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SOLAR ENERGY. (U)

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SOLAR ENERGY

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This bibliography is a selection of unclassified and unlimited distribution references on Solar Energy. These citations of reports present information on performance characteristics, fabrication, development of power levels and energy conversion. Four computer-generated indexes are provided. 344101		

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Identifiers and/or open-ended terms

Photovoltaic Cells
Photovoltaic Power
Solar Arrays
Interplanetary Energy Flux
Biomass Energy Conversion
Solar Cooling
Solar Models

Accession For	
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F O R E W O R D

This unclassified and unlimited bibliography contains 238 selected citations on reports on *Solar Energy*.

Research and development in the field of solar energy is sorely needed. Its importance is highlighted by the current energy crisis in this nation and the rest of the world. This bibliography compiles information on research and development that has already been accomplished. By using these studies as the basis for a rigorous review and analysis, solar energy may emerge as a practical, albeit partial, solution to the energy crisis.

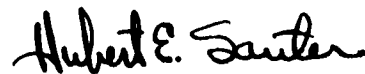
These citations were taken from entries processed into the Defense Technical Information Center's data bank during the period of January 1955 to January 1980.

This report supersedes DDC report bibliography on Solar Energy, AD-A038600, DDC/BIB-77/03, dated April 1977.

Individual entries are arranged in descending AD number sequence. Computer generated indexes of Corporate Author/Monitoring Agency, Subject, Title, and Personal Author.

BY ORDER OF THE DIRECTOR, DEFENSE LOGISTICS AGENCY

OFFICIAL



HUBERT E. SAUTER
Administrator
Defense Technical Information Center

C O N T E N T S

FOREWORD iii

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TITLE T-1

PERSONAL AUTHOR P-1

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A078 653

13/1

CIVIL ENGINEERING LAB (NAVY) PORT HUENEME CA

Solar-Powered Sun Tracker. (U)

DESCRIPTIVE NOTE: Final rept. Feb 77-Sep 79.

JUN 79 33p

Ward, Carter J. ;

REPT. NO. CEL-TN-1556

PROJ: F57571

TASK: ZF57571001

UNCLASSIFIED REPORT

DESCRIPTORS: *Positioning devices(Machinery),

*Solar energy, *Tracking, Passive systems,

Boilers, Costs, Economic analysis

IDENTIFIERS: Solar tracking, Sun trackers,

WU01010, PE62765N (U)

A solar-powered sun tracker believed to be capable of repositioning equipment to within 1 degree of the angle-of-incident radiation is described in this report. The proposed tracker is designed to reposition itself automatically after cloudy periods and should prove inexpensive as well as reliable. Included in this report are (1) a description of two tracker concepts, (2) a derivation of the heat-balance equation used to predict work available for equipment rotation, (3) a discussion of the experimental model fabricated to prove concept feasibility, and (4) an economic analysis comparing the cost of generating steam with a solar-powered boiler with the cost of generating steam with a coal-fired boiler. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A078 144

20/8

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VIRGINIA UNIV CHARLOTTESVILLE DEPT OF CHEMISTRY

The Step Excitation Method for Studying
Reversible Excited-State Electron-Transfer
Reactions: Experimental Realization. (U)

APR 79 4P Taylor, David G. ; Demas, James N. ;

CONTRACT: AFOSR-78-3590, NSF-CHE77-20379

PROJ: 2303

TASK: B2

MONITOR: AFOSR TR-79-1077

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical
Physics, v71 n2 p1032-1033, 15 Jul 79.

DESCRIPTORS: *Electron transport, *Solar energy,
Excitation, Microcomputers, Data acquisition,
Reprints

IDENTIFIERS: WUAFOSR230382, PE61102F (U)

Reprint: The Step Excitation Method for Studying
Reversible Excited-State Electron-Transfer
Reactions: Experimental Realization. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A078 118 10/3
 NEW MEXICO UNIV ALBUQUERQUE ERIC H WANG CIVIL ENGINEERING
 RESEARCH FACILITY

Survivability of Remote Site Alternate
 Energy Systems. Volume I. Survivability
 Analysis. (U)

DESCRIPTIVE NOTE: Final rept. Sep 78-Mar 79.
 SEP 79 84P Scheuch, Karl E.; Baird,
 Glenn T.;
 CONTRACT: F29601-76-C-0015
 PROJ: 2103
 TASK: 80
 MONITOR: AF 3C/ESL TR-79-21-VOL-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-8042

322L. DESCRIPTORS: *Power supplies, *Solar cells,
 *Electric batteries, *Auxiliary power plants,
 *Survival(General), Remote areas, Early warning
 systems, Threats, Reliability, Maintenance,
 Costs, Planning, *Meteorological data, Radar
 stations, Systems analysis, Long range(Time),
 Operation, Acquisition, Feasibility studies,
 Gallium arsenides, Photovoltaic effect, Fuels
 IDENTIFIERS: Survivability analysis, Alternate
 energy systems, Gallium arsenide batteries,
 Photovoltaic cells. WUESL21038006, PE63723F

As a result of increasing fuel costs and decreasing
 reserves, the USAF is studying the possibility of
 providing power to remote sites by means of alternate
 energy sources. Remote sites are identified and
 categorized. Several alternate energy sources are
 examined with respect to reliability,
 maintainability, and survivability against natural
 and man-made threats. Energy storage devices are
 also studied, and a final decision matrix is
 developed which relates these findings. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A077 684 20/2 10/2 7/4
 SPECTROLAB INC SYLMAR CALIF

Low Resistivity-High Minority Carrier
 Lifetime Single Crystal Silicon
 Investigation. (U)

DESCRIPTIVE NOTE: Interim technical rept. Jul 77-Sep
 78.
 APR 79 50P Stella, Paul W.; Opjorden,
 R. W.;
 CONTRACT: F33615-77-C-2045
 PROJ: 2308
 TASK: 53
 MONITOR: AFAPL TR-79-2031

UNCLASSIFIED REPORT

DESCRIPTORS: *Single crystals, *Solar cells,
 *Silicon, *Life expectancy, *Charge carriers,
 Space systems, Power supplies, Photovoltaic
 effect, Measurement, Purity, Fabrication,
 Gettering, Test and evaluation, Ion implantation,
 wafers, Crystal growth, Phosphorus, Electrical
 resistance, Irradiation, Proton beams, Electron
 beams, Boron compounds
 IDENTIFIERS: High minority carriers, Low
 resistivity materials, Photovoltaic power, Ingots,
 PE61102F, WUAFAPL23085301 (U)

The objective of this program is to improve the
 performance of N+/P silicon solar cells by
 improving the minority carrier lifetime of moderate
 to low resistivity silicon material. The behavior
 of cells fabricated from improved material will be
 demonstrated by measuring electrical output without
 irradiation and after 1 Mev electrons and 10 Mev
 proton irradiation. This report discusses the
 first fifteen months' efforts toward developing and
 evaluating a new solar cell silicon material.
 During this time period, equipment and techniques
 for material growth have been developed along with
 analysis of methods for removing impurities from non-
 ultra pure silicon after wafer fabrication. Five
 preliminary ultra pure ingots have been grown using
 boron ion implantation and a single ingot using
 elemental gallium to provide the p dopant.
 Results are presented for solar cells made from the
 ingots. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A077 112 10/2 9/5 9/1
 ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER NJ
 MANAGEMENT INFORMATION SYSTEMS DIRECTORATE

The Application of DC-DC Energy Conversion
 in a Solar Energy System. (U)

DESCRIPTIVE NOTE: Final rept.,
 SEP 79 155P Tobak, John P. ;
 REPT. NO. ARMD-TR-78002
 MONITOR: SBIE AD-E400 363

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy conversion, *DC to DC
 converters, *Voltage regulators, Voltage
 amplifiers, Photovoltaic effect, Feedback,
 Electronic multipliers, Solar energy, Gain,
 Efficiency, Switching, Electrical loads,
 Semiconductors, Computer aided design,
 Prototypes

IDENTIFIERS: Series switching (U)
 (U)

Expressions of voltage gain, current, and
 efficiency are developed for each of five different
 methods of DC-DC energy conversion. One of the
 five methods is selected as the design model for a
 prototype converter to be used in solar energy
 applications. Both the prototype's performance and
 the test methods employed are described.
 Efficiencies as high as 86% are measured along with
 a constant voltage line regulation of 0.04 volts per
 volt and a constant voltage load regulation of 0.034
 volts per ohm. The prototype acts as a constant 12-
 volt power supply capable of delivering up to 10-amp
 currents. (Author) (U)

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AD-A076 836

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A076 836 3/2 10/2 9/2
 NAVAL POSTGRADUATE SCHOOL MONTEREY CA

Solar Energy Design Improvement: A
 Methodology for Hydronic Flat Plate
 Collector Systems. (U)

DESCRIPTIVE NOTE: Master's thesis,
 SEP 79 235P Kozoyed, Lawrence William ;

UNCLASSIFIED REPORT

Availability: Document partially illegible.
 DESCRIPTORS: *Solar energy, *Flat plate models,
 *Experimental design, *Collection, *Methodology,
 Automation, Optimization, Parameters, Systems
 analysis, Economics, Fortran,
 Performance(Engineering), Water, Variables,
 Machine coding, Computer programs, Theses,
 Fluids, Energy storage, Heat exchangers,
 Velocity

IDENTIFIERS: Flat plate collectors, Hydronic flat
 plate collectors (U)
 (U)

A methodology for solar energy system design
 improvement has been developed and coupled with a
 constrained function optimization code resulting in
 an automated solar energy system design procedure.
 The scope of the methodology is limited to systems
 using flat plate collectors and water as the working
 fluid. Eight parameters have been included as
 independent design variables. The design variables
 included collector area, collector tilt angle,
 collector and storage fluid stream velocities, and
 collector to storage heat exchanger dimensions. The
 procedure includes an accounting for economic
 parameters as an intimate part of the design process.
 The resulting methodology has been used for the
 design of solar energy systems which would use shelf
 item collectors for the purpose of determining the
 optimum design variable vector for a given situation.
 The methodology could also be used on a limited
 basis for collector design optimization by exploring
 the effects of changing selected collector parameters
 on system performance. The methodology is coded in
 the FORTRAN computer language under the name
 SOLOAD-1 (Solar Energy Optimization
 Analysis or Design). (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A076 612 3/2 3/1
STANFORD UNIV CA INST FOR PLASMA RESEARCHIs the Galactic Corona Produced by Galactic
Flares.

JUL 79 18P Sturrock, P. A.; Stern,

Robert ;

REPT. NO. SU-IPR-780

CONTRACT: N00014-75-C-0673, NAS8-33012

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Sponsored in part by Grant Nos.
NGL-05-020-272 and NGR-05-020-668.DESCRIPTORS: *Astrophysics, *Solar flares,
Galaxies, Magnetic fields, Solar energy, Energy
transfer, Data acquisition, Coronas, Photospher

We consider the effect of the differential rotation of the disk of the Galaxy on magnetic field which penetrates the disk. The magnetic field will be progressively distorted from a potential (current-free) form and will at some stage become unstable. We expect, from knowledge of solar flares, that an MHD instability, a resistive instability, or a combination of the two, will result in the release of the excess magnetic energy and that part of the released energy will be converted into heat. By estimating the energy release and the rate at which this process will occur and by assuming that this energy input is balanced by radiation, we obtain estimates of the parameters of the resulting plasma. It appears that this process alone can heat a galactic corona to temperatures of order 1,000,000 K. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A075 097 5/2
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)European Scientific Notes. Volume 33.
Number 7,

JUL 79 54P Kaufman, I.; Newton,

Victoria S. ;

REPT. NO. ESN-33-7

UNCLASSIFIED REPORT

DESCRIPTORS: *Foreign technology, Reports, Airships, Chemistry, Computer aided design, Computer programming, Electric batteries, Solar energy, Fluid dynamics, Materials, Low alloy steels, Medical research, Oceanography, Injection lasers, Western Europe, Egypt, NATO

This monthly publication presents brief articles concerning recent developments in European scientific research. It is hoped that these articles (which do not constitute part of the scientific literature) may prove of value to American scientists by calling attention to current developments and to institutions and individuals engaged in these scientific efforts. The articles are written primarily by members of the staff of ONRL. Topics in this issue include: La Renaissance du Dirigeable - A solution in search of a problem; Chemistry at Swiss Universities; Formal Design Methodology - How to design computer systems without really using your head; UK Battery Research -- Air Force; Solar Energy in Greece and Egypt; Fluid Dynamics at the Technische Hogeschool Delft; The Institut fuer Hydromechanik at the University of Karlsruhe; Materials Research at Leicester, Loughborough, and Leeds; High Strength Low Alloy Steels; Preoperative Hypothermic Renal Perfusion -- Another use for the arterial catheter; and Semiconductor Injection Lasers.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD-A074 968 7/4 10/3 7/5
BOSTON UNIV MASS DEPT OF CHEMISTRY

Photosensitization Mechanisms for Energy
Storing Isomerizations. (U)

DESCRIPTIVE NOTE: Technical rept. no. 10, 1 Nov 75-28
Feb 79, JUL 79 32p Jones, Guilford, II; Xuan,
Phan Thanh; Chiang, Sheau Hwa;
CONTRACT: N00014-76-C-0442

UNCLASSIFIED REPORT

DESCRIPTORS: *Photochemical reactions,
*Photosensitivity, *Energy storage,
*Isomerization, Solar energy, Valence, Addition
reactions, Visible spectra, Light, Energy trans
IDENTIFIERS: Photoisomerization, (U)
Photosensitization, Intramolecular cycloaddition
reactions, WUNR051-574 (U)

The results of a study of photochemical storage of
radiant energy in organic molecules are reviewed and
prospects for the reversible storage of solar energy
outlined. A number of intramolecular cycloaddition
reactions are identified as candidates for efficient
photochemical energy storage and findings concerning
the mechanisms of these reactions are discussed.
Strategies for the photosensitization of reactions
to visible light are evaluated. The use of
wavelengths past 500 nm is demonstrated for an energy
storing isomerization which is efficiently driven by
a triplet energy transfer mechanism. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD-A074 915 10/3 7/4 7/2
BOSTON UNIV MASS DEPT OF CHEMISTRY

Energy Storing Organic Photoreactions. (U)

DESCRIPTIVE NOTE: Final rept. 1 Nov 75-28 Feb 79,
AUG 79 11p Jones, G., II;
CONTRACT: N00014-76-C-0442

UNCLASSIFIED REPORT

DESCRIPTORS: *Photochemical reactions, *Energy
storage, *Organic compounds, Organic chemistry,
Photons, Photosensitivity, Solar energy,
Isomerization, Charge transfer, Complex compounds,
Valence, Alkenes, Quantum efficiency, Electron
donors (U)
IDENTIFIERS: Photoisomerization, Photon energy,
Photoaddition reactions, Valence bonds, Cyclo
addition reactions, Excimers, Biradicals,
Photodimerization reactions, WUNR051574 (U)

Results of a study of energy storing organic
photoreactions are summarized. Discussion includes
criteria for efficient photon energy storage, quantum
yield and other quantitative results for a variety of
photoisomerization and photoaddition reactions, the
nature of intermediates for these photoreactions,
photochemistry of charge-transfer complexes, and
prospects for photochemical storage of solar energy.
(Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD-A074 893 10/2
COAST GUARD RESEARCH AND DEVELOPMENT CENTER GROTON CT

Evaluation of Solar Photovoltaic Arrays for
Use on Marine Aids to Navigation.

DESCRIPTIVE NOTE: Final rept. May 74-Jul 78,
MAR 79 32P Kostuk, R. K. ;
REPT. NO. CGR/DC-7/79
MONITOR: USCG D-43-79

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar cells, *Power supplies,
Navigational aids, Solar energy, Arrays,
Photovoltaic effect, Remote systems, Buoys
IDENTIFIERS: Solar arrays

During the period from May 1974 to July 1978,
four test and evaluation programs of solar
photovoltaic arrays were conducted to evaluate the
potential of these energy sources for use on marine
aids to navigation. Array testing consisted of:
long-term rooftop exposure; field deployment on buoys
in Alaska, Florida, and Massachusetts; field
deployment on buoys in Long Island Sound; and
initial development of a screening test to evaluate
performance in a short time frame. The results of
these tests are presented. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD-A074 869 10/2 10/3 10/1
DAYTON UNIV OHIO SCHOOL OF ENGINEERING

Analysis of Remote Site Energy Storage and
Generation Systems.

DESCRIPTIVE NOTE: Final technical rept. Jul 78-Jun 79.
JUL 79 148P Crisp, J. N. ; Bishop, W.
S. ; Pinson, J. D. ; Anderson, L. A. ;
REPT. NO. UDSE-TR-79-35, UDSE-TR-79-02
CONTRACT: F33615-77-C-2004
MONITOR: AFESC/ESL TR-79-20

UNCLASSIFIED REPORT

DESCRIPTORS: *Electric power production, *Wind
machines, *Energy storage, *Storage batteries,
Remote areas, Turbogenerators,
Performance (Engineering), Cost analysis,
Operational readiness, Experimental design,
Comparison, Solar energy, Thermal power plants,
Hydrogen oxygen fuel cells, Thermionic power
generation, Photovoltaic effect

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This report presents the results of an
investigation and analysis of energy storage systems
and alternate energy sources for remote site
applications. The first phase of the effort
centered on the broad based study of hydrogen
storage, thermal storage, batteries, and flywheels as
energy storage systems along with wind turbine, solar
photovoltaic, and solar thermionic energy converters.
A wind turbine battery system was recommended based
on performance, cost and availability. Effort under
the second phase of the program concentrated on a
system using two separate nominal eight kilowatt wind
turbine modules in conjunction with a lead-acid
battery energy storage unit. The system was
specified to operate in conjunction with an existing
power grid system located at Bar Main, Barter
Island, Alaska. Specific system concepts and
recommendations are presented with supporting
analyses. A design checklist is included with
specific items for consideration in the preparation
of a design specification. (Author)

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AD-A073 190 5/1 5/2 5/3 9/2
10/1

NAVAL POSTGRADUATE SCHOOL MONTEREY CA

Technology Transfer in Science, Technology
and Public Policy. (U)78 100P Jolly, J. A. ; Creighton, J.
W. ; Moore, Bonita M. ;
REPT. NO. NPS-54CF77121

UNCLASSIFIED REPORT

DESCRIPTORS: *Technology transfer, *Public
administration, *Research management, Policies,
Economics, International relations, Communist
countries, Food, Climate, Population, Computer
applications, Solar heating

Contents: Technological Interactions with
Public Policy; Technology and Economics;
Problems or Answers; Technology--No Policy
for Grants; International Technology
Transfer--Ramifications Concerning Communist
Bloc Nations; The Effect of Climate on
Food Production and Population; World
Population Explosion--A Technological, Not
Fertility, Crisis; The Computer--It
Leadeth Man to Think; Computers, Privacy,
and the American Public; Product Liability,
and How the Engineer and Small-Business
Manager Can Be Prepared; and Solar
Heating of Homes--A Technology
Assesment .

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AD-A072 986 3/2
CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN
ILInvestigation of the Interrelationship between
Direct, Diffuse, and Total Solar
Radiation. (U)

DESCRIPTIVE NOTE: Special rept.,
JUL 79 25P Walton, George ;
REPT. NO. CERL-SR-E-155
PROJ: 4A161101A91D
TASK: 04

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar radiation, Diffusion, Solar
heating, Experimental data, Pyranometers, Thermal
diffusion, Altimeters, Solar energy, Data
acquisition, Horizontal orientation
IDENTIFIERS: PE61101A, WU058, AS91D

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(U)

This report describes an investigation of the
relationship between total solar radiation on a
horizontal surface and its direct and diffuse
components. It is based on radiation measurements
taken in Champaign, IL in 1978. Good agreement
was found between the observed data and the SOLMET
correlation, which was published after this study
was begun. This report recommends use of the
SOLMET correlation for solar simulation programs.
(Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A071 676 5.3 13/13
FOREST PRODUCTS LAB MADISON WISEnergy Efficiency in Light-Frame Wood
Construction.

(U)

DESCRIPTIVE NOTE: Forest Service research paper,
79 62P Sherwood, Gerald E. ; Hans,
Gunsard E. ;
REPT. NO. FSRP-FPL-317

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes Rept. no. FSRP-FPL-
1740 and Rept. no. FSRP-FPL-86.
DESCRIPTORS: *Energy conservation, *Construction,
*Housing(Dwellings), Wood, Efficiency, Thermal
insulation, Heat transfer, Solar energy
IDENTIFIERS: Forest Products Laboratory,
*Energy efficient housing

(U)

(U)

This report presents information needed for design
and construction of energy-efficient light-frame wood
structures. The opening section discusses improving
the thermal performance of a house by careful
planning and design. A second section of the report
provides technical information on the thermal
properties of construction materials, and on the
basic engineering design principles applicable to
light-frame wood structures. Moisture condensation
problems are discussed in relation to the effects of
increased building insulation and more effective air
leakage control. (Author)

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AD-A071 388

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A071 388 2/14 4/1
ALASKA UNIV FAIRBANKS GEOPHYSICAL INSTInterplanetary Energy Flux Associated with
Magnetospheric Substorms,

(U)

AUG 78 9P Akasofu, S.-I. ;
REPT. NO. UAG-CONTRIB-AE30
CONTRACT: F19628-76-C-0074, NSF-ATM74-23832
PROJ: 7663
TASK: 08
MONITOR: AFGL TR-79-0141

UNCLASSIFIED REPORT

Availability: Pub. in Planetary and Space
Science, v27 p425-431 1979.
DESCRIPTORS: *Geomagnetism, *Magnetosphere, Solar
wind, Energy, Astrophysics, Reprints
IDENTIFIERS: Magnetospheric substorms,
Interplanetary energy flux, PE62101F,
WUAFGL76630801

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Reprint: Interplanetary Energy Flux Associated
with Magnetospheric Substorms.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A069 424 7/5
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LABElectrode Materials for the Photoelectrolysis
of Water.

(U)

DESCRIPTIVE NOTE: Journal article,

78 12P Mavroides, John G. ;

REPT. NO. JA-4880

CONTRACT: F19628-78-C-0002

PROJ: 649L

MONITOR: ESD TR-78-388

UNCLASSIFIED REPORT

Availability: Pub. in Materials Research

Bulletin, v13 n12 p1379-1388 1978.

DESCRIPTORS: *Photochemical reactions, *Water,

Electrolysis, Semiconductors, Electrodes,

Electrolytes, Solar energy, Energy conversion,

Reprints

IDENTIFIERS: PE65705F

Reprint: Electrode Materials for the
Photoelectrolysis of Water.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A069 423 11/2
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LABSelective-Black Absorbers using Sputtered
Cermet Films.

(U)

DESCRIPTIVE NOTE: Journal article,

APR 78 11P Fan, John C. ;

REPT. NO. MS-4590

CONTRACT: F19628-78-C-0002

PROJ: 649L

MONITOR: ESD TR-78-379

UNCLASSIFIED REPORT

Availability: Pub. in Thin Solid Films, v54 p139-
148 1978.SUPPLEMENTARY NOTE: Presented at the International
Conference on Metallurgical Coatings, San
Francisco, CA, 3-7 April 1978.

DESCRIPTORS: *Cermets, *Absorbers (Materials),

Blackbody radiation, Solar energy, Infrared

radiation, Gold, Magnesium oxides, Chromium

compounds, Sputtering, Reprints

IDENTIFIERS: PE65705F

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Reprint: Selective-Black Absorbers using Sputtered
Cermet Films.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A069 319 10/2 20/12 13/8
 MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Solar Cells: Plugging into the Sun. (U)

DESCRIPTIVE NOTE: Journal article.

78 18P Fan, John C. ;

REPT. NO. JA-4854

CONTRACT: F19628-78-C-0002

PROJ: 649L

MONITOR: ESD TR-78-385

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color plates: All

DDC reproductions will be in black and white.

DESCRIPTORS: *Solar cells, Energy conversion, Photovoltaic effect, Fabrication, Costs,

Reprints

IDENTIFIERS: PE65705F

Reprint: Solar Cells: Plugging into the Sun.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A069 138 10/2 5/2
 TETRA TECH INC ARLINGTON VA

Department of the Navy Energy Fact Book. (U)

DESCRIPTIVE NOTE: Technical rept.

MAY 79 520P

REPT. NO. TETRAT-A-6054-79-403

CONTRACT: N00014-78-C-0434

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy, *Energy conservation, *Manuals, Naval planning, Fuel oil, Fossil fuels, Synthetic fuels, Petroleum industry, State of the art, Coal, Solar energy, Nuclear energy, Naval research

IDENTIFIERS: *Energy Fact Book, Petroleum

The Department of the Navy Energy Fact Book presents the U.S., including the DOD and Navy, energy situation; summarizes Navy energy R and D initiatives; provides an in-depth description of the various processes and developments related to hydrocarbon fuels, synthetic fuels, non-hydrocarbon energy sources, and energy conversion; and briefly describes energy R and D legislation and cooperative energy programs.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A068 365 20/1 17/7
COAST GUARD RESEARCH AND DEVELOPMENT CENTER GROTON CTEconomic Analysis of Solar Photovoltaics for
Low-Power Lighted Aids to Navigation.

(U)

DESCRIPTIVE NOTE: Final rept.,
JUN 78 53P Allen, William R. ;
REPT. NO. CGR/DC-11/78
MONITOR: USCG D-23-79

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar cells, Low power, Navigational
aids, Photovoltaic effect, Coast Guard, Economic
analysis

(U)

A detailed economic analysis with decision-making criteria for converting the present energy storage system used on U.S. Coast Guard low-power lighted aids to navigation to one that relies upon conversion of solar energy by photovoltaics is presented. The analysis demonstrates that converting 12-volt lighted aids to navigation from reliance on primary air-cell batteries to reliance on solar photovoltaics is attractive from an economic point of view. However, questions concerning reliability and life must be answered before the Coast Guard plans conversion to solar photovoltaics. (Author)

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UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A067 891 10/2 20/12
COAST GUARD RESEARCH AND DEVELOPMENT CENTER GROTON
CONNCoast Guard Marine Exposure Facilities for
Naturally Aging Solar Photovoltaic
Modules.

(U)

DESCRIPTIVE NOTE: Final rept.,
OCT 78 20P Giovane, Frank ;
REPT. NO. CGR/DC-20/78
MONITOR: USCG D-18-79

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar cells, *Semiconductors,
*Photovoltaic effect, Navigational aids, Coast
Guard research, Military facilities, Test
facilities, Solar energy, Energy conversion,
Acceptance tests, Electric power, Cold regions,
Hot regions, Site selection

(U)

A program to evaluate photovoltaics in the marine environment has been undertaken by the Coast Guard Research and Development Center. This effort aims at development of suitable screening and qualification tests for solar photovoltaic energy systems intended for powering low voltage lighted aids to navigation. To assist in the attainment of these goals, two facilities have been established in proximity to the sea. One located at Avery Point, Groton, Connecticut, is characteristic of a northern marine climate with frequent frosts and cold winter cycles. The other, located in the south, at CG Station Fort Lauderdale, Dania, Florida, is characteristic of a southern marine climate with no frost cycles and relatively year round constant temperatures. Together, they nominally represent the extremes of climate under which the Coast Guard deploys aids to navigation. The two sites offer the Coast Guard a unique facility from which to access the reliability of solar photovoltaic energy system components in the marine environment, and to generate data essential to determining their cost-reliability relations.

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(Author)

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AD-A067 891

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A066 780 3/2
TUFTS UNIV MEDFORD MASS DEPT OF PHYSICS

Very Large Array (V.L.A.) Observations
of Solar Active Regions.

(U)

DESCRIPTIVE NOTE: Rept. for 15 Oct 78-1 Feb 79.

FEB 79 19P Lang, Kenneth R. ;

REPT. NO. SCIENTIFIC-1

CONTRACT: F19628-79-C-0010

PROJ: 2311

TASK: G3

MONITOR: AFGL TR-79-0037

UNCLASSIFIED REPORT

DESCRIPTORS: *Radio astronomy. *Radio interferometry. *Solar activity. *Solar corona. Antenna arrays. Solar flares. Radio interferometers. Photosphere. Magnetic fields. Sunspots. Solar disturbances. Solar energy
IDENTIFIERS: WUAFGL2311G3BD, PE61102F

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High resolution radio wavelength observations of solar active regions indicate even present, fine scale features whose high degree of circular polarization reflects the magnetic field structure in the solar corona. Changes in this structure may trigger major flare eruptions in solar active regions which create geophysical disturbances and disrupt terrestrial communication and surveillance systems. In this paper we discuss the basic techniques of using the Very Large Array (V.L.A.) to obtain radio wavelength observations (6 cm) maps of solar active regions. It is shown that the V.L.A. coverage in the u-v plane (the Fourier plane of the active region's brightness distribution) is much more complete than the u-v coverage available with other synthesis telescopes or with interferometers with east-west baseline configurations. Calibration procedures for V.L.A. observations of the Sun are discussed, and maps of two solar active regions are presented. For the first time radio wavelength maps of coronal magnetic field structures have been obtained with angular resolutions comparable to those obtained at optical wavelengths when viewing the cooler, lower lying photosphere.

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AD-A066 699

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A066 699 13/1
CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN ILL

The performance of an Experimental Solar Heating System.

(U)

DESCRIPTIVE NOTE: Interim rept.,

FEB 79 26P Juncich, D. M. ; Leverenz, D.

J. ; Johnson, D. L. ;

REPT. NO. CERL-IR-e-144

PROJ: 4A762731AT41

TASK: T6

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar heating. *Performance (Engineering). Solar energy. Energy conversion. Heat transfer. Experimental design. Test facilities. Collecting methods. Army Corps of Engineers. Residential section. Housing (Dwellings)
IDENTIFIERS: PE62731A, WU021, AST41

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This report describes the performance of a residential-scale, completely instrumented solar heating system located at the U.S. Army Construction Engineering Research Laboratory (CERL), Champaign, IL. The investigation was made between January 1977 and April 1978. In addition, a daily profile of the performance of the system and its components is presented for a representative sunny winter day. An analysis of the solar system operation indicated that the collector array is by far the most inefficient component in the system for converting incident solar energy into useful heat. The solar system consists of 20 sq m (220 sq ft) of flat-plate, selective surface, singly glazed solar collectors and a 7.6 cu m (2000 gal) equivalent hot water storage tank. The storage system supplies hot water for heating a 50 sq m (540 sq ft) building used by CERL as office space. There is no domestic hot water in the building. Auxiliary energy is supplied by an electric, flow-through hot water heater. The results of this research are presented in terms of mean daily averages for each month during the heating season and include instantaneous solar radiation (horizontal and in the plane of the collector), useful heat acquired by the collector.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A066 616 10/2 12/1
 HUGHES AIRCRAFT CO LOS ANGELES CALIF SPACE AND
 COMMUNICATIONS GROUP

High Efficiency GaAs Solar Cell
 Development.

DESCRIPTIVE NOTE: Final rept. 1 Aug 76-1 Jul 78.

JAN 79 106P Kamath,S.; Wolff,G.;
 CONTRACT: F33615-76-C-2121
 PROJ: 3145
 TASK: 19
 MONITOR: AFAPL TR-78-96

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar cells, *Mathematical models,
 Gallium arsenides, Space propulsion, Solar energy,
 Energy conversion, Radiation resistance,
 Junctions, Epitaxial growth, Melts, Temperature,
 Humidity, Test methods, Packaging, Pilot plants,
 Industrial production

IDENTIFIERS: WUAFAPL31451961, PE62203F

The major goals of the High Efficiency
 Gallium Arsenide (GaAs) Solar Cell
 program have been met. An AMO efficiency of 17.5
 percent was achieved. During the second phase of
 the program, was optimized to improve radiation
 resistance of the cell without loss of efficiency,
 thus improving the suitability of the cell for space
 missions. (U)

AD-A066 616

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AD-A066 385

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A066 385 10/2 13/10
 NAVAL OCEAN SYSTEMS CENTER SAN DIEGO CA
 Performance of Photovoltaic Cells in an
 Undersea Environment.

DESCRIPTIVE NOTE: Final rept. Mar-Oct 78.

JAN 79 44P Stachiw,J.D.;
 REPT. NO. NOSC/TR-359
 PROJ: F61512
 TASK: ZF61512001

UNCLASSIFIED REPORT

DESCRIPTORS: *Photoelectric cells(Semiconductor),
 *Solar cells, *Marine engineering, Underwater,
 Electric power production, Silicon, Submersible (U)

Photovoltaic solar cells can serve as a reliable
 source of electric power for electronic
 instrumentation in temporarily or permanently
 submerged marine systems in the form of bottom
 installations, buoys, or remotely controlled unmanned
 vehicles. The power output of submerged solar cells
 is a function of solar insolation intensity on the
 water surface, depth of submersion, optical
 properties of water, temperature, and the orientation
 of the cell surface with respect to the sun.
 Experimental data were generated by submerging
 solar cell panels in different bodies of water with a
 2.5- to 95-ft visual contrast limit, as defined by
 the observation of a submerged, standard, 12-in
 Secchi disc, and measuring their performance under
 upward-facing, photovoltaic cells submerged to the
 visual contrast limit depth was found to be a
 constant, equal to approximately 5 to 10 percent of
 the power generated by upward-facing, horizontally
 oriented cells in an atmospheric environment. The
 power output of the cells increased at lesser depths,
 until in the splash zone the output was essentially
 the same or higher than in the atmospheric
 environment. Based on these findings it can be
 concluded that high-efficiency silicon solar cells
 can serve as a practical electrical power supply in
 electronic devices for marine applications, if their
 depth of submersion is less than the visual contrast
 limit at the dive location. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A066 221 10/2 3/2 8/7
CIVIL ENGINEERING LAB (NAVY) PORT HUENEME CALIF

Digest of Equipment for Converting Solar,
Wind, and Geothermal Energy into Electric
Power for USN Application Ashore.

DESCRIPTIVE NOTE: Final rept. May 77-Mar 78,
REPT. NOV 78 103P Lorman, William R. ;

PROJ. NO. CEL-TN-1534

PROJ: F57571

TASK: ZF57571001

UNCLASSIFIED REPORT

DESCRIPTORS: *Electric power production, *Solar
wind, *Geothermy, *Naval shore facilities, Energy
conversion, Efficiency, Savings, Electric
generators, Natural resources, Heating, Energy
conservation

IDENTIFIERS: *Geothermal energy,

WUZF5757100101008, PE62765N

This document enumerates principal requirements of
self-sufficient electric power conversion equipment
under active consideration by CEL. Data pertain
to financial requirements, physical characteristics,
and potential outputs of solar, wind, and geothermal
energy conversion systems; these systems are part of
USN shore energy research and development program.
Data are intended for use by CEL systems analysts
as input to mathematical model for planning and
optimizing power systems throughout the Naval
Shore Establishment. (Author)

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AD-A065 845

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A065 845 11/2 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

The Possibilities of Selective Glass.

MAR 78 11P Semenov, A. ;
REPT. NO. FTD-ID(RS)T-0327-78

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited trans. of Izebratatel' i
Ratsionalizator (USSR) n8 p2-3; 10-11 Aug 71, by
Bernard L. Tauber.

DESCRIPTORS: *Glass, *Solar heating, *Coatings,
*Foreign technology, Tin compounds, Oxides,
USSR, Translations

The Possibilities of Selective Glass --
Translation.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A065 009 10/2 22/2
SPECTROLAB INC SYLMAR CALIF

High Efficiency Solar Panel (HESP-II).

(U)

DESCRIPTIVE NOTE: Final technical rept. Aug 77-Jun 78.

AUG 78 74P Stella, P. M.; Uno, F. M.

; Thornhill, Jay W.;

CONTRACT: F33615-77-C-3108

PROJ: 682J

TASK: 04

MONITOR: AFAPL

TR-78-60

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar panels, *Solar cells, *Spacecraft components, Power supplies, Energy conversion, Efficiency, Silicon, Radiation Damage, Solar radiation, Synchronous satellites, Accelerated testing, Gettering, Metals, Laminates

IDENTIFIERS: PE63401F, WJAFAPL682J0405

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The objective of this program is to develop space qualified weapon survivable silicon solar cells having a BOL conversion efficiency of 16% at 25 C under AMO illumination. After seven (7) years in the synchronous orbit environment (approximately 3 x 10 exp (14) 1 mev electrons/square centimeter equivalent irradiation) the cells shall not degrade more than 13% in conversion efficiency. The status of the work at this point and the performance of the most recent state-of-the-art cells delivered as representative samples are reported. The results obtained to date indicate that some of the processes chosen for optimization have not proven as fruitful as originally anticipated, while others have demonstrated marked success. The task now is to integrate these various optimizations into an integrated sequence to fabricate cells that meet or surpass the requirements. A list of possible additional investigations, which appear pertinent and useful to this effort, is included in the section entitled Recommendations. (Author)

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AD-A065 009

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AD-A064 431

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A064 431 10/2 20/12 22/2
SOLAREX CORP ROCKVILLE MD

Nonreflecting Vertical Junction Silicon Solar Cell Optimization.

(U)

DESCRIPTIVE NOTE: Final rept. 15 May 76-31 Aug 78.

NOV 78 71P Wohlgenuth, John H.; Wrigley, C. Y.;

CONTRACT: F33615-76-C-2058

PROJ: 3145

MONITOR: AFAPL

TR-78-91

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar cells, *Semiconductor diodes, *Photovoltaic effect, Charge carriers, Photolithography, Radiation hardening, Silicon, Grooving, Wafers, Mobility, Etching, Spaceborne

IDENTIFIERS: High efficiency, Vertical junction solar cells, Spectral response, PE62203F

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This research program has resulted in the development of high conversion efficiency radiation resistant vertical junction silicon solar cells. New techniques of oxidation growth and the use of photolithography enable the use of an orientation dependent etch to produce grooves 5 - 10 microns wide and up to 100 microns deep. These silicon wafers have been processed into solar cells with all processes performed at temperatures compatible with producing high efficiency solar cells. Theoretical calculations of the expected current as a function of radiation dose have been performed. An explanation of the observed open-circuit voltage is provided. Vertical junction solar cells have been fabricated with AMO conversion efficiencies greater than 14%. These cells have shown superior radiation resistance. Vertical junction cells have been fabricated in 2cm x 2cm, 2cm x 4cm and 2cm x 6cm sizes with no size dependence on efficiency or yield. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A062 719 13/1
CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN
ILL

Design of Solar Heating and Cooling
Systems.

(U)

DESCRIPTIVE NOTE: Final rept..

OCT 78 57P Juncich, David M.; Leverenz,
Donald James; Hittle, Douglas C.; Walton,
George N.;

REPT. NO. CERL-TR-E-139

PROJ: 4A762731AT41

TASK: T6

UNCLASSIFIED REPORT

Availability: Document partially illegible.

DESCRIPTORS: *Solar heating, *Cooling, *Solar
energy, *Cost analysis, *Computerized simulation,
Computer aided design, Solar collectors,
Buildings

(U)

IDENTIFIERS: BLAST(Building Loads Analysis and
Systems Thermodynamics) Program, WU021,
AST41, PE62731A

(U)

This report presents a method for making an energy
and an economic cost/benefit analysis of solar energy
systems. A graphical method is presented for
evaluating the performance of solar domestic hot
water systems, solar heating systems, and solar
heating and cooling systems. Methods for selecting
the optimum collector area based on benefit-to-cost
ratio and for systematically making detailed design
calculations using the Building Loads Analysis
and System Thermodynamics (BLAST) computer
simulation program are also presented. Practical
considerations for solar system designs are
discussed. The methods presented provide the
required accuracy for both initial evaluations and
final design calculations. Examples are provided
throughout the text to aid in using the methods
described. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A061 961 22/2 3/2
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Satellite Solar Station.

(U)

JAN 78 7p

REPT. NO. FTD-ID(RS)T-1452-77

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited trans. of mono. Heng K'ung
Chih Shin, Peking, Nov-Dec 76 p23-24, by Gilbert
S. R. /Hwang.

DESCRIPTORS: *Solar satellites, *Solar energy,
Solar radiation, Sunlight, China,
Translations

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Satellite Solar Station--Translation.

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AD-A061 961

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A061 956 10/2 13/8
SPIRE CORP BEDFORD MALow Temperature Fabrication of High
Efficiency Silicon Solar Cells.

(U)

DESCRIPTIVE NOTE: Final technical rept. Feb 75-Jun 78.

AUG 78 86P Kirkpatrick, Allen R. ;

Minnucci, John A. ; Greenwald, Anton C. ;

CONTRACT: F33615-75-C-2006

PROJ: 3145

TASK: 19

MONITOR: AFAPL TR-77-86

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar cells, *Silicon, *Annealing,
*Pulses, *Electron beams, *Ion implantation,
Wafers, Energy, Deposition, Processing,
Fabrication, Low temperature, Spacecraft
IDENTIFIERS: PE62203F, WUAFAPL31451951

(U)
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IAC ACCESSION NUMBER: MCIC-104719

IAC DOCUMENT TYPE: MCIC -HARD COPY--

This report describes the results of a program to develop ion implantation/pulsed energy processing for spacecraft solar cell applications. The approach involves employing pulsed electron beam technology to achieve processing parameters not previously possible by conventional furnace heat treatments.

Optimization of the ion implanted solar cell structure was undertaken but not completed. Cells with efficiencies to 13.7% AMO were achieved using furnace annealing and to 12.9% AMO using pulsed electron beam annealing. Prospects for future development to higher efficiencies and for totally automated production are excellent.

Experimental evidence suggests that the ion implanted, pulsed electron beam annealed solar cell may have better inherent tolerance to electron irradiation than similar diffused or furnace annealed implanted junction cells. (Author)

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IAC SUBJECT TERMS: M--(U)Solar Cells, Fabrication,
Ion Implantation, Electron Beam Heating,
Annealing, Pulse Heating, Silicon, Oxide
Coatings, Zirconium Oxide, Titanium Oxide,
Tantalum Oxide, Refractive Index, Electrical
Resistivity, Irradiation.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A060 458 13/1

CIVIL AND ENVIRONMENTAL ENGINEERING DEVELOPMENT OFFICE
TYNDALL AFB FL DETACHMENT 1 (ADIC)Third Interim Technical Report on USAFA
Solar Test House Design Parameters.

(U)

DESCRIPTIVE NOTE: Rept. for May 77-Apr 78.

SEP 78 154p Eden, Anthony ; Finsley, John

T. ;

REPT. NO. CEEDO-TR-78-32

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color plates:

All DDC reproductions will be in black and white.

DESCRIPTORS: *Solar heating, *Heating plants,
Performance (Engineering), Efficiency,
Housing (Dwellings), Prototypes, Energy

Storage, Heat transfer, Heat exchangers

(U)

IDENTIFIERS: LPN-CEEDO-PQ-DIC-8-108
(U)

This report describes the continuing performance of the first retrofit-constructed, solar-heated facility in the USAF, the Solar Test House at the USAF Academy. Continued efforts to improve the performance have been a further reduction of the storage tank volume and installation of make-up water system to work in conjunction with the bleed air valves. The thermography studies started during the previous research period were completed and the techniques of using this advanced procedure for displaying flow patterns validated. The data analysis for the Solar Test House shows the improvement to the efficiency of the total system's ability to supply the thermal energy to the structure. Finally, the various parameters used to design the solar energy systems originally are analyzed and shown to be valid for this application.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A059 131 7/1 7/4
UTAH UNIV SALT LAKE CITY DEPT OF CHEMISTRY'Water Splitting' by Titanium Exchanged
Zeolite A. (U)

DESCRIPTIVE NOTE: Technical rept.,
SEP 78 9p Kuznicki, Steven M.; Eyring,
Edward M.;
REPT. NO. TR-16
CONTRACT: N00014-75-C-0796

UNCLASSIFIED REPORT

DESCRIPTORS: *Ion exchange, *Hydrogen, *Gas
generating systems, Titanium oxides, Gas
chromatography, Electron spin resonance, Photolysis,
Water, Solar energy, Energy conversion, Mass
spectrometry, Free radicals (U)
IDENTIFIERS: Zeolite A, Zeolite Y, (U)
WUNR051556

Visually detectable and chromatographically and
mass spectrally identified hydrogen gas evolves from
titanium (III) exchanged zeolite A immersed in
water and illuminated with visible light.
Titanium(III) exchanged zeolite X and zeolite
Y do not produce this reaction. A photochemically
produced, oxygenated titanium free radical
(detected by electron spin resonance) not
previously described is the species in the zeolite
that reduces protons to molecular hydrogen. The
other product of this reduction step is a nonradical,
oxygenated titanium species of probable empirical
formula TiO₄. Heating the spent oxygenated
titanium containing zeolite A under vacuum at 375
C restores over fifty percent of the free radical.
Unlike previously reported systems, heating does
not restore the original aquotitanium(II) species
in the zeolite. Thus a means other than heating
must be found to achieve a closed photochemical cycle
that harnesses visible solar energy in the production
of molecular hydrogen. The titanium exchanged
zeolite A does, however, lend itself to a
thermolysis of water previously described by Kasai
and Bishop. (Author) (U)

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AD-A058 626

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A058 626 13/1 3/2 15/5
DUBIN-BLOOM ASSOCIATES NEW YORKSolar Assisted Heat Pump Study for
Heating of Military Facilities. (U)

DESCRIPTIVE NOTE: Final rept. Jul 76-Nov 77.
JUL 78 202p Beason, Freddie L.; Strother,
Larry W.;
CONTRACT: F08635-76-C-0276
MONITOR: AFCEC TR-78-6

UNCLASSIFIED REPORT

DESCRIPTORS: *Heat pumps, *Solar energy, *Military
facilities, Solar heating, Energy conservation,
Life cycle costs, Performance(Engineering),
Hot water, Experimental data, Methodology (U)

This study identified 21 generic solar assisted
heat pump systems and subjectively evaluated them.
The six most promising systems were evaluated in
further detail. A complete objective analysis of
the two most promising systems was then made to
determine which could be most economical to install
in a family housing unit at Little Rock Air
Force Base, Arkansas. The system chosen was a
solar hot water heating system in parallel with a
water source heat pump. Preliminary drawings
integrating this system into a family housing unit
at Little Rock AFB were developed. The system
selected had a 27-32 year pay back. (Author) (U)

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DOC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO. ZOM09	DDC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO. ZOM09
AD-A058 304	18/3 13/1 14/2	AD-A058 281	10/2
SCIENCE APPLICATIONS INC MCLEAN VA		MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB	
Experimental Studies of Soil Thermal Irradiation. Volume III. Design of Flux Diversion Equipment for Soil Irradiation Testing.	(U)	Simplified Fabrication of GaAs Homojunction Solar Cells with Increased Conversion Efficiencies.	(U)
DESCRIPTIVE NOTE: Final rept. 1 Jan 76-1 Mar 77. APR 77 48P Houghton, A. ; Knasel, T. M.		DESCRIPTIVE NOTE: Journal article. DEC 77 4P Fan, John C. C. ; Bozler, Carl O. ; Chapparan, Ralph L. ; REPT. NO. JA-4802 CONTRACT: F19628-78-C-0002 PROJ: 649L MONITOR: ESD TR-78-94	
REPT. NO. SAI-78-540-WA-VOL-3			
CONTRACT: DNA001-75-C-0209			
PROJ: Y99QAXS			
TASK: A002			
MONITOR: DNA, SBIE 4484F-3, AD-E300 289			
UNCLASSIFIED REPORT		UNCLASSIFIED REPORT	
SUPPLEMENTARY NOTE: See also Volume 1, AD-A058 302.		Availability: Pub. in Applied Physics Letters. v32 n6 p390-392. 15 Mar 78.	
DESCRIPTORS: *Nuclear explosion simulation, *Solar furnaces, *Thermal radiation, Soils. Test equipment, Experimental design, Heat flux, Reflection, Directional, Flux density, Blowoff, Soils, Irradiation, Instrumentation, Blast waves, Precursors	(U)	DESCRIPTORS: *Solar cells, *Gallium arsenides, Semiconductor junctions, Energy conversion, Efficiency, Reprints	(U)
IDENTIFIERS: Thermal layers, Design, PE62704H, WU05	(U)	Reprint: Simplified Fabrication of GaAs Homojunction Solar Cells with Increased Conversion Efficiencies.	
The total report describes three experimental activities in thermal layer experimental development. Volume I/1 contains descriptions of design and experimental work directed toward the use of a flux redirector for a large solar furnace. Successful completion of this design allows testing of soils at above 300 cal/sq cm sec. An investigation was made of the feasibility of extending the solar furnace source soil blow-off tests (reported in Volume 1) to higher flux levels. Previous work had identified the CIPAS solar furnace at Odillo-Font Romeu, France, as the unique radiant energy source. Accomplishment of the tests would require: Design of an optical configuration to direct the solar furnace flux onto horizontal soil samples (necessitating a 90 deg redirection); Construction of the critical optical and mechanical components and testing in the actual solar furnace environment;	(U)		
AD-A058 304	PAGE 20	AD-A058 281	PAGE 20
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ZOM09		ZOM09	

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A057 252 10/2 10/3
BURNS AND ROE INC WOODBURY NY

USAF Terrestrial Energy Study. Volume III. Part 2. Energy Conversion Systems Handbook.

(U)

DESCRIPTIVE NOTE: Final rept. 1 Apr 76-1 Feb 78.
MAY 78 483PRever, R. ; Mallen, C. ; Fogelson, S. ;
CONTRACT: F33615-76-C-2171

PROJ: 3145

TASK: 23

MONITOR: AFAPL TR-78-19-VOL-3-PI-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-A055 213.

DESCRIPTORS: *Energy. *Energy conversion. *Electric power production, Planning. Economics, Performance (Engineering). Costs. Life cycle costs. Efficiency. Environmental impact statements. Energy management. Energy storage. Fuels. Chemicals. Radioactive isotopes. Reactor fuels. Solar energy. Wind

IDENTIFIERS: PE62203F, WUAFAPL31452312 (U) (U)

This report was prepared by Burns and Roe, Inc. to serve as a guide for the U.S. Air Force in selection of energy conversion systems to meet future ground power requirements. Included in this report are power requirements included in this report range from 10 kilowatts to 50 megawatts. Twenty-one types of systems, conventional as well as advanced, are considered. These include 19 types of energy conversion systems which utilize either chemical fuel, nuclear fuel, solar energy or wind energy and two types of energy storage systems which utilize electric power for recharging. Each system is characterized in terms of a set of economic, physical and performance parameters including acquisition costs, life cycle costs, size, efficiency and environmental constraints. A total of eighteen such parameters are presented for each type of system for several sets of requirements. The requirements are defined in terms of electric power level.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A056 603 13/1 8/10 13/10
TRACOR MARINE PORT EVERGLADES FL OCEAN TECHNOLOGY DIV

A Preliminary Design, Economic and Energy Analysis, and Environmental Impact Assessment for a Seawater Cooling Project Naval Security Group Facilities at Winter Harbor, Maine.

(U)

DESCRIPTIVE NOTE: Final rept.,

MAR 77 179P Hirshman, Jules ;

REPT. NO. TRACOR-726171

CONTRACT: N62305-77-C-0012

PROJ: Z0412

TASK: Z041201

MONITOR: CEL CR-78.009

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-A056 604.

DESCRIPTORS: *Air conditioning equipment. *Sea water. *Naval shore facilities. Energy conservation. Life cycle costs. Solar energy. Temperature control. Heat exchangers. Economic analysis. Coils. Fouling organisms. Pipelines. Maine. Environmental impact statements

IDENTIFIERS: Winter Harbor (Maine),
PE64710N, WUZ041201001 (U) (U)

Preliminary design and analysis were performed for a proposed seawater air conditioning system for an existing U.S. Navy building at Corea, Maine. Two major options were examined. The first, to use seawater for the entire cooling load (100 tons); the second, to use additional cooling and dehumidification (enhancement) if necessary, when the seawater temperature is too high. A number of alternate enhancement methods were examined, and preliminary designs developed, including one for a solar/desiccant drying system. The existing air conditioning system was also considered for use for enhancement, if desired. The initial costs would be lower than for a new enhancement system; however, life cycle costs for this option would be higher due to greater energy use. The life cycle costs for the seawater system are lower than for a conventional system. If the seawater system can be used without enhancement, it can save 87% of the electrical energy used for air conditioning. With enhancement it can save 68% of the electrical energy.

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3. OFFICE OF THE ADJUTANT GENERAL
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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A054 912 3 2
IOWA UNIV IOWA CITY DEPT OF PHYSICS AND ASTRONOMY

High Resolution Spectrograms of Ion-
Acoustic waves in the Solar Wind.

(U)

DESCRIPTIVE NOTE: PROGRESS REPT.,
MAR 78 29p Kunth, W. S.; Gurnett, D.
A.; Scarf, F. L.;
REPT. NO. U. of Iowa-78-15
CONTRACT: N00014-76-C-0016, N459-54013

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar wind. *Ion density. *Acoustic
waves. Bow shock. Spectrum analysis. Space probes.
Signal processing. Data reduction
IDENTIFIERS: Voyager, Helios satellites

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Ion-acoustic waves, similar to those detected by
the Helios spacecraft from 0.3 to 1.0 AU, have now
been detected by the Voyager spacecraft in the
solar wind out to heliocentric radial distances of
1.7 AU. High bit rate waveform measurements
provide the first high resolution, frequency-time
spectrograms of these waves. The Voyager
spectrograms show that the ion-acoustic waves consist
of narrow-band bursts which last for a few seconds or
less. The center frequency of the bursts can
fluctuate rapidly in frequency, usually in the range
between the electron and ion plasma frequency f_{sub}
 $p(-)$ and $f_{sub} p(+)$. (These waves have been
previously referred to as $f_{sub} p(+)$ < f < $f_{sub} p(+)$
 $f_{sub} p(-)$ noise.)

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AD-A054 601

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A054 601 3/2 13/1
CIVIL ENGINEERING LAB (NAVY) PORT HUENEME CALIF

Solar Heating of Buildings and Domestic Hot
Water.

(U)

DESCRIPTIVE NOTE: Final rept. Jul 74-Dec 75,
NOV 77 88p Beck, E. J., Jr.; Field,
R. L.;
REPT. NO. CEL-TR-835
PROJ: F57571
TASK: YF57571999

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes report dated Jan 76.
AD-A021 852.
DESCRIPTORS: *Solar heating.
*Heating/Dwelling. *Hot water. Solar energy.
Solar collectors. Water tanks. Heat transfer.
Design to cost. Architecture.
Sizes (Dimensions). Fuel consumption. Savings.
Investments. Bibliographies
IDENTIFIERS: PB027651, A01006

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The purpose of this document is to provide guidance
in the design and cost analysis of solar heating
systems for buildings and domestic hot water (DHW).
The nature of solar radiation, several types of
solar systems, storage devices and architectural
considerations are among topics included.
Calculation methods are included for determining
collector size, storage size, simplified building and
DHW loads, value of fuel saved, and saving-
investment ratios. The calculation procedure is
based on parametric curves for fraction of heating
load supplied by solar energy and several rules of
thumb for design. A series of 11 worksheets is
used to enable the engineer with no prior experience
with solar systems to accomplish a complete design
and cost analysis. With this information he can
prepare bidding and specification documents for the
job. Tables of solar insolation at various Navy
stations, typical building heat loads, collector
prices by type, and storage tank prices are included.
Two example problems are worked for tube-in-sheet
collectors; one for space and DHW heating for a
single dwelling, and the other DHW supply for a
dispensary.

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A053 960 10/2 14/2 9/6
 ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT COMMAND
 FORT BELVOIR VA

Solar Cell Power for Field Instrumentation
 at White Sands Missile Range.

(U)

DESCRIPTIVE NOTE: Final rept..

JAN 78 49p Bond, John W., Jr.;
 Reckart, Darwin H., Jr.; Milway, William B.;
 REPT. NO. MERADCOM-2229
 PROJ: 1U765702D623

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar cells, *Instrumentation,
 *Guided missile ranges, *Telemeter systems, Remote
 systems, Photovoltaic effect, Telescopes, Storage
 batteries, Radar equipment, Range finding, Drones,
 Formation flight, Interrogators, Airborne
 IDENTIFIERS: Cinethedolites, AS623,
 PE65702A

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The initial phase of an Instrumentation
 Development Project to explore and document what
 solar power can do for remote field instrumentation
 systems is described. The work scope consisted of
 selection, design, construction, test, and delivery
 of a solar cell power system for White Sands
 Missile Range. A Drone Formation Control
 System Interrogator was selected; a power supply
 was built and installed in the San Andres
 Mountain Range at WSMR in late August 1977.
 (Author)

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AD-A053 428

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A053 428 5/1 10/2 13/10
 TETRA TECH INC ARLINGTON VA

U.S. Navy Energy R and D Progress,
 1977.

(U)

DESCRIPTIVE NOTE: Technical rept.

MAR 78 156p
 REPT. NO. TETRAT-A-938-78-361
 CONTRACT: N00014-77-C-0350

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy management, *Energy,
 conservation, Cost effectiveness, Naval planning,
 Synthetic fuels, Energy consumption, Legislation,
 Geothermy, Solar heating, Cost overruns, Nival
 vessels

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IDENTIFIERS: Self sufficiency

This U.S. Navy Energy R and D

Progress report summarizes the progress of the
 Navy Energy, R and D program from October
 through December 1977 and progress prior to
 October 1977 which had not previously been
 documented. Potential energy savings for each
 project is included. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A051 851 10/2 18/8
 HUGHES AIRCRAFT CO EL SEGUNDO CALIF SPACE AND
 COMMUNICATIONS GROUP

GaAs Concentrator Photovoltaic Power
 System Feasibility Investigation.

(U)

DESCRIPTIVE NOTE: Final rept. 15 Jun 76-30 Sep 77.
 DEC 77 99P
 :Schwartz, S.; Wolff, G.;
 REPT. NO. SCG-70392P
 CONTRACT: F3615-76-C-2142
 PROJ: 682J
 TASK: 04
 MONITOR: AFAPL TR-77-80

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar cells, *Solar energy, Gallium
 arsenides, Radiation damage, Solar collectors,
 Temperature coefficients, Welded joints, Circuit
 interconnections
 IDENTIFIERS: Space power systems, PE63401F,
 WUAFAPL682J0403

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IAC ACCESSION NUMBER: MCIC-102720
 IAC DOCUMENT TYPE: WCIC -HARD COPY--
 A number of GaAs Solar Cells for high
 sunlight intensity operation were fabricated and
 experimentally evaluated. I-V characteristics
 were determined for 1, 5, and 9 solar constants.
 Temperature coefficients of OC, SCC, and
 Pmax were determined for one Sun GaAs cells by
 measuring cell electrical performance at 50 C steps
 from -190 C to +250 C. Results of 1 Mev
 electron irradiation to 1 x 10 to the 16th power,
 Mev equivalent electrons/sq.cm, and welded
 interconnect investigations are presented.
 (Author)

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IAC SUBJECT TERMS: M--(U)Solar Cells, Gallium
 Arsenide, Radiation Studies, Welding, Design,
 Absorption Coefficient, Temperature Coefficient,
 Measurement, Fabrication, Thermal Analysis.

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AD-A051 335

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A051 335 7/3 20/8 7/5
 BOSTON UNIV MASS DEPT OF CHEMISTRY

Photoisomerization of Bis(9-Anthryl)Methane
 and other Linked Anthracenes. The Role of
 Excimers and Biradicals in Photodimerization.

(U)

DESCRIPTIVE NOTE: Technical rept. no. 7, 1 Nov 76-31
 Dec 77.
 MAR 78 43P Bergmark, William R.; Jones,
 Guilford, II; Reinhardt, Thomas E.; Halpern,
 Arthur W.;
 CONTRACT: N00014-76-C-0442

UNCLASSIFIED REPORT

DESCRIPTORS: *Methane, *Anthracenes,
 *Isomerization, *Photochemical reactions, Solar
 energy, Energy conversion, Energy storage, Valence
 bands, Photochromism, Pyrolysis, Reaction
 kinetics, Heat of reaction, Protons, Fluorescence,
 Quantum chemistry, Life expectancy, Chemical
 radicals
 IDENTIFIERS: WUNR051574

(U)

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A series of linked anthracenes capable of storing
 photon energy through endogenic valence photo-
 isomerization have been studied. Photochemical and
 photochemical characteristics of the systems have
 been completely characterized by measurement of
 fluorescence quantum yields and lifetimes, and
 efficiencies for forward and reverse isomerization.
 The release of energy stored in photoisomers has
 been measured using kinetic and calorimetric
 techniques. From emission and lifetime data the
 respective roles of excimers and biradicals in
 anthracene photodimerization have been defined.
 (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A051 101 13/1 10/2
LITTLE (ARTHUR D) INC CAMBRIDGE MASSPreliminary Design of a 10 kWe Solar Heated
Open Brayton-Cycle Engine. Phase I.

DESCRIPTIVE NOTE: Final rept.

NOV 77 76P

REPT. NO. ADL-C-79516-F

CONTRACT: N68305-76-C-0014

PROJ: F57571

TASK: YF57571999

MONITOR: CEL CR-78.003

UNCLASSIFIED REPORT

DESCRIPTORS: *Brayton cycle, *Solar energy, Solar collectors, Solar generators, Electric power production, Heat exchangers, Parabolic bodies, Reflectors, Solar heating

IDENTIFIERS: *Brayton cycle engines, Parabolic dish reflectors, PE62765N, WUXF575719901009C

This report discusses the results of the first phase of a two-phase program to assess the applicability of electric power generation from solar energy at Naval bases, particularly advanced bases which require small, mobile systems not under development in the civilian sector. For purposes of establishing a baseline system against which the costs and benefits of various solar-to-electric energy conversion processes can be compared, an open-cycle air turbine/generator set was chosen with tracking parabolic dish reflector to focus direct solar radiation onto a collector/heat exchanger providing heat for the engine.

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AD-A050 640

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A050 640 4/1
AEROSPACE CORP EL SEGUNDO CALIF IVAN A GETTING LABSSatellite Observations of Polar, Magnetotail
Lobe, and Interplanetary Electrons at Low
Energies.

DESCRIPTIVE NOTE: Interim rept.,

JAN 78 33P

Joseph F.; Mizera, Paul F.; Fennell,

REPT. NO. TR-0078(3690-05)-4

CONTRACT: F04701-77-C-0078

MONITOR: SAMSO TR-78-6

UNCLASSIFIED REPORT

DESCRIPTORS: *Electron flux, *Polar regions, Low energy, Magnetosphere, Interactions, Solar wind, Spectrum analysis, Electron density, Altitude, Distribution, Trapping(Charged particles)

(U)

Low altitude satellite observations of the low energy electron fluxes that populate the polar regions are summarized and classified into two groups: 1, the very low intensity distributions and 2, the more intense, often structured distributions observed during magnetically disturbed conditions. High altitude observations of electron fluxes, including the solar wind and the tail lobes, are presented to suggest that class 1 observations are the result of direct access of interplanetary electrons through the lobes into the polar regions. Class 2 observations may be due in part to magnetospheric processes. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A050 026 3/2 10/1
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIFSolar Energy for the Naval Shore
Establishment.DESCRIPTIVE NOTE: Master's thesis.
DEC 77 246P Geibel, Bruce Burgee ;

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar energy, *Naval shore facilities,
*Energy conversion, Feasibility studies, Energy
conservation, Modification, Retrofitting,
Computerized simulation, Solar cells, Photovoltaic
effect, Fossil fuels, Military requirements,
Energy management, Theses

(U)

This thesis discusses the background and extent of
the current national energy crisis, and reviews the
alternative energy sources available to the United
States Navy other than conventional fossil fuels.
An in-depth analysis is made of the advantages,
disadvantages and techniques of one of these
alternatives, solar energy conversion. The
National Solar Energy Program is reviewed, as
is the role of the Department of Defense and the
United States Navy in this program. Methods
of 'retrofitting' existing Navy facilities with
solar energy systems are discussed, as are new
construction techniques. The thesis further
contains techniques for life-cycle costing of
alternative solar energy systems, which includes
computer model programs such as BASIC Language,
F-Chart calculations, and SOLCOST calculations.
The thesis concludes with suggestions for
establishing a viable solar energy program on an
activity or individual basis. A comprehensive
reference list and bibliography is provided to
identify where technical and engineering details can
be found. (Author)

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AD-A049 982

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A049 982 10/2
PENNSYLVANIA STATE UNIV UNIVERSITY PARK APPLIED RESEARCH
LABHigh-Temperature Linear Radiation-Cavity
Solar Collector with a Fresnel
Concentrator.

(U)

DESCRIPTIVE NOTE: Doctoral thesis,
DEC 77 235P Antoniak, Zenen I. ;
REPT. NO. TM-77-326
CONTRACT: N00017-73-C-1418

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar collectors, Scale models, Test
and evaluation, Solar energy, Energy transfer,
Heating, Efficiency, Heat transfer, Cavities,
Fresnel lenses, Focusing, Control systems,
Mirrors, Steering, Computer applications
IDENTIFIERS: Design

(U)

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A model solar-thermal concentrator-collector that
is 1/8th scale (in cross section) relative to a
system considered to be of practical dimensions for
power generation has been constructed and tested.
It consists of an Archimedes (i.e.,
Fresnel) mirror-concentrator, 5 cm ID x 1.5 m
long glass receiver pipe, 0.3 cm thick graphite
absorber, and gaseous (Ar) heat transfer medium.
On clear days (direct solar flux ca. 800 W/
sq.m.), stagnation (i.e., no-flow condition)
temperatures of ca. 370 C have been reached at the
center of the experimental device, where end effects
are minimal. Experiments have been performed with
gas flow rates up to ca. 100 liters/min (200 RE
2000), resulting in a bulk fluid temperature rise
in the axial (flow) direction of up to 295 C.

These experiments have been utilized in a study of
heat transfer processes within the collector. A
computer model of this system which takes into
account most of the influential variables (e.g.,
combined forced-free convection, establishment of
velocity and temperature profiles, and axial heat
conduction) has been developed. Its behavior
agrees well with observations. Also, after ca. 200
h of high-temperature operation, materials
degradation was measured and found to be very low.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A049 490 13/1 10/1 10/2 13/2
 CIVIL AND ENVIRONMENTAL ENGINEERING DEVELOPMENT OFFICE
 TYNDALL AFB FL DETACHMENT 1 (ADTC)

A Survey of Considerations for Solar Energy
 Facility Applications. (U)

DESCRIPTIVE NOTE: Final rept.,
 DEC 77 65P Nay, Marshall W. , Jr;
 REPT. NO. CEEDO-TR-77-39

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar heating, Air Force facilities,
 Energy management, Solar energy, Solar collectors,
 Technology forecasting, Space heaters,
 Retrofitting, Cost estimates, Amortization, Air
 Force planning, Fossil fuels, Resource management,
 Energy consumption, Energy conversion,
 Photovoltaic effect, Heat pumps, Air conditioning
 equipment, Military requirements, Remote areas
 IDENTIFIERS: Environmental impact (U)
 (U)

The purpose of this report is to provide Air Force civil engineers some useful information for the planning and programming of solar energy systems to satisfy facility energy requirements. This report has been prepared in response to the belief that considerable interest in solar energy system technology, as well as other alternate energy schemes, is increasing at a rapid pace in the Air Force. A considerable effort is devoted to appraising the current status of fossil fuel energy resources in order to establish the need for expanded work in developing solar energy technology. The current and potential areas of application of solar energy technology are described with special attention devoted to space heating. Additionally, environmental considerations of solar energy technology are described along with the current Air Force solar energy program. This report concludes with some suggestions for establishing a solar energy program on an individual or installation basis. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A048 908 10/1 10/2
 AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF
 ENGINEERING

Solar Electric Generating System Resource
 Requirements and the Feasibility of Orbiting
 Solar Reflectors. (U)

DESCRIPTIVE NOTE: Master's thesis,
 DEC 77 187P Enger, Rolf G. ;
 REPT. NO. AFIT/GE/PH/77D-3

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar collectors, *Solar energy,
 *Space to surface, *Electric power production,
 Solar orbits, Mirrors, Photovoltaic effect,
 Terrestrial radiation, Materials, Costs, Thermal
 power plants, Spaceborne, Orbits, Theses
 IDENTIFIERS: Solar optics, OSR(Orbiting Solar
 Reflectors), *Solar reflectors (U)
 (U)

The potential consumption of natural resources by four solar electric generating systems was evaluated. They included a terrestrial solar thermal, a terrestrial photovoltaic, an orbiting solar reflector, and a satellite solar power system. Each was evaluated on its projected consumption of materials, land, water, manpower, energy, and money. The evaluation demonstrated that, per megawatt of electrical generating capacity, the terrestrial systems would consume less resources mainly because they would not require massive space transportation and construction systems and expensive developmental programs. It was also shown that construction of terrestrial systems would require fewer technological advancements and would pose less of a threat to the environment. A feasibility study of orbiting solar reflectors demonstrated that single-mirror systems may be useful for intra-space power generation. The report contains a 47-item bibliography. (U)

(Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A048 312 11/2 10/2 11/3
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG
MISS

Identification of Alternative Power Sources
for Dredged Material Processing
Operations.

(U)

DESCRIPTIVE NOTE: Final rept.,
NOV 77 136P Parker, C. E. ; Pat. D. ;
Vodnaska, K. F. ; Ciani, J. B. ;
REPT. NO. WES-TR-D-77-32

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Includes Appendices A-E.

DESCRIPTORS: *Dredged materials, *Processing,
*Power supplies, *Wind, Solar energy, Hydraulic
power, Energy conversion, Electric power production,
Dredging, Water, Silt, Sand, Gravel, Clay,
Removal

IDENTIFIERS: Wind power

(U)
(U)

This report provides a basis for selecting
alternative, renewable power sources specifically for
operating dredged material processing systems. A
dredged material processing system is designed to:
(1) extract sand and gravel for commercial use,
(2) remove silt and clay from water to meet
quality restrictions on return water, and (3)
dewater the residual silt and clay to reduce volume
and provide a usable foundation for later land use.
Currently, processing of dredged material usually
consists of holding the hydraulically pumped slurry
in a diked containment area and pumping or draining
off the water after settlement of the suspended
material. Subsequent natural drying by sun and wind
presents a problem if the material is a fine-grained
silt or clay. The scope of the assigned task was to
provide a screening and selection procedure for the
engineer designing a dredged material processing
system in order to decide which natural form of
energy (or combination), if any, should be chosen
to power the system. Alternative power can be
provided in several forms. The following were
considered in this study: (1) Wind power,
driving pumps and electric generators, (2)
Solar radiation converted to thermal and electrical
energy.

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AD-A047 925

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A047 925 9/2 10/2
JET PROPULSION LAB PASADENA CALIF

Computer program for Design and Performance
Analysis of Navigation-Aid Power Systems.
Program Documentation, Volume I. Software
Requirements Document.

(U)

DESCRIPTIVE NOTE: Final rept.,

JUL 77 182P Goltz, G. ; Kaiser, L. M. ;
Weiner, H. ;
REPT. NO. JPL-5040-27-Vol-1
MONITOR: USCG, CGR/DC D-11-77-VOL-1, 18/76-VOL-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2. AD-A047
356.

DESCRIPTORS: *Computer program documentation, *Power
supplies, *Solar cells, *Electric batteries,
*Computer aided design, Feasibility studies, Life
expectancy, Cost effectiveness, Flow charting,
Algorithms, Test and evaluation

(U)

A computer program has been developed for designing
and analyzing the performance of solar array/battery
power systems for the U.S. Coast Guard
Navigation Aids. This program is called the
Design Synthesis/Performance Analysis
(DSPA) Computer Program. The basic function
of the Design Synthesis portion of the DSPA
program is to evaluate functional and economic
criteria to provide specifications for viable solar
array/battery power systems. The basic function of
the Performance Analysis portion of the DSPA
program is to simulate the operation of solar array/
battery power systems under specific loads and
environmental conditions. This document establishes
the software requirements for the DSPA computer
program, discusses the processing that occurs within
the program, and defines the necessary interfaces for
operation.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A047 842 3/2

STANFORD UNIV CALIF INST FOR PLASMA RESEARCH

An Observational Search for Large-Scale
Organization of Five-Minute Oscillations on
the Sun.

(U)

DESCRIPTIVE NOTE: Technical rept.,

JUL 77 22P Dittner, Phil H.; Scherrer,

Philip H.; Wilcox, John M.;

REPT. NO. SU-IPR-809

CONTRACT: N00014-76-C-0207, NGR-05-020-559

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Also prepared under contract nos.
NSF-ATM-74-19007 and NSF-DES-75-15664 and supported
by Max C. Fleischmann Foundation.

DESCRIPTORS: *Solar corona, *Solar activity, Solar
energy, Solar observatories, Temperature,
Variations, Sunspots, Power spectra, Magnetic
fields, Velocity, Solar wind, Acoustic waves,
Solar disturbances

(U)

IDENTIFIERS: Coronal holes, Solar velocity
fields

(U)

The large-scale solar velocity field has been
measured over an aperture of radius 0.8 R on 121
days between April and Sept., 1975.
Measurements are made in the line FeI
5123.730A, employing a velocity subtraction
technique similar to that of Severny et al.
(1976). Comparisons of the amplitude and
frequency of the five-minute resonant oscillations
with the geomagnetic C9 index and magnetic sector
boundaries show no evidence of any relationship
between the oscillations and coronal holes or sector
structure. The average period measured for the
five-minute oscillation is 312.0 plus or minus 0.9
sec, which is longer than the average 296.1 plus or
minus 1.3 sec period originally reported by Noyes
and Leighton (1963) from measurements in the
line CaI 6103. The average amplitude is 2.0 m/
s, which agrees reasonably with the 2.4 m/s value
reported by Fossat and Rontz (1975). This
amplitude is larger than might have been expected
from an extrapolation of the work of Tanenbaum et
al. (1969) to a large aperture, and is evidence
of a large horizontal wavelength for the
oscillations.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A047 542 9/2 10/3 4/2

JET PROPULSION LAB PASADENA CALIF

Computer Program for Design and Performance
Analysis of Navigation-Aid Power Systems
Program Documentation, Volume III -
Programmer's Manual.

(U)

DESCRIPTIVE NOTE: Final rept.,

JUL 77 166P Goltz, G.; Weiner, H.;

REPT. NO. JPL-5040-27-VOL-3-Change 1

MONITOR: USCG, CGR/DC D-11-77-VOL-3, 18/76-VOL-

3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-A047
356.

DESCRIPTORS: *Programming manuals, *Mathematical
analysis, *Solar cells, *Power supplies,
Navigation aids, Electronic batteries, Cost
effectiveness, Feasibility studies,
Performance engineering, Input output
processing, Computer programs, Solar radiation,
Geographical distribution, Variations,
Meteorological data, Cloud cover

(U)

A computer program has been developed for designing
and analyzing the performance of solar array/battery
power systems for the U.S. Coast Guard
Navigation Aids. This program is called the
Design Synthesis/Performance Analysis (DSPA)
Computer program. The basic function of the
Design Synthesis portion of the DSPA program
is to evaluate functional and economic criteria to
provide specifications for viable solar array/battery
power systems. The basic function of the
Performance Analysis portion of the DSPA
program is to simulate the operation of solar array/
battery power systems under specific loads and
environmental conditions. This document provides a
detailed description of the DSPA Computer Program
system and its subprograms. This manual will assist
the programmer in revising or updating the several
subprograms.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD-A047 433
AIR FORCE INST OF TECH
SYSTEMS AND LOG: 100

Net Energy Analysis
Evaluation of a
and a Comparison of

DESIGN NOTE: Viste
SEP 77 128

Michael F
REPT. NO. AFOSR-83-02

UNCLASSIFIED

DESCRIPTION: The report describes a net energy analysis of a heating, ventilation, and air conditioning (HVAC) system. The analysis compares the net energy consumption of a conventional HVAC system with that of a solar-powered HVAC system. The analysis includes a detailed description of the system components, a description of the data collection and analysis methods, and a comparison of the results of the two systems. The analysis shows that the solar-powered system has a significantly lower net energy consumption than the conventional system.

This report describes a net energy analysis of a heating, ventilation, and air conditioning (HVAC) system. The analysis compares the net energy consumption of a conventional HVAC system with that of a solar-powered HVAC system. The analysis includes a detailed description of the system components, a description of the data collection and analysis methods, and a comparison of the results of the two systems. The analysis shows that the solar-powered system has a significantly lower net energy consumption than the conventional system.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD-A047 433
AIR FORCE INST OF TECH
SYSTEMS AND LOG: 100

Net Energy Analysis
Evaluation of a
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DESIGN NOTE: Viste
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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A046 763 17/2 22/2 20/5
SPACE AND MISSILE SYSTEMS ORGANIZATION LOS ANGELES
CALIF

Solar-Powered Laser Communications System
for Space.

(U)

DESCRIPTIVE NOTE: Rept. for 1 Jul-31 Aug 77
77 10P Barry, James D. ;

REPT. NO. SANSO-TR-77-179

PROJ: 2028

TASK: 03

UNCLASSIFIED REPORT

Availability: Pub. in Astronautics and
Aeronautics, V15 n9 p39-45 1977.

DESCRIPTORS: *Laser communications, *Space
communications, Neodymium lasers, Solar energy,
Optical pumping, Long life, Data rate, High
rate, Reprints

(U)

IDENTIFIERS: Satellite communications, Nd-YAG
lasers, PE63431F

(U)

Space communications with the Nd:YAG laser
offers extended operating life due to the use of
direct solar pumping of the laser. Solar radiation
is converted directly to laser light. A laser
communications system now in final development will
allow the transfer of 10 to the 9th power data bits
per second. The laser system is to be tested in the
early 1980s. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A046 150 10/2 9/5 9/1
SCLAREX CORP ROCKVILLE MD

Nonreflecting Vertical Junction Silicon
Solar Cell Optimization.

(U)

DESCRIPTIVE NOTE: Interim rept. May 76-May 77,
JUL 77 82p Monigemuth, John ; Lindmayer,

J. ; Scheinine, A. ;

CONTRACT: F33615-76-C-2058

PROJ: 3145

TASK: 19

MONITOR: AFAPL TR-77-38

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar cells, *Semiconductor diodes,
Silicon, Photovoltaic effect, Efficiency,
Radiation resistance, wafers, Charge carriers,
Mobility, Etching, Conversion ratio,
Antireflection coatings

(U)

IDENTIFIERS: Diffusion length, Characteristic
curves, WUAFAPL31451959, PE62203F

(U)

This work on nonreflective vertical-junction
silicon solar cells has resulted in high conversion
efficiency radiation resistant solar cells. New
techniques of oxidation growth and the use of
photolithography enable the use of an orientation
dependent etch to produce grooves 5-10 microns wide
and over 100 microns deep. These silicon wafers
have been processed into solar cells with all of the
processes performed at temperatures compatible with
producing high efficiency solar cells. A
theoretical calculation of the generated current for
the vertical junction structure was performed. It
indicates the decreased dependence on carrier
diffusion length and, therefore, the reduced effect
or radiation damage on collection efficiency for
vertical junction solar cells. Vertical junction
solar cells 2 cm x 2 cm in size have been fabricated
with AMO conversion efficiencies greater than
13%. These cells have shown superior radiation
resistance. (Author)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A045 082 13/1 14/1 5/2
DECISIONS AND DESIGNS INC MCLEAN VAAn Attitudinal Study of the Home Market for
Solar Devices.

(U)

DESCRIPTIVE NOTE: Technical rept. Mar-Sep 77,
SEP 77 71p Campbell, Vincent N.; Brown,
Rex V.; Rhees, Thomas R.; Repici, Dominic J.REPT. NO. TR-77-5-25
CONTRACT: N00014-75-C-0426

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar heating. *Commercial equipment,
*Cost analysis. *Surveys. Public opinion,
Attitudes (Psychology). Market research,
Projection, Comparison. Public utilities,
Statistical analysis. Computer applications,
Correlation techniques

(U)

This study estimates that 1.1 million American residences would have home and hot water heated with solar energy by 1985 if the total cost averaged \$20 a month more than the cost of heating with fossil fuels, and initial costs were no barrier. An additional 7.2 million homes would have hot water alone heated with solar energy by 1985 if the total cost was \$5 a month more. These are fairly favorable cost assumptions under current conditions. Almost half (44%) of potential homeowners surveyed would prefer to have their living spaces and hot water heated with solar energy if the total cost averaged \$20 per month more than conventional heating and initial costs were no barrier. Although interest runs high, for various economic and technical reasons only about 1 in 75 American families may have both their home and water heated with solar energy by 1985. Any development that makes solar energy cost-competitive with fossil fuels for home heating will increase the level of market penetration. Another key to how quickly Americans will have solar homes is how fast builders and developers use solar energy in new homes and can assure good performance. (Author)

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AD-A045 042

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A045 042 13/1
FRANK J SEILER RESEARCH LAB UNITED STATES AIR FORCE
ACADEMY COLOSecond Interim Technical Report on USAFA
Solar Test House.

(U)

DESCRIPTIVE NOTE: Rept. for May 76-Apr 77,
SEP 77 165p Eden, Anthony; Tinsley, JohnT. ;
REPT. NO. FUSRL-TR-77-0016
PROJ: 2303.2054
TASK: F1.50
MONITOR: CEEGO TR-77-34

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color plates:
All DDC reproductions will be in black and white. See
also Rept. no. FUSRL-TR-76-0008, AD-A030 843.

DESCRIPTORS: *Solar heating.

*Housing (Dwellings). *Air Force facilities.

*Solar panels. Retrofitting. Solar energy.

Energy conservation. Thermography.

Performance (Engineering). Heat exchangers.

Bleed systems. Arrays. Storage tanks. Flow rate.

Thermal insulation

IDENTIFIERS: WUFUSRL2303F175, PE61102F.

WUFUSRL20545005, PE64708F

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This report describes the continuing performance of the first retrofit-constructed, solar-heated facility in the USAF, the Solar Test House at the USAFA. The attempts at improving the performance of the system have centered on the following: additional heat exchangers; bleed air line and valves; ground array angle changes; reduced volume of storage tank; control temperature reductions; flow rate reductions and new data gathering system. The Solar Test House was modified to conserve thermal energy by using urea foam insulation in the ceilings, vestibules on the doors, and linear diffusers for the duct outlets. Thermography studies have been started to explore the flow patterns through the solar arrays and correlate pictures with multiplexed sensor readings. Daily, monthly, and yearly data analysis is reported to show the effects of the various system and operational changes and the improved performance. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
 AD-A043 951 13/1 10/1 3/2
 LITTLE (ARTHUR D) INC CAMBRIDGE MASS

Solar Air - Conditioning Study.

(U)

DESCRIPTIVE NOTE: Final rept.,

APR 77 149P Merriam, Richard ;

REPT. NO. ADL-C-79679

CONTRACT: N68305-76-C-0029

PROJ: F57571

TASK: ZF57571001

MONITOR: CEL CR-77.018

UNCLASSIFIED REPORT

DESCRIPTORS: *Air conditioning equipment, *Solar energy, *Energy conversion, Cooling and ventilating equipment, State of the art, Life cycle costs, Heat transfer coefficients, Rankine cycle, Desiccants, Dehumidifiers, Refrigerants, Storage, Silica gel, Solar collectors, Buildings, Climate, Heat pumps
 IDENTIFIERS: PE62765N

(U)

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The state-of-the-art of solar cooling is evaluated to determine the near term performance potentials and life-cycle costs of the most promising approaches. The heat actuated absorption cycle, Rankine cycle, and desiccant dehumidification cycle are examined. The principles of operation are described, performance coefficients are reviewed, operating constraints are examined, and the commercial status of each approach is evaluated. An analysis of the major solar cooling demonstrations (as of 1976) is carried out. Savings-to-investment ratios are calculated for solar cooling systems in buildings in seven locations within the United States. (Author)

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AD-A043 951

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AD-A043 382

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
 AD-A043 382 10/2
 SPECTROLAB INC SYLMAR CALIF

High Efficiency Solar Panel (HESP).

(U)

DESCRIPTIVE NOTE: Final rept. 1 Jun 75-15 Jun 77,

JUL 77 137P Scott-Monck, John ; Gay,

Charles ; Stolla, Paul ; Uno, Frank ;

CONTRACT: F33615-75-C-2028

PROJ: 682J

TASK: 04

MONITOR: AFAPL TR-77-36

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar cells, *Silicon, Power supplies, Solar panels, Spacecraft, Space technology, Energy conversion, Space environments, Environmental tests, Sizes (Dimensions), Thickness, Electrical resistance, Temperature coefficients, Radiation hardening, Materials, Antireflection coatings, Fabrication
 IDENTIFIERS: High efficiency solar panel program, Nuclear radiation, Laser beams, Tantalum pentoxide, Electric contacts, Chromium, Tantalum, Palladium, Silver,
 WUAFAPL682J0401, PE63401F

(U)

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A family of high efficiency, weldable silicon solar cells, incorporating every feature of advanced technology developed in the past four years, was produced and subjected to space qualification testing. This matrix contained both field and non-field cells ranging in thickness from 0.10 mm to 0.30 mm, and in base resistivity from nominal two to one hundred ohm-cm. Initial power outputs as high as 20 mw/sq.cm (14.8% AMO efficiency) were produced by certain cell types within this group. All these cells had certain common features: a selectively etched front surface which reduced reflection losses, tantalum-palladium-silver front contacts, chromium-palladium-silver back contacts, junction depths approx 0.10 micrometers, and a tantalum pentoxide antireflection coating. For the field cells, acceptor doping was accomplished using a screen printed aluminum paste source. The baseline cell, which was 0.23 mm thick, nominal two ohm-cm, non-field type was produced in three sizes, 2 x 2 cm, 2 x 4 cm and 2 x 6 cm, the others in 2 x 2 cm form.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A042 584 3/2 10/1
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)

Efficiencies of Various Methods for Solar Energy Conversion.

JUN 77 34P Soper, W. G. ;
REPT. NO. ONRL-R-6-77

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar energy, *Energy conversion, Solar cells, Heat engines, Efficiency, Hydrogen, Thermodynamic try
IDENTIFIERS: Water splitting process, Thermal decomposition

Three methods are examined for converting solar energy to electricity or shaft work: heat engines, thermal decomposition of water to produce hydrogen and solar cells. Maximum efficiencies of conversion are found to lie between 20% and 50%. For most applications, the heat engine is superior to the water splitting process. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A042 178 10/1 5/3 14/1
CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN ILL

Market Evaluation Study: Solar Heating and Domestic Hot Water Heating in DOD Buildings.

DESCRIPTIVE NOTE: Final rept.,
JUL 77 30P Windingland, L. M. ; Martel, C. ;

REPT. NO. CERL-TR-E-114

UNCLASSIFIED REPORT

DESCRIPTORS: *Economic analysis, *Solar heating, Hot water, Heating, Commerce, Cost analysis, Department of Defense, Facilities, Buildings

IDENTIFIERS: Solar space heating, Solar domestic hot water heating, Solar hot water heating, Energy utilization index

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This study assesses the potential market for combined solar space heating and domestic hot water heating in Department of Defense (DOD) buildings. The study considers eight building categories: family housing, bachelor enlisted quarters, bachelor officers' quarters, administration, training, operational, community support, and recreational, which together contain 683 million sq ft (61.5 million m2), or 40 percent of the DOD inventory. All buildings were assumed to be oil heated. The buildings were grouped by climatological/solar regions, and the loads for each building type were determined by using the Energy Utilization Index (EUI) method. Solar system performance in each region was obtained by using the U.S. Army Construction Engineering Research Laboratory universal curve method. The life-cycle costs of providing solar space heating and domestic hot water heating were analyzed, and the DOD market potential for installed solar system costs of \$9, \$15, and \$20 per square foot were determined. The study shows that at an estimated initial fuel cost of \$3.50 MBtu for oil heating, a 10 percent cost of money, and an 8.5 percent overall fuel inflation factor,

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AD-A042 584

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AD-A042 178

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A039 702 7/4 10/3
BOSTON UNIV MASS DEPT OF CHEMISTRYPhoton Energy Storage in Organic
Materials: The Case of Linked
Anthracenes.

DESCRIPTIVE NOTE: Technical rept. no. 6, 1 Nov 75-31

Dec 76, MAR 77 30P Jones, Guilford, II;
Bergmark, William R.; Reinhardt, Thomas E.;
CONTRACT: N00014-76-C-0442

(U)

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy storage, *Energy conversion,
*Photochemical reactions, *Isomerization,
*Anthracenes, *Solar energy, Photons, Test
equipment, Calorimetry, Enthalpy, Quantum
efficiency, Valence, Isomers, Organic materials
IDENTIFIERS: WUNROC51574(U)
(U)

Criteria for the photochemical storage of solar energy as latent heat are outlined. Energy-storing valence isomerizations which may be driven by irradiation and which may be reversed by heating with or without a catalyst are described. Data for photoisomerization which utilize 300-500 nm radiation with storage capacities of 50-250 cal/g and with storage efficiencies of 5-10% are summarized. New data concerning linked anthracenes which photoisomerize with $\phi = 0.2-0.4$ are provided. A photocalorimeter for the measurement of storage enthalpies is described. New systems for the practical conversion of solar energy are suggested.

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AD-A039 546

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A039 546 10/1
TETRA TECH INC ARLINGTON VAU.S. Navy Energy R and D Progress
October 1976-March 1977.

(U)

DESCRIPTIVE NOTE: Technical rept.

APR 77 142P
REPT. NO. IT-A-872-77-316
CONTRACT: N00014-76-C-0239

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-A023 340.
DESCRIPTORS: *Energy, *Energy conservation, *Naval research, *Synthetic fuels, Energy management, Research management, Synthetic fuels, Resource management, Geothermy, Solar energy, Natural resources, Braile, Coal gas, Wind, Law (Jurisprudence), Legislation

(U)

This U.S. Navy Energy R and D Progress report summarizes the progress and accomplishments of the Navy Energy R and D Program for the period from October 1976 through March 1977. This report complements the U.S. Navy Energy R and D Program Plan, FY 1977-FY 1982, published in October 1976.

(U)

(Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A038 802 10/1
 TETRA TECH INC ARLINGTON VA
 Energy Fact Book-1977.

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DESCRIPTIVE NOTE: Technical rept.
 APR 77 446P
 REPT. NO. TETRAT-A-642-77-306
 CONTRACT: N00014-76-C-0239

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Supersedes Rept. no. TETRAT-A-642-76-254 dated 15 Jul 76. AD-A028 284 and report dated 1975. AD-A029 331.
 DESCRIPTORS: *Energy management. *Energy.
 *Handbooks. Fossil fuels. Natural gas. Coal.
 Nuclear energy. Synthetic fuels. Fuel cells.
 Geothermy. Nuclear power plants. Petroleum products. Hydrogen. Magnetohydrodynamics. Solar energy. Wind. Thermoelectric power generation. Oil shales. Thermal power plants. Energy conservation. Legislation. Research management. Manuals. Foreign technology. Reviews. United States. Policies. Regulations. Crude oil. Reserves(Energy). Fuel consumption. Energy conversion
 IDENTIFIERS: Tar sands. Coal liquefaction. Ocean energy. Biomass energy conversion

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The Energy Fact Book-1977 summarizes the present U.S. Energy situation; Energy R and D Legislation; Federal Government Energy R and D; and International Energy R and D. It includes a brief description of the various processes and developments related to hydrocarbon fuels, synthetic fuels, non-hydrocarbon energy sources and energy conservation. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A038 600 10/2
 DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA
 Solar Energy.

(U)

DESCRIPTIVE NOTE: Report bibliography Jan 55-Dec 76.
 APR 77 211P
 REPT. NO. DDC/B18-77/03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-771 750.
 DESCRIPTORS: *Solar energy. *Energy conversion.
 *Bibliographies. Power supplies. Electric power production. Solar radiation. Solar heating. Solar cells. Solar generators. Solar collectors. Solar furnaces. Indexes
 IDENTIFIERS: PE65801S

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This bibliography is a selection of unclassified and unlimited distribution references on Solar Energy. These citations of reports present information on performance characteristics, fabrication, development of power levels and energy conversion. Corporate Author-Monitoring Agency, Subject, Title and Personal Author are provided. (Author)

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UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 20M09

AD-A036 479 13/1
CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN
ILL

Market Evaluation Study: Solar Domestic
Water Heaters for DOD Barracks.

(U)

DESCRIPTIVE NOTE: Final rept..

FEB 77 39P Windingland, Larry; Walton, George; Hittle, Douglas;
REPT. NO. CERL-TR-E-102

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar heating, *Solar collectors,
*Barracks, *Hot water, Life cycle costs, Cost
analysis, Solar energy, Heating, Solar radiation,
Geographic areas, Computerized simulation, Graph

(U)

This study assesses the potential market for solar domestic hot water systems in DOD bachelor enlisted and bachelor officer quarters (barracks). The number and locations of existing and planned bachelor enlisted and bachelor officer quarters in the United States are analyzed, and the locations where solar domestic water heating is most feasible are determined. Life-cycle costs of providing solar domestic water heating systems are analyzed and the DOD market potential for these systems determined for varying system costs. The results of more than 120 one-year solar hot water heating system simulations are presented along with a dimensionless graph and methodology which can be used to estimate solar hot water heater performance for building loads and sites other than those studied. The potential markets for solar collectors based on varying system costs are presented. Results indicate that at an anticipated future system cost of \$9/sq ft (\$97/sq m) of collector the probable market for solar collectors is 4.4 million sq ft (409 000 sq m). Over a 20-year life, the potential savings resulting from application of this collector area is estimated to be 4.5 million barrels of fuel and \$29 million. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 20M09

AD-A035 603 10/1 20/13
CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN
ILL

Predicting the Performance of Solar Energy
Systems.

(U)

DESCRIPTIVE NOTE: Final rept..

JAN 77 45P Hittle, D. C.; Walton, G. N.; Holsouser, D. F.; Leverenz, D. J.;
REPT. NO. CERL-IR-E-98
PROJ. 4A763734DT08
TASK: 06

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar energy, *Heating plants,
*Solar collectors, Solar radiation, Hot water,
Life cycle costs, Cooling and ventilating equipment,
Computerized simulation, Charts, Cost analysis
IDENTIFIERS: AST09, WU001, PE63734A

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This report presents a method for making an energy and life-cycle cost analysis of solar energy systems. A graphical method is presented for predicting the performance of solar domestic hot water systems, solar heating systems, and solar heating and cooling systems. Methods for selecting the optimum collector area based on life-cycle cost and for systematically making detailed design calculations using the Building Loads Analysis and System Thermodynamics (BLAST) computer simulation program are also presented. Practical considerations for solar system designs are discussed. The methods presented provide the required accuracy for both initial evaluations and final design calculations. Examples are provided throughout the text to aid in using the methods described. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD-A034 141 13/1
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
Energy Conservation in Buildings. (U)

DESCRIPTIVE NOTE: Special rept.,
DEC 76 10P
REPT. NO. CRREL-SR-76-17 Ledbetter, C. Burgess ;
PROJ: 4A762719AT06
TASK: 01

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy conservation, *Buildings,
Architecture, Thermal insulation, Ventilation,
Windows, Solar heating, Illumination, Life cycle
costs (U)
IDENTIFIERS: PE62719A, WJ003, AST06 (U)

This report scans current building designs and describes, for the layman, ways that buildings could be designed for improved energy consumption. Topics of building design addressed are insulation, thermal bridges, ventilation, orientation, lighting, windows, and solar heat. (Author) (U)

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AD-A032 221

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD-A032 221 10/1 10/2
RAND CORP SANTA MONICA CALIF
California's Energy Future. (U)

MAR 76 31P Morris, Deane N. ;
REPT. NO. P-5616

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Abridgement of Rept. no. 9-1793-CSA RF.

DESCRIPTORS: *Energy management, *California,
Energy conservation, Energy consumption, Emergency
rations, Petroleum products, Natural gas,
Hydroelectricity, Coal, Coal gas, Nuclear
energy, Geothermy, Crude oil, State government,
State law, Legislation, Offshore drilling,
Alaska, Pipelines, Solar energy, Transportation,
Residential section, Industrial plants, Public
utilities, Forecasting, Policies (U)
IDENTIFIERS: Energy crisis, Embargoes (U)

This paper presents an abridgement of the results of a Rand study on energy policy issues facing California, more fully reported in Energy Alternatives for California: Paths to the Future, R-1793-CSA/RF, and summarized in some detail in an Executive Summary, R-1793.1-CSA/RF. The study is concerned with the problems of an uncertain future. These problems are extraordinarily complex and interwoven. Under conditions of rapid change, the full consequences of policy actions are difficult to predict and policy objectives are difficult to define. In addition, the relationships between state and federal actions are poorly understood, involving issues of equity among individuals and regions, and issues of environment, health, safety, and land use. Simple solutions should not be expected in such a policy area. However, a number of recommendations are presented because policy decisions should be made on the basis of the best information available when the political process demands they be made. The brief summary presented here necessarily omits most of the rationale for our conclusions and recommendations, as well as a number of subsidiary conclusions. The interested reader should consult the full report for these additional details. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A031 164
INTERTECHNOLOGY CORP WARRENTON VA

10/1

Feasibility of Meeting the Energy Needs of
Army Bases with Self-Generated Fuels
Derived from Solar Energy Plantations
(Appendices A, B, and C).

(U)

DESCRIPTIVE NOTE: Final rept..
JUL 76 321P Szego, George C. ;
REPT. NO. ITC-260675-App
CONTRACT: DACA23-74-C-0009, ARPA Order-2630

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Appendices to AD-A031 163.
DESCRIPTORS: *Energy conversion, *Solar energy,
*Fuels, *Plants(Botany), *Energy storage,
Steam power plants, Fuel consumption, Military
facilities, Cooking devices, Climate, Electric
power production, Trees
IDENTIFIERS: *Energy plantation, Deciduous
trees

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AD-A031 163

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A031 163
INTERTECHNOLOGY CORP WARRENTON VA

10/1

Feasibility of Meeting the Energy Needs of
Army Bases with Self-Generated Fuels
Derived from Solar Energy Plantations.

(U)

DESCRIPTIVE NOTE: Final rept..
JUL 76 149P Szego, George C. ;
REPT. NO. ITC-260675
CONTRACT: DACA23-74-C-0009, ARPA Order-2630

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Appendices, AD-A031
164.

DESCRIPTORS: *Energy conversion, *Solar energy,
*Fuels, *Plants(Botany), *Energy storage,
Synthetic fuels, Solar radiation, Natural gas,
Electric power production, Costs, Military
facilities
IDENTIFIERS: *Energy plantations

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This project thoroughly investigated the possibility of collecting and storing solar radiation in plants especially grown for their fuel value as a source of fuel on U. S. Army bases. The study investigated the merit of producing this fuel at energy plantations at or near the bases. The fuel would be used for directly fired steam generators, hot water heaters, space heaters, and cooking. The research examined the major characteristics of energy plantations; analyzed plant-matter production rates from deciduous plants; and examined fuel consumption in stationary facilities at major troop training centers. The possibilities and requirements of energy plantations at Fort Benning, Fort Leonard Wood, and at Army bases in general were detailed. It was concluded that energy plantations could be feasible at approximately 15 large Army bases and that the cost of solid fuel produced from them would be approximately \$1/1 million Btu; the cost of synthetic natural gas produced from plants was determined to be approximately \$3.10 to \$4.20/1000 standard cu ft. Besides being a perpetually renewable fuel source, it was found that energy plantations could provide independence from other fuel sources, reduction in future environmental problems caused by present fuels.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A030 843 13/1 15/5 13/13 3/2

FRANK J SEILER RESEARCH LAB UNITED STATES AIR FORCE
ACADEMY COLOSolar Heating Retrofit of Military Family
Housing.

(U)

DESCRIPTIVE NOTE: Technical rept. Apr 75-Jun 76.

SEP 76 296P Nay, Marshall W., Jr.;

Davis, Jon M.; Schmiesing, Roy L.; Tolbert,

William A.;

REPT. NO. FJSRL-TR-76-0008

PROJ: FJSRL-7903-03-75

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar heating, *Retrofitting,
*Housing(Dwellings), *Military facilities,
*Solar energy, Civil engineering, Military
engineering, Maintenance, Cost analysis,
Inflation(Economics)IDENTIFIERS: *Military family housing, Ground
array, B... array, Solar test house, Real
property

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This interim technical report describes the programming, facility, acquisition and initial performance of the first retrofit constructed solar-heating facility in the United States Air Force, the Solar Test House at the United States Air Force Academy. The Air Force civil engineer is responsible today for operating and maintaining approximately 150,000 units of military family housing. As is the case in the private sector, the Air Force civil engineer is experiencing higher operating and maintenance costs due to inflation. Just recently, operating costs have begun to exceed maintenance costs. Higher energy related utility costs are believed responsible for this. Accordingly, Air Force civil engineers are interested in investigating the use of alternate energy schemes such as solar energy for its real property, not only in response to inflation in energy costs but also in response to energy crisis scenarios for a number of reasons which include: providing a mechanism to help offset rising utility costs; providing a mechanism to help guarantee mission continuation at installations that have their normal sources of conventional fossil fuels

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A030 529 10/1

NAVAL RESEARCH LAB WASHINGTON D C

Navy Applications for Terrestrial
Photovoltaic Solar Power.

(U)

DESCRIPTIVE NOTE: Interim rept.,

SEP 76 39p

K.; Guenzen, C. S.; Statler, R. L.; Hubler, G.

REPT. NO. NRL-MR-3363

PROJ: NRL-HQ1-55, RR012-06

TASK: RR012-06-41

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy conversion, *Photovoltaic
effect, *Solar energy, *Solar cells, Solar
radiation, Electric power, Cost effectiveness,
Navigational aids, Communication equipment,
Surveillance

(U)

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The U.S. Army Mobility Equipment Research and Development Center (MERDC), Fort Belvoir has been tasked by the Assistant Secretary of Defense (Installations and Logistics) with Energy Research and Development Administration (ERDA) funds to prepare a Department of Defense proposal for installing terrestrial solar photovoltaic power in DoD operational systems. This report describes a survey made by the Radiation Effects Branch of the Radiation Technology Division to identify specific terrestrial solar photovoltaic power applications appropriate to DoD operational systems and facilities.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A028 548 4/1 8/3
ARIZONA UNIV TUCSON INST OF ATMOSPHERIC PHYSICS

A Two-Dimensional Global Climatic Model, (U)

JUL 75 18P Sellers, William D.;
CONTRACT: DAHC04-70-C-0038, AF-AFSR-2633-74

PROJ: 9751

TASK: 03

MONITOR: AFOSR TR-76-0784

UNCLASSIFIED REPORT

Availability: Pub. in Monthly Weather Review,
v104 n3 p233-248 Mar 76.DESCRIPTORS: *Climate, *Atmosphere models,
Computerized simulation, Ocean models, Global,
Spatial distribution, Air water interactions,
Seasonal variations, Two dimensional, Humidity,
Equations of motion, Boundary layer, Cloud cover,
Energy transfer, Solar energy, Digital computers,
Mathematical prediction, Atmospheric circulation,
Thermodynamics, ReprintsIDENTIFIERS: CDC 7600 computers, Ocean
circulation (U)

A two-dimensional global climatic model has been developed, using a 10 deg longitude by 10 deg latitude box grid and a one-month time step. The lapse rates of temperature and the meridional component of the flow in the oceans and atmosphere and of specific humidity in the atmosphere are parameterized in terms of their respective sea-level values. The model then utilizes the vertically-averaged thermodynamic energy equation, the equation of motion for the boundary layer, the thermal wind equation, the hydrostatic equation, the surface water balance equation, and empirical relations between the sea-level temperature and pressure gradient fields and between cloud cover and precipitation to determine the global distribution by months of sea-level pressure, temperature, wind speed and direction, and relative humidity, precipitation, evaporation, runoff, soil moisture content, ice and snow cover and thickness, cloud cover, and poleward energy transport. A simple ocean model is included. Two 100 model-year runs were made on the NCAR CDC 7600 computer. Each required about 27 min of computer time. They differed only in the value of the solar constant used. Both runs indicate that

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A028 418 13/1
NAVAL ACADEMY ANNAPOLIS MD ENERGY-ENVIRONMENT STUDY
GROUPFeasibility of Heating Domestic Hot Water
for Apartments with Solar Energy. (U)DESCRIPTIVE NOTE: Final rept. 1 Jul 75-30 Jun 76,
MAR 76 14P Graham, Billie J.;
REPT. NO. USNA-EPD-20

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar heating, *Solar collectors,
Buildings, Hot water, Feasibility studies, Cost
effectiveness

IDENTIFIERS: Apartments (U)

A feasibility study has shown that because of the age and nature of construction of the Wherry Apartments within the Annapolis Complex, the use of solar energy retrofitted to the existing heating system to supply heat for the space heating requirements is not economically justified. However, because the energy requirements for domestic hot water are essentially constant year round, the solar heat collecting system for this application is much more simple in design. For these reasons, the economical use of solar energy to heat the domestic hot water in these apartments appears promising. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A028 332 13/1
TETRA TECH INC ARLINGTON VAAnalysis of the Technical and Cost
Feasibility of Solar and/or Wind Energy
Systems for Coast Guard Public Quarters.

(U)

DESCRIPTIVE NOTE: Final rept. on Task 3.
JUN 76 97P Arbo, P. E.; Reed, J. J.;
Garcia, A. F.; Hemphill, C. W.;
REPT. NO. TETRA-A-463-76-248
CONTRACT: DOT-CG-50960-A
PROJ: CG-8600
MONITOR: US 3 D-80-76

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar heating. *Wind. *Air.
Heating. Solar collectors. Coast Guard.
Buildings. Feasibility studies. Cost
effectiveness. Computer programs. Weather. Solar
energy

IDENTIFIERS: Wind heating

Energy requirements of existing Coast Guard-
owned public quarters were assessed based on a survey
of energy usage for FY 1975. A computerized
solar collector heat gain model was developed to
identify regions in which solar heating might be cost
beneficial under a conservative scenario and using
generalized data. A region containing 45 structures
(with 74 public quarters) at 10 sites was
identified. Energy requirements and regional
insulation and weather data for each specific site
were then used in the model to determine solar
collector requirements and cost break-even periods.
Based on these results, a solar heating
applications research project was outlined to
capitalize on solar energy. (Author)

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AD-A028 083

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A028 083 10/3
BALLISTIC RESEARCH LABS ABERDEEN PROVING GROUND MD

Solar Energy Storage.

(U)

JUN 76 24P Gauss, Arthur, Jr.;
REPT. NO. BRL-1895
PROJ: DA-1-7-161101-A-91-A

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar energy. *Energy storage. Low
temperature. Reversible. Chemical reactions. Solar
heating. Solar collectors. Endothermic reactions.
Flat plate models. Heat of vaporization. Heat
pumps

(U)

Low temperature processes for solar energy storage
have been evaluated. Temperatures are low enough so
that relatively inexpensive flat plate solar
collectors can be employed. Low temperature
reactions are proposed which demonstrate the
principles of chemical storage of solar energy.
Certain of these reactions could be laboratory
tested with little difficulty since they yield
products which separate naturally. The most
practical low temperature system analyzed to date is
the heat of vaporization storage system. The
storage capacity for this system, typically about 200
kcal/liter, is close to an order of magnitude better
than conventional sensible heat storage in water.

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(Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMD9

AD-A028 057 3/2 3/3
JOHNS HOPKINS UNIV LAUREL MD APPLIED PHYSICS LABPrediction of Solar Energetic Particle
Event Histories Using Real-Time Particle
and Solar Wind Measurements, (U)

JUN 76 22P Roelof, E. C.; Gold, R. E.

REPT. NO. Scientific-1
 CONTRACT: N00017-72-C-4401
 PROJ: AF-6813
 TASK: 681311
 MONITOR: AFGL TR-76-0136

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar corona, *Solar wind, Mapping,
 Magnetic fields, Solar structure, Solar energy,
 Solar cosmic rays, Transport properties, Velocity,
 Particles, Predictions, Real time
 IDENTIFIERS: Solar cycle 20, Heliographic
 longitude, Coronal particles, Coronal plasma

The comparatively well-ordered magnetic structure in the solar corona during the decline of Solar Cycle 20 has revealed a characteristic dependence of solar energetic particle injection upon heliographic longitude. When analyzed using solar wind mapping of the large scale interplanetary magnetic field line convection from the corona to the Earth, particle fluxes display an approximately exponential dependence on heliographic longitude. Small variations in the solar wind velocity (and hence the coronal connection longitude) can severely distort the simple coronal injection profile, the use of real-time solar wind velocity measurements can be of great aid in predicting the decay of solar particle events. Although such exponential injection profiles are commonplace during 1973-1975, they have also been identified earlier in Solar Cycle 20 (e.g., 1967 and 1969), and hence this structure may be present during the rise and maximum of the cycle, but somewhat obscured by greater temporal variations in particle injection. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMD9

AD-A027 547 20/12
DAVID SARNOFF RESEARCH CENTER PRINCETON N JApplication of Granular Semiconductors to
Photothermal Conversion of Solar Energy, (U)

NOV 75 4P Gittleman, J. I.;

CONTRACT: F44620-75-C-0057
 PROJ: AF-9764
 MONITOR: AFOSR TR-76-0672

UNCLASSIFIED REPORT

Availability: Pub. in applied physics letters, v28
 n7 p370-371, 1 Apr 76.
 DESCRIPTORS: *Semiconductors, *Solar energy,
 *Photothermal energy, Absorbers (Materials),
 Energy conversion, Reprints

A novel selective solar absorber, consisting of a dispersion of semiconductor grains in a low-dielectric-constant insulator is proposed. Calculations based on Maxwell-Garnett theory show that because of its lower reflectivity for $\lambda < 1.5$ micrometers this material is about 60% more efficient than silicon in converting solar energy to heat. Reflectivity measurements for Ge-Al₂O₃ films on aluminum agree with the predictions of the Maxwell-Garnett theory. The problems associated with the reduction to practice are discussed. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A027 110 13/1 3/2

MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Thin-Film Conducting Microgrids as
Transparent Heat Mirrors.

(U)

DESCRIPTIVE NOTE: Journal article,

DEC 75 4P Fan, John C. ; Bachner, Frank

J. ; Murphy, Ralph A. ;

REPT. NO. JA-4567

CONTRACT: F19628-73-C-0002

PROJ: AF-649L

MONITOR: ESD TR-76-174

UNCLASSIFIED REPORT

Availability: Pub. in Applied Physics Letters,
vol. 28 p440-442, 15 Apr 76.DESCRIPTORS: *Solar heating, *Solar collectors,
*Solar energy, *Mirrors, *Solar radiation, Thin
films, Transparencies, Reprints
IDENTIFIERS: Heat mirrors, Infrared
reflectivity

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A new type of transparent heat mirror for solar-energy applications has been fabricated by chemically etching a Sn-doped In2O3 film to form a transparent conducting microgrid. For square openings 2.5 micrometers on a side, separated by lines 0.6 micrometers wide, the solar transmission increases from 0.8 for the original continuous film to 0.9 for the microgrid. Although 65% of the area of the film is removed by etching, the infrared reflectivity decreases by only 9%, from 0.91 to 0.83. A smaller decrease in the infrared reflectivity may be possible if materials with higher optical conductivity are used. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A027 105 13/1 3/2

MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Transparent Heat Mirrors for Solar-Energy
Applications.

(U)

DESCRIPTIVE NOTE: Journal article,

NOV 75 8P Fan, John C. ; Bachner, Frank

J. ;

REPT. NO. JA-4555

CONTRACT: F19628-73-C-0002

PROJ: AF-649L

MONITOR: ESD TR-76-173

UNCLASSIFIED REPORT

Availability: Pub. in Applied Optics, vol. 15 no
p1012-1017 Apr 76.DESCRIPTORS: *Solar heating, *Solar radiation,
*Mirrors, *Solar energy, *Solar collectors,
Films, Transparencies, Reprints
IDENTIFIERS: Heat mirrors, Infrared
reflectivity

(U)

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IAC ACCESSION NUMBER: MCIC-096998
IAC DOCUMENT TYPE: MCIC -JOURNAL ARTICLES--
Transparent heat-mirror films, which transmit solar radiation but reflect in thermal radiation, have potentially important applications in solar/thermal/electric conversion, solar heating, solar photovoltaic conversion, and window insulation. We have used rf sputtering to prepare two types of films: TiO2-Ag/TiO2 and Sn-doped In2O3. To characterize the properties of heat-mirror films for solar-energy collection, we define the parameters Alpha sub eff, the effective solar absorptivity, and Epsilon sub eff the effective infrared emissivity. For our Sn-doped In2O3 films, Alpha sub eff/Epsilon sub eff is comparable to the values of Alpha Epsilon reported for the leading selective absorbers. Even higher values of alpha sub eff/epsilon sub eff are obtained for the TiO2-Ag/TiO2 films. (Author)

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IAC SUBJECT TERMS: M--(U)TRANSPARENT HEAT MIRRORS, THIN FILMS, COATINGS, TITANIUM DIOXIDE/SILVER-TITANIUM DIOXIDE, INDIUM OXIDE, TIN ADDITIONS, SPUTTERING, SOLAR ABSORPTIVITY, INFRARED EMISSIVITY, FLAT-PLATE COLLECTORS, SOLAR ENERGY APPLICATIONS.;

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A026 962 10/1
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)Energy and Physics--General Conference of the
European Physical Society (3rd) Held in
Bucharest (Romania) on 9-12 September
1975.DESCRIPTIVE NOTE: Conference rept.,
JUN 76 17P Potter, Roy F. ;
REPT. NO. ONRL-C-14-76

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy. *Meetings. Solar energy.
Energy conversion. Energy storage. Thermoelectric
energy. Transports. Rumania
IDENTIFIERS: Energy transport

This report covers portions of most of the plenary sessions including the opening session of the Conference, Physics and Energy; Energy Strategies; Maturity of Nuclear Energy; Use of Solar Energy; New Goals and Challenges; Photochemistry; Thermoelectric Research; Energy, Dissipation and Structure; Transport and Storage of Energy. Other sessions covered are on solar energy use, transport and storage of energy and energy research strategies.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A026 660 5/4 10/2 13/1
RAND CORP SANTA MONICA CALIFIs the Right to Light a California
Necessity.DEC 75 31P Harris, William R. ;
REPT. NO. P-5558

UNCLASSIFIED REPORT

DESCRIPTORS: *Sunlight. *State law. *Land use.
User needs. Regulations. California. Energy
consumption. Solar heating. High costs. Solar
energy. Air conditioning equipment. Life cycle
costs. Resource management

(U)

This report is the statement prepared for delivery before the California State Assembly Committee on the Judiciary. California's favorable coastal climate and solar heating load, provide an ultimate potential for solar heating and cooling. The inadequacy of California's regulatory framework in facilitating and safeguarding property interests in sunlight is by no means the primary impediment to solar energy development. The relatively high cost of solar heating, and even higher cost of solar cooling deter even those potential customers who are aware of life cycle costs. Lack of a legally-protected interest in sunlight is not the primary impediment but may be a sufficient impediment to widespread solar heating and cooling outside rural and new subdivision areas. In contrast to the economic impediments to solar energy utilization, the legal impediments may be mitigated at modest cost by some combination of transferable solar energy rights (ISER's), transferable development rights (TDR's), and land use plans, zones, or contracts for solar system districts and high rise development districts.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD-A026 588 13/1
CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN ILL

Interim Feasibility Assessment Method for Solar Heating and Cooling of Army Buildings. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 76 51P Hittle,Doug ;Holshouser,D. ;

Walton,G. ;
REPT. NO. CERL-TR-E-91
PROJ: RDT/E-4-A-763734-DT-08
TASK: RDT/E-4-A-763734-DT-0806

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar heating, *Solar energy,
*Cooling, Buildings, Military facilities,
Weather, Computerized simulation, Time dependence,
Feasibility studies, Solar collectors, Life cycle costs (U)
IDENTIFIERS: *Solar cooling (U)

This report discusses design considerations for heating and cooling buildings with solar energy. General criteria are provided for selecting the components and configuration of such a system. The report presents parametric computer simulation studies for two buildings of typical construction at five locations in the United States. Hourly building heating and cooling loads were computed for each building at each site using the National Bureau of Standards Load Determining Program (NBSLD) and hourly weather data. Using these loads, hourly simulation studies were performed to determine the effects of collector type, collector area, collector tilt angle, thermal energy storage tank volume, and heat exchanger effectiveness on simulated solar heating and cooling system performance. The results of more than 200 one-year solar system simulations are presented. In addition, a dimensionless graph and methodology are provided which can be used to estimate solar heating and cooling system performance for buildings and sites other than those studied. The report provides an explanation and an example of an approach for determining the life cycle cost of a solar-equipped building as compared to a conventional installation. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD-A026 041 13/1
CONSTRUCTION ENGINEERING RESEARCH LAB (ARMY) CHAMPAIGN ILL

Method for Estimating Solar Heating and Cooling System Performance. (U)

76 14P Hittle,Douglas C. ;Walton,
George N. ;Holshouser,Donald F. ;

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar heating, *Solar energy, *Air conditioning equipment, Buildings, Geographical distribution, Solar radiation, Computerized simulation, Climate (U)

During FY75 the Construction Engineering Research Laboratory, under funding from the Office of the Chief of Engineers, engaged in a research effort to develop a method for the preliminary determination of the feasibility of heating and cooling buildings with solar energy. The principle objective of the work effort was to provide a simple means for estimating the expected performance of a given solar heating and cooling system when applied to typical buildings in various regions of the Country. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMD9

AD-A025 922 10/3
SPECTROLAB INC SYLMAR CALIF

Low Reflectivity Solar Cells. (U)

DESCRIPTIVE NOTE: Final rept. 31 May 74-4 Jan 76.
JAN 76 83P Stella, Paul; Avery, James;Scott-Monck, John;
REPT. NO. 380-4680F
CONTRACT: F33615-74-C-2044
PROJ: AF-3145
TASK: 314519
MONITOR: AFAPL TR-75-98

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar cells, *Antireflection coatings, Reflectivity, Reflection, Reflectance, Etching, Silicon, Quartz, Sodium, Potassium compounds, Hydroxides (U)

IDENTIFIERS: *Silicon solar cells, Solar energy conversion, Photovoltaic conversion (U)

Techniques for both reducing and changing specular reflectance from silicon solar cell assemblies (cell and cover) were developed. Mechanical and chemical treatments of quartz cell covers yielded surfaces that acted like nearly perfect diffusers of incoming visible radiation. A four order of magnitude reduction in specular reflectivity was achieved in this manner. Selective etchings and multiple antireflection (AR) coatings were used to reduce the total reflection from the cell. Etches such as sodium and potassium hydroxide reduced the total reflection over the entire silicon cell spectrum (350-1100 nm) to below one percent, with a corresponding increase in output current of nearly eight percent over conventionally prepared surfaces. Some degradation in fill factor was observed with the etched surface so that the current increase at the load voltage was somewhat less than at short circuit. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A025 719 10/2 22/2
TEXAS INSTRUMENTS INC DALLAS SEMICONDUCTOR GROUP

Development of Vertical Multijunction Solar Cells for Spacecraft Primary Power. Volume II. (U)

DESCRIPTIVE NOTE: Final rept. Jun 74-Jun 75.
NOV 75 54P Lloyd, W. W.; Yeakley, Richard; Fuller, Clyde; Malone, Farris;
REPT. NO. 11-03-75-41
CONTRACT: F33615-73-C-2019
PROJ: AF-3145
TASK: 314519
MONITOR: AFAPL TR-74-45-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Jun 74, AD-A001 084.

DESCRIPTORS: *Solar cells, Spacecraft, Power supplies, Sourceborne, Radiation hardening, Long wavelengths, Response (U)

IDENTIFIERS: *Vertical multijunction solar cells, Solar arrays (U)

Based on the types of vertical multijunction cells developed in the first half of this contract (Report No. AFAPL-74-45), the open-groove type configuration was selected since early characterization results showed the predicted improvement in long-wave response and tolerance to electron bombardment. In addition, a process was developed that converts the surface of this cell into an effective black body, which also has the potential of reducing the area of the collecting junction. Cells made using the black-surface, open-groove structure have demonstrated that the short circuit current has dropped only 13% after exposure to 10 to the 16th power, kev electrons; the blue response is not limited by the deep grooves; the long-wave response can be 30% higher than for a conventional cell; actual efficiencies of 9% have been obtained, with a clear potential of reaching 14%. Together with the significantly simplified processes developed for the fabrication of the cells, these results show that the Vertical Multijunction cell is a viable device for spacecraft power. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A025 033

312

AIR FORCE GEOPHYSICS LAB HANSCOM AFB MASS

Production of Flame-Produced H₂ and He₃.

(U)

FEB 75 7P
 REPT. NO. AFGL-TR-75-0107
 PROJ: AF-8600
 TASK: 860007

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of Geophysical
 Research, 78(14) p709-714, 1 Feb 76.

DESCRIPTORS: *Solar flares, *Isotopes, Protons,
 Deuterons, Helium, Hydrogen, Reaction kinetics,
 Solar atmosphere, Monte Carlo method, Solar
 physics, Sun, Models, Solar energy, Reprints
 IDENTIFIERS: Solar models

Recent measurements indicate the enhanced
 production of He₃ but not of H₂ in some solar
 flares. This leads to an apparent paradox if the
 reaction $H + He^4 \rightarrow He^3 + He^4$ is the
 dominant mode of production. A detailed Monte
 Carlo calculation for this reaction is performed to
 determine the kinematical regions where He₃
 dominates. It is found that for the thick-target
 case, no such region exists. For the thin-target
 case, He₃ dominates in the backward and
 perpendicular directions relative to the incident
 proton. Obtaining reliable production ratios above
 approximately 10 Mev/nucleon is not possible
 because of uncertainties in the production cross
 section at high incident proton energies (E sub p
 from 400 Mev). One possibility recently
 proposed by Raraty and Kozlov is that the
 measured He₃ are accelerated after being produced
 by protons impinging on the solar atmosphere. The
 author examines this hypothesis and concludes that
 the required postproduction acceleration must occur
 over very small distances on a solar scale and before
 photospheric turbulence mixes the separated H₂ and
 He₃. It is concluded that a thick-target model
 based on primary protons mirroring just below the
 solar surface is the most likely source of the He₃
 enriched events.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A024 234

20/12

MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Properties of Sn-Doped In₂O₃ Films
 Prepared by RF Sputtering.

(U)

DESCRIPTIVE NOTE: Journal article.
 MAR 75 8P Fan, John C. C.; Bachner,
 Frank J.;
 REPT. NO. JA-4487
 CONTRACT: F19628-73-C-0002
 PROJ: AF-643-
 MONITOR: ESC TR-75-345

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of the Electrochemical
 Society, 122(12) p1719-1725 Dec 75.
 DESCRIPTORS: Thin films, *Semiconductors, *Solar
 collectors, *Solar energy, Mirrors, Substrates,
 Crystallography, Electron irradiation, Sputtering,
 Reflectivity, Reprints
 IDENTIFIERS: Heat mirrors, Indium oxides

(U)
(U)

An rf sputtering process has been used without
 postdeposition annealing to prepare Sn-doped
 In₂O₃ films with low electrical resistivity
 (down to 0.0002 ohm-cm), high visible
 transmission, and high infrared reflectivity (up to
 93% at 10 microns) for applications as
 transparent conductors and heat mirrors. Substrate
 heating is accomplished entirely by the electron
 bombardment intrinsic to rf sputtering. Rather than
 by using an auxiliary resistance heater, the film
 properties improve with increasing substrate
 temperature up to 650 C, the maximum employed, and
 are relatively independent of other sputtering
 parameters. The electrical and optical properties
 of the films do not depend significantly on the
 crystallographic orientation degree of texturing, or
 substrate material (glass, fused silica, and
 single crystal Al₂O₃ and CaF₂).

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A022 977 17/2.1 20/7 3/2
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUSInfluence of the Solar Electron Energy
Distribution on the Microwave Spectrum of
Gyro-Synchrotron Radiation.

(U)

DESCRIPTIVE NOTE: Final rept. 1 Oct 72-30 Sep 75.
FEB 76 34P Ko,Hsien C. :Chuang,ChiweiCONTRACT: F19628-73-C-0004
PROJ: AF-4643
TASK: 464303
MONITOR: AFGL TR-76-0030

UNCLASSIFIED REPORT

DESCRIPTORS: *Synchrotrons, *Solar energy,
*Communication and radio systems, Microwaves,
Solar radiation, Solar flares, Electron energy,
Protons, Charged particles, Emissivity
IDENTIFIERS: Gyro synchrotrons(U)
(U)

The volume emissivity formula for gyro-synchrotron radiation from an ensemble of electrons having a power-law energy distribution and an isotropic pitch-angle distribution is presented. Numerical calculations of the radiation spectrum were made for four electron kinetic energy ranges (10 keV - 100 keV, 100 keV - 1 MeV, 1 MeV - 10 MeV, and 10 keV - 10 MeV), and for four values of electron energy spectral index. The influence of electron energy distribution on the radiation spectrum is discussed. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A022 829 10/2
RAND CORP SANTA MONICA CALIFThe Potential of Indigenous Energy
Resources for Remote Military Bases.

(U)

DESCRIPTIVE NOTE: Interim rept.,
MAR 76 141P Connors,T. T. :Morrison,P.
F. :Moore,C. C. :Salter,R. G. ;
REPT. NO. R-1798-ARPA
CONTRACT: DAKC15-73-C-0181, ARPA Order-189

UNCLASSIFIED REPORT

DESCRIPTORS: *Electric power production, *Energy storage, *Energy conservation, Resources, Power supplies, Solar radiation, Wind, Ocean waves, Energy conversion, Military facilities, Remote areas

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IDENTIFIERS: Indigenous energy resources

An examination of the potential of solar radiation, wind, and ocean waves to provide thermal and electrical power to standard remote military bases. Sufficient energy is shown to be available in the North Atlantic, Indian, and Pacific Oceans, and the Caribbean to satisfy average remote base power requirements. A survey of indigenous energy technologies indicates that considerable research is needed to bring wave power recovery up to the level of solar and wind systems. An analytic computer model is used to show that indigenous energy systems are extremely costly, in part because of storage requirements, and that a mix of indigenous and conventional (petroleum) systems would be far less so. Since even a combined system is shown to exceed the cost of a pure conventional power supply, use of indigenous energy is justifiable only as a means of reducing the dependence of remote bases on petroleum fuels. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A022 080 10/2 13/1
TETRA TECH INC ARLINGTON VAProposal Evaluation - Ocean Thermal
Gradients and Solar Ponds.

(U)

DESCRIPTIVE NOTE: Technical rept.,
MAR 74 25P Tomlinson, Glen ;
REPT. NO. TETRAT-A-642-75-121
CONTRACT: N00014-74-C-0348

UNCLASSIFIED REPORT

DESCRIPTORS: *Electric power plants, *Solar
generators, Water, Solar heating, Temperature
gradients, Pacific Ocean Islands, Israel,
Power supplies, Naval shore facilities, Closed
cycle systems, Ponds, Heat sinks, Sea water,
Salt water, Oceans, Costs, Construction,
Proposals, Feasibility studies

(U)

The information received for evaluation contained
two proposals: the first proposes a 150-Mw
solar pond/thermal gradient power plant for Guam
and the second proposes construction of a 5-10Mw
plant in Israel. The basic concepts to be
employed in the two systems are similar in that they
both employ solar-heated water as an energy source. (U)

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AD-A022 079

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A022 079 13/1
TETRA TECH INC ARLINGTON VA

Absorption Air Conditioning.

(U)

DESCRIPTIVE NOTE: Technical rept.,
AUG 74 21P Hedman, Paul ;
REPT. NO. TETRAT-A-642-75-130
CONTRACT: N00014-74-C-0348

UNCLASSIFIED REPORT

DESCRIPTORS: *Air conditioning equipment,
*Absorption, Steam, Absorbers (Materials),
Absorbers (Equipment), Lithium compounds,
Bromides, Salts, Evaporators, Heat exchangers,
Steam condensers, Compression, Solar energy,
Cost analysis, Naval equipment
IDENTIFIERS: *Absorption air conditioning(U)
(U)NDS, Indian Head has proposed a study of steam
absorption air conditioning. This paper addresses
the utilization of waste steam for absorption air
conditioning of Navy facilities and compares
absorption and compression systems. Accordingly,
the specific study and costs for the singular
application at NDS, Indian Head will not be
addressed. Instead, a general discussion of
absorption versus compression air conditioning will
be presented. (U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A020 794 10/1
NOTTINGHAM (H D) AND ASSOCIATES INC MCLEAN VA

Review and Analysis of National Energy
Research and Development Programs and
Proposals.

DESCRIPTIVE NOTE: Final rept.,
JAN 76 433P Singh, T. ; Soni, J. S. ;
CONTRACT: DAAG53-75-C-0233
MONITOR: USAFESA-RT 2006

(U)

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated 7 Oct 74,
AD-A008 887.

DESCRIPTORS: *Energy, Nuclear energy, Solar
energy, Geothermal, Energy conversion, Energy
conservation, Energy storage, Shale, Transmission
lines, Impact, Reviews, Catalogs, Surveys,
Planning

IDENTIFIERS: *Research projects, Geothermal
energy, Shale oil, Photovoltaic conversion,
Solar space heating, Wind power, Solar sea power
plants, Biological energy conversion,
Environmental impacts

(U)

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Tabulated and analyzed in this report are recently
completed and on-going energy R and D programs by
pertinent governmental and industrial organizations.
The five major areas of discussion in this study
include: nuclear fission; renewable energy
resources; conversion systems; energy conservation;
and multi-directional energy R and D studies.
Outlined are the state-of-the-art; established
national goals and objectives; nature of R and D
studies currently underway; and recommendations for
future R and D work by the U.S. Army.

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AD-A020 776

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A020 776 3/2
AIR FORCE CAMBRIDGE RESEARCH LABS HANSCOM AFB MASS

Interpretation of Flare-Produced Proton
Spectra,

(U)

MAY 74 6P Rothwell, Paul L. ; Katz,

Ludwig ; Yates, G. Kenneth ;

REPT. NO. AFRL-TR-76-0042

PROJ: AF-8600

TASK: 860007

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of Geophysical
Research, v80 n34 p4757-4761, 1 Dec 75.

DESCRIPTORS: *Solar spectrum, *Protons, *Solar
flares, Power spectra, Anomalies, Solar energy,
Solar physics, Energy storage, Chromosphere,
Solar corona, Diffusion, Interplanetary space,
Reprints

(U)

Flare-produced proton (1.3-40 MeV) energy
spectra from the extramagnetospheric satellite QV5-
6 (1959-0428) are examined for the October 29
to November 5, 1972 period. The higher-energy
portion of the spectra is further defined by
simultaneous measurements obtained from the polar-
orbiting satellite S72-1 (1972-0768). A

turnover in the spectra below approximately 4 MeV
is observed. The spectral shape is examined in
terms of either: (1) dE/dx losses in a
chromospheric/coronal storage region; or (2)
adiabatic deceleration with an energy-dependent
interplanetary diffusion coefficient(K). It is
concluded that the data are consistent with dE/dx
losses if the protons were stored at an altitude of
less than 3 R sub s. The possibility was also
examined of adiabatic deceleration in the solar wind.
An order of magnitude calculation indicates that
K (10 MeV) approximately 7.5 x 10 to the 21st
power sq cm/s. a value too high for diffusion-
convection to be a viable explanation for the
observed spectral shape.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A020 466 10/2 6/6 13/2 20/13
14/2 20/8
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)

Annual International Seminar of the
International Centre for Heat and Mass
Transfer (8th).

(U)

DESCRIPTIVE NOTE: Conference rept.,
DEC 75 23P Lopina, Robert F. ;
REPT. NO. ONRL-C-20-75

UNCLASSIFIED REPORT

DESCRIPTORS: *Electric power production, *Heat
transfer, *Mass transfer, *Energy, Thermal
pollution, Air pollution, Solar energy, Nuclear
energy, Geothermy, Great Britain
IDENTIFIERS: *Geothermal energy, Environmental
pollution, Power production

(U)

(U)

This report summarizes most of the papers given at
a one-week meeting on Future Energy Production
- Heat and Mass Transfer Problems. Problems
associated with solar, nuclear, geothermal and coal
energy production were discussed. Papers were also
given on alternative energy sources and impacts of
energy production on the environment.
(Author)

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AD-A017 297

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A017 297 13/1
NAVAL ACADEMY ANNAPOLIS MD ENVIRONMENTAL PROTECTION
RESEARCH AND DEVELOPMENT TEAM

Cost Benefit of Utilizing Thermal Storage
for Peak Cooling Power Leveling.

(U)

DESCRIPTIVE NOTE: Supplementary rept.,
SEP 75 21P Morgan, Bruce H. ;
REPT. NO. USNA-EPRD-13

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy storage, Solar heating,
Barracks, Buildings, Cost estimates
IDENTIFIERS: *Off peak energy storage, Solar space
heating, Apartment buildings

(U)

(U)

Calculations indicate that provision for diurnal
ice storage, reducing peak air conditioning power
demand, would save money by decreasing the amount and
therefore the cost of the electrical generating
equipment which must be installed. The thermal
storage facility of a solar heating system might be
used for this purpose, perhaps with chilled water
rather than ice.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A015 672 4.1
 CALIFORNIA UNIV RIVERSIDE INST OF GEOPHYSICS AND
 PLANETARY PHYSICS

Upper Limits to the Quiet-Time Solar
 Neutron Flux from 10 to 100 MeV.

(U)

DESCRIPTIVE NOTE: Technical rept.,

JUN 75 31P Moon, Shin ;Simnett, George
 M. ;White, R. Stephen ;
 REPT. NO. IGRP-UCR-75-15
 CONTRACT: N00014-69-A-0200-5004, NGR-05-008-022

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar radiation. *Neutron flux,
 Limitations, Quiet. Solar energy, Temperate
 regions, Neutron detectors, Balloons, Neutron
 scattering, Telescopes, High altitude

(U)

The UCR large area solid-angle double scatter
 neutron telescope was flown to search for solar
 neutrons on 3 balloon flights on September 26,
 1971, May 14, 1972 and September 19, 1972. The
 first two flights were launched from Palestine,
 Texas and the third from Cape Girardeau,
 Missouri. The float altitude on each flight was
 at about 5 g/sq cm residual atmosphere. Neutrons
 from 10 to 100 MeV were measured. No solar
 flares occurred during the flights. Upper limits to
 the quiet time solar neutron fluxes at the 95%
 confidence level are .00028, .00046, .00096 and
 .00090 neutrons/sq cm-sec in the energy intervals of
 10-30, 30-50, 50-100 and 10-100 MeV,
 respectively. (Author)

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AD-A014 858

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A014 858 10/1
 AIR FORCE WEAPONS LAB KIRTLAND AFB N MEX

Alternative Energy Sources for United
 States Air Force Installations.

(U)

DESCRIPTIVE NOTE: Final rept. Jul 74-Jun 75,

AUG 75 111P Dewitte, Michael D. ;
 REPT. NO. AFWL-TR-75-193
 PROJ: AF-2102
 TASK: 21022E04

UNCLASSIFIED REPORT

DESCRIPTORS: *Air Force facilities. *Air Force
 planning. Fuel consumption, Coal. Natural gas.
 Fuel oil, Electricity, Forecasting, Substitutes,
 Solar energy, Wind, Geothermy, Energy
 conversion, Reviexs

(U)

IDENTIFIERS: Fuel substitution. Energy
 consumption, Electric power demand, Wind power,
 Geothermal energy, *Energy policy

(U)

This report is concerned with the consumption and
 cost of facilities-related energy, both present and
 future, at Air Force installations, and it
 presents a basic assessment of the potential of
 alternative energy sources. In particular-solar,
 wind, and geothermal energy resources are
 investigated.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A014 534 10/1
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
VA

Research and Development Project for New
Energy Technology (Sunshine Plan).

(U)

74 786P
REPT. NO. FSTC-HT-23-0019-75

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of mono. VIIA, n.p., 1974
4100.

DESCRIPTORS: *Solar energy, Solar heating,
Cooling, Solar generators, Petroleum products,
Coal gas, Liquefied gases, Electric power
production, Hydrogen, Geopotential, Energy
management, Technology, Japan, Translations
IDENTIFIERS: *Energy technology, *Geothermal
energy, *Manufactured gas, *Hydrogen based energy,
Synthesis gas, Solar space heating, Solar air
conditioning, Solar power generation, Coal
gasification, Coal liquefaction, Energy policy,
Technology assessment

(U)

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In view of the world-wide energy crisis and
environmental problems, it is recommended that
Japan, as a country with no noteworthy natural
resources, should immediately establish a national
project in order to advance research and development
programs of new energy technologies. The present
status of technological development in Japan and
in other countries is reviewed. Solar energy,
geothermal energy, synthetic natural gases and
hydrogen energy are chosen as important subject
matters of future research and development. If the
presented time schedule is followed, a fairly large
portion of the total demand for energy will be
supplied by these new energy sources by the year
2000.

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AD-A012 702

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A012 702 7/4 21/4
NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL
WASHINGTON D C

Conference on Thermodynamics and National
Energy Problems Held at Airline House,
Warrenton, Virginia on Jun 10-12, 1974.

(U)

DESCRIPTIVE NOTE: Final rept. Jun 74-May 75,
JUN 74 442p Beckett, C. W.; Brewer, Leo
; Holler, C. E., Jr.; Hubbard, Ward; Rossini,
F. D.;

CONTRACT: AF-AFOSR-2741-74
PROJ: AF-9750
TASK: 975001

UNCLASSIFIED REPORT

DESCRIPTORS: *Thermodynamics, *Meetings, *Energy
management, Chemicals, Enthalpy, Entropy,
Thermal properties, Coal, Fossil fuels, Nuclear
energy, Energy storage, Solar energy
IDENTIFIERS: Geothermal energy

(U)

(U)

This volume is the report of the Conference on
Thermodynamics and National Energy Problems
which was held at Airline House, Warrenton,
Va, 10-12 June 1974, and attended by about 110
scientists and engineers from universities, industry
and government. The purpose of the Conference
was to arrive at both the needs for thermodynamic
data in a developed program to achieve national
energy self-sufficiency, and the capability of
thermodynamicists to meet those needs. To achieve
this purpose, most of the time of the Conference
was spent in four parallel panel discussions on
on coal, fossil fuels other than coal, nuclear
energy, geothermal energy, and solar energy and
energy storage. The report includes a summary of
each panel's recommendations and reasons for them, an
overview summary, texts of prepared presentation, and
all pertinent discussion.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMD9

AD-A011 084 22/2 10/2
ROYAL AIRCRAFT ESTABLISHMENT FARNBOROUGH (ENGLAND)Work in UK on the Applications of Solar
Cells in Space. (U)DEC 74 16P Treble, F. C. ;
REPT. NO. RAE-TR-74159
MONITOR: ORIC BR-44998

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar cells, *Photovoltaic effect,
Scientific satellites, Spacecraft components,
Silicon, Cadmium sulfides, Reviews, Great
BritainIDENTIFIERS: Ariel 3 satellite (U)
(U)

British efforts and achievements in the field of photovoltaic solar energy conversion in space over the past 14 years are reviewed. The satellites powered by British solar cells are listed and the Ariel 3 array is described in detail by way of an introduction to the subject. Silicon cells of conventional thickness have been developed to a conversion efficiency exceeding 11.5% and thin cells with a superior power-to-weight ratio have been developed and manufactured in pilot production. Other achievements are a cheaper and better type of glass covering, an ultra-thin integral glass coating and lightweight flexible cadmium sulfide cells. In anticipation of future multikilowatt power requirements, a prototype lightweight deployable array embodying advanced concepts has been built and qualified for prolonged operation in the geostationary orbit. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMD9

AD-A010 712 10/1
HITMAN ASSOCIATES INC COLUMBIA MDProjections of Energy Availability, Cost, and
Aggregate Demand for 1975, 1980, 1985 and
1990. (U)DESCRIPTIVE NOTE: Final rept.,
MAY 75 137P Berstein, H. M. ; Hinkle, B.
K. ; Bazques, E. O. ;
CONTRACT: DAC488-74-C-0040
MONITOR: CERL TR-E-58

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy, Petroleum products, Natural
gas, Coal, Nuclear energy, Hydrodynamics, Solar
energy, Geothermy, Electric power, Electricity,
Abundance, Costs, Fuel consumption,
ForecastingIDENTIFIERS: *Energy demand, *Energy supplies,
Manufactured gas, Geothermal resources,
Hydroelectric power generation, Electric power
demand, Availability, Demand (Economics) (U)
(U)

This report investigates the availability, cost, and aggregate demand of energy resources for 1975, 1980, 1985, and 1990. The consumption of energy resources for 1970 has been included for comparative purposes. The energy sources examined include: petroleum, gas, coal, nuclear, hydropower, solar, geothermal, and electricity. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A008 887

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NOTTINGHAM (H D) AND ASSOCIATES INC MCLEAN VA

Technical Review and Analysis of National
Energy Research and Development Programs and
Proposals (Phase II).

(U)

DESCRIPTIVE NOTE: Final rept. 4 Apr-7 Oct 74,
OCT 74 280P Singh, Tara ; Marks, Alfred
H. ;

CONTRACT: DAAK02-74-C-0214

PROJ: DA-4-A-762719-A-886

TASK: 4-A-762719-A-88606

UNCLASSIFIED REPORT

Availability: Reference only at NTIS. No copies
furnished by DDC.

DESCRIPTORS: *Energy, Nuclear energy, Solar
energy, Energy conversion, Energy conservation,
Energy storage, Shale, Tidal currents,
Transmission lines, Impact, Reviews, Catalogs,
Surveys

(U)

IDENTIFIERS: *Research projects, Geothermal
energy, Shale oil, Tidal power, Environmental
impacts, Energy transmission

(U)

The scope of this investigation included a survey
of the energy research and development programs being
pursued in the United States. Included is a
review and analysis of the recently completed
projects as well as current and future energy R and
D programs. Principal objectives were: to
identify projects or programs having a potential
application to the fixed facilities of the Army; to
assess the state-of-art of the technology; and to
determine the impact of such R and D programs on
the Army's facilities.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A007 892

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MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

Transparent Heat-Mirror Films of TiO₂/
Ag/TiO₂ for Solar Energy Collection and
Radiation Insulation.

(U)

DESCRIPTIVE NOTE: Journal article,
AUG 74 4P Fan, John C. ; Bachner,
Frank J. ; Foley, George H. ; Zavracky, Paul M.

REPT. NO. JA-4431

CONTRACT: F19628-73-C-0002

PROJ: AF-649L

MONITOR: ESD TR-74-363

UNCLASSIFIED REPORT

Availability: Pub. in Applied Physics Letters,
V25 n12 p693-695, 15 Dec 74.

DESCRIPTORS: *Titanium oxides, *Silver, *Films,
*Mirrors, Visible spectra, Infrared radiation,
Light transmission, Reflectivity, Solar energy,
Fabrication, Reprints

(U)

Transparent heat-mirror films of TiO₂/Ag/
TiO₂ on glass with a visible transmission of
84% (at 0.5 micrometers) and an infrared
reflectivity of 98-99% (at 10 micrometers) have
been fabricated by rf sputtering. Initial tests
indicate that the films are thermally stable in air
at 200 C and inert to water attack. Because of
their excellent optical properties and apparent
stability, these transparent heat-mirror films offer
great promise for use in solar-thermal power
conversion and as transparent thermal insulators.
(Author)

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AC-A007 892

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A007 799 10/1 21/4
EDGEWOOD ARSENAL ABERDEEN PROVING GROUND MD

Proceedings of Annual Symposium 'Energy Research and Development' (5th) on 13-14 March 1974, Sponsored by the American Defense Preparedness Association.

(U)

JAN 75 177P Falconer, Donald ;Gerber, Bernard ;Magee, William ;
REPT. NO. ED-SP-74026

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy, *Meetings, Petroleum products, Coal, Thermonuclear energy, Hydrogen, wind, Photosynthesis, Enzyme chemistry, Wastes, Cellulose, Hydrolysis, Solar energy
IDENTIFIERS: Coal gasification, Coal liquefaction, Wind power generation

(U)

(U)

Contents: Energy research and development programs of the United States Department of the Interior; Energy R and D programs of the U.S. Atomic Energy Commission; National Science Foundation energy research and development programs; The energy problem and defense; American Petroleum Institute; Coal research and development; Thermonuclear fusion; Pictorial overview of the hydrogen-energy concept; Review of power from the wind; Bioconversion of solar energy-photosynthesis; Enzymatic hydrolysis of cellulosic wastes; Coal liquefaction and gasification; Beneficial uses of waste heat from steam electric power plants; Energy systems analysis.

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A002 576 13/1 10/2
GENERAL ELECTRIC CO PHILADELPHIA PA SPACE DIV

Solar Heating and Cooling of Buildings Study Conducted for Department of the Army. Volume I: Executive Summary and Implementation Plans.

(U)

JUN 74 66P
REPT. NO. 74SD4226-Vol-1
MONITOR: CERL TR-E-65-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD/A-002 563.

DESCRIPTORS: *Solar heating, *Buildings, Solar collectors, Storage, Site selection, Control systems, Exchange

(U)

IDENTIFIERS: *Solar air conditioning, Heat storage, Fort Belvoir, Fort Huachuca, Implementation testing, Heat exchangers

(U)

Feasibility studies on solar heating and cooling of buildings are summarized. Report covers site and building selection, technology assessment, and implementation plan summaries dealing with the retrofitting of existing buildings.

(U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A002 563 13/1 10/2
GENERAL ELECTRIC CO PHILADELPHIA PA SPACE DIV

Solar Heating and Cooling of Buildings
Study Conducted for Department of the Army.
Volume II. Technical Report.

(U)

JUN 74 597P
REPT. NO. 74SD4226-Vol-2
MONITOR: CERL TR-E-65-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD/A-002 576.

DESCRIPTORS: *Solar collectors. *Solar heating.
*Buildings. Storage. Exchange. Air conditioning
equipment. Pumping. Absorbers (Materials).
Insulation. Feasibility studies. Cost estimates.
Drawings. Bromides. Buildings. Control systems.
Structural properties. Computerized simulation.

(U)

IDENTIFIERS: Heat exchangers. Heat storage.

*Solar air conditioning. Solar space heating.
Heat pumps. Solar energy absorbers.
Antireflection coatings. Design. Lithium
bromide. Fort Belvoir. Fort Huachuca

(U)

A study of the use of solar energy for the heating
and cooling of buildings at Army installations was
conducted with two principal objectives: (1)
the preliminary design of a solar heating system for
retrofitting on an existing building and (2) the
evaluation of solar system concepts for the combined
heating and cooling of a building in the construction
planning phase. A two story administration
building at Fort Belvoir, Virginia was selected
for the retrofit heating only application and a
single story classroom building planned for Fort
Huachuca, Arizona was selected for the evaluation
of combined solar heating and cooling system
concepts. In both applications, the solar energy
was absorbed by roof mounted, flat-plate collectors,
heating a circulating water flow which was collected
in large thermal storage tanks until needed.
Assessments were made of the principal technologies
associated with solar collectors, thermal energy
storage, and cooling by means of solar energy.

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A001 253 4/1
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF

Parameterization of Solar Absorptivity and
Transmissivity Using NIMBUS II Reflectance
Data.

(U)

DESCRIPTIVE NOTE: Master's thesis.
SEP 74 64p Healy, Donald Jeremiah ;

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar radiation. Atmosphere models.
Theses. Albedo. Transmissivity. Absorption.
United States. Canada. Solar energy. Light
transmission

(U)

(U)

IDENTIFIERS: Nimbus 2 satellite. Insolation

In this study, satellite measurements of reflected
solar insolation from NIMBUS II were combined with
simultaneous pyranometer readings of transmissivity
over North America to provide the basis for
computation of the atmospheric absorptivity. In
the statistical parameterization of the absorptivity,
such readily available data as water vapor mass and
satellite reflectance were introduced as independent
variables in the regression equations. Correlation
coefficients between observed regression-determined
absorptivities and transmissivities were computed
based upon an initial total of 235 data-samples, and
the results interpreted.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A001 066 13/1
AIR FORCE MISSILE DEVELOPMENT CENTER HOLLOMAN AFB N
MEX

Notes on Optical Design Principles,
Concentration Ratios, and Maximum
Temperatures of Parabolic Solar
Funnaces.

DESCRIPTIVE NOTE: Technical memo.,
JUL 56 21p Bliss, Raymond W. , Jr;
REPT. NO. MOC-HOW-TM-56-1

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar funnaces, Mirrors, Parabolic
bodies (U)
IDENTIFIERS: Solar energy concentrators,
Design (U)

The memorandum is intended as a preliminary guide
to designers and interested possible users of solar
funnaces. Optical design principles are summarized
briefly, and a simple expression is derived for the
solar concentration ratio obtainable from a perfectly
reflecting paraboloid of large aperture. The
transmission losses necessarily occurring in an actual
funnace are considered and estimated, and estimates
are presented as to the concentration ratios
obtainable with actual solar funnaces of various
apertures. The maximum attainable temperatures of
such funnaces, when operating under favorable
sunshine conditions, is similarly estimated. A
short bibliography is included.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A001 063 13/1
AIR FORCE MISSILE DEVELOPMENT CENTER HOLLOMAN AFB N
MEX

Summary of Parabolic Solar Funname
Performance Design.

DESCRIPTIVE NOTE: Technical memo.,
OCT 56 38p Bliss, Raymond W. , Jr;
REPT. NO. MOC-HOW-TM-56-2

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar funnaces, Mirrors, Parabolic
bodies (U)
IDENTIFIERS: Solar energy concentrators,
Design (U)

The memorandum summarizes the basic knowledge
necessary for the design of a solar funname to
specified performance. The intensity of available
southwestern sunshine is estimated from currently
available records. Instruments for measurement of
direct sunshine intensities are described briefly.
The fundamental equations yielding the spot
diameter and concentration ratio of a paraboloid are
given, and the maximum temperatures attainable by
funnaces of given concentration ratios are derived.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A000 941 22/2 10/2 13/11
XEROX CORP/ELECTRO-OPTICAL SYSTEMS PASADENA CALIF

Solar Collector Thermal Power System.
Volume II. Development, Fabrication, and
Testing of Fifteen Foot Heat Pipes.

(U)

DESCRIPTIVE NOTE: Final rept. 16 Aug 71-28 Jun 74,

NOV 74 199P Richter, Robert ;

REPT. NO. 4074-Vol-2

CONTRACT: F33615-72-C-1092

PROJ: AF-3145

TASK: 314519

MONITOR: AFAPL

TR-74-89-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD/A-000 940
and Volume 3, AD/A-000 942.

DESCRIPTORS: *Solar collectors. *Power supplies.

*Spacecraft components. Fabrication.

Sizes(Dimensions). Construction materials.

Insulation. Test equipment. Stress testing

Manufacturing. Instrumentation. Temperature

IDENTIFIERS: BMS satellite, Design, Tests

(U)

(U)

Technical effort in the development of a 15-foot
long primary heat pipe capable of transferring 6 kw
of thermal power and its integration with the
remaining components of a complete thermal train is
presented. The effort comprised the design,
fabrication, and testing of the heat pipe as an
individual component and the integration and testing
with the secondary heat pipe, the thermal energy
storage unit, and a radiation heat transfer joint. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD-A000 940 22/2 10/2
XEROX CORP/ELECTRO-OPTICAL SYSTEMS PASADENA CALIF

Solar Collector Thermal Power System.
Volume I. Preliminary Technology Systems
Study.

(U)

DESCRIPTIVE NOTE: Final rept. 16 Aug 71-28 Jun 74,

NOV 74 143P Richter, Robert ;

REPT. NO. 4074-Vol-1

CONTRACT: F33615-72-C-1092

PROJ: AF-3145

TASK: 314519

MONITOR: AFAPL

TR-74-89-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD/A-000
941.

DESCRIPTORS: *Solar collectors. *Power supplies.

*Spacecraft components. *Thermoelectricity. Power

equipment. Heat pipes. Energy storage.

Bibliographies. Heat transfer. Space systems.

Deployment. Orientation(Direction).

Construction materials

(U)

(U)

IDENTIFIERS: BMS satellite, Design criteria

Work performed on the Solar Collector Thermal
Power System (SCIPS) program from 16 August
1971 to 28 June 1974 is presented. Volume 1
contains the system analysis for a solar collector
thermal power system supplying thermal energy to a
Vulcanizer cooler that is carried on a BMS type
satellite. The analysis covers specific
requirements of individual components of the power
system, including the solar collector, heat pipes,
and the thermal energy storage system. An extensive
bibliography of pertinent heat transfer, solar
collectors, and space power system reports is a part
of this volume. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 879 939 10-2 13/1 22/2
HONEYWELL INC MINNEAPOLIS MINN SYSTEMS AND RESEARCH
DIV

Solar Heat Source Feasibility Study. (U)

DESCRIPTIVE NOTE: Final technical rept. 1 Oct 69-15
Aug 72.

JAN 71 1862 Ramsey, James W. ; Petersen,
Carl B. ; Schmidt, Roger N. ;
REPT. NO. 1200-FR
CONTRACT: F33615-70-C-1093
PROJ: AF-ADP84A
MONITOR: AFML TR-70-294

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR COLLECTORS, FEASIBILITY STUDIES),
(*POWER SUPPLIES, THERMAL UTILIZATION), (*SCIENTIFIC
SATELLITES, REFRIGERATION SYSTEMS), SOLAR RADIATION,
COLLECTING METHODS, MIRRORS, FOCUSING, HEAT EXCHANGERS,
DESIGN, OPTIMIZATION, (U)
IDENTIFIERS: *CRYOGENIC REFRIGERATORS, HEAT PIPES,
*SOLAR HEAT SOURCES (U)

The goal of this study is to demonstrate the feasibility of direct conversion of solar energy to heat to provide a lightweight, inexpensive power source for orbital cryo-cooling. This was accomplished by design of a solar heat source for satellite use, optimizing the design for 1250 degrees F, and verifying the design with tests of a scale model. The design and optimization were done by conducting a series of tradeoff studies on the various components. The resulting design is predicted to have an efficiency in excess of 50 percent, at a cost and weight far less than that of competing solar cell powered heaters. It is also much less expensive than nuclear sources of heat. The design provides for sun tracking in any orbit with heat storage provisions for shadow transit. The design includes a parabolic collector, a spherical receiver with a selective solar energy absorbing coating, potassium or sodium-filled molycorp heat pipe, lithium fluoride as the heat storage material, and sunpointing handled with stratosphere and state-of-the-art techniques. The verification of system feasibility was by fabrication and testing of a test model.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 839 951 13/1 20/13
AIR FORCE AERO PROPULSION LAB WRIGHT-PATTERSON AFB
OHIO

DETERMINATION OF CAUSE OF PRESSURE SURGE ASSOCIATED
WITH LITHIUM-FLUORIDE STEAM HEAT RECEIVER. (U)

DESCRIPTIVE NOTE: Technical rept. Nov 65-Sep 66.

JUN 68 872 Hopkins, Kenneth N. ;
REPT. NO. AFAPL-TR-68-36
PROJ: AF-3145
TASK: 314501

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR FURNACES, BOILERS), (*BOILERS,
*THERMAL STABILITY), LITHIUM FLUORIDES, RANKINE CYCLE,
PRESSURE, SPIKES, STABILIZATION, HEAT TRANSFER, BOILING, (U)
STABILITY, TEST METHODS (U)
IDENTIFIERS: *FAULT ANALYSIS, PRESSURE SURGE,
RECUPERATORS, SOLAR BOILERS (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 820 856

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AEROSPACE CORP EL SEGUNDO CALIF LABS DIV

AN EVALUATION AND COMPARISON OF POWER SYSTEMS FOR LONG-DURATION, MANNED SPACE VEHICLES. (U)

DESCRIPTIVE NOTE: Rept. for Jan-Aug 65, MAY 67 49p Knisillas, John G. ; Killian, Harrison J. ;

REPT. NO. TR-1001(2730-01)-2

CONTRACT: AF 04(695)-1001

MONITOR: SSD TR-67-132

UNCLASSIFIED REPORT

DESCRIPTORS: (*POWER EQUIPMENT, MANNED SPACECRAFT), MILITARY OPERATIONS, FUEL CELLS, SOLAR CELLS, SOLAR RADIATION, NUCLEAR POWER PLANTS, RADIOACTIVE ISOTOPES, WEIGHT, NUCLEAR REACTORS, COSTS, RELIABILITY(ELECTRONICS), PHOTOELECTRIC CELLS(SEMICONDUCTOR) (U)

This report presents the results of an analysis to evaluate and compare the application of space power systems to long-duration, manned space vehicles. From 2 to 10 kilowatts of average power is the range of interest for future manned military spacecraft. Such spacecraft will operate also at orbital altitudes below 200 nmi and may have orbital lifetimes of up to five yr. Six types of power systems (fuel cell, solar-photovoltaic, solar-dynamic, radioisotope-thermoelectric, radioisotope-dynamic, and nuclear reactor/dynamic) were evaluated for possible application to such missions. Evaluation and comparison criteria for a typical space mission included weight, development costs, operational costs, potential reliability, and spacecraft integration factors. It was concluded from this study that radioisotope-dynamic power systems are best for the range of applications being considered in this report. Radioisotope-thermoelectric systems have a high inherent reliability, but are heavier than radioisotope-dynamic systems. Fuel cell systems are too heavy and incurred excessive cost for resupply for long-duration missions. Solar-powered systems are not competitive because of excessive weight and difficult integration problems. Nuclear reactor systems are not competitive because of excessive weight, high costs, and poor mission integration characteristics. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

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LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

SPACE LINKAGE SYSTEM. ANALYTICAL STUDY AND PRELIMINARY DESIGN. VOLUME II. APPENDIXES. (U)

DESCRIPTIVE NOTE: Final rept. 1 Mar 66-1 Apr 67, APR 67 135P Weiten, E. F. ; Daughton, A. U. ; Helm, J. R. ; Woldow, A. F. ; Dotson, R. D. ;

REPT. NO. LMSC-A858074-Vol-2

CONTRACT: AF 33(615)-3709

PROJ: AF-3145

TASK: 314502

MONITOR: AFAPL TR-67-53-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-816 039. DESCRIPTORS: (*POWER SUPPLIES, SPACEBORNE), (*TRANSMISSION LINES, RENDEZVOUS SPACECRAFT), ELECTRIC POWER PRODUCTION, SOLAR CELLS, ENERGY CONVERSION, ELECTRIC CONVERTERS, BOOBS(EQUIPMENT), DIGITAL COMPUTERS, SIMULATION, SUBROUTINES, EQUATIONS OF MOTION, MATHEMATICAL ANALYSIS, TORQUE, STRUCTURAL PROPERTIES, TORSION, THERMAL STRESSES, BUCKLING, STRESSES, THERMAL ANALYSIS, ELECTRIC CABLES, SLIP RINGS (U) IDENTIFIERS: ASTERIS-ADVANCED SOLAR TURBO ELECTRIC CONCEPT, STATION KEEPING (U)

Electrical power may be generated in space by heliotropically oriented static or dynamic energy conversion devices. Such devices, however, must be capable of being attached to an earth-orbiting mission vehicle. To provide maximum utility, the resulting two-body system must be capable of operation at any orbital inclination angle. The physical connection of two bodies in space, which precludes sliding or oscillation of the two bodies, imposes a widely spaced, linked-together, two-body space system. The severe control dynamics problem associated with such a system must be investigated and solved. The objective of this study, as to analytically determine the problems associated with a space linkage used to tether a sun-oriented space power system to an earth-oriented mission vehicle and to provide a preliminary design of a feasible space linkage system consistent with the established analytical results and criteria. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 816 039 10/2 9/1
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

SOLAR LINKAGE SYSTEM, ANALYTICAL STUDY AND
PRELIMINARY DESIGN, VOLUME I.

DESCRIPTIVE NOTE: Final rept. 1 Mar 66-1 Apr 67,
APR 67 104P Weiten,E. F.; Daughton,A.
J.; Heim,J. R.; Woldow,A. F.; Dotson,R.
D.;

REPT. NO. LMSC-A858074-Vol-1
CONTRACT: AF 33(615)-3709
PROJ: AF-3145
TASK: 314502
MONITOR: AFAPL TR-67-53-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-816 040.
DESCRIPTORS: (*POWER SUPPLIES, SPACEBORNE),
(*TRANSMISSION LINES, *RENDEZVOUS SPACECRAFT), ELECTRIC

CABLES, ELECTRIC CONNECTORS, SOLAR CELLS, ELECTRIC POWER
PRODUCTION, ENERGY CONVERSION, DESIGN, BOOMS(EQUIPMENT),
CONFIGURATION, AERODYNAMIC LOADING, DRAG, ANGLE OF
ATTACK, DEPLOYMENT, STRUCTURAL PROPERTIES, SLIP RINGS,
LOADS(FORCES), THERMAL ANALYSIS, WEIGHT, ATTITUDE
CONTROL SYSTEMS, TORQUE
IDENTIFIERS: ASTECI,ADVANCED SOLAR TURBO ELECTRIC
CONCEPT, STATION KEEPING

The objective of this study was to analytically determine the problems associated with a space linkage used to tether a sun-oriented space power system to an earth-oriented mission vehicle and to provide a preliminary design of a feasible space linkage system consistent with the established analytical results and criteria. A computer program was developed in which the appropriate parameter variations of control system design of the two vehicles were analyzed. Families of possible space linkages were established from which the final space linkage configuration evolved. This configuration utilizes either a Ryan type deployable boom or a folding type of linkage. Assuming a five-minute extension time for the space linkage, a loads and dynamics response analysis was accomplished which established the loads for the space linkage preliminary design. It is concluded that a linkage providing four degrees of freedom at appropriate locations will meet the mission

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 813 123 10/2 11/7
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

PROGRAM ROE (REFLECTOR ORBITAL EXPERIMENT). PART V.
INVESTIGATION OF TEST PROGRAMS FOR SOLAR COLLECTOR
MATERIALS.

DESCRIPTIVE NOTE: Technical rept. Oct 63-Aug 64.

DEC 64 335P
REPT. NO. LMSC-A730140
CONTRACT: AF 33(657)-10868
PROJ: AF-3145
TASK: 314502
MONITOR: AFAPL TR-64-132-Pt-5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Part 4, AD-458 241.
DESCRIPTORS: (*REFLECTORS, POWER SUPPLIES), (*SOLAR
COLLECTORS, ELECTRIC POWER PRODUCTION), FEASIBILITY
STUDIES, ORBITS, SPACE ENVIRONMENTS, SOLAR RADIATION,
COSMIC RAYS, AURORAE, SOLAR FLARES, PROTONS, VACUUM,
SCIENTIFIC SATELLITES, ENVIRONMENTAL TESTS, PAYLOAD,
THERMAL RADIATION, ATTITUDE CONTROL SYSTEMS, SOLAR
PANELS, GEOMAGNETISM, MATERIALS, ENERGY CONVERSION
IDENTIFIERS: AGENA, FOGO, REFLECTOR MATERIALS, ROE
PROGRAM

The ROE 1 task was preliminary design of an orbital vehicle and system for simultaneously testing in space two types of reduced-scale (10-ft-diameter) solar reflectors. Subsequently, the nature of this task was changed to ROE 11 1C, a group of heterogeneous studies pertaining to the design and orbital testing of a full-scale (45- to 60-ft-diameter) solar reflector for a solar-dynamic power system. The tasks pertaining to the materials required for the solar reflector are described in this volume. Initial laboratory evaluations and unsophisticated flight tests employing recoverable payloads were planned and conducted. At the same time, detailed analyses were made of the requirements for the ground laboratory and on-orbit flight tests to develop and qualify materials for the full-scale reflector.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 804 111 22/2
ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF

FEASIBILITY STUDY OF AN ION-PROPELLED MARS ORBITER/
LANDER SPACECRAFT WITH SOLAR PHOTOVOLTAIC POWER.
VOLUME III. SPACECRAFT DESIGN. (U)

DESCRIPTIVE NOTE: Final technical rept. Mar-Sep 65,
DEC 66 232P Toms, R. S. ; Waddell, R.

L. ; Fine, S. B. ;
REPT. NO. EDS-4816-F-Vol-3
CONTRACT: AF 33(615)-1530
MONITOR: AFAPL TR-66-109-Vol-3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-804 109, and
Volume 2, AD-804 110.
DESCRIPTORS: (*MARS PROBES, DESIGN). (*ASTRONAUTICS,
MARS PROBES). LAUNCH VEHICLES. ION ENGINES. POWER
SUPPLIES. SOLAR CELLS. ATTITUDE CONTROL SYSTEMS.
TELEMETRY SYSTEMS. PAYLOAD, MONITORS, MISSION PROFILES,
SYSTEMS ENGINEERING. SPACECRAFT COMPONENTS (U)
IDENTIFIERS: VOYAGER (U)

Volume III describes the craft design and its
interfaces with the launch vehicle and lander.
Selection and analysis of subsystems include the
structure, power, attitude control,
telecommunications, and scientific payload. System
integration discussion includes mass distribution,
thermal analysis, mechanisms, deployment, mission
profile and system operation. The conceptual
design and weight summary for a baseline craft are
given, together with comparison with the basic
Voyager design. (U)

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AD- 804 110

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 804 110 21/3 22/1 22/3
ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF

FEASIBILITY STUDY OF AN ION-PROPELLED MARS ORBITER/
LANDER SPACECRAFT WITH SOLAR PHOTOVOLTAIC POWER.
VOLUME II. MISSION ANALYSIS. (U)

DESCRIPTIVE NOTE: Final technical rept. Mar-Sep 65,
DEC 66 153P Toms, R. S. H. ; Waddell, R.

R. L. ; Fine, S. B. ;
REPT. NO. EDS-4816-Vol-2
CONTRACT: AF 33(615)-1530
MONITOR: AFAPL TR-66-109-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-804 109, and
Volume 3, AD-804 111.
DESCRIPTORS: (*ION ENGINES, *MARS PROBES). (*ELECTRIC
PROPULSION, MARS PROBES). (*ASTRONAUTICS, MARS PROBES).
(*SPACE PROPULSION, ION ENGINES). MISSION PROFILES.
LAUNCHING, TRAJECTORIES, CURVE FITTING, COMPUTER
PROGRAMS. SPACECRAFT COMPONENTS. SOLAR CELLS. SOLAR
RADIATION, ENERGY CONVERSION, ELECTRIC POWER PRODUCTION,
CESIUM, LIQUID ROCKET PROPELLANTS, EFFECTIVENESS (U)
IDENTIFIERS: VOYAGER (U)

Volume II describes mission analysis and
propulsion system design, together with its
development to a fixed thrust line, boost-coast
trajectory employing a near-rendezvous approach.
Launch window, thrust direction, specific impulse
and other tradeoffs are given. Characteristics of
contact and bombardment engines and the associated
power conditioning and control systems and feed
systems are given with detailed design considerations
to meet specific requirements. Ion engine
development status as of May 1966 is
summarized. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 804 109 21/3 22/2
ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF

FEASIBILITY STUDY OF AN ION-PROPELLED MARS ORBITER/
LANDER SPACECRAFT WITH SOLAR PHOTOVOLTAIC POWER.
VOLUME I. SUMMARY. (U)

DESCRIPTIVE NOTE: Final technical rept., Mar-Sep 65,
DEC 66 87P Toms, R. S. H.; Waddell,
R. L.; Fine, S. B.;
REPT. NO. EDS-4816-F-Vol-1
CONTRACT: AF 33(615)-1530
MONITOR: AFAPL TR-66-109-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 2, AD-804 110, and
Volume 3, AD-804 111.

DESCRIPTORS: (*ION ENGINES, *SOLAR CELLS), (*MARS
PROBES, FEASIBILITY STUDIES), SOLAR PANELS, ORBITS,
LAUNCH VEHICLES, RENDEZVOUS SPACECRAFT, CESIUM, ION
BOMBARDMENT, SPACE PROBES, ELECTROOPTICS (U)
IDENTIFIERS: ARRAYS, SOLAR CELLS (U)

Volume I describes a solar-electric propelled
spacecraft using ion engines and photovoltaic power
to effect the heliocentric transfer from Earth to
Mars, carrying a lander and orbiter to perform a
Voyager-type mission. The mission feasibility is
described in terms of trajectory analysis, launch
requirements and parametric trade-offs, resulting in
substantial gains for electric propulsion compared
with conventional chemical propulsion. Feasibility
of the ion propulsion system is described with
summaries of supporting programs on feed systems,
neutralizers, power conditioning, and thruster system
life tests. Spacecraft feasibility is described in
terms of subsystem integration, launch vehicle
compatibility, deployment, and system operation.
Volume II describes mission analysis and
propulsion system design, together with its
development to a fixed thrust line, boost-clast
trajectory employing a non-rendezvous approach.
Volume III describes the craft design and its
interfaces with the launch vehicle and lander.
Selection and analysis of subsystems includes the
structure, power, attitude control,
telecommunications, and scientific payload. System
integration discussion includes mass distribution,
thermal analysis, mechanisms, deployment. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 786 935 10/2 13/10
REED RESEARCH INC WASHINGTON D C

Study of Solar-Energy Use in Marine
Navigation Aids. (U)

DESCRIPTIVE NOTE: Final rept.
OCT 62 127P
CONTRACT: Tcg-42045
PROD: RR-1750

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: *Solar cells, *Navigational aids,
*Marine transportation, Solar radiation,
Thermocouples, Converters, Storage batteries,
Reviews, Battery components, Costs, Fermi
surfaces, Reliability, Electronics) (U)
IDENTIFIERS: *Photogalvanic cells, *Photovoltaic
cells, Solar insolation, *Semiconductor
junctions (U)

The report describes qualitatively three types of
solar converters: thermocouple, photogalvanic cell
and barrier layer photovoltaic cells. The
performance characteristics of the photovoltaic
converter when used to convert solar radiation
directly to electrical energy, the theory of p-n
junction, and different types of solar cells are
described in detail. Empirical and analytical
relationships are derived which present expected
efficiencies of conversion as a function of
temperature, solar insolation, and other factors. A
discussion is also included describing the state-of-
the-art and practical and theoretical limitations of
a solar battery system. (Modified author
abstract) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 786 844 10/1
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
VA

Wind and Solar Power Engineering.

(U)

APR 74 11P Konovalev, B. ;
REPT. NO. FSTC-HT-23-0402-74

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. from Izvestiya (USSR) v273
p2, 21 Nov 72.

DESCRIPTORS: *Wind machines, *Solar heating,
Translations, USSR

(U)

IDENTIFIERS: *Solar power generation, *Wind
power

(U)

The need for small wind and solar powered
installations for use at small settlements and
installations is briefly discussed.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 786 757 10/1 10/2
BOOZ-ALLEN AND HAMILTON INC BETHESDA MD

Alternative Strategies for Optimizing Energy
Supply, Distribution, and Consumption Systems
on Naval Bases. Volume II. Advanced
Energy Conservation Strategies.

(U)

DESCRIPTIVE NOTE: Final rept. Nov 73-Jan 74,
JAN 74 231P Conner, T. ; Nicholas, J. ;
Nichols, J. ; Mulfinghoff, D. ; Mateyka, J. ;
CONTRACT: N62399-73-C-0029
MONITOR: CEL CR-74-007

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-777 471.

DESCRIPTORS: *Energy management, *Naval shore
facilities, solar heating, Fuel cells,
Transportation, Heat engines, Technology, Cost
effectiveness, Energy conservation, Cost analysis,
Benefits, Thermionic converters, Solar collectors
IDENTIFIERS: Cost benefit analysis, Electric power
generation, Wind power, Solar air conditioning,
Photovoltaic cells

(U)

(U)

The report describes five advanced strategies for
optimizing energy supply, distribution, and
consumption systems on naval bases: (1)
Solar energy applications; (2) automated
building control and monitoring systems; (3)
electrochemical sources--fuel cells; (4) advanced
transportation technology; and (5) total energy
systems. For each advanced strategy, the report
contains a technology assessment, a discussion of
applicability to the Navy, a discussion of costs
and benefits, and recommendations for Navy
implementation. (Modified author abstract)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 786 384 10/2 17/7
COAST GUARD BALTIMORE MD FIELD TESTING AND DEVELOPMENT
CENTER

Hoffman HSPP-1 Solar Converter. (U)

SEP 68 17P Witter, R. W. ;

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar generators, *Navigational
lights, Solar cells. (U)

IDENTIFIERS: Solar panels, Solar cell arrays (U)

This report describes an application of the Hoffman HSPP-1 Solar Converter as a potential power source for minor aids to navigation. This project and report's purpose is to study solar cells as a potential source for minor lights, and to define conditions under which the use of solar cells in aids to navigation would be economical. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 785 608 20/12
HARRY DIAMOND LABS WASHINGTON D CLarge Polarization Dependent Voltages in
Ferroelectric Ceramics. (U)

Frank ; 73 12P Brody, Philip S. ; Crowne.

UNCLASSIFIED REPORT

DESCRIPTORS: *Ferroelectric materials, *Photovoltaic
effect, High voltage, Polarization, Solar energy,
Ceramic materials (U)

This paper describes a new high-voltage photovoltaic effect appearing in ferroelectric ceramics. A thin ceramic wafer illuminated uniformly produces a steady voltage across electrodes on the wafer edge. This is a new effect with possible applications. This effect could be used to produce very high voltages in a relatively uncomplicated fashion. Of greater importance, perhaps, is a possible potential for direct solar-to-electric energy conversion, although this would necessitate finding a material with considerably greater photovoltaic efficiencies over broader spectral regions. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMD9

AD- 784 708 10/1
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
Development of Solar Engineering in the USSR, (U)

JUL 74 15P Arifov, U. A. ;
REPT. NO. FTD-HT-23-792-74

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited trans. of Geliotekhnika (USSR) n6 p3-8 1972, by Dean F.W. Koolbeck.
DESCRIPTORS: *Solar energy, Engineering, Utilization, Reviews, Solar generators, Solar heating, Solar furnaces, Translations, USSR

Development of Solar Engineering in the USSR-- Translation.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMD9

AD- 784 520 3/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS

Interplanetary Particle Fluxes Observed by OV5-6 Satellite. (U)

DESCRIPTIVE NOTE: Scientific interim rept.,
74 BP Yates, G. Kenneth ; Katz, Ludwig ; Sellers, Bach ; Harser, Frederick A. ;
REPT. NO. AFRL-TR-74-C362
PROJ: AF-8600
TASK: 860007

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of Correlated Interplanetary and Magnetospheric Observations, p597-602 1974.

SUPPLEMENTARY NOTE:

DESCRIPTORS: *Solar cosmic rays, Particle flux, Particle spectra, Protons, Alpha particles, Alpha particle detectors, Channels, Sunspots
IDENTIFIERS: *Solar protons, OV5-6 satellite, Solar energy, (U)

(U)

The OV5-6 (1969-0455) satellite launched 23 May 1969 and with 2.9 R sub E perigee, 19.3 R sub E apogee and 30.6 degrees inclination, has observed numerous solar events since its launch. The proton-alpha telescope aboard this satellite is capable of measuring protons in 8 energy bins between 1 and 100 Mev and alphas in 3 energy bins between 20-100 Mev. Time histories of fluxes of various channels and energy spectra are presented for the August 2-15, 1972 series of events. This multiple event included a more than 10.0% factor increase in the proton and alpha particle fluxes. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 782 041 10/2

ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTEVILLE VA

Electric Circuit Calculations for Multistage Solar Thermoelectric Generators.

(U)

APR 74 9P Arazmedov, B. ; Agabaev, Ch. ;
Malevskii, Yu. N. ; Berd'ev, B. M. ; Annaev, O.

REPT. NO. FSTC-WT-23-1591-73

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Geliotekhnika (USSR) n2
p13-16 1972.

DESCRIPTORS: *Solar generators, *Thermoelectric
power generation, Circuits, Computations,
Translations, USSR

(U)

A method of calculating the electric circuit of a
multistage solar thermoelectric generator is
described for the case when all thermopile-stage
functions are in appropriate working conditions and
are series-connected into the external load
circuit.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 781 817 10/1

STANFORD RESEARCH INST MENLO PARK CALIF

Assessment of Total Energy Systems for the
Department of Defense. Volume 2.
Appendices.

(U)

DESCRIPTIVE NOTE: Final rept.,
NOV 73 160P Goen, Richard L. ; Stout,
Gordon ; Beaulaurier, L. O. ; Schmidt, Richard A.
; Ryan, John W. ;

REPT. NO. SRI-EGU-2513-Vol-2

CONTRACT: DACA23-73-C-0014, ARPA Order-2408

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume 1, AD-781 816.
DESCRIPTORS: *Energy, Military facilities, Fuels,
Nuclear energy, Nuclear power plants, Geothermy,
Fuel consumption, Diesel engines, Electric
generators, Solar energy, Gas turbines, Steam
turbines, Solid wastes, Costs, Computer
programs

(U)

IDENTIFIERS: *Total energy systems, Fossil
fuels

(U)

The purpose of the study is to assess the potential
applicability of various types of total energy
systems to military installations. The appendix
volume of the final report contains (1)
engineering performance characteristics and costs of
fossil fuel system elements, (2) energy
consumption data for military bases and derivation of
the energy load profiles used in the study, (3)
description of the fuel consumption model and
summaries of the fuel consumption and total system
costs for the various cases, (4) characteristics
and costs of geothermal systems, and (5)
description of solar energy systems.

(U)

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AD- 781 817

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 781 816 10/1
STANFORD RESEARCH INST MENLO PARK CALIF

Assessment of Total Energy Systems for the
Department of Defense - Volume 1.

DESCRIPTIVE NOTE: Final rept.,
NOV 73 122P
REPT. NO. SRI-EGU-2513-Vol-1
CONTRACT: DACA23-73-C-0014, ARPA Order-2408

UNCLASSIFIED REPORT

SUPPLEMENTAR NOTE: See also Volume 2, AD-781 817.
DESCRIPTORS: *Energy, Military facilities, Fuels,
Solar energy, Nuclear energy, Nuclear power
plants, Geothermy, Diesel engines, Electric
generators, Gas turbines, Steam turbines, Solid
wastes, Costs, Fuel consumption
IDENTIFIERS: *Total energy systems, Fossil
fuels (U)
(U)

The purpose of the study is to assess the potential
applicability of various types of total energy
systems to military installations. The types of
energy systems considered include diesel, gas
turbine, steam turbine, geothermal, solar, nuclear,
and solid wastes. Fuel savings are given for each
type of system, and their costs are compared with the
costs of conventional systems. The two most
promising systems are (1) solar energy applied to
heating and cooling, and (2) nuclear power.
(Author) (U)

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AD- 779 877

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 779 877 10/1
NAVAL RESEARCH LAB WASHINGTON D C

Energy from the Ocean: An Appraisal.

DESCRIPTIVE NOTE: Memorandum rept.,
MAY 74 47P Griffin, Owen M. ;
REPT. NO. NRL-MR-2803
PROJ: NRL-F02-24, RR131-03
TASK: RR131-03-41

UNCLASSIFIED REPORT

DESCRIPTORS: *Energy, Oceans, Solar energy,
Tides, Gradients, Heat, Wind, Power,
Feasibility studies, Electric power plants (U)

The oceans and their environment have long been
envisioned as renewable sources of energy. It is
the purpose of this report to assess the feasibility
of drawing on the sea for power and to determine the
extent to which the oceans are likely to serve future
energy needs. A review is made of proposed
U.S. funding levels for the research and
development of renewable energy sources during the
years 1975 - 1979, and a study is made of the
technical and environmental acceptability status of
tidal, wind, and sea thermal power generation
systems. The estimated costs of these environmental
power sources are compared with the prevailing power
costs for nuclear and coal plants. On the basis of
these comparisons, recommendations are made for a
program of research and development, culminating in
the construction of prototype plants, for wind and
sea thermal power plants. Tidal power generation
is found to be technically feasible but economically
uninviting at present. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 778 846 10/1

INFORMATICS INC ROCKVILLE MD

Solar Energy.

(U)

MAR 74 478P Stevovich, Vlastimir A. ;

CONTRACT: F44620-72-C-0053, ARPA Order-1622-4

MONITOR: AFOSR TR-74-0600

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar energy, Energy conversion, Power, Energy, Energy storage, Collection, Solar heating, Utilization, USSR, Power supplies, Reviews

(U)

The report is a comprehensive review of present major developments and future planning in various fields of applied solar engineering. The study covers theoretical and experimental data on the background and state-of-the-art of applied solar research in general, with emphasis on foreign work, particularly in the Soviet Union.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 777 737 10/2

MICHIGAN UNIV ANN ARBOR DEPT OF MATERIALS AND METALLURGICAL ENGINEERING

Preliminary Reports, Memoranda and Technical Notes of the Materials Research Council Summer Conference Held at La Jolla, California, July, 1973, Volume II. Proceedings of the Discussion Group on Solar Energy Conversion.

(U)

JUL 73 307P Hucker, Edward E. ;

CONTRACT: DANC15-71-C-0253, ARPA Order-2341

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Volume I, AD-777 743. DESCRIPTORS: *Energy conversion, *Solar energy, *Meetings, Photovoltaic effect, Energy, Thermal radiation, Gradients, Thermal power plants, Energy storage, Fuel cells, Hydrogen, Heat

(U)

Discusses applications of solar energy, concentration and collection of solar energy, photovoltaic conversion, ocean thermal gradients, energy storage, and fuel cells.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 772 451 10/2
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTEVILLE
VA

The Heliodevice (Gelioustanovka).

(U)

JUN 73 4P Kharazyan, G. A. ;
REPT. NO. FSTC-HT-23-1209-72

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of unidentified Russian language patent, pub. by Committee for the Matters of Inventions and Discoveries, Moscow, 17 Jul 70.
DESCRIPTORS: *Solar generators. Solar collectors, Solar radiation, Tracking, Patents, Translations, USSR

(U)

The patent describes an installation used in producing energy from the sun. It has an elliptical form and is provided with a mechanical rotation of the optical center, connecting the center of heliostat with the center of concentrator. The blinds of the regulator are mounted on the heliostat parallel to the large center line of the ellipse.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 771 302 11/9 10/3 20/12
MICHIGAN UNIV ANN ARBOR DEPT OF MATERIALS AND
METALLURGICAL ENGINEERING

Report of the Materials Research Council
(1973).

(U)

DEC 73 108P Huckle, Edward E. ;
CONTRACT: DAHCl5-71-C-0253, ARPA Order-2341

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also report dated Dec 72, AD-755 585.

DESCRIPTORS: *Materials, Organic materials, Scientific research, Abstracts, Polymers, Superconductors, Energy storage, Crystals, Brittleness, Inorganic materials, High temperature, Ductility, Solar energy, Stress, Corrosion, Physical properties, Mechanical properties

(U)

IDENTIFIERS: Amorphous materials

(U)

The report provides a summary of the activities and output of the Materials Research Council for the year ending December, 1973. Research topics include superconductors, crystals, mechanical properties of materials, energy transfer, solar energy, high temperature research, and other areas.

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AD- 771 302

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 770 319 4.1 AEROSPACE CORP EL SEGUNDO CALIF LAB OPERATIONS

Solar Electron Access to the Magnetosphere, (U)

AUG 73 41P Kampola, Alfred L. :
REPT. NO. TR-0074(4260-20)-5
CONTRACT: F04701-73-C-0074
MONITOR: SAMSO TR-73-347

UNCLASSIFIED REPORT

DESCRIPTORS: *Solar flares, *Solar radiation, (U)
*Magnetosphere, Solar energy, Electrons (U)
IDENTIFIERS: *Solar electrons

The problem of solar flare electron access to the geomagnetosphere is reviewed. The lack of a definitive solution to this problem is found to be due to the inadequacy of the measurements that have been published to date rather than to the nature of the problem. The data that have been published support the interconnection model of the magnetosphere. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 765 715 5/14 3/2 4/1 AEROSPACE CORP EL SEGUNDO CALIF LAB OPERATIONS

Experimental Evidence for the Connection between the Geomagnetic and the Interplanetary Fields as Determined from Observations of Energetic Solar Particles. (U)

SEP 73 49P Paulikas, George A. :
REPT. NO. TR-0074(4260-011)-1
CONTRACT: F04701-73-C-0074
MONITOR: SAMSO TR-73-257

UNCLASSIFIED REPORT

DESCRIPTORS: (*GEOMAGNETISM, MAGNETIC FIELDS), (*SPACE ENVIRONMENTS, MAGNETIC FIELDS), CORRELATION TECHNIQUES, (U)
SOLAR RADIATION, ELECTRONS, PROTONS, AURORAE, POLAR REGIONS, MAGNETOSPHERE (U)
IDENTIFIERS: POLAR CAP ABSORPTION, ELECTRONS, SOLAR ENERGY, SOLAR PROTONS (U)

Recent measurements of energetic solar particles have shown that a direct connection exists between the geomagnetic field and the interplanetary magnetic field. The access window for 300 keV solar protons that reach the center of the polar cap may be as near as 150 R(1) in the downstream magnetotail; access windows of solar protons, which precipitate into the atmosphere at latitudes near the geomagnetic cutoff, may be as near as 30 R(1). Comparison of the patterns of auroral particle precipitation with the zones of access of energetic solar electrons and protons indicates that a substantial fraction of the aurora originates on field lines connected to the interplanetary field. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 762 848

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IOWA UNIV IOWA CITY DEPT OF PHYSICS AND ASTRONOMY

Characteristics of Electron and High-Energy
Proton Flares.

(U)

SEP 72 14P Sarris,Emmanuel T.;Shawhan,
Stanley D.;

CONTRACT: N00014-68-A-0195-0003, NGL-16-001-002

UNCLASSIFIED REPORT

Availability: Pub. in Solar Physics, v28 p519-
532 1973.SUPPLEMENTARY NOTE: Revision of report dated 23 May
72.DESCRIPTORS: (SOLAR FLARES, CHARGED PARTICLES),
SCIENTIFIC SATELLITES, ELECTRONS, PROTONS, ALPHA
PARTICLES, X RAYS

(U)

IDENTIFIERS: ELECTRONS, SOLAR ENERGY, SOLAR PROTONS,
SOLAR X RAYS, EXPLORER 35 SATELLITE, EXPLORER 33
SATELLITE

(U)

High energy, proton (EHP) ~ 55 MeV) and
electron (ELE) > 50 keV) events were observed
by University of Iowa experiment on the
satellites Explorer 33 and 35. The solar X-ray
(2-12A) flares associated with the energetic
proton events were found to have in general higher
peak fluxes, considerably longer decay times (delta
t) and smaller rise to decay (rise ratios) in
than the X-ray flares associated with the electron
events. The most common decay times and rise to
decay, time ratios are: $60 < \delta t < 100$
min, $0.1 < \delta t / \delta t_{\text{on}} < 0.2$ for the proton X-
ray flares and $\delta t < \delta t_{\text{on}} = 20$ min, $0.3 < \delta t / \delta t_{\text{on}} = 0.7$ for the electron ones. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 762 803

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METEOROLOGICAL RESEARCH INC ALTADENA CALIF

Project AS-20: An Investigation of the Use
of Solar Heating to Improve the Performance
of Polyurethane Balloons.

(U)

DESCRIPTIVE NOTE: Final report.

MAY 73 132P Star,Paul;Stead, A. D.;

CONTRACT: N00014-71-C-0356

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Sea
Star, Paul;Stead, A. D.;
DESCRIPTORS: (METEOROLOGICAL BALLOONS, ISOCYANATE
PLASTICS), FILMS, BALLOONS, FLIGHT PATHS, RECRYSTALLI-
ZATION, RUBBER, ELONGATION, SOLAR RADIATION, HIGH ALTITUDE, LOW
TEMPERATURE

(U)

IDENTIFIERS: SOLAR HEATING

(U)

The report presents investigations relative to the
use of polyurethane film for fabrication of
expandable envelopes to achieve very high altitude
balloon flights; the altitude goal is 180,000 feet.
Evaluation was made of the exponential-hyperbolic
elasticity parameters for dental dam rubber and
preliminary estimates as to the physical limitations
of polyurethane film relative to its ductility and
capacity were made. A preliminary evaluation by
mock-up was made as to the temperature elevation to
be expected in pertinent parts of a tinted balloon
envelope as it is held in the launch arm during the
inflation process. Balloon flight profiles with
superpressure initiation at 90,000 feet were also
analysed showing the relative performance of tinted
versus untinted polyurethane film.

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 759 812

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ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTEVILLE
VA

Calculation and Cost Optimization of Certain
Solar Generator Thermobattery Parameters (K
Raschetu i Optimizatsii po Stoimosti
Nekotorykh Parametrov Termobatarei
Solnechnykh Generatorov).

(U)

JAN 73 11P Drabkin, L. M. ;
REPT. NO. FSTC-HT-23-1433-72

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Geliotekhnika (USSR) no
pg-15 1971.
DESCRIPTORS: (*THERMOELECTRICITY, COSTS), (*SOLAR CELLS,
COSTS), PRODUCTION, BATTERY COMPONENTS, ELECTRIC
BATTERIES, MATHEMATICAL MODELS, USSR, DESIGN
IDENTIFIERS: TRANSLATIONS (U)
(U)

A method for economic analysis of thermoelectric
generators is discussed in the Russian report. A
formula is presented which permits calculation of the
cost of manufacture of a thermoelectric generator
thermobattery (if material outlay on it is
known). From the formula proposed, it follows in
particular that, with a decrease in the weight of
materials, the cost of a battery decreases linearly.
However, with an increase in the weight of materials
(thickness of elements), the number of
thermoelements per watt generated grows, approaching
infinity. Wage expenditures also increase
considerably here. The formula does not take all
factors into account, and it is impossible to build
up a method for optimizing thermobattery construction
parameter design, especially for the solar
thermoelectric generator. (Author Modified
Abstract)

(U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 757 087

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ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTEVILLE
VA

Performance Reliability Calculation for a
Modular Solar Thermoelectric Generator, (U)

JAN 73 8P Malevskii, Yu. N. ;
REPT. NO. FSTC-HT-23-1434-72

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Geliotekhnika (USSR) no
pg-20 1971.
DESCRIPTORS: (*GENERATORS, *THERMOELECTRICITY), SOLAR
RADIATION, MODULES/ELECTRONICS), RELIABILITY,
SEMICONDUCTOR DEVICES, USSR (U)
IDENTIFIERS: *THERMOELECTRIC POWER GENERATION,
TRANSLATIONS (U)

Analysis is given of the overall reliability of a
solar energy converter unit composed of
thermoelectric modules, as a function of the
reliability of individual photocells and component
modules. Expressions are given to determine the
reliability of various module circuit designs having
the modules in series, parallel and combined
connections. The usefulness of redundancy in these
designs is noted. Suggestions are given concerning
the selection of module circuit designs most suitable
for given operational requirements. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD- 756 591 11/7 11/9 13/1
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
VA

The application of Phenol-Formaldehyde
Plastic Foam as Thermal Insulation for
Solar Water Heaters (Primenenie Fenol-
Formaldegidnogo Penoplasta u Kachestve
Teploizolyatsii dlya Geliyodonagrevatelei), (U)

AUG 72 4P Guner, K. A. ; Jamalov, M. ;
Umarov, G. Ya. ;
REPT. NO. FSTC-WT-23-1578-71

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. from Geliotekhnika (USSR)
n4 1970.
DESCRIPTORS: (*EXPANDED PLASTICS, *THERMAL INSULATION),
HEATERS, SOLAR RADIATION, USSR (U)
IDENTIFIERS: PHENOL FORMALDEHYDE RESINS, *SOLAR
HEATING, TRANSLATIONS (U)

The purpose of the research is to find methods of
improving the efficiency and productivity of a solar
heater, reduce its cost and prolong its service life.
The authors insulated the floor of the heater with
type FRP-I foam plastic on a base of phenol-
formaldehyde resin of the resol type. The
experiment was conducted in parallel with two water
heaters. The first had wood insulation, the second
the FRP-I plastic foam. The technique of
preparing the thermal insulation is given. (U)

AD- 756 591

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AD- 756 039

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD- 756 039 10/2 22/2
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
VA

Space Electric Power Plants. Part 2, (U)
FEB 73 6P Korolev, M. ;
REPT. NO. FSTC-WT-23-921-72

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Pravda, Moscow (USSR)
n161 p3, 10 Jun 71. See also Part 1, AD-711
524.
DESCRIPTORS: (*SOLAR PANELS, SPACECRAFT COMPONENTS),
SOLAR CELLS, LIFE EXPECTANCY, PHOTOELECTRIC
CELLS(SEMICONDUCTOR), SILICON, INTEGRATED CIRCUITS,
ELECTRIC POWER PRODUCTION, USSR (U)
IDENTIFIERS: *SOLAR GENERATORS, TRANSLATIONS (U)

Solar batteries and power cells are discussed, 7,
500 photocells comprising a panel 1 meter square
generate more than 100 watts of electrical energy.
Space service life of certain semiconductors is
given as two to three years. Glass coatings
protect panels from heavy protons. Reference is
made to the Boeing Co. project of unfolding glass
fabric panels for space use. Korolev also states
that Soviet scientists confirm the feasibility of
such a project but claim that it will be surpassed.
Thin film highly efficient photocell panels have
been developed in the USSR. Reference is made to
an unspecified plant/factory which manufactures not
only space power units (using solar energy) but
ground solar power plants as well. A 600 watt
pilot installation has been in operation in the
Karakum desert. (Author) (U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD- 755 829 13/1
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTEVILLE
VA

Film Solar Energy Collector with Concentric
Circular Seams (Plenochnyi Konsentratort
Solnechnoi Energii s Krugovymi
Konsentricheskimi Shvami),

JAN 73 11P Kamilzhanov, A. Kh. ;
REPT. NO. FSTC-HT-23-1208-72

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. from Geliotekhnika (USSR)
in 1970.
DESCRIPTORS: (*SOLAR COLLECTORS, FILMS), PLASTICS,
ALUMINUM, SOLAR RADIATION, REFLECTORS, SOLAR FURNACES,
USSR
IDENTIFIERS: TRANSLATIONS (U)
(U)

At the present time, plastic films, covered on one
side with a thin layer of aluminum, are used as solar
energy concentrators in heliotechnology.
Commercially produced film is insufficiently broad
to obtain concentrators with large concavities.
Therefore, in making concentrators with diameters
larger than the film width, their surfaces are glued
together from pieces. Thus, concentrators with
parallel, radial and circular concentric seams are
discussed. The results of experimental
investigations of such concentrators was compared
with data from investigations of concentrators
without seams. Mirror diameters were identical,
0.5m in all variants of the tests, and the width and
number of seams were not indicated. (Author) (U)

AD- 755 829

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AD- 753 063

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD- 753 063 10/2 9/1
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

Semiconductor Photoconvertors. (U)

SEP 72 299P Vasiliev, A. M. ; Landsman, A.
P. ;
REPT. NO. FTD-HT-23-317-72

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited trans. of "mono.
Poluprovodnikovye Fotoelektrozovatelyi, Moscow, 1971
p1-225, by Dean F. W. Koelbeck.
DESCRIPTORS: (*PHOTOELECTRIC CELLS(SEMICONDUCTOR),
*SOLAR CELLS), GENERATORS, SPACECRAFT COMPONENTS,
DAMAGE, RADIATION EFFECTS, PHOTOELECTRIC EFFECT, SPACE
ENVIRONMENTS, MANUFACTURING, REVIEWS, USSR
IDENTIFIERS: PHOTOVOLTAIC EFFECT, SOLAR GENERATORS,
THERMOELECTRIC POWER GENERATION, TRANSLATIONS (U)
(U)

An effort is made to generalize and systematize
material connected with the operating principle and
operational characteristics of photoelectric
converters which are widely used at present as power-
supply sources for space vehicles. The physical
principles of the photovoltaic effect and the
application of the theory for determination of volt-
ampere characteristics and parameters of various
types of photoconverters are outlined. Some new
directions in photoelectric power engineering are
discussed (thermophotoconverters).
(Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 748 694 10/2
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
VA

Solar Battery-Photovoltaic Cell Power
Supply for Equipment (Ustroistvo Dlya
Pitaniya Potrebitelei Ot Solnechnoi Batarei
S Fotopreobrazo Vatelyami), (U)

JUN 72 2P Grigoryan, R. S. ;
REPT. NO. FSTC-HT-23-750-72

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Patent (USSR) 271
619.

DESCRIPTORS: (*POWER SUPPLIES, *SOLAR CELLS),
(*SWITCHING CIRCUITS, POWER SUPPLIES), ELECTRIC RELAYS, (U)
DETECTORS, PATENTS, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

A device is described for the power supply of
consumers by a solar battery with photoconverters
containing a commutator to connect the loads to the
battery. To increase reliability, the commutator
has relays and power sensors, the contacts of which
are included in the circuit of the coil of a relay
separating the solar battery into several sections,
each of which is connected to an individual consumer
through the contact of this relay. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 747 293 10/2
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
VA

Contemporary Status of Studies on Direct
Conversion of Solar Energy to Electrical
Energy (Sovremennoe Sostoyanie Issledovaniy
po Prikladnoy Preobrazovaniyu Solnechnoy
Energii v Elektrotekhniku), (U)

JUL 72 10P Lidorenko, N. S. ;
REPT. NO. FSTC-HT-23-1429-71
PROJ: FSTC-T7023012301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Geliotekhnika (USSR) n6
03-9 1969, by Albert L. Peabody.

DESCRIPTORS: (*ENERGY CONVERSION, SOLAR RADIATION),
ELECTRIC POWER PRODUCTION, SOLAR CELLS, PHOTOELECTRIC
EFFECT, THERMOELECTRICITY, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

Photoelectric, thermoelectric and thermoemission
methods of direct conversion of solar energy into
electric energy are studied. The article presents
a review of modern methods of investigation.
(Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 747 033 3 2

BOSTON COLL CHESTNUT HILL MASS DEPT OF PHYSICS

A Model for U-Shaped Solar Burst Spectra, (U)

MAY 72 63P Kalman, Gabor ; Yukon, Stanford

: Bakshi, Pradip ;

REPT. NO. Scientific-1

CONTRACT: F19628-72-C-0003

PROJ: AF-4643

TASK: 464303

MONITOR: AFCL 72-0324

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR FLARES, MATHEMATICAL MODELS), SOLAR RADIATION, CERENKO: RADIATION, ELECTRONS, PROTONS, PLASMAS(PHYSICS), MAGNETIC FIELDS (U)
 IDENTIFIERS: COMPUTER AIDED ANALYSIS, ELECTRONS, SOLAR ENERGY, SOLAR MAGNETIC FIELDS, SOLAR PROTONS (U)

A model, for U-shaped solar bursts based on one single group of moderately relativistic electrons radiating in an ambient cold magnetoplasma is presented. Results of computer calculations are discussed. Suggestions for comparison with observation are made. Speculations about the mechanism of proton acceleration are included. (Author) (U)

AD- 747 033

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AD- 746 325

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 746 326 4/1

AEROSPACE CORP EL SEGUNDO CALIF LAB OPERATIONS

The Aerospace Corporation Space Science Program Report to CCSPAR CY 1971. (U)

DESCRIPTIVE NOTE: Rept. for Jan-Dec 71,

DEC 71 20P Paulikas, George A. ;

REPT. NO. TR-0172(2260-01)-2

CONTRACT: F04701-71-C-0172

MONITOR: SAMSO TR-72-169

UNCLASSIFIED REPORT

DESCRIPTORS: (*MAGNETOSPHERE, SCIENTIFIC RESEARCH), (*UPPER ATMOSPHERE, PLASMAS(PHYSICS)), ATMOSPHERIC SOUNDING, IONOSPHERE, IONOSPHERIC DISTURBANCES, MAGNETIC STORMS, ELECTRON DENSITY, SOLAR DISTURBANCES, VAN ALLEN RADIATION BELT, SCIENTIFIC SATELLITES (U)
 IDENTIFIERS: MAGNETOSPHERIC RING CURRENTS, OVI-10 SATELLITE, OVI-15 SATELLITE, OV3-3 SATELLITE, *ATMOSPHERIC PHYSICS, ATS-1 SATELLITE, ATS-2 SATELLITE, ELECTRONS, SOLAR ENERGY, SOLAR PROTONS (U)

Results obtained during 1971 by the Space Research Program of The Aerospace Corporation are presented. The results deal with magnetospheric physics and the physics of the upper atmosphere. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 745 364

10/2

ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTEVILLE
VA

A Study of 'Photovolt' Generator at High
Radiation Intensity (Issledovanie
Elektricheskikh Kharakteristik Generatorov
'Fotovolt' pri povyshennoi Moshchnosti
Izlucheniya).

(U)

D. S. ; Landsman, A. P. ; Stren'ov,

JUN 72 5P

REPT. NO. FSTC-WT-23-1014-72

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. from Geliotekhnika (USSR)
n3 p3-6 1970, by Albert L. Peabody.
DESCRIPTORS: (*SOLAR CELLS, DESIGN), PHOTOELECTRIC
CELLS(SEMICONDUCTOR), PHOTOSENSITIVITY, ELECTRICAL
PROPERTIES, USSR
IDENTIFIERS: PHOTOVOLTAIC CELLS, SOLAR GENERATORS,
TRANSLATIONS

(U)

(U)

The new high voltage photoelectric generator
'Photovolt' is described. The spectral
sensitivity and current-voltage characteristics are
given. The generator efficiency rises from 7% to
10% while the light power increases from normal
value up to 4 kw/sq m. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 745 309

4/1

AEROSPACE CORP EL SEGUNDO CALIF LAB OPERATIONS

Annual and Sub-Annual Effects of EUV
(Extreme Ultraviolet) Heating. Volume II.
Comparison with Density Observations.

(U)

APR 72 33P Ching, Barbara K. ; Chiu, Yam

T. ;

REPT. NO. TR-0172(2260-10)-9-Vol-2

CONTRACT: F04701-71-C-0172

MONITOR: SAMSO TR-72-116-Vol-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-745 305.
DESCRIPTORS: (*UPPER ATMOSPHERE, HEATING), ABSORPTION,
ULTRAVIOLET RADIATION, FOURIER ANALYSIS, DENSITY, SOLAR
RADIATION
IDENTIFIERS: *ATMOSPHERIC HEATING, ATMOSPHERIC
DENSITY, SEASONAL VARIATIONS, SOLAR HEATING,
*THERMOSPHERE

(U)

(U)

By a detailed comparison of annual and sub-annual
components of extreme ultraviolet (EUV) absorption
heat input with those of the Jacchia models, the
authors consider the importance of EUV heating in
the annual and sub-annual variations of the upper
atmosphere. When all the geometrical effects of
EUV heat input have been taken into account, it is
found that a remarkable correspondence exists between
properties of each harmonic component of EUV heat
input and Jacchia model temperature and densities.
Equinoctial latitude independence of diurnal
averaged annual and sub-annual components of heat
input and density is proposed as a test of the
significance of the EUV heat input. The
Jacchia model is found to satisfy this test
rigorously. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 745 305 4/1
AEROSPACE CORP EL SEGUNDO CALIF LAB OPERATIONSAnnual and Sub-Annual Effects of EUV
(Extreme Ultraviolet) Heating. Volume I.
Harmonic Analysis.

(U)

APR 72 39P Ching, Barbara K. ; Chiu, Yam
T. ;
REPT. NO. TR-0172(2260-10)-9-Vol-1
CONTRACT: F04701-71-C-0172
MONITOR: SAMSO TR-72-116-Vol-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-745 309.
 DESCRIPTORS: (UPPER ATMOSPHERE, HEATING), DENSITY,
 ULTRAVIOLET RADIATION, SOLAR RADIATION, PHOTOCHEMICAL
 REACTIONS, GAS IONIZATION, DISSOCIATION, FOURIER
 ANALYSIS, ABSORPTION, HARMONIC ANALYSIS (U)
 IDENTIFIERS: ATMOSPHERIC DENSITY, -ATMOSPHERIC
 HEATING, PHOTOIONIZATION, SEASONAL VARIATIONS, SOLAR
 HEATING (U)

The authors compute the rate of solar extreme ultraviolet radiation (EUV) heating in the upper atmosphere by photo-dissociation and photo-ionization, taking care to include properly the effects of oblique incidence of solar flux, sphericity of the atmosphere and ellipticity of the earth's orbit. The time and latitudinal variations of the computed heat function are revealed by numerical Fourier analysis of the heat function into harmonics of the yearly cycle. It is shown that EUV absorption contains a latitude independent semi-annual component of heating with the proper phase to account for the semi-annual density variations. Further, the annual component of the heat function predicts the existence of summer polar density increases in the northern and southern hemispheres. (Author)

(U)

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AD- 744 404

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 744 404 4/1
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD
MASSRapid Access of Solar Electrons to the
Polar Caps.

(U)

OCT 71 7P Turtle, J. P. ; Oelbermann,
E. J. ; Jr.; Blake, J. B. ; Lanzerotti, L. J.
; Vampola, A. L. ;
REPT. NO. AFRL-72-0301
PROJ: AF-7661
TASK: 766104

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of Geophysical
 Research, 77 n4 p730-735, 1 Feb 72.
 SUPPLEMENTARY NOTE: Revision of report dated 17 Aug
 71.
 DESCRIPTORS: (-MAGNETOSPHERE, SOLAR RADIATION),
 ELECTRONS, IONOSPHERIC DISTURBANCES, VERY LOW FREQUENCY, (U)
 POLAR REGIONS, PROTONS (U)
 IDENTIFIERS: POLAR CAP ABSORPTION, ELECTRONS, SOLAR
 ENERGY (U)

Simultaneous measurements of solar electrons and protons in interplanetary space and in the magnetotail were made during the onset of the November 2, 1969, solar-particle event. These particle measurements, when compared with continuous transpolar VLF measurements on three propagation paths, indicate that the solar electrons have access to the magnetotail and north polar cap with a time delay t such that $0 < \text{or approximately equal } t < 1 \text{ min. (Author)}$

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD- 743 031 20/12 9/1 10/2
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
VA

Semiconductor Solar Energy Converters and the
Phenomenon of Photo Conductivity Quenching
(Poluprovodnikovye Preobrazovateli Solnchnoi
Energii i Yavlenie Gasheniya
Fotoprovodimosti). (U)

FEB 72 9P Isamukhamedova, M. S. ;
Karageorgii-Alkalaev, P. M. ;
REPT. NO. FSTC-HT-23-1577-71
PROJ: FSTC-T7023012301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. from Geliotekhnika (USSR)
n3 1970.
DESCRIPTORS: (*SEMICONDUCTORS, PHOTOCONDUCTIVITY),
(*PHOTOELECTRIC CELLS, SEMICONDUCTOR),
PHOTOCONDUCTIVITY), (*SOLAR CELLS, ENERGY CONVERSION),
SOLAR RADIATION, SEMICONDUCTOR DEVICES, ATOMIC ENERGY
LEVELS, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

A semiconductor model with two impurity levels
exchanging current carriers is analyzed to determine
the conditions for the occurrence of
photoconductivity quenching. The effects of this
phenomenon on efficiency are described.
(Author) (U)

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AD- 742 111

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD- 742 111 11/9 13/1
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
VA

Study of Phototechnical Characteristics of
Polymer Films Used as Transparent Coatings
in Solar Water Heaters (Issledovanie
Svetotekhnicheskikh Kharakteristik Polimernykh
Plenok, Primenyayemykh dlya Proznachnogo
Pokrytiya i Geliogonagrevatelyakh). (U)

FEB 72 9P Zhamalov, A. ; Eliseev, V. N.
; Popkova, A. M. ;
REPT. NO. FSTC-HT-23-1580-71
PROJ: FSTC-T7023012301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. of Geliotekhnika (USSR) n4
p29-33 1970.
DESCRIPTORS: (*PLASTICS, *LIGHT TRANSMISSION), POLYAMIDE
PLASTICS, POLYETHYLENE PLASTICS, REFLECTIVITY, SOLAR
RADIATION, HEATERS, USSR (U)
IDENTIFIERS: POLYETHYLENE TEREPHTHALATE, *POLYMERIC
FILMS, *SOLAR HEATING, TRANSLATIONS (U)

The light transmittance and the reflection on
coefficients of polyamide, PET, and polyethylene
films were determined. The 75 micrometer films
absorbed the following amounts of solar light:
Polyamide 0.5%, PET 0.5%, and polyethylene
0.2%. The films were recommended for use in solar
water heaters. (Author, modified-PL) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 741 524 10/2 22/2
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTEVILLE
VA

Space Electric Power Plants, Part I
(Litsom & Solntsov),

(U)

72 7P Lidorenko, N. ;
REPT. NO. FSTC-HT-23-923-72
PROJ: FSTC-T7023012301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. from Pravda, Moscow
(USSR) n160 p3, 9 Jun 71, by Donald E.
Chamberlain.

DESCRIPTORS: (*SOLAR CELLS, SPACECRAFT COMPONENTS),
ENERGY CONVERSION, SEMICONDUCTOR DEVICES, USSR
IDENTIFIERS: SOLAR GENERATORS, TRANSLATIONS

(U)
(U)

The theoretical aspect of solar power plants of
Soviet spacecraft is explained by Lidorenko, an
expert in the field of rechargeable power sources.
Development of solar batteries for Lunokhod-1
solves new problems. The type of semiconductor
chosen performs well in the 100-150C and withstands
vigorous cooling. The semiconductor passed through
a lunar eclipse intact when the cover of the
Lunokhod was left open. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 738 925 3/2
IOWA UNIV IOWA CITY DEPT OF PHYSICS AND ASTRONOMY

Direct Observations of Low-Energy Solar
Electrons Associated with a Type III Solar
Radio Burst,

(U)

FEB 72 56P Frank, L. A. ; Gurnett, D.

A. ;

REPT. NO. U. of Iowa 72-2

CONTRACT: N00014-68-A-0196-0003, NGL-16-001-002

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Sponsored in part by Contracts
NA55-11039 and NA55-11074.

DESCRIPTORS: (*SOLAR RADIATION, EXTRATERRESTRIAL RADIO
WAVES), (*SOLAR FLARES, ELECTRONS), INTENSITY, POWER
SPECTRA, CORRELATION TECHNIQUES, SCINTILLATION, SATELLITE
IDENTIFIERS: *ELECTRONS, *SOLAR ENERGY, *SOLAR RADIO
BURSTS

(U)

(U)

Direct observations of the impulsive ejection of a
highly anisotropic, low-energy solar electron packet
which was accompanied by a Type 3 solar radio noise
burst detected simultaneously with instrumentation on
the satellite IMP-6 have been examined here.

These events were associated with a solar flare
commencing at 0935 UT, 6 April 1971, on the
western limb of the sun.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 736 430

4/1

AEROSPACE CORP EL SEGUNDO CALIF LAB OPERATIONS

Rapid Access of Solar Electrons to the Polar Caps.

(U)

DESCRIPTIVE NOTE: Rept. for Jul-Aug 71.

DEC 71

23P Turtle, John P.; Delberman,

E. J., Jr.; Blake, J. Bernard; Lancozzotti,

Louis J.; Vampola, Alfred L.;

REPT. NO: TR-0172-2260-201-11

CONTRACT: F04701-71-C-0172

MONITOR: SAMSO TR-71-318

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR RADIATION, POLAR REGIONS), (*MAGNETOSPHERE, ELECTRONS), SOLAR FLARES, IONOSPHERIC DISTURBANCES, ELECTRON DENSITY, VERY LOW FREQUENCY, COSMIC RAYS, PROTONS (U)
IDENTIFIERS: OV5-6 SATELLITE, SOLAR COSMIC RAYS, *ELECTRONS, *SOLAR ENERGY (U)

Simultaneous measurement of solar electrons and protons in interplanetary space and in the magnetotail were made during the onset of the 2 November 1969 solar particle event. These particle measurements, when compared with continuous trans-polar VLF measurements on three propagation paths, indicate the solar electrons have access to the magnetotail and north polar cap with a time delay t such that 0 approximately equal or $< t$ less than 1 min. (Author) (U)

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AD- 735 305

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 735 305

4/1

AEROSPACE CORP EL SEGUNDO CALIF LAB OPERATIONS

Solar Photoabsorption and Thermal Processes in the Polar Thermosphere.

(U)

DESCRIPTIVE NOTE: Rept. for Jul 70-Jun 71.

NOV 71

69p Ching, Barbara K.; Breig,

Edward L.;

REPT. NO: TR-0172(2260-10)-5

CONTRACT: F04701-71-C-0172

MONITOR: SAMSO TR-71-320

UNCLASSIFIED REPORT

DESCRIPTORS: (*UPPER ATMOSPHERE, SOLAR RADIATION), (*OXYGEN, UPPER ATMOSPHERE), PHOTOCHEMISTRY, DISSOCIATION, ABSORPTION, IONIZATION, ULTRAVIOLET RADIATION, ATMOSPHERE MODELS, POLAR REGIONS, DIURNAL VARIATIONS (U)
IDENTIFIERS: SOLAR HEATING, SOLAR ULTRAVIOLET RADIATION, *THERMOSPHERE (U)

The report reviews a number of physical processes that occur in the thermosphere and significantly affect its neutral state through the deposition or loss of thermal energy and by modification of its composition. Specifically, the processes discussed are: (1) thermal heating from absorbed solar radiation in the wavelength region below 2400 Å, (2) photodissociation of O₂, (3) thermal heating from atomic oxygen recombination, and (4) cooling by infrared emission of atomic oxygen. Basic concepts associated with the calculation of the various processes are discussed in detail, and most recent data on relevant physical parameters are reviewed. Numerical models of the heating, dissociation, and cooling are presented on the basis of a nominal atmospheric model. Special emphasis is placed on diurnal, seasonal, and latitudinal variations. (Author) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 726 114 10/2 20/12
NORTHEASTERN UNIV BOSTON MASS

Research in Solar Energy Conversion. (U)

DESCRIPTIVE NOTE: Final rept. 1 Oct 66-30 Sep 70.

JAN 71 163P Nowak, Melville B. ;

CONTRACT: F19628-67-C-0119

PROJ: AF-8659

TASK: 865901

MONITOR: AFCHL 71-0163

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR CELLS, RELIABILITY(ELECTRONICS)),
(*PHOTOELECTRIC CELLS(SEMICONDUCTOR)), MANUFACTURING),
SEMICONDUCTING FILMS, VACUUM PLATING,
CARRIERS(SEMICONDUCTORS), SILICON, EPITAXIAL GROWTH,
COMPUTER PROGRAMS, ABSORPTION SPECTRA, ELECTRICAL
PROPERTIES, GALLIUM COMPOUNDS, PHOSPHIDES, GALLIUM
ARSENIDES, GERMANIUM, ZINC COMPOUNDS, SELENIDES
IDENTIFIERS: ZINC SELENIDES, GALLIUM PHOSPHIDES,
HETEROJUNCTIONS (U)
(U)

IAC ACCESSION NUMBER: NCIC-081592

IAC DOCUMENT TYPE: YCIC -HARD COPY--

The following topics related to photovoltaic solar-

energy conversion were investigated: Transient

Response of Momentarily Reverse-Biased

Solar Cells, Electrodiffusion Effects in

Semiconductors, Effect of Electric Fields and

Changed Particle Impingement on Planar-

Edge-Growth of Single-Crystal Silicon

Films on Amorphous Quartz, and Heterojunction

Photovoltaic Solar Cells. (U)

IAC SUBJECT TERMS: M--(U)SILICON COATINGS, QUARTZ
SUBSTRATE, SUBSTRATES, SINGLE CRYSTALS, CRYSTAL STRUCTURE,
GALLIUM PHOSPHIDE COATINGS, SOLAR CELL DIODES, SILICON
SUBSTRATE, GERMANIUM SUBSTRATE, EPITAXIAL DEPOSITION.;

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 721 662 10/2 18/4
TRAPELO, WEST RICHMOND CALIF

A Study of Conventional and Unconventional
RADIAC Power Sources. (U)

DESCRIPTIVE NOTE: Final rept.,

DEC 70 74P Sturman, Ivan ;

REPT. NO. TUX-6063

CONTRACT: DAH-C20-69-C-0122

PROJ: OCD-2122F

UNCLASSIFIED REPORT

DESCRIPTORS: (*RADIATION MEASURING INSTRUMENTS, *POWER
SUPPLIES), CIVIL DEFENSE, PRIMARY BATTERIES, COSTS,
MONITORS, THERMOELECTRICITY, THERMIONIC CONVERTERS,
SOLAR CELLS, FUEL CELLS (U)
IDENTIFIERS: RADIACMETERS, RADIACMETER POWER SOURCES,
RESERVE BATTERIES (U)

Feasible substitutes for RADIAC power sources are
identified and evaluated. The experimental methods
and the results are described. Cautions that
should be observed in the selection of RADIAC power
sources are described. Cost comparisons are made
of power sources considered to be suitable D-cell
substitutes and conventional D-cells.
Recommendations are made for RADIAC power sources
and for further study topics. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 720 136 22/1 7/1
 CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
 Industrial Chemistry in Space.

(U)

MAR 70 5P Libby, M. F. ; Payton, P.
 H. ;
 CONTRACT: AF-AFOSR-1255-67, NOL-05-007-003
 PROJ: AF-9538
 MONITOR: AFOSR TR-71-0535

UNCLASSIFIED REPORT

Availability: Pub. in Proceedings of the ASME
 Space Technology and Heat Transfer Conference,
 Los Angeles, Calif. 21-24 Jun 70. 70-Av/Spt-
 4. 50.

DESCRIPTORS: (*CHEMICAL ENGINEERING, *SPACE STATIONS),
 (*SOLAR FURNACES, SPACE STATIONS, CRYSTAL GROWTH,
 METALLURGY, ASTRONAUTICS (U)

Some aspects of chemical manufacture in an orbiting
 spacecraft are presented and discussed. The design
 and operation of a 100-meter-dia parabolic solar
 furnace is considered. Some further subjects of
 future chemical interest are also presented.
 (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 704 754 13/1 20/13
 FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

(U)

HIGH-TEMPERATURE SOLAR FURNACE.

MAR 70 9P Baum, V. A. ; Annaev, A. A.
 ; Atlijev, K. ; Kurbaneldyev, B. ;
 REPT. NO. FTO-HT-23-62-70
 PROJ: FTO-6040102
 TASK: DIA-T69-04-9

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited trans. of Gel. tekhnika
 (USSR) n2 p56-59 1969, by V. Mesenzeff.
 DESCRIPTORS: (*SOLAR FURNACES, HIGH TEMPERATURE),
 REFRACTORY MATERIALS, OPTICAL TRACKING, CALORIMETRY,
 HEAT FLUX, THERMAL RADIATION, MATHEMATICAL ANALYSIS,
 USSR

IDENTIFIERS: TRANSLATIONS

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(U)

Description of the furnace and the absolute
 calorimeter for investigation power characteristics
 of solar power furnaces are given and also power
 characteristics and the region of temperatures in
 which thermophysical and radiation properties of
 refractories can be investigated are presented.
 (Author)

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AD-A083 000 DEFENSE TECHNICAL INFORMATION CENTER ALEXANDRIA VA
SOLAR ENERGY.(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 704 002

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FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

MATCHING A THERMIONIC CONVERTER WITH A SOLAR CELL IN
A SOLAR POWER ARRAY, (U)

FEB 70 7P Arifov, U. A.; Kulagin, A.

I. ;Nagaeva, D. M. ;

REPT. NO. FTD-HT-23-42-70

PROJ: FTD-6040102

UNCLASSIFIED REPORT

SUPPLEMENTAR NOTE: Edited trans. of Gelliotekhnika

(USSR) ni p41-43 1969, by L. Thompson.

DESCRIPTORS: (*SOLAR COLLECTORS, EFFICIENCY),

(*THERMIONIC CONVERTERS, DESIGN), SOLAR CELLS,

EXPERIMENTAL DESIGN, CESIUM, FEASIBILITY STUDIES, TEST

METHODS, ANALYSIS, USSR (U)

IDENTIFIERS: TRANSLATIONS (U)

The aim of the report is to determine the possibility of combining a high-temperature thermionic converter with a solar cell with partial use of its outer surface as the cathode with the introduction of the concentrator parameters corresponding to glass projector mirrors.

(Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 701 739

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AEROSPACE CORP EL SEGUNDO CALIF LAB OPERATIONS

PROPAGATION OF SOLAR PARTICLES TO THE POLAR
CAPS. (U)

DESCRIPTIVE NOTE: Rept. for Jan-Jun 69.

DEC 69 29P Paulikas, George A.; Blake,

J. Bernard; Vampola, Alfred L. ;

REPT. NO. TR-0066(5260-20)-11

CONTRACT: F04701-69-C-0066

MONITOR: SAMSO TR-70-30

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR RADIATION, MAGNETOSPHERE),
(*CHARGED PARTICLES, POLAR REGIONS), PROTONS, ELECTRONS,
SCIENTIFIC SATELLITES (U)
IDENTIFIERS: UV1-12 SATELLITE, QV3-3 SATELLITE, QV1-15
SATELLITE, POLAR CAP ABSORPTION, RADIATION BELTS,
ELECTRONS, SOLAR ENERGY, SOLAR COSMIC RAY (U)

Measurements of solar particles over the polar caps by satellite-borne experiments are summarized. Solar protons down to about 200-kev energy and solar electrons to about 40-kev energy reach the polar caps. In general, solar electrons illuminate the polar caps uniformly during a solar particle event; in contrast, solar proton fluxes exhibit a great deal of spatial structure. Some diffusion of solar protons across the magnetic field is required in order to account for the experimental results.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 701 352 10/2 22/2 18/14
 NAVY SPACE SYSTEMS ACTIVITY LOS ANGELES CALIF
 SPACE ELECTRICAL POWER SYSTEMS FOR THE MID-
 1970'S.

(U)

DESCRIPTIVE NOTE: Final technical rept.,

SEP 69 122P Silverman, Richard V. ;
 REPT. NO. NSSA-R40-69-4

UNCLASSIFIED REPORT

DESCRIPTORS: (*SPACECRAFT, *POWER SUPPLIES), ELECTRIC
 POWER PRODUCTION, NUCLEAR REACTORS, THERMOELECTRICITY,
 RANKINE CYCLE, BRAYTON CYCLE, SOLAR CELLS, SOLAR
 COLLECTORS, COSTS, PLANNING, POLAR ORBIT TRAJECTORIES,
 LIFE EXPECTANCY (U)
 IDENTIFIERS: SNAP-10A REACTORS, THERMOELECTRIC POWER
 GENERATION (U)

An evaluation of candidate electrical power systems
 capable of providing up to 6.5 kw for an earth
 orbiting mission is presented in this report. Three
 power systems could be ready for a mid-1970 launch,
 if proper funding were provided for development
 programs. They are: a Solar Cell/Battery
 System; a Reactor/Thermoelectric System; and
 a Reactor/Organic Rankine System. The
 preferred system for the proposed mission is the
 Reactor/Thermoelectric system, based on its
 inherent simplicity, lower weight, lower unit costs,
 and high degree of technology readiness relative to
 the competing systems. (Author) (U)

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AD- 699 358

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 699 358 13/1 10/1
 QUARTERMASTER RESEARCH AND DEVELOPMENT CENTER NATICK
 MASS

EXPLORATORY STUDY TO DETERMINE FAVORABLE LOCATIONS
 IN THE UNITED STATES FOR CONSTRUCTION OF A SOLAR
 FURNACE.

(U)

DESCRIPTIVE NOTE: Research study rept.,

NOV 55 26P Hull, Blanche B. ;

REPT. NO. QROC-EA-4

PROJ: DA-7-83-05-004A

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR FURNACES, SITE SELECTION),
 CONSTRUCTION, THERMAL RADIATION, CLOUDS, MOISTURE, ARMY
 OPERATIONS, FEASIBILITY STUDIES, GRAPHICS, STATISTICAL
 DATA, UNITED STATES (U)

The total receipt of radiant solar energy at the
 earth's surface is dependent upon the clarity of the
 atmospheric envelope and the number of sunshine
 hours. For short-wave solar radiation, water vapor
 and clouds are the two major absorbers and
 scatterers. The graphs of solar radiation and the
 average number of sunshine hours shown in this report
 indicate that the stations in the Southwest
 United States have the most favorable climatic
 conditions for the location of a solar furnace that
 will provide thermal radiation of high intensity
 throughout the year. On a climatological basis the
 arid Southwest appears to be the logical site for
 the solar furnace. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
 AD- 698 653 10/1 21/3 22/2
 ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT
 PARIS (FRANCE)

SPACE POWER SYSTEMS. PART II. (U)

NOV 69 295P
 REPT. NO. AGARD-Ograph-123-Pt-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: NATO furnished. See also Part 1, AD-698 652. Presented by the Propulsion and Energetics Panel and the Consultant and Exchange Programme of the Advisory Group for Aerospace Research and Development, at Universite' Libre de Bruxelles, Belgium, 2-6 Oct 67.
 DESCRIPTORS: (*SPACE PROPULSION, SYMPOSIA), TURBINES, POWER SUPPLIES, MOTOR GENERATORS, THERMIONIC CONVERTERS, THERMOELECTRICITY, SOLAR RADIATION, SOLAR CELLS, NUCLEAR REACTORS, ELECTROCHEMISTRY, FUEL CELLS, BATTERY COMPONENTS, ELECTRIC BATTERIES, PHOTOELECTRIC CELLS(SEMICONDUCTOR), ENERGY MANAGEMENT, OPTIMIZATION, BELGIUM (U)
 IDENTIFIERS: AC GENERATORS, PHOTOVOLTAIC CELLS, THERMOELECTRIC POWER GENERATION (U)

Contents: Turbomachinery for space power; Alternators for space power applications; Technology of thermoelectric and thermionic energy; Engineering aspects of thermionic energy conversion; Electrochemical space power sources; Photovoltaic devices and systems; Optimization of energy storage for solar space power; and Panel discussion on space power sources. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
 AD- 698 652 10/1 22/2 21/6
 ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT
 PARIS (FRANCE)

SPACE POWER SYSTEMS. PART I. (U)

NOV 69 349P
 REPT. NO. AGARD-Ograph-123-Pt-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: NATO furnished. See also Part 2, AD-698 653. Presented by the Propulsion and Energetics Panel and the Consultant and Exchange Programme of the Advisory Group for Aerospace Research and Development, at Universite' Libre de Bruxelles, Belgium, 2-6 Oct 67.
 DESCRIPTORS: (*SPACE PROPULSION, SYMPOSIA), HEAT ENGINES, SPACECRAFT NUCLEAR PROPULSION, SOLAR ROCKETS, SOLAR CELLS, FUEL CELLS, ENERGY CONVERSION, RANKINE CYCLE, THERMIONIC CONVERTERS, THERMOELECTRICITY, TURBINES, BRAYTON CYCLE, ELECTROCHEMISTRY, ION ENGINES, SOLAR RADIATION, POWER SUPPLIES, OPTIMIZATION, STATE-OF-THE-ART REVIEWS, BELGIUM (U)
 IDENTIFIERS: AC GENERATORS, RADIOISOTOPE HEAT SOURCES, SNAP (U)

Contents: Power requirements, similitudes and limitations in trans-conventional propulsion systems; Space power systems; Nuclear space power systems; (Nuclear space power systems, Reactor space power systems, Radioisotope space power); Mechanical heat engines for space power systems. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 696 425 10/3 10/2 10/1
ARMY ELECTRONICS COMMAND FORT MONMOUTH N JPOWER SOURCES CONFERENCE (20th ANNUAL), HELD
24-25-26 MAY 1966. PROCEEDINGS. (U)

66 260P

UNCLASSIFIED REPORT

Availability: Paper copy available from PSC
Publication Committee, Red Bank, N. J. 07701.
\$15.00.

SUPPLEMENTARY NOTE: See also Annual rept. no. 19, AD-696 424 and Annual rept. no. 21, AD-696 426.

DESCRIPTORS: (*POWER SUPPLIES, SYMPOSIA), (*FUEL CELLS, SYMPOSIA), (*STORAGE BATTERIES, SYMPOSIA), (*PRIMARY BATTERIES, SYMPOSIA), (*ENERGY CONVERSION, POWER SUPPLIES), (*SOLAR CELLS, SYMPOSIA), BATTERY COMPONENTS, ELECTRIC BATTERIES, ELECTRODES, GAS GENERATING SYSTEMS, ALKALINE BATTERIES, HYDROGEN, VOLTAGE REGULATORS, THERMOELECTRICITY, GENERATORS, THERMIONIC CONVERTERS, SILICON, INVERTERS (U)

IDENTIFIERS: *METAL AIR BATTERIES, *NICKEL CADMIUM BATTERIES, *THERMOELECTRIC POWER GENERATION (U)

Topics included are: Fuel cell battery systems;
High energy density battery systems; Secondary
batteries; Thermal and solar energy conversion;
Power conditioning. (U)

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AD- 696 424

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 696 424 10/3 10/2 10/1
ARMY ELECTRONICS COMMAND FORT MONMOUTH N JPOWER SOURCES CONFERENCE (19th ANNUAL), HELD
18-20 MAY 1965. PROCEEDINGS. (U)

65 199P

UNCLASSIFIED REPORT

Availability: Paper copy available from PSC
Publication Committee, Red Bank, N. J. 07701.
\$10.00.

SUPPLEMENTARY NOTE: See also Annual rept. no. 18, AD-696 423 and Annual rept. no. 20, AD-696 425.

DESCRIPTORS: (*POWER SUPPLIES, SYMPOSIA), (*FUEL CELLS, SYMPOSIA), (*STORAGE BATTERIES, SYMPOSIA), (*PRIMARY BATTERIES, SYMPOSIA), (*ENERGY CONVERSION, POWER SUPPLIES), (*SOLAR CELLS, SYMPOSIA), ELECTRODES, BATTERY COMPONENTS, ELECTRIC BATTERIES, ALKALINE BATTERIES, INVERTERS, BATTERY CHARGERS, DC TO DC CONVERTERS, THERMIONIC CONVERTERS, PHOTOELECTRIC CELLS(SEMICONDUCTOR), THERMOELECTRICITY, GENERATORS, SEMICONDUCTOR DEVICES (U)

IDENTIFIERS: *THERMOELECTRIC POWER GENERATION (U)

Topics included are: Fuel cell batteries;
Secondary batteries; New battery systems; Power
conditioning; Thermal energy conversion; TPV and
solar energy conversion. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 696 423 10/3 10/2 10/1
ARMY ELECTRONICS COMMAND FORT MONMOUTH N JPOWER SOURCES CONFERENCE (18th ANNUAL), HELD
19-21 MAY 1964. PROCEEDINGS. (U)

64 193P

UNCLASSIFIED REPORT

Availability: Paper copy available from PSC
Publication Committee, Red Bank, N. J. 07701.
\$10.00.

SUPPLEMENTARY NOTE: See also Annual rept. no. 17, AD-696 422 and Annual rept. no. 19, AD-696 424.

DESCRIPTORS: (*POWER SUPPLIES, SYMPOSIA), (*FUEL CELLS, SYMPOSIA), (*STORAGE BATTERIES, SYMPOSIA), (*PRIMARY BATTERIES, SYMPOSIA), (*ENERGY CONVERSION, POWER SUPPLIES), (*SOLAR CELLS, SYMPOSIA), GAS GENERATING SYSTEMS, HYDROGEN, ELECTRODES, BATTERY COMPONENTS, ELECTRIC BATTERIES, ALKALINE BATTERIES, DC TO DC CONVERTERS, INVERTERS, GENERATORS, THERMOELECTRICITY, THERMIONIC CONVERTERS, GUIDED MISSILE BATTERIES, DAMAGE, RADIATION EFFECTS, VOLTAGE REGULATORS, BATTERY CHARGERS, PHOTOELECTRIC CELLS (SEMICONDUCTOR) (U)

IDENTIFIERS: NICKEL CADMIUM BATTERIES, SILVER CADMIUM CELLS, SILVER ZINC BATTERY CELLS, THERMOELECTRIC POWER GENERATION (U)

Topics included are: Fuel cell batteries;
Secondary batteries; Primary batteries;
Electrical to Electrical energy conversion;
Thermal energy conversion; Solar energy conversion. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 696 422 10/3 10/2 10/1
ARMY ELECTRONICS COMMAND FORT MONMOUTH N JPOWER SOURCES CONFERENCE (17th ANNUAL), HELD
21-23 MAY 1963. PROCEEDINGS. (U)

63 195P

UNCLASSIFIED REPORT

Availability: Paper copy available from PSC
Publication Committee, Red Bank, N. J. 07701.
\$10.00.

SUPPLEMENTARY NOTE: See also Annual rept. no. 16, AD-696 421 and Annual rept. no. 18, AD-696 423.

DESCRIPTORS: (*POWER SUPPLIES, *SYMPOSIA), (*SOLAR CELLS, SYMPOSIA), (*ENERGY CONVERSION, POWER SUPPLIES), (*FUEL CELLS, SYMPOSIA), (*STORAGE BATTERIES, SYMPOSIA), (*PRIMARY BATTERIES, SYMPOSIA), SILICON, DAMAGE, RADIATION EFFECTS, GENERATORS, THERMOELECTRICITY, THERMIONIC CONVERTERS, ELECTRODES, BATTERY COMPONENTS, ELECTRIC BATTERIES, ALKALINE BATTERIES, THERMOCOUPLES, DC TO DC CONVERTERS, INVERTERS, FREQUENCY CONVERTERS (U)

IDENTIFIERS: AMMONIA BATTERIES, NICKEL CADMIUM BATTERIES, SILVER ZINC BATTERY CELLS, SILVER CADMIUM CELLS, *THERMOELECTRIC POWER GENERATION (U)

Topics included are: Solar energy conversion;
Thermal energy conversion; Fuel cell batteries;
The future of fuel cells; Secondary batteries;
Primary batteries; Electrical conversion. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 696 421 10/3 10/2 10/1
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

POWER SOURCES CONFERENCE (16th ANNUAL), HELD
22-24 MAY 1962. PROCEEDINGS.

MAY 62 184P

UNCLASSIFIED REPORT

Availability: Paper copy available from PSC
Publication Committee, Red Bank, N. J. 07701.
\$10.00.

SUPPLEMENTARY NOTE: See also Annual rept. no. 15, AD-
421 601, and Annual rept. no. 17, AD-696 422.
DESCRIPTORS: (*POWER SUPPLIES, *SYMPOSIA), (*FUEL CELLS,
SYMPOSIA), (*STORAGE BATTERIES, SYMPOSIA), (*PRIMARY
BATTERIES, SYMPOSIA), (*SOLAR CELLS, SYMPOSIA), (*ENERGY
CONVERSION, POWER SUPPLIES), MEMBRANES, ION EXCHANGE,
BATTERY COMPONENTS, ELECTRIC BATTERIES, ELECTRODES,
GENERATORS, THERMOELECTRICITY, THERMIONIC CONVERTERS,
RADIOACTIVE ISOTOPES, ELECTRIC POWER PRODUCTION, NUCLEAR
REACTORS, AUXILIARY POWER PLANTS, SPACEBORNE, ALKALINE
BATTERIES, INVERTERS, DC TO DC CONVERTERS (U)
IDENTIFIERS: *NICKEL CADMIUM BATTERIES, *REGENERATIVE
FUEL CELLS, *SILVER CADMIUM CELLS, *SILVER ZINC
BATTERY CELLS, *THERMOELECTRIC POWER GENERATION (U)

Topic included are: Fuel cell materials and
mechanisms; Fuel cell batteries and systems;
Thermal energy conversion; Solar energy
conversion; Secondary batteries; Primary
batteries; Electrical to electrical energy
conversion. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 692 635 14/2 20/13

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

INSTALLATION FOR HIGH-TEMPERATURE INVESTIGATIONS
OF HEAT-RESISTANT AVIATION MATERIALS AND COATINGS.

(U)

JUN 69 15P Pasichnyi, V. V. ;Dvernyakov,
V. S. ;
REPT. NO. FTD-MT-24-504-68

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited machine trans. of
Samoletoostroenie i Tekhnika Vozdushnogo Flota
(USSR) n10 p77-83 1967.

DESCRIPTORS: (*SOLAR FURNACES, HIGH TEMPERATURE), (*HEAT
RESISTANT MATERIALS, TEST METHODS), HEAT FLUX,
MEASUREMENT, CONTROL SYSTEMS, MODEL TESTS, PYROMETERS,
REFRACTORY COATINGS, AVIATION, DESIGN, USSR
IDENTIFIERS: AVIATION, TRANSLATIONS (U)

Helioapparatus and the method for and results of
determining the thermal parameters of aviation
materials are described. The apparatus produces a
temperature of up to 1500-2000C, which is measured
with great accuracy by thermocouples. Radiation is
measured with an AT-50 actinometer and a GSA-1
galvanometer. The redistribution of thermal-flux
density in the focal zone is analyzed when the
temperature is controlled by a shielding cylinder and
by defocusing. Strict determination of the thermal
flux incident on the specimen and its distribution
over the heating area is found to be important. The
apparatus allows experiments to be made under very
pure conditions and at easily controllable
temperatures and thermal fluxes. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 686 496 10/2 20/12
GENERAL DYNAMICS/ASTRONAUTICS SAN DIEGO CALIF
PHOTOVOLTAIC AND THERMOELECTRIC SOLAR ENERGY
CONVERSION USING THIN FILMS, (U)

DEC 61 65P Zimmerman, W. B. ; Evans, J.
C. , Jr;
REPT. NO. GDA-ERR-AN-103

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR CELLS, FILMS), PHOTOELECTRIC
EFFECT, SEE-ECK EFFECT, SILICON, SEMICONDUCTORS, BAND
THEORY OF SOLIDS, CADMIUM SULFIDES, DEPOSITION (U)
IDENTIFIERS: THIN FILMS (U)

Solar energy conversion by the use of thin films in
photovoltaic and thermoelectric devices is discussed.
Experimental work is presented on the fabrication
of a thin film cadmium sulfide cell which utilizes
the photovoltaic effect. A theoretical
investigation is made of the temperature differences
obtainable in space by using thin, light-weight
plastic sheets, and the use of such plastics for
thermoelectric generators is discussed.
Temperature differences of several hundred
centigrade degrees can be obtained. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 681 757 10/1 7/5
GENERAL DYNAMICS/ASTRONAUTICS SAN DIEGO CALIF
CHEMICAL PHOTOGENERATIVE SOLAR CONVERTER
EFFICIENCY, (U)

JAN 61 22P Neu, John T. ;
REPT. NO. GDA-ERR-AN-035

UNCLASSIFIED REPORT

DESCRIPTORS: (*PHOTOLYSIS, EFFICIENCY), (*SOLAR
RADIATION, ENERGY CONVERSION), THEORY, BROMIDES,
HYDROGEN COMPOUNDS, FREE RADICALS, MOLECULAR ENERGY
LEVELS, SOLAR CELLS, FUEL CELLS (U)
IDENTIFIERS: HYDROGEN BROMIDE, PHOTOVOLTAIC CELLS,
QUANTUM EFFICIENCY (U)

Systems have been studied which use a chemical
working fluid to absorb solar energy and convert it
to chemical energy for recovery as electrical energy
from electric cells. There is a possibility of
attaining the above objectives with a
photoregenerative system. A method for simply
calculating the quantum yield is given with
suggestions for improving efficiency. A suggested
research approach is presented. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 672 772 10/3 10/2 18/14 22/2
NAVY SPACE SYSTEMS ACTIVITY LOS ANGELES CALIF

SPACE POWER SUPPLY STUDY. (U)

DESCRIPTIVE NOTE: Final rept.,
MAY 68 178P Silverman, Richard V. ;
REPT. NO. NSSA-R40-68-5

UNCLASSIFIED REPORT

DESCRIPTORS: (*SATELLITES(ARTIFICIAL), *POWER SUPPLIES,
FUEL CELLS, SOLAR CELLS, BATTERY COMPONENTS, ELECTRIC
BATTERIES, RADIOACTIVE ISOTOPIES, THERMOELECTRICITY,
WEIGHT, COSTS, RELIABILITY, ANALYSIS (U)

This report presents the results of a parametric analysis, evaluation and comparison of space electrical power systems capable of meeting a set of mission requirements. The parameters include: continuous power (300 or 600 W), peak power (2, 3.5 or 5 kW), duty cycle (5%, 10% or 20%) and mission duration (1 to 12 months). The spacecraft is defined to be in a low circular polar orbit and the power systems are to be available in the 1970-1973 time frame. Six types of power systems (solar cell/battery, fuel cell, fuel cell/battery, solar cell/battery/fuel cell, solar cell/fuel cell, and radioisotope thermoelectric generators/battery) were evaluated for possible application to such missions. Evaluation and comparison criteria include mass, volume, procurement costs, reliability and spacecraft integration factors. (Author)

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AD- 669 994

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 669 994 10/2 10/3 22/2
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS
LAB

DODGE SATELLITE POWER SYSTEM. (U)

DESCRIPTIVE NOTE: Technical memo.,
MAY 68 39P Wilson, Louis ;
REPT. NO. APL-TG-978
CONTRACT: N0W-62-0604

UNCLASSIFIED REPORT

DESCRIPTORS: (*SCIENTIFIC SATELLITES, ELECTRIC POWER
PRODUCTION), (*SOLAR CELLS, *STORAGE BATTERIES),
GRAVITY, STABILIZATION, DAMPING, MAGNETIC FIELDS,
HYSTERESIS, INVERTERS, DC TO DC CONVERTERS, VOLTAGE,
ELECTRIC CURRENTS, ATTITUDE CONTROL SYSTEMS, DIAGRAMS,
POWER SUPPLIES (U)
IDENTIFIERS: DEPARTMENT OF DEFENSE GRAVITY EXPERIMENT,
DODGE(DEPARTMENT OF DEFENSE GRAVITY EXPERIMENT), DODGE
SATELLITE (U)

The DODGE (Department of Defense Gravity Experiment) satellite was launched on July 1, 1967 to an altitude of 18,000 statute miles into a near-synchronous orbit. The satellite was designed, as an experiment to demonstrate two- and three-axis gravity-gradient stabilization using magnetic and hysteresis damping techniques. A solar cell/battery power system furnishes all of the electrical energy required to operate the satellite subsystems. The solar power generating capability is 45 watts (average). A 6-ampere-hour 10-volt nickel-cadmium battery operates peak electrical loads during light and dark orbits as required. DC-to-AC inverters and DC-to-DC converters transform the solar/battery voltage to the proper levels required to operate the on-board electrical loads. The power system contains protective devices for safeguarding the battery against excessive discharge currents and charging voltages. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 668 263 10/1 10/2 21/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

DIRECT CONVERSION OF VARIOUS FORMS OF ENERGY INTO
ELECTRIC AND MECHANICAL POWER. (U)

JUL 67 270P Alekseev, G. N. ;
REPT. NO. FTD-MT-64-355

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Edited machine trans. of mono.
Neposredstvennoe Prevrashchenie Razlichnykh vidov
Energii v Elektricheskuyu Mekhanicheskuyu, Moscow/
Leningrad, 1963 336p.

DESCRIPTORS: (*ENERGY CONVERSION, REVIEWS), POWER
SUPPLIES, BATTERY COMPONENTS, ELECTRIC BATTERIES, FUEL
CELLS, THERMOELECTRICITY, GENERATORS, THERMIONIC
CONVERTERS, PLASMA GENERATORS, MAGNETOHYDRODYNAMIC
GENERATORS, ELECTRIC PROPULSION, RADIOACTIVE ISOTOPIES,
ELECTRIC POWER PRODUCTION, NUCLEAR REACTORS, NUCLEAR
PROPULSION, THERMONUCLEAR REACTIONS, SOLAR CELLS, SOLAR
SAILS, USSR (U)

IDENTIFIERS: PHOTON ROCKETS, RADIOISOTOPE GENERATORS, (U)
TRANSLATIONS

Contents: Direct conversion of chemical energy
to electrical energy (Theory of fuel cells, Fuel
cells with solid fuel, Fuel cells with gaseous
fuel, Combined (solid-gas) fuel cells, Fuel
cells with liquid fuel, Oxidizing reducing cells,
Possibilities of application of fuel cells);
Direct transformation of thermal energy into
electrical and mechanical energy (Thermoelectric
generators, Vacuum thermionic emission electric
generators, Gas-filled thermionic emission electric
generators, Plasma thermionic emission electric
generators, Certain general questions for
thermionic electric generators, Information on
magnetohydrodynamics, Magnetohydrodynamic electric
generators, Electrorocket motors); Direct
transformation of nuclear energy into electrical and
mechanical energy (Radioisotope electric
generators, Nuclear radioisotope motors, Nuclear
reactor electric generators, Nuclear reactor
motors, Thermoelectric generators,
Thermoelectric motors); Direct transformation of
solar energy into electrical and mechanical energy
(Solar electric generators, Solar sail, Photon
rocket motor). (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 668 144 10/2 22/2 18/5
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS
LAB

SOLAR CELL POWER SYSTEMS FOR APL SATELLITES. (U)

DESCRIPTIVE NOTE: Technical memo.,
FEB 68 33P Fischell, Robert E. ;
REPT. NO. APL-TG-950
CONTRACT: N0W-62-0604

UNCLASSIFIED REPORT

DESCRIPTORS: (*SATELLITES(ARTIFICIAL), *SOLAR CELLS),
(*ELECTRIC POWER PRODUCTION, SATELLITES(ARTIFICIAL)),
POWER SUPPLIES, PERFORMANCE(ENGINEERING),
RELIABILITY(ELECTRONICS), BATTERY COMPONENTS, ELECTRIC
BATTERIES, TEMPERATURE, VOLTAGE, NUCLEAR POWER PLANTS,
THERMOELECTRICITY, AUXILIARY POWER PLANTS, PLUTONIUM,
SEMICONDUCTOR DIODES, ATTITUDE CONTROL SYSTEMS, DC TO AC
CONVERTERS, DIAGRAMS, SOLDERING (U)
IDENTIFIERS: SNAP 3 (U)

Since 1959, the Applied Physics Laboratory
has designed and launched 31 earth satellites.
From very simple, low-power design in 1959, there
have developed much more sophisticated solar cell
power systems that generate higher power levels.
This paper describes the development of various
power systems and the application of several control
techniques for improving satellite operating
performance and reliability. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 654 285 10/2 22/2
AEROSPACE CORP EL SEGUNDO CALIF LABS DIV

SOLAR CELL POWER SYSTEMS FOR AIR FORCE SATELLITES, (U)

MAY 67 34P Stofel, Edwin J. ;
REPT. NO. TR-1001(2250-20)-7
CONTRACT: AF 04(695)-1001
MONITOR: SSD TR-67-89

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR CELLS, *POWER),
(*SATELLITES(ARTIFICIAL), *SOLAR PANELS), POWER
SUPPLIES, SPACEBORNE, QUALITY CONTROL, TESTS, DESIGN (U)

The U.S. Air Force has used solar cell power systems on various types of satellites. The current methods used for choosing the array, the number of cells, their placement on the solar panels, and the quality assurance tests conducted on the panels are discussed. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 653 184 10/2
LIBRARY OF CONGRESS WASHINGTON D C AEROSPACE TECHNOLOGY
DIVDIRECT ENERGY CONVERSION IN THE USSR, SOVIET SOLAR
CONCENTRATORS: COMPREHENSIVE REPORT, (U)NOV 66 142P Litynski, Z. ;
REPT. NO. ATD-66-138
MONITOR: IT 67-62078

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Rept. on Surveys of Foreign Scientific and Technical Literature.
DESCRIPTORS: (*SOLAR COLLECTORS, USSR), SOLAR RADIATION, ENERGY CONVERSION, SOLAR FURNACES, CONFIGURATION, OPTICAL EQUIPMENT, POWER SUPPLIES, THERMOELECTRICITY, PARABOLIC BOILERS, PHOTOELECTRIC EFFECT, THERMIONIC CONVERTERS, SOLAR PANELS, CONSTRUCTION MATERIALS, COATINGS, REVIEWS (U)

Contents: Theoretical considerations (Basic calculations of an ideal system, Calculations of a real concentrator, Attainable temperatures, Precision index, Cavity calculations); Concentrator design (Paraboloids, Multimirror systems, Parabolic-cylindrical concentrators, Other geometries); Concentrators for direct energy conversion (Concentrators for applications in space, Photovoltaic systems, Thermoelectric systems); Materials and manufacturing processes (Glass and aluminum, Reinforced concrete shells, Asbestos-cements, resins, and foam materials, Elastic membranes).

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 652 752 20/2 10/1

AVCO CORP WILMINGTON MASS AVCO SPACE SYSTEMS DIV

THORIA SINGLE CRYSTALS GROWN BY VAPOR DEPOSITION IN A SOLAR FURNACE, (U)

JUL 66 13P Laszio.T. S. ;Shuehan,P.

J. ;Gannon,R. E. ;

CONTRACT: AF 49(638)-1166

PROJ: AF-9763

TASK: 976301

MONITOR: AFOSR 67-1139

UNCLASSIFIED REPORT

Availability: Published in J. Phys. Chem.

Solids v28 p313-6 1967.

DESCRIPTORS: (*THORIUM COMPOUNDS, CRYSTAL GROWTH), (*CRYSTAL GROWTH, *SOLAR FURNACES), DIOXIDES, SINGLE CRYSTALS, VAPOR PLATING, DENDRITIC STRUCTURE, X RAY DIFFRACTION, CRYSTAL LATTICES (U)

IDENTIFIERS: THORIUM(IV) OXIDE (U)

A solar furnace capable of heat fluxes corresponding to a blackbody temperature as high as 4900K was successfully used to grow ThO₂ crystals from the vapor phase. This was accomplished by heating a small area of a polycrystalline ThO₂ rod to temperatures well above its melting point until profuse vaporization was observed. The vapors condensed around the molten crater forming single crystals with well defined crystal habits as well as clearly defined dendrites. The preferred directions of growth were determined by X-ray diffraction analysis. This crystal growing technique also yields crystals of very high purity since the process involves a fractional condensation. The experimental technique and apparatus is described in detail. Laue diagrams of the single crystals and lattice parameters obtained from the powder pattern are also given. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 648 011 20/13 22/1

HUGHES AIRCRAFT CO EL SEGUNDO CALIF SPACE SYSTEMS DIV

LOCAL RADIATION EQUILIBRIUM TEMPERATURES IN SEMIGRAY ENCLOSURES. (U)

DESCRIPTIVE NOTE: Aerospace technology research rept.,

DEC 66 15P Bobco,R. P. ;Allen,G. E.

;Othmer,P. W. ;

REPT. NO. RR-17, SSD-60475R

UNCLASSIFIED REPORT

DESCRIPTORS: (*SPACECRAFT, THERMAL PROPERTIES), (*SOLAR RADIATION, INTEGRAL EQUATIONS), (*THERMAL RADIATION, INTEGRAL EQUATIONS), THERMODYNAMICS, REFLECTION, TEMPERATURE, APPROXIMATION(MATHEMATICS), HEAT TRANSFER (U)

A rigorous analytical formulation is derived for computing local radiation equilibrium temperatures in diffusely reflecting, semigray cavities. Radiosity integral equations for solar and thermal radiation are related through a heat balance to obtain a third integral equation for the temperature distribution in an enclosure. The temperature equation is solved, in principle, by postulating a resolvent in terms of Fredholm's solution. The solution is reduced to an approximate formulation suitable for engineering applications by introducing a mean value for the integral and using Hottel's script eff in place of the resolvent. The resulting solution shows that local temperature depends on the sum of local direct solar energy, weighted diffusely reflected solar energy from other cavity regions, and weighted temperature of other regions. The analysis is completed by presenting closed-form expressions suitable for hand computation of mean temperatures in a semigray enclosure of two surfaces: (1) A concave surface which 'sees' itself (shape factor F11 not = 0) and (2) a plane surface (F22 = 0). Numerical results are given for an L-shape geometry and a shallow circular cavity to compare the solutions derived in the paper to those obtained by computer nodal analyses. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 629 241

10/2 10/1

WISCONSIN UNIV MADISON SOLAR ENERGY LAB

PHOTOVOLTAIC POWER SYSTEMS USING HIGH SOLAR ENERGY FLUXES.

(U)

DESCRIPTIVE NOTE: Final rept., 1 Mar 64-30 Nov 65,
DEC 65 73P Schoffer, P.; Beckman, W.;
CONTRACT: DA-28-043-AMC-00005(E),
PROJ: DA-1C6-22001-A-053,
TASK: 01,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also AD-458 879.
DESCRIPTORS: (*SOLAR CELLS, ENERGY CONVERSION), (*ENERGY CONVERSION, SOLAR CELLS), (*POWER SUPPLIES, SOLAR CELLS), ELECTRIC POWER PRODUCTION, SILICON, REFLECTORS, COOLING + VENTILATING EQUIPMENT, HEAT, PERFORMANCE(ENGINEERING), EFFECTIVENESS, HEAT EXCHANGERS

(U)

Experimental data is presented on the operation of a high solar flux power system. Using 18 one by two cm cells with 20 gridlines/cm and with a concentrated solar flux of about 25 W/sq cm, the system produced 40 watts of electrical power. Approximately 5 of the 40 watts are necessary for the cooling system pump motor. The expected net output of 50 watts was not obtained due to low cell efficiencies and nonuniform flux distribution. Probable reasons for the low cell efficiencies are discussed and a method for obtaining a more uniform flux distribution is presented. Tests on the individual cooling system components are also presented. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 614 023

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

EARTHLY SUN OBEY.

(U)

MAR 65 5P
REPT. NO. FT0-TT-64-1326
MONITOR: TT, 65-61995

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Unedited rough draft trans. from Izvestiya (USSR) n271 p 5 Nov 13 1964.
DESCRIPTORS: (*NUCLEAR PHYSICS, POWER SUPPLIES), (*MAGNETOHYDRODYNAMICS, ENERGY CONVERSION), LASERS, PLASMAS(PHYSICS), NUCLEAR REACTIONS, CONTROL, USSR

(U)

A popularized Russian newspaper article on the progress of controlled nuclear reactions as a power source is presented.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 607 425

ARMY ELECTRONICS LABS FORT MONMOUTH N J

PROCEEDINGS, ANNUAL POWER SOURCES CONFERENCE (14TH), (U)
17-19 MAY 1960.

MAY 60 162P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: This conference was formerly called The Battery Research and Development Conference. Legibility of this document is in part unsatisfactory. Reproduction has been made from best available copy.
DESCRIPTORS: (*BATTERIES AND COMPONENTS, SYMPOSIA), (*POWER SUPPLIES, SYMPOSIA), (*ELECTRIC POWER PRODUCTION, SYMPOSIA), ENERGY CONVERSION, SOLAR RADIATION, THERMAL RADIATION, FUEL CELLS, STORAGE BATTERIES, PRIMARY BATTERIES, ELECTROCHEMISTRY, REVIEWS (U)

Contents: Thermal Energy Conversion Solar Energy Conversion Fuel Cell Batteries Secondary Batteries Comparison Of Energy Conversion Systems Energy Storage Devices High Rate Batteries Primary Batteries (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 431 557

GV DEFENSE RESEARCH LABS SANTA BARBARA CALIF

STUDY OF A THERMOPHOTOVOLTAIC CONVERTER. (U)

DESCRIPTIVE NOTE: Final rept., 1 Jan-31 Dec 63.

FEB 64 139P

REPT. NO. GW-DRL-TR64-15

CONTRACT: DA-36-039-ANC-02255(E)

PROJ: DA-1-3-64-209-D-534

TASK: 1-3-64-209-D-53410

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:
DESCRIPTORS: (*PHOTOELECTRIC CELLS (SEMICONDUCTOR), WATERPUMP), (*PHOTOELECTRIC MATERIALS, THERMOELECTRICITY), (*SOLAR RADIATION, ENERGY CONVERSION), (*THERMOELECTRICITY, SEMICONDUCTORS), (*ENERGY CONVERSION, PHOTOELECTRIC CELLS (SEMICONDUCTOR)), PORTABLE (HAND-PORTABLE), THERMAL CONDUCTION, GERMANIUM SILICON, ELECTRIC POWER PRODUCTION, REFLECTION, INEQUALITIES, ENERGY, HIGH TEMPERATURE RESEARCH, EMISSIVITY, GOLD, SILICON COMPOUNDS, CERAMICS, ANTIMONY ALLOYS, GALLIUM ALLOYS, INDIUM ALLOYS, ABSORPTION, ELECTRICAL PROPERTIES, ELECTRIC POTENTIAL, ELECTRIC CURRENTS, GLOWMETERS, INFRARED RADIATION, THEORY (U)

Components for a portable thermophotovoltaic energy converter have been investigated experimentally and theoretically. Using a newly designed reflectance goniometer, reflectance values were measured for specular front-surface gold-germanium (98.2%), for specular front-surface germanium and rear-surface germanium-gold coated (92.7%), and for a rougher scattering front-surface gold-germanium (97.4%). It appears that adequately transparent germanium cells can be made with a 4x long-wave length transmission loss per round trip, with acceptable front and back levels. Neither gallium antimonide nor indium arsenide shows promise as an alternative to germanium. For german mantle materials, SiC shows promise. The reflectance measurements on Cr-CrO₂ oxide-stained alumina indicate that the emissivity may be as high as 0.95; stained oxides may, therefore also be suitable. Design studies for a burner with 30% stack loss were completed. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 429 505

NORTHEASTERN UNIV BOSTON MASS

RESEARCH IN ENERGY CONVERSION.

(U)

DESCRIPTIVE NOTE: Final rept., 1 July 60-30 Sep 63.

NOV 63 304P

CONTRACT: AF 19(604)-7358

PROJ: AF-6692, AF-6694

TASK: 669204, 669402

MONITOR: AFCL 63-940

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENERGY CONVERSION, SCIENTIFIC RESEARCH),
(*SOLAR CELLS, SINGLE CRYSTALS), SILICON, CRYSTAL
GROWTH, VAPOR PLATING, PHOTOELECTRIC EFFECT,
PHOTOCHEMICAL REACTIONS, THERMOELECTRICITY, THERMIONIC
CONVERTERS, PLASMAS, (*SOLAR CELLS), NITROGEN COMPOUNDS, SULFUR
COMPOUNDS, SEMICONDUCTORS, ORGANIC SULFUR COMPOUNDS,
CHELATE COMPOUNDS, METALORGANIC COMPOUNDS, ELECTRICAL
PROPERTIES, ELECTRIC POWER PRODUCTION, SPACECRAFT,
OPTICAL PROPERTIES (U)

Research in energy conversion: photovoltaic,
thermoelectric, thermionic, and photochemical phenomena.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 418 322

GENERAL INSTRUMENT CORP NEWARK N J

SOLAR FLAT PLATE THERMOELECTRIC GENERATOR
RESEARCH.

(U)

DESCRIPTIVE NOTE: Quarterly rept. no. 2, 1 June-1 Sep
63.

SEP 63

24P

CONTRACT: AF33 657 10335

PROJ: 8173

TASK: 817302

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR PANELS, THERMOELECTRIC),
(*AUXILIARY POWER PLANTS, SPACECRAFT), DESIGN, OPTICAL
COATINGS, TEMPERATURE, STRUC, THERMOCOUPLES, ENERGY
CONVERSION, SOLAR RADIATION, METAL PLATES, PIPES,
ALUMINUM, NICKEL, THICKNESS, WEIGHT, SOLDERED JOINTS,
TESTS. (U)

A solar flat plate thermoelectric generator con
sists of a collector plate with an optically
selective coating, small size semiconductor
thermoelements, a radiator plate and a support
structure. Emphasis has been placed on a support
structure concept designated as the integral
reinforced plate in which radiator and collector
plates are folded into self-supporting structures.
A number of thermal cycling tests have been con
ducted up to a maximum of 2000 cycles. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 415 024

WESTINGHOUSE ELECTRIC CORP LIMA OHIO

SOLAR THERMOELECTRIC GENERATOR SYSTEM CONCEPT AND
FEASIBILITY STUDY. (U)

DESCRIPTIVE NOTE: Quarterly rept. no. 6, 15 May-15 Aug

63, AUG 63

23P

Naumer, D. A.; McCabe, J. L. ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*GENERATORS, SOLAR RADIATION), (*SOLAR RADIATION, GENERATORS), (*THERMOELECTRICITY, SOLAR RADIATION), DESIGN, FEASIBILITY STUDY, TESTS, LIFE EXPECTANCY, EXPERIMENTAL DATA, GAMMA RAYS, ELECTRIC POWER PRODUCTION, LITHIUM COMPOUNDS, HYDRIDES, MODELS (U)

Ground level - natural sunlight testing of the solar powered thermoelectric generator has been completed. Evaluation of the test data has shown that the short within the generator, which occurred during simulated altitude evaluation, has been repaired. Maximum power output obtained during solar testing was 20 watts. The waste heat radiator was operated at a lower temperature than would be encountered in a space atmosphere. The rate of heat input to the thermopile was therefore greater than that to be expected under space flight conditions. This shortened the cycle from 90 to 83.3 minutes. The integrated average for an 83.3 minute cycle is 17.82 watts or 24.8 watt hours output. The overall efficiency for the cycle is 3.55% including convection losses. Assuming the collector concentrator efficiency to be 86.6% the generator efficiency including reradiation but excluding convection losses from the cavity is 4.53%. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 410 932

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

ENERGY, ITS SOURCES ON EARTH AND ITS ORIGIN. PART
IV. (U)

MAY 63 105P

Lazarev, P. P.;

REPT. NO. FTD-TT-61-479

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Trans. from Energiya, Yeye Iztchniki Na Zemle ; Yeye Proiskhozhdeniye, IZD-vo AN SSSR, Moskva, pp. 195-276, 1959.
DESCRIPTORS: (*ENERGY, SOURCES), (*MASS-ENERGY, SOLAR SYSTEM), (*NUCLEAR ENERGY, RESONANCE ABSORPTION), PHYSICS, ASTROPHYSICS, BIOPHYSICS, SOLAR FLARES, SOLAR RADIATION, WIND, FUELS, ENERGY CONVERSION, ELECTRIC POWER PRO, NUCLEAR REACTORS, PROTONS, NUCLEONS. (U)

Energy sources on earth.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 409 001

TEXTRON ELECTRONICS INC SYLMAR CALIF HELIOTEK DIV

HIGH EFFICIENCY SILICON SOLAR CELLS. (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 3, 15 Dec
62 15 Mar 63, 1V Berman, Paul A.; Handy,

APR 63 Roland J.; Rolik, Geza P.;

CONTRACT: DA36 039sc90777

PROJ: JA99 09 002

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR CELLS, ELECTRICAL PROP), (*SOLAR
RADIATION, INTENSITY), RESIST, SILICON, DESIGN, THEORY,
MEASUREMENT, ELECTRIC CURRENTS, MIRRORS, ELEC,
MATHEMATICAL PREDICTION, EQUATIONS. (U)

An additional mirror was added to the solar con-
centrator equipment so that it is possible to make
solar cell measurements at approximately 5 gm-
calories/sq cm/min solar intensity. The
concentrator was used to verify the sunlight power
predictions made from tungsten power measurements
during the P()/N bivariable experiment. A
generalization was developed for the theoretical
determination of the total cell series resistance
from a knowledge of the values of the component
resistances. The equations were utilized to
predict the series resistance of production type
N()/P and N()/N cells. (Author)

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JOINT PUBLICATIONS RESEARCH SERVICE WASHINGTON D C

SOLAR ELECTRIC POWER STATIONS (U)

DEC 62 1V SOMINSKII, M.S.;
REPT. NO. 16683

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *PHOTOELECTRIC
CELLS (SEMICONDUCTOR), *SOLAR CELLS, BATTERY COMPONENTS,
ELECTRIC BATTERIES, ENERGY, SILICON, SOLAR RADIATION (U)
IDENTIFIERS: TRANSLATIONS (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 299 004

TAPCO DIV THOMPSON RAMO WOOLDRIDGE INC INGLEWOOD
CALIFLONG-LIFE THERMIONIC CONVERTERS FOR SOLAR POWER
SYSTEMS

(U)

FEB 63 1V

CONTRACT: AF33 616 8114

MONITOR: ASD TDR62 1069

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *THERMIONIC
EMISSION, CESIUM, DESIGN, EFFECTIVENESS, ELECTRIC
POTENTIAL, FAILURE (MECHANICS), INSTRUMENTATION, LIFE
EXPECTANCY, SOLAR CELLS, SPACE ENVIRONMENTS,
TEMPERATURE, TEST FACILITIES, TEST METHODS, THERMIONIC
CONVERTERS (U)
IDENTIFIERS: SOLAR GENERATORS (M)

LONG-LIFE THERMIONIC CONVERTERS FOR SOLAR POWER SYSTEMS.
EFFORTS ARE DIRECTED TOWARDS INCREASING THE LIFE
CYCLE OF SOLAR THERMIONIC GENERATORS. SPECIALIZED
EQUIPMENT, TECHNIQUES, AND DESIGN DETAILS ARE
PRESENTED.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 294 000

WESTINGHOUSE ELECTRIC CORP BALTIMORE MD

PHOTOEMISSIVE ENERGY CONVERSION APPLIED RESEARCH
PROGRAM

(U)

DEC 62 1V

LIMANSKY, IGOR; WOOD, E. F.; JENSEN, A. S.;

REPT. NO. TDR62 10211183A

CONTRACT: AF33 657 7865

MONITOR: ASD TDR62 1021

UNCLASSIFIED REPORT

DESCRIPTORS: *POWER SUPPLIES, DESIGN, ELECTRIC POWER
PRODUCTION, ENERGY CONVERSION, FEASIBILITY STUDIES,
PHOTOELECTRIC EFFECT, SOLAR RADIATION, THEORY (U)

THE FEASIBILITY WAS STUDIED OF MAKING A CLOSESPACED,
GLASS-SANDWICH PHOTOEMISSIVE SOLAR POWER CONVERTER.
IT WAS NOT POSSIBLE TO MAKE OPERABLE SEALED-OFF
CONVERTERS IN THE LABORATORY DUE TO THE DIFFICULTY OF
SEALING WITHIN A VACUUM SYSTEM AND THE PARTICULAR
CONFIGURATION OF THE DEVICE GIVING A LARGE VALUE OF
SURFACE-TO-VOLUME RATIO. THE REQUIREMENT OF A LOW
WORKFUNCTION SURFACE FOR THE ANODE WAS VERIFIED BY A
TEST INVOLVING CHANGING THE INTERELECTRODE SPACING OF
A CONVERTER IN SITU WITHIN THE PROCESSING SYSTEM.
CONVERTER ACTION WAS OBTAINED WITH A SPACING OVER AN
INCH, BUT DECREASED WITH SPACING. IT WAS NOTED THAT
AT CLOSER SPACINGS THE OUTPUT POWER INCREASES AND THE
INTERNAL RESISTANCE DECREASES. CONSIDERATION OF THE
SUBSEQUENT INVENTION AND DEMONSTRATION OF THE CADMIUM
SULPHIDE SOLAR POWER CONVERTER AT RELATIVELY HIGH
CONVERSION EFFICIENCIES AND IN A THIN, FLEXIBLE,
POLYCRYSTALLINE FILM FORM LEADS TO THE CONCLUSION
THAT THE PHOTOEMISSIVE CONVERTER IS NO LONGER
COMPETITIVE (U)

AD- 299 004

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 288 650

NATIONAL RESEARCH CORP CAMBRIDGE MASS

DEVELOPMENT OF A PHOTOEMISSIVE SOLAR ENERGY CONVERTER

(U)

SEP 62 1V FOWLER, PETER; KOLLER, LEWIS R; SCHRANK,

MARTIN P.;

REPT. NO. TDR62 600

CONTRACT: AF33 616 8145

MONITOR: ASD TDR62 600

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *SATURABLE REACTORS, *SOLAR RADIATION, DIELECTRICS, ETHYLENES, SUN, PHTHALATES, SIMULATION, SOLAR CELLS, SPACE FLIGHT, SUN, WORK FUNCTIONS (U)

DEVELOPMENT OF A PHOTOEMISSIVE SOLAR ENERGY CONVERTER.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 286 578

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

SOLAR BATTERIES OF THE FUTURE

(U)

SEP 62 1V KOLTUN, M.;

REPT. NO. IT 62 972

UNCLASSIFIED REPORT

DESCRIPTORS: *FUEL CELLS, *POWER SUPPLIES, *SOLAR CELLS, *SOLAR RADIATION, INTERMETALLIC COMPOUNDS, PHOTOELECTRIC CELLS (SEMICONDUCTOR), PHOTOTUBES, SILICON (U)

The conversion of helioenergetics into an independent and important technological field is discussed. Outstanding scientists of the world, including Frederic Joliot-Curie, feel that helioenergetics will be put on an equal footing with the study of atomic energy. In this connection scientists await further research. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 285 084

DEPUTY COMMANDER AEROSPACE SYSTEMS INGLEWOOD CALIF

ENERGY CONVERSION RESEARCH PROGRAM. DIRECT CONVERSION
OF CHEMICAL ENERGY TO ELECTRICAL ENERGY (U)

AUG 62 1V HESS, F.D.; MAYER, S.W.;
 REPT. NO. TOR62 164
 CONTRACT: AF04 695 69
 MONITOR: DCAS TOR62 164

UNCLASSIFIED REPORT

DESCRIPTORS: *FUEL CELLS, *POWER SUPPLIES, *SOLAR CELLS,
 ACETAMIDES, ANTIMONY COMPOUNDS, CHLORIDES, CHLORINE,
 DIELECTRIC PROPERTIES, ELECTRIC POTENTIAL,
 ELECTROCHEMISTRY, ELECTRODES, ENERGY CONVERSION, METHYL
 RADICALS, ORGANIC SOLVENTS, OXIDATION, PHOSPHORUS
 COMPOUNDS, REACTION KINETICS, TUNGSTEN COMPOUNDS (U)
 IDENTIFIERS: METHYL RADICALS (M)

Prototype fuel cells were operated employing
 chlorine as oxidant, phosphorus trichloride as fuel,
 and methyl thiocyanate as solvent. Studies were
 made of pyrolytic processes for regeneration of
 reaction products and means of separating products.
 Other systems were investigated by
 chronopotentiometric techniques. Tungsten and
 antimony chlorides were found to have characteristics
 of special interest. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 282 213

GENERAL DYNAMICS SAN DIEGO CALIF GENERAL ATOMIC DIV

FLAT-PLATE SOLAR THERMOELECTRIC CONVERSION
PANELS. (U)

DESCRIPTIVE NOTE: Final rept., Nov 60-Dec 61,
 MAY 62 47P Himle, Arthur N.; Brush,
 Daniel S.;
 REPT. NO. TOR62 214
 CONTRACT: AF33 616 7676
 PROJ: 8173
 MONITOR: ASD TOR62 214

UNCLASSIFIED REPORT

DESCRIPTORS: (*THERMOELECTRICITY), (*POWER SUPPLIES),
 (*SANDWICH PANELS), ALUMINUM, LEAD COMPOUNDS,
 TELLURIDES, ZINC COMPOUNDS, ANTIMONIDES, SOLAR
 ENERGY (U)
 IDENTIFIERS: SOLAR ENERGY, ANTIMONIDES (M)

Procedures were developed for constructing a
 lightweight solar energy converter, using
 thermoelectric materials sandwiched between flat
 sheets of aluminum. Two panels, each one foot
 square, have been delivered to the Flight
 Accessories Laboratory, Aeronautical Systems
 Division. Each panel contains 153 n-type
 PbTe elements and 153 p-type ZnSb elements,
 arranged in eighteen alternating rows of seventeen
 elements each. According to measurements made on
 test panels constructed in a similar fashion, the
 delivered panels are capable of an output of at least
 1.33 w/sq ft when subjected to an incident energy of
 1400 w/sq m, which is equal to the solar energy
 intensity at the Earth's distance from the sun.
 At this output, the solar panel weight 95 pounds
 per electric kilowatt. The observed output is
 lower than is calculated from the properties of the
 materials used; however, it is anticipated that
 improved performance can be obtained in future
 panels. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMQ9

AD- 274 922

GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE
DIV

TEMPERATURE CONTROL TECHNIQUE FOR SOLAR ENERGY
CONVERTERS

(U)

DESCRIPTIVE NOTE: Final rept.

FEB 62 189P BAKER, JOEL K.;

CONTRACT: AF33 616 7889

PROJ: AF-3134

TASK: 60959

MONITOR: ASD TR61 689

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *SOLAR CELLS,
*SOLAR RADIATION, ARSENIDES, COATINGS, GALLIUM
COMPOUNDS, MEASUREMENT, POWER SUPPLIES, SATELLITES
(ARTIFICIAL), SILICON, SPACECRAFT, TEMPERATURE
CONTROL

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOMQ9

AD- 273 551

GOODYEAR AEROSPACE CORP AKRON OHIO

SOLAR ORIENTING DEVICE FOR EXPANDABLE FLAT-PANEL
ARRAY

(U)

JAN 62 1V MCKEEL, G.J.;

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *SOLAR CELLS,
DESIGN, DETECTION, ENERGY CONVERSION, FEASIBILITY
STUDIES, FOCUSING, POWER SUPPLIES, ROTATING STRUCTURES,
SENSITIVITY, SOLAR RADIATION, SUN, TESTS, THERMAL
RADIATION, TRACKING

(U)

IDENTIFIERS: ROTATING STRUCTURES

(M)

The effects of solar declination change on the total angular error of the array and the position for mounting the sun sensor are treated. Curves of total angular error versus declination change for various values of the tracking drive error are presented. An example is outlined for calculating the possible period of unattended operation of the solar orienting device and its array for a particular set of initial conditions which contain a constant declination value. The tracking rate for the array is examined to obtain an insight into some of the important parameters affecting its operation. The requirements for automatic declination control applicable to the solar orienting device were examined, and a feasible approach to the sensor is presented. A circuit diagram illustrates the additional hardware needed for two-axis automatic control. Sensor modification is discussed for the purpose of removing the dead zone which, under certain tracking conditions, can occur. Experimental results gained from the breadboard model of the mount and drive unit are given, and the sun sensor accuracy is also obtained. Photographs of the breadboard mount and sun sensor are included.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 271 829

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

A MOTOR CONNECTED TO THE SUN

FEB 62 1V YEFIMOV, YE.;

REPT. NO. TT 61 399

(U)

UNCLASSIFIED REPORT

DESCRIPTORS: *SOLAR CELLS, ELECTRIC POWER PRODUCTION, ENERGY CONVERSION, POWER SUPPLIES, SOLAR RADIATION, THERMAL RADIATION, THERMOELECTRICITY (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 267 330

TRW INC CLEVELAND OHIO

DESIGN STUDY FOR ADVANCED SOLAR THERMIONIC POWER SYSTEMS. ITEM II. PART I. VAPOR TYPE THERMIONIC GENERATOR

(U)

SEP 60 1V

UNCLASSIFIED REPORT

DESCRIPTORS: *SOLAR CELLS, *THERMIONIC EMISSION, CESIUM, DESIGN, ELECTRIC POWER PRODUCTION, ENERGY CONVERSION, GENERATORS, PLASMA(S)PHYSICS, POWER SUPPLIES, SOLAR RADIATION, THERMIONIC CONVERTERS, THERMOELECTRICITY, VAPORS (U)

A survey of the state of the art of thermionic power generation was carried out as part of a design study for advanced solar thermionic power systems. The results are reported and serve as a basis for the preparation of a detailed design and test specification for two laboratory test models of thermionic generators. Part I of the report pertains to the Vapor Type Thermionic Generator, and Part II (AD-260 066) pertains to the Close-Spaced Vacuum Thermionic Generator. Part I describes the results of a design study on vapor type thermionic converters and establishes the design and test specifications for a laboratory test model Cs thermionic converter. The unit is rated at 28 volts, 250 watts electrical power output and consists of 2 identical Cs converters connected in series. The series combination voltage of 2.8 volts is converted to the specified 28 volts by an 80% efficient d-dc transistorized converter. The gross power output from each Cs converter is 156 watts. (U)

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AD- 264 989

ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF

INVESTIGATION OF SOLAR CONCENTRATING PHOTOVOLTAIC
POWER GENERATORS (U)

MAY 61 1V MCCLELLAND, DONALD H.;
 REPT. NO. 530 1R 1
 CONTRACT: AF33 616 7346
 MONITOR: ASD TR60 849

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *MIRRORS
 *PHOTOELECTRIC CELLS (SEMICONDUCTOR), *PHOTOTUBES,
 *REFLECTORS, *SOLAR CELLS, ANALYSIS, DESIGN,
 ELECTROMAGNETIC PROPERTIES, ERRORS, MATERIALS,
 MATHEMATICAL ANALYSIS, METAL FILMS, OPTICS, PLASTIC
 COATINGS, REFLECTION, SOLAR RADIATION (U)

The results are presented of Phase I of a program to study and evaluate the use of concentration with photovoltaic power generators. The program is divided into 3 parts: (1) Preliminary investigation of all factors relating to the use of concentration with photovoltaic power generators; (2) Technical analysis of photovoltaic power generators in the power range from 500 to 1500 watts; and (3) Design, fabrication, and test of a 50-watt scale model of the 1500 watt power system. It was concluded from the work conducted to date that the use of concentration with photovoltaic power systems has important advantages at the present time and will become even more useful in the near future as better solar cell filters and fabrication techniques are developed.
 (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 264 828

WESTINGHOUSE ELECTRIC CORP BALTIMORE MD

PHOTOEMISSION SOLAR ENERGY CONVERTER (U)

JUL 60 1V
 REPT. NO. 3845 2
 CONTRACT: DA36 039SC85248
 MONITOR: ARPA 80 59

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *SOLAR CELLS,
 DESIGN, ELECTRODES, ELECTRON OPTICS, GENERATORS,
 PHOTOELECTRIC CELLS (SEMICONDUCTOR), PHOTOELECTRIC
 EFFECT, PHOTOTUBES, PROCESSING, SOLAR RADIATION, SPACE
 FLIGHT, TESTS (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 263 905

NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

UNFUELED POWER SUPPLY FOR ISOLATED BASES ON SEA ICE (U)

OCT 61 19P TERRY, C.W.:

REPT. NO. NCEL-TR-163

PROJ: Y-R011-01-031

UNCLASSIFIED REPORT

DESCRIPTORS: *POLAR REGIONS, *POWER SUPPLIES, AIR, ELECTRIC POWER PRODUCTION, FEASIBILITY STUDIES, GENERATORS, ICE ISLANDS, NAVAL SHORE FACILITIES, SEA WATER, SOLAR CELLS, TEMPERATURE, TEST EQUIPMENT, TESTS, THERMOELECTRICITY, WIND (U)

The feasibility of an unfueled power supply for use at isolated bases on sea ice was considered. Three sources of power which do not require fuel were investigated to determine whether their use might be practical: (1) the temperature differential between the water under sea ice and the air above the ice, (2) wind-driven generators, and (3) solar energy cells. A review of theory AND THE RESULTS OF A LABORATORY TEST SHOWED THAT A DEVICE DEPENDING ON TEMPERATURE DIFFERENTIAL IS NOT A PRACTICAL ANSWER BECAUSE OF ICE FORMATION ON THE EVAPORATOR. A literature search showed that windmills have been used satisfactorily under somewhat similar circumstances; it appears that they would give adequate power for at least part of the bases under consideration. The literature search also showed that solar energy cells should operate satisfactorily during the seasons having long hours of sunlight. A further study of these two possibilities is recommended. (Author)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 257 788

ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF

ENERGY CONVERSION SYSTEMS REFERENCE HANDBOOK. VOLUME V. DIRECT SOLAR CONVERSION (U)

SEP 60 1V EVANS, W.: MENETREY, W.R.:

REPT. NO. 390 F V5

CONTRACT: AF33 616 6791

UNCLASSIFIED REPORT

DESCRIPTORS: *HANDBOOKS, *PHOTOELECTRIC CELLS (SEMICONDUCTOR), *PHOTOELECTRIC EFFECT, *PHOTOTUBES, *POWER SUPPLIES, *SOLAR CELLS, *SOLAR RADIATION, CONFIGURATION, COOLING, CRATERING, DESIGN, DIRECT CURRENT, EFFECTIVENESS, ELECTROMAGNETIC RADIATION, ENERGY CONVERSION, GENERATORS, GEOMETRY, MATERIALS, METEORITES, MIRRORS, PLASMA (PHYSICS), PRODUCTION, SPACE ENVIRONMENTS, SPACE FLIGHT, TEMPERATURE CONTROL, THEORY, VAN ALLEN RADIATION BELT (U)

The performance characteristics are described of the photovoltaic converter when used to convert solar radiation directly to dc electrical energy.

Empirical and analytical relationships are derived which present expected efficiencies of conversion as a function of temperature, solar insolation.

*Photoelectric cells, plasma physics, Electro magnetic waves, Theory, Materials, Cratering, Configuration, Production, Open-ended Terms:

Energy conversion. The performance characteristics are described of the photovoltaic converter when used to convert solar radiation directly to dc electrical energy. Empirical and analytical relationships are derived which present expected efficiencies of conversion as a function of temperature, solar insolation, and other factors. The effects of environmental degradation due to meteoroids and the Van Allen belts are discussed. The present and anticipated state-of-the-art of fabrication techniques is presented, along with the advantages of using concentrating mechanisms for increasing the solar illumination level. A discussion is also included describing the state of the art and practical and theoretical limitations of the photo-emissive generator. It does not appear at present that the photo-emissive generator offers competition to the photovoltaic cell. (Author)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 257 495

TECHNICAL OPERATIONS INC BURLINGTON MASS

RESEARCH DETECTED TOWARD THE IMPROVEMENT OF THE
EFFICIENCY OF SILICON BATTERIES BY UTILIZATION OF
UNABSORBED PHOTONS (U)

MAY 61 1V
REPT. NO. 861 24
CONTRACT: AF19 604 7306
MONITOR: AFCL 475

UNCLASSIFIED REPORT

DESCRIPTORS: *POWER SUPPLIES, *SILICON, *SOLAR CELLS,
ABSORPTION, COATINGS, DYES, EFFECTIVENESS, INFRARED
RADIATION, INSTRUMENTATION, PHOSPHORESCENT MATERIALS,
PHOTOGRAPHIC CHEMICALS, PHOTONS, REFLECTION,
SENSITIVITY, SOLAR RADIATION, SURFACES, TEST METHODS, (U)
ULTRAVIOLET RADIATION

Attempts were made to increase the power output of
Si solar cells by sensitizing the cells to those
regions in which they do not respond, (UV and IR)
and by increasing the absorption and efficiency of
the cells in the spectral regions in which they do
respond. Three methods were studied: (1)
coating the cell surface with phosphors which absorb
in the UV and blue region and fluoresced in the
region of response of the solar cell (0.45 to 1.0
microns) and with dye energy-transfer agents;
(2) applying antireflection coatings to the cell
surface for the region of response; and ()
applying dye sensitizers for the IR region.
Adsorption and response of Si solar cells was
optimized by industry in the region 0.45 to 1.0
angstroms. Sensitization of the cells by phosphors
in the UV region is feasible but the intensity of
fluorescence required to drive the cell appears to be
greater than that easily achieved by surface coating.
Neither sensitization by chemical sensitizers in
the UV region nor by dye sensitization in the IR
region appears to be possible. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 256 973

ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF

ENERGY CONVERSION SYSTEMS REFERENCE HANDBOOK. VOLUME
II, SOLAR-THERMAL ENERGY SOURCES (U)

SEP 60 1V
REPT. NO. 390 F V2
CONTRACT: AF33 616 6791

UNCLASSIFIED REPORT

DESCRIPTORS: *HANDBOOKS, *POWER SUPPLIES, *SOLAR
RADIATION, ABSORPTION, COATINGS, COLLECTING METHODS,
CONFIGURATION, DESIGN, ENERGY CONVERSION, HEAT, LENSES,
MATERIALS, MIRRORS, OPTICAL EQUIPMENT, OPTICAL
MATERIALS, PROCESSING, REFLECTORS, SATELLITES
(ARTIFICIAL), SPACE ENVIRONMENTS, SPACE FLIGHT,
SPACECRAFT, STORAGE, TESTS, THERMOCHEMISTRY (U)

Basic problems in the development of lightweight,
high efficiency, solar concentrating mirrors for
space power systems are discussed. Various
concentrator and absorber configurations are compared
both on the basis of idealized performance and in
regard to performance degradation due to geometric
errors. Concentrator structural design
classifications are presented and are related to
fabrication techniques, materials, and reflective
surfacing methods. Orientation requirements and the
effects of the space environment are considered.
Tests are presented for determining collector
performance and for evaluating mirror surface
quality. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD- 256 748
ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF

SEP 60 1V
REPT. NO. 390 F
CONTRACT: AF33 616 6791

UNCLASSIFIED REPORT

DESCRIPTORS: *HANDBOOKS, *POWER SUPPLIES, *SOLAR CELLS,
*SOLAR RADIATION, *THERMIONIC EMISSION,
*THERMOELECTRICITY, COSTS, DESIGN, ELECTROCHEMISTRY,
ENERGY CONVERSION, GENERATORS, HEAT ENGINES,
PHOTOELECTRIC CELLS (SEMICONDUCTOR), PHOTOTUBES,
RELIABILITY, SATELLITES (ARTIFICIAL), SPACE
ENVIRONMENTS, SPACE FLIGHT, SPACECRAFT, STORAGE
BATTERIES, THEORY, THERMOCOUPLES, TURBINES (U)

A summary is given of the anticipated performance of solar power systems over the next decade. This summary is based upon the analytical and empirical relationships describing component performance. Weight, cost, and reliability estimates are presented for photovoltaic power systems, and weight estimates are given for solar-thermal systems. Thermal converters include thermoelectric discs, thermionic emitters, turbo-generators, and the Stirling engine. (Author) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09
AD- 255 609
ASSISTANT CHIEF OF STAFF FOR INTELLIGENCE (ARMY)
WASHINGTON D C

OPTIC IN INSTALLATIONS FOR THE UTILIZATION OF SOLAR ENERGY (U)

DEC 59 1V
REPT. NO. H 4787
VEYNBERG,V.B.:

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *OPTICAL EQUIPMENT, *SOLAR RADIATION, HEAT EXCHANGERS, LENSES, POWER, REFLECTORS, SOLAR FURNACES, THERMAL RADIATION (U)

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AD- 255 389

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

A SPLINTER OF THE SUN

NOV 60 1V NABIULLIN, F.:

UNCLASSIFIED REPORT

(U)

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *SOLAR CELLS,
*SOLAR RADIATION, ENERGY, SILICON, SUN (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 101 783

MARSHAW CHEMICAL CO CLEVELAND OHIO

A CADMIUM SULFIDE SOLAR ENERGY GENERATOR

(U)

JUN 56 1V HAMMOND, DAVID A.: SHIRLAND, FRED A.:
CONTRACT: AF33 613 2E82
MONITOR: ASD TR-56-57

UNCLASSIFIED REPORT

DESCRIPTORS: *GENERATORS, *SOLAR RADIATION, CADMIUM
COMPOUNDS, CRYSTALS, GROWTH (PHYSIOLOGY), SULFIDES (M)

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AD- 101 783

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 99 917

HARSHAW CHEMICAL CO CLEVELAND OHIO

CADMIUM SULFIDE SOLAR GENERATOR

(U)

DESCRIPTIVE NOTE: Quarterly progress report, no. 4, 1 July-1 Oct 55.

OCT 55 212 HARVARD, DAVID A.

CONTRACT: AF33 616 2682

UNCLASSIFIED REPORT

DESCRIPTORS: *CADMIUM COMPOUNDS, *POWER SUPPLIES, CRYSTALS, GROWTH (PHYSIOLOGY), SOLAR RADIATION, SULFIDES

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 69 093

HARSHAW CHEMICAL CO CLEVELAND OHIO

CADMIUM SULFIDE SOLAR GENERATOR

(U)

DESCRIPTIVE NOTE: Progress report, no. 23

JUL 55 169 HARVARD, DAVID A.

CONTRACT: AF33 616 2682

PROD: TAT-1401

UNCLASSIFIED REPORT

DESCRIPTORS: *GENERATORS, *SOLAR RADIATION, CADMIUM COMPOUNDS, CRYSTALS, SULFIDES

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 66 783
HARSHAW CHEMICAL CO CLEVELAND OHIO

CADMIUM SULFIDE SOLAR GENERATOR (U)

DESCRIPTIVE NOTE: Quarterly progress rept. no. 2, 1 Jan-
1 Apr 55.
APR 55 9P HAMMOND, DAVID A.;
CONTRACT: AF33 616 2682

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR CELLS), (*CADMIUM SULFIDES),
(*GENERATOR), ELECTRIC POWER PRODUCTION, SOLAR
RADIATION, MANUFACTURING (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. ZOM09

AD- 53 603
HARSHAW CHEMICAL CO CLEVELAND OHIO

CADMIUM SULFIDE SOLAR GENERATOR (U)

JAN 55 1V HAMMOND, DAVID A.;
CONTRACT: AF33 616 2682

UNCLASSIFIED REPORT

DESCRIPTORS: *GENERATORS, *PHOTOELECTRIC CELLS
(SEMICONDUCTOR), *THERMOELECTRICITY, CADMIUM COMPOUNDS,
CRYSTALS, GROWTH(PHYSIOLOGY), NUCLEATION, SOLAR CELLS,
SOLAR RADIATION, SULFIDES (U)

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