan; (3) some pattern distortion resulted from lack of field matching between the ballistic and post acceleration region; (4) the overall system with the gun designed for this tube should be capable of giving an undeflected spot size of 0.0018 inches; and (5) P28 phosphor was not a good candidate for high resolution work. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 425 492
OPTICS TECHNOLOGY INC BELMONT CALIF

INFRARED FIBER OPTICS INVESTIGATION. (U)

DESCRIPTIVE NOTE: Interim engineering rept. no. 2, NOV 63 56P Kapany,Narinder S. ;
CONTRACT: AF33 657 11480

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*FIBER OPTICS, INFRARED RESEARCH), EXPERIMENTAL DATA, INFRARED OPTICAL MATERIALS, GLASS, FLAT PLATE MODELS, CONICAL BODIES, OPTICAL MATERIALS, OPTICAL EQUIPMENT, THEORY, MEASUREMENT, ARSENIC, SULFUR (U)

Work on the Research and Development of Infrared Fiber Optics is reported. The results of the experimental evaluation of fused fiber optics components from IR 442 glass are presented. These results are discussed in detail for fused fiber optics plates, imaging cones and single conical elements and, where applicable, conclusions drawn on their performance potential in optical systems. With the availability of a theory describing the skew ray performance of conical fibers and the results of edge response measurements, this evaluation will be complete. Edge response measuring equipment has been designed and is under construction. A concentric crucible has been built and used for the production of coated arsenic-sulphur glass fibers and these fibers are of sufficient quality for fabrication into fused components. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 425 416
OPTICS TECHNOLOGY INC BELMONT CALIF

INFRARED FIBER OPTICS INVESTIGATION. (U)

DESCRIPTIVE NOTE: Interim engineering rept. no. 1, 15 May-15 Aug 63, AUG 63 14P Kapany,Narinder S. ;Simms, R. J. ;
CONTRACT: AF33 657 11480

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*FIBER OPTICS, MANUFACTURING), LIGHT TRANSMISSION, RARE EARTH ELEMENTS, OXIDES, GLASS, SULFUR, ARSENIC, FEASIBILITY STUDIES, OPTICAL EQUIPMENT TESTS, OPTICAL ANALYSIS (U)

Work is reported on the ''Research and Development of Infrared Fiber Optics.'' The experimental work falls into two categories: (1) the fabrication and evaluation of fiber optics devices made from rare earth oxide glasses; and (2) the fabrication and evaluation of fiber optics devices made from arsenic-sulphur glasses. The fiber optics components of oxide glasses have been fabricated and are being tested and evaluated. The processes required for the construction of fiber optics components from arsenic sulphur glasses have been demonstrated on pilot quantities and will be used with larger quantities during the second quarter. (Author) (U)

AD- 424 987
RADIO CORP OF AMERICA CAMDEN N J DEFENSE ELECTRONIC PRODUCTS

A FIBER OPTIC SENSING DEVICE. (U)

DESCRIPTIVE NOTE: Final rept.
OCT 63 53P
CONTRACT: AF30 602 2802
PROJ: 6244
TASK: 558101
MONITOR: RADC TDR63 438

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*FIBER OPTICS, PHOTOELECTRIC CELLS (SEMICONDUCTOR)), (*PHOTOELECTRIC CELLS (SEMICONDUCTOR), FIBER OPTICS), SERVOMECHANISMS, LIGHT TRANSMISSION, TELEPHOTO LENSES, ANALOG SYSTEMS, ELECTRIC MOTORS, CIRCUITS (U)

The report describes a fier optic device which has optical inputs and analog current outputs. Fiber optics were used in order to preserve the analog nature of the input patterns. The device as built will be used aa an optical input device for the analog learning machine under construction at Rome Air Development Center. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 423 755
IIT RESEARCH INST CHICAGO ILL

STUDY OF FACSIMILE SCANNING AND RECORDING TECHNIQUES EMPLOYING FIBER OPTICS. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 2.
NOV 63 9P
REPT. NO. A1203 7
CONTRACT: DA36 039sc88927
TASK: 3A99 22 001 02 04

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*FIBER OPTICS, FACSIMILE EQUIPMENT), (*FACSIMILE RECORDING SYSTEMS, FIBER OPTICS), (*FACSIMILE EQUIPMENT, FIBER OPTICS), (*OPTICAL SCANNING, FIBER OPTICS), DIELECTRIC FILMS, RESOLUTION, REFLECTION, SPECTROPHOTOMETERS, FACSIMILE TRANSMISSION, OPTICAL COATINGS, TEST EQUIPMENT, TEST METHODS, TENSILE PROPERTIES (U)

Research was continued on a study of theoretical and experimental problems related to the utiliza tion of dielectric fibers in a facsimile scanner and recorder. An elemental scanner was constructed to study scanning parameters and resolution of fiber optics illuminating and scanning systems. For the purpose, an automat.c microdensitometer, designed to measure and record transmission density of film, was modified to measure reflection density of opaque copy. A recording spectrophotometer was modified to measure spectral transmission of fiber bundles in a study of transmission characteristics of individual fibers. A study of strength coefficients of coated fibers was initiated in connection with a search for glass combinations with optimum strength consistent with acceptable opt.cal properties. Facsimile set NA/GXC-4(XC-2) was delivered and work is in progress for its modification to accommodate fiber optics components. (Author) (U)

AD- 420 252
GENERAL ATRONICS CORP PHILADELPHIA PA

DESIGN, DEVELOP AND FABRICATE MINIATURE, FIBER OPTIC FACEPLATE CATHODE RAY TUBES. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 1, May-July 63. by Robert C.
JUN 63 37P Guy ,Hilliard, ;Robert S, Barnett, ;Sam ,Moore and ;
CONTRACT: NObsr81280
PROJ: SR008035
TASK: 9477

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CATHODE RAY TUBES, FIBER OPTICS), (*FIBER OPTICS, CATHODE RAY TUBES), (*ELECTRON OPTICS, CATHODE RAY TUBES), ELECTRON BEAMS, PARTICLE TRAJECTORIES, PHOPHORESCENT MATERIALS, ELECTRON GUNS, MINIATURE ELECTRONIC EQUIPMENT, RESOLUTION, DEFLECTION, SENSITIVITY, HELEXIS, THEORY, COATINGS, MECHANICAL DRAWINGS, TABLES(DATA) (U)

Progress is described toward the fabrication of a miniature fiber optic Cathode Ray Tube. Work was done in thiipal areas of phosphor evaluation, gun design and electron optics. Preliminary guns have been constructed, tested and evaluated. Gun computations and design have been completed and the new assemblies have been fabricated for further test and evaluation. Phosphor samples have been studied and results of the study indicate the need for more efficiency. Components for the electron optics are being designed and manufactured. Spray apparatus has been set up for producing conductive films on glass substrates prior to phosphor deposition. (Author) (U)

AD- 409 312
IIT RESEARCH INST CHICAGO ILL

STUDY OF FACSIMILE SCANNING AND RECORDING TECHNIQUES EMPLOYING FIBER OPTICS. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 5 (Final), 15 Dec 62 15 Mar 63.
JUN 63 6P
REPT. NO. ARF A1203 16
CONTRACT: DA36 039sc88927

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIBER OPTICS, FACSIMILE), (*FIBERS (SYNTHETIC), MANUFACTURING), ELECTRONIC SCANNERS, GLASS, CLEANING, CLEANING COMPOUNDS, DRAWING, MELTING, VACUUM, LIGHT TRANSMISSION. (U)

Efforts were directed towards the design and construction of equipment for the drawing ole core fiber and multiple core fiber of improved optical quality. The results of this work will be the fabrication of 50 micron diameter multiple fiber containing 5 micron diameter cores of uniformly high transmission. This fiber is to be used in a high resolution facsimile scanner. (Author) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 400 246
RAULAND CORP CHICAGO ILL

EXPERIMENTAL CATHODE RAY TUBES WITH FIBER OPTIC INSERTS IN FACEPLATE (U)

62 1V

UNCLASSIFIED REPORT

DESCRIPTORS: *FIBER OPTICS, CATHODE RAY TUBE SCREENS, CATHODE RAY TUBES, GLASS SEALS, MANUFACTURING, MATERIAL FORMING, PHOSPHORUS, PRODUCTION (U)
IDENTIFIERS: AN/SPA-8 (M)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. Z0M07

AD- 299 007
AMERICAN OPTICAL CO SOUTHBRIDGE MASS

STUDY OF OPTICAL FIBER TECHNIQUES FOR DATA PROCESSING (U)

AUG 62 1V KOESTER,CHARLES J.;
CONTRACT: AF30 602 2440
MONITOR: RADC TDR-62-478

UNCLASSIFIED REPORT

DESCRIPTORS: *FIBER OPTICS, *LASERS, *PHOSPHORESCENT MATERIALS, COMPUTER LOGIC, MEMORY DEVICES, COMPUTERS, DATA PROCESSING, DATA STORAGE SYSTEMS, DIODES, ELECTRONIC SWITCHES, FLUORESCENCE, INFRARED OPTICAL MATERIALS, MAGNETOOPTICS, NEODYMIUM, REFRACTIVE INDEX, RUBY, SILICON (U)
IDENTIFIERS: KERR EFFECT (U)

STUDY OF OPTICAL FIBER TECHNIQUES FOR DATA PROCESSING. LASER SWITCHING EXPERIMENTS. FARADAY AND KEN EFFECT EXPERIMENTS. PHOSPHOR AND DETECTOR STUDIES. NEURISTOR LASER ANALYSIS.

CORPORATE AUTHOR - MONITORING AGENCY

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AGARD-CP-219
Optical Fibres, Integrated Optics and Their Military Applications.
AD-A050 748

*AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB OHIO

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AMRL-TR-66-31
PHOTOELECTRIC PLETHYSMOGRAPHY USING FIBER OPTICS FOR APPLICATION IN THERMAL PHYSIOLOGY.
AD- 637 173

*AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

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ARL-68-0182
Development of an Image Isocon with Fiber Optics Faceplate.
AD- 843 963

*AIR FORCE AERO PROPULSION LAB WRIGHT-PATTERSON AFB OHIO

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AFAPL-TR-67-31
ULTRAVIOLET FIBER OPTICS FOR FIRE AND EXPLOSION DETECTION.
AD- 809 848

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AFAPL-TR-69-78
FIBER OPTICS HAZARD IDENTIFICATION DEVICE.
AD- 697 036

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AFAPL-TR-75-48
Sapphire Fiber Transmission at Temperatures up to 1000 F.
AD-A022 373

*AIR FORCE AVIONICS LAB WRIGHT-PATTERSON AFB OHIO

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AFAL-TDR-64-98
INFRARED FIBER OPTICS INVESTIGATIONS.
AD- 601 572

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AFAL-TR-73-164
Optoelectronic Aspects of Avionic Systems.
AD- 910 760

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Fiber Optics and Related Technology.
AD- 917 450

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AFAL-TR-73-271
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AD- 914 009

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AFAL-TR-77-151
A Star Scene Simulator for Test and Evaluation of Imaging Systems Used in Point- Source Detection.
AD-A048 201

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AFAL-TR-77-190
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AD-A049 859

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AFAL-TR-78-4
The Impact of Wideband Multiplex Concepts on Microprocessor-Based Avionic System Architectures.
AD-A057 878

*AIR FORCE CAMBRIDGE RESEARCH LABS HANSCOM AFB MASS

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AFCRL-68-0557
ADAPTIVE LOGIC ELEMENTS USING NON-GALVANIC MODIFYING INPUTS.
AD- 690 517

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AFCRL-196
CYLINDRICAL DIELECTRIC WAVEGUIDE MODES.
AD- 674 600

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AFCRL-197
OBSERVED DIELECTRIC WAVEGUIDE MODES IN THE VISIBLE SPECTRUM.
AD- 673 366

CORP AUTHOR-MONITOR AGENCY-1
UNCLASSIFIED Z0M07

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AD-A013 786

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AD-A013 786

*AIR FORCE FLIGHT DYNAMICS LAB WRIGHT-PATTERSON AFB OHIO

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AFFDL-TR-77-54
Simulated Lightning Test on the Navy Airborne Light Optical Fiber Technology (ALOFT) A-7 Aircraft.
AD-A046 370

*AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

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AFIT/GEO/PH/77-2
Design and Evaluation of Couplers for a Multimode Single Fiber Optical Data Bus.
AD-A047 773

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GEO/PH/75-10
A Theoretical Study of Fiberoptronics for Avionic Applications.
AD-A019 859

*AIR FORCE MATERIALS LAB WRIGHT-PATTERSON AFB OHIO

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AFML-TR-70-62
Optical Fiber Image Evaluation Studies.
AD- 869 699

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AFML-TR-70-279
Exploratory Development of Improved Optical Fiber Bundles.
AD- 881 276

*AIR FORCE OFFICE OF SCIENTIFIC RESEARCH BOLLING AFB D C

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AFOSR-65-0445
ROLE OF FIBER OPTICS IN PHOTOGRAPHY,
AD- 612 637

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AFOSR-65-1977
FIBER OPTICS AND THE LASER,
AD- 627 456

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AFOSR-67-0834
A TRANSIENT FIBER OPTICS PROBE FOR SPACE RESOLVED DIAGNOSTICS OF DENSE PLASMAS.
AD- 650 234

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AFOSR-67-1699
DIFFRACTION BY FIBER MOSAICS,
AD- 655 751

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AFOSR-70-0140TR
DIFFRACTION AND COHERENCE PHENOMENA IN OPTICAL WAVEGUIDES.
AD- 705 250

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AFOSR-70-1321TR
WAVE PROPAGATION ALONG HOLLOW DIELECTRIC WAVEGUIDES,
AD- 705 885

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AFOSR-70-1322TR
THERMALLY INDUCED BEAT PHENOMENON IN COUPLED OPTICAL WAVEGUIDES,
AD- 705 886

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AFOSR-TR-76-0750
Direct Transmission of Pictorial Information in Multimode Optical Fibers,
AD-A027 937

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AFOSR-TR-76-0752
On Transmission and Recovery of Three-Dimensional Image Information in Optical Waveguides,
AD-A027 747

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AFOSR-TR-76-1442
Three-Dimensional Pictorial Transmission in Optical Fibers.
AD-A034 616

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AFOSR-TR-77-0007
Coupling between Rectangular Optical Waveguides.
AD-A034 910

* * *

AFOSR-TR-78-0626
Thin-Film Acoustooptic Devices with Applications to Integrated/Fiber Optic Signal Processing and Communications.
AD-A052 949

*AIR FORCE WEAPONS LAB KIRTLAND AFB N MEX

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AFWL-TR-76-291
Preliminary Investigation of Mechanical Responses of Fiber Optics to Nuclear Radiation.
AD-A041 264

*AMERICAN OPTICAL CO KEENE N H

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SCIENTIFIC-2
OBSERVED DIELECTRIC WAVEGUIDE MODES IN THE VISIBLE SPECTRUM, (AFCRL-197)
AD- 673 366

*AMERICAN OPTICAL CO SOUTHBRIDGE MASS

* * *

STUDY OF OPTICAL FIBER TECHNIQUES FOR DATA PROCESSING (RADC-TDR-62-478)
AD- 299 007

* * *

FIBER OPTIC LASER.
AD- 605 431

*AMERICAN OPTICAL CORP SOUTHBRIDGE MASS

* * *

Exploratory Development of Improved Optical Fiber Bundles. (AFML-TR-70-279)
AD- 881 276

*AMERICAN OPTICAL CORP SOUTHBRIDGE MASS RESEARCH GROUP

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SCIENTIFIC-1
CYLINDRICAL DIELECTRIC WAVEGUIDE MODES, (AFCRL-196)
AD- 674 600

*ARMY COMMUNICATIONS COMMAND FORT HUACHUCA ARIZ ADVANCED CONCEPTS OFFICE

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ACC-ACO-12-74
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ECOM-73-0348-1
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ECOM-73-0348-F
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ECOM-75-1328-1
Low Cost Fiber Optic Cable Assemblies for Local Distribution Systems.
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ECOM-75-1328-F
Low Cost Fiber Optic Cable Assemblies for Local Distribution Systems.
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ECOM-76-1357-1

Connectors for Optical Fiber TDM Cables.
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ECOM-77-1777-F
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CONTINUOUS FACSIMILE SCANNER EMPLOYING FIBER OPTICS.
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ECOM-02057-1
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PROGRAM TO DEVELOP A 12 INCH DIAMETER FIBER OPTIC FACEPLATE CATHODE RAY TUBE.
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MEASURING THE PERMEABILITY OF FIBERS MADE FROM ARTIFICIAL MATTER (MERENI PROPUSTNOSTI VLAKEN Z UMELYCH HMOT).
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DESIGN, DEVELOP AND FABRICATE MINIATURE, FIBER OPTIC FACEPLATE CATHODE RAY TUBES.
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STUDY OF DETERMINE DESIGN CRITERIA FOR A STEREO FIBER OPTIC PERISCOPE FOR AIRCRAFT APPLICATION.
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