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Update of Directorate Activities [1991]

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EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20506

July 29, 1991

MEMORANDUM FOR D. ALLAN BROMLEY

FROM: NANCY G. MAYNARD *NH*
SUBJECT: Update: EOS Engineering Review

Background

As part of the FY 1992 budget process, it was decided that "...an external review of the EOS platform configuration and launch sequence will be undertaken by a group of government, industry, and academic experts..."

The purpose of the review was "...to assess alternatives for the implementation of EOS, including size of platforms, instrument configuration, and launch requirements and sequencing.

The objectives of the review were "...to ensure that the recommended program (1) meets established scientific objectives; (2) places highest priority on achieving data collection needs specifically focused on climate change and global warming issues; (3) minimizes annual funding requirement; (4) minimizes technical risk; and (5) has sufficient resiliency to be adaptable to changing requirements. [Terms of Reference for the review, approved March 4) are attached at Tab A]

The Panel

The Panel established (March 21) to carry out the review consists of the following members:

Chairman

- . Dr. Edward Frieman, Scripps Institution of Oceanography

Members

- . Dr. D. James Baker, Joint Oceanographic Institutes
- . Dr. Peter Banks, University of Michigan
- . Dr. Greg Canavan, Los Alamos National Laboratories
- . Dr. Richard Goody, Harvard University
- . Dr. V. Ramanathan, Scripps Institution of Oceanography
- . Dr. Warren Washington, National Center for Atmospheric Research
- . Dr. Albert Wheelon, (retired Hughes)

Summary of July 18-26 Meeting

The Panel has met twice: May 30-31 and July 18-26, 1991. The agenda for the recent July meeting is attached at Tab B. These meetings were open to the public and the discussions were very candid. Press accounts from the early part of the review only reflect discussions which took place in the first days of the review. This is unfortunate because the nature of the discussions changed dramatically over the following week due to new information and capabilities. (Press accounts are attached at Tab C). The open meetings were concluded on July 24 and the Panel adjourned to prepare a preliminary draft of a report.

As noted, there was some very significant, new information introduced during the review which dramatically changed the nature as well as the conditions of the review. Before listing the Panel's statements/recommendations, it is important that these new conditions of the review are understood. They are as follows:

1. Three new engineering/flight options were introduced during the review which created new and different opportunities for the EOS platforms which had not previously been available to NASA (e.g., when designing the EOS-A platform):

a. Simultaneity requirements for those core instruments which need to be flown together (due to new engineering and launch options) can now be met with smaller platforms such as Atlas.

b. Pointing accuracy (improved) and formation flying make it possible to provide similar conditions to one large platform.

c. New launch options are now available (construction of a Western Test Range will open up the opportunity for utilization of the Atlas IIA platform)

2. Two new developments (just prior to the Review) also significantly influenced the nature of the EOS review:

a. Budgetary guidance from OMB and the Hill (e.g., mark by Senate) indicated that, simply put, there are not enough funds to carry out EOS the way it is currently planned. NASA and the Panel had been asked by OMB to provide a more "resilient" program, given the present and anticipated budgetary limitations.

b. There has been increased pressure for more immediate scientific results for policy-makers (i.e., global warming detection studies), from earlier missions than previously planned.

3. New EOS Options

After the new launch and engineering options had been presented in the review, NASA was asked by the Panel to present some new options which included the use of Atlas-IIAS's and addressed the changing budgetary limitations. NASA developed a strategy using the Atlas for EOS-A and B, the essence of which was that the payload for both A and B would be grouped by scientific question, as defined by the IPCC, and by requirements for simultaneity, and then distributed on Atlas-sized spacecraft (and Deltas as necessary).

Major Recommendations

A list of specific statements and recommendations which may be made by the committee is given in the following section. However, it appears that the Panel will recommend several options with budgetary implications which will include the following:

1. EOS could be reconfigured into a subset of the EOS A and B instruments, grouped by scientific questions, as defined by IPCC, and by requirements for simultaneity, and then flown on smaller platforms that can be launched on smaller satellites (Atlas and Delta). Two options were prepared for the Panel by NASA on the last day of the review.
2. Near-term funding (DOE?) may be recommended to help in expediting earlier launches of generic CLIMSATs, using Remotely Piloted Vehicles (RPVs), for global warming detection.
3. There may be a recommendation for long-term funding for non-NASA agencies (e.g., DOE and DARPA) to develop small spacecraft and instruments.

Other Panel Statements and Recommendations

Based upon the new information which was presented during the review plus the new NASA launch options, the committee is expected to make the following statements/recommendations in the report:

- a. EOS as a key element of the USGCRP as well as other important elements of the USGCRP must be properly supported so the program is able to carry out its planned scientific missions.
- b. The Panel noted that EOS should be viewed as a process not as a satellite or platform.
- c. Due to the availability of the Atlas, simultaneity requirements of those instruments which must be flown together can now be satisfied by smaller platforms.
- d. Smaller satellites may be more useful than the larger ones because there may be less risk budgetarily and there is more diversity of orbits possible for the

different component parts of the EOS instruments.

e. There are new launch opportunities (Western Test Range) plus opportunities for smaller satellites.

f. Satellites planned by science element will help underscore the importance of each science missions (e.g., role of clouds, oceans, etc)

g. The latest proposal by NASA (presented as several options by NASA on the last day which take into account the new technology, launch options, small sats, etc) is a good example of how NASA will be able to meet the budgetary restraints and tie in newer options for earlier flight opportunities.

h. The Panel will strongly support precursor missions and Earth Probes.

i. The Panel will discuss a partnership for the EOS program. NASA, DOD, DOE (ARM, RPVs) must participate in the EOS program. It will also be important to work more closely with foreign partners to obtain data and information. NOAA must be included as a stronger player in aspects associated with long-term monitoring.

j. EOSdis should be readjusted to be paced with the science. Ground operations must be separated from data management.

k. As EOS moves toward the development of new clusters of sensors and earlier flights for certain science missions, the USGCRP may have to be rebalanced to insure that the ground-based programs are properly aligned with the space-based program in EOS. This will necessarily involve a reexamination of certain critical elements of the USGCRP like JGOFS, TOGA, WOCE, etc to insure that their programs are developing at the appropriate rate relative to the relevant space portion of those missions.

l. With regard to the Lawrence Livermore Lab presentation (Brilliant Eyes technology) which essentially claimed that they could do the entire NASA EOS program for 0.5 billion dollars, the Panel was skeptical that they could actually deliver what they promised. Much of their presentation was built on instruments/sensors/launch vehicle technology that is still in concept phase only - not on proven or tested sensors and spacecraft.

However, the Panel will note that there are elements of the LLNL presentation which should be utilized where appropriate. Three main items in particular: (a) RPVs in support of ARM, (b) New sensors (e.g. LIDAR), (c) New, "real" (proven) satellite technology now available to civilian community.

Panel Issues of Concern:

The Panel will voice concern about several related issues:

a. NASA launch time: They have grave concerns about the problems NASA faces regarding the length of time it takes for them to launch any missions. (9 years - due primarily to procurement restrictions and other government regulations.)

b. RPV's: There are many new opportunities for small satellites to be launched on RPV's (Remotely Piloted Vehicles). There is new technology here which was previously unavailable. These RPV's may be able to help in the earlier launch of a number of generic "Climsats" (global warming detection).

c. New remote sensing agency partnership: There will be a major set of new partnerships recommended to do remote sensing of the earth such as in EOS:

NASA
NOAA

DOE

DOD (DARPA, USAF)

d. NOAA: There is serious concern about the way that NOAA is presently not stepping up the its mission of providing the observational arm of space observations.

e. They will stress the importance of scientific infrastructure to deal with the huge amounts of data and information which will be made available. (e.g., they discussed the fact that there is no system now for looking at the world's data from ocean science (like NCAR does for the atmosphere), and perhaps, we need to set up a similar type center for oceans and other discipline areas.

f. There was some discussion about what NASA should do immediately (since they were able to come up with the new options) so that they (a) can make some near term progress and (b) get some credit for being responsive.

Next Steps:

1. Ed Frieman will come to Washington (week of July 29) to meet with Dr. Bromley, the Vice President, Albrecht, Darman, Grady, and Truly to discuss the Panel's conclusions/recommendations and to determine the best strategy for (1) release of the report, (2) Administration strategy for announcement of results to show Administration being responsive to country's needs and those of Congress, (3) NASA's actions - short term and long-term, (4) possible implementation actions, (5) How to get strongest backing from EOS scientists to insure success of project and positive support by scientific community.

2. Possibly set up 2 Committees to deal with the multiagency aspect of the new partnership (and quickly begin the dialogue among agencies involved) within the federal government to do space exploration of Earth: (1) FCCSET Special Committee to handle S&T issues and (2) Space Council Committee to deal with Space Policy issues.

3. Need to provide guidance to NASA on short-term response to Panel report (both before and following release of the report).

4. It will be very important to insure that the science will still drive the program instead of space hardware development. Because this review is only one of the many groups involved in this global change research program (e.g., CEES, NASA Scientific Payload Advisory Committee, NRC), the EOS options recommended by the Panel should be reviewed by the appropriate groups in the scientific community to insure that the space-based program is still integrated with the USGCRP goals and ground-based effort. The timing of the involvement of the scientific community is critical (sooner rather than later) in order to entrain their support in the new EOS.

A partnership among the Engineering Review Panel, the EOS scientists, the Administration, and NASA must be forged in developing a restructured EOS which is politically and scientifically viable.

Earth Observing System External Engineering Review

Terms of Reference

Background

The NASA Earth Observing System (EOS) program has undergone extensive scientific and engineering reviews by: (i) the Committee of Earth Studies of the Space Studies Board of the National Academy of Sciences (NAS); (ii) an NAS panel that reviewed the NASA EOS in terms of approach, content, and scientific relevance to the U.S. Global Change Research Program (USGCRP); and (iii) the Report of the Advisory Committee on the Future of the U.S. Space Program (Augustine Committee) that evaluated NASA's long-term goals, objectives, and programs. Each of these panels strongly endorsed the scientific goals and objectives of EOS, stating that EOS was an essential element of the USGCRP and Mission to Planet Earth (MTPE) program that have been endorsed by President Bush.

Purpose of the Review

As part of the President's FY 1992 budget process, it was determined that "...an external engineering review of the EOS platform configuration and launch sequence will be undertaken by a group of government, industry, and academic experts..."

The purpose of the review will be to assess alternatives for the implementation of EOS, including size of platforms, instrument configuration, and launch requirements and sequencing. The objective of the review are to ensure that the recommended program (1) meets established scientific objectives; (2) places highest priority on achieving data collection needs specifically focused on climate change and global warming issues; (3) minimizes annual funding requirement; (4) minimizes technical risk; and (5) has sufficient resiliency to be adaptable to changing requirements.

For the EOS-A series of platforms, which is an ongoing activity, the purpose of the review is to assess whether any alternatives are significantly superior to the current program, with respect to the objectives stated above. For the EOS-B series of platform, which is currently being reconfigured by NASA, the purpose of the review is to assist NASA in adopting a new design which best meets the stated objectives.

Review Panel Membership

The review will be undertaken by a group of government, industry, and academic experts prior to proceeding with future platform development. The members of this panel shall:

- o be of a sufficiently high level, and of sufficient independence of NASA and its contractors, so that its advice can be considered to be appropriate validation or criticism of NASA's current EOS implementation approach,
- o include an appropriate balance of scientists with strong knowledge of global change science and engineers with extensive technical expertise on the execution of spacecraft hardware and remote sensing instruments, and
- o include, as appropriate, members of both the National Research Council's Panel to Review NASA's Earth Observing System in the Context of the U.S. Global Change Research Program and the Advisory Committee on the Future of the U.S. Space Program (i.e., Augustine Committee) to ensure that the Panel's deliberations benefit from and are consistent with these recent reviews.

Panel Reporting Structure

The Panel will be established by NASA under the provisions of the Federal Advisory Committee Act. It will submit its findings to NASA and report, through NASA, to the NSPC, OMB, and OSTP.

Panel Charge

While ensuring no unacceptable degradation of the current U.S. Global Change Research Program (USGCRP) and EOS scientific objectives (i.e., the recent National Research Council conclusions on the USGCRP and EOS scientific objectives and data simultaneity requirements), this engineering review will include:

1. an analysis of cost, budget, technical, and scientific trade-offs of alternative approaches to the EOS instruments (i.e., relax the complexity of EOS instrument specifications without significant degradation of the science requirements).
2. an analysis of cost, budget, technical, and scientific trade-offs of launching and flying all the EOS instruments (as determined from 1.) with a series of large platforms or with a series of smaller platforms flying in formation. The analysis should also include an examination of alternative platform launch sequences with the objective of accelerating the instruments most directly related to global warming issues. In addition, an analysis should be made on the

possibilities and possible configuration of a near-term (prior to the late 1990s) data collection system focused on rapidly addressing issues specifically oriented around climate change and global warming. This portion of the analysis should include explicit discussion of climate change models and their data needs.

3. as recommended by the Augustine Committee, an analysis of NASA's plans to allow for evolution in EOS technology and science goals during the 15-year life of the EOS program. This NASA plan will be made available to the Panel at the earliest possible date, but not later than May 1, 1991.
4. an analysis of an interagency Committee on Earth and Environmental Sciences report on the cost, technical, budget, scientific utility of using high-altitude, unmanned aircraft missions as precursors or complements to the current ground- and space-based observations. This report will be made available to the Panel at the earliest possible date, but not later than May 1, 1991.

General Requirements

In comparing and analyzing alternatives, the Panel should clearly delineate the trade-offs among annual budget spending levels, total program costs and mission risks. In addition, the Panel should carefully assess the resiliency of the proposed alternatives to possible change in scientific requirements or technical capabilities that could occur over the lifetime of the program. Finally, the Panel's assessment should assess the resiliency of the proposed alternatives to possible future adjustment in budget projections.

The review shall cover both the EOS-A and EOS-B series of instruments and platforms. However, because the EOS-A platform and instruments are currently under development, any recommendations for changes to the EOS-A series must take into account this current status and provide significant risk, schedule, science return, and/or cost advantages over the current EOS-A plan.

Panel Reporting Schedule

The Panel should provide an interim report by June 1, 1991. The Panel should submit its final report by September 30, 1991.

Panel Recommendations

Due to the significant importance and impact of the Panel's recommendations, the Panel will make every effort to ensure that it's recommendations are conveyed in the most straightforward and unambiguous wording.

**EARTH OBSERVING SYSTEM (EOS)
ENGINEERING REVIEW ADVISORY COMMITTEE**

**Meeting
July 18-26, 1991**

**Scripps Institution of Oceanography
Martin Johnson House (Building T-29)
8602 La Jolla Shores Drive
La Jolla, CA**

Thursday, July 18

9:00 a.m. General Committee Discussion

9:15 a.m. EOS Status, Cost, Schedule, and Budget
 Dr. Lennard A. Fisk

11:10 a.m. Discussion on Current Budget Situation
 Dr. Jack Fellows

11:30 a.m. Discussion of Launch Vehicle Availability
 Committee Members
 Col. Pete Worden
 Col. John Angell

12:00 p.m. Launch Vehicle Availability
 Orbital Sciences Corporation
 McDonnell Douglas
 Ariane Space Incorporated

4:30 p.m. Adjourn

Friday, July 19

9:00 a.m. Launch Vehicle Availability
 General Dynamics
 Martin Marietta

12:00 p.m. Committee Discussion

12:30 p.m. Measurement, Simultaneity, and Pointing Accuracy
 Requirements
 Dr. Berrien Moore
 Dr. Richard Garwin

3:30 p.m. Adjourn

Saturday, July 20

9:00 a.m. Results of JASON Project Meeting
Dr. Norvell Fortson
Dr. J. Michael Cornwall

11:00 a.m. Discussion of Small Satellite Planning
Dr. James Hansen
Mr. John Vitko

1:00 p.m. Discussion of Water Vapor Science/Measurements

3:00 p.m. Adjourn

Sunday, July 21

No Session

Monday, July 22

1:00 p.m. USGCRP Planning and Implementation
Dr. Nancy Maynard
Dr. Robert Corell

2:00 p.m. Coordination and Planning
Dr. Robert Watson

3:00 p.m. EOS Budget and Schedule

Tuesday, July 23

9:00 a.m. DOE Programs/Brilliant Eyes
Dr. John Vitko

10:00 a.m. EOSDIS
Mr. Tom Taylor

12:00 p.m. EOS-B Discussion
Dr. Dixon Butler
Mr. Martin J. Donohoe
Mr. Christopher J. Scolese

2:00 p.m. Adjourn

Wednesday, July 24

8:00 a.m. Responses to Call for Perspectives on EOS Program
8-12 Presentations

10:00 a.m. Discussion

11:00 a.m. Adjourn

**EARTH OBSERVING SYSTEM (EOS)
ENGINEERING REVIEW ADVISORY COMMITTEE**

**Scripps Institution of Oceanography
Martin Johnson House (Building T-29)
8602 La Jolla Shores Drive
La Jolla, CA**

Response to Call for Perspectives on EOS

July 24, 1991

8:00 a.m.	General Electric Astro Space Division
8:20 a.m.	TRW
8:40 a.m.	Standard Space Platform Corporation
8:55 a.m.	Rockwell International
9:10 a.m.	Spectrum Research Incorporated
9:25 a.m.	Autonomous Technologies Corporation
9:40 a.m.	Mr. John Pike
9:55 a.m.	Committee Discussion
10:00 a.m.	End of Session

Thursday, July 25

Additional Presentations and Discussion

1:00 p.m. Adjourn

Friday, July 26

9:00 a.m. Final Presentations (if needed)

11:00 a.m. Committee Discussion

1:00 p.m. Future Meeting and Committee Planning

3:00 p.m. Adjourn

*both sessions
cancelled -
Presentations concluded
Panel worked on report
July 25 + 26*

EOS Panel Favors Shrinking Satellites

By DOUGLAS ISBELL
Space News Staff Writer

LA JOLLA, Calif. — The long-standing rift between NASA and outside experts over the size and capabilities of the proposed Earth Observing System (EOS) satellites widened last week at a meeting of a White House panel reviewing the environmental monitoring system.

NASA officials continue to insist that large platforms are the best approach, despite objections by others that smaller, simpler platforms would better fit a shrinking budget plan.

Lennard Fisk, NASA associate administrator for space science, said during a White House panel meeting here July 18-26 that the agency would prefer to delay the missions or take some instruments off the spacecraft, rather than to divide the instruments among smaller satellites.

Among those who preferred smaller satellites was Greg Canavan, a senior scientist at Los Alamos National Laboratories, Los Alamos, N.M., who said the message behind congressional budget constraints "is to generate a program that breaks the instruments up into sequential launches that fit a smaller budget."

EOS is intended to be a comprehensive space-based system to provide long-term data on global environmental change.

NASA plans to spend \$2.9 billion through the end of the decade building the first three platforms, known collectively as EOS-A, and parts of the first platform of the second series, EOS-B1, Fisk said. The first platform in the EOS-A series alone is expected to cost \$950 million, plus launch costs of \$250 million.

See EOS, Page 21

Space News

7/29-8/4, 1991

p. 4

NASA Bucks Panel's Criticism; Backs Big Spacecraft for EOS

EOS, From Page 4

The Senate cast serious doubt on this spending rate in its version of the 1992 NASA spending bill passed July 18. The Senate reduced NASA's \$336 million 1992 request for EOS by \$50 million and told the space agency to expect about half the \$300 million increase it planned for 1993. The Senate also directed NASA to plan for \$5 billion less than the \$16 billion originally forecast for the program through the end of the decade.

At the meetings, NASA officials clung to the concept of large EOS platforms.

Fisk several times raised the option of simply delaying the launch of the first platform beyond 1998.

Other NASA officials warned the panel that major changes to the space agency's existing EOS contracts with GE Astro Space of

East Windsor, N.J., for very large satellites would delay the program by at least two years.

Fisk said the budget cuts suggested by the Senate will lead to both launch delays and significant "casualties" in the number and types of EOS science instruments. "The only way to save money is to not measure something," he said.

However, Canavan and other panel members took a different approach. "I do not think that the budget is advice not to measure something," said Canavan. Parts of the EOS mission could be accomplished by smaller, less expensive satellites, he said. For example, NASA's relatively inexpensive Clouds and Earth's Radiant Energy System (CERES) instrument, which measures radiation flux through the atmosphere, could be combined with a simple device that could image

clouds. "That is one place where a small instrument could have leverage," he said.

Panel member James Baker, president of Joint Oceanographic Institutions, Washington, said, "If we are looking at a greatly reduced budget, we have to look at doing things in a different way. It is more than simply shoehorning the EOS instruments into different configurations."

Panel member Bud Wheelon, a retired executive of Hughes Aircraft Co., warned that, "There is a real danger that we are going to end up with a data system and no satellites, unless we can get [a program] with more resiliency."

The eight-member EOS Engineering Review Panel, established by the White House National Space Council in April to evaluate NASA's elaborate plans for the system, will submit its report to Vice President Dan

Quayle by September 30. The report is expected to guide Bush administration policy regarding future environmental research from space.

A top Office of Management and Budget official said July 23, however, that the administration does not regard the Senate 1992 EOS budget as the final word on the program's fiscal future.

"I would not say we accept [the budget numbers] as new ceilings," Robert Grady, associate director of the Office of Management and Budget for natural resources, energy and science, told a Washington meeting of Women In Aerospace.

"We knew EOS was ambitious and it would be difficult to get funding," Grady added. The current EOS review will help determine "whether there are innovative engineering approaches that might enable us to proceed with

the EOS program even more cheaply, or in a way that will tell us something [about global environmental change] more quickly," he said.

Panel members also discussed ways to draw other U.S. federal agencies into the EOS program.

"We keep forgetting that this is not a NASA program alone," said panel chairman Edward Frieman, director of the Scripps Institution of Oceanography, La Jolla.

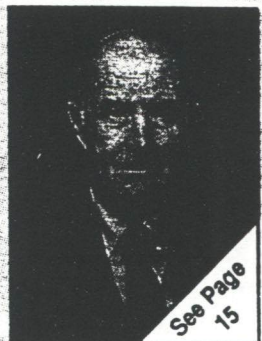
Pete Worden, the space council liaison to the EOS panel, emphasized the capabilities of the Energy and Defense departments during his presentation to the panel July 19. The Department of Energy "will get a small amount of money to start technology development [related to EOS in its 1992 budget], and we would encourage them to get more involved," Worden said.

July 25, 1991

WASHINGTON TECHNOLOGY

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ing... sciences



**PRICING
A MISSION
TO MARS**

Stafford
Says Pick a
Profile and
He'll Cost
It Out

See Page
15

Defensive NASA * Drubbed on EOS

By Gene Koprowski
STAFF WRITER

LA JOLLA, Calif.—White House officials and members of a federal panel last week concurred in a hearing here that NASA must scale back its scientific ambitions for the Earth Observing System, and focus on gleaning useful, credible data for federal policymakers as soon as possible.

"If you live by the press release, you die by the press release," said White House National Space Council staff member Pete Worden, speaking before the EOS Engineering Review panel, at the Scripps Institute of Oceanography here. "We want answers now, not 10 to 15 years from now. As important as science is, it has become secondary to policy in this issue."

James Baker, a scientist and director of the Joint Oceanographic Institutes, Washington, and member of the review panel agreed, before the audience of about 50, including officials from potential contractors General Electric, TRW, Hughes, Martin Marietta, General Dynamics and Orbital Sciences Corp.

"The point of this is not to fly hardware for a technology try-out," said Baker. "We have to find a program that finds data—for our questions."

One example of the need: Six economic bills are pending on Capitol Hill that depend on obtaining knowledge about global change. "Congress wants to

work with us on policy issues," said Worden.

Dr. Lennard Fisk, the NASA associate administrator who heads the EOS project, was defiant, however, about making any changes to the program, a \$30 billion endeavor once called the largest scientific project ever undertaken.

"We are not going to make you procurement officials. You can consider any scenario. You can consider the pros and cons of

continued on page 11

NASA on Defensive

continued from page 1

breaking up the satellites," Fisk told the panel. "But there is a very vocal satellite community out there who will not be kind to you if you make their job harder. Do not glorify yourselves. I view this committee as being in partnership with the agency. Do not tell us that everything we did was wrong."

Though the panel, Worden and Jack Fuller, a deputy to White House Budget Director Richard Darman seem inclined to devise several "options" as to how the program can be configured, NASA rigidly maintains that no changes are needed, even though the Senate called for a restructuring of the program and cut \$5 billion from its budget over the next 10 years.

A meeting attendee and NASA insider said Fisk has staked his credibility—and career—that the EOS—A multi-sensor platform is the only way to go in studying global change. That's why getting changes enacted in the program is so hard, the source said. Moreover, any changes made to EOS could make it into a second version of the Space Station, a long, drawn-out project that barely generates support, observers said. "Fisk knows that," said one insider.

Fisk did, however, admit that the EOS never has had the "consensus" of the science community, and that that was a major problem.

"The barrage of snipers is maddening," said Fisk. "It's almost fatal. We may never get up the budget curve. All of the astronomers were behind the observatories. It's not the same with earth scientists."

Fisk then told the panel that if it made any "radical" changes in EOS, its recommendations would be subjected to scrutiny in the NASA peer review process and submitted once again to the National Acad-

my of Sciences for a study.

A senior space industry official said that this would mean a four-year delay in the program—pushing its launch to past the year 2000. "The committee is being pulled in several directions," said another industry official. "If it endorses the full EOS, it will be called fiscally irresponsible. If it changes the instruments, it will be attacked by some in the science community."

The panel also criticized NASA for portraying several

upcoming satellite missions as "precursors" to the EOS program. When Dr. Jeff Dozier, senior EOS scientist at Goddard Space Flight Center, told the Group that the SeaWifs, TRMM, and TOMS satellite programs would lay the data-gathering groundwork for EOS, he was rebuffed.

"It's a little unfair to say those are part of EOS," said Albert Wheelon, a panel member. "You're on notice that your logic is pretty flimsy. Why do we need anything more, if these are so good? If the things we'll find with EOS are important, we'll have to wait. If not, you're caught." And when it was pointed

out that Sen. Barbara Mikulski put \$15 million in NASA's budget for true precursor satellites, Fisk called them "stupid."

"Scientific illiteracy is alive and well on Capitol Hill," Fisk said.

Separately, the White House has adopted a policy in which it will not eliminate any NASA programs, choosing instead to stick with slow budget growth to maintain the mix of science, space station and space shuttle missions, Worden said.

"But we are not going to kill any part of the space program to give the others money," said Worden. "We're probably stuck with a budget that will go up slowly. There are only limited increases in resources. We like the current balance there is between manned and unmanned." ♦

Members of the Engineering Review Panel

Albert Wheelon

space consultant, Los Angeles

Warren Washington

scientist at the National Center for Atmospheric Research

V. Ramanathan

University of California at San Diego

Edward Frieman

director the Scripps Institution of Oceanography;

Richard Goody

Harvard University

Greg Canavan

Los Alamos National Laboratories

Peter Banks

University of Michigan

James Baker

Joint Oceanographic Institutions

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20506

June 3, 1991

MEMORANDUM FOR D. ALLAN BROMLEY, J. THOMAS RATCHFORD

FROM:

NANCY G. MAYNARD *NM*

SUBJECT:

Environment Update - Week of May 26 and June 3, 1991

The purpose of this memo is to provide you with a brief update on the status of several important environmental activities which are occurring during these weeks.

1. June 5, 1991. 2:30 - 3:30 p.m. - Global Warming Scientific "Skeptics" Meeting.

As requested by Governor Sununu, a meeting between the Governor and a small group of scientists who are somewhat skeptical of the popular approach to the global warming issue has been set up in the Governor's office at 2:30 p.m.

The plan is to have Maynard contact the participants just before the conference and bring them to the meeting without much notice in order to minimize any pre-meeting controversy. One of the participants is presently scheduled to be one of the 2 debaters in a 2-man debate at the exact time of this meeting. Thus, it looks like I will probably have to contact him somewhat earlier and request confidentiality although I fear that the probability of this meeting remaining confidential is close to zero.

- . The participants are: Richard Lindzen (MIT), Patrick Michaels, (UVA), Robert Balling (Arizona St. U), Andrew Solow (WHOI), and Hugh Ellsaesser (Livermore).
- . OSTP attendees: Nancy Maynard, J. Thomas Ratchford, Vickie Sutton
- . White House Attendees: Governor Sununu has invited Bob Grady and Roger Porter.
- . A memo describing a possible agenda to guide the discussion is attached at Tab A.

2. Global Change Regional Institutes - Puerto Rico Workshop:

The planning for the workshop in Puerto Rico, July 15-19, 1991, is in very good shape. The invitation letters from Drs. Bromley and Peck, together with a white paper on the regional institutes, tentative agenda, and logistics summary have all

been sent. Based upon the tentative list of participants from each country, there will be an excellent group of scientists and science policy people attending from the various countries.

As agreed, U.S. delegates will be Tom Lovejoy (Smithsonian) and Mike Hall (NOAA). Tom and Mike provide valuable input from two different aspects of both the science community as well as the science management community. Attending in an advisory capacity will be Paul Risser (U New Mexico/suggested by NAS) and Bob Watson (as chair of Global Environmental Facility).

For your reference, I have attached a copy of the following at Tab B:

1. Letter of invitation from Dr. Bromley
2. Letter of invitation from Dr. Peck
3. Public paper on the regional institute concept
4. Tentative agenda for July workshop
5. List of tentative participants (as of May 10)

Weekly meetings among representatives from Corell's office (conference director), OSTP, CEES WGCG International Task Force, DOS, USGS, and others as appropriate are being held to coordinate the many tasks involved with the logistics of the workshop. I will continue to provide you with updated material regularly between now and the workshop in July.

3. EOS Engineering Review - May 30-31, 1991.

The new Panel set up to carry out the EOS Engineering Review met on May 30 and 31 at NASA Headquarters. Ed Freiman and the Panel members had clearly done a great deal of homework prior to coming to the meeting, and the quality of the discussion during the two days was excellent. There were a number of very good, in-depth presentations by NASA, members of the scientific community, and DOE on various aspects of EOS. The Panel asked many good questions and requested a substantial amount of background information in preparation for the 10-day meeting in July, to be held in La Jolla.

A more detailed report will be prepared for your reference. In summary, however, there appears to be no question that this Panel has taken their charge very seriously and will continue to carry out this review in the most competent, thorough and fair means possible over the next few months.

THE WHITE HOUSE
WASHINGTON

June 3, 1991

MEMORANDUM FOR GOVERNOR SUNUNU

FROM: D. ALLAN BROMLEY 
SUBJECT: Meeting with Global Change Scientists

As we discussed, your meeting on June 5 with the scientists from the CATO Institute Conference on Global Warming has been arranged for 2:30 - 3:30 p.m. in the Roosevelt Room.

In order to spark a lively debate and encourage a good exchange of ideas among the participants, we might allow each of the scientists an opportunity to present a few thoughts on his favorite global change topic. This could be followed by some time for questions and discussion. If you would like each of the participants to address a specific aspect of the global warming issue, we could use an agenda such as the following:

Proposed Agenda

- I. Welcome and Introduction - Governor Sununu
- II. Issues in Global Warming: Science and Politics
 - . Critical Issues in Climate Forecasting - Richard Lindzen
 - . The Detection of Greenhouse Warming - Andrew Solow
 - . Interpreting the Global Temperature Effect - Robert Balling
 - . Atmospheric Science and Global Warming - Hugh Ellsaesser
 - . The Political Science of Global Warming - Patrick Michaels
- III. General Discussion

As you know, I will not be in town on June 5 but Dr. Nancy Maynard (x6202) of my staff, who will be attending the CATO Conference, will take care of the arrangements for the participants and provide support for the meeting. She will continue to stay in touch with your staff to finalize details of the meeting.

Dear :

by cable

I am pleased to invite you to participate in the Workshop for the Development of a Western Hemisphere Institute for Global Change Research hosted by the United States Committee on Earth and Environmental Sciences. The Workshop will take place July 15 - July 19, 1991 at the Normandie Hotel in San Juan, Puerto Rico.

The goal of this Workshop is to design an institute to conduct ~~and to promote~~ scientific and economics research on global change issues that are both unique to the region and important to the world. The Workshop will be asked to develop options and recommendations for the Institute's scientific and economics research agenda. Based on this agenda, the Workshop will be tasked with outlining the functions of such an institute; identifying the capabilities and facilities required; generating options for organization, structure, management, and funding; and, lastly, designing criteria for later selection of a site (or sites).

Several weeks ago we suggested that governments of the Western Hemisphere indicate their interest in this Workshop by selecting two representatives -- a senior scientist to discuss global change research issues and an official with expertise in science management and funding issues -- to attend the Workshop. You were designated by your government to participate in this Workshop and its development of options and recommendations for the establishment of the regional institute.

Included with this invitation is a paper entitled, "Initiative for Development of Regional Global Change Research Institutes" which offers an initial U.S. perspective on some of the relevant issues. We welcome comments on this document and encourage the preparation of similar concept papers. Any such papers may be sent to Dr. Robert Corell, Chairman of the Workshop, via fax (202/357-9629) and/or via diplomatic channels. All papers received will be reproduced and distributed in advance of the Workshop.

Also included is a proposed agenda for the Workshop, an information note on hotel and transportation arrangements, and a copy of the letter Dr. D. Allan Bromley, Science Advisor to President Bush, sent to colleagues in the Hemisphere to inform governments of the overall process by which we propose to establish the Institute.

We are looking forward to your participation in what promises to be an interesting and productive meeting.

Sincerely

Dallas L. Peck
Chairman
Committee on Earth and Environmental
Sciences

Dear

:

As you may recall, a number of initiatives to advance global change research were presented during the White House Conference on Science and Economics Research Related to Global Change last April. One of the most important of these proposed establishment of a network or regional institutes for global change research. In December I had the opportunity, in conjunction with President Bush's visit to Latin America, to discuss with senior science officials in a number of countries the possibility of setting up such an institute in the Western Hemisphere. Their initial response was very positive. Consultations with others in Latin America resulted in equally enthusiastic responses.

It is now appropriate to convene a workshop to bring together experts from Western Hemisphere countries to develop plans for such an Institute. These plans would include a draft agenda for the Institute's scientific and economic research program, and, based on this agenda, an outline of the overall functions of such an institute; identification of the capabilities and facilities required; options for organization, structure, management, and funding; and, lastly, criteria for selection of a site (or sites).

We expect the workshop to result in a series of options and/or recommendations on these points. This report would then be distributed to interested governments and international organizations in preparation for a second meeting later this year at which participants would be asked to formally agree on Institute plans and commit resources to the Institute's establishment and operation.

I have asked Dr. Dallas Peck, Chairman of the Committee on Earth and Environmental Sciences, to host this workshop which will be convened from July 15 - July 19, 1991 in San Juan, Puerto Rico. Dr. Peck will invite the delegates your government has designated to attend the workshop and provide detailed information about it. We are also inviting countries from outside the region which have research interests in the Hemisphere as well as the major international global change research programs, such as the World Climate Research Program (WCRP) and the International Geosphere-Biosphere Program (IGBP), to send observers to the workshop.

I believe this initiative for global change research will assist the countries of the Hemisphere to jointly address a broad range of important global change issues with resulting benefits for all. Such an institute would furthermore serve as a model for establishment of similar institutes in other regions, thus promoting development of a global network of regional institutes which would make major contributions to our understanding of the very important processes which underlie global change.

I look forward to working with you and with our colleagues in other interested countries to assure the effective implementation of this initiative.

Sincerely,
D. Allan Bromley

INITIATIVE
FOR
DEVELOPMENT OF
REGIONAL INSTITUTES FOR GLOBAL CHANGE RESEARCH

In order to understand global change, it is essential to study important aspects of such change on a regional as well as global basis. Improved knowledge of regional physical and biogeochemical processes and their economic implications is needed to determine how these dynamic processes and trends interact with and affect the total Earth system.

To this end, the U.S. has proposed establishment of global change research institutes to bring together the critical mass of resources and capabilities to undertake global change research in three important regions of the world: the Western Hemisphere, Europe/Africa, and the Far East/ Southwest Pacific.

A WESTERN HEMISPHERE INSTITUTE

The United States is convening a planning workshop for the first of these institutes: a "Western Hemisphere Institute for Global Change Research". The objectives of this workshop are, first, to develop a regional consensus for a scientific and management agenda for such an institute; second, to decide on the overall role such an institute should play in global change research and develop an organizational plan; third, to identify criteria for the siting of such an institute; and fourth, to discuss funding requirements and mechanisms for obtaining funding. Workshop participants will be asked to prepare options and/or recommendations regarding the scientific agenda; organization and structure; and siting criteria for a Western Hemisphere Institute for Global Change Research.

It is expected that these options/recommendations will be distributed to governments and to interested international organizations in preparation for a later more formal meeting to 1) consider, modify (if necessary), and approve these recommendations; and, 2) commit financial and in-kind resources for the Institute's establishment and operations.

To assist in the initial planning and design of such a unique research institute, it may be useful for the workshop to consider the following options for the issues listed above. We expect and encourage the development of other options, all of which can be fully and thoughtfully considered at the workshop.

OVERALL FUNCTIONS:

The Western Hemisphere Institute might perform the following overall functions. Since this institute may serve as a model for others to follow, some of these functions might also be appropriate for other such institutes:

- o Develop, conduct and sponsor research on global change issues and contribute to other global-scale research programs;
- o Stimulate interdisciplinary studies of the science and economics of global change;
- o Promote enhancement of scientific and technological capabilities for global change research in the region;
- o Promote collection, analyses, and exchange of global change data, research results, and related information;
- o Develop cooperation with other regional institutes for global change research; and
- o Establish linkages with other international and national institutions involved in global change research, possibly leading to formal affiliations with these institutes.

SCIENTIFIC AGENDA

The following are some broad subject areas which are likely to benefit from study on a regional, as well as global, basis. Such areas would, if included in the Institute's scientific agenda, require characterization and detailing:

- o ecosystems analysis;
- o climate variability;
- o human interactions;
- o model development;
- o economic analysis; and
- o pollution processes.

ORGANIZATION AND STRUCTURE:

The Institute's organization and structure should reflect its scientific agenda and functions and will have to be conditioned by the financial resources expected to be available. Generally speaking, it is proposed that Institute programs be designed to make maximum use of existing capabilities and facilities, linking to and augmenting them as needed to optimize the use of available funds and provide the broadest benefits.

Given these factors, an institute based on the concept of a research network consisting of a central facility and affiliated sites may provide the greatest benefits. Using a network approach, all sites could:

- o conduct and/or sponsor research programs;
- o provide field training; and

- o collect data.

In addition, the central facility could provide:

- o centralized data management facilities;
- o education and training programs for scientists and the public;
- o administrative support for field research; and
- o coordination with other regional institutes.

STAFFING:

If the Institute is assigned a broad range of scientific functions and responsibilities, a central facility may require at least a small permanent (full-time) staff to assure effective day-to-day management of scientific programs, as well as to provide administrative services. Augmenting this central staff with a mix of long- and short-term scientific staff could assure both institutional stability and a steady infusion of scientific capabilities.

It might also be useful to consider long-term "visiting staff" arrangements under which scientists could maintain regular staff positions at their home institutions and also arrange to work at the central facility for a limited time each year.

FACILITIES:

Facilities would also, of course, depend very much on the Institute's scientific agenda and on available resources. However, it is possible to consider establishing at a central facility a suite of facilities, first, to support a wide-ranging scientific program and, second, to augment capabilities and resources of existing institutions in the region.

All sites could include:

- o basic computing and data management systems;
- o laboratories;
- o field program support facilities;
- o communications systems; and
- o scientific libraries.

In addition, the central site might include:

- o a central computer facility;
- o intercalibration and standardization facilities;
- o a communications center;
- o central library facilities;
- o conference and meeting facilities; and
- o access to a (satellite) data receiving facility and related support systems.

MANAGEMENT:

The Institute will require its own management structure, even though it is likely to be linked to an existing institution. Such a management structure could be based on:

- o a board of governors to provide policy guidance, approve the institute's program of work and budget, and assure availability of resources;
- o a director, to oversee the institute's operations and be responsible to the board of governors; and
- o a system for obtaining outside independent advice on and evaluation of the institute's scientific programs and management.

ADVISORY SERVICES AND PROGRAM/MANAGEMENT EVALUATION:

Considering the broad mandate of the Institute, it may be appropriate to provide for review of the Institute's scientific programs and management on a regular basis. It might be useful to establish oversight committees both to review the Institute's scientific programs and its operations and management and to provide advice on these issues to the board and/or the director.

Such committees generally are most effective if they bring outside independent expertise to bear on the issues they address. Thus, any such committees probably should be composed of experts from outside of the Institute. Perhaps a committee for scientific program review could best be organized under an independent international scientific organization such as ICSU.

FUNDING:

Again, funding requirements will be determined by the breadth of the scientific agenda, organization, structure, and location of the Institute. In addition, the nature and extent of the facilities and resources made available by host countries will impact on the Institute's budget. However, it is clear that such an Institute will require substantial funding for both start-up costs and its long-term operations. The U.S. is prepared to contribute programmatic funding for these institutes and hopes that other countries will also contribute.

Substantial funding of both start-up and operating costs could be sought from a broad range of potential sponsors. These include, but may not be limited to, countries, intergovernmental organizations, international scientific organizations, and private foundations. Commitments of such resources should be sought from potential sponsors as soon as agreement is reached on the scope of the initiative. It may

be useful to consider various ways in which such commitments could be sought and how the resulting funds could be made available to the Institute.

CRITERIA FOR THE LOCATION OF THE INSTITUTE:

In addition to locating the Institute within existing facilities, it could be desirable to site the Institute at locations convenient for the conduct or support of some aspects of its planned research programs. The central facility would very likely benefit from ready access to major transportation facilities; to a modern communications center; to engineering and equipment support facilities; banking facilities and to computer services.

Finally, it is likely to be important that the Institute be established at a location at which arrangements can be facilitated for administration, staffing, and operations.

AGENDA FOR THE WORKSHOP FOR DEVELOPMENT
OF A WESTERN HEMISPHERE INSTITUTE
FOR GLOBAL CHANGE RESEARCH

Monday, July 15

3:00 - 6:00: Registration

6:00 - 9:30: Welcoming Reception and Dinner hosted by the
 Committee on Earth and Environmental Sciences
Cocktails: 6:00 - 7:30
Dinner: 7:30 - 9:30

Tuesday, July 16

(Registration for participants arriving after 6:00, July 15)

Plenary Session I

Introductory Remarks: Dr. Dallas L. Peck

Keynote Address: Dr. D. Allen Bromley

Overview of the Workshop Objectives: Dr. Robert Corell

National Presentations

Brief discussions (approx. 10 minutes) on each country's
specific research interests and priorities in the field of
global change might provide a useful foundation for the working
group sessions

Wednesday, July 17

Morning

Working Group 1 - topics suggested for discussion are the following:

What are the regionally relevant scientific issues worth studying in
terms of the causes and effects of global change and the
interactions between change, ecological processes, and economic
impacts?

What type of evaluation mechanism will assure the excellence and
credibility of the scientific research?

How can this inter-disciplinary scientific agenda be structured in

order to be receptive to broader public policy needs?

What functions are necessary for the support of the scientific agenda (in terms of the conduct of research, management of data, organization of education programs and regional/global interactions)?

Afternoon

Working Group 1: - continues

Working Group 2: - topics suggested for discussion are the following:

What type of facilities, management structure, and staffing requirements are necessary for the Institute to fulfill these functions?

What are the most necessary, viable and appropriate long-term funding mechanisms for the core facility and what are the funding needs and/or possibilities to augment research at affiliated locations within the region?

Thursday, July 18

Morning

Plenary: Review progress of Working Groups

Working Groups 1 and 2: Reconvene as necessary

Afternoon

Working Group 3 - topics suggested for discussion are the following:

(Based on the recommendations of Working Group 1 and the status report of Working Group 2) What should the criteria be for locating the Institute's central facility and developing links to affiliated research sites, assuming that the objectives are responsiveness to regional needs and interests, a global orientation, and linking to and augmenting existing resources?

Drafting Sessions (as necessary)

Friday, July 19

Plenary: Consideration and Adoption of Report

Concluding Remarks: Dr. Robert Corell

(DRAFT) INFORMATION NOTE

Conference Logistics

The "Workshop for Development of a Western Hemisphere Institute for Global Change Research" will be held 15-19 July 1991 in San Juan, Puerto Rico. The meeting will be hosted by the United States Committee on Earth and Environmental Sciences and complete meeting support services will be provided.

The meetings and social functions will be held at the Radisson Normandie Hotel, Munoz Rivera Avenue, Corner of Rosales Street (Call Box 50059), San Juan, Puerto Rico 00902, at (telephone) 809/729-2929, (fax) 809/729-3083. The hotel is located on the beach, five minutes from new and Old San Juan. Meeting registration will be held on the 6th Floor, outside the Gold Room of the Normandie Hotel, between 3:00 and 6:00 p.m. on Monday, 15 July 1991. Meeting participants are invited to a dinner on Monday evening: a welcome reception will be held on the 7th Floor of the hotel beginning at 6:00 p.m. and dinner will begin at 7:00 p.m. in the Gold room on the 6th Floor.

A special conference rate has been arranged and a block of rooms reserved at the Normandie Hotel. The rate for both twin and single rooms is \$90 (plus 7% tax, a one-time bellman charge (in and out) of \$3.00, and \$0.25 per person daily for maid service). To make reservations, contact the Radisson Normandie Hotel (see above for phone, fax, and address). A deposit equal to one night's lodging is required and can be made by mailing a check after contacting the hotel for your reservation or, preferably, by using a credit card (American Express, Visa, MasterCard, Diners Club) when contacting the hotel to make your reservation. When making reservations, identify yourself as part of the Western Hemisphere Workshop block of rooms. Please contact the hotel as soon as possible to ensure room availability. Reservations received after 14 June 1991 will be on a space available basis and a higher room rate may apply.

Transportation between the airport and the hotel is most easily achieved by using public taxis. The one-way fare is approximately US \$9.00, with a small additional charge for luggage. (Be sure the driver sets the meter or establishes a fare before you leave.) Although auto rental is available (from ABC Car Rental, Afro, Avis, Budget, Discount, Luchetti, National, Thrifty, and Hertz) please be aware that you will encounter heavy traffic and difficulty parking most hours of the day, especially in Old San Juan where most non-hotel restaurants are located. (Old San Juan is about a 5-10 minute cab ride from the Normandie Hotel.)

Administrative Matters

You will receive prior to the meeting the following

documents: an agenda; a tentative list of participants; the U.S. concept paper; and any additional concept papers submitted to us in advance of the meeting. Any concept papers sent to us within less than two weeks of the meeting will be made available at the registration desk at the Workshop. After registration is complete, a revised list of participants will be issued.

The working languages for the meeting will be English and Spanish. Simultaneous interpretation will be provided at all plenary sessions and will be available during working group sessions. Translation will also be available during working group meetings and drafting sessions, as needed. The final report of the workshop will be drafted and approved in English; a translated copy will be made available as soon as possible after the report is adopted.

A Workshop office will be located on the 6th Floor, near the Gold Room, and limited office services will be provided to the meeting participants. A message board will be located just outside this office and all incoming messages will be posted daily. Incoming electronic mail messages via Omnet can be sent to participant's attention via L.Brown/Omnet. During the Workshop, incoming phone communications can be handled by calling the hotel at 809/729-2929 and asking to be connected to the Western Hemisphere Workshop Office.

Audio/visual equipment (35mm projects, overhead projects, screens, etc.) will be available in the meeting rooms.

All participants will be invited to a reception and dinner on the first evening of the workshop, July 15. Lunches and coffee breaks will be provided throughout the course of the workshop, but participants will need to make their own arrangements for remaining meals. Numerous options are available including restaurants in the Normandie hotel, surrounding hotels and in Old San Juan.

Additional Information

o **Entry Requirements:** All non-US citizens will require visas in order to enter Puerto Rico. Local US embassies and consulates will be informed about the Workshop; therefore, you should identify yourself as a Workshop participant when you contact the US embassy.

o **Currency Exchange:** The US dollar is the accepted medium of exchange in Puerto Rico, although a few establishments will make transactions in foreign currency. There are currency exchange offices at the following locations:

Banco Popular: exchange into US and/or into foreign currency at any branch. Open Monday through Friday, 9:00 a.m. to 5:00 p.m.

Caribbean Foreign Exchange: 201B Tetuan, Old San Juan. Open Monday through Friday, 9:00 am to 5:00 p.m. The International Airports location is open Monday through Friday, 8:00 a.m. to 9:00 p.m.; Saturday 8:00 a.m. to 8:00 p.m., and Sunday 10:00 a.m. to 7:00 p.m.

Deak International: International Airport, open Monday through Saturday 8:00 a.m. to 9:00 p.m.; Sunday 10:00 a.m. to 7:00 p.m.

Conference Logistics

o Climate/Clothing: Average temperatures in Puerto Rico range from 24 to 29 degrees Celsius, 75 to 85 degrees Fahrenheit. Dependable easterly trade winds keep the island comfortable and the skies sunny most of the time. Light summer clothes will be appropriate for July. Informal evening wear is often required at particular establishments; this usually means a jacket and tie for men and comparable clothing for women.

o Sightseeing/Local Activities: Sunshine Tours is located in the lobby of the Normandie Hotel. The company provides tours to the Rain Forest, Luquillo Beach, the Bacardi Rum Destillary, Old City, Ponce, and Rio Camuy Caverns. A number of other tours are available through local tour companies and the Concierge at the Normandie will be happy to assist you with making arrangements. Other activities on the island include: swimming (an outdoor, beach-front pool is open daily until 8:00 p.m. at the Normandie Hotel), diving, snorkeling, sailing, tennis, golf, and horseback riding.

Expected Attendance

5/10/91

Western Hemisphere Institute Planning Workshop

cc: R. Corell
L. Brown
H. Virji
C. Clark
C. Nierenberg
INT

Antigua: NO RESPONSE

Argentina: WILL PARTICIPATE

Dr. Haul F. Matera
Secretary for Science and Technology
Secretariat of Science and Technology
President, Committee on Global Climate Change

Ing. Juan Jacinto Burgos
Vice President, Committee on Global Climate Change
Secretariat for Science and Technology
Avda. Cordoba B31 - piso 2
1054 Buenos Aires, Argentina
Tel: (54-1) 312-8364 FAX: (54-1) 312-1706

Argentina would like to have other officials accompany this team.

Bahamas: WILL PARTICIPATE IF EXTERNAL FUNDING IS AVAILABLE

Michael Stubbs
Meteorological Department (MET)

Barbados: NO RESPONSE

Belize: PENDING

Post advises following be invited:

Dr. Victor Gonzales
Permanent Secretary
Ministry of Tourism and the Environment
Belmopan, Belize

Mr. Carlos Fuller
Chief Meteorological Officer
Meteorology Department
Ladyville, Belize

Bolivia: CANNOT PARTICIPATE BECAUSE OF FUNDING PROBLEMS

Embassy suggests invitations be sent to following individuals to stir up interest:

Gerardo Aguirre
General Secretary for the Environment
Ministry of the Presidency
Presidential Palace
Las Paz, Bolivia

Carlos Quintel
Secretary of the Environmental Fund
General Secretariat for the Environment
Ministry of the Presidency
Presidential Palace
La Paz, Bolivia

Brazil: WILL PARTICIPATE

Edson Machada, Deputy Secretary of Science and Technology
Eneas Salati, Director of National Institute for Amazon
Research (INPA)

Canada: PENDING DECISION

Government will probably participate but has not yet made a final decision. "Initial Canadian reaction to the Institute proposal is lukewarm."...Funding is a major concern. GOC is concerned that call for institute in Western Hemisphere might lead to call for others. Canada would like to see more use of IIASA. 4/29 report notes letter received from EXSTAFF Energy and Env. Div Dir. De Hoog stating that he believes with some confidence that Canada is in a position to accept the invitation. He notes, however, that at this stage GOC would have to remain non-committal on the question of possible contribution. Chief concern is how to reconcile US initiative with various others. GOC will hold a workshop on regional research on global change on May 27. NSF indicates Lou Brown will participate.

Chile: WILL PARTICIPATE

Dr. Humberto Fuenzalida
National Coordinator, Chilean Working Group for Global
Change

Prof. Claudio Anguita
University of Chile

Columbia: WILL PARTICIPATE

Dr. Humberto Rodriguez
Coordinador Comité Biosfera-geosfera
Professor of Physics, National University
Academia de Ciencias
CRA. 3, No. 17-34, Piso 3
Bogota, Colombia
Tel: 342-9174, 341-4805

Dr. Jose Lozano
Geologist
Academia de Ciencias
CRA. 3, No. 17-34, Piso 3
Bogota, Colombia
Tel: 342-9174, 341-4805

IGBP Contact: Julio Carrisoza
TEL and FAX: 341-1921

Costa Rica: WILL PARTICIPATE

Max Campos
Jefe Del Departamento De Climatologia Bm
Dzyan Jose 1000
San Jose, Costa Rica

Eduardo Lopez
Subdirector General del Servicio Forestero

Dominican Republic: NO RESPONSE

Ecuador: WILL PARTICIPATE

Ingeniero Oscar Aguirre A.
Director Ejecutivo
Consejo Nacional de Ciencia y Tecnologia
Av. Patria 850 y 10 de Agosto
Edificio Banco de Prestamos
Quito, Ecuador
Tel: (593-2) 550699/FAX: (593-2) 569983

Licenciado Rafael Paredes
Departamento Del Medioambiente
Piso 1
Ministerio de Relaciones Exteriores
Quito, Ecuador
Tel: (593-2) 501261

El Salvador: WANTS TO PARTICIPATE BUT MAY NEED FINANCING

Ingeniero Jose Roberto Denys
Director, Cenren, Mag
El Matazano, Soyapango
San Salvador, El Salvador

Ingeniero Jorge Alberto Rodriguez Deras
Director, Centro De Investigaciones Geotecnicas
Ministerio de Obras Publicas
Calle Antigua la Charca, Ctgo. Talleres Dua
San Salvador, El Salvador

Guatemala: WILL PARTICIPATE

"The idea is an excellent initiative." Will soon supply
names of participants.

Granada: NO INTEREST TO DATE

Embassy believes Granada will not participate due to budgetary problems.

Guyana: WILL PARTICIPATE

Father Malcolm Rodrigues
Dean, Faculty of Natural Sciences
University of Guyana
Turkeyen, Greater Georgetown
Guyana

Mr. Chander Persaud
Chief Hydrometeorological Officer
Hydromet
Ministry of Communications and Works
Kingston, Georgetown
Guyana

Haiti: NO RESPONSE

Honduras: WILL PARTICIPATE

Ingeniero Franklin Bertrand Anduray
Executive Secretary
National Commission for Environment and Development (CONAMA)
Edificio Palmira
Tegucigalpa, Honduras

Jamaica: WILL PARTICIPATE

GOJ is uncertain about level of participation until receipt of invitation. Invitations should be sent to :

Dr. Gladstone V. Taylor, Executive Director
Scientific Research Council
Hope Gardens, P.O. Box 350
Kingston 6, Jamaica

Dr. Allan G. Kirton
Permanent Secretary
Ministry of Finance, Development and Planning
11A Oxford Road
Kingston 5, Jamaica

Dr. Ted Aldridge, Special Advisor on
Environment/Conservation
Ministry of Finance, Development and Planning
11A Oxford Road
Kingston 5, Jamaica

Martinique: NO RESPONSE

Mexico: WILL PARTICIPATE

Dr. Jose Sarukhan
Rector
National Autonomous University (UNAM)

Dr. Sergio Reyes
Undersecretary for Ecology
Secretariat of Urban Development and Ecology (SEDUE)

Lic. Victor Lichtinger
General Coordinator for Natural Resources and Environment
Secretary of Foreign Affairs (SRE)

Netherland Antilles: WILL NOT PARTICIPATE

Nicaragua: WILL PARTICIPATE

Patricio Jerez
Sub-Director/Vice Minister of the Natural Resources
Institute (Instituto Nicaraguense de Recursos Naturales y
del Medio Ambiente)

Claudio Gutierrez
Director of the Nicaraguan Territorial Studies Institute
(Instituto Nicaraguense para Estudios de la Tierra)

Invitations should be sent to Michael Pucetti, AMEMBASSY
Managua, APO Miami 34021-3240

Panama: WILL PARTICIPATE

Lic. Noel J. Moron
Deputy Director General
National Institute for Renewable Natural Resources

Dra. Raisa Ruiz, Agroclimatological Specialist
National Institute for Renewable Natural Resources

Ing. Claudia Candanedo
Chief of the Hydrometrology Department, Institute
for Hidraulic Resources and Electrification

Prof. Luis D' Croz
Director of the Center for Marine Science and Limnology
University of Panama

Paraguay: NO RESPONSE

Peru: NO RESPONSE

St. Vincent and the Grenadines: WOULD LIKE TO PARTICIPATE

GOSV wants to know if financial support is available for small country delegations.

Suriname: NO RESPONSE

Trinidad and Tobago: WILL PARTICIPATE

GOTT will confirm names of delegates later.

Uruguay: WILL PARTICIPATE

Ing. Fredrico Garcia Brum
Presidente de la Commision
Iniciativa del Cono Sur - Uruguay
Edil Pratto 2197
Montevideo - CP 11200
Uruguay
Tel: (5982) 48-82-48 FAX: (5982) 48-70-37

Lic. Annie Hareau
Asistente Tecnico
Iniciativa del Cono Sur - Uruguay
Edil Pratto 2197
Montevideo - CP 11200
Uruguay

Venezuela: WILL PARTICIPATE

Ing. Adalberto Gabaldon Asuaje, Director General
Ministerio del Ambiente y de los Recursos Naturales y
Renovables
Torre Sur, Piso 25
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Venezuela would like to bring staff.



Spino