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Online FOIA Request Form

National Aeronautics and Space Administration

Headquarters
Washington, DC 20546-0001

November 22, 2011

Reply to Attn of: Office of Communication
Headquarters, FOIA Office

FOIA: 12-HQ-R-00002

This letter is in reference to your Freedom of Information Act (FOIA) request sent to the NASA Office of the Inspector General (OIG) on December 2, 2008. Your request was for:

A copy of the following records from the Office of the Inspector General:

G-98-012, Review of International Space Station Phase I – lessons Learned Activity
NOTE: I WISH TO OBTAIN APPENDICES B AND C ONLY

G-98-005, Enhancing Compatibility for Long-Duration Space Flight Crews
NOTE: I WISH TO OBTAIN THE APPENDICES ONLY

G-98-004, Observations and Recommendations on the Phase I NASA-Mir Science Program
NOTE: I WISH TO OBTAIN THE APPENDICES ONLY

G-98-003, Shuttle-Mir rendezvous and Docking Missions and International Space Station Operational Readiness Task Forces NOTE: I WISH TO OBTAIN THE APPENDICES ONLY

OIG located the responsive NASA records for Items 1-3 and referred them to this office for review and direct response to you. This referral was assigned NASA Case File Number 12-HQ-R-00002. Enclosed you will find these responsive records, released to you in full. The fees associated with the processing of your request are less than $15.00 and are not being charged in accordance with 14 CFR § 1206.700(i)(2)). Please contact me at (202) 358-3924 if you require further assistance.

Sincerely,

Jessica Bowen
Headquarters FOIA Officer

Enclosures

Enclosure 1

G-98-012, Appendices B and C

APPENDIX B

Office of Space Flight Response to Draft Report

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

DEC 18 1998

Reply to Attn of: ML

TO: W/Assistant Inspector General for Inspections, Administrative Investigations, and Assessments

FROM: M/Associate Administrator for Space Flight

SUBJECT: Review of International Space Station (ISS) Phase I Lessons Learned Activity Draft Report G-98-012

The Office of Space Flight (OSF) has reviewed the lessons learned draft report and offers the following comments.

IG Recommendation 1: The Space Station Program Office (SSPO) or the Phase I Program Office should identify a point of contact from the submitting organization for each current lesson to aid in future problem solving.

OSF Comment: Concur.

IG Recommendation 2: The SSPO should ensure that lessons learned activities are an ongoing process. Although some lessons learned in this activity have already been implemented, many of the lessons are still open, and actual implementation of the lessons may occur well into the Phase II program. This process should include program reviews of Phase I lessons and continuing incorporation of ISS lessons learned.

OSF Comment: Concur.

IG Recommendation 3: The SSPO should review other historical sources for applicable lessons to further enhance the effectiveness of the database as well as providing a valuable resource for future human exploration of space.

OSF Comment: OSF agrees with the spirit of the recommendation, but will need to assess the implementation issues before reaching a conclusion.

If you have any questions or require additional information, please contact Mr. Patrick McCracken at (202) 358-1608.

Joseph H. Rothenberg

cc:
Q/F. Gregory
U/A. Nicogossian
JSC/AA/G. Abbey
BU/P. Ritterhouse
NQ/H. Baker
OA/R. Brinkley
F. Culbertson

APPENDIX C

Office of Safety and Mission Assurance Response to Draft Report

National Aeronautics and
Space Administration

Headquarters
Washington, DC 20546-0001

DEC 11 1998

Reply to Attn of: Q

TO: W/Assistant Inspector General for Inspections, Administrative Investigations, and Assessments

FROM: Q/Associate Administrator for Safety and Mission Assurance

SUBJECT: Review of International Space Station (ISS) Phase I Lessons Learned Activity, Draft Report, G-98-012

The Office of Safety and Mission Assurance (OSMA) has been involved in lessons learned activities for approximately 10 years. As a result, we took interest in your draft report and wish to provide the following comments.

IG Recommendation 1: The Space Station Program Office (SSPO) or the Phase I Program Office should identify a point of contact from the submitting organization for each current lesson to aid in future problem solving.

OSMA Comment: Concur. Throughout the history of our involvement in lessons learned activities, we have always believed in having a person's name listed as the point of contact for every lesson.

IG Recommendation 2: The SSPO should ensure that lessons learned activities are an ongoing process. Although some lessons learned in this activity have already been implemented, many of the lessons are still open, and actual implementation of the lessons may occur well into the Phase II Program. This process should include program reviews of Phase I lessons and continuing incorporation of ISS lessons learned.

OSMA Comment: Concur. SSPO, having completed a review of over 500 Phase I lessons learned, has committed (with an implementation plan) to reviewing the Phase I lessons that are still considered open. The first monthly presentation of the status of this plan to the ISS Program Manager is scheduled for December 11, 1998. OSMA and ISS Independent Assessment will be provided these presentations and will assure progress on the implementation of the remaining open issues.

IG Recommendation 3: The SSPO should review other historical sources for applicable lessons to further enhance the effectiveness of the database as well as providing a valuable resource for future human exploration of space.

OSMA Comment: Concur. In fact, per NPG 7120.5A, the ISS Program should transition all the identified lessons to the NASA Lessons Learned Information System (LLIS). Doing so will enable other NASA programs, projects, and Centers, as well as SSPO, to have access to the lessons; will increase the effectiveness of the Agency lessons learned effort; and will provide a single repository of lessons for future human space exploration. Of the 473 lessons that have been identified in the ISS Phase I Shuttle/Mir Program, OSMA is aware of only two that have also been submitted to the NASA LLIS.

For background, NPG 7120.5A requires programs and projects to document lessons learned, and refers to NPD 8700.1, which stipulates that the Associate Administrator (AA) for OSMA is responsible for assuring the collection and retention of lessons learned as a means of recurrence control. Additionally, NPD 8720.1 and NPD 8730.5 both state that the AA for OSMA is responsible for assuring that the NASA LLIS database is maintained and accessible for the collection, retention, and retrieval of lessons learned. OSMA maintains this database on the Web at URL: http://llis.nasa.gov. These policies further stipulate that Center Directors (in NPD 8720.1 and NPD 8730.5) and Associate Deputy Administrators (in NPD 8730.5) are responsible for utilizing the NASA LLIS for documenting, investigating, and applying reliability, maintainability, and quality management related lessons learned information and practices to all NASA programs and projects. NPD 8621.1G.4 also says that Enterprise AA's, Institutional Program Officers, and Center Directors are responsible for contributing to and utilizing the NASA LLIS as a key element of their mishap prevention efforts.

OSMA, as office of prime responsibility for the LLIS, is willing to consider making any and all reasonable modifications to the LLIS to adapt it to ISS needs.

If you have any questions or require additional information, please contact me. You may also contact Mr. Miles Whitnah (ISS Phase I activities) on 358-0411 or Mr. Eric Raynor (NASA LLIS) on 358-4738.

Frederick D. Gregory

cc:
Q/M. Greenfield
M/J. Rothenberg

Enclosure 2

G-98-005, All Appendices

APPENDIX A
(Chronology of Mir Mishaps)

Chronology of Mir Mishaps
(February 1997 - February 1998)

February 26, 1998	Increased presence of carbon monoxide following an emission of smoke into the cabin
January 2, 1998	Main computer failed. Solar panels stopped tracking the sun and the station lost power
December 17, 1997	Inspektr satellite malfunctioned and was abandoned.
October 6, 1997	Progress M-35 supply ship did not undock properly due to a clamp left in place.
September 22, 1997	Main computer failed.
September 16, 1997	Near miss with American science satellite. Crew retreated to the Soyuz.
September 8, 1997	Main computer failed. All systems except life-support equipment were turned off.
August 25, 1997	Primary and backup oxygen generators failed.
August 18, 1997	Main computer failed. Central systems were shut down.
August 18, 1997	Progress redocking failed due to computerized automatic pilot system failure. Crew used manual controls to redock Progress.
August 5, 1997	Two oxygen generators broke down. Crew used special oxygen canisters.
July 17, 1997	Crew member accidentally disconnected a computer cable. MIR lost power and went into free drift.
July 14, 1997	Russian Commander Vasily Tsibliyev has irregular heart beat and was declared unfit for EVA.
July 5, 1997	Cosmonauts report a substance leaking from Spektr. Substance later identified as urine from the Progress vehicle.
July 3, 1997	Stabilizing gyroscopes shut down.
June 27, 1997	Computer disconnected from control system.

June 25, 1997	Progress collided with Mir and damaged a solar panel and the Spektr.
April 11, 1997	Cooling system leaked ethylene glycol fumes.
April 4, 1997	Cooling system leak forced crew to shut down primary carbon dioxide removal system.
March 7, 1997	Oxygen generator failed.
March 6, 1997	Progress failed a manual redock and almost hit Mir.
February 24, 1997	Oxygen generating canister erupted in flames causing the crew to wear oxygen masks. Crew fought the fire until it burned out.

Appendix B
(NASA Management Response)

National Aeronautics and
Space Administration

Headquarters
Washington, DC 20546-0001

MAY 28 1998

Reply to Attn of: ML

TO: W/Assistant Inspector General for Inspections, Administrative Investigations, and Assessments

FROM: M/Associate Administrator for Space Flight

SUBJECT: Response to the "Enhancing Compatibility for Long-Duration Space Flight Crews, Draft Report"

Thank you for the opportunity to review the above subject report. As the office responsible for crew selection, I requested the Johnson Space Center (JSC) to offer comments and clarifications to the report. Their response, which I support, is enclosed.

As you know, the selection of flight crewmembers is a complicated and critical process. Many factors must be considered, including the technical skill and operational capabilities of the candidates. While it should not be considered the primary evaluation factor in the selection of astronaut crews, the compatibility of the crewmembers is another important consideration. Accordingly, the JSC has informed me that they are developing an integrated program to manage flight crew psychological interactions. The aspects being considered for this program include:

1. Enhanced selection criteria for long-duration missions.
2. A Family Support Plan.
3. A Psychological Support Group
4. Individualized adaptation planning for each crewmember.
5. Increased personal interaction between crewmembers and managers for better morale and support.
6. Increased postflight readaptation time.
7. Monitoring of psychological factors, including fatigue, stress, mood, cognition, performance, and behavior (preflight, in flight, and postflight).
8. Experience-based adaptation training, including conflict resolution, coping strategies, etc.
9. Annual behavioral health assessments.

I am satisfied that steps are being taken to improve crew compatibility and psychological support for NASA's future long-duration space flight crews. If you have any questions please contact Mr. Mike Hawes at 358-1854.

Joseph H. Rothenberg

Joseph H. Rothenberg

Enclosure

cc:
J/J. Sutton
JM/D. Green

M-4/G. McClain
ML/W. Hawes
MX/G. Gabourel
JSC/AA/G. Abbey
YA/F. Culbertson
OA/R. Brinkley

Response to Office of Inspector General Report "Enhancing Compatibility for Long-Duration Space Flight Crews"

As an overview response to your April 28, 1998, report, we believe that the recommendations of the Inspector General's Office are helpful and synergistic with the conclusions drawn from it's review of long-duration missions flown in the Phase I, Shuttle-Mir Program. The Mir Phase I Program did anticipate the psychological demands on our long-duration crew members prior to the first Shuttle-Mir mission, and created the Psychological Services Group to provide support for long-duration mission astronauts. At present, JSC is reviewing the implementation of a Behavioral Health and Performance Program, which will be an expansion of the Psychological Services Group and will provide an integrated effort to reach many of the Inspector General's identified goals in this area.

Recommendation 1: "NASA should move forward with the proposed study or propose another study to further validate the select-in criteria for astronauts. The study should be expanded to develop a data base of attributes necessary for use in crew selection for long-duration flights."

Response: Partially Concur We agree that we should move forward with a study that will validate psychological tests and techniques that will be used as aids during the selection process. In 1996, the Psychological Services Group formally began a Selection Upgrade Project, which resulted in an expansion of the attributes thought predictive for use in crew selection. However, we believe that psychological testing is only a part of the crew-selection process.

Recommendation 2: "NASA management should develop and implement a psychological evaluation process as an integral part of an astronaut's annual physical examination. In developing the process, NASA should study mission data in the area of performance and behavior. A preflight and postflight evaluation should be conducted each time an astronaut flies a long-duration mission."

Response: Partially Concur We are reviewing the implementation of regular meetings preflight and postflight with the NASA psychiatrist which would culminate not only in-flight certification, but also in an individual adaptation and potential treatment plan for each crew member. We are also considering the collection of in-flight data to advise the crew member on their health and well being. We are considering the implementation of a behavioral medicine exam that would be conducted during the annual astronaut physical exam, as well as a method to support the health of the mission ground support team as well.

Recommendation 3: "As part of its formal training program, NASA should include training on the stressors that individuals and crews will experience on long-duration flights. NASA should factor into this training the results of the research recommended by the Task Force on Countermeasures."

Response: Partially Concur We concur that psychological training, preparation and support should be provided to the entire mission team. We already provide information and training on coping and adaptive strategies that have been used effectively by previous long-duration astronauts. However, additional preflight training is needed. We are also reviewing, as part of the Behavioral Health and Performance Program, the interface between the crew member and the environment, including habitability, work schedules, and retraining issues during long-duration flight.

In summary, we concur in spirit with the recommendations of the report, with caveats and notations, as provided. Furthermore, we will take additional steps to improve the areas of crew compatibility and emotional stability for our long-duration space-flight crew.

Enclosure 3

G-98-004, All Appendices

APPENDIX A

PAYLOAD STEERING COMMITTEE CHARTER

CHARTER FOR THE NASA-MIR PROGRAM PAYLOAD STEERING COMMITTEE MARCH 1995

PURPOSE:

The Payload Steering Committee (PSC) reviews and approves, as appropriate, integrated NASA science and technology payload plans and allocations for Phase I of the International Space Station Program (NASA-Mir).

SCOPE:

The PSC is responsible for coordinating and integrating requirements from all U.S. science and technology users for the NASA-Mir Program. Issues involving multiple Headquarters user Offices will be brought to the PSC for disposition. The PSC shall remain cognizant of risk mitigation hardware and coordinate the integration of research and technology payloads with risk mitigation hardware.

RESPONSIBILITIES:

a. Establish the level I requirements, priorities, and process for integrating science and technology hardware and investigations into the Phase I program.
b. Establish a science and technology program plan which will include a research plan.
c. Resolve research program implementation issues.
d. Evaluate the research program implementation.
e. Ensure that international implications/agreements relating to science and technology payloads are considered in overall requirements.
f. Provide policy guidance to, and manage activities of the NASA-Mir Payload Planning Working Group.

ORGANIZATION:

Policies deliberated by the PSC are typically implemented by the Associate Administrators of the Offices represented by standing members of the committee. The PSC operates by consensus of its members. If unable to reach consensus within the PSC, the authority to resolve issues will be given to the Associate Administrators of the standing members of the PSC. On a periodic basis, as appropriate, the PSC provides status briefings or reports to the NASA Administrator.

Staff support for the activities of the PSC is provided by the NASA-Mir Payload Planning Working Group. The PPWG is chaired by the Utilization manager, NASA-Mir Program, from the Office of Life and Microgravity Sciences and Applications (OLMSA). The OLMSA is responsible for the mission management and integration resources for all level I science and technology hardware.

COMMITTEE MEMBERSHIP:

- Chairperson : The committee chair shall be the Deputy Associate Administrator for Operations and Space Flight (or designee) of the OLMSA.
- Deputy Chairperson : The committee deputy chair shall be the Deputy Associate Administrator (or designee) of the Office of Space Access and Technology (OSAT).
- Standing Members: Deputy Associate Administrator or designee for the OSAT, OSF, OSS, OMTPE, and Phase 1 Russian Program Manager from the Space Station Program Office.
- Ad Hoc Members: As assigned by the Chairperson, with approval of majority of Standing Members.
- Executive Secretary: Utilization Manager, NASA-Mir Program, Flight Systems Division, OLMSA.
- Recording Secretary: Designee from the OSAT.

CHARTER FOR THE NASA-MIR PROGRAM PAYLOAD STEERING COMMITTEE MARCH 1995

RESPONSIBILITIES AND AUTHORITIES:

Chairperson:

a. Reviews issues brought to the Committee for disposition, acts on behalf of the Committee for minor actions, and names Ad Hoc Members as required.
b. Solicits recommendations from Members on matters facing the Committee and issues findings.

Deputy Chairperson:

a. Acts in the Chairperson's absence.
b. Assists in the development of the agenda for Committee meetings.

Members:

a. Evaluate issues submitted to the Committee and provides recommendations to the Chairperson , as required.
b. May call for additional studies or investigations as needed.

Executive Secretary:

a. Serves as the focal point for all information flow on Committee actions, establishes committee meeting dates, and maintains record and actions of all PSC meetings.
b. Facilitates the timely evaluation of proposed action items by Committee Members.

Recording Secretary:

a. Prepares the minutes and records all actions for each Committee meeting.

APPROVAL:

____
Deputy Associate Administrator, Operations & Space Flight, OLMSA

____
Deputy Associate Administrator, OSS

____
Deputy Associate Administrator, OSAT

W. F. Townsend
Deputy Associate Administrator, OMTPE

____
Deputy Associate Administrator, OSF

APPENDIX B

RECOMMENDATIONS FOR MIR

SCIENCE WORKING GROUP

Background: The Mir Science Working Group (not to be confused with the Mission Science Working Group at JSC) consisted of leading non-NASA researchers in the life and microgravity sciences, chaired by Jeffrey Borer, MD, professor of cardiovascular medicine at Cornell University Medical Center. It was convened in July of 1993 after the Shuttle-Mir Science Program was underway to make recommendations regarding that program and during the follow-on additional missions on Mir which were under consideration at that point. The recommendations below are the output from the July 1993 meeting.

Following the meeting, a draft NASA Research Announcement for life sciences activities on Mir during the Phase 1 program was written. This NRA was reviewed by the committee, and at a meeting of the committee in January 1994, specific recommendations were made on changes to the NRA. The committee, having completed its charter, was then disbanded.

Recommendations of the Mir Science Working Group July 5-6, 1993

Introduction

In order to obtain extramural advice for planning the late stages of the U.S.-Russia cooperative program on the Russian space station Mir and for planning subsequent enhanced U.S. activities in life sciences and microgravity research on Mir, the NASA Office of Life and Microgravity Sciences and Applications empanelled an ad hoc Mir Science Working Group to meet July 54, 1993. The committee was to review the current and planned flight activities between the U.S. and Russia in the areas of life and microgravity sciences with the intention to evaluate the overall scientific and operational benefits of such activities when viewed within known and anticipated constraints."

To this end, the group received formal briefings on the current status of U.S.- Russian space science interactions, including existing plans for cooperative work on shuttle and on Mir through 1995 and proposed strategies for additional fundamental biological observations in the life sciences and for microgravity research. The dimensions and physical capacities of Mir were described and the known characteristics of the Mir environment were reported. The group was charged with evaluating these data and with responding to the following questions.

1) As it now exists, does Mir provide an environment which will permit useful space biology studies by NASA?

2) What additional information, if any, is needed to adequately evaluate the potential for useful NASA/Mir interaction?

3) What conditions, including both physical facilities, human factors, and management policies, are necessary to optimize the return from use of Mir?

4) Should we plan new or altered activities on future Mir missions? As a corollary, what goals should be set at this time for future Mir activities?

5) What procedures should be employed to review and select scientific proposals for use on Mir?

this document summarizes the Working Group's responses to these questions.

Responses

As it now exists, does Mir provide an environment which will permit useful space biology studies by NASA ?

The committee concluded that Mir could provide a useful opportunity for studies in the life and microgravity sciences during long-term space flight. However, sufficient information now is available concerning size, structure and facilities of Mir to indicate that U.S. plans for scientific research must be limited in scope and that the return from such studies in terms of useful new knowledge is likely to be limited. Thus, even if electrical power availability were returned to start-up specifications and the environment could be stabilized to NASA standards, limitations in power availability, physical space, crew size, and the complement of non-removable facilities (which are not adaptable for modem study of life and microgravity sciences) will place important constraints on the use of Mir as a laboratory facility for these disciplines. In fact, optimal usage of Mir for such purposes currently might be best served by selecting among P.I.-specific equipment. In the opinion of the committee, though the capacity for limited long duration study, not otherwise available in the current NASA program, mandates U.S. use of Mir, these constraints render Mir less than comparable to the current NASA Spacelab, as well as to the planned Space Station, for study in biological and microgravity sciences.

The committee was unable to fully evaluate the extent to which, in its current state, Mir can be employed in scientific study because knowledge of the Mir internal environment, as well as the specifications and capabilities of existing Mir scientific facilities, is incomplete. Comprehensive planning cannot be undertaken until the environment and facilities have been more fully characterized, and until the compatibility of available U.S. equipment with Mir can be determined. In addition, it is unclear how or if electrical power, now known to be relatively limited on Mir, can be increased to permit stabilization of the internal environment and extend, broaden, and enhance scientific opportunities.

Nonetheless, the committee believes that a carefully planned program of studies designed to utilize the known characteristics of Mir can form a useful part of the evolutionary process of systematically unraveling the effects of microgravity on biological and physical processes. Thus, though within a strictly limited scope, Mir offers opportunity for fundamental studies involving a variety of organisms (plant, animal and microbial) as well as non-biological materials, which otherwise will not be available during long duration space flight until the launch of Space Station. Mir also can provide opportunity for testing technological developments and for verifying concepts which can be expected to hasten hardware development for Space Station.

2. What additional information, if any, is needed to adequately evaluate the potential for useful NASA/Mir interaction?

The Mir is a space platform for assessment of biological and physical responses to long duration exposure of microgravity. To adequately evaluate the potential for useful

US/Russia interaction on Mir, detailed information must be made available regarding the Mir environment and available experimental systems on board. Such information now is unavailable or severely deficient, and is absolutely required for planning of scientifically useful studies by U.S. investigators. Specific information requirements, divided into the two major categories, are listed below.

A) Environmental Conditions, Spacecraft, and EVA

1. Light
2. Air (Composition and pressure)
3. Temperature
4. Moisture (Relative humidity and condensation)
5. Waste disposal
6. Diet and water analysis
7. Hardware function (repair and quality)
8. Daily work and rest schedule
9. Medical support services
10. Containment of plant, animal and hazardous chemical matter
11. Radiation levels
12. Noise levels
13. Acceleration and vibration characteristics
14. Microbiological bioload of the internal environment, including exposed surfaces, and of crew members

B. Experimental Systems

1. Condition of equipment for monitoring and experimentation
2. Instrument precision, accuracy, and sensitivity
3. Capacity for sample storage (refrigerator and ambient)
4. Capacity for telemetry
5. Capacity for on-board data storage
6. Capacity for instrument hook-ups
7. Capacity for physiological and psychological assessment
8. Access to available systems for preflight, during flight and postflight assessment

3. *What conditions, including but not limited to physical facilities, human factors, and management policies, are necessary to optimize the return from use of Mir?*

Optimal return from use of Mir requires judicious selection of science projects based on 1) scientific validity (good hypotheses and good methods) and 2) feasibility (plausibly achievable during missions). In addition, studies should be chosen based on the degree to which they depend upon the long duration feature of the Mir mission. Moreover, NASA may require integration of two or more projects to maximize scientific benefit..

To obtain optimally developed research proposals, NASA must completely describe to prospective investigators the currently proposed baseline studies, scientific equipment definitely and likely to be available, and general support equipment which will accept new science hardware. Also, it should be made clear to prospective investigators that Russian policy may override NASA decisions in selection of projects.

Because of the constraints imposed by maximal Mir capabilities, hardware, technological and procedural complexities should be minimized. Moreover, given the cultural and language variations of planned crews, crew training requirements also should be maximally simplified. For example, it may be useful to expand projects previously carried out during short duration flights. Data gathered from the short duration experience thus may serve as pilot data for Mir-based long duration projects. Other innovative experiments may be proposed with proper justification. Extensive ground-based preliminary data already available should be used as a basis for! Mir studies whenever possible, and need not be repeated. However, if new and developmental equipment or approaches must be employed, they should be tested on ground-based models before flight. For this purpose, there should be continual ground based involvement and access for investigators to modules and habitats planned for flight. This need applies to all stages in preparation for flight, and should be extended to postflight manipulations, as well as to during-flight ground based controls, when they are employed.

To optimize return from well designed projects, several characteristics of the Mir environment and facilities will require attention. First, power availability aboard Mir should be maximized, if possible to start-up specifications, to provide environmental stability and scientific flexibility. Environmental stability and standards should be naintained by all other available means, and environmental monitoring must be stringent to permit appropriate interpretation of data. SAMS, essential to life and nicrogravity science investigations, should be flown on all Mir missions. Similarly, ample preservation and transport require adequate refrigerator-freezer facilities and ample fixation methods. Optimization of return from Mir would require the availability f such facilities. The committee strongly suggests that participation of all crew iembers should be mandatory for all human studies. Strict adherence to the time ible and individual steps of all experiment protocols should be required. Finally, ecause of the opportunity for increasing sample size and statistical certainty of sults in human studies, NASA should explore the possibility of adopting standard easurement protocols with other international users of Mir to be applied in omedical evaluation of astronauts. For similar reasons, NASA should seek simultaneous return of entire three man crews, rather than staggered return of individuals, so that postflight evaluations can be performed under identical conditions.

4. Should we plan new or altered activities on future Mir missions ? As a corollary, what goals should be set at this time for future Mir activities ?

Mir provides specific opportunities for life science and microgravity research which can supplement NASA's current activities on its own spacecraft and those of Hs existing collaborators, and may provide useful linkage to subsequent investigations on the proposed U.S. Space Station. These opportunities should be utilized, with the development of new activities and specific goals, prioritized according to updated strategic plans.

Given the constraints defined in response 1, above, carefully designed investigations on Mir now should be undertaken in the following areas listed in priority order.

a) Detailed characterization of the internal environment of Mir (see response 2, above) performed over a period sufficient to define environmental variability. These studies will permit interpretation of the large body of data collected by the Soviets and now by the Russians over the past seven years. These data, not yet fully available to us, cannot be interpreted at present because we lack information regarding the environment in which they were collected. It is understood that the environment now extant in the aging spacecraft may differ from that existing earlier in the life cycle of Mir. Nonetheless, characterization at this time will provide outer confidence limits within which to interpret earlier data. In addition, detailed characterization of the environment will provide a necessary baseline for planning future studies.

Monitoring of gross human physiology during long du ration spaceflight. NASA has minimal information regarding human physiology beyond two weeks of spaceflight. The maximum NASA experience is three months, involving few observations. Use of Mir, assuming an acceptably stabilized environment, could add observations of 2 3 months duration in at least 7 -10 humans, usefully enlarging our database and enhancing statistical stability of observations. Though it is understood that facility and environmental limitations on Mir are likely to limit the scope of such studies, simple performance testing and gross physiological measurements, supplemented by simple machine-aided testing (e.g., echocardiography), should be sufficient to importantly add to existing knowledge and inform future planning. The return from this activity could be markedly enhanced by adoption of uniform standards and crew monitoring protocols with other nations which plan 2 3 months flights on Mir, thus enlarging the pool of comparable observational data for analysis. As a corollary, the proposed monitoring program should be organized to permit systematic observations in relation to performance of countermeasures. Such organization can be expected to importantly enlarge the existing database regarding the effects of countermeasures. If the pool of similarly observed crew members is of sufficient size, it might be possible to define controlled studies of different countermeasures, though it is understood that such controlled studies, if feasible at all, would need to be limited in scope.

Research on life support systems, and on environmental sensors to detect systems failure. Mir is an aging spacecraft, and is expected to lose operational status by 1998. Systems research to detect systems/environmental failure can employ Mir's senescence to perfect measures to improve spacecraft monitoring in the future. As a corollary, research should be undertaken to develop crew monitoring systems which may complement environmental monitors in detecting systems failure. Finally, existing life support systems can be perfected and tested with the milieu of the failing Mir spacecraft.

d) Research on plant growth. developmental biology and cell and crystal growth. Facility and environmental limitations are believed to constrain the potential scope of these studies. Nonetheless, selected studies may be well suited to investigation on Mir. If carefully circumscribed so as to employ models which have been well characterized in other environments, studies in several areas can importantly add to our knowledge of fundamental biology and .microgravity science. Such studies can be implemented at any appropriate stage of the cooperative program, and certainly no later than the time of Shuttle-Mir docking, as well as for a follow-on, enhanced, program. Judicious choice of experiments could insure observations in sufficient quantity to provide acceptable statistical reliability of results. Studies of plants may be particularly useful since plants display direct, profound, and readily measurable gravitropic responses which can be studied at the gross physiological, ultrastructural, cell biological, and molecular biological levels.

e) Study of psychosocial human factors. These studies, which can be carried out with questionnaires and /or regular communication with ground-based facilities, can provide information not yet available regarding cross-cultural social interactions in the space environment. This information is necessary to optimize future cooperative efforts in space.

Finally, the committee suggests that NASA should periodically reconsider research opportunities on Mir as information becomes available in response to question 2, above, and as conditions set in response 3, above, are met.

5. What procedures should be employed to review and select scientific proposals for use on Mir?

There are two aspects to the science selection and review process. The first is to recommend review procedures for the baseline Shuttle/Mir Science Program (SMSP) while the second is the review process to support an enhanced SMSP.

For the baseline SMSP, it is recognized that the primary focus should be on life support and environmental studies. However, it is recommended that, to the extent possible, fundamental biology and microgravity experiments should be conducted. Final projects in the baseline program should be recommended by the co-chairpersons of the Shuttle-Mir Working Group. The individual projects should include investigators who have successfully participated in peer-reviewed responses to prior Announcement of Opportunities or NASA Research Announcements and whose expertise may further the scientific goals of the project. In addition, written descriptions of the projects should be prepared and a baseline Shuttle-Mir Review Panel should be convened for the purpose of ensuring that meritorious science is performed. This Panel should be composed of experts drawn primarily from extramural sources.

In the enhanced SMSP, the standard NASA solicitation, review, and selection process should be implemented. The review panel for this enhanced program should consist.

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APPENDIX C

PHASE I NMSP EXPERIMENTS

Phase I NASA-Mir Science Experiments[20]

Type*	Investigation	Mission 2	3	4	5	6	7
AT	Liquid Phase Sintering	X				X	
AT	Commercial Generic Bioprocessing Apparatus (CGBA)		X			X	
AT	Materials in Devices as Semiconductors (MIDAS)		X				
AT	Liquid Motion Experiment (LME)				X		
AT	X-ray Detector						X
AT	Astroculture						X
ES	Earth Observation	X	X	X	X	X	X
ES	Test Site Monitoring			X	X	X	X
ES	Color			X	X	X	X
ES	Prairies			X	X	X	X
ES	Sailwet			X	X	X	X
ES	IKAR			X	X	X	X
ES	Chemistry			X	X	X	X
ES	Rain			X	X	X	X
FB	Incubator	X					
FB	Environmental Radiation	X	X	X	X		
FB	Greenhouse-2		X				
FB	Effective Dose Measurement			X	X		
FB	BRIC			X			
FB	Greenhouse-3				X		
FB	Beetle				X		
FB	Active Dosimetry (CHAPAT)					X	

* AT : ADVANCED TECHNOLOGY ES : EARTH SCIENCES
FB : FUNDAMENTAL BIOLOGY

[20] Source: JSC Phase I Program Manager Office/Mission Scientist

Appendix C

Phase I NASA-Mir Science Experiments

Type**	Investigation	Mission 2	3	4	5	6	7
HLS	Gaze	X					
HLS	Posa	X					
HLS	Renal Stone Risk	X	X			X	X
HLS	Protein Metabolism	X	X				
HLS	Bone Mineral Loss	X	X	X	X	X	X
HLS	MRI	X	X	X	X	X	X
HLS	Posture	X	X				
HLS	Humoral Immunity	X	X	X		X	X
HLS	Volatile Organics	X	X				
HLS	Micro		X				
HLS	Exercise		X				
HLS	Water	X	X				
HLS	Interactions		X	X	X	X	X
HLS	Sleep			X	X		
HLS	Orientation			X	X		
HLS	Cardiovascular Investigations					X	X
RM	SMASE (STS 71, 74, 76, 79)	X*					
RM	MANM (STS 74)		X*				
RM	MWNE (STS 74, 76)		X*				
RM	EDLS		X		X	X	
RM	MEFC		X*	X*	X*	X*	
RM	MEEP (STS 76-STS 86)		X	X	X	X	X
RM	RRMD (STS 79, STA 84)			X*		X*	
RM	MiSDE			X	X	X	X
RM	WMM			X	X	X	
RM	WQM				X*		
RM	VOA (STS 81, 86)			X*			X*
RM	OPM				X	X	X
RN	RME-III				X*		X*
RM	CREAM				X*	X	X
RM	In-Suit Doppler (Shuttle-only)					X*	
RM	SPSR					X	
RM	TPCS					X	X

** HLS : Human Life Sciences RM : Risk Mitigation for Space Station (ISS)

*Docked phase only

Appendix C

Phase I NASA-Mir Science Experiments

Type*	Investigation	Mission 2	3	4	5	6	7
MG	SAMS	X	X	X	X	X	X
MG	PCG-Dewar	X	X	X	X	X	X
MG	DCAM	X	X	X	X	X	X
MG	ICE-MGBx	X					
MG	FFFT-MGBx	X					
MG	CFM-MGBx	X					
MG	QUELD-MIM	X		X	X	X	X
MG	TEM-1-MIM	X					
MG	BTS-DE	X		X	X		
MG	PAS		X				
MG	BTS-CART		X				
MG	MGM (Shuttle only)		X				X
MG	BCAT-MGBx		X			X	
MG	ALB-MGBx			X			
MG	OFFS-MGBx			X			
MG	LMD-MIM			X			
MG	CGEL-MGBx				X		
MG	TEM-2-MIM (contingency)				X		
MG	IPGC-MGBx					X	
MG	PGC-STES					X	
MG	BTS-BIO3D					X	
MG	CAPE-MIM					X	
MG	BTS-COCULT					X	
SS	PIE	X	X	X			
SS	MSRE	X	X	X			

Note: Both PIE and MSRE are passive payloads. They were deployed on the exterior of Kvant 2 by the Mir 21 crew during EVA and retrieved by the Mir 23/NASA 4 crew during EVA.

* MG : Microgravity SS : Space Sciences

APPENDIX D

NASA-MIR PROGRAM MANAGEMENT

OFFICE STRUCTURE

MANAGEMENT STRUCTURE

RSC Energia RSA Russia		NASA
MANAGEMENT WORKING GROUP (WG-0)		
Technical Director ValeRIY Viktorovich Ryumin (RSC-E) Tel: 516-42-56 PSON: 205-961-6153 Fax: 205-961-6164	Technical direction of activities; coordination of activities of working groups	Technical Director Frank L. Culbertson Tel: (281) 483-1386 Fax: *(281)* 483-2968
Technical Director Boris Dmitryevich Ostroumov (RSA) Tel: 281-83-26 Fax: 288-90-63	Technical Coordination of RSA and NASA Activities	Contract Director James R. Nise (NASA) Tel: (281) 244-7520 Fax: (281) 483-2968
Aleksandr Botvinko (RSA) Tel: 9-011-7095-971-9724 9-011-7095-971-8319 Fax: 9-011-7095-251-8702		
Chairman of Crew Training Yuri N. Glaskov Tel: 526-38-48 (Gagarin Crew Training Center) Tel: 526-38-45 Fax: 526-26-12		
MANAGEMENT SUB GROUP		
Group Leader Boris Artemov (RSC-E) Tel: 513-76-14 PSCN: 205-961-6127 Fax: 187-98-77	Configuration Management Control Sub Group that establishes standards and controls for documents and communications	Group Leader Bob Heselmeyer Tel: (281) 483-1292 Fax: (281) 483-3047
WG-0 FCSSWG-FLIGHT AND CARGO SCHEDULES SUB-WORKING GROUPS		
Group Leader Pavel M. Vorobiev (RSC-E) Tel: 516-75-96 PSCN: 205-961-6106 Fax: 187-98-77	This WG-0 sub group is responsible for joint manifesting, flight scheduling, and content definition of joint cargos launched by Russia and by NASA	Group Leader Sharon Castle Tel: (281) 483-5505 Fax: (281) 483-6400

PUBLIC RELATIONS WORKING GROUP (WG-1)

Group Leader		Group Leader
Valery A. Udaloy (MCC-M) Tel: 9-011-7095-513-5803 Fax: 205-961-6207	Defines and coordinates all public relations activity, including measures taken during time of flight.	Debra Rahn Tel:(202)358-1639 Fax: (202) 358-2983

INSTITUTIONAL COMMUNICATIONS (WG-9)
Requirements Sub Group

Chairman		Chairman
Valeri Vladimirovich Grigoriev (RSA) Tel: 7095-971-8439 Fax: 7095-975-4467 Fax: 7095-288-9063		Dan Jacobs Tel: 713-244-8960 Fax: 713-244-8512

SAFETY ASSURANCE WORKING GROUP (WG-2)

Group Leader		Group Leader
Boris Ivanovich Sotnikov (RSC-E) Tel: 513-77-46 PSCN: 205-961-6160	Is responsible for the evaluation of safety requirements of the Mir/Shuttle Program	Gary W. Johnson Tel: (281) 483-4136 Fax: (281) 483-0567

FLIGHT OPERATIONS AND SYSTEMS INTEGRATION WORKING GROUP (WG3)

Group Leader		Group Leader
Vladimir Alekseyevich Solovyev Tel: 581-91-11 Fax: 187-98-77 Victor Blagov	Develops flight programs, crew work schedules, and control, communications, and systems integration requirements	Philip L. Engelauf Tel: (281)483-4416 Fax: (281) 483-33304 George Sandars Tel: (281) 483-1228 Fax: (281)244-5640

MISSION SCIENCE WORKING GROUP (WG-4)

Group Leader		Group Leader
Oleg Nikolayevich Lebedev (RSC-E) Tel: 513-80-32 PSCN: 205-961-6161 Fax: 205-961-6166	Develops scientific programs and experiments, and requirements for scientific equipment.	John Uri Tel: (281) 483-1085 Fax: (281) 483-2888

CREW TRAINING AND EXCHANGE WORKING GROUP (WG-5)

Group Leader Aleksandr Pavlovich Aleksandrov (RSC-E) Tel: 516-07-32 PSCN: 205-961-6163 Fax: 187-98-77 Yuri Kargopolov (GCTC) Tel: 526-23-86 Fax: 526-26-12	Develops requirements for crew functions, programs, schedules and crew training.	Group Leader Charlie Brown Tel: (281) 483-5438 Fax: (281)-483-201 1 Shannon Lucid Tel: (281)-244-8938 Fax: (281)-244-8873

MIR OPERATIONS AND INTEGRATION WORKING GROUP (WG-6)

Group Leader Oleg Nikolayevich Lebedev (RSC- E) and others. Tel: 513-80-32 PSCN: 205-961-6161 FAX: 205-961-6166	For the Mir standalone operations (no Shuttle involved), this group coordinates the hardware integration and operations activities of NASA hardware on Russian vehicles.	Group Leader Rick Nygren Tel: (281) 483-3879 Fax: (281) 483-6089

EXTRAVEHICULAR ACTIVITY (EVA) WORKING GROUP (WG-7)

Group Leader Aleksandr Pavlovich Aleksandrov Tel: 516-07-32 PSCN: 205-961-6163 Yuri Kargopolov (GCTC) Tel: 526-23-86 Fax: 526-26-12	This working group is responsible for defining the EVA requirements and the hardware required to support the EVAs.	Group Leader Richard Fullerton Tel: (281) 483-2589 Fax: (281) 483-2420 Jerry Ross Tel: 281) 244-8905 Fax: (281) 244-8873

MEDICAL OPERATIONS WORKING GROUP (WG-8)

Group Leader Valeri V. Bogomolov (IBMP) Tel: 195-23-63 Fax: 195-22-53 Valeri V. Morgun (GCTC) Tel: 526-38-71 Fax: 526-36-12	This working group is responsible for defining requirements for health care systems in support of astronauts and cosmonauts involved in cooperative missions.	Group Leader Roger Billica Tel: (281) 483-7894 Fax: (281) 483-2224 Gaylon Johnson Tel: (281) 483-4418 Fax: (281) 483-2224

APPENDIX E

PHASE I NMSP SCIENCE PROGRAM METRICS

Appendix E

Phase I NASA-Mir Science Program Metrics

For each science, technology, and commercial discipline, an experiment is an investigation of a scientific phenomenon or process which may utilize one or more instruments. In these metrics, the term experiment is used generically across disciplines. Considering that the NASA/Mir program is a long-term joint endeavor with several areas of study, each science and technology discipline shall determine the success criteria of the investigations in their area. The success of the NASA/Mir science, technology, and commercial research program is measured by:

1. For disciplines which solicit specifically for the NASA/Mir program, the percentage of experiments integrated with respect to the total experiments funded.
   # of experiments integrated for flight / # of proposals funded (for disciplines which solicited specifically for the NASA/Mir program)

2. Percentage of experiments or instruments permitted to fly on either Shuttle or Mir versus the total instruments planned (approved by the PSC) for integration at L-12 months.
   <u># experiments flown</u>
   # planned at L-12 mo.
   Rationale: To measure the success rate for both integrating and flying experiments.

3. Percentage of experiments or instruments attempted per increment versus the number planned at launch.
   <u># experiments attempted</u>
   # experiments flown
   Rationale: To measure the execution rate of all flown experiments.

4. A) Percentage of experiments completed or instruments successfully operated per increment versus the number of experiments or instruments operating periods actually attempted per the JSC-approved daily flight plan on-orbit.
   <u># experiments successful</u>
   # experiments attempted
   Rationale: To measure the experiment/instrument success rate when flight operations impact the planned timeline.
   B) Percentage of data/samples which are successfully transferred and delivered to the investigators.
   <u># samples returned</u>
   # samples taken
   Rationale: To measure the efficiency of experiment data or sample return.

Appendix E

Phase I NASA-Mir Science Program Metrics

5. Percentage of U.S. time spent on Mir with respect to the time allotted by the contract.
   # of U.S. flight days spent on Mir / total # days in contract (equiv. to 2 years)
   Rationale: To measure the amount of US on-orbit time achieved in Phase I with respect to the contractual requirement.

6. Percentage of Russian crew time used for U.S. research with respect to the Russian crew-time allotted by the contract.
   # cosmonaut hours used on-orbit for U.S. research / # cosmonaut hours promised in the contract
   Rationale: To measure the amount of Russian on-orbit time achieved in Phase I with respect to the contractual requirememts.

Metrics for Medical Operations:

7. Percentage of inflight medical events handled successfully.

8. Number of days for rehabilitation of crew members versus planned L+7 days.

Long-term Metrics:

9. Number of publications or presentations made in peer-reviewed journals or Symposia.
   Rationale: To measure the amount of peer-reviewed research resulting from this program.

10. Commercial:
   a)Product transition
      # Successful experiment transitions to next phase of product development
      # Projected experiment transitions to next phase of product development
   Rationale: To quantify the number of projects which reach the next phase of transition to market stage.

   b)Leveraged corporate support:
      Cash/In-Kind corporate commitment by project
      NASA funding by project
   Rationale: To measure the trend of leveraged industry support versus NASA funding

11. Technology:
   The number of technology transfers/patents made by industry/academia.
   Rationale: To quantify technology spin-off activity arts mg from the Shuttle/Mir program experiments.

Appendix E

Phase I NASA-Mir Science Program Metrics

Mir Environment Characterization: Due to the high priority placed on characterizing the Mir environment, the following chart is to be evaluated for each mission with a brief explanation of the high, medium, or low success criteria placed in each cell indicating success of completion.

Phase I NASA/Mir Program Metrics for Environment Characterization

	A. Ensure Health of U.S. Astronauts on Mir	B. Support Phase I Research Program	C. Support ISS Phase 2/3 Development	Comments
1. Light				a. b. c. Not Applicable
2. Air (Quality and pressure)				a. b. c.
3. Temperature				a. b. c. Not Applicable
4. Moisture (Relative humidity and condensation				a. b. Not Applicable c. Not Applicable
5. Waste Disposal				a. b. Not Applicable c. Not Applicable
6. Diet				a. b. c. Not Applicable
7. Water Quality				a. b. Not Applicable c.
8. Daily work and schedule				a. b. c. Not Applicable
9. Medical support services				a. b. Not Applicable c.
10. Containment of plant, animal, and hazardous chemical matter				a. b. Not Applicable c. Not Applicable
11. Radiation				a. b. c.
12. Noise levels				a. b. Not Applicable c. Not Applicable
13. Acceleration and vibration characteristics				a. Not Applicable b. c.
14. Microbiological bioload of the internal environment, (surfaces, crew, etc.)				a. b. Not Applicable c.
15. Resources and capabilities to support research equipment				a. Not applicable b. c. Not Applicable
16. Micrometeroid/orbital debris				a. Not Applicable b. c.

Appendix E

Phase I NASA/Mir Program Metrics for Environment Characterization

Explanatory notes

Numbers/rows correspond to environmental parameters of interest
Letters/Columns correspond to goals I reasons why these parameters are being characterized
Indicate the degree of success in characterizing each of the 15 environmental parameters for the three reasons by entering red (unsuccessful) yellow (moderately successful) or green (successful) in the corresponding blanks.
-Blacked out areas indicate cases where the environmental parameter is not being evaluated for the indicated reason. (E.g. parameter ~l (light level on Mir) is important for the first two reasons (a. and b.) but not for the purposes of supporting ISS Phase 2/3 development. Therefore, characterizing the success of measuring light in support of this goal is not evaluated
The final column provides a comments area to provide information on each parameter I goal. This could be used to note the way in which this parameter was characterized (e.g. light may have been characterized for the goal of ensuring astronaut safety through review of Russian documents, and by actual measurement for the goal of supporting Phase 1 research)

To: Chambers_Lawrence, Elsbernd_Bob, Misener_Garland, Montrose_Mayra, Mortillaro_Philip, Nichols_Stan, Doarn_Charles, Schneider_Victor, Daues_Katherine, Schlagheck_Ron, Kadunc_Rick
From: rzwierko@hq.nasa.gov (Richard Zwierko)
Subject: 19 February HQ IPT (PPWG) Summary
Cc: Gabris_Edward, Havens_Kathryn, Collier_James, Parker_Dr_Bob, Pipkin_Frank, Sistilli_Mark, Reeves_Edmond, Rhome_Robert, Vernikos_Joan, Cintron_Nitza, Nygren_Rick, Uri_John, Sullivan_Tom, Swilley_Marcie
Bcc: Nicogossian_Arnauld, Rummel_John, Nise_Jim, Rausch_Diane, Pool_Sam, Leary_Kathy
X-Attachments:

A. Summary of referenced meeting follows. The next HQ IPT is tentatively scheduled for Wednesday, 12 March at 1100-1200 hrs Eastern (1000-1100 hrs Central) in the 8th floor HQ/Code US POD (east end of HQ Bldg.). Center personnel wishing to participate via telecon please notify me with a phone number tie-in by COB Friday, 14 March. The primary agenda topic will involve discussion of changes/clarification of the remaining Phase I Metrics - numbers six (6) through eleven (11) inclusive, time permitting.

B. Suggested changes/clarifications to the first five (5) Phase I metrics are contained below. Numbers reference the Phase I Metrics approved by the PSC.

Metric #1. - This is interpreted to apply to Life Sciences only. The metric is interpreted as: (# experiments flown)/(# experiments that were accepted for definition post the PRA review). The data is to be accumulated by long duration increment and "totalled" at the end of the (Phase I) program.

Metric #2. - The metric is interpreted as (# experiments flown)/(# experiments planned). The "L-12" month interval in the original metric is deleted to accommodate the effects of "merged experiments" (i.e., a prime PI and one or more CO-PI's), program replanning, schedule slips, etc., and to focus only on the experiments (investigations) actually flown.

Metric #3. - The metric is interpreted as (# experiments attempted)/(# experiments available per long duration increment). This will remove ambiguities associated with experiments conducted over several increments or of one experiment conducted "piecemeal" over an increment.

Metric #4. - Part "A" of the metric is interpreted as (# operations successful)/(# operations attempted) - both parenthesized items referenced to a particular experiment. Part "B" is then interpreted as (# samples planned for return)/(# samples taken); data recorded would be EOM (end of mission) data and would not include delivery time to the PI(s) which could vary considerably.

Metric #5. - This data would be accumulated as "planned" versus "actual" in a distribution function by increment over the length of the Phase I Program. The rationale is self evident.

C. To assist "senior level management" for upcoming mission VIP Briefings and/or associated Press conferences, Victor Schneider requested payload sponsors (via applicable Code U Division elements) to provide the following data at least two (2) or more weeks prior to the mission - AT THE REQUEST OF MANAGEMENT. Data to be provided per experiment should be summarized on a 5" X 7" card and include a 35mm color slide of the experiment hardware and/or salient (experiment) features. The requested data must include: experiment title; objective(s); PI(s); organization or university; what's important and why; uniques aspects of the technology, the data, or the experiment and/or hardware. Additional data such as "reflight" of a prior experiment, key science impacts, commercial aspects, etc., as applicable, should be included.

D. FYI - The members present were informed that ISWE (Ukrainian Welding Experiment) has indicated an interest to fly experimental hardware to the Mir on STS-91. As articulated by HQ/MP/ Levin et al., HQ/MO/W. Green et al., the experiment (an alleged joint and/or cooperative venture) would be stowed on the Mir and eventually would be performed outside of the KVANT II module in an EVA by the Russian Cosmonauts at a later date; the data (samples) would be returned via a Soyuz/Progress (TBD). HQ/MO/W. Green et al. were advised to notify HQ/MP to refrain from further activity on this particular payload until the technical, political and fiscal feasibility can be ascertained.

E. Comments to the above should be forwarded to me via E-Mail. These will be briefly summarized at the next HQ IPT.

APPENDIX F

LISTING OF NMSP MICROGRAVITY-RELATED EXPERIMENTS SHOWING MANY HAVE PRIOR FLIGHT HISTORY

NASA/3 manifesft STS-79

Facility	Exp	Title	Investigator	Affiliation	Program
MGBX	Fac.	Microgravity Glovebox	Donald Riess	MSFC	flew on many shuttle flights starting with USML-1
	BCAT	Binary Colloidal Alloy	David Weitz	U. of Penn	related to similar flight exp. CDOT flown on USML-2
	PAS	Passive Accelerometer	Iwan Alexander	U.of Alabama Huntsville	flew on USML-1
PCG	DECAM	Diffusion-Controlled Apparatus for Microgravity	Danial Carter	New Century Pharmaceuticals,Inc	Part of an extensive PCG program with many previous flights
	GN2 Dewar	Gaseous Nitrogen Dewar	Alex Mc Pherson	U. Cal. Irvine	Part of an extensive PCG program with many previous flights
MIM	Fac.	Microgravity Isolation Mount	Bjarni Tryggvasson	Canadian Space Agency	new facility
BTS	Fac.	Bio Technology System	Steve Gonda	JSC	
	CART	Cartilage in Space	Liza Freed	MIT	part of a series of cell growth investigations
SAMS	Fac.	Space Acceleration Measurement System	Richard Delombard	LeRC	this system flew on many missions

NASA/4 manifesft STS-81

Facility	Exp	Title	Investigator	Affiliation	Program
MGBX	Fac.	Microgravity Glovebox	Donald Riess	MSFC	Flew on many shuttles flights beginning with USML-1
	ALB	Angular Liquid Bridge	Paul Concus	U. Cal Berkeley	same as ICE, on USML-1&2
	OFFS	Opposed Flame Flow Spread on Cylindrical Surfaces	Altenkirch	U. of Washington	Part of an extensive combustion program
PCG	DECAM	Diffusion-Controlled Apparatus for Microgravity	Danial Carter	New Century Pharmaceuticals,Inc	Part of an extensive PCG program with many previous shuttle flights
	GN2 Dewar	Gaseous Nitrogen Dewar	Alex Mc Pherson	U. Cal Irvine	Part of an extensive PCG program with many previous shuttle flights
MIM	Fac.	Microgravity Isolation Mount	Bjarni Trygvasson	Canadian Space Agency	new facility
	QUELD	Queens University Experiment in Liquid Diffusion	Reganel Smith	Queens U., Canada	Involves investigators from many Canadian Universities, augments extensive ground based research
*not run	TEM#2	Technical Evaluation of MIM	Jeff Allen	U. Dayton , Ohio	
	LMD	Liquid Metal Diffusion Experiment	Rosenberger	U. Alabama Huntsville	Part of a program leading to ISS flight
BTS	Fac.	Bio Technology System	Steve Gonda	JSC	
		Diagnostic Experiment reflight (radiation test)			
SAMS	Fac.	Space Acceleration Measurement System	Richard Delombard	LeRC	This system has flown on many missions

NASA/5 manifesft STS-84

Facility	Exp	Title	Investigator	Affiliation	Program
MGBX	Fac.	Microgravity Glovebox	Donald Riess	MSFC	Flew on many shuttle flights beginning with USML-1
	GCEL	Colloidal Gellation	Dan Weitz	U of Penn	augments CDOT exp. from USML-2
PCG	DECAM	Diffusion-Controlled Apparatus for Microgravity	Danial Carter	New Century Pharmaceuticals,Inc	Part of a very extensive PCG program with many previous shuttle flights
	GN2 Dewar	Gaseous Nitrogen Dewar	Alex Mc Pherson	U. of Cal Irvine	Part of a very extensive PCG program with manly previous shuttle flights
MIM	Fac.	Microgravity Isolation Mount	Bjarni Tryggvasson	Canadian Space Agency	
not run	TEM#2	was carried over from inc.4, but still not run			
*not run	QUELD	Queens Univirsity Experiment in Liquid Diffusion	Reganel Smith	Queens U., Canada	
BTS	Fac.	Bio Technology System	Steve Gonda	JSC	
*not run	Diag.exp.	Diagnostic Experiment reflight II (rad. Test)			
SAMS	Fac.	Space Acceleration Measurement System	Richard Delombard	LeRC	This system was flown on many missions

NASA/6 manifesft STS-86

Facility	Exp	Title	Investigator	Affiliation	Program
MGBX	Fac.	Microgravity Glovebox	Donald Riess	MSFC	Flew on many shuttle flights beginning with USML-1
	IPCG	Interometric study of Protein Crystal Growth	Alex Mc Pherson	U Cal. Irvine	Initial experiment in a series to investigate dynamics of PCG
	BCAT-2	Binary Colloid Alloy Test #2	David Weitz	U of Penn	associated and related to CGEL, BCAT-1, CDOT (USML-2)
MIM	Fac.	Microgravity Isolation Mount	Bjarni Tryggvasson	Canadian Space Agency	
	CAPE	Canadian Protein Experiment	Sygusch	U of Monteal	initial CSA protein growth study
	TEM#2	Technical Evaluation of MIM	Jeff Allen	U Dayton, Ohio	
	QUELD	Queens University Experiment in Liquid Diffusion	Reganel Smith	Queens U, Canada	Involves investigators from many Canadian Universities, augments extensive ground based research
BTS	Fac.	Bio Technology System	Steve Gonda	JSC	
	Bio3D	Bio3D	Lelkes & Hammond		Part of cell growth program
SAMS	Fac.	Space Acceleration Measurement System	Richard Delombard	LeRC	This system has flown on many missions

NASA/7 manifesft STS-89

Facility	Exp	Title	Investigator	Affiliation	Program
PCG	DECAM	Diffusion-Controlled Apparatus for Microgravity	Danial Carter	New Century Pharmaceuticals,Inc	Part of an extensive PCG program with many previous flighs
	GN2 Dewar	Gaseous Nitrogen Dewar	Alex Mc Pherson	U Cal. Irvine	Part of an extensive PCG program with many previous flights
MIM	Fac.	Microgravity Isolation Mount	Bjarni Tryggvasson	Canadian Space Agency	
	QUELD	Queens University Experiment in Liquid Diffusion	Reganel Smith	Queens U, Canada	Involves investigators form many Canadian Universities, augments extensive ground based research
BTS	Fac.	Bio Technology System	Steve Gonda	JSC	
	CoCult	CoCult			Part of the cell growth program
SAMS	Fac.	Space Acceleration Measurement System	Richard Delombard	LeRC	This system has flown on many missions

APPENDIX G

NASA MANAGEMENT RESPONSE TO DRAFT REPORT

National Aeronautics and
Space Administration

Headquarters
Washington, DC 20546-0001

11 February 1998

ply to Attn of: U

TO: W/Inspector General

FROM: U/Associate Administrator for Life and Microgravity Sciences and Applications (OLMSA)

SUBJECT: Response to Office Of the Inspector General (OIG) Report, dated 13 January 1998, "Phase I NASA-Mir Science Program Draft Report"

I appreciate the opportunity to evaluate and discuss this draft report. There is no disagreement that the OIG investigations should provide NASA the service of a "disinterested, objective party" in assessing the processes that NASA uses to implement its activities. In this particular case, the OIG directed its assessment at OLMSA process in recruiting and implementing research for the NASA/Mir Phase I Research Program.

The response that follows was coordinated with the JSC and with HQ/Code M, Office of Space Flight. We agree in principle with the thrust of the report recommendations; however, the report contains misconceptions and/or inaccuracies that should be corrected. To this end a number of clarifications, additions and corrections relative to each of the report findings and recommendations are included in the following paragraphs.

General Comments:

Your office was provided a copy of OLMSA Organization and Operations guide which was presented to the Life and Microgravity Sciences and Applications Advisory Committee (LMSAAC), on February 5 and 6, 1998. This document should clarify the specific research acquisition and execution processes that are currently used by OLMSA. This Office's sponsored research program is derived from the NASA strategic goals, mission and vision as stated in the NASA and Human Exploration and Development of Space (HEDS) Strategic Plans. Relevant scientific questions are developed in concert with the appropriate discipline working groups for each specific area of research. The research questions and priorities are then publicized through NASA Research Announcements (NRA) or Announcement of Opportunity (AO). Investigator initiated research proposals may originate from academia, government, or industry. The proposals are reviewed by peer groups for scientific and technical merit. Those that are judged to have high merit and are relevant to the applicable research priorities are selected for further technical review and assigned either to ground or flight research as appropriate. The investigators are contacted, and protocol discussions and negotiations for costs are completed, before the grants and/or contracts are finally approved and funded.

Furthermore, the new OLMSA policy on the acquisition of research and quality assurance control of the peer-review process was also furnished to your office. This policy was developed by OLMSA over the last six months and has been reviewed by the LMSAAC. After their deliberations are complete and advice is provided, this policy will become a part of our formal process.

The OIG has the compendium of OLMSA research abstracts for FY96. The task books for FY97 will be sent to you in the near future as soon as they are completed. Publications are important to university investigators to secure tenure and to continue to obtain new or renewed grants from funding agencies (including NASA). OLMSA continues to support the development of a suitable database for both ground-based and flight experimental data for use by the scientific community at large.

Specific Comments to the OIG Draft Report Recommendations:

Response to your Recommendation 1:

Annual reporting of progress (including scientific meeting presentations, abstracts, preliminary peer-reviewed journal articles, etc.) is a requirement for continued funding. Final completion of the research projects also requires an additional NASA report. It is expected that new information will be published in peer-reviewed journals. OLMSA makes the investigators' annual abstracts available to the broader research community by placing them on the World Wide Web.

We have established with our advisors that the extant peer review process is working well. However, we will continue to evolve this process to assure continued excellence in science and technology as directed by the NASA Administrator. OLMSA endorses for flight research only scientifically and technically meritorious research investigations / experiments as determined either by the peer review process or when sponsored and funded by commercial entities. Your suggestion to withhold funds from investigators until publication of an appropriate level of report is not practical since the cost of research is an ongoing requirement. Moreover, neither NASA nor the funded PIs control the schedule of scientific meetings or journal publication. Therefore we know of no rational basis to withhold funding for failure of this aspect of the program reporting to occur within a specific timeframe.

Although grants traditionally are approved for 3-4 years, they are funded annually and are adjusted based on the measured progress of the investigator over the prior year. Publication of a report in a recognized, peer reviewed journal is similar to the NRA / AO process in the impact that it has relative to schedule. It is not unusual in this process that several years may elapse between the time when the data are received by an investigator(s) and the actual publication date of a report. Since withholding of NASA funding cannot effect the review schedule of an independent peer-reviewed journal, we fail to understand how withholding funds will address this issue.

Response to your Recommendation 2:

Quarterly reports have been provided by the JSC Mission Scientist for your review. A copy of the Phase I Research Program Symposium Interim Results Report held August 5-7, 1997 was also sent to your office. A second, similar symposium is tentatively scheduled to be held at the Ames Research Center on March 31- April 2, 1998. We anticipate holding a third and final symposium this fall to present the final results of the Phase I Program. A draft Phase I Program document for general distribution is enclosed for background information. There are already 15 publications; it is expected that this number will likely more than double in the near future. (The time from submission of a manuscript by an investigator to a publisher to publication in a peer reviewed journal is about fourteen (14) months on average.)

JSC Mission Scientists already emphasize timely submission of Preliminary and Final reports and associated data sets, including pursuing corrective action as necessary. JSC does review investigator compliance with reporting requirements prior to approving future funding.

Response to your Recommendations 3 and 4

The Headquarters Payload Steering Committee (PSC) for the NASA/Mir Phase I Program established metrics to both evaluate the aggregate of the projects' success and to determine the appropriate "lessons learned" to be incorporated into the International Space Station (ISS) Program. However, there are two (2) other sets of metrics that were provided to the OIG audit staff that unfortunately were overlooked and were not mentioned in the OIG report. Research on the Mir has been under contractual agreement with Russia and contractual milestones such as deliverables (CDRLs) have themselves been established as metrics to assure a successful program from a contract cost and performance standpoint. A third set of metrics was established by OLMSA for ISS and will be applied to Phase I. These metrics will assess the value added of the Mir as a research platform in terms of the actual research outcomes and impacts.

As was mentioned to the OIG auditors, for the most part, these metrics can only be evaluated retrospectively when the completed work can be shared and judged by peer review (publication and/or patent) and presented to the appropriate advisory committees and other scientific organizations. While OLMSA has and continues to integrate the lessons learned from Phase I to the ISS Phase II, the ISS Program Office continues to be apprised of the Phase I lessons via the appropriate Phase I Program Office personnel at JSC.

The OIG draft report mentions that inadequate funding was provided to the investigators. We have requested JSC to contact all investigators to assure that they have adequate research funds. However, because each of these investigators enters into a negotiated agreement at the time of their selection, we believe that this allegation can not be substantiated. Not a single investigator has contacted JSC managers or this Office regarding this issue.

Regarding the question of program review which your report raises, OLMSA continues to carefully review the NASA/Mir research activities prior to, during and after the commencement of each new NASA/Mir segment. The IG has always been welcome at these reviews and attended the last video conference held before the flight of the STS-89/NASA 7 increment. Daily reports are reviewed, discussed and the appropriate oversight is exercised during the course of the mission. This Office coordinates activities as necessary with Code S and Code Y; additional reviews regarding each flight are also conducted by the Russian Space Agency/NASA bilateral working groups. Presuming safety and vehicle readiness, each flight and each segment is approved only if the research investigations / experiments meet the predefined criteria established for research aboard the Mir platform. This approval process has been strictly structured so that approval of a mission represents the resultant approvals of several key, independent review groups both in the U.S. and in Russia, and the review and approval of several joint groups.

Response to your Recommendation 5:

We mutually agree that oversight is an important Headquarters function. Regarding the PSC, because of the many reorganizations, transfers of individuals and groups, and consolidations that have occurred at Headquarters as a result of the downsizing process, its charter was no longer viable. Since the Phase I Program was also ending, rather than undertake a major effort to redraft and to coordinate a new charter with all the organizational elements both at Headquarters and the Centers, OLMSA decided it was more expedient to disestablish the PSC and to transfer its function to the Space Station Utilization Board where it more appropriately belongs at this point in time. This memo was given to you at our recent meeting on 30 January.

Throughout the program, we reported the status and scientific results of the NASA-Mir program to appropriate Discipline Working Groups and Advisory Committees. Peer review processes should be applied to the evaluation of the scientific merit of the investigations (as in peer review of journal articles or new grant submissions), and is not an appropriate function for reviews conducted by internal organizations such as the PSC or similar Agency entities. On the other hand independent assessments are appropriate for programmatic and costing evaluations and, as such, can be conducted by special organizations as described in the NASA Strategic Management Handbook.

Response to your Recommendation 6:

Given the depth and scope of oversight by our advisory committees, the National Academy of Sciences and the Congress, the OLMSA peer review process has already received high marks and has been held as a model for others. As noted previously, we are beginning the review of the Life Sciences peer review process to assure continued excellence and to ensure that the process is adequate to achieve that level of quality. Microgravity Sciences review was completed by the National Academy of Sciences and their recommendations are being implemented. OLMSA Commercial Program practices are currently under review by the National Academy of Public Administration. A report is expected early April 1998, after which recommended changes will be implemented, as appropriate.

OLMSA believes that it is in full compliance with the spirit of obtaining expert assessment by independent advisors for our peer review and science oversight. We have always received our technical information from the JSC Program Management Office; but we reserve and retain the right to obtain an independent contractor, NASA or other outside reports as deemed appropriate.

After the accident affecting the Mir Spektr module, OLMSA's contract monitor for ANSER tasked them to support the Program Scientist by developing an independent assessment of the relevant facts for LMSAAC use in its deliberations on the value added of continuing the research program on Mir. In no way was the ANSER report used as a stand alone justification of the issue. Our primary assessment was made by LMSAAC at the September 1997 meeting that was attended by the IG. The LMSAAC recommendation to continue the NASA/Mir research program was carried forward to the NASA Advisory Committee.

While we can debate the merits of doing the same survey with NASA personnel, I believe this would be antithetical at this point. We chose ANSER to provide this assessment accurately and within the short timeframe specified without effecting their other contractual obligations. The statement in the OIG draft report that this task was performed under "...a larger $4.1 million long-term contract..." is misleading since it implies the report was produced as part of a major contract activity when in fact, this was produced with minimum expenditure under a task order to the existing contract. Contrary to the allegations of this report being used as a scientific assessment, this report met a very specific requirement for a semi-qualitative, top level, independent assessment of whether or not the Mir configuration post collision was capable of continuing to support our research objectives.

Finally I remain concerned regarding the statements under the "conclusion" heading of this report. I am especially concerned about the phrase "...it is essential for the Agency to ensure that the scientific experiments are value added." The innuendo of this phrase is to question the underlying scientific validity of the Phase I Program. However, your own introduction acknowledges that " the program has produced some important benefits." your recommendations are all couched in terms of improved management of Phase I and ISS; the report contains no scientific analysis of the results nor do we understand that either you or your staff consider themselves competent to undertake analysis of the scientific data. I therefore

APPENDIX H

MEMORANDUM TRANSFERRING NMSP OVERSIGHT TO THE SPACE STATION UTILIZATION BOARD

National Aeronautics and
Space Administration

Headquarters
Washington, DC 20546-0001

JAN 26 1998

ply to Attn of: US

TO: Distribution

FROM: U/Associate Administrator for Life and Microgravity Sciences and Applications

SUBJECT: NASA-Mir Program Payloads Steering Committee (PSC)

The NASA-Mir Payload Steering Committee (PSC) was established in May 1994 to provide coordination and utilization of NASA experiments and payload manifests for the NASA-Mir Phase I Programs. The launch of the STS-89 mission to Mir represents the flight of the last long-duration U.S. crewmembers to the NASA-Mir and the launch of the final associated research investigations. The final planned flight to Mir, STS-91, in May 1998 will mark the end of the NASA participation in long-duration research or Mir and the return of U.S. research hardware.

With the completion of the long-duration research activities and the extensive changes in personnel and offices participating in the PSC, there is no need to continue this formal organization. Therefore, as Chairman, I am terminating the activities of the PSC and the associated Working Group. Any remaining functions such as the review of metrics, accomplishments, or "lesson-learned" are hereby transferred to the cognizance of the Space Station Utilization Board for incorporation in the International Space Station.

Arnauld E. Nicogossian