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TR-968

TRANSducers: LIST OF CURRENT
STATE-OF-THE-ART PROJECTS

Joseph Pearlstein

10 August 1961



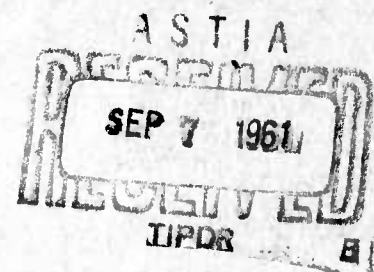
DIAMOND ORDNANCE FUZE LABORATORIES
ORDNANCE CORPS • DEPARTMENT OF THE ARMY

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WASHINGTON 25, D. C.**

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The Diamond Ordnance Fuze Laboratories is a research, development, and engineering installation under the jurisdiction of the Chief of Ordnance.

The Diamond Ordnance Fuze Laboratories was established by the Ordnance Corps, Department of the Army, on 27 September 1953. The nucleus for these Laboratories was the personnel and facilities of the Ordnance Divisions of the National Bureau of Standards.

Typical fields of activity at the Diamond Ordnance Fuze Laboratories include electronics, physics, mechanics, chemistry, and applied mathematics. Examples of topics under these activities are radiation and field studies, circuit devices, chemical problems, and special electron tube design. The programs include all phases from basic research to product design.

The mission of the Laboratories is to:

1. Conduct research and development in the various physical science and engineering fields directed toward meeting the military characteristics for fuzes and related items.
2. Provide consulting and liaison services as required in connection with the development, production, and use of items developed in the laboratories, or of related items.
3. Fabricate models and prototypes of items under development at the laboratories.
4. Perform developmental testing, including destructive testing of prototypes.
5. Serve as principal Nuclear Radiation Effects Research Group to investigate and determine susceptibility of Ordnance electronic materiel to nuclear weapons radiation environment, mechanisms of those effects, and ways and means of developing less susceptible materiel.
6. Maintain and operate for OCO a special library of technical and progress reports, prepared by Army, Navy, Air Force, and their contractors.
7. Perform the Industrial Engineering Support Mission for all proximity fuze items.
8. Administer the Department of the Army Regional Training Center for the District of Columbia, Virginia, and Maryland region.

DIAMOND ORDNANCE FUZE LABORATORIES
ORDNANCE CORPS **WASHINGTON 25, D. C.**

DOFL Report No. TR-968

OMS Code 5010.11.82600

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DA-5B97-01-005

10 August 1961

TRANSDUCERS: LIST OF CURRENT STATE-OF-THE-ART PROJECTS

by

Joseph Pearlstein

FOR THE COMMANDER:

Approved by

I. Rotkin

I. Rotkin
Chief, Laboratory 300



CONTENTS

	<u>Page</u>
ABSTRACT	5
1. INTRODUCTION	5
2. LIST OF PROJECTS	6
3. APPENDIX	13
DISTRIBUTION	15-19

ABSTRACT

A list is presented of current research and development projects on transducers and related systems compiled by the Aeronautical Systems Division, Wright Patterson Air Force Base.

1. INTRODUCTION

This report presents a list of current research and development projects on transducers and related systems compiled by the Aeronautical Systems Division, Wright Patterson Air Force Base. This information was obtained at the Second Transducer Users Workshop held at Holloman Air Force Base, New Mexico on 25 and 26 July 1961. The Workshop is sponsored by the Telemetry Working Group (TWG) of the Inter-Range Instrumentation Group (IRIG).

Approval for dissemination of this list to Department of Defense installations was given by Mr. Paul Polishuk, ASD, WPAFB. Mr. Polishuk is chairman of the TWG Transducer Committee.

Requests for further information on these projects should be addressed to the individuals or organizations listed.

This is one of a series of reports that have been issued in conformance with the requirements of an Ordnance Corps project established at DOFL for the dissemination of information in the "transducer or phenomena areas of direct interest to the Ordnance Corps."

A list of reports that have been issued under the Ordnance Corps Transducer Project at DOFL is given in the appendix.

2. LIST OF PROJECTS

ACCELERATION

"High Temperature, Radiation Resistant Accelerometer Development"
AF 33(600)-39507, Giannini Controls Corporation
Project Engineer: Lt. W. Imfeld (WWDPFC) ASD

"Accelerometer, High Accuracy"
No project number, Palomar Scientific Corporation
Project Engineer: NI *

"Window Accelerometer, Self Switching"
No contract number, Palomar Scientific Corporation
Project Engineer: NI

"Accelerometer, Servo-Balanced Dual Output"
No project number, Palomar Scientific Corporation
Project Engineer: NI

"Rotating Pendulum Accelerometer"
S. Schalkowsky and H. F. Blazek
ARS Journal Vol 31 No. 4 April 1961

CALIBRATION, TESTING, & INSTRUMENTATION TECHNIQUES

"Telemetry Transducer Calibration and Testing Techniques Development"
AF 33(616)60-12, NBS
Project Engineer: P. Polishuk (ASRMCE-1) ASD
L. Bosim, BUWEPS
G. Wright, White Sands

"High Temperature Photoelectric Techniques"
Nobsr 77556, Westinghouse
Project Engineer: Mrs. F. Darne

"Flight Data Instrumentation Techniques for Advanced Military Aerospace Vehicles"
AF 33(616)-7289, Bell Aerosystems Company
Project Engineer: R. E. Guth (ASRMCE-1) ASD

"Control Data System Technology for Advanced Military Aerospace Vehicles"
AF 33(616)-6579, Litton Industries, Inc.
Project Engineer: R. E. Guth (ASRMCE-1) ASD

* Not Identified

DIGITAL TECHNIQUES

"Digital Code for Mechanized Exchange"
AF 33(616)-8053, Telecomputing Corporation
Project Engineer: W. G. James (ASRMCE-1) ASD

"Digital Transducer Research Program"
NADC-ED-6029, 14 Dec 1960
J. R. Wullert
TED PROJECT ADC-RS-7045

Mr. A. L. deGraffenried, "The Elvis Module - A High Reliability Analog and Digital Display Device" 7th Aero-Space Instrumentation Symposium, April 30 - May 4, 1961.

Mr. A. Zuehlke - Bournes, Inc., "Aero-Space Transducer Reliability Considerations", 7th Aero-Space Instrumentation Symposium, April 30-May 4, 1961

Mr. L. R. Burrow - Electronics Division, General Dynamics, "Vibration Analysis", 7th Aero-Space Instrumentation Symposium, April 30-May 4, 1961

Mr. Maseland D. Blaurelt - Eclipse Pioneer Division, The Bendix Corporation, Teterboro, New Jersey, "Stabilized Synchro - to Digital Converter", IRE International Convention, March 20-23, 1961, no. 40.4

DISPLACEMENT

"High Temperature Displacement Transducers"
Company Sponsored, G. L. Collins Corporation
Project Engineer: NI

"Dynamic Displacement Meter"
No project number, Palomar Scientific Corporation
Project Engineer: NI

FLOW

"Hydrogen Mass Flowmeter System Development"
No contract number, Aerojet-General Corporation
Project Engineer: A. Belcher (FTRFD) AFFTC

"Heat Flowmeter"
Company Sponsored, RdF Corporation
Project Engineer: A. Johnson

"Q-1000 PFM Fuel Flowmeter System"
AF 33(600)-39905, General Electric Company
Project Engineer: CWO Fels (ASDPFC) ASD

"System Mass Flowmeter with Digital Output"
AF 33(600)-41430, Gulton Industries, Inc.
Project Engineer: CWO Fels (WWDDFC) ASD

"Measurement of Mass Flow of $H_2(1)$ "
Cont: TRACER LAB, NASA
Sponsor: Mr. David Novick
1528 H. Street
Washington 25, D. C.

"Development of $H_2(1)$ Mass Flowmeters"
NA58-1326
WYLE LABS

William D. Jackson - Research Laboratory of Electronics and
Department of Electronic Engineering, MIT, Cambridge, Massachusetts,
"Calibration of Electromagnetic Flowmeters", IRE International
Convention, March 20-23, 1961, Session 47.1

PRESSURE

"Product Improvement Program, Transmitter System, Pressure Oil and
Data"
AF 33(600)-41806, Edison Research Laboratory
Project Engineer: J. Thompson (WWDPFC-2) ASD

"Radiation Resistant Pressure Transmitter"
AF 33(600)-40324, Edison Research Laboratory
Project Engineer: H. Snowball (ASRMCE-1) ASD

"Product Improvement of the Edison Pressure Indicator and Pressure
Transmitter"
AF 33(600)-37435, Edison Industries
Project Engineer: CWO Fels (WWDPFC) ASD

"Torque Pressure Measuring System, Servo Type"
AF 33(600)-41413, Bendix Corporation
Project Engineer: CWO Fels (ASDPFC) ASD

"Develop Differential Pressure Transmitters for High Line Pressures"
No contract number, International Resistance Company
Project Engineer: W. B. Pegram

"Develop Unique Telemetering Pressure Transducer"
No contract number, International Resistance Company
Project Engineer: J. Chass

"Discrepancies and Causes of Errors in Bayard - Alpert and Cold
Cathode Gauges"
AF 33(616)-6526, University of Nevada
Project Engineer: W. E. Rosa (ASRMCE-1) ASD

"A New Kind of Vacuum Gauge"
AF 33(616)-6526, University of Nevada
Project Engineer: R. E. Guth (ASRMCE-1) ASD

James W. Ballard - Systems Research Laboratories, "A Ceramic Diode Pressure Transducer for Use at High Temperature", Electronic Technology in the Aerospace Age, May 8-10, 1961.

Heinz Schmidt - John Oster Manufacturing Co, Inc., "Force Balance Transducer with a Frequency Output," Electronic Technology in the Aero-Space Age, May 8-10, 1961

REENTRY CONTROL

"Using Temperature Derived Data for Obtaining Flight Control Parameters"
AF 33(616)-7816, Avco Manufacturing Company
Project Engineer: R. E. Guth (ASRMCE-1) ASD

"Reactor Core Temperature Measurement"
L. H. Shinault and T. F. McGrath
Rocketdyne Division of North American
ARS Journal Vol 31 No. 6 June 1961, pp 799-802

STRESS & STRAIN

"Develop Semi-Conductor Strain Gage Pressure Transducer"
No contract number, International Resistance Company
Project Engineer: NI

C. E. Land - Sandia Corporation, Albuquerque, New Mexico, "A Ferrite Piezomagnetic Stress Transducer", IRE International Convention, March 20-23, 1961, Session 54.1

TEMPERATURE IN RADIATION ENVIRONMENTS

"High Temperature, Radiation Resistant Temperature Probe Development"
AF 33(600)-40684, Cook Electric Company
Project Engineer: John Long (WWDFFC) ASD

"High Temperature, Radiation Resistant Temperature Amplifier Development"
AF 33(600)-38141, Systems Research Laboratories
Project Engineer: John Long (ASRMCE-1) ASD

VELOCITY

"High Temperature, Nuclear Radiation Resistant, Tachometer System"
AF 33(600)-40291, American Machine and Foundry Company
Project Engineer: NI

"Velocity Sensing Based on Determining Propagation Time of Disturbance in Shock Wave"

AF 33(616)-7764, Giannini Controls

Project Engineer: R. E. Guth (ASRMCE-1) ASD

"HydraKinetic Rate Sensor"

AF 33(616)-7880, Lear, Inc.

Project Engineer: A. DeThomas (ASRMCE-1) ASD

"Rate Sensing Techniques Using Vibrational Energy"

AF 33(616)-8010, Westinghouse Electric Corporation

Project Engineer: W. G. James (ASRMCE-1) ASD

F. R. Dickey, Jr., - Electronic Equipment and Systems Laboratory, General Electric Company, Syracuse, New York, "Velocity Sensing for Soft Lunar Landing by Correlation between Spaced Microwave Receivers." IRE International Convention, March 20-23, 1961, Session 15.1

VIBRATION

"Development of Vibration Apparatus"

IPR SP-5-61-4, NBS

Project Engineer: J. B. Mahan, ASD

MISCELLANEOUS

"Miniature Radiometer"

Company Sponsored, RdF Corporation

Project Engineer: A. Johnson

"High Temperature Zone Box"

Company Sponsored, RdF Corporation

Project Engineer: W. A. Flagg

"Tungsten Sensor"

Company Sponsored, RdF Corporation

Project Engineer: W. A. Flagg

"Investigation of Microwave Reflection Techniques for Air Data Measurements at Hypersonic Velocities"

AF 33(616)-7764, Giannini Control Corporation

Project Engineer: R. E. Guth (ASRMCE-1) ASD

"Design and Construction of Six Solid-State Optical Devices Called 'The Photopot'"

N123-(60530)24912A, Giannini Control Corporation

Project Engineer: J. Ruhge (Code 304)

"Altitude Measurements Independent of Ground Tracking Facilities"

AF 33(616)8147, Westinghouse

Project Engineer: R. E. Guth (ASRMCE-1) ASD

"UVICON Tube" (Image tube)
PO28222, Westinghouse Research Laboratories
Project Engineer: R. Davis, ASD

"Accurate Signal Devices with Improved Accuracy"
AF 33(600)-39801, Sperry Gyroscope Company
Project Engineer: Lt. W. Imfeld (WWDFFC) ASD

"Synchro Transmitter - High Temperature Radiation Resistant"
AF 33(600)-40637, Clifton Precision Products
Project Engineer: John Long (ASDPFC) ASD

"Nuclear Irradiation and High Temperature Testing of Flight &
Engine Instruments"
AF 33(616)-7226, Admiral Corporation
Project Engineer: V. G. Smalley (ASRMCE-1) ASD

"Environmentally Adapted Single Stage Intensifier"
AF 33(600)-39403, Westinghouse
Project Engineer: M. St. John (WWTNET) ASD

"Astracon Tube" (Light Image Intensifier)
DA-44-009-ENG-4531, Westinghouse
Project Engineer: Myron Klein, ASD

"Storage Transducer Tube"
AF 33(616)-6422, Westinghouse
Project Engineer: M. St. John

"Solid State Transducers"
Company Sponsored, G. L. Collins Corporation
Project Engineer: NI

"Magna-Ducer Magnetic/Resistance Transducer"
Clark Electronic Labs, (No contract number)
Project Engineer: D. B. Clark

"Verify Radiation High Temperature Resistance of Specially Modified
Transducers"
AF 33(616)-7266, Admiral Corporation
Project Engineer: V. G. Smalley (ASRMCE-1) ASD

"Radiometric Vertical Sensing Technique"
AF 33(616)-6606, Collins Radio Company
Project Engineer: W. G. James (ASRMCE01) ASD

"Fluid Sphere Gyro"
AF 33(616)-7756, Sperry Gyroscope Company
Project Engineer: A. DeThomas (ASRMCE-1) ASD

J. Q. Rice, Jr., - Central Research Laboratories, Texas Instruments,
Inc., Dallas, Texas, "Metastable Helium Sensitive Magnetometer",
IRE International Convention, March 20-23, 1961, Session 54.2

3. APPENDIX

List of DOFL Transducer Reports & Technical Memoranda

(Projects 30330 and 30331)

TR-752, A Transducer Information Program for Ordnance, J. Pearlstein,
1 October 1959 (AD 227969)*

TR-753, Searching the Literature of Transducer Information Part I.
A Guide to the Literature, J. Pearlstein, 15 October 1959 (AD 228743)

R-300-60-1, Summary of Telemetry Transducer Symposium Sponsored by
the Telemetry Working Group of the Inter-Range Instrumentation Group
on 15 and 16 February 1960, J. Pearlstein **

TR-836, Measurement of Displacement, Velocity, and Acceleration:
Bibliography with Abstracts and Index, J. Pearlstein, 22 August 1960
(AD 243420)

TR-887, Bibliography of NBS Reports on Performance of Telemetry
Transducers and Calibration Methods, J. Pearlstein, 12 October 1960
(AD 248534)

TR-888, Notes on the Relationship of Temperature & Resistance, J.
Pearlstein, 1 December 1960 (AD 248392)

TR-898, Searching the Literature for Transducer Information Part II.
A Survey of the Field, J. Pearlstein, 1 December 1960 (AD 249131)

TR-727, Chemical Transducers, Proposed Program, R. H. Comyn,
28 May 1959

TR-814, A Guide to Selection and Use of Dynamic Pressure Transducers,
A. Hausner, September 1959 (AD 233007)

TR-857, Accelerometer Measurements and Projectile Parameters,
H. J. Rosenberg, 17 November 1960 (AD 248339)

TM-61-29, Visit to Redstone Arsenal Regarding DOFL Transducer **
Program, J. Pearlstein, 9, 10, 11 May 1961

TM-61-33, Visit to Springfield Armory Regarding DOFL Ordnance **
Transducer Program, J. Pearlstein, 24 May 1961

TM-61-34, Visit to Ballistic Research Laboratories Regarding DOFL
Transducer Program, J. Pearlstein, 1 June 1961 **

* Numbers in parentheses are ASTIA document numbers. Reference to
these numbers will facilitate the procurement of the report from
ASTIA.

** Internal Distribution

TR-869, Strong Shock Waves in "Polled" Barium Titanate Ceramic Elements, P. S. Brody, 20 October 1960

TR-917, Dielectric Constant of Barium Titanate at 100-Kilobars, P. S. Brody and R. H. Wittekindt, 15 March 1961

TR-968, Transducers: List of Current State-of-the-Art Projects, Joseph Pearlstein, 10 August 1961

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TR-968, 10 Aug 1961, 19 pp text			TR-968, 10 Aug 1961, 19 pp text		
DA-5B97-01-005; OMS 5010.11.82600			DA-5B97-01-005; OMS 5010.11.82600		
DOFL Proj 30300; UNCLASSIFIED Report			DOFL Proj 30300; UNCLASSIFIED Report		
A list is presented of current research and development projects on transducers and related systems compiled by the Aeronautical Systems Division, Wright Patterson Air Force Base.			A list is presented of current research and development projects on transducers and related systems compiled by the Aeronautical Systems Division, Wright Patterson Air Force Base.		
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DA-5B97-01-005; OMS 5010.11.82600		Projects
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