

## **Discovery Missions Program: Lessons Learned Workshop Minutes 1/30/98**

On January 28, 1998, the Third Workshop on Discovery Missions Program: Lessons Learned was convened by Chairman Dr. David Bohlin of NASA Headquarters at the Lunar and Planetary Institute, Houston, Texas. After the initial welcome and review of the planned two-day agenda (see Attachment 1), Dr. Bohlin introduced Mary Cloud of LPI who provided the group with logistical information such as planned Electronic Submittal demonstrations, emergency phone and fax numbers, etc. Dr. Bohlin emphasized to the group the importance of completing and turning in the workshop questionnaire and question sheets so that matters of interest to the community could be addressed during the Workshop.

Following these matters, the rest of the morning was consumed with presentations provided by Dr. Jay Bergstralh, NASA Discovery Program Scientist, Mark Saunders from the Langley Space Science Support Office, and Dr. Bohlin. The three briefings, in Attachment 2, provided a complete review of the Discovery AO process as well as the planning for the current AO.

After lunch, two members of the community provided briefings: Ms Cindy Faulconer of Lockheed Martin and Dr. Larry Esposito of the University of Colorado. Both of these briefings are also provided in Attachment 2.

The remainder of Day 1 of the conference was spent reviewing and responding to all of the written questions from the Workshop attendees. Some 22 questions were submitted and each was discussed in the Workshop and answers provided by NASA. These Q&A's are provided as Attachment 3. Before adjourning for the day, Dr. Bohlin showed the group the summary results of the areas of interest indicated by the results of their submitted questionnaires. The group discussed and agreed that most of the areas indicated had been discussed and satisfied in the course of the meeting. A few areas were agreed to remain open for further discussion on Day 2.

On Day 2, Dr. Bohlin convened the Workshop at approximately 8:00 a.m. CST. He provided the group with summary charts of the Workshop results up to that time and the open areas to be discussed. These charts were subsequently revised to include the additional topics and are shown in Attachment 4. During the next two hours, all the open areas were discussed and any agreements documented. One of the most significant agreements was the consensus recommendation from the Workshop that a mechanism was needed in the Discovery Program to fund the development of science proposals without competing these directly with mature mission proposals. Mark

Saunders agreed to lead a steering committee to investigate and develop a proposed way of doing this to be provided to Code S at NASA Headquarters. An enthusiastic number of the audience volunteered to serve on this committee with Mark Saunders. After allowing for final comments and questions by the Workshop attendees, Dr. Bohlin adjourned the meeting.

Attachment 1

**DISCOVERY LESSONS LEARNED WORKSHOP**

**Wednesday, January 28, 1998**

7:30 a.m.	Registration and Coffee	
8:15 a.m.	Introduction (Logistics and Modus Operandi)	David Bohlin
8:30 a.m.	NASA Briefings on AO, Review, and Process	
	- AO, Flow Process, etc.	Jay Bergstralh
	- TMCO	Mark Saunders
	- Process Oversight	David Bohlin
10:00 a.m.	Coffee Break	
10:15 a.m.	Community Comment Period	
	- Speaker 1	
	- Speaker 2	
	- Speaker 3	
12:00 noon	Lunch	

1:30 p.m. Questionnaire Results

2:00 p.m. Discussion of Issues

5:00 p.m. Adjourn

**Thursday, January 29, 1998**

8:00 a.m. Continuation of Discussion of Issues  
Drafting of Recommendations

9:45 a.m. Coffee Break

10:00 a.m. Finalization of Recommendations

12:00 p.m. Adjourn

Attachment 2

# **DISCOVERY**

## **AO Overview, Proposal Review Process, Categorization, & Evaluation**

**Presentation to the Lessons Learned Workshop**

**Dr. Jay Bergstralh**

**January 28, 1998**

# AO HIGHLIGHTS

## **Two-Phase, One-Step Procurement**

Phase I: Solicit science proposals with sufficient implementation information to evaluate risk, expected total cost to NASA, and commitment to other programmatic goals. Select 4-6 proposals and award contracts for Concept Studies, with contract options for Phase A/B, Phase C/D, and Phase E.

Phase II: Evaluate Concept Study Reports, and downselect to one or two investigations for implementation.

**Science Investigations must support either the Solar System Exploration theme or the search for extrasolar planetary systems element of the Search for Origins and Planetary Systems theme.**

I.e. the scientific scope of Discovery is unchanged from the previous AO, contrary to what we were told last spring.

# **AO HIGHLIGHTS**

**Missions of Opportunity: Individual investigations may be proposed for flight on non-NASA (excluding military) spacecraft.**

Cost cap of \$21 M.

**Missions intended to achieve same science goals as missions already in Strategic Plan, in same time period, may*not* be proposed.**

**Electronic submission of NOI and Proposal Cover Sheet**

**competitive selections of industrial partners.**

Consequently, Concept Study period shortened to 4 months.

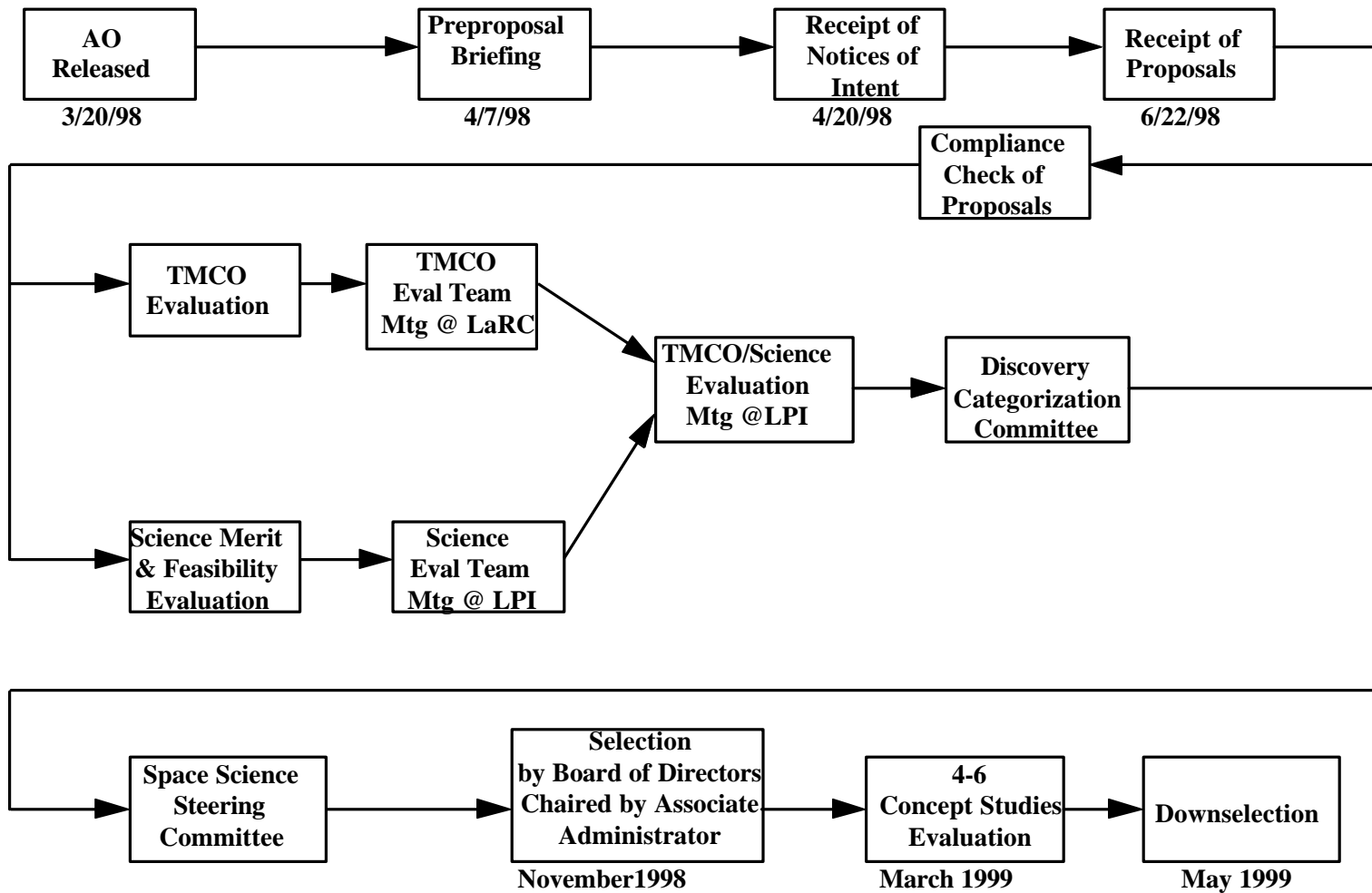


# **AO HIGHLIGHTS**

**Earth Orbital Discovery missions (e.g. telescopes) can be proposed for Shuttle launch**

Restricted to orbits achievable by Shuttle itself; i.e. no upper stages

# DISCOVERY PROPOSAL REVIEW PROCESS



# **CATEGORIZATION PROCESS**

## **CATEGORIZATION OF PROPOSALS**

### **(NFSD 1872.403)**

**CATEGORY I:** Well conceived and scientifically and technically sound investigations

competent investigator from an institution capable of supplying the necessary support to ensure that any essential flight hardware or other support can be delivered on time and that data can be properly reduced, analyzed, interpreted, and published in a reasonable time. Investigations in Category I are recommended for acceptance and normally will be displaced only by other Category I investigations.

**CATEGORY II:** Well conceived and scientifically or technically sound investigations which are recommended for acceptance, but at a lower priority than Category I.

**CATEGORY III:** Scientifically or technically sound investigations which require further development. Category III investigations may be funded for development and may be reconsidered at a later time for the same or other opportunities.

**CATEGORY IV:** Proposed investigations which are recommended for rejection for the particular opportunity under consideration, whatever the reason.

## **Proposal Evaluation Criteria**

Proposals evaluated using five criteria from AO:

**Scientific merit of the investigation**

**Total cost of the mission to NASA**

**Technical merit and feasibility of the science investigation**

**Feasibility of the mission implementation scheme**

**Education, Outreach, Technology, and Small Disadvantaged  
Business Activities**

remaining 3 criteria were given still lower and approximately equal weighting.

# **PROPOSAL REVIEW**

## **Evaluation**

**Evaluations conducted per 5 Evaluation Criteria in the Announcement of Opportunity**

**Evaluation Ratings per Announcement of Opportunity**

Scientific Merit : 9=Best; 1=Worst

Technical Merit & Feasibility : 9=Best; 1=Worst

Mission Feasibility : Low, Medium, High Risk

Other Program Factors : Excellent, Good, Poor

## **Discovery AO TMC0 Changes/Issues**

TMC0 Process changes:

- UNEX delays full TMC0 until after Categorization

- Discovery TMC0 is considering similar change

AO Appendix B has been modified to document information TMC0 team needs for risk assessment; similar to UNEX AO

AO Appendix : Table B1 changing to reflect WBS level 2

AO requires electronic submittal of NOI & cover sheet and disk for cost tables

- Considering request for submittal of disk for whole proposal

E/O self-assessment completed; changes made in evaluation methodology and focus

Other areas under consideration/in work

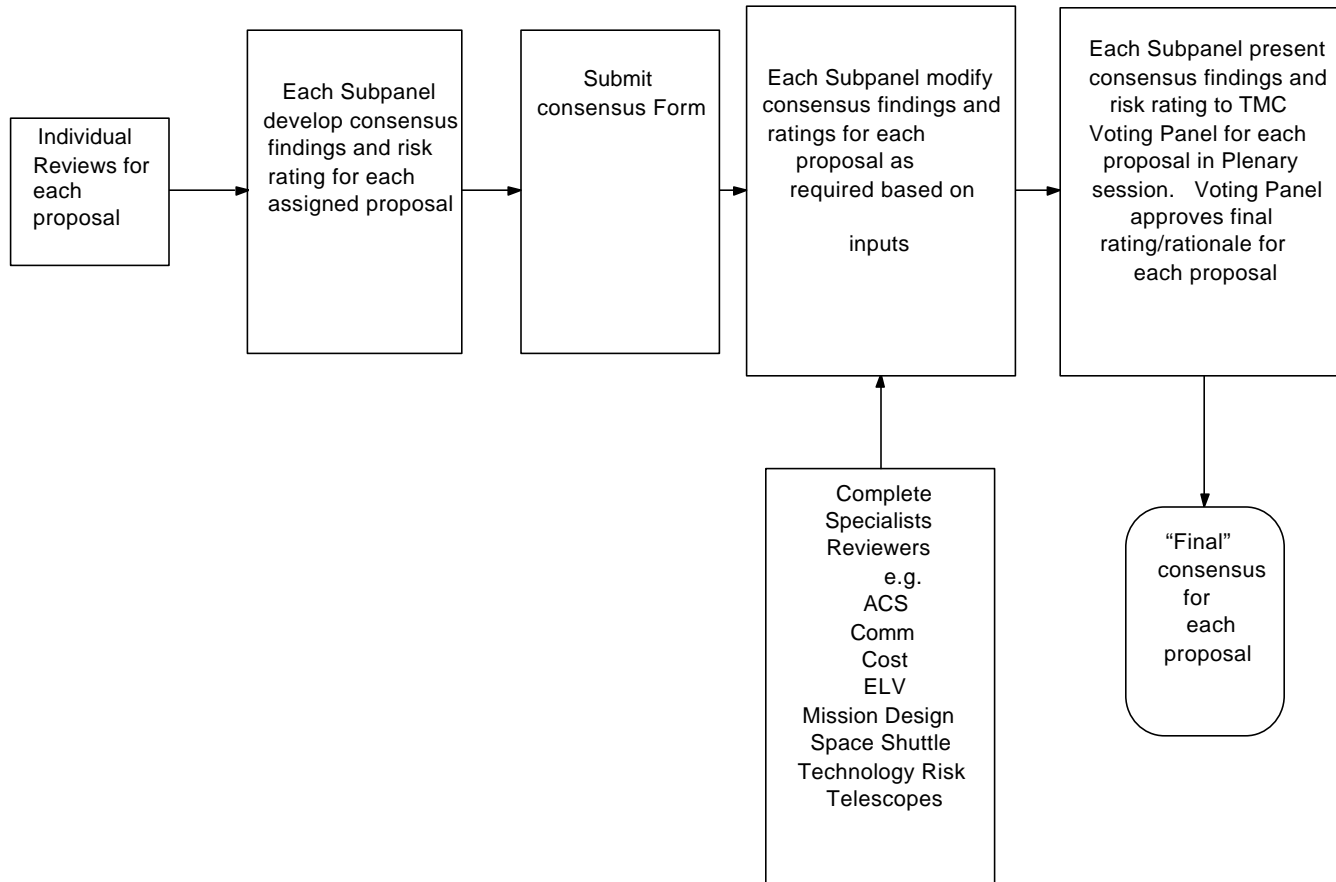
- NHB 7120.5

- Discovery Lead Center assignment

- Radioactive source limitations

# TMCO Overview

## TMC Panel Flow



# **TMCO Overview**

## **TMC Evaluation Objective**

The TMC evaluation is to determine, for each proposal, the level of risk of accomplishing the scientific objectives of the mission, as proposed, on time and within cost.

3 levels of risk are typically defined: **Low Risk, Medium Risk and High Risk**

**High Risk** may be defined as Even if this is the best science, we recommend



## **TMCO Overview**

### **Typical TMC Evaluation Questions to be Answered**

Will overall mission design (spacecraft, launch vehicle, ground system, mission ops) allow successful implementation of mission as proposed? If not, are there sufficient resources (time & \$) to correct identified problems?

Does proposed spacecraft design/development allow investigation to have a reasonable probability of accomplishing its objectives? Does it depend on new technology that has not yet been demonstrated? Are spacecraft requirements within existing capabilities or are advances required? Does proposal accommodate sufficient resiliency in appropriate resources (e.g., mass, power) to accommodate development uncertainties?

Does proposer understand their risks and are there adequate fallback plans to mitigate them, including risk of using new technology, to assure that investigation can be completed as proposed?

## TMCO Overview

Is the schedule doable? Does it reveal an understanding of work to be done and time it takes to do it? Is there a reasonable probability of launching on time? Does it include schedule margin?

Will proposed management plan (e.g., institutions (as known), organization, roles and responsibilities, experience, decision making) allow successful completion of investigation? Is the PI in charge?

Are proposed costs within appropriate caps and does cost estimate cover all costs including full-cost accounting for NASA Centers? Are costs phased reasonably? Does the investigation, as proposed, have a reasonable chance of being accomplished within proposed cost? Is there evidence in the proposal to give confidence in the proposed cost? Does the proposer recognize the additional costs (e.g., safety) of utilizing the Space Shuttle/Space Station?

# **TMCO Overview**

## **TMC Considerations**

### **Spacecraft**

Depth of Detail  
Simplicity vs Complexity  
New Technology  
Design Life/Reliability

Margins  
Heritage/Maturity  
Redundancy

### **Instruments**

Requirements/Interface  
Complexity/Difficulty  
Depth of Detail

Heritage/Maturity  
Operations

### **Mission Design**

Depth of Detail  
Launch Vehicle

Difficulty/Complexity/Flexibility

# TMCO Overview

## **Mission Ops/GDS/Communication**

Facilities (including ground stations)

Complexity

Depth of Detail

Comm margins

Team Experience/Roles

## **Systems Engineering**

Depth of Detail

Complexity

QA

Trades

Integration and Testing

## **Management/Organization/Structure**

Structure tied to Task/Teaming

Detailed description (incl SOW)

Maturity

PI/PM Roles proper

Org/key person Experience

Evidence of Commitment

## **Risk Management**

Risk Assessment (& understanding)

Reserves and Margins

Technology Risk Mitigation

Descope Plan

# TMCO Overview

## Cost and Schedule

Cost Envelope (Comparison to Government Estimate)

Cost Reserves

Cost vs. Tasks

Risk Mitigation Level

Cost Basis            Grassroots/Model  
                                 Variety of Techniques

Cost Caps - Caps vs. 20%

Technical Maturity vs. Cost Estimate

Technical Complexity vs. Cost Estimate

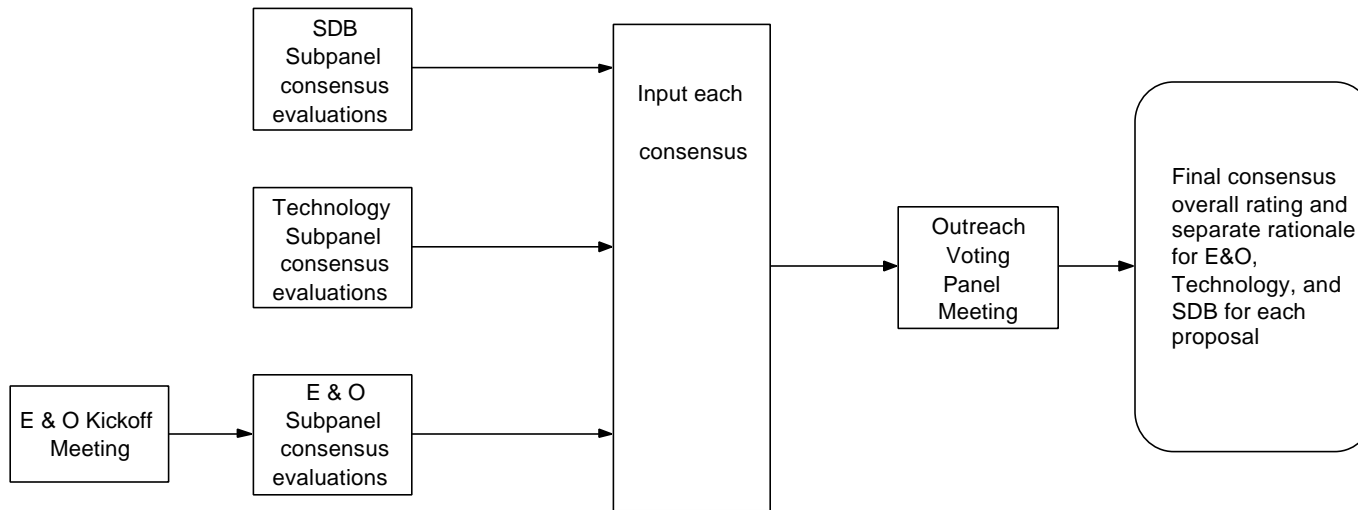
Past Experience

Schedule vs. Tasks

Schedule Reserve

# TMCO Overview

## Outreach Panel Flow



# **TMCO Overview**

## **Outreach Considerations**

Generally, the degree to which proposals address the following factors directly relate to a grade of EXCELLENT, GOOD, or POOR

### **Education and Outreach** (Commitment, not originality, is now the key factor)

Effectiveness/realism of proposed effort

Leveraging of resources beyond requested budget

Support of national standards and efforts

Capability/commitment of proposer

Realism/adequacy of proposed budget

### **Technology (both infusion and transfer)**

Degree of tech transfer out to NASA, commercial, & non-aerospace industries

Involvement of good transfer orgs

Degree of infusion

# **TMCO Overview**

## **Small Disadvantaged Businesses**

Commitment to meet 8% SDB goal

Past experience in meeting goals

Planned SDB subcontracts vs goal



## Future Directions/Changes?

Are you happy with the:

AO scope, content and process? Are changes needed to make it better?  
Evaluation criteria? Does it focus on the right things and in proper order?  
Evaluation methodology? Is emphasis put on the right things? What about

Acquisition strategy? Is the 1 step, 2 phase process acceptable?

Program management? Is there something we can do to make it better?

What about ways to bring desirable missions up to competitive speed  
without having to compete in the mission AO (e.g. the San Juan  
Capistano Workshop)?

Is the program facilitating effective development of high quality science  
missions?

Discovery is a community program, but there are many competing interests in  
the Discovery family with some conflicting recommendations. Our objective  
is to implement as many community recommendations as possible.

# SPACE SCIENCE STEERING COMMITTEE (SScSC)

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July 1997

- **Charter** (*defined by NASA Federal Acquisition Regulations (FAR) Supplement (NFS) Part 1872.406, “ACQUISITION OF INVESTIGATIONS”*)

**“...to provide a substantive review of a potential payload or program of investigations and to recommend a selection to the Program Associate Administrator.”**

**- “... applies the collective experience of representatives from the program and discipline communities and offers a forum for discussing the selection from those points of view.”**

- **“... is responsible for assuring adherence to required procedures” (and finally provides) “... the forum where discipline objectives are weighed against program objectives and constraints.”**

- **SScSC Responsibilities** (*NFS Part 1872.406(b)*)

“To ...

- “Review compliance with procedures governing the application of the AO process” (*i.e., all the rest of NFS 1872.0*).

- “Ensure that adequate documentation exists has been made of the steps in the evaluation process”

(*namely,*

- . *the Announcement of Opportunity;*

- . *the peer scientific, technical & programmatic evaluations;*

- . *the Categorizations; and*

- . *the formulation of the recommendation for selection.*)

- “Review the results of the evaluation by the (*Categorization*) subcommittee, Project, and Program Offices and prepare an

**assessment or endorsement of a recommended payload or program of investigations to the Program AA.”**

- **What SScSC Does *It reviews the:***

**“(1) Degree to which results of evaluations and recommendations follow logically from the criteria in the AO.**

**“(2) Consistency with objectives and policies generally beyond the scope of Project/Program Offices.**

**“(3) Sufficiency of reasons stated for tentative recommendations of those investigations requiring further instrument research and development  
(*Category III proposals only*).**

**“(4) Sufficiency of reasons stated for determining responsibilities for instrument development (*Category III proposals only*).**

**“(5) Sufficiency of consideration of reusable space flight hardware and support equipment for the recommended investigations.**

**“(6) Sufficiency of reasons for classifying proposed investigations in their respective categories.**

**“(7) Fair treatment of all proposals.”**

- **What SScSC Does Not Do.**

- **Re-review proposals**

- (although the Committee may request that such activity be undertaken by the Program Scientist if it is judged that inadequate and/or inconsistent reviews are presented).*

- **Re-categorize proposals**

- (although the Committee may request that such activity be undertaken, or even recommend an alternative Categorization itself, if inadequate and/or inconsistent documentation is presented).*

- **Reject a recommendation for selection by the Program Scientist**

- (although the Committee may recommend that the Program Scientist revise their recommendation, or in an extreme case, the Committee may provide an alternative recommendation to be forwarded to the S/AA).*



- **Final Product of SScSC:**

**“... makes recommendations to the selection official on the payload or program of investigations and notes caveats or provisions important for consideration of the selection official.”**

*In practice, this “recommendation” takes the form of a finding or determination prepared by the SScSC Chairman that introduces the Selection Statement forwarded by the Program Scientist to the Program AA.*

*- In the best case, the Committee goes on formal record as determining that all elements of the solicitation, review, categorization, and recommendation processes are in order and are properly documented, and that the SScSC endorses without qualification the Selection Statement as proffered.*

*- In the worst (and exceptional!) case, the SScSC may tender an alternative recommendation for selection to the Program AA.*

## Discovery 5/6 Feedback and Discovery 7 Draft AO Recommendations

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# Discovery 5/6 Feedback - Good Things

Overall, Two Step Process is Good

Saves Some Effort on the Part of Proposers

Feasibility Studies are a Valuable Investment for NASA and Proposers

Results in Increased NASA Insight and Overall Proposal Detail

Debriefings May Be Time and Effort Intensive, But Extremely Valuable to Proposers

Feedback from Debriefings Results in Better Proposals Next Round

Pleased to See the Process Converging from AO to AO

Will Save NASA and Proposers Significant Time and Money

Pleased That NASA Chose to Fund Two Missions With This AO to

Gets the Most Out of The AO and Save Proposers Effort

# Discovery 5/6 Feedback - Areas for Improvement

Discovery Program Continues to Be Risk Averse

Not Willing to Take the Same Level of Risk as Other NASA Programs Such as Mars Surveyor

Some Credit Given for Design Commonality

Would Prefer to See the Discovery Program Make Policy Statements to Save Proposers Effort:

Level of Risk That Will Be Found Acceptable

New Technology Infusion Versus Risk Debate

Be Specific on Technologies That Are Unacceptable for This AO

When Does Heritage Become OK?

Use of Other NASA Resources Like the MSP Orbiters

Statement

Maximum Mission Life for a Discovery Mission

# Discovery 5/6 Feedback - Areas for Improvement

Greater Than Discovery Issue: How to Develop Enabling

Need a Means of Proving Far Reaching, Enabling Technologies  
The Process is Long (1 1/2 Years), Are There Ways to Shorten?

# Discovery 7 Draft AO - Positive Feedback

Pleased to See That The AO Restricts Missions That Duplicate Currently Planned Missions in the Space Science Enterprise Strategic Plan For the Same Timeframe (Europa Orbiter, Pluto/Kuiper Express, Mars 2003, etc)

NASA is Allowing More Project Spending in Early Phases to Support Faster/Better/Cheaper Developments

SF1411 Is Not Required for Concept Study

The Process and Proposal Requirements Are Very Similar to Discovery 5/6 AO

Will Save Significant Time and Money for Re-bids and Retraining of Some Evaluators

# Discovery 7 Draft AO - Recommendations for Change

AO Position: Notices of Intent to Bid Will Be Made Available to Commercial Aerospace and Technology

Services) Should the PI give NASA the Authority to Release

Made Public

Issue: The Responsibility Should Be on the Industry Players to

Appropriate Sources of Spacecraft and Technologies

Recommendation: Turn This Process Around and Have the Industry Players Post a Capabilities Summary on a Discovery-

to Contact Thereby Expediting and Simplifying the Process

# Discovery 7 Draft AO - Recommendations for Change

AO Position: Detailed Proposal Summary to Be Provided Early in Process for Public Release Upon Selection

Issue: These Proposal Summaries Sound Extremely Detailed for Public Release During a Concept Study Competition and May Either Release Proprietary / Competition Sensitive Information or Be Uninformative. It is Agreed That a Brief Statement of the Mission is Required By NASA for Press Release upon Concept

Summary Very Early in the Proposal Development Process You Open the PI to Releasing Information That the Team Partners May Not Want Released

Recommendation: Request that a Brief (Few Sentence) Statement of Mission Be Provided With the Proposals (Not During Proposal Preparation) To Be Used for Press Release By NASA Should That Proposal Be Selected By NASA for Concept Study



# Discovery 7 Draft AO - Recommendations for Change

that Address the Thematic Areas of the Discovery Program  
Using Non-NASA Space Missions

Issue: There is Widespread (Industry and NASA) Feeling That  
Selecting Missions of Opportunity (MOOs) Under the Same AO as  
Full Investigations Will Dilute the Discovery Effort, Resulting in  
Fewer Full Investigations Being Studied and Selected

Issue: It Seems Overkill to 1) Have MOO Proposers Go Through  
the Same Long, Detailed Proposal Process As Full Investigations  
and 2) Fund MOO Studies at the Same Level as Full Investigations

Recommendation: First Choice: Put Out a Separate AO for MOO  
Selection With Shorter, Easier Proposal Process. Second Choice  
(Should First Not Be Implemented): Determine How Much of  
Discovery Budget Will Be Spent on MOOs vs. Full Investigation  
and Have Separate Proposal Requirements and Evaluations

# Discovery 7 Draft AO - Recommendations for Change

## Education/Outreach Activities

As Worded, It Sounds Like a Cap on Funding for Education/  
Outreach Activities. Was This the Intent or Should It Be Re-  
Worded to Specify a Recommended Amount of Project Funds to  
be Spent on These Activities?

# Discovery 7 Draft AO - Recommendations for Change

Launch Vehicle Technical and Cost Data Not Provided in  
Draft AO

Makes it Sound Like the Delta II 7925 - H is Not An Option  
(Wayne Richie Says This Will Be Reworded to Include the Delta  
II 7925 - H)

The Final AO Should Include the Athena I and II Launch Vehicles  
as Official Options for Discovery Missions

Athena I and II have Both Successfully Launched NASA  
Missions

The SELVS II Procurement Continues to Be Delayed

NASA Would Save Money and Proposers May Increase  
Selection Probability By Using This Low Cost Launch Vehicle  
Option

Launch Vehicle Cost and Technical Data are Required By  
Proposers in the Near Term (Before the Final AO Comes Out)

# Discovery 7 Draft AO - Recommendations for Change

Evaluation Criterion for the Discovery 5/6 Feasibility Studies Was Not Well Understood and Some Did Not Feel it Added to the Assessment

Recommendation: Remanifest This Criterion to Be More Meaningful, One Option Being to Change the Science Evaluation to Have Greater Discrimination Between Missions (Beyond the 1-9 Rating) So That The Value Per Dollar Criterion Gives Equal Treatment to Lower and Higher Cost Missions

# Discovery 7 Draft AO - Recommendations for Change

The Procurement Schedule is Very Long Which Results in Significant Cost to NASA and Proposers

Step 1 Proposals Can Be Developed in Two Months Versus the Three in AO

We Can Do It!

Step 1 Evaluation Process Could Be Shortened to Three Months Versus the Planned Four to Five Months

Evaluation Process Can Be Shortened Due to Commonality With Previous AO Evaluation Process

We Believe You Can Do It!

Please Clarify If The Four Month Concept Study Ends With Final Report or With Orals

Proposers Work (And \$ Required) Does Not End Until Orals

We Recommend The Same Schedule as Last Time (Four Months to Report Due Plus One Month to Orals)

# Discovery Program Strategic Planning

January 29, 1998

L.W. Esposito

University of Colorado at Boulder

Laboratory for Atmospheric & Space Physics (LASP)

# Current Program

- 1 All areas of science open
- 1 No memory from previous selections

# Problems

- 1 Number of quality proposals far exceeds flight opportunities -- some proposers making poor investments
- 1 Shortage of science community reviewers



# Proposed Actions

- 1 OSS develop strategic emphasis for each Discovery selection
- 1 Encourage proposals which address these science areas
- 1 Fund future mission possibilities from a

# Potential Improvements

- 1 More orderly and efficient process
- 1 Better reviews of proposed missions
- 1 Meet larger set of science goals
- 1 The strategy provides a baseline for Discovery program evaluation

**Discovery Missions Program:  
Lessons Learned Workshop  
Participants Questions/Answers  
1/29/98**

1. Does full cost accounting in the context of this Discovery AO include Civil Service Support?

Answer: Yes

2. Will missions be evaluated in the science per dollar context? Can a slightly more expensive mission be justified for selection versus a slightly (10-15%) cheaper one by the fact that an extra investment in better science justifies the small extra cost?

Answer: All proposal evaluation results for each criteria are delivered to the AA of OSS and the Board of Directors. During this debate during this Workshop it was decided that the Value to NASA criterion will be deleted; however, NASA clearly intends to assure that smaller focused science missions compete as equitably as possible with larger missions.

3. In the event that two or more proposed Discovery missions are targeted to the same or similar solar bodies (i.e., comets, asteroids, mercury, etc.), addressing similar scientific questions and perhaps similar instrumentation and/or producing similar data products, what will be the principal criteria that the Discovery Proposal Review Board will use to rank these proposals relative to one another?

Answer: First, proposal ranking is NOT done; all data for all proposals is provided to the selecting officials. Discrimination for like scientific proposals will be accomplished via the remaining criteria which are provided in the AO (cost, mission implementation feasibility, or Other Program Factors). If evaluations for all criteria are exactly the same, the selection will likely be done on other significant factors like launch or mission date.

4. Does a mission which is ranked very highly from a scientific standpoint have a chance of being selected if it not ranked among the lowest cost with a high ranking on the cost realism criterion as well?

Answer: Proposals are not ranked during the evaluation process. All evaluation criteria are evaluated for each proposal and all evaluations provided to the selecting officials. Cost, however, is weighted second on to Science Merit in importance. Cost realism is one of many factors considered in the evaluation of Mission Implementation feasibility. It should be noted that, to date, the Discovery selecting officials have selected missions that were not strictly the lowest cost missions.

5. There is a need for written feedback from evaluation process including the raw peer review comments.

Answer: Providing written feedback and/or the raw evaluations cannot and will not be done. There are both legal and logistical reasons making this prohibitively impossible. Should these restrictions ever be removed, the Evaluation process can be expected to increase by months.

6. There is a need for increased numbers of primary and secondary reviewers: suggest 1 primary and 5 secondary rather than 1 primary and 1 secondary:

Answer: NASA is very sensitive to this issue and will as was agreed at the workshop, give its best efforts to improve in this area. It should be noted that since consensus is reached by an entire subpanel, this usually means about 5 or 6 people minimum are utilized.

7. AO said last time (and this AO does as well) that questions may be directed to the PI, however, I am not aware of this having taken place. What is the status?

Answer: It is extremely difficult under procurement regulations to have questions of proposers during proposal evaluations since only clarifications are allowed. No new information or data can be introduced or used. Since most often clarification could be viewed as adding missing information, not clarification, we have been very careful with this. This language will be removed from the AO and no questions will be asked.

8. Provide to review panel the comments made by previous panels in the case of proposals that are resubmitted.

Answer: No. NASA must assure that each evaluation is conducted independently and fairly for all proposers. Providing data and knowledge from previous reviews to a subsequent panel is viewed as providing an unfair competitive advantage and will not be done.

9. Can implementation of prescreening of science projects before Step 1 evaluations be done?

Answer: This is a fundamental change to the Discovery process and will be investigated. See Workshop minutes.

10. Missions services catalog (Appendix E): Can you describe what's included and what's new (if anything) for this AO.

Answer: Appendix E is really just a top level table of contents for the Discovery Program Library which resides on the WWW at the Langley Research Center. The document in question and also the Expendable Launch Vehicles capabilities and costs documents are at present being revised to update capabilities and costs that are available via NASA. These revised documents will be added to the DPL as soon as they are provided to LaRC.

11. What cost models are used for the cost evaluations?

Answer: It should be emphasized that many tools in addition to cost models will be used during the evaluations. However, two specific cost models have been used and are likely to be used in this evaluation: The Aerospace Corporation spacecraft model which was developed for NASA with specific upgrades using better, faster, cheaper mission data; and the GSFC/MSFC models for instruments.

12. For the Discovery AO, how can proposers determine the priorities for the Solar Systems Exploration program?

Answer: These are documented in the strategic documents referenced in the AO and reside on the WWW. For a given AO the priorities within these documents can be considered frozen.

13. How do you evaluate proposals How do you come up with risk ratings?

Answer: Proposal evaluation and the treatment of risk during evaluations was discussed and answered as clearly as possible during the NASA briefings. Please refer to the Science and TMCO briefings for these answers.

14. Is it possible to consider a mission using Solar Electric Propulsion as Low Risk?

Answer: Considering such a mission Low risk would depend greatly on the specific mission and its usage of SEP. SEP 3 years ago would on its own merit raised some concerns to evaluators since it had neither been tested nor flown. Since by the time the next AO selections are made, many thousands of hours of ground testing and possibly even flight data will be available, SEP usage in itself would likely not drive evaluations to high or medium risk.

15. Is the 7925 H Delta launch vehicle available for Discovery use? If a proposer uses it, must proposals include its costs in the total mission costs? Will the entire cost (approximately \$60 million) be borne by the proposer?

Answer: The final Discovery AO will indicate that the 7925 H is a NASA offered vehicle. The cost for proposers using this vehicle and its capabilities will be found in a launch services summary document in the Discovery Program Library and must be included in the total mission cost cap (\$299 million FY 99).

16. Is the Phase E cost cap \$43 or \$ 44 million?

Answer: In the final AO, only two cost caps will be shown: total mission cap is \$299 million and the Phase C/D cap is \$190 million (both figures are in FY 1999 dollars). Proposers may propose Phase A/B and E costs as they feel appropriate given those caps.

17. Will a NASA funding profile after 2003 be specified in the AO?

Answer: No. The purpose of Appendix I (Budget Profile) is to provide proposers actual funding constraints for early year costs. The costs shown in FY 99, 00, and 01 are Discovery program funding constraints; i.e., missions cannot request more funding than shown in each year nor the sum of these years. Costs in later years should not be considered a concern.

18. Groundrules for Categorization?

Answer: Definitions and usage of categorization are defined in the NASA briefings. Refer to these briefings for response.

19. Can Discovery Process be changed to provide funding for creativity (i.e., new investigations without competing as missions)?

Answer: Same as Question 9.

20. Given all the required TMCO details for proposal submit, can the AO page limit be increased to allow adequate coverage of these items?

Answer: No. NASA's experience is that good proposals can be described within the page limits. Additional pages will add additional review time that is unwarranted. NASA is *considering* the possibility of adding 1 additional page in the final AO for cost data.

21. Is Phase A/B limited to 10% of Phase C/D cost cap (\$190 million) or 10% of proposed Phase C/D?

Answer: See answer to Question 16.

22. If an ELV is larger than a Delta II 7925 is required, can it be proposed with the excess cost deducted from the \$190 million Phase C/D cap?

Answer: Yes. See answers to Question 15 and 16.

**January 30, 1998**

**Discovery Workshop #3 Results**

**I. Questions and Answers: 22 Questions, all answered in the Workshop. Q&A's will be posted on Discovery Homepage with Workshop Results.**

**II. Areas Remaining Open for Discussion on 1/29:**

- o International Participation**
- o Strategic Planning**
- o Funding Future Mission Opportunities**
- o Others**
- o Wrapup of Results**





## **Discovery Workshop Results (Continued)**

### **III. Recommendations:**

#### **Recommendation**

#### **Response**

**1. Increase # of Proposal Reviewers**

**1. Accepted: Given the discussed limitations NASA to provide best effort**

**2. TMCO after Categorization**

**2. Disapproved: Community favors present process**

**3. Press Release of Proposal Summary @ Step 1**

**3. PR @ step 1 to be constrained to non-proprietary**

## **Discovery Workshop Results (Continued)**

### **Recommendation**

### **Response**

**4. Industry Capabilities on WWW**

**4. Disapproved:  
Industry can do; PI name  
remains voluntary**

**5. Delete MOO/Limit funding**

**5. Disapproved: MOO  
required; funding is  
constrained**

**6. Clarify E/PO Cap**

**6. Done: 2% is G/L**

**7. Verify Athena for Discovery**

**7. Accepted: In Work**

**8. Value for \$ Criterion?**

**8. Accepted: Criterion  
will be deleted from**

## **Concept Study Eval**

## **Discovery Workshop Results (Continued)**

### **Recommendation**

### **Response**

**9. Shorten Eval Process**

**9. Accepted: Proposal period remains 90 days; given Community's desire to not degrade Eval quality, NASA will provide best efforts**

**10. OSS Strategic Emphasis**

**10. Disapproved: The WS consensus was mixed, with some strong opposing arguments**

**11. Encourage Proposals in Emphasis Areas**

**11. Same as above**

## **Discovery Workshop Results (Continued)**

**12. Funding Future Mission Opportunities**

**12. Accepted: A steering committee was organized which investigate this and provide recommendations for implementation**