No. NGR 33-016-167 Supplement Number 2
To New York University
For: Numerical Design of Transonic Shockless Airfoils
Under the direction of Dr. Paul R. Garabedian
For a period of approximately ten (10) months beginning about November 1, 1972

The NASA Technical Officer for this grant is:
Jerry C. South, Jr.
Theoretical Aerodynamics Section
(Office)
(703) 827-2561
Grant (Phone)

Mr. Donald H. Carson, Telephone (703) 827-3214

This grant is awarded to support basic scientific research pursuant to the authority to make such grants as set forth in P.L. 85-934 (72 Stat. 1793; 42 U.S.C. 1891-1893); and will be administered in accordance with the "NASA Provisions for Research Grants" attached hereto and incorporated herein and in conformity with other written understandings between NASA and the Grantee relating to this grant.

The United States Of America
By Frank V. Moore
Grants Officer

Acceptance

By (Signature) (Date)

(National Aeronautics & Space Administration)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Langley Research Center, Hampton, Virginia

Hereby Awards Research Grant

In the amount of $ 70,000

New York, New York 10012

(Name of Institution)

(Address)

Prior Funding $205,000
Current Funding 70,000
Total Funding $275,000

Theoretical Aerodynamics Section

Office)

(Office)

(703) 827-2561

(Title)

(Institution)

Acceptance

By (Signature) (Date)

(Frank V. Moore
Grants Officer

The United States Of America

By (Signature) (Date)

(Title)

(Institution)

NATIONAL AERONAUTICS & SPACE ADMINISTRATION

NASA FORM 1463 FEB 71 PREVIOUS EDITION MAY BE USED.

ACCOUNTING DATA: PR: 33.100.569; REH-663; 760-64-01-81-00; 3004; 2511; $50,000 (Complete)

RLH-370; 501-22-04-84-00; 3004; 2511; $20,000 (Complete)
NASA PROVISIONS FOR RESEARCH GRANTS

The National Aeronautics and Space Administration makes grants for scientific research relevant to its objectives. NASA's grant authority is limited by statute to the support of basic scientific research at nonprofit institutions of higher education or at nonprofit organizations whose primary purpose is the conduct of scientific research.

Technical Reports and Publications

Publication to accomplish widest practicable and appropriate dissemination of research results is encouraged at any time during the course of the investigation. Examples of appropriate media for such dissemination are the learned journals, the proceedings of professional groups and NASA scientific and technical publications. NASA grantees may elect to publish the results of their work by whichever media they feel most appropriate. Publications and reports prepared under a grant should contain a statement which properly sets forth NASA's responsibility for the material; unless otherwise specified, this will consist of acknowledgment of NASA support and identification of the grant by number.

When results obtained under a grant are to be published in a technical journal, or in transactions or proceedings of a technical meeting, three copies of a preprint or manuscript of each such publication shall be provided to NASA prior to submission for publication, and three copies of a reprint shall be provided promptly after publication. Prior approval for publication is not required unless security classification is involved or the grant contains special conditions pertinent to publication of results.

Material submitted for publication by NASA in a formal NASA report series must comply with the highest practicable standards of excellence. It shall be provided initially in three draft copies. Upon agency review and approval, reproducible copy shall be submitted in the style and format specified by NASA. If the grantee wishes NASA to consider such publication, a specific request to this effect should accompany the draft copies.

Five copies of a brief, informal Semi-Annual Status Report including a concise statement of the research accomplished during the report period shall be submitted. This is a minimum requirement and grantees are urged to submit interim reports (or to publish in the open literature) whenever the research has reached a point where it is logical to summarize the results, a research phase has been completed, or whenever significant new findings are made. (See paragraph 204 (a) (v) of the NASA Grant Handbook.)

Upon completion of the research, the Grantee shall submit five copies of a Final Technical Report which summarizes the results of the entire project.

The status and final reports must be identified as such and may consist in whole or in part of references to and abstracts of published material resulting from the grant. All reports, including preprints, reprints, manuscripts and repro copy, shall be submitted to:

NASA Scientific and Technical Information Facility
P. O. Box 33
College Park, Maryland 20740

Extension of Grants

It is NASA policy to provide maximum possible continuity in funding of grant-supported research, and grants may be extended for additional periods of time. Any extension requiring additional funding must be supported by an unsolicited proposal submitted at least four months in advance of the expiration date of the grant. The period of performance shown in the grant document is approximate, but extension for more than 30 days must be requested by application to the Grants Officer and approved in writing.

When a grant is step funded, NASA will, if circumstances permit, make available additional funding to extend the period for an additional year, preserving a similar pattern of step funding. The step funding is based on unsolicited proposals received prior to the completion of each year of full support. NASA shall be the sole judge of whether circumstances will permit this increase. This statement of policy should not be taken as a commitment by NASA.

Unsolicited proposals referenced in this section will be submitted to:

National Aeronautics and Space Administration
Proposal Control Officer
Office of University Affairs (Code Y)
Washington, D.C. 20546

Revocation

It is a condition of each grant that it may be revoked in whole or in part by NASA after consultation with the Grantee. In the event of revocation, the Grantee shall refund to NASA any unexpended funds that it has received under the grant, except such portion thereof as may be required by the Grantee to meet commitments which had in the judgment of NASA become firm prior to the effective date of revocation and are otherwise appropriate.

Travel

Domestic travel is an appropriate charge to research grants, and prior authorization for specific trips is not required. Foreign travel must be clearly essential to the research effort and must, to be charged against a grant, have the prior approval of the Grants Officer regardless of its inclusion in the approved proposal budget.

Allowable Costs

NASA Grant Handbook, Exhibit B, is the basic guidance document in determining the allowability of costs chargeable to research sponsored by NASA under grants.

Accounting Records

The Grantee shall maintain books and accounting records, in accordance with the principles enunciated in Exhibit B of the NASA Grant Handbook, in a manner sufficient to reflect properly all direct and indirect costs incurred or anticipated as a result of commitments made during the period of the grant.
All accounting records relating to costs under NASA grants are subject to inspection and audit by representatives of NASA and the General Accounting Office during the period of performance and for three years thereafter.

**Payment**

NASA Form 1031, “Grantee Quarterly Cash Requirement Report” shall be submitted quarterly. Funds are made available on the basis of the quarterly estimates shown on the Form 1031, either by Treasury Department check or under the Treasury Department Letter of Credit System.

Funds received by the Grantee and not committed prior to the conclusion of the research or within 30 days next following the terminal date of the Grant shall be considered excess payments and shall be refunded by check made payable to the National Aeronautics and Space Administration or in accordance with instructions provided by the NASA Grants Officer.

**Equipment**

NASA research grants permit acquisition of technical equipment required for the conduct of research. Title to equipment purchased with grant funds shall vest in the Grantee unless otherwise provided. The Grantee shall maintain property records in accordance with generally accepted property accounting procedures. Acquisition of equipment costing in excess of $2,000 and not included in the approved proposal budget requires the prior approval of the NASA Grants Officer unless such equipment is merely a different model of an item shown in the approved proposal budget.

NASA grant funds shall not be used to purchase furniture, furnishings, office equipment or other items of a nontechnical nature; exceptions to this require prior approval of NASA Grants Officer and must be fully justified as essential to the research under the grant. The Government reserves the right to require transfer to it of title to items purchased at a cost in excess of $1,000. This right may be exercised at any time, but no later than 180 days after receipt of the final equipment inventory report. Any charges for packing, crating and shipping which may be involved in such transfers will be at the expense of the Government.

Title to Government Furnished Equipment (including excess personal property) will remain with the Government. Such property will be maintained in accordance with NASA Grant Handbook, Exhibit C.

Final equipment inventory reports covering purchased items in excess of $1,000 and Government furnished equipment will be forwarded to the NASA Grants Officer within 30 days following the terminal date of the grant.

**Property Rights in Inventions**

This grant and all subcontracts issued thereunder are subject to Section 305 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2457) relating to property rights in inventions. The term “invention” includes any invention, discovery, improvement, or innovation. Any invention made in the performance of work under this grant or any subcontract issued thereunder shall be presumed to have been made under the conditions of and subject to Section 305(a) of the Act and becomes the exclusive property of the United States subject, however, to the retention by the grantee or subcontractor of a royalty free license to practice the invention prescribed by 14 C.F.R. 1245.209. The grantee or applicable subcontractor may petition for waiver of title to the invention in accordance with the NASA Patent Waiver Regulations (14 C.F.R. 1245 Subpart 1).

The Grantee shall furnish to NASA a written report containing full and complete technical information concerning any invention made in the performance of any work under this grant promptly upon the making of such invention and shall require all subcontractors to do so. Upon written request by NASA, the grantee shall furnish additional information available to him, and shall secure the execution of such documents as may be necessary to enable the Administrator, NASA, to file and prosecute patent applications on any such invention. Upon completion of the work under this grant, the grantee shall furnish to NASA a report as to whether or not any inventions of the type referred to herein have been made in the performance of such work.

**Rights in Data**

The grantee grants to the Government, for Governmental purposes, the right to publish, translate, reproduce, deliver, use and dispose of, and to authorize others to do so, all data, including reports, drawings, blueprints, and technical information resulting from the performance of work under this grant.

**Security**

Normally, NASA research grants do not involve classified defense information. However, if information is sought or developed by the grantee that should be classified in the interests of national security, the NASA Grants Officer that issued the grant shall be notified immediately.

**Civil Rights**

Work on NASA grants is subject to the provisions of the Civil Rights Act of 1964, and the NASA implementing regulations (14 CFR 1250).

**Safety**

The Grantee shall act responsibly in matters of safety and shall take all reasonable safety measures in performing under this grant. The Grantee shall comply with all applicable federal, state, and local laws relating to safety. The Grantee shall maintain a record of, and will notify the NASA Grants Officer of any accident involving death, disabling injury or substantial loss of property. The Grantee will advise NASA of hazards that come to its attention as a result of the work under the grant; reporting thereon through routine status reports furnished in compliance with the grant.

Where the work under this grant involves flight hardware, the hazardous aspects, if any, of such hardware will be identified, in writing, by the Grantee. Compliance with the provisions of this clause by subcontractors shall be the responsibility of the Grantee.

**Subcontracts**

Approval of subcontracts for the purchase of equipment under this research grant shall be obtained in accordance with the provision herein entitled “Equipment.” All other subcontracts not provided for in the approved proposal budget require the prior consent of the Grants Officer.
The "Property Rights in Inventions" clause on Page 4 is deleted and the following clause is substituted in lieu thereof:

**Property Rights in Inventions**

a. This grant and all subcontracts issued thereunder are subject to Section 305 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2457) relating to property rights in inventions. The term "invention" includes any invention, discovery, improvement, or innovation. Any invention made in the performance of work under this grant or any subcontract issued thereunder shall be presumed to have been made under the conditions of and subject to Section 305(a) of the Act and becomes the exclusive property of the United States subject, however, to the retention by the grantee or subcontractor of a royalty-free license to practice the invention pursuant to, and of the scope defined in, 14 C.F.R. 1245.204(a). This license may be revoked under the conditions set forth in 14 C.F.R. 1245.211(b)(c). The grantee or applicable subcontractor may petition for waiver of title to the invention in accordance with the NASA Patent Waiver Regulations (14 C.F.R. 1245, Subpart I).

b. The grantee shall furnish to NASA a written report containing full and complete technical information concerning any invention made in the performance of any work under this grant promptly upon the making of such invention and shall require all subcontractors to do so. Upon written request by NASA, the grantee shall furnish additional information available to him, and shall secure the execution of such documents as may be necessary to enable the Administrator, NASA, to file and prosecute patent applications on any such invention. Upon completion of the work under this grant, the grantee shall furnish to NASA a report as to whether or not any inventions of the type referred to herein have been made in the performance of such work.
(a) If an institution of higher education determines, after affording notice and opportunity for hearing to an individual attending, or employed by, such institution, that such individual has been convicted by any court of record of any crime which was committed after November 18, 1969 and which involved the use of (or assistance to others in the use of) force, disruption, or the seizure of property under control of any institution of higher education to prevent officials or students in such institution from engaging in their duties or pursuing their studies, and that such crime was of a serious nature and contributed to a substantial disruption of the administration of the institution with respect to which such crime was committed, then the institution which such individual attends, or is employed by, shall deny for a period of two years any further payment to, or for the direct benefit of, such individual under any of the programs authorized by the National Aeronautics and Space Act of 1958. If an institution denies an individual assistance under the authority of this clause, then any institution which such individual subsequently attends shall deny for the remainder of the two-year period any further payment to, or for the direct benefit of, such individual under any of the programs authorized by the National Aeronautics and Space Act of 1958.

(b) If an institution of higher education determines, after affording notice and opportunity for hearing to an individual attending, or employed by, such institution, that such individual has willfully refused to obey a lawful regulation or order of such institution after November 18, 1969 and that such refusal was of a serious nature and contributed to a substantial disruption of the administration of such institution, then such institution shall deny, for a period of two years, any further payment to, or for the direct benefit of, such individual under any of the programs authorized by the National Aeronautics and Space Act of 1958.

(c) Nothing in this clause shall be construed to prohibit any institution of higher education from refusing to award, continue, or extend any financial assistance to any individual because of any misconduct which in its judgment bears adversely on his fitness for such assistance.

(d) Nothing in this clause shall be construed as limiting or prejudicing the rights and prerogatives of any institution of higher education to institute and carry out an independent, disciplinary proceeding pursuant to existing authority, practice, and law.

(e) Nothing in this clause shall be construed to limit the freedom of any student to verbal expression of individual views or opinions.
The following Special Conditions are applicable to this Grant:

1. The Grantee shall submit NASA Form 1031, "Grantee Quarterly Cash Requirement Report" to NASA Langley Research Center, Hampton, Virginia 23365, Attn: Chief, Financial Management Division, Mail Stop 175, by the 20th of the month following the quarter being reported. A report shall be submitted whether or not additional funds are being requested.

2. In addition to the reporting requirements contained in the grant, two (2) additional copies of all technical reports shall be sent to the Grants Officer, NASA Langley Research Center, Hampton, Virginia, Mail Stop 139.

3. Cost Sharing (March 1972) The Grantee agrees to share in the cost of the research by charging to the Government not more than 97.9 per cent of the costs of performance determined to be allowable in accordance with Exhibit B of the NASA Grant Handbook. The remaining 2.1 per cent, or more of the allowable costs of performance so determined will constitute the Grantee's share and will not be charged to the Government under this grant or under any other grant or contract (including allocation to other grants or contracts as part of an independent research and development program). The Grantee will maintain records of all grant costs claimed by the Grantee as constituting part of its share and such records shall be subject to audit by the Government.

4. In submitting the Final Cost Expenditure Report on this grant, the grantee will be required to execute a certification essentially as follows:

   "I certify that all expenditures reported (or payments requested) are for appropriate purposes and in accordance with the agreements set forth in the application and award documents.

   (Signed by an Authorized Official of the University)"

5. Written or oral communications regarding administrative matters such as approval of foreign travel, property matters, extension of the period of the grant, etc., should be channeled through the grantee business office or equivalent to the NASA Grants Officer. Communications outside of these channels only cause delay in the appropriate action.

NASA Langley (Mar. 1972)  PROC./P-165
6. The following statement shall be signed by the Institution Officer executing the grant in verification that recruiters are not being barred:

Pursuant to telephone conversation between Donald H. Carson (NASA Representative) and Mr. Bill Watson (Grantee Representative) on Sept. 18, 1972, the grantee represents that at that time no recruiting personnel of any of the Armed Forces of the United States were being barred from the premises or property of New York University (Name of Institution).

(Signature-Institution Officer Executing)