NATIONAL AERONAUTICS AND SPACE ADMINISTRATION NEGOTIATED CONTRACT	Contract No. NAS-5-5490

ISSUING OFFICE

NAME	ADDRESS
National Aeronautics & Space Administration Goddard Space Flight Center	Glendale Road Greenbelt, Maryland 20771

CONTRACTOR

NAME	ADDRESS
Georgetown University Principal Investigator: Dr. P. Thekaekara	37th and O Streets, N.W. Washington, D.C. 20007

CONTRACT FOR	AMOUNT
Plan and Conduct Data Reduction and Analysis	Fixed Price $4,000.00

APPROPRIATION AND OTHER ADMINISTRATIVE DATA

Control Number: 57190; J.O. 322Y09-05; D.R. 322-219-64

Type of Contract: Fixed Price

Administration By: Goddard Space Flight Center

Appropriation and Allotment Chargeable: R&D 80X0108(64) Space Technology

Office to make payment: Fiscal Office, Goddard Space Flight Center

Security Classification: Unclassified

Priority: None

Technical Officer: Neil P. Zylich, Code 322

Negotiator: Bruce A. Bodine, Code 249.2

This negotiated contract is entered into pursuant to the provisions of 10 U.S.C. 2304 (a) (5) and any required Findings and Determination have been made.

THIS CONTRACT is entered into as of _____, 19 ___, by and between the United States of America, hereinafter called the Government, represented by the Contracting Officer executing this contract, and Georgetown University

(i) a corporation organized and existing under the laws of the state of District of Columbia

(ii) a partnership consisting of _____

(iii) an individual trading as _____

hereinafter called the Contractor. The parties hereto agree that the Contractor shall furnish and deliver all supplies and perform all the services set forth in the attached Schedule, for the consideration stated herein.

ARTICLE I - STATEMENT OF WORK:

A. The Contractor shall plan and conduct data reduction and analysis from a measurement program to evaluate sensing techniques used for detection and definition of spectral energy distribution characteristics of Hg Xe high energy sources. Measurements will be obtained on the Hg Xe 2.5 KW source and with the source housed in an optical module typical of the Goddard Space Flight Center's Space Environmental Simulator.

B. The Contractor shall perform the following:

1. Generate an Experiment Program Plan.

2. Provide assistance to GSFC personnel during set-up of the experimental apparatus.

3. Verify set-up and initial data runs.

4. Analyze data generated per the experiment matrix in accordance with the experiment plan.

5. Determine the variation in spectral energy distribution as a function of source life, power input, and source cooling for both a bare source and the module configuration.

6. Evaluate two (2) spectral energy monitoring techniques - filter differential and Eppley Filter Wheel - on the basis of accuracy and operability.

7. Recommend a spectral energy monitoring technique for use in the Space Environmental Simulator. The technique selected must be capable of rapid analysis such that raw data may be inserted into a computer program for determination of values of absorptivity for materials illuminated by the source. The termination of effective absorptivity must be accomplished under dynamic conditions of the test.

C. In the performance of the work required by this contract, the Contractor shall provide up to eight-hundred (800) hours of physics or engineering graduate student level effort as necessary, or an equivalent acceptable to the Contracting Officer.

ARTICLE II - DELIVERABLE ITEMS:

Item 1 - Three (3) copies of an experimental program plan.

Item 2 - Three (3) copies of brief monthly letter progress reports which summarize the work completed during the month being reported and describe the work projected for the succeeding month.

Item 3 - Five (5) copies of a final report fully covering each of the following topics:

a. The Variation of Spectral Energy Distribution vs. Each Selected Variable Parameter

b. The Evaluation of Filter Differential Techniques vs. the Eppley Filter Wheel.

c. The Evaluation and Recommendation of Monitoring Techniques Based on Accuracy, Reliability and Data Handling Requirements.

Item 4 - One (1) computer program for reducing spectral data for:

a. Filter Differential Technique.

b. Eppley Filter Wheel Technique.

Item 5 - One (1) computer program, written for the CDC 160A computer, for reducing spectral distribution data compatible with a program for determination of absorptivity of materials illuminated by the source.

ARTICLE III - DELIVERY SCHEDULE:

Item 1 - shall be delivered within two (2) weeks after the date of execution of this contract. Two (2) copies shall be delivered to the Technical Officer, Code 322, and one (1) copy to the Contracting Officer, Code 249.2.

Item 2 - shall be delivered within ten (10) days after the completion of each full month of contract effort. Two (2) copies shall be delivered to the Technical Officer, and one (1) copy to the Contracting Officer.

Item 3 - shall be delivered within nineteen (19) weeks after the date of execution of this contract. Four (4) copies shall be delivered to the Technical Officer and one (1) copy to the Contracting Officer.

Items 4 and 5 - shall be delivered to the Technical Officer no later than the date of delivery for Item 3.

ARTICLE IV - FIXED PRICE:

The fixed price for this contract is $4,000.00 which is composed of the following unit prices:

a.	First monthly report	$1,000.00
b.	Second monthly report	1,000.00
c.	Third monthly report	1,000.00
d.	Fourth monthly report	900.00
e.	Final report	100.00
	Total Fixed Price	$4,000.00

ARTICLE V - PAYMENTS:

Upon acceptance by the Technical Officer of each monthly report and the final report, the Contractor may submit a voucher for the amount set forth for that report in ARTICLE IV. Vouchers shall be submitted to the Goddard Space Flight Center, Glenn Dale Road, Greenbelt, Maryland, 20771, to the attention of the Technical Officer, Code 322. All vouchers shall be submitted in quadruplicate - an original and three (3) copies - and shall reference the Contract, Procurement Control, Job Order, Division Request and Appropriation numbers shown on the Title Page of this Contract.

ARTICLE VI - INSPECTION AND ACCEPTANCE:

Inspection and Acceptance of all goods and Services delivered under this Contract shall be performed by the Contracting Officer's Representative. For purposes of this ARTICLE, the Technical Officer, Code 322, is hereby designated the Contracting Officer's duly authorized representative.

ARTICLE VII - FACILITIES:

All experimental apparatus shall be furnished by the Government at the Goddard Space Flight Center. Data to be reduced shall be furnished by GSFC in accordance with the experiment plan and will be analysed at the Contractor's site using Contractor owned facilities.

ARTICLE VIII- ACCIDENT PREVENTION:

In order to provide safety controls for protection to the life and health of employees and other persons; for prevention of damage to property, materials, supplies and equipment; and for avoidance of work interruptions in the performance of this Contract; the Contractor will comply with all pertinent provisions of the publication "General Safety Requirements" EM 385-1-1 (March 13, 1958) prepared by the Department of the Army, Corps of Engineers, U.S. Army, and published by the U.S. Government Printing Office, together with additions or

modifications thereto, or new edition thereof, in effect on the date of this contract, and will also take or cause to be taken, such additional measures as the Contracting Officer may determine to be reasonably necessary for the purpose.

ARTICLE IX - NONDISCRIMINATION IN EMPLOYMENT:

General Provision Clause No. 18 "Nondiscrimination in Employment" of Standard Form 32, is hereby deleted in its entirety and the following Clause is substituted therefor:

During the performance of this contract, the contractor agrees as follows:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicious places, available to employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of this Nondiscrimination Clause.

2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, or national origin.

3. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency Contracting Officer, advising the said labor union or workers' representative of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

4. The Contractor will comply with all provisions of Executive Order No. 10925 of March 6, 1961, as amended, and of the rules, regulations and relevant orders of the President's Committee on Equal Employment Opportunity created thereby.

5. The Contractor will furnish all information and reports required by Executive Order No. 10925 of March 6, 1961 as amended, and by the rules, regulations, and orders of the said committee, or pursuant thereto, and will permit access to his books, records and accounts by the contracting agency and the committee for purposes of investigation or ascertain compliance with such

rules, regulations and orders.

6. In the event of the Contractor's noncompliance with the Nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be cancelled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 10925 of March 6, 1961, as amended, and such other sanctions may be imposed and remedies invoked as provided in the said Executive Order or by rule, regulation, and order of the President's Committee on Equal Employment Opportunity, or as otherwise provided by law.

7. The Contractor will include the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the President's Committee on Equal Employment Opportunity issued pursuant to Section 303 of the Executive Order No. 10925 of March 6, 1961, as amended, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the Contractor may request the United States to enter into such litigation to protect the interest of the United States.

ARTICLE X - CONTENTS OF CONTRACT:

This contract consists of:

1. The Title Page

2. Six (6) Schedule Pages

3. Standard Form 32 (September 1961) "General Provisions"

4. NASA Form 250(1-63 "Additional General Provisions to U.S. Standard Form 32

5. The Signature Page

Standard Form 32
SEPTEMBER 1961 EDITION
GENERAL SERVICES ADMINISTRATION
FED. PROC. REG. (41 CFR) 1–16.101

GENERAL PROVISIONS

(Supply Contract)

1. DEFINITIONS

As used throughout this contract, the following terms shall have the meanings set forth below:

(a) The term "head of the agency" or "Secretary" means the Secretary, the Under Secretary, any Assistant Secretary, or any other head or assistant head of the executive or military department or other Federal agency; and the term "his duly authorized representative" means any person or persons or board (other than the Contracting Officer) authorized to act for the head of the agency or the Secretary.

(b) The term "Contracting Officer" means the person executing this contract on behalf of the Government, and any other officer or civilian employee who is a properly designated Contracting Officer; and the term includes, except as otherwise provided in this contract, the authorized representative of a Contracting Officer acting within the limits of his authority.

(c) Except as otherwise provided in this contract, the term "subcontracts" includes purchase orders under this contract.

2. CHANGES

The Contracting Officer may at any time, by a written order, and without notice to the sureties, make changes, within the general scope of this contract, in any one or more of the following: (i) Drawings, designs, or specifications, where the supplies to be furnished are to be specially manufactured for the Government in accordance therewith; (ii) method of shipment or packing; and (iii) place of delivery. If any such change causes an increase or decrease in the cost of, or the time required for, the performance of any part of the work under this contract, whether changed or not changed by any such order, an equitable adjustment shall be made in the contract price or delivery schedule, or both, and the contract shall be modified in writing accordingly. Any claim by the Contractor for adjustment under this clause must be asserted within 30 days from the date of receipt by the Contractor of the notification of change: *Provided, however,* That the Contracting Officer, if he decides that the facts justify such action, may receive and act upon any such claim asserted at any time prior to final payment under this contract. Where the cost of property made obsolete or excess as a result of a change is included in the Contractor's claim for adjustment, the Contracting Officer shall have the right to prescribe the manner of disposition of such property. Failure to agree to any adjustment shall be a dispute concerning a question of fact within the meaning of the clause of this contract entitled "Disputes." However, nothing in this clause shall excuse the Contractor from proceeding with the contract as changed.

3. EXTRAS

Except as otherwise provided in this contract, no payment for extras shall be made unless such extras and the price therefor have been authorized in writing by the Contracting Officer.

4. VARIATION IN QUANTITY

No variation in the quantity of any item called for by this contract will be accepted unless such variation has been caused by conditions of loading, shipping, or packing, or allowances in manufacturing processes, and then only to the extent, if any, specified elsewhere in this contract.

5. INSPECTION

(a) All supplies (which term throughout this clause includes without limitation raw materials, components, intermediate assemblies, and end products) shall be subject to inspection and test by the Government, to the extent practicable at all times and places including the period of manufacture, and in any event prior to acceptance.

(b) In case any supplies or lots of supplies are defective in material or workmanship or otherwise not in conformity with the requirements of this contract, the Government shall have the right either to reject them (with or without instructions as to their disposition) or to require their correction. Supplies or lots of supplies which have been rejected or required to be corrected shall be removed or, if permitted or required by the Contracting Officer, corrected in place by and at the expense of the Contractor promptly after notice, and shall not thereafter be tendered for acceptance unless the former rejection or requirement of correction is disclosed. If the Contractor fails promptly to remove such supplies or lots of supplies which are required to be removed, or promptly to replace or correct such supplies or lots of supplies, the Government either (i) may by contract or otherwise replace or correct such supplies and charge to the Contractor the cost occasioned the Government thereby, or (ii) may terminate this contract for default as provided in the clause of this contract entitled "Default." Unless the Contractor corrects or replaces such supplies within the delivery schedule, the Contracting Officer may require the delivery of such supplies at a reduction in price which is equitable under the circumstances. Failure to agree to such reduction of price shall be a dispute concerning a question of fact within the meaning of the clause of this contract entitled "Disputes."

(c) If any inspection or test is made by the Government on the premises of the Contractor or a subcontractor, the Contractor without additional charge shall provide all reasonable facilities and assistance for the safety and convenience of the Government inspectors in the performance of their duties. If Government inspection or test is made at a point other than the premises of the Contractor or a subcontractor, it shall be at the expense of the Government except as otherwise provided in this contract: *Provided,* That in case of rejection the Government shall not be liable for any reduction in value of samples used in connection with such inspection or test. All inspections and tests by the Government shall be performed in such a manner as not to unduly delay the work. The Government reserves the right to charge to the Contractor any additional cost of Government inspection and test when supplies are not ready at the time such inspection and test is requested by the Contractor or when reinspection or retest is necessitated by prior rejection. Acceptance or rejection of the supplies shall be made as promptly as practicable after delivery, except as otherwise provided in this contract; but failure to inspect and accept or reject supplies shall neither relieve the Contractor from responsibility for such supplies as are not in accordance with the contract requirements nor impose liability on the Government therefor.

(d) The inspection and test by the Government of any supplies or lots thereof does not relieve the Contractor from any responsibility regarding defects or other failures to meet the contract requirements which may be discovered prior to acceptance. Except as otherwise provided in this

contract, acceptance shall be conclusive except as regards latent defects, fraud, or such gross mistakes as amount to fraud.

(e) The Contractor shall provide and maintain an inspection system acceptable to the Government covering the supplies hereunder. Records of all inspection work by the Contractor shall be kept complete and available to the Government during the performance of this contract and for such longer period as may be specified elsewhere in this contract.

6. RESPONSIBILITY FOR SUPPLIES

Except as otherwise provided in this contract, (i) the Contractor shall be responsible for the supplies covered by this contract until they are delivered at the designated delivery point, regardless of the point of inspection; (ii) after delivery to the Government at the designated point and prior to acceptance by the Government or rejection and giving notice thereof by the Government, the Government shall be responsible for the loss or destruction of or damage to the supplies only if such loss, destruction, or damage results from the negligence of officers, agents, or employees of the Government acting within the scope of their employment; and (iii) the Contractor shall bear all risks as to rejected supplies after notice of rejection, except that the Government shall be responsible for the loss, or destruction of, or damage to the supplies only if such loss, destruction or damage results from the gross negligence of officers, agents, or employees of the Government acting within the scope of their employment.

7. PAYMENTS

The Contractor shall be paid, upon the submission of proper invoices or vouchers, the prices stipulated herein for supplies delivered and accepted or services rendered and accepted, less deductions, if any, as herein provided. Unless otherwise specified, payment will be made on partial deliveries accepted by the Government when the amount due on such deliveries so warrants; or, when requested by the Contractor, payment for accepted partial deliveries shall be made whenever such payment would equal or exceed either $1,000 or 50 percent of the total amount of this contract.

8. ASSIGNMENT OF CLAIMS

(a) Pursuant to the provisions of the Assignment of Claims Act of 1940, as amended (31 U.S.C. 203, 41 U.S.C. 15), if this contract provides for payments aggregating $1,000 or more, claims for moneys due or to become due the Contractor from the Government under this contract may be assigned to a bank, trust company, or other financing institution, including any Federal lending agency, and may thereafter be further assigned and reassigned to any such institution. Any such assignment or reassignment shall cover all amounts payable under this contract and not already paid, and shall not be made to more than one party, except that any such assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in such financing. Unless otherwise provided in this contract, payments to an assignee of any moneys due or to become due under this contract shall not, to the extent provided in said Act, as amended, be subject to reduction or setoff. (The preceding sentence applies only if this contract is made in time of war or national emergency as defined in said Act and is with the Department of Defense, the General Services Administration, the Atomic Energy Commission, the National Aeronautics and Space Administration, the Federal Aviation Agency, or any other department or agency of the United States designated by the President pursuant to Clause 4 of the proviso of section 1 of the Assignment of Claims Act of 1940, as amended by the Act of May 15, 1951, 65 Stat. 41.)

(b) In no event shall copies of this contract or of any plans, specifications, or other similar documents relating to work under this contract, if marked "Top Secret," "Secret," or "Confidential," be furnished to any assignee of any claim arising under this contract or to any other person not entitled to receive the same. However, a copy of any part or all of this contract so marked may be furnished, or any information contained therein may be disclosed, to such assignee upon the prior written authorization of the Contracting Officer.

9. ADDITIONAL BOND SECURITY

If any surety upon any bond furnished in connection with this contract becomes unacceptable to the Government, or if any such surety fails to furnish reports as to his financial condition from time to time as requested by the Government, the Contractor shall promptly furnish such additional security as may be required from time to time to protect the interests of the Government and of persons supplying labor or materials in the prosecution of the work contemplated by this contract.

10. EXAMINATION OF RECORDS

(The following clause is applicable if the amount of this contract exceeds $2,500 and was entered into by means of negotiation, but is not applicable if this contract was entered into by means of formal advertising.)

(a) The Contractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three years after final payment under this contract, have access to and the right to examine any directly pertinent books, documents, papers, and records of the Contractor involving transactions related to this contract.

(b) The Contractor further agrees to include in all his subcontracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three years after final payment under the subcontract, have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor, involving transactions related to the subcontract. The term "subcontract" as used in this clause excludes (i) purchase orders not exceeding $2,500 and (ii) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public.

11. DEFAULT

(a) The Government may, subject to the provisions of paragraph (c) below, by written notice of default to the Contractor, terminate the whole or any part of this contract in any one of the following circumstances:

(i) if the Contractor fails to make delivery of the supplies or to perform the services within the time specified herein or any extension thereof; or

(ii) if the Contractor fails to perform any of the other provisions of this contract, or so fails to make progress as to endanger performance of this contract in accordance with its terms, and in either of these two circumstances does not cure such failure within a period of 10 days (or such longer period as the Contracting Officer may authorize in writing) after receipt of notice from the Contracting Officer specifying such failure.

(b) In the event the Government terminates this contract in whole or in part as provided in paragraph (a) of this clause, the Government may procure, upon such terms and in such manner as the Contracting Officer may deem appropriate, supplies or services similar to those so terminated, and the Contractor shall be liable to the Government for any excess costs for such similar supplies or services: *Provided,* That the Contractor shall continue the performance of this contract to the extent not terminated under the provisions of this clause.

(c) Except with respect to defaults of subcontractors, the Contractor shall not be liable for any excess costs if the failure to perform the contract arises out of causes beyond the control and without the fault or negligence of the Contractor. Such causes may include, but are not restricted to, acts of God or of the public enemy, acts of the Government in either its sovereign or contractual capacity,

fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather; but in every case the failure to perform must be beyond the control and without the fault or negligence of the Contractor. If the failure to perform is caused by the default of a subcontractor, and if such default arises out of causes beyond the control of both the Contractor and subcontractor, and without the fault or negligence of either of them, the Contractor shall not be liable for any excess costs for failure to perform, unless the supplies or services to be furnished by the subcontractor were obtainable from other sources in sufficient time to permit the Contractor to meet the required delivery schedule.

(d) If this contract is terminated as provided in paragraph (a) of this clause, the Government, in addition to any other rights provided in this clause, may require the Contractor to transfer title and deliver to the Government, in the manner and to the extent directed by the Contracting Officer, (i) any completed supplies, and (ii) such partially completed supplies and materials, parts, tools, dies, jigs, fixtures, plans, drawings, information, and contract rights (hereinafter called "manufacturing materials") as the Contractor has specifically produced or specifically acquired for the performance of such part of this contract as has been terminated; and the Contractor shall, upon direction of the Contracting Officer, protect and preserve property in possession of the Contractor in which the Government has an interest. Payment for completed supplies delivered to and accepted by the Government shall be at the contract price. Payment for manufacturing materials delivered to and accepted by the Government and for the protection and preservation of property shall be in an amount agreed upon by the Contractor and Contracting Officer; failure to agree to such amount shall be a dispute concerning a question of fact within the meaning of the clause of this contract entitled "Disputes."

(e) If, after notice of termination of this contract under the provisions of paragraph (a) of this clause, it is determined that the failure to perform this contract is due to causes beyond the control and without the fault or negligence of the Contractor or subcontractor pursuant to the provisions of paragraph (c) of this clause, such notice of default shall be deemed to have been issued pursuant to the clause of this contract entitled "Termination for Convenience of the Government," and the rights and obligations of the parties hereto shall in such event be governed by such clause. (*Except as otherwise provided in this contract, this paragraph (e) applies only if this contract contains such clause.*)

(f) The rights and remedies of the Government provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

12. DISPUTES

(a) Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Contractor. The decision of the Contracting Officer shall be final and conclusive unless, within 30 days from the date of receipt of such copy, the Contractor mails or otherwise furnishes to the Contracting Officer a written appeal addressed to the Secretary. The decision of the Secretary or his duly authorized representative for the determination of such appeals shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, or capricious, or arbitrary, or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence. In connection with any appeal proceeding under this clause, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of its appeal. Pending final decision of a dispute hereunder, the Contractor shall proceed diligently with the performance of the contract and in accordance with the Contracting Officer's decision.

(b) This "Disputes" clause does not preclude consideration of law questions in connection with decisions provided for in paragraph (a) above: *Provided,* That nothing in this contract shall be construed as making final the decision of any administrative official, representative, or board on a question of law.

13. NOTICE AND ASSISTANCE REGARDING PATENT INFRINGEMENT

The provisions of this clause shall be applicable only if the amount of this contract exceeds $5,000.

(a) The Contractor shall report to the Contracting Officer, promptly and in reasonable written detail, each notice or claim of patent infringement based on the performance of this contract of which the Contractor has knowledge.

(b) In the event of litigation against the Government on account of any claim of patent infringement arising out of the performance of this contract or out of the use of any supplies furnished or work or service performed hereunder, the Contractor shall furnish to the Government, upon request, all evidence and information in possession of the Contractor pertaining to such litigation. Such evidence and information shall be furnished at the expense of the Government except in those cases in which the Contractor has agreed to indemnify the Government against the claim being asserted.

14. BUY AMERICAN ACT

(a) In acquiring end products, the Buy American Act (41 U.S. Code 10 a–d) provides that the Government give preference to domestic source end products. For the purpose of this clause:

(i) "components" means those articles, materials, and supplies, which are directly incorporated in the end products;

(ii) "end products" means those articles, materials, and supplies, which are to be acquired under this contract for public use; and

(iii) a "domestic source end product" means (A) an unmanufactured end product which has been mined or produced in the United States and (B) an end product manufactured in the United States if the cost of the components thereof which are mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. For the purposes of this (*a*) (iii) (B), components of foreign origin of the same type or kind as the products referred to in (*b*) (ii) or (iii) of this clause shall be treated as components mined, produced, or manufactured in the United States.

(*b*) The Contractor agrees that there will be delivered under this contract only domestic source end products, except end products:

(i) which are for use outside the United States;

(ii) which the Government determines are not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality;

(iii) as to which the Secretary determines the domestic preference to be inconsistent with the public interest; or

(iv) as to which the Secretary determines the cost to the Government to be unreasonable.

(The foregoing requirements are administered in accordance with Executive Order No. 10582, dated December 17, 1954.)

15. CONVICT LABOR

In connection with the performance of work under this contract, the Contractor agrees not to employ any person undergoing sentence of imprisonment at hard labor.

16. EIGHT-HOUR LAW OF 1912—OVERTIME COMPENSATION

This contract, to the extent that it is of a character spec-

ified in the Eight-Hour Law of 1912, as amended (40 U.S. Code 324–326) and is not covered by the Walsh-Healey Public Contracts Act (41 U.S. Code 35–45), is subject to the following provisions and exceptions of said Eight-Hour Law of 1912, as amended, and to all other provisions and exceptions of said Law:

No laborer or mechanic doing any part of the work contemplated by this contract, in the employ of the Contractor or any subcontractor contracting for any part of said work contemplated, shall be required or permitted to work more than eight hours in any one calendar day upon such work, except upon the condition that compensation is paid to such laborer or mechanic in accordance with the provisions of this clause. The wages of every laborer and mechanic employed by the Contractor or any subcontractor engaged in the performance of this contract shall be computed on a basic day rate of eight hours per day; and work in excess of eight hours per day is permitted only upon the condition that every such laborer and mechanic shall be compensated for all hours worked in excess of eight hours per day at not less than one and one-half times the basic rate of pay. For each violation of the requirements of this clause a penalty of five dollars shall be imposed for each laborer or mechanic for every calendar day in which such employee is required or permitted to labor more than eight hours upon said work without receiving compensation computed in accordance with this clause, and all penalties thus imposed shall be withheld for the use and benefit of the Government.

17. WALSH-HEALEY PUBLIC CONTRACTS ACT

If this contract is for the manufacture or furnishing of materials, supplies, articles, or equipment in an amount which exceeds or may exceed $10,000 and is otherwise subject to the Walsh-Healey Public Contracts Act, as amended (41 U.S. Code 35–45), there are hereby incorporated by reference all representations and stipulations required by said Act and regulations issued thereunder by the Secretary of Labor, such representations and stipulations being subject to all applicable rulings and interpretations of the Secretary of Labor which are now or may hereafter be in effect.

18. NONDISCRIMINATION IN EMPLOYMENT

(*The following clause is applicable unless this contract is exempt under the rules and regulations of the President's Committee on Equal Employment Opportunity issued pursuant to Executive Order No. 10925 of March 6, 1961* (*26 FR 1977*).)

In connection with the performance of work under this contract, the Contractor agrees as follows:

(a) The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of this Nondiscrimination clause.

(b) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, or national origin.

(c) The Contractor will send to each labor union or representative of workers with which he has a collective-bargaining agreement or other contract or understanding, a notice, to be provided by the agency Contracting Officer, advising the said labor union or workers' representative of the Contractor's commitments under this Nondiscrimination clause, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(d) The Contractor will comply with all provisions of Executive Order No. 10925 of March 6, 1961, and of the rules, regulations, and relevant orders of the President's Committee on Equal Employment Opportunity created thereby.

(e) The Contractor will furnish all information and reports required by Executive Order No. 10925 of March 6, 1961, and by the rules, regulations, and orders of the said Committee, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Committee for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(f) In the event of the Contractor's noncompliance with the Nondiscrimination clause of this contract or with any of the said rules, regulations, or orders, this contract may be canceled in whole or in part and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 10925 of March 6, 1961, and such other sanctions may be imposed and remedies invoked as provided in the said Executive order or by rule, regulation, or order of the President's Committee on Equal Employment Opportunity, or as otherwise provided by law.

(g) The Contractor will include the provisions of the foregoing paragraphs (a) through (f) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the President's Committee on Equal Employment Opportunity issued pursuant to section 303 of Executive Order No. 10925 of March 6, 1961, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: *Provided, however*, that in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

19. OFFICIALS NOT TO BENEFIT

No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

20. COVENANT AGAINST CONTINGENT FEES

The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. For breach or violation of this warranty the Government shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

21. UTILIZATION OF SMALL BUSINESS CONCERNS

(a) It is the policy of the Government as declared by the Congress that a fair proportion of the purchases and contracts for supplies and services for the Government be placed with small business concerns.

(b) The Contractor agrees to accomplish the maximum amount of subcontracting to small business concerns that the Contractor finds to be consistent with the efficient performance of this contract.

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NASA Form 250 (1-68)
Previous Editions Are Obsolete

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Additional General Provisions to U.S. Standard Form 32

(Sept. 1961 Edition)

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22. PRIORITIES, ALLOCATIONS, AND ALLOTMENTS (September 1962)

The Contractor shall follow the provisions of DMS Reg. 1 and all other applicable regulations and orders of the Business and Defense Services Administration in obtaining controlled materials and other products and materials needed to fill this order.

23. SECURITY REQUIREMENTS (September 1962)

(a) The provisions of this clause shall apply to the extent that this contract involves access to information classified "Confidential" or higher.

(b) NASA shall notify the Contractor of the security classification of this contract and the elements thereof, and of any subsequent revisions in such security classification, by the use of a Security Requirements Checklist (DD Form 254), or other written notification.

(c) The Contractor agrees to execute, if it has not already done so, a Security Agreement (DD Form 441) with the Government, represented by the Military Department assigned security cognizance over the Contractor's facility. To the extent the Government has indicated, as of the date of this contract, or thereafter indicates a security classification under this contract as provided in paragraph (b) above, the Contractor shall safeguard all classified elements of this contract and shall provide and maintain a system of security controls within its own organization in accordance with the requirements of:

(i) the Security Agreement (DD Form 441), including the Industrial Security Manual for Safeguarding Classified Information in effect on the date of this contract, and any modification to the Security Agreement for the purpose of adapting the Manual to the Contractor's business; and

(ii) any amendments to said Manual made after the date of this contract, notice of which has been furnished to the Contractor by the Security Office of the Military Department assigned security cognizance over the facility.

(d) Representatives of the Military Department having security cognizance over the facility, and representatives of NASA, shall have the right to inspect at reasonable intervals the procedures, methods, and facilities utilized by the Contractor in complying with the security requirements under this contract. Should the Government, through these representatives, determine that the Contractor is not complying with the security requirements of this contract, the Contractor shall be informed in writing by the Security Office of the cognizant Military Department of the proper action to be taken in order to effect compliance with such requirements.

(e) If, subsequent to the date of this contract, the security classifications or security requirements under this contract are changed by the Government as provided in this clause and the security costs under this contract are thereby increased or decreased, the contract price shall be subject to an equitable adjustment by reason of such increased or decreased costs. Any such equitable adjustment shall be accomplished in the same manner as if such changes were directed under the "Changes" clause of this contract.

(f) The Contractor agrees to insert, in all subcontracts hereunder which involve access to classified information, provisions which shall conform substantially to the language of this clause, including this paragraph (f) but excluding the last sentence of paragraph (e) of this clause.

(g) The Contractor also agrees that it shall determine that any subcontractor proposed by it for the furnishing of supplies and services which will involve access to classified information in the Contractor's custody has been granted an appropriate facility security clearance, which is still in effect, prior to being accorded access to such classified information.

24. TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (September 1962)

(a) The performance of work under this contract may be terminated by the Government in accordance with this clause in whole, or from time to time in part, whenever the Contracting Officer shall determine that such termination is in the best interest of the Government. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which performance of work under the contract is terminated and the date upon which such termination becomes effective.

(b) After receipt of a Notice of Termination, and except as otherwise directed by the Contracting Officer, the Contractor shall:

(i) stop work under the contract on the date and to the extent specified in the Notice of Termination;

(ii) place no further orders or subcontracts for materials, services or facilities, except as may be necessary for completion of such portion of the work under the contract as is not terminated;

(iii) terminate all orders and subcontracts to the extent that they relate to the performance of work terminated by the Notice of Termination;

(iv) assign to the Government, in the manner, at the times, and to the extent directed by the Contracting Officer, all of the right, title, and interest of the Contractor under the orders and subcontracts so terminated, in which case the Government shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;

(v) settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Contracting Officer, to the extent he may require, which approval or ratification shall be final for all the purposes of this clause;

(vi) transfer title and deliver to the Government, in the manner, at the times, and to the extent, if any, directed by the Contracting Officer, (A) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced as a part of, or acquired in connection with the performance of, the work terminated by the Notice of Termination, and (B) the completed or partially completed plans, drawings, information, and other property which, if the contract had been completed, would have been required to be furnished to the Government;

(vii) use his best efforts to sell, in the manner, at the times, to the extent, and at the price or prices directed or authorized by the Contracting Officer, any property of the types referred to in (vi) above; *provided, however,* that the Contractor (A) shall not be required to extend credit to any purchaser, and (B) may acquire any such property under the conditions prescribed by and at a price or prices approved by the Contracting Officer; *and provided further,* that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Government to the Contractor under this contract or shall otherwise be credited to the price or cost of the work covered by this contract or paid in such other manner as the Contracting Officer may direct;

(viii) complete performance of such part of the work as

shall not have been terminated by the Notice of Termination; and

(ix) take such action as may be necessary, or as the Contracting Officer may direct, for the protection and preservation of the property related to this contract which is in the possession of the Contractor and in which the Government has or may acquire an interest.

At any time after expiration of the plant clearance period, as defined in Part 8, NASA Procurement Regulations, as it may be amended from time to time, the Contractor may submit to the Contracting Officer a list, certified as to quantity and quality, of any or all items of termination inventory not previously disposed of, exclusive of items the disposition of which has been directed or authorized by the Contracting Officer, and may request the Government to remove such items or enter into a storage agreement covering them. Not later than fifteen (15) days thereafter, the Government will accept title to such items and remove them or enter into a storage agreement covering the same; *provided*, that the list submitted shall be subject to verification by the Contracting Officer upon removal of the items, or if the items are stored, within forty-five (45) days from the date of submission of the list, and any necessary adjustment to correct the list as submitted shall be made prior to final settlement.

(c) After receipt of a Notice of Termination, the Contractor shall submit to the Contracting Officer his termination claim, in the form and with certification prescribed by the Contracting Officer. Such claim shall be submitted promptly but in no event later than one (1) year from the effective date of termination, unless one or more extensions in writing are granted by the Contracting Officer, upon request of the Contractor made in writing within such one (1) year period or authorized extension thereof. However, if the Contracting Officer determines that the facts justify such action, he may receive and act upon any such termination claim at any time after such one (1) year period or any extension thereof. Upon failure of the Contractor to submit his termination claim within the time allowed, the Contracting Officer may, subject to any Settlement Review Board approvals required by NASA Regulations in effect as of the date of execution of this contract, determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.

(d) Subject to the provisions of paragraph (c), and subject to any Settlement Review Board approvals required by NASA Regulations in effect as of the date of execution of this contract, the Contractor and the Contracting Officer may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the total or partial termination of work pursuant to this clause, which amount or amounts may include a reasonable allowance for profit on work done; *provided*, that such agreed amount or amounts, exclusive of settlement costs, shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the contract price of work not terminated. The contract shall be amended accordingly, and the Contractor shall be paid the agreed amount. Nothing in paragraph (e) of this clause, prescribing the amount to be paid to the Contractor in the event of failure of the Contractor and the Contracting Officer to agree upon the whole amount to be paid to the Contractor by reason of the termination of work pursuant to this clause, shall be deemed to limit, restrict, or otherwise determine or affect the amount or amounts which may be agreed upon to be paid to the Contractor pursuant to this paragraph (d).

(e) In the event of the failure of the Contractor and the Contracting Officer to agree as provided in paragraph (d) upon the whole amount to be paid to the Contractor by reason of the termination of work pursuant to this clause, the Contracting Officer shall, subject to any Settlement Review Board approvals required by NASA Regulations in effect as of the date of execution of this contract, determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and shall pay to the Contractor the amounts determined as follows:

(i) for completed supplies accepted by the Government (or sold or acquired as provided in paragraph (b) (vii) above) and not theretofore paid for, a sum equivalent to the aggregate price for such supplies computed in accordance with the price or prices specified in the contract, appropriately adjusted for any saving of freight or other charges;

(ii) the total of—

(A) the costs incurred in the performance of the work terminated, including initial costs and preparatory expense allocable thereto, but exclusive of any costs attributable to supplies paid or to be paid for under paragraph (e) (i) hereof;

(B) the cost of settling and paying claims arising out of the termination of work under subcontracts or orders, as provided in paragraph (b) (v) above, which are properly chargeable to the terminated portion of the contract (exclusive of amounts paid or payable on account of supplies or materials delivered or services furnished by subcontractors or vendors prior to the effective date of the Notice of Termination, which amounts shall be included in the costs payable under (A) above); and

(C) a sum, as a profit, equal to 2 percent of that part of the amount determined under (A) above which represents the cost of articles and materials not processed by the Contractor, plus a sum equal to 8 percent of the remainder of such amount, but the aggregate of such sums shall not exceed 6 percent of the whole of the amount determined under (A) above; *provided, however*, that if it appears that the Contractor would have sustained a loss on the entire contract had it been completed, no profit shall be included or allowed under this subdivision (C) and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate of loss; and

(iii) the reasonable costs of settlement, including accounting, legal, clerical, and other expenses reasonably necessary for the preparation of settlement claims and supporting data with respect to the terminated portion of the contract and for the termination and settlement of subcontracts thereunder, together with reasonable storage, transportation, and other costs incurred in connection with the protection or disposition of property allocable to this contract.

The total sum to be paid to the Contractor under (i) and (ii) of this paragraph (e) shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the contract price of work not terminated. Except for normal spoilage, and except to the extent that the Government shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor as provided in (e) (i) and (ii) (A) above, the fair value, as determined by the Contracting Officer, of property which is destroyed, lost, stolen, or damaged so as to become undeliverable to the Government, or to a buyer pursuant to paragraph (b) (vii).

(f) Any determination of costs under paragraph (c) or (e) hereof shall be governed by the principles for consideration of costs set forth in Section XV, Part 2, of the Armed Services Procurement Regulation, as in effect on the date of this contract.

(g) The Contractor shall have the right of appeal, under the clause of this contract entitled "Disputes," from any determination made by the Contracting Officer under paragraphs (c) or (e) above, except that if the Contractor has failed to submit his claim within the time provided in paragraph (c) above and has failed to request extension of such time, he shall have no such right of appeal. In any case where the Contracting Officer has made a determination of the amount due under paragraph (c) or (e) above, the Government shall pay to the Contractor the following: (i) if there is no right of appeal hereunder or if no timely appeal has been taken, the amount so determined by the Contracting Officer, or (ii) if an appeal has been taken, the amount finally determined on such appeal.

(h) In arriving at the amount due the Contractor under this clause there shall be deducted (i) all unliquidated advance or other payments on account theretofore made to the Contractor, applicable to the terminated portion of this contract, (ii) any claim which the Government may have against the Contractor in connection with this contract, and (iii) the agreed price for, or the proceeds of sale of, any materials, supplies, or other things acquired by the Contractor or sold, pursuant to the provisions of this clause, and not otherwise recovered by or credited to the Government.

(i) If the termination hereunder be partial, prior to the settlement of the terminated portion of this contract, the Contractor may file with the Contracting Officer a request in writing for an equitable adjustment of the price or prices specified in the contract relating to the continued portion of the contract (the portion not terminated by the Notice of Termination), and such equitable adjustment as may be agreed upon shall be made in such price or prices.

(j) The Government may from time to time, under such terms and conditions as it may prescribe, make partial payments and payments on account against costs incurred by the Contractor in connection with the terminated portion of this contract whenever in the opinion of the Contracting Officer the aggregate of such payments shall be within the amount to which the Contractor will be entitled hereunder. If the total of such payments is in

excess of the amount finally agreed or determined to be due under this clause, such excess shall be payable by the Contractor to the Government upon demand, together with interest computed at the rate of 6 percent per annum, for the period from the date such excess payment is received by the Contractor to the date on which such excess is repaid to the Government; *provided, however*, that no interest shall be charged with respect to any such excess payment attributable to a reduction in the Contractor's claim by reason of retention or other disposition of termination inventory until 10 days after the date of such retention or disposition, or such later date as determined by the Contracting Officer by reason of the circumstances.

(k) Unless otherwise provided for in this contract, or by applicable statute, the Contractor, from the effective date of termination and for a period of 3 years after final settlement under this contract, shall preserve and make available to the Government at all reasonable times at the office of the Contractor but without direct charge to the Government, all his books, records, documents, and other evidence bearing on the costs and expenses of the Contractor under this contract and relating to the work terminated hereunder, or to the extent approved by the Contracting Officer, photographs, microphotographs, or other authentic reproductions thereof.

25. NOTICE TO THE GOVERNMENT OF LABOR DISPUTES (September 1962)

(a) Whenever the Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of this contract, the Contractor shall immediately give notice thereof, including all relevant information with respect thereto, to the Contracting Officer.

(b) The Contractor agrees to insert the substance of this clause, including this paragraph (b), in any subcontract hereunder as to which a labor dispute may delay the timely performance of this contract; except that each such subcontract shall provide that in the event its timely performance is delayed or threatened by delay by any actual or potential labor dispute, the subcontractor shall immediately notify its next higher tier subcontractor, or the prime contractor, as the case may be, of all relevant information with respect to such dispute.

26. UTILIZATION OF CONCERNS IN LABOR SURPLUS AREAS (September 1962). (*The provisions of this clause shall be applicable if the contract is in excess of $5,000.*)

It is the policy of the Government to place contracts with concerns which will perform such contracts substantially in areas of persistent or substantial labor surplus where this can be done, consistent with the efficient performance of the contract, at prices no higher than are obtainable elsewhere. The Contractor agrees to use his best efforts to place his subcontracts in accordance with this policy. In complying with the foregoing and with paragraph (b) of the clause of this contract entitled "Utilization of Small Business Concerns," the Contractor in placing his subcontracts shall observe the following order of preference: (i) persistent labor surplus area concerns which are also small business concerns; (ii) other persistent labor surplus area concerns; (iii) substantial labor surplus area concerns which are also small business concerns; (iv) other substantial labor surplus area concerns; and (v) small business concerns which are not labor surplus area concerns.

27. FEDERAL, STATE, AND LOCAL TAXES (September 1962)

(a) Except as may be otherwise provided in this contract, the contract price includes all applicable Federal, State, and local taxes and duties.

(b) Nevertheless, with respect to any Federal excise tax or duty on the transactions or property covered by this contract, if a statute, court decision, written ruling, or regulation takes effect after the contract date, and—

(1) results in the Contractor being required to pay or bear the burden of any such Federal excise tax or duty or increase in the rate thereof which would not otherwise have been payable on such transactions or property, the contract price shall be increased by the amount of such tax or duty or rate increase, *provided* the Contractor warrants in writing that no amount for such newly imposed Federal excise tax or duty or rate increase was included in the contract price as a contingency reserve or otherwise; or

(2) results in the Contractor not being required to pay or bear the burden of, or in his obtaining a refund or drawback of, any such Federal excise tax or duty which would otherwise have been payable on such transactions or property or which was the basis of an increase in the contract price, the contract price shall be decreased by the amount of the relief, refund, or drawback, or that amount shall be paid to the Government, as directed by the Contracting Officer. The contract price shall be similarly decreased if the Contractor, through his fault or negligence or his failure to follow instructions of the Contracting Officer, is required to pay or bear the burden of, or does not obtain a refund or drawback of, any such Federal excise tax or duty.

(c) No adjustment of less than $100 shall be made in the contract price pursuant to paragraph (b) above.

(d) As used in paragraph (b) above, the term "contract date" means the date set for bid opening, or if this is a negotiated contract, the contract date. As to additional supplies or services procured by modification to this contract, the term "contract date" means the date of such modification.

(e) Unless there does not exist any reasonable basis to sustain an exemption, the Government upon the request of the Contractor shall, without further liability, furnish evidence appropriate to establish exemption from any Federal, State, or local tax; *provided* that, evidence appropriate to establish exemption from any Federal excise tax or duty which may give rise to either an increase or decrease in the contract price will be furnished only at the discretion of the Government.

(f) The Contractor shall promptly notify the Contracting Officer of matters which will result in either an increase or decrease in the contract price, and shall take action with respect thereto as directed by the Contracting Officer.

28. RENEGOTIATION (September 1962)

(a) To the extent required by law, this contract is subject to the Renegotiation Act of 1951 (50 U.S.C. App. 1211, *et seq.*) as amended, and to any subsequent act of Congress providing for the renegotiation of contracts. Nothing contained in this clause shall impose any renegotiation obligation with respect to this contract or any subcontract hereunder which is not imposed by an act of Congress heretofore or hereafter enacted. Subject to the foregoing this contract shall be deemed to contain all the provisions required by Section 104 of the Renegotiation Act of 1951, and by any such other act, without subsequent contract amendment specifically incorporating such provisions.

(b) The Contractor agrees to insert the provisions of this clause, including this paragraph (b), in all subcontracts, as that term is defined in Section 103g of the Renegotiation Act of 1951, as amended.

29. AUTHORIZATION AND CONSENT (January 1963)

The Government hereby gives its authorization and consent (without prejudice to its rights of indemnification, if such rights are provided for in this contract) for all use and manufacture, in the performance of this contract or any part hereof or any amendment hereto or any subcontract hereunder (including any lower tier subcontract), of any invention described in and covered by a patent of the United States (i) embodied in the structure or composition of any article the delivery of which is accepted by the Government under this contract, or (ii) utilized in the machinery, tools, or methods the use of which necessarily results from compliance by the Contractor or the using subcontractor with (a) specifications or written provisions now or hereafter forming a part of this contract, or (b) specific written instructions given by the Contracting Officer directing the manner of performance.

30. FILING OF PATENT APPLICATIONS (September 1962)

(a) Before filing or causing to be filed a patent application disclosing any subject matter of this contract, which subject matter is classified "Secret" or higher, the Contractor shall, citing the 30-day provision below, transmit the proposed application to the Contracting Officer for determination whether, for reasons of national security, such application should be placed under an order of secrecy or sealed in accordance with the provisions of 35 U.S.C. 181–188 or the issuance of a patent should be otherwise delayed under pertinent statutes or regulations; and the Contractor shall observe any instructions of the Contracting Officer with respect to the manner of delivery of the patent application to the United States Patent Office for filing, but the Contractor shall not be denied the right to file such patent application. If the Contracting Officer shall not have given any such instructions within thirty (30) days from the date of mailing or other transmittal of the proposed application, the Contractor may file the application.

(b) The Contractor shall furnish to the Contracting Officer, at the time of or prior to the time when the Contractor files or causes to be filed a patent application disclosing any subject matter of this contract, which subject matter is classified "Confidential," a copy of such application for determination whether, for reasons of national security, such application should be placed under an order of secrecy or the issuance of a patent should be otherwise delayed under pertinent statutes or regulations.

(c) In filing any patent application coming within the scope of this clause, the Contractor shall observe all applicable security regulations covering the transmission of classified subject matter.

31. SOVIET-CONTROLLED AREAS (September 1962)

(a) The Contractor shall not acquire for use in the performance of this contract any supplies or services originating from sources within Soviet-controlled areas, as listed in the Schedule of this contract, or transported from or through Hong Kong or Macao, without the written approval of the Contracting Officer.

(b) The Contractor agrees to insert the provisions of this clause, including this subparagraph (b) and the Soviet-controlled areas listed in the Schedule, in all subcontracts hereunder.

32. ORDER OF PRECEDENCE (September 1962)

To the extent of any inconsistency between any of the following, which are listed in the order of their precedence, the item of higher precedence governs, unless otherwise specified:

(a) The Schedule;
(b) The Terms and Conditions of the Invitation for Bids;
(c) The Additional General Provisions;
(d) The General Provisions;
(e) The Specifications; and
(f) The Drawings.

33. INTEREST (January 1963)

Notwithstanding any other provision of this contract, unless paid within 30 days all amounts that become payable by the Contractor to the Government under this contract (net of any applicable tax credit under the Internal Revenue Code) shall bear interest at the rate of six percent per annum from the date due until paid. Amounts shall be due upon the earliest one of (i) the date fixed pursuant to this contract, (ii) the date of the first demand for payment, (iii) the date of a supplemental agreement fixing the amount, or (iv) if this contract provides for revision of prices, the date of written notice to the contractor stating the amount of refund payable in connection with a pricing proposal or in connection with a negotiated pricing agreement not confirmed by contract supplement.

34. ALTERATIONS (September 1962)

(a) **Clause 1, Definitions,** is hereby revised as follows:

(i) Paragraph (a) is deleted and the following substituted therefor:

(A) The term "Administrator" means the Administrator or Deputy Administrator of the National Aeronautics and Space Administration; and the term "his duly authorized representative" means any person or persons or board (other than the Contracting Officer) authorized to act for the Administrator.

(ii) The following paragraph (d) is added:

(d) The term "NASA" means the National Aeronautics and Space Administration.

(b) **Clause 11, Default,** is hereby revised as follows:

(i) Add to the end of paragraph (d) thereof the following sentence: "The Government may withhold from amounts otherwise due the Contractor for such completed supplies or manufacturing materials such sum as the Contracting Officer determines to be necessary to protect the Government against loss because of outstanding liens or claims of former lien holders."

(ii) Paragraph (e) is hereby deleted and the following substituted therefor:

(e) If this contract contains a clause providing for termination for convenience of the Government, and, if, after notice of termination of the contract under the provisions of this clause, it is determined for any reason that the Contractor was not in default under the provisions of this clause, or that the default was excusable under the provisions of this clause, the rights and obligations of the parties shall be the same as if the notice of termination had been issued pursuant to the clause of this contract providing for termination for convenience of the Government. If this contract does not contain such a clause and, if, after notice of termination of the contract under the provisions of this clause, it is determined for any reason that the Contractor was not in default under the provisions of this clause, the contract shall be equitably adjusted to compensate for such termination and the contract modified accordingly; failure to agree to any such adjustment shall be a dispute concerning a question of fact within the meaning of the clause of this contract entitled "Disputes."

(c) **Clause 12, Disputes,** is hereby revised by deleting the word "Secretary" wherever it appears and substituting therefor the word "Administrator."

(d) **Clause 13, Notice and Assistance Regarding Patent Infringement,** is hereby deleted and the following substituted therefor:

13. **Notice and Assistance Regarding Patent and Copyright Infringement.** (The provisions of this clause shall be applicable if the amount of this contract exceeds $10,000.)

(a) The Contractor shall report to the Contracting Officer, promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this contract of which the Contractor has knowledge.

(b) In the event of any suit against the Government, or any claim against the Government made before suit has been instituted, on account of any alleged patent or copyright infringement arising out of the performance of this contract or out of the use of any supplies furnished or work or services performed hereunder, the Contractor shall furnish to the Government, upon request, all evidence and information in possession of the Contractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except in those cases in which the Contractor has agreed to indemnify the Government against the claim being asserted.

(e) **Clause 14, Buy American Act,** is hereby revised by deleting the word "Secretary" wherever it appears and substituting therefor the word "Administrator."

In paragraph (a)(iii)(B) after the words "United States," (second occurrence), insert "or Canada."

(f) **Clause 16, Eight-Hour Law of 1912—Overtime Compensation,** is hereby deleted and the following Work Hours Act of 1962—Overtime Compensation, is substituted therefor:

16. **Work Hours Act of 1962—Overtime Compensation (December 1962).** This contract, to the extent that it is of a character specified in the Work Hours Act of 1962 (Public Law 87–581, 76 Stat. 357–360) and is not covered by the Walsh-Healey Public Contracts Act (41 U.S.C. 35–45), is subject to the following provisions and to all other provisions and exceptions of said Work Hours Act of 1962.

(a) **Overtime requirements.** No Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any laborer or mechanic to be employed on such work in excess of eight hours in any calendar day or in excess of forty hours in any workweek unless such laborer or mechanic receives compensation at a rate of not less than one and one-half times his basic rate of pay for all hours worked in excess of eight hours in any such calendar day or in excess of forty hours in any such workweek, as the case may be.

(b) **Violations; liability for unpaid wages; liquidated damages.** In the event of any violation of the provisions set forth in paragraph (a) of this clause, the Contractor and any subcontractor responsible therefor shall be liable to any affected employee for his unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed, with respect to each individual laborer or mechanic employed in violation of the provisions set forth in paragraph (a) of this clause in the sum of $10 for each calendar day on which such employee was required or permitted to work in excess of eight hours or in excess of the standard workweek of forty hours without payment of the overtime wages required by the provisions set forth in paragraph (a) of this clause.

(c) **Withholding for unpaid wages and liquidated damages.** The Contracting Officer may withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor, such sums as may administratively be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the provisions set forth in paragraph (b) of this clause.

(d) **Insertion of clause in subcontracts.** The Contractor agrees to insert this clause including this paragraph (d) in all subcontracts.

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The rights and obligations of the parties to this contract shall be subject to and governed by the Schedule and the General Provisions. To the extent of any inconsistency between the Schedule or the General Provisions, and any specifications or other provisions which are made a part of this contract by reference or otherwise, the Schedule and the General Provisions shall control. To the extent of any inconsistency between the Schedule and the General Provisions, the Schedule shall control.

The Contractor represents that aggregate number of employees of the Contractor and its affiliates is [X] 500 or more, [ ] less than 500.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

THE UNITED STATES OF AMERICA

By _____
(Signature)

J. O. MACKEY, JR.
(Contracting Officer)

CONTRACTOR

President and Directors of Georgetown College
(for Georgetown University)
(Name of Company or Individual)

By _____

Joseph A. Haller SJ
(Signature)

(Rev.) Joseph A. Haller, S.J.
(Typed Name)

Treasurer
(Title)

Georgetown University
37th and O Sts., N.W., Washington, D.C., 20007
(Address)

Experimental Program Plan Sent on Nov 22, 63 to Neil Zylich 2 Copies Bruce Bodine 1 Copy

Filter Techniques for Spectral Irradiance

To apply the filter differential method the following must be done:

1) Thermopile calibration -
   a) find incident energy a function of voltage.
   b) determine wavelength dependence, if any.
   c) determine aging effects, temperature dependence, if any.

2) Filter transmission characteristics -
   a) determine the transmission coefficients, τ_λ
   b) determine effect of temperature, aging on τ_λ

3) Determine the spectral distribution of Hg-Xe using the filter method and compare with known distribution -
   a) find largest wavelength band over which τ_λ may be considered constant to give good results.
   b) determine which filters should be used.

The approach to obtaining the required results is outlined below:

Thermopile Calibration

a) Measure output voltage vs. distance from a calibrated standard lamp. The thermopile must view only the filament through the Pyrex envelope.

The incident energy due to the lamp is determined by $E_r = \Sigma I_\lambda \Delta\lambda \, (A/r^2)$ where A mm^2 is the area of the filament, r is the distance in cm from the filament to the thermopile, and I_λ is the intensity in a small range (nanometer) about the wave length λ.

A table of I_λ , as viewed through the quartz window, is supplied with the lamp. This table must be extended to give the irradiance from .2 μ to 3.8 μ ; also a correction must be made to account for the transmission characteristics of Pyrex.

To extend the calibration of the lamp the temperature of the filament must be found. This is done by preparing a table of the Blackbody Radiation functions for several temperatures in the expected temperature range of the filament. For each wavelength (intervals 100nm) in the range .2 μ to 3.8 μ the Blackbody function is multiplied by the emissivity of tungsten and the transmission coefficient of quartz. This gives the spectral irradiance of a tungsten lamp operating at each of the temperatures used. Now, if the values supplied with the standard lamp coincide with the values calculated for a given temperature then the standard lamp must have been operated at that temperature-hence, the range of the calibration may be extended by using the calculated values of $N_{BB\lambda}\, \varepsilon_{w\lambda T}\, \tau_{q\lambda}$ at that temperature ($N_{BB\lambda}$ = blackbody radiation, $\varepsilon_{w\lambda T}$ = emissivity of tungsten, $\tau_{q\lambda}$ = transmission of quartz).

Now, this gives a calibration of the lamp as viewed through the quartz window. If each value of I_λ so obtained is multiplied by $\tau_{p\lambda} / \tau_{q\lambda}$ ($\tau_{p\lambda}$ transmission of pyrex) then the spectral irradiance viewed through the pyrex is obtained. The sum $\sum \bar{I}_\lambda \Delta\lambda$ where $\bar{I}_\lambda$ is the intensity viewed through pyrex is now used in the formula $E_r = (A/r^2) \sum \bar{I}_\lambda \Delta\lambda$.

A plot of V_r vs. E_r (on the log scale for convenience) can then be used to construct a calibration curve for the thermopile.

b) There should be very little wavelength dependence in the range of interest .2 μ to 3.8 μ. To detect any wavelength dependence a monochrometer (such as the Leiss) may be used. The ratio of intensities of a source (standard) (say tungsten) at two wavelengths can be obtained through the electronics associated with the monochrometer. Using the thermopile as detector for the same two wavelengths should then give the same ratio.

c) The temperature dependence can be neglected when a water cooled thermopile is used. The aging effect can be determined by periodic calibrations.

Filter Characteristics

a) The Beckman DK-2 is the most promising device yet for obtaining the transmission coefficients. The coefficients obtained from the DK-2 should be compared with the previous results from the Perkin-Elmer. The determination of these coefficients should be done with as much accuracy as possible.

b) Periodic checks are necessary since the material which gives the filter its characteristics may deteriorate. There is some evidence of this. Certainly extremes in temperature will effect the filter. A simple experiment will show if there will be any need to maintain a temperature level during a run.

Testing the Method by Comparison

a) Using a standard lamp as a source, a calibrated thermopile as a detector and several filters with known transmission characteristics one may determine the percent energy passed by each filter. From this, and the filter transmission coefficients, the intensity of the source in the region covered by the filter may be calculated. To perform the calculation assume the point transmission coefficient may be approximated by an average transmission over a wavelength band Then: $E = \sum \bar{I}_\lambda \tau_\lambda \Delta\lambda$.

One assumption would be that the whole range λ_1 to λ_2 of a filter may be approximated by an average $\bar{\tau}_\lambda$. <u>ie.</u> $E = \bar{I}_\lambda \bar{\tau}_\lambda \Delta\lambda$, $\Delta\lambda = \lambda_2 - \lambda_1$. This may be too crude for a distribution such as is found in Hg-Xe. A better approximation is obtained when the interval $\Delta\lambda$ is halved:

$$E' = (\bar{I}_1 \tau_{\lambda_1}' + \bar{I}_2 \tau_{\lambda_2}') \Delta\lambda$$

And for another filter covering the same range $E'' = (\bar{I}_1 \tau''_{\lambda 1} + \bar{I}_2 \tau''_{\lambda 2}) \Delta\lambda$
It is simple to solve these equations for $\bar{I}_1$, $\bar{I}_2$.

If $\Delta\lambda$ were fairly large, i.e. the whole spectral range .2 to 3.8 μ, had to be covered, then $\bar{I}_1$, $\bar{I}_2$ are not adequate for monitoring the solar simulator.

Suppose $\bar{I}_1$, $\bar{I}_2$ .... $\bar{I}_{10}$ are ~~is~~ sufficient to monitor the simulator. In other words, assume that the energy distribution in ten bands provides enough information. Then a series of ten different filters can be used. The range of transmission of these filters should overlap.

To analyse the results a set of ten simultaneous equations must be evaluated. This is best handled by Matrices-on a computer.

b) Selecting the filters is straightforward in that they must overlap and cover the whole range. In analysing the results of(a) it may be decided that a certain region should have less or more overlap- this would call for a new filter.

LOGIC DIAGRAM

FILTER TECHNIQUES FOR SPECTRAL IRRADIANCE MEASUREMENTS