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KNOTT BUILDING, DAYTON, 2, OHIO

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LOW PRESSURES RESEARCH  
College Avenue Pool

April 14, 1952

1978

Director  
Office of Naval Research  
Branch Office  
1000 Geary Street  
San Francisco 9, California

MONTHLY STATUS REPORT - MARCH 1952

Contract N7-onr-295-Task 3  
Project Number NR 061-003

Dear Sir:

Progress on the contract for the month of March has been as follows:

1. A preliminary measurement of the direct molecular beam indicates that a strong beam has been produced. Various improvements resulting from observations made during the short tube flow investigation have materially improved this equipment. A programming device which will control the cycle of measurements during the reflection experiments has been fabricated and is now being installed.
2. A series of tests were made in the No. 3 Wind Tunnel to determine the influence of various mounting support systems on the base pressure of a cone-cylinder model. Further runs will be made in April.
3. The preliminary performance evaluation of the semi-adjustable diffuser in the No. 3 Wind Tunnel is awaiting completion of the base pressure investigation.
4. Further tests of nozzle No. 5 in the No. 2 Wind Tunnel are under way to give additional data needed for the design of a similar nozzle for the No. 3 Wind Tunnel.
5. Bench tests of the flexure pivots and force element are continuing. The design of the three component balance has been completed. Further drafting and shop work is being delayed awaiting the results of the bench tests.
6. Fabrication of the  $M = 4.0$  (ideal) axi-symmetrical nozzle is again under way.
7. The following reports were completed in March:

HR-150-89: "Viscosity Correction to Impact Pressure on Prolate Spheroid"  
by D. C. Ipsen.

Abstract: The influence of viscosity on the pressure at the forward stagnation point on a prolate spheroid is estimated analytically. Potential flow, Stokes flow, and Oseen flow are utilized in turn to approximate the viscous term of the Navier-Stokes equation for the stagnation streamline. The approximations so obtained establish a basis for estimating the viscosity corrections to the stagnation pressure at any Reynolds number. The effects of slip and compressibility are not considered. The results provide a possible indication of the viscous effect on a source-shaped impact probe at low Reynolds number.

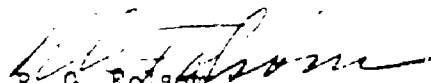
HE-150-97: "Design and Performance of an Adjustable Two-Dimensional Nozzle with Boundary Layer Correction" by G. H. Becker.

Abstract: The design and evaluation of a two-dimensional adjustable throat nozzle is described. The nozzle was designed to produce an ideal Mach number of 3.106 at a static jet pressure of 85 microns Hg. Experimental values of the Mach number and static pressure were 3.07 and 93 microns Hg respectively. A shock-free uniform stream of approximately 0.3 inches square was secured over a limited Mach number range.

8. Visitors: The following persons visited the project during the month:

|                      |   |                                                                              |
|----------------------|---|------------------------------------------------------------------------------|
| J. J. Bartolotta     | - | Sverdrup & Parcel, Syndicate Trust Bldg.,<br>St. Louis, Missouri             |
| Prof. I. Estermann   | - | Code 419, O.N.R., Washington, D. C.                                          |
| Prof. Newman A. Hall | - | Institute of Technology, Univ. of Minn.                                      |
| Prof. H. Emmons      | - | Harvard University, Cambridge, Mass.                                         |
| Sir G. I. Taylor     | - | Cambridge University, England                                                |
| John F. Sherborne    | - | Union Oil Research Center, Brea, Calif.                                      |
| Robert E. Loeck      | - | Calif. Research & Development Company<br>200 Bush St., San Francisco, Calif. |

Very truly yours,

  
R. G. Folsom  
Faculty Investigation

RGF/bp

cc • ONR SF (1), ONR WASH. (5)  
Colonel F. Seiler, AMC WASH. (2)  
Lieut-Col. J.H. Clayton, Hdqts. USAF WASH. (1)  
Capt. N.E. Nelson, Los Angeles Eng. Field Stn.  
(1)

Dr. Morton Alperin, Western  
Regional Office, Hdqts. ARDC,  
55 S. Grand Ave., Pasadena,  
Calif. (1)  
Fluid Mechanics Branch, Office  
of Scientific Research Research  
& Development Command, P.O. Box  
1000, Baltimore, Maryland

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