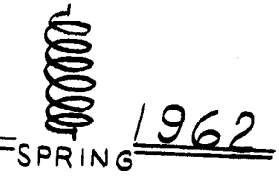
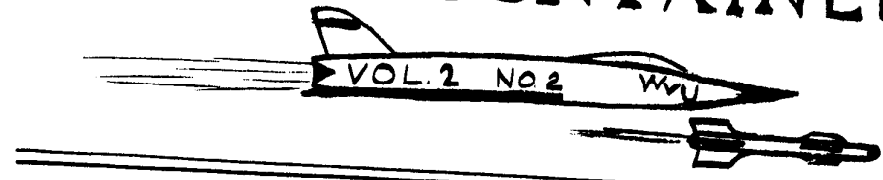


# THE MOUNTAINEER MISSILE



Morgantown, West Virginia

A newsletter for graduates of the West Virginia University Aero-Space Engineering Department prepared by the members of Sigma Gamma Tau, Aeronautical Engineering Honorary. The purpose of this letter is to keep Alumni of the Department informed of the Department's development and of the news of their classmates.

Dear Aero-Space Alumni,

You will note as you read this issue of The Mountaineer Missile that a considerable amount of space deals with graduate research. I believe that this is a prelude to the future when more of the departmental effort will be concerned with this type of activity. The addition of Roland Anderson to the staff will make it possible for us to devote more time to the development of the graduate program and to creative research endeavors.

There are many demands being made on all engineering departments to include more fundamentals in the form of basic and engineering sciences, and also to broaden the curricula with additional liberal arts courses. If the program is to be maintained at four years' duration, the additional material must replace some professional Aero-Space Engineering courses. The reason for the current accent on graduate study is obvious.

A strong graduate program requires an adequate financial aid program in the form of fellowships or research assistantships, adequate staff, facilities and equipment. At present, we do have good physical facilities. I hope that, as time goes on, I can report improvement in our position with regard to the other three ingredients.

Sincerely,

*L. Z. Seltzer*  
L. Z. Seltzer

## GRADUATE RESEARCH IN THE AERO-SPACE DEPARTMENT

### Investigation of Glass-Reinforced Plastic Cylinders Subjected to Torsion and Bending.

This graduate project involves the testing of glass-reinforced plastics (GRP) in torsion and bending. The cylinders were fabricated from a pre-impregnated GRP material. This is a two-phase material consisting of a uni-directional glass filaments and epoxy resin. The material used in this project is known as Hi-Mod, and was supplied by the Houze Glass Company, of Point Marion, Pennsylvania.

The cylindrical test specimens were constructed with a number of different fiber orientations to establish the best tube construction for pure torsion and pure bending loadings. The experimental results will be compared with similar experiments performed on metal cylinders.

An apparatus for testing the cylinders was designed by Neil Jubeck, and was constructed in the Aero-Space Engineering shop. The test rig can apply pure bending, pure torsion, or a combination of torsion and bending loads to the test specimens. The test rig has a loading capacity of 200,000 inch-pounds in torque or bending.

Professor B. H. Ulrich, Jr., is Mr. Jubeck's thesis advisor.

Preliminary Gas Dynamic Analysis of a Nuclear Rocket System with a Wave Super Heater.

Mr. George Saad, of Lebanon, has completed his Master's thesis, "Preliminary Gas Dynamic Analysis of a Nuclear Rocket System with a Wave Super Heater". Mr. Saad attended Robert College, Istanbul, Turkey, where he received a Bachelor of Science degree, with a major in Mechanical Engineering.

The wave superheater is a device which uses shock waves generated by high pressure gas to heat low temperature gas. This thesis considers the use of this device to circumvent the temperature limitations of a nuclear reactor and thereby increase the specific impulse of nuclear powered rockets. The wave super heater is a temperature multiplier. This analysis is also applicable when a solar mirror is the energy source.

A cycle in which hydrogen is first used as the high pressure gas and then as the low pressure gas is not feasible. However, a cycle in which a condensable gas, such as steam, is used as the high pressure gas, then condensed and re-used, gave a definite improvement with either hydrogen or water as the low pressure gas. Whether this improvement is sufficient to justify the additional weight and complexity of the superheater cycle can only be determined by detailed mission analysis.

Professor William Squire is Mr. Saad's thesis advisor.

The Ball is Rolling

Presently performing intense research on the characteristics of the airflow when a sphere is undergoing rotational motion in an axial airstream is Richard E. Walters, full-time instructor in the Department of Aero-Space Engineering.

Mr. Walters was graduated from West Virginia University in 1956, when he received his Bachelor's degree in Aeronautical Engineering. During the summer following graduation, "Dick" was employed

by the Bell Aircraft Corporation, of Buffalo, New York, as an aerodynamacist. He was "employed" as a First Lieutenant in the United States Air Force from November, 1956, until July, 1959, as a test project engineer at the Air Proving Ground Center (ARDC), Eglin AFB, Florida. Since the end of his assignment with the USAF, Mr. Walters has been with this department working towards his M. S. degree. Consultants for this project are Professor L. Z. Seltzer, Professor and Chairman, Department of Aero-Space Engineering, and James T. Anderson, Professor and Chairman, Department of Mechanical Engineering.

The majority of the present research will be experimental. Problems to be investigated are the boundary layer characteristics and velocity and pressure gradients of the sphere at free stream velocities from 5 to 200 fps, at ratios of the sphere tangential velocity to the free stream velocity from 0 to 2.0. The experiment has been designed so that it can easily yield itself to the study of heat transfer characteristics under the before mentioned conditions.

SIGMA GAMMA TAU PINPOINTS WVU AERO-SPACE GRADUATES

Sigma Gamma Tau has constructed a map of the United States which locates the alumni of Aero-Space Engineering. Each alumni is located by a numbered pin which is coded to an information card file.

The idea for the map was conceived last year, and the map was completed the first semester of this year. The map and card file will be kept up to date. The map now shows 120 alumni in twenty-three states. It is displayed in the Aero-Space Engineering office.

ROLAND C. ANDERSON TO JOIN DEPARTMENT

Roland C. Anderson will join the Aero-Space Department this summer as

Instructor of Aero-Space Engineering. At the present time, he is employed as an instructor at the University of Florida.

Mr. Anderson received his Master of Science degree at the University of Florida, in August, 1961, with a major in Aero-Space Engineering and a minor in math and physics. Mr. Anderson's thesis for his Master of Science degree was entitled, A Study of Shape Changes of Wing Shaped Models by Ablation at Supersonic Speeds in an Incompressible Fluid.

Mr. Anderson has been employed for two summers with the Martin Company in Orlando, Florida. He has also written a paper entitled, Stability of Ground Effect Vehicles, which was presented at the IAS student conference in Atlanta, Georgia, and was published in the Florida Engineer.

Mr. Anderson is twenty-six years old, married, and has one child. He will be involved with the operation and research activities of the supersonic wind tunnel.

PROFESSOR SELTZER HEADS PANEL DISCUSSION  
ON ENGINEERING EDUCATION

A panel discussion was conducted on the topic of Engineering Education at the Hotel Astor in New York on January 24, 1962. Those on the panel included Professor L. Z. Seltzer, Chairman; W. H. Arata, Jr., of Fairchild Stratots; Harold T. Luskin, of Lockheed Missiles and Space Company; Dr. John T. Hagen, Associate Director of NASA, Office of Plans and Program Evaluation; and Dr. L. F. Doty, of Martin Marietta Company.

Each member presented a brief talk, and questions were directed to the panel from the audience.

Professor Seltzer led the discussion by asking three questions: "Is there a branch of Engineering that can be classified as Aero-Space Engineering? Is there a need for Aero-Space Engineers? If the answer to the first two of the questions is in the affirmative, what should be included in this Aero-Space Engineering curriculum?"

The general consensus was mixed; however, most agreed that there is a specific field that encompasses Aero-Space Engineering, there is a definite need for Aero-Space Engineers, and Aero-Space Engineering no longer depends alone on fundamental engineering sciences. Aero-Space Engineering also embraces the physical sciences, life sciences, and social sciences.

Other topics, such as "degree competition" versus "A real desire to learn", attracting more women into Aero-Space Engineering, and inserting more humanity and English courses into the Aero-Space curriculum, were also discussed.

SIGMA GAMMA TAU SPONSORS CONTEST

Sigma Gamma Tau plans to sponsor a contest for the best paper written by students in the Aero-Space Engineering department. The papers will be presented at local I. A. S. meetings. The best three papers will receive prizes. The first prize is \$25.00, the second prize is \$15.00, and the third prize is \$10.00.

A combination of A. I. E. E. and I. A. S. rules will be used in judging the papers. Authors of winning papers will be encouraged to present them at regional I. A. S. meetings. It is hoped that an organization can be found to sponsor this program and contribute prize money.

SIGMA GAMMA TAU SELECTS NEW MEMBERS

Five students have been selected for membership in Sigma Gamma Tau, Aero-Space Engineering Honorary. Initiation and banquet were held on April 14, at the Old Mill Inn.

Initiates are Jerry Jester, of New Cumberland, James Land, of Clarksburg, Don Cunard, of Wheeling, Charles Stricklin, of Triadelphia, and Gary Jones, of Sutton.

DR. NORTHUP ADDRESSES I. A. S.

Dr. David Northup, Chairman of the Physiological Department of West Virginia University, gave an interesting talk on aerospace medicine at the March meeting of I. A. S.

Dr. Northup discussed some of the topics covered at Air Force sponsored lectures held in San Antonio, Texas, in January of this year.

Dr. Northup discussed the hazards produced by high intensity sounds of large rockets, the probable long-term effects of zero gravity, and the logistics problems associated with a lunar landing.

Charles Rupert Bartlett '54  
The Martin Company  
Orlando, Fla.

William Robert Barton '52  
1842 Propps, N. E.  
Albuquerque, N. M.

Richard Claude Beall '59  
504 Warren St.  
Cumberland, Md.

Donald Lee Bellia '59  
Dept. of Theoretical and  
Applied Mechanics  
West Virginia University  
Morgantown, W. Va.

Joann Berry (Mrs. Nicholas Mazzio) '48  
Webster Springs, W. Va.

I. A. S. ELECTS NEW OFFICERS

The West Virginia Student Branch of I. A. S. elected new officers for 1962. The newly elected officers are James Hess, of Morgantown, Chairman; Richard Stalnakar, of St. Albans, Vice-Chairman; Gary Jones, of Sutton, Secretary; and John Snoderly, of Fairmont, Treasurer.

Bernard C. Boggs '51  
51 Cherry Drive  
Springfield, Ohio

Charles Adams Boitnott '61  
Associate Engineer  
Convair  
San Deigo, Calif.

Ray Borst '59  
Box 2231  
Madison 5, Wis.

GRADUATES OF THE DEPARTMENT AND THEIR PRESENT ADDRESSES A-Ch

David E. Anderson '54  
3515 S. 27th St.  
Omaha 5, Neb.

John Orr Ashbaugh, Jr. '61  
Associate Engineer  
Convair Astronautics  
San Diego, Calif.

J. R. Atchison '59  
WDDDFC  
Wright Air Development Div.  
Fairborn, Ohio

Curtiss Gebert Barrett '61  
Box 71  
Culloden, W. Va.

Darius Nelson Brant '61  
1064 Van Voorhis Road  
Morgantown, W. Va.

Donald Gannon Brown '56  
The Boeing Company  
P. O. Box 3707  
Seattle 24, Washington

Richard B. Cady '58  
2340 Harvard St.  
Palo Alto, Calif.

Ernest D. Casseday '60  
306-1/2 Riverview Ave.  
Westover, W. Va.

Lu-Chung Chang '61  
223 Madison St., Apt. 6  
New York 2, N. Y.