



Part 1 of 4

April 1993

Conference Proceeding

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.



PHILLIPS LABORATORY
Directorate of Space and Missiles Technology
AIR FORCE MATERIEL COMMAND
KIRTLAND AIR FORCE BASE, NM 87117-5776

PL-CP--93-1001

This final report was prepared by the Phillips Laboratory, Kirtland Air Force Base, New Mexico, under Job Order 11050502. The Laboratory Project Officer-in-Charge was Marko M. Stoyanof (VTPT).


When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely Government-related procurement, the United States Government incurs no responsibility or any obligation whatsoever. The fact that the Government may have formulated or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication, or otherwise in any manner construed, as licensing the holder, or any other person or corporation; or as conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

This report has been authored by employees and contractors of the United States Government and Foreign Governments. Accordingly, the United States Government retains a nonexclusive royalty-free license to publish or reproduce the material contained herein, or allow others to do so, for the United States Government purposes.

This report has been reviewed by the Public Affairs Office and is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nationals.

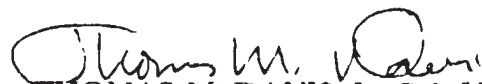
If your address has changed, or if your organization no longer employs the addressee, please notify PL/VTPT, Kirtland AFB, NM 87117-5776 to help maintain a current mailing list.

This conference proceeding has been reviewed and is approved for publication.


MARKO M. STOYANOF
Project Officer

FOR THE COMMANDER


ROBERT M. VACEK, GM-14, DAF
Chief, Thermal Management Br


THOMAS M. DAVIS, Lt Col, USAF
Acting Director of Space & Missile
Technology

DO NOT RETURN COPIES OF THIS REPORT UNLESS CONTRACTUAL OBLIGATIONS OR NOTICE ON A SPECIFIC DOCUMENT REQUIRES THAT IT BE RETURNED.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302 and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE April 1993	3. REPORT TYPE AND DATES COVERED 17-19 Nov 92, Conference Proceeding
----------------------------------	-------------------------------------	--

4. TITLE AND SUBTITLE 7th International Cryocooler Conference Part 1 of 4	5. FUNDING NUMBERS PE: 62601F PR: 1105 TA: 05 WU: 02
6. AUTHOR(S) Several authors	

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Phillips Laboratory Kirtland AFB, NM 87117-5776	8. PERFORMING ORGANIZATION REPORT NUMBER PL-CP--93-1001
--	---

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSORING / MONITORING AGENCY REPORT NUMBER
---	--

11. SUPPLEMENTARY NOTES
Publication of this report does not constitute approval or disapproval of the ideas or findings. It is published in the interest of scientific and technical information exchange. The established procedures for editing reports were not followed for this report

12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release: distribution is unlimited.	12b. DISTRIBUTION CODE
--	------------------------

13. ABSTRACT (Maximum 200 words)

The 7th International Cryocooler Conference was held in Santa Fe, New Mexico, on 17-19 November, 1992. Jiri L. Ludwigsen of Nichols Research was the conference chairperson; Capt William Wyche and Marko Stoyanof of Phillips Laboratory served as the program committee chairmen.

The topics included Cryocooler Testing and Modeling, Space and Long Life Applications, Stirling Cryocoolers, Pulse Tube Refrigerators, Novel Concepts and Component Development, Low Temperature Regenerator Development, and J-T and Absorption Coolers.

14. SUBJECT TERMS Absorption, Cryocoolers, Cryogenic, Low Temperature Heat Exchanger, Pulse Tube Refrigerators, Regenerative, Recuperative, Stirling, Thermal Modeling	15. NUMBER OF PAGES 320
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT SAR
--	---	--	--

Chairman

Jill Ludwigsen
Nichols Research Corporation
2201 Buena Vista, S.E. #203
Albuquerque, NM 87106
(505) 843-7364

Program Committee

Capt. Bill Wyche, Co-Chairman
Marko Stoyanof, Co-Chairman
Air Force Phillips Laboratory
Ronald White, WRDC/FIVE
Dodd Stacy, Creare
Ron Ross, Jet Propulsion Lab
Al Johnson, Aerospace Corp.
Peter Gifford, Cryomech

Local Arrangements

Peter Jones, Aerospace Corp.

Advisory Board

John Barclay University of Victoria	Joseph Smith MIT
Stephen Castles NASA/GSFC	Michael Superczynski DTRC
Ray Radebaugh NIST	Klaus Timmerhaus University of Colorado
Hiroshi Nagano Toyama University, Japan	Paul Sheihing DOE
Ralph Longsworth APD Cryogenics	Peter Kerney Janis Research
Martin Nisenoff NRL	George Robinson Nichols Research Corp.
Martin Nisenoff NRL	George Robinson Nichols Research Corp.

FOREWORD

This report contains the proceedings of the Seventh International Cryocooler Conference, held in Santa Fe, New Mexico, on 17-19 November, 1992. Jill L. Ludwigsen of Nichols Research was the conference chairperson; Capt William Wyche and Marko Stoyanof of Phillips Laboratory served as the program committee chairmen.

The first cryocooler conference held in 1980 was designed to stimulate interest and discussion in the scientific and engineering community about the latest developments and advances in refrigeration for cryogenic sensors and electronic systems. The conference is held every even numbered year and this year over 300 participants attended representing 11 countries.

The technical program consisted of over 100 unrestricted oral and poster presentations. The topics included Cryocooler Testing and Modeling, Space and Long Life Applications, Stirling Cryocoolers, Pulse Tube Refrigerators, Novel Concepts and Component Development, Low Temperature Regenerator Development, and J-T and Absorption Coolers. The proceedings show significant progress in the field of cryocooler technology.

ACKNOWLEDGEMENTS

The Seventh International Cryocooler Conference Board would like to thank the Air Force Phillips Laboratory for sponsoring the conference and publishing these proceedings. The generous supply of manpower and dedication contributed by Phillips Laboratory was key to the success of the 1992 conference.

The Conference Chairperson would like to express her appreciation to Nichols Research Corporation for providing the support, assets and time required for this effort.