PUBLICATIONS OF THE JPL SOLAR THERMAL SYSTEMS PROJECT 1976 TO 1983

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Jet Propulsion Laboratory
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The bibliographical listings in this publication are documentation products associated with the solar thermal power system project carried out by the Jet Propulsion Laboratory from 1976 to 1983. Documents listed are categorized as conference and journal papers, JPL external reports, JPL internal reports, or contractor reports. Alphabetical listings by title were used in the bibliography itself to facilitate location of the document by subject. Two indexes are included for ease of reference: one, an author index; the other, a topical index.

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ABSTRACT

The bibliographical listings in this publication are documentation products associated with the Solar Thermal Power Systems Project carried out by the Jet Propulsion Laboratory from 1976 to 1983.

Documents listed herein are categorized as conference and journal papers, JPL external reports, JPL internal reports, or contractor reports (i.e., deliverable documents produced under contract to JPL). Alphabetical listings by title were used in the bibliography itself to facilitate location of the document by subject. Two indexes are included for ease of reference: one, an author index; the other, a topical index.
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The Solar Thermal Power Systems Project Office and Leuann Burrus of the Solar Data Library provided valuable assistance in locating documents for this bibliography. Appreciation is also expressed to Leonard Jaffe who prepared the Topical Index and to Justine Weiher and Arlene Rush of the JPL Document Review Group who helped prepare the Contractor Report Section.

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SECTION I
INTRODUCTION

In 1976 the Jet Propulsion Laboratory (JPL) was given responsibility for solar thermal parabolic dish technology development by the Energy Research and Development Administration (predecessor agency to the current U.S. Department of Energy). Initial comparative assessment studies conducted by the JPL Solar Thermal Power Systems (TPS) Project showed that, in addition to central receivers, distributed receivers, such as dishes having power conversion units at their focal points, had potential for cost-effective production of electricity.

This Bibliography of JPL-related efforts in solar thermal parabolic dish/dish-electric technology development is a comprehensive list of reports published by JPL or its contractors during the time period from 1976 through 1983. It was assembled to help facilitate an orderly transition of work on this technology from JPL to Sandia National Laboratories-Albuquerque (SNLA) during 1984. Compilation of the listings was made through reference to records kept by the TPS Project and the JPL library and through a survey of documents used as sources for TPS work. Material was also contributed by individuals who had been involved in the TPS Project during the eight-year period.

An objective in assembling the Bibliography was to include those publications deemed most central to the work of the project and those for which complete reference background is available. Not included are status reports which were prepared periodically for specific events and would be less useful from a technological perspective. The Bibliography, which covers the full range of the TPS effort from the standpoints of time, subject matter, and participants, is divided into six parts:

(1) Conference and Journal Papers
(2) External Reports
(3) Internal Reports
(4) Contractor Reports
(5) Author Index
(6) Topical Index

Papers in the first four areas are arranged alphabetically by title to aid in identification of subject material. The Topical Index provides more specific guidance for locating a particular area in which the TPS Project was involved. The majority of the publications are included in a library of JPL documents managed by the DOE Solar Thermal Division's Technical Program Integrator's Office at Sandia National Laboratories in Livermore, California. Copies of external publications listed can be obtained from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161.

An update of this Bibliography, which will include TPS reports and papers published during 1984, is planned for issuance before the end of the calendar year.
SECTION II

CONFERENCE AND JOURNAL PAPERS

Advanced Development - Fuels, K. Ramohalli, Parabolic Dish Solar Thermal
Annual Program Review, Pasadena, California, January 1981.

Advanced Receiver Technology, A.A. Kudirka, Fourth DOE Advanced Solar Thermal

Advanced Solar Thermal Receiver Technology, A.A. Kudirka and L.P. Leibowitz,
American Institute of Aeronautics and Astronautics Aerospace Sciences
Meeting, Pasadena, California, January 1980.

Advanced Solar Thermal Technology for Process Applications, L. Leibowitz,
E. Hanseth, and T. Liu, American Institute of Chemical Engineers Winter

Advanced Solar Thermal Technology: Potential and Progress, L.P. Leibowitz and
E. Hanseth, 14th Intersociety Energy Conversion Engineering Conference,
Boston, Massachusetts, August 1979.

Aging Characteristics of Glass Mirrors for Solar Thermal Power Applications,
F. Bouquet, American Physical Society, Youngstown, Ohio, May 1980; "Journal
of Non-Crystalline Solids," Vol. 40, 1980; Fifth University Conference on

A Graphical Method for the Prediction of Annual Performance of Solar
Energy Society Solar World Congress, Perth, Western Australia, August 1983.

A Nomogram for Determining Efficiency and Useful Heat of a Parabolic Dish,

Application of a Reversible Chemical Reaction System to Solar Thermal Power
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Mechanical Engineers Solar Energy Conference, San Francisco, California,
August 1980.

A Simulation Exercise of a Cavity-Type Solar Receiver Using the JPL-HEAP
Program, F. Lansing, 14th Intersociety Energy Conversion Engineering
Conference, Boston, Massachusetts, August 1979.

Assessment of Ceramic Technology for Solar Thermal Energy Systems, M. Adams,

Barriers and Incentives to the Innovation of Small Solar Thermal Electric
Power Systems: A Commercialization Perspective for R&D Management,
Section Annual Meeting, Denver, Colorado, August 1978.


Dynamics and Control of Stirling Engines in a 15-kWe Solar Electric Generation Concept, R.L. Das and K.A. Bahrami, 14th Intersociety Energy Conversion Engineering Conference, Boston, Massachusetts, August 1979; American Chemical Society, 1979.


Efficiency Degradation Due to Tracking Errors for Point-Focusing Solar Collectors, R.O. Hughes, American Society of Mechanical Engineers Winter Annual Meeting, San Francisco, California, December 1978.


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The Sun Tracking Control of Solar Collectors Using High-Performance Step Motors, R.O. Hughes, Energy Research and Development Administration (Now DOE) Conference on Concentrating Solar Collectors, Atlanta, Georgia, September 1977.


DOE/JPL-1060-9, JPL Publication 79-43.

Application of Field-Modulated Generator Systems to Dispersed Solar Thermal
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DOE/JPL-1060-25, JPL Publication 79-83.

Cost and Price Estimate of Brayton and Stirling Engines in Selected Production
Publication 80-42.

Cost/Performance of Solar Reflective Surfaces for Parabolic Dish
Concentrators, F. Bouquet, July 15, 1980, DOE/JPL-1060-40, JPL
Publication 81-2.

Criteria for Evaluation of Reflective Surfaces for Parabolic Dish
Concentrators, F. Bouquet, July 15, 1980, DOE/JPL-1060-39, JPL
Publication 80-81.

Decision Analysis for Evaluating and Ranking Small Solar Thermal Power System
Technologies, Vol. I - A Brief Introduction to Multi-Attribute Decision
Analysis, Vol. II - The Criteria and Methodology for Evaluation and Ranking,

Dish Concentrators for Solar Thermal Energy: Status and Technology
Publication 81-43.

Dish Stirling Solar Receiver Combustor Test Program, C.P. Bankston, L.H. Back,

Effects of Regional Insolation Differences Upon Advanced Solar Thermal
Electric Power Plant Performance and Energy Costs (The), A.F. Latta, et al,

Electrochemical Energy Storage Systems for Solar Thermal Applications,
S. Krauthamer, H. Frank, March 1, 1980, DOE/JPL-1060-30 Rev. 1, JPL
Publication 79-95.

Evaluation of Cellular Glasses for Solar Mirror Panel Applications, M. Giovan,

Evaluation of the Effects of a Freeze/Thaw Environment on Cellular Glass,

Focus on Solar Technology - A Review of Advanced Solar Thermal Power Systems,

Fracture Mechanics of Cellular Glass, J.G. Zwissler, M.A. Adams,
DOE/JPL-1060-42, JPL Publication 81-16.


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Advanced Solar Thermal Technology: Potential and Progress, L. Leibowitz,
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Advanced Technology Development - Semiannual Progress Report, June 1978,
5102-67.

Aging Characteristics of Mirrors for Solar Energy Application, F.L. Bouquet,
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Analytical Foundations/Computer Model for Dish-Brayton Power System,

An Overview of Power Plant Options for the First Small Power System
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A Survey of Solar Thermal Energy Systems Manufacturers, Summary Results,

Assessment of Ceramic Technology For Solar Thermal Energy Systems, March 15,
1982, 5105-104.

Assessment and Planning for the Commercialization of Small Solar Thermal

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Brief Review of Increasing Geometric Concentration Ratio Vs. Improving
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5102-63.

Ceramic Technology for Solar Thermal Receivers, A. Kudirka, R. Smoak,
September 1, 1982, 5105-120.

Chemical Energy Storage Systems Screening and Preliminary Selection,

Comparison of Advanced Thermal and Electrical Storage for Parabolic Dish Solar

Computer Model for Pricing of Thermal Power Systems Engines for Annual
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*Copy not available

Heat and Electricity from the Sun Using Parabolic Dish Collector Systems, V.C. Truscello, August 9, 1979, 5105-2.


Methodology to Establish Goals for ERDA Solar Thermal Technology Development Programs, R.S. Caputo, June 21, 1977, 5102-40.


Parabolic Dish Program: The 1980 Multi-Year Plan - Preliminary, May 12, 1980, 5105-4 Rev. A.


Point Focusing Distributed Receiver R&D Test Facility, March 31, 1977, TR/TPS D/C 008, 7A000(SE).

*Copy not available


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Solar Ponds for Power Generation, J. Biddle, September 1, 1979, 5102-100.


Systems Requirements for Power Plant Small Community Solar Thermal Power Experiment 1, March 9, 1983, 5105-96 Rev. A.

Systems Requirements for Power Plant Small Community Solar Thermal Power Experiment 2, March 9, 1983, 5105-123.


Thermal Storage Applications Workshop, Volume I - Plenary Session Analysis, Volume II - Contributed Papers, February 15, 1978, 5102-78


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Dynamics and Control of Stirling Engines in a 15-kWe Solar Electric Generation Concept, (C/J).


Bloomfield, H.S., Solar/Fossil Hybrid Systems Program Plan for Retrofit and New Hybrid Configurations, (I).


Dish PRDA: Engineering Experiments Selection, (I).


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Criteria for Evaluation of Reflective Surfaces for Parabolic Dish Concentrators, (E).

Evaluation of Solar Reflective Surfaces for Dish Concentrators, (C/J).

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Measurements of Coefficients of Thermal Expansion for High Temperature Polymers, (C/J).


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Configuration Selection Study for Isolated Loads Using Parabolic Dish Modules, (C/J).

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Optical Performance of Several Point-Focusing Solar Concentrators, (C/J).


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Hughes, R.O., Effects of Pointing Errors on Receiver Performance for Parabolic Dish Solar Concentrators, (C/J).

Efficiency Degradation Due to Tracking Errors for Point-Focusing Solar Collectors, (C/J).

Optimal Control of Sun Tracking Solar Concentrators, (C/J).

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The Sun Tracking Control of Solar Collectors Using High-Performance Step Motors, (C/J).


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Economic Feasibility of Small Solar Thermal Power Systems, (I)


Advanced Solar Thermal Technology - Potential and Progress, (C/J), (I).

High Temperature Solar Thermal Technology, (C/J).


Levin, R.R., The JPL Isolated Application Experiment Series, (C/J).


Ceramic Technology for Solar Thermal Receivers, (I).


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Presentation of Solar Thermal Power Systems Project - Energy Options for Industrial Users and Suppliers, (I).

Presentation to Solar Thermal Energy Division of the Solar Energy Industries Association (SEIA), (I).


Solar Thermal Power Systems Point-Focusing Distributed Receiver (PFDR) Technology: A Project Description, (C/J).

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Poon, P., Comparative Study of Solar Optics for Paraboloidal Concentrators, (C/J).

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Optical Performance of a Fresnel-Type Concentrator with Truncated Paraboloidal Facets, (C/J).

Optical Performance of Several Point-Focusing Solar Concentrators, (C/J).


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