MA-96-001

AUDIT REPORT

MICROGRAVITY PROJECTS

MARSHALL SPACE FLIGHT CENTER

April 24, 1996

National Aeronautics and Space Administration

OFFICE OF INSPECTOR GENERAL

National Aeronautics and
Space Administration
Headquarters
Washington, DC 20546-0001

Reply to Attn of: W

APR 24 1996

TO: UG/Director, Microgravity Science and Applications Division
DA01/Center Director, MSFC

FROM: W/Assistant Inspector General for Auditing

SUBJECT: Final Report on Microgravity Projects
Marshall Space Flight Center (MSFC)
Assignment No. A-MA-95-006
Report No. MA-96-001

The NASA Office of Inspector General has completed a survey of selected aspects of MSFC microgravity projects. Our survey objectives were to:

- evaluate the progress of selected projects toward achieving established project objectives; and
- identify and consider any alternatives for accomplishing projects quicker and at less cost.

We determined that Marshall's microgravity projects were generally making acceptable progress toward achieving their objectives. MSFC's microgravity research program is attempting to advance the state of the art (technology) in microgravity science and, therefore, individual projects will occasionally experience some difficulties. We did not identify systemic deficiencies in MSFC's management of the microgravity program. The management controls reviewed during our survey were generally adequate to minimize fraud and mismanagement. However, we did note areas where some procedural improvements could be made to better document proposal selection and award of microgravity grants, and to complete the award process in a more timely manner.

We recommended the Director, Microgravity Science and Applications Division (Code UG), the selecting official for microgravity research proposals, comply with NASA guidance for preparing technical evaluations and selection statements on proposals. We also recommended certain improvements to notification letters issued by Code UG.

We issued a discussion draft report on January 31, 1996. Code UG indicated agreement with the recommendations and declined an exit conference; an exit conference was held with MSFC officials on February 29, 1996. We received a written response from Code UG on March 26, 1996. The Code UG management reply is responsive to the audit recommendations and is

incorporated into the report with the complete management response included as Appendix B. In accordance with the OIG's audit follow-up policy, please include our office in the concurrence cycle for closing recommendations 1 and 2.

We appreciate the cooperation and assistance provided by Code UG and MSFC officials during the survey.

Debra A. Guentzel

Enclosure

cc:
HK/A. C. Guenther
JMC/P. Chait
BC01/D. K. Bates
BE01/L. Cucarol
W/N. Echerd

INTRODUCTION

The NASA Office of Inspector General (OIG) has completed a survey of selected aspects of microgravity projects at Marshall Space Flight Center (MSFC). The overall objective of NASA's microgravity program is the utilization of space as a laboratory in which to conduct research in three primary areas: (1) Fundamental Science, which includes the study of the behavior of fluids, transport phenomena, condensed matter physics and combustion science; (2) Materials Science, which includes electronic and photonic materials, metals, alloys, glasses, and ceramics; and (3) Biotechnology, which focuses on macromolecular crystal growth science, separation, and cell science. Research is performed in space to better understand important physical, chemical, and biological processes that are normally made obscure by the effects of gravity. This understanding may add significantly to our knowledge of important industrial processes and may serve as the basis for developing new technologies for use on earth and in space. The Microgravity Science and Applications Division (Code UG) within the Office of Life and Microgravity Sciences and Applications at NASA Headquarters manages the microgravity program.

In 1995 MSFC was designated a NASA center of excellence for microgravity research in the fields of biotechnology and materials science. In early 1996 this designation was changed to "lead center" for microgravity. MSFC is responsible for carrying out a microgravity research program utilizing both space flight vehicles, such as the Space Shuttle, and ground-based facilities including microgravity laboratories and MSFC's drop tower which simulates the weightlessness of space. The research programs are performed under several MSFC contracts and grants, as well as in-house efforts by NASA civil service personnel. Research currently being accomplished under microgravity flight programs on the Space Shuttle may subsequently fly on the International Space Station (ISS).

During our survey, certain Agencywide downsizing initiatives, such as the Zero-Based Review, were in process that included a review of NASA's microgravity program. Some organizational restructuring or changes to NASA's microgravity program may result. Although such changes are not yet finalized, MSFC officials stated the Center will remain a lead center for microgravity research and will likely be given increased responsibility for administration of the Agency microgravity research program. The 1995 NASA Strategic Plan includes

microgravity effort at the Center.

At least five NASA Centers perform microgravity research: MSFC, Lewis Research Center, Jet Propulsion Laboratory, Langley Research Center, and Johnson Space Center. MSFC and Lewis Research Center together have responsibility for about 75 percent of NASA's fiscal year (FY) 1995 microgravity budget of $177 million.

MSFC's microgravity research effort includes: (i) research programs utilizing **space flight**, (ii) **ground-based** research programs, including the use of MSFC's drop tower, and (iii) a **technology transfer and space commercialization** program to promote early industry participation in the development and use of microgravity science. The total funding for MSFC's microgravity effort in FY 1995 was about $71 million and included more than 140 grants and contracts. Almost all of this funding was authorized by NASA Headquarters, Code UG, and most was expended on the Center's microgravity **space flight** research projects. The Office of Space Access and Technology (Code X) provided the funding for MSFC's technology transfer and commercial application effort. There was additional cost for about 300 MSFC civil servants working on microgravity research in FY 1995. Again, most of this effort was for microgravity **space flight** research projects.

OBJECTIVES, SCOPE, AND METHODOLOGY

OBJECTIVES

Our survey objectives were to:

- evaluate the progress of selected microgravity projects toward achieving established project objectives; and
- identify and consider any alternatives for accomplishing projects quicker and at less cost.

Our survey approach relied heavily upon ideas and suggestions provided by responsible NASA officials.

SCOPE AND METHODOLOGY

We identified the extent of MSFC's microgravity effort and evaluated a judgmental sample of current projects to determine the status and overall progress of the projects. We solicited suggestions from NASA officials to identify specific opportunities for reducing cost. We also reviewed the procedures for documenting the selection and notification of the recipients of NASA grant awards to perform microgravity research in response to NASA Research Announcements (NRAs). Our survey included a review of documents and interviews of NASA and contractor personnel, as applicable.

MANAGEMENT CONTROLS REVIEWED

Applicable management controls reviewed included:

- MSFC's monthly progress reports (cost/schedule) submitted to NASA Headquarters, Code UG.
- Implementation of requirements in the NASA FAR Supplement (NFS) and Handbook 5800.1C, Grant Handbook, regarding documentation of actions under NRAs for the selection and award of grants.

AUDIT FIELD WORK

Survey field work was conducted from February through October 1995 at MSFC and NASA Headquarters. The survey was conducted in accordance with generally accepted government auditing standards.

OBSERVATIONS AND RECOMMENDATIONS

We determined that the Center's microgravity projects were generally making acceptable progress toward achieving their objectives. Most projects were attempting to advance the state of the art (technology) in microgravity science; therefore, individual projects will occasionally experience some difficulties. We did not identify systemic deficiencies in MSFC's management of microgravity projects. The management controls included in our survey appeared generally adequate to minimize fraud and mismanagement of microgravity projects. However, we noted that procedural improvements could be made to better document proposal selection and award of NASA Headquarters grants for microgravity research and to complete the award process in a more timely manner. Specifically, we determined that technical evaluations, selection statements, and notification letters could be improved. Our concerns regarding these three documents include their content and use as well as responsibility for preparation.

Technical Evaluations and Selection Statements. NASA Headquarters, Code UG is not in full compliance with Agency directives on documenting the evaluation and selection of research proposals leading to the award of grants for microgravity research. Specifically, the Code UG selecting official for microgravity research grants does not prepare the technical evaluation and selection statements as required by NASA directives.

NFS 18-35.016-70(e)(10) provides guidance and procedures for using NRAs to solicit proposals for research investigations. The NFS requires that the selecting official forward to the contracting officer: (i) the results of the technical evaluation; and (ii) the selection statement.

Code UG often uses grants to fund microgravity ground-based research. NHB 5800.1C, Grant Handbook, 1260.302, requires that proposals selected for award of a NASA grant be supported by proper documentation. For grants awarded under a NRA, an Announcement of Opportunity (AO), or other Broad Agency Announcement (BAA), the NHB specifically requires that the grant officer be provided "... a signed selection statement and technical evaluation based on the evaluation criteria stated in the NRA, AO, or other BAA." Upon receipt, the MSFC grant officer responsible for the award includes these documents in the Center procurement files and initiates award of the grant.

Once the proposals are received, Code UG administers a peer review to include technical feasibility and scientific merit (technical evaluation), and makes the final selection of those proposals to be awarded a grant. Code UG then notifies successful proposal submitters of their selection. Because grant officers at NASA Centers actually award and administer the grants, Code UG also provides the responsible Center a copy of the notification letter. These letters are primarily administrative in nature, and generally do not address technical issues or rationale for proposal selection.

Code UG personnel are the designated "selecting official" for microgravity research proposals to be awarded grant funding. However, our review disclosed Code UG does not comply with the NFS and NHB requirement that the selecting official prepare and provide selection statements and technical evaluations to Center grant officers who are responsible for award and administration of the grants. Instead, Code UG's practice is to have Centers prepare selection statements and technical evaluations. According to Code UG and MSFC officials, the current practice resulted from several factors including evolving documentation requirements and differing interpretations of those requirements by Code UG and MSFC.

We believe the directives clearly require Code UG to prepare these documents. Centers cannot effectively prepare the technical evaluation and selection statement because information on the evaluation and selection process is "close hold," according to Code UG officials. Specifically, Code UG does not provide the Centers the detailed results of the peer review, nor the rationale used by Code UG to rate, rank, and select individual proposals. As a result, selection statements and technical evaluations prepared by MSFC, without benefit of specific data on Code UG's evaluation and selection of individual proposals, contained few specifics and appeared much like form letters. Also, only one general selection statement was prepared for all 19 of the ground-based research proposals.

MSFC officials said they experienced some delay in initiating grant awards because the selection statements which they prepared had to be sent to Headquarters, signed by the Code UG selecting official, and returned before grants could be awarded. In this regard, we noted that selection statements signed by Code UG were dated almost a month after Code UG had notified principle investigators their proposals had been selected. Preparation of required documentation by Code UG, in accordance with NASA directives, should provide for

more timely award of microgravity grants.

The failure to provide selection statements and technical evaluations to grant officers at NASA field installations was previously addressed by the Associate Administrator for Procurement in a letter dated July 8, 1994, to those Headquarter's organizations, including Code U, responsible for the evaluation and selection of proposals to be funded under NRAs and AOs. The Associate Administrator stated "... some installations are attempting to recreate these documents, particularly the technical evaluation and the selection statement, by way of information obtained over the telephone. Such a duplication of effort is not an efficient use of resources and creates a greater chance for error."

We agree. Also, the quality of documentation on the grant selection and award process, as well as the timeliness of awards, would be improved if Code UG prepared selection statements and technical evaluations in accordance with the NFS and NHB requirements.

Notification Letters. Our review disclosed that Code UG letters notifying those individuals whose proposals were selected for award of a grant could be improved by including additional information. Specifically, notification letters generally stated only the amount of funding and the duration (number of years) approved by NASA. Most notification letters did not (1) identify the extent of any differences in the funding and/or duration approved by NASA versus the funding and/or duration requested by the proposal submitter; or (2) provide the rationale for any such differences.

Our review of the 22 announcement letters which Code UG sent to individuals submitting successful proposals (to be administered by MSFC) in response to NRA-94-0LMSA-02, Microgravity Biotechnology, dated February 28, 1994, disclosed the funding level and/or duration approved by NASA differed from that requested by the principle investigator's proposal for 20 of the 22 proposals (See Appendix A). Funding differed on 20 of the 22 proposals ($18.9 million was requested vs $11.7 million which was approved), and duration differed on five proposals. Some proposals received substantial (20 to 40 percent) increases in funding, often in combination with an additional year of research effort. In contrast, the funding and/or duration Code UG approved for other proposals was significantly decreased (40 percent or more).

Notification letters, however, generally did not address these differences or provide an explanation. While we did not identify any reason to question the appropriateness of the Code UG decisions to increase or decrease funding and/or duration on these proposals, we believe the basis for such decisions should be better documented and proposal submitters better informed. Code UG stated a factor in limiting the data in the letters was that the peer review comments on each proposal, as well as details on the ranking and final selection (funding approval/disapproval) of proposals by the NASA selecting official, were considered "close hold" information. We appreciate the sensitive "close hold" nature of data on the evaluation and selection process. However, notification letters would be greatly improved if they identified and briefly explained the rationale for such differences.

Conclusion. The need for improvements in technical evaluations, selection statements, and notification letters was discussed with appropriate management officials at MSFC and NASA Headquarters. They acknowledged the selection statements and technical evaluations should be provided by the selecting official. They also agreed notification letters would be improved by addressing any increase or decrease in funding and/or duration approved by NASA.

RECOMMENDATION 1

The Director, Microgravity Science and Applications Division, should comply with the NASA FAR Supplement and NASA Grant Handbook requirements for preparing selection statements and technical evaluations on proposals for microgravity research.

MANAGEMENT RESPONSE

The Director agreed with the recommendation and plans to fully implement it beginning with the procurements arising from NRA-94-OLMSA-06. The rationale for the Government's acquisition must be adequately explained in the selection statement and technical evaluation and should be documented by personnel as close to the selection process as practicable. However, there appear to be inconsistencies between the NASA Grants Handbook and the NASA FAR Supplement with regard to these requirements. Examples of pertinent documentation now being prepared by Code UG and provided to MSFC are attached.

EVALUATION OF MANAGEMENT'S RESPONSE

The Code UG reply is considered responsive to the recommendation. Attachments to the reply demonstrate the corrective actions taken by Code UG in carrying out assigned responsibility for preparing pertinent procurement documents.

We brought the issues raised by Code UG, regarding apparent inconsistencies in existing procurement guidance, to the attention of responsible officials in the NASA Headquarters Office of Procurement, Contract Management Division (Code HK). They acknowledged the current restructuring of NASA may necessitate certain revisions to procurement guidance, and will give consideration to the issues raised by Code UG. However, they stated that in order to ensure the appropriateness of any substantial revisions, such changes should be made after Agency restructuring actions have been completed.

Code HK officials considered the apparent inconsistency between the NASA FAR Supplement and the NASA Grants Handbook (NGH), regarding responsibility for preparing certain documents, primarily a "semantics" problem with minimal impact. However, Code HK currently is revising the NGH. In order to be consistent with the NASA FAR Supplement, they agreed to replace the term "technical officer" with "selecting official" in the NGH reference addressed by Code UG.

Code HK officials did not agree with Code UG's position that sending a proposal, which had been evaluated and selected by a Headquarters program office, to a field center for procurement/award "... would assign center personnel responsibility for preparing selection statements and technical evaluations." Code HK officials stated the selecting official remains responsible for preparation of the documents and forwarding them to the contracts or grants officer even when a field center will make the award.

RECOMMENDATION 2

The Director, Microgravity Science and Applications Division, should ensure notification letters identify any significant difference in the funding and/or duration requested by the proposal submitter versus that approved by NASA. Notification letters should also briefly state the rationale for any increases or decreases in funding and/or duration.

MANAGEMENT RESPONSE

This recommendation is very reasonable and will be fully implemented with NRA-94-OLMSA-06. Our future notification letters will document in greater detail the rationale and intention of changes directed from the original proposal. An example of a notification letter prepared by Code UG and provided to MSFC is attached.

EVALUATION OF MANAGEMENT'S RESPONSE

The Code UG reply is considered responsive to the recommendation. The notification letter attached to the reply demonstrates the specific corrective actions taken by Code UG.

MAJOR CONTRIBUTIONS TO THIS AUDIT

MARSHALL SPACE FLIGHT CENTER	C. Thomas Hassell, Audit Manager James W. Linville, Auditor-in-Charge

APPENDIX A

RESOURCES REQUESTED VS APPROVED

MSFC MANAGED GRANTS/RTOPS/CONTRACTS AWARDED
Per
NASA RESEARCH ANNOUNCEMENT (NRA) - 94 - OLMSA - 02
(Microgravity Biotechnology)

ID #	RESOURCES PI* REQUESTED Funds (000's)	Years	RESOURCES NASA APPROVED Funds (000's)	Years	INCREASE (DECREASE) Funds (000's)	Years
H-13058D	$739	4	$739	4	-	-
NAG8-1163	407	3	539	4	$132	1
NAG8-1145	521	3	465	3	(56)	-
RTOP	960	4	830	4	(130)	-
NAG8-1152	800	4	755	4	(45)	-
NAG8-0965	300	3	426	4	126	1
RTOP	202	2	202	2	-	-
RTOP	651	4	387	4	(264)	-
NAG8-1147	520	4	518	4	(2)	-
NAG8-1151	644	3	730	4	86	1
NAG8-1162	419	3	536	4	117	1
NAG8-1146	998	4	860	4	(138)	-
NAG8-1193	646	2	281	2	(365)	-
NAG8-1168	592	3	591	2	(1)	-
NAG8-1165	1,646	4	730	4	(916)	-
NAG8-1164	872	4	665	4	(207)	-
H-25793D	631	3	730	4	99	1
NAG8-1148	786	4	487	4	(299)	-
NAG8-1149	997	4	805	4	(192)	-
H-25500D	3,609	5	200	1-2	(3,409)	(3-4)**
NCC8-0080	1,614	4	150	1-2	(1,464)	(2-3)**
NAS8-40633	382	3	114	1-2	(268)	(1-2)**
TOTALS	$18,936		$11,740		$(7,196)	

* PI = Principal Investigator

** Proposal for Space Flight Experiment; but approved only for Flight Definition Phase.

National Aeronautics and
Space Administration
Headquarters
Washington, DC 20546-0001

Reply to Attn of: **UGS96-0148**

MAR 2 5 1996

TO: W/Assistant Inspector General for Auditing

FROM: UG/Director, Microgravity Science and Applications Division

SUBJECT: Response to Audit Report A-MA-95-006

The objectives of the NASA Office of the Inspector General (OIG) in undertaking its survey of Marshall Space Flight Center (MSFC) Microgravity projects were ambitious, but addressed issues critical to the success of the Microgravity Program: "Evaluate the progress of selected projects toward achieving established project objectives; and identify and consider any alternatives for accomplishing projects quicker and at less cost." Progress on particularly the second of these objectives is vital to the health of the microgravity program in an era of intense budget pressure and competition. In this regard, it is disappointing that your survey was not able to congregate more specific ideas for lowering the cost and shortening the schedule of our flight projects. However, I do understand that the survey relied on the contributions of those interviewed for its content, and I believe that the survey effectively involved a broad cross-section of the microgravity program. We will continue to pursue the objective of faster, more economical flight projects, and look forward to continuing efforts, with the OIG as appropriate, toward this end.

The survey made two specific recommendations, both of which address deficiencies in the documentation forwarded to procurement from the selecting official in the course of implementing grants or contracts arising from NASA Research Announcements (NRA's). We have traditionally relied on procurement personnel to provide guidelines for the adequacy of our supporting documentation, and there exists a history of effort between this division, technical personnel at MSFC, and representatives of the MSFC procurement office to design a satisfactory procurement package. However, I do agree with the recommendations provided on page seven of the report, and plan to fully implement them beginning with the procurements arising from NRA-94-OLMSA-06, Microgravity Materials Science: Research and Flight Experiment Opportunities, with the following comments on the respective recommendations:

Recommendation 1: ***The Director, Microgravity Science and Applications Division, should comply with the NASA FAR Supplement and NASA Grant Handbook requirements for preparing selection statements and technical evaluations on proposals for microgravity research.***

I agree that the rationale for the Government's acquisition must be adequately explained in the selection statement and technical evaluation, so that the grant or contract officer can properly fulfill his or her responsibility to represent the interest of the Government in implementing a procurement, and that logically this rationale should be documented by personnel as close to the selection process as practicable. However, there appear to be inconsistencies between the NASA Grants Handbook (NGH) and the NASA FAR Supplement (NFS) with regard to these requirements.

The NGH states in §1260.302 that the technical officer will prepare and furnish to the grant officer a selection statement and technical evaluation. The technical officer is generally understood to be the person who signs a procurement request as the COTR (Contracting Officer's Technical Representative). The NGH does not appear to have anticipated the instance of Headquarters selection and Center procurement. When a proposal selected for award by a Headquarters program office is sent to a field center for procurement, this would assign center personnel responsibility for preparing selection statements and technical evaluations. The NGH also gives no guidance regarding the content of the required documentation. The NFS, on the other hand, at 18-35.016-70(e)(10), stipulates that the selecting official (not the technical officer) must forward to the contracting officer the technical evaluation, selection statement, the selected proposal, a description of any changes desired in the statement of work, including the reasons for the changes and the effect on the level of funding, comments on the offeror's cost proposal, a description of deliverables, data regarding the NRA, copies of relevant correspondence, and a procurement request. The NFS does give guidance at 18-35.016-70 on the purpose of the selection statement, but does not there or in adjacent sections describe the requirements or intent of the technical evaluation. I note that the NFS stipulates that the selecting official is responsible for the procurement request that is forwarded to the contracting official. It has not been the previous practice of this division to forward procurement requests to the field center as part of our documentation. We have relied on field center personnel to work with the procurement office to complete the request, and we believe that this, the most practical means to complete the procurement package, has not resulted in materially deficient procurement packages. The NFS, like the NGH, does not appear to have anticipated the instance of a headquarters selection followed by a center implementation. I recognize that the NFS is a regulatory document and do not intend to knowingly violate its stipulations. I would appreciate the assistance of the OIG, however, to both bring the NGH and the NFS into consistency, and to adapt the governing regulations for NASA research contracting to better recognize the evolving relationship between headquarters and the field centers, not just for the microgravity program, but for every research program that will be looking to field centers for award implementation in a restructured NASA.

Recommendation 2: ***The Director, Microgravity Science and Applications Division, should ensure notification letters identify any significant difference in the funding and/or duration requested by the proposal submitter versus that approved by NASA. Announcement letters should also briefly state the rationale for any increases or decreases in funding and/or duration.***

This recommendation is very reasonable and will be fully implemented. Apart from the requirements of the NFS, there are obvious benefits, not only from the standpoint of procurement, but for the technical management as well, for clear, written documentation on changes to the budget, statement of work, and period of performance. Our past practice has been to allow substantial flexibility for negotiation, particularly regarding the statement of work, between the technical monitor and the principal investigator after selection. There is certainly a greater potential for misdirection in this case than when procurement, the technical officer, and the principal investigator are informed in writing of the rationale and intended consequences for changes in budget, statement of work, and period of performance. Our future notification letters will document in greater detail the rationale and intention of changes directed from the original proposal.

The report, in its survey of microgravity projects, focused on one step in a long and complex process, but it is a critical step; the specification of what the Government will acquire in a research project. However, as clear as is the need for clarity and completeness in contracting, I think you will agree that the guidance under which we document procurement activity is incomplete and inconsistent, and perhaps inappropriate to the model of operations that will be characteristic of the agency in the near future. Your efforts to assist NASA procurement policy in addressing these shortcomings would be of great value to every research program in NASA that conducts competitive selections at Headquarters. We have made a commitment to make our notification letters, selection statements, and technical evaluations more informative to procurement personnel. I trust that our efforts will result in a more efficient and timely procurement process.

For your information, I am enclosing examples of the documentation we have provided to MSFC for the 1994 Microgravity Materials Science NRA; a selection statement, a technical evaluation, and a notification letter. Your efforts to improve our project acquisition and development process are sincerely welcomed.

Robert C. Rhome

Enclosure

cc:
HQ/U/Dr. Holloway
Dr. Nicogossian
UG/Mr. Martin
Dr. Carpenter
UP/Ms. Hoyt

National Aeronautics and
Space Administration

Headquarters
Washington, DC 20546-0001

Reply to Attn of: UGS96-0040

Dr. Daniel R. Talham
Department of Chemistry
University of Florida
Gainesville, FL 32611-2046

Dear Dr. Talham:

I am pleased to inform you that your proposal, "The Features of Self-Assembling Organic Bilayers Important to the Formation of Anisotropic Inorganic Materials in Microgravity Conditions," submitted in response to the NASA Research Announcement *Microgravity Materials Science: Research and Flight Experiment Opportunities*, NRA-94-OLMSA-06, has been tentatively selected for support in ground-based research. Funding for your project has been planned at approximately $70,000 for FY 1996, $70,000 for FY 1997, $70,000 for FY 1998, and $70,000 for FY 1999. You have been provided a four year budget to enable your research activities to conform to our planned schedule of future announcements. This funding plan is lower than your requested budget, consistent with the recommendation of our review and programmatic consideration provided by the Division. I am enclosing a summary of our review of your proposal for your guidance as you plan your project. If programmatic guidance was given it is also provided in the summary. You will be contacted by a representative of the Marshall Space Flight Center to negotiate a final award level and statement of work.

This is not an authorization to proceed with your project, and you should be aware that NASA may not reimburse an expenditure of funds incurred before satisfactory contractual arrangements are agreed upon. Actual funding will be contingent upon the availability of funds and satisfactory progress of your project. If you have any questions regarding your grant, please contact Dr. Michael J. Wargo, either by mail at the above address or by telephone at (202) 358-0822.

I would like to express my appreciation for the effort you have invested in preparing your proposal. I am confident that your research will prove to be a significant contribution to materials science, and to our nation's civil space program.

Sincerely,

Robert C. Rhome
Director, Microgravity Science
and Applications Division

Enclosure

cc:
NASA HQ/UGS/Dr. Carpenter/Dr. Wargo
NASA MSFC/ES71/Dr. Snyder, FA21/Mr. Kearns

Materials Science NRA-94-OLMSA-06

#	Proposer	Affiliation
06-089	Daniel R. Talham	University of Florida

The Features of Self-Assembling Organic Bilayers Important to the Formation of Anisotropic Inorganic Materials in Microgravity Conditions

The proposal is a good one and summarizes some good science done by the PIs, built upon a great body of research by many groups in the area of metal and compound semiconductor growth in restricted geometries. What is less clear is what is new in this proposal vs. what has already been done. The proposed model systems (principally LB films) will be used for some benefit in larger scale solution preparations. It would be helpful to know why control of particle shape is important, in particular for Ag/Pd alloys (even though this is an important system for conductive patterns in microelectronics, why is particle shape important?) and II-VI semiconductors.

In addition, in Task 4, it is mentioned that S^{2-} will be produced via thermal decomposition and used in the synthesis of sulfides, with a reference to the work of Vanderhoff on polymer latexes. What is the relationship between thermal decomposition of a free radical initiator for a polymerization reaction vs. the production of S^{2-} for sulfide synthesis?

However, there is good stuff in this proposal, and it merits serious consideration. It is recommended that the work be funded over four years instead of three, ensuring that sufficient time is available for preparing for low-g experiments.

Selection Statement for the Ground-Based Scientific Investigation of the Proposal for: "The Features of Self-Assembling Organic Bilayers Important to the Formation of Anisotropic Inorganic Materials in Microgravity Conditions"

Procurement Description

NASA Research Announcement NRA-94-OLMSA-06 entitled "Microgravity Materials Science: Research and Flight Experiment Opportunities" was issued on December 12, 1994 for the purpose of soliciting proposals to conduct scientific investigations of microgravity materials science using a low-gravity environment.

Evaluation Criteria

Proposals received in response to NRA-94-OLMSA-06 were evaluated by scientific peers using criteria specified in the NRA with selection being made by the Director of the Microgravity Science and Applications Division.

Categorization of Proposal

The proposal listed above is well conceived scientifically, is technically sound, and is offered by competent investigators. In keeping with the objectives of NRA-94-OLMSA-06, this investigation will lead to an increase in understanding of the role of gravity on earth-based materials science and will broaden participation in the Microgravity Science and Applications ground-based research program. The proposal summarizes some good science done by the investigator, built upon a great body of research by many groups in the area of metal and compound semiconductor growth in restricted geometries.

Investigation Selection

Pursuant to the definition contained in the NASA FAR Supplement 18-70.103, the following is selected as the Principal Investigator for the investigation listed above:

Dr. Daniel R. Talham, University of Florida

This investigation is selected for the performance of the ground-based research as stated in the above proposal.

Role of the Principal Investigator with Regard to Hardware

The Principal Investigator will be responsible for all equipment and hardware associated with the investigation.

Contractual Arrangement

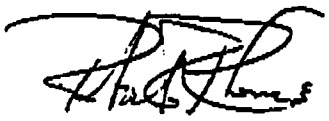
Marshall Space Flight Center is responsible for establishing the required contractual arrangements with the selected Principal Investigator and his/her institution for the effort necessary during the investigation. The Principal Investigator shall be responsible for the overall technical accomplishment of the investigation.

Phased Procurement Aspects

The selection of the investigation is for the ground-based research as stated in the proposal, and procurement of the investigation will be awarded annually until the Project Scientist deems the investigation complete.

Use of Government Owned Space Flight Hardware

No Space Flight Hardware is anticipated for use in this investigation.



Robert C. Rhome, Director
Microgravity Science and Applications Division