

**Discovery Program Lessons Learned Workshop  
Wednesday, July 24, 2002**

**Washington, DC**

**Minutes**

**SPEAKER: Dr. Faith Vilas**

The meeting was convened at 8:15 a.m. with introductory comments by Dr. Faith Vilas, Discovery Program Scientist. Dr. Vilas indicated that this workshop was intended to be interactive, and verbal and written questions are welcome. Questions submitted prior to the workshop will be touched on later in the workshop, and you are welcome to ask questions at any point.

Dr. Vilas outlined the agenda for the workshop, introduced the speakers, and indicated that she expected the meeting to go quickly, and that it might finish before the scheduled time.

Dr. Vilas then introduced Dr. Paul Hertz for a discussion on the Announcement of Opportunity Processes and Oversight.

**SPEAKER: Dr. Paul Hertz**

Dr. Hertz indicated he was glad to be back with the Discovery community, and gave a brief refresher on how NASA selects missions, and in particular Discovery missions.

Dr. Hertz described the two mechanisms for selection, the strategic planning cycle and established mission lines with Announcements of Opportunities, and he elaborated on the strategic missions devised from the road map. Dr. Hertz described how the road map goals are revised every three years, and that the road map team for Solar System Exploration is being revised currently. The strategic planning process is heavily influenced by the scientific community, which makes recommendations to NASA on what the chief priorities for missions should be. In the Discovery Program, the highest priority missions are not decided in advance. The scientific topics depend on the results of the peer review process during the Discovery selection.

Dr. Hertz described how Discovery missions are selected, and indicated (with input from Dr. Vilas), that the next Discovery AO will come no sooner than January 2003.

**Q:** If the science panel's assessment is that the science is great, should be top priority, is there any interaction with the TMC panel where the TMC panelists could sit in and say yes, but we don't believe the instrument that's needed could ever be built as indicated? That is, is there any cross-pollination between the Science and TMC Panels?

**A:** Yes and no. We try to keep the two independent, but we do allow the panels to ask questions of each other. If the Science Panel needs to know some aspect of the technology development, they can ask this of the TMC Panel. We usually have some member of the TMC panel who is assigned to the Science Panel and sits in. This person does not give information as to TMC findings, but rather is present as a resource for the Science Panel. The Discipline Scientist participates in the TMC as well.

Dr. Hertz went on to describe the Categorization process and category definitions, indicating that this is the second most important part of the process, following the science peer review (science is the highest priority criterion for selection). Dr. Hertz elaborated, saying that NASA never intends to fund a Category II proposal if there is a Category I proposal option, and that Category III is not an excuse for an immature proposal, but rather is a rating for a well-developed proposal that simply requires some area of technology development.

Dr. Hertz described the Steering Committee, which reviews the entire peer review and categorization process to ensure that all has been done according to the proper set of standards and measures.

Following his discussion of the selection process, Dr. Hertz opened the floor to questions.

**Q:** In Step I, everyone who makes it through the gate is on the table for selection?

**A:** Yes. All Category I proposals are selectable and all Category I proposals are presented to the Associate administrator and the Science Selection Board. Technically, Category II proposals are also selectable. However, unless there are no Category I proposals, a Category II proposal can not be selected in the Discovery program. There have always been, and I suspect there always will be, Category I Discovery proposals because the overall quality of the proposals is so high.

**Q:** What about Step II?

**A:** All of missions that complete a Phase A concept study will be considered for the downselect. Of course the emphasis in the evaluation of concept study reports is on the technical, management, cost, and other factors (TMCO) criteria. If there is no change in the science objectives or science implementation, then science will not be reevaluated at this stage. If changes are made in the science implementation (due to the increased maturity of your mission design and implementation plans), then we will determine whether the science needs to be reevaluated. A science reevaluation will concentrate on how the changes in science implementation affect the ability to meet the science objectives, and on how this change affects the findings of the Step I science panel. At the downselect decision meeting, all of the findings from the TMCO evaluation of the concept study report, the Step I science review of the original proposal, and the Step II science review (if applicable) of the concept study report are presented to the Associate Administrator and the Science Selection Board.

**Q:** Is the performance floor or the baseline mission categorized?

**A:** The Science Panel may find that the baseline mission is compelling, but the floor is not; there is no formula for how this works. This is part of the science evaluation, so it does enter into categorization, but there is no specific formula.

Hearing no further questions, Dr. Hertz introduced Mr. Brad Perry for a discussion on the TMC Evaluation Process.

**SPEAKER: Mr. Brad Perry**

Mr. Perry began by asking the attendees if there was anyone in the audience who had not been in attendance at the previous day's New Frontiers Pre-Solicitation Conference. Seeing that a few hands indeed went up to indicate this, Mr. Perry declared that because some people had not been in attendance at the aforementioned meeting, he would go into further detail than he had originally planned to (his talk for this workshop mirrored his talk from the previous day).

Mr. Perry's presentation covered various aspects of the TMC and TMCO review processes. In the past, the process used has been a TMCO approach, but now, with the addition of Step 2, the "O" [Outreach] portion of the review has been moved to the Phase A (Step II) evaluation, and only a TMC evaluation is done prior to Phase A.

Mr. Perry described a flow diagram of the evaluation process, highlighting the TMC areas, including the compliance check (in the areas of Science, Administrative, and Technical compliance with the AO), and then described the TMC evaluation assessment process and plenary session, the result of which is the Form C risk rating.

**Q:** You said earlier that there is no Form D evaluation for Step I, but in at least one recent program there has been more than a minor education factor built into the AO...where does this fit in?

**A:** We have already done an Explorer round without using Form D at Step I. There is a "sanity check" that the team has a running start on an E/PO plan, but there is not actually an evaluation, nor is such a check a selection criteria, but rather a method of feedback to the proposers regarding their E/PO plans.

Mars Scout will go one step beyond this, for when selections are made an E/PO peer review group will be convened to review the winning proposals and provide feedback during the downselect process. This will not, however, be a *selection criterion*; it does not go through re-categorization based on this evaluation, but it will be subject to a compliance check to ensure that an E/PO program really exists.

Mr. Perry described the types of risks associated with space missions, discussing in depth the "Implementation Risks" which will be assessed by the TMC review panel. The TMC panel will assume that you are the experts on your proposal, and your job is to convince us that you understand the risks you face, that you have mitigated the risks you can mitigate, and that your proposal should be considered Low Risk. Mr. Perry further

discussed the principles used by the TMC panel in reviewing proposals, and discussed the definitions of, the causes for, and the implications of the three ratings of High, Medium, and Low Risk which are assigned to proposals. He indicated that typically low and medium risk missions go forward for further discussion, and high-risk missions are not recommended for selection due to exceeding the resource envelope and other associated problems.

Mr. Perry described the "TMC Envelope" concept, and described the definitions of and differences between "contingency (reserve)" and "margin." He advised all potential proposers to pay careful attention to these definitions and apply them clearly and consistently in writing proposals. There will be definitions and examples in the next AO. Pay due diligence to these when writing proposals, for in the past there has clearly been some confusion between reserves and margins.

Mr. Perry discussed some TMC evaluation considerations taken by the reviewers, as specifically regards Discovery missions. He noted especially the importance of cost and cost realism analyses, especially important given that funds are capped. The anticipated cap for the next round of Discovery is around \$325M, but whatever the final total, funds are limited and it is up to the proposers to show in a clear way that they will not exceed the cost cap.

**Q:** What real year dollars is the stated \$325M calculated in?

**A:** FY 2003.

Mr. Perry reviewed characteristics of Low Risk proposals. The Step I evaluation is based primarily on the Science review. The TMC panelists give a reasonable benefit of the doubt to the proposer. However, you must put forth your best effort and provide as much information as possible. We will look also at your commitment to the "Other" Factors, but these will not be *evaluated* until downselection (Step II).

**Q:** For Step I proposals, is it sufficient to put in a statement that the PI understands NASA goals of exceeding 1% of the mission budget for E/PO programs, to small disadvantaged businesses, etc.? Is a sentence like this sufficient or do you want more?

**A:** That is a part of what we want to see, and we will provide guidance specifically in the AO, but what we will want to see will likely require more depth in your plans. Currently, you get 2 pages for E/PO to describe your plans. We expect you to use them. We are looking for enough information about your plan to evaluate it, and give you feedback on it.

Mr. Perry discussed TMC plans and considerations for the next Discovery AO. He pointed out that there has been confusion in the past between the evaluation areas , Technical Merit and Feasibility of the Investigation, and Feasibility of the Mission Implementation Including Cost Risk. These are separate areas and should be seen as such, and the review process has been altered slightly to help differentiate the two.

Mr. Perry indicated that, in the past, multiple flight unit proposals were constrained by the page count limit, and NASA is working on increasing the page count for such proposals to alleviate this constraint.

**Q:** Is this page count increase across the board for all proposals?

**A:** Yes. The common page count increase will be for all full mission proposals.

**Q:** The cost cap is not yet final?

**A:** Correct. This will not be finalized until the AO comes out; we're just not sure yet what it will be.

**Q:** Is there consideration to go above the stated \$325M?

**A:** Possibly. That's all that can be said at this point.

**Q:** Do you anticipate two selections in the next round, or only one?

**A:** We are not sure as of yet.

Hearing no further questions, Mr. Perry turned over the floor to Dr. Faith Vilas.

**SPEAKER: Dr. Faith Vilas**

Dr. Vilas presented charts outlining questions submitted prior to the meeting and offered answers.

**Q:** When will the next AO be released?

**A:** January 2003 at the earliest. Due to the long time lapse, I am instituting something like Discovery updates to address what is new, what has changed for the benefit of the community. I hope to do this at the DPS meeting in Alabama this October. We are trying to space out all the OSS releases, however, and the date does remain subject to change.

**Q:** Do you hope to release a draft or the AO itself in January?

**A:** Right now we aim to release the AO itself, but I hope there will be a draft prior to release. Mr. Perry added that there is a possibility that we will use an FBO announcement cycle like we will with New Frontiers and did with Mars Scout, in lieu of - or in addition to - a draft AO for community comment. We will continue to examine the options and try the most efficient means for release. The key thing is that we need and welcome community feedback, which is the principal reason for our meeting today, and we want to build your feedback into the next AO.

**Q:** Are there any major changes from the last AO?

**A:** Mars, Phobos, and Deimos will now be in Mars Scout--so they are no longer in Discovery. Lots of comments were submitted in relation to an increase in the cost cap. I have made the case that it would be great to increase the overall cost cap to adjust for inflation, but have not had luck in this as yet.

**Q:** Any instructions for proposals?

**A:** Not yet, but it will not be dissimilar to what we have done with Mars Scout.

**Q:** How many proposals do you expect to fund for concept studies, and how much do you intend to fund for each?

**A:** Three to six, depending on whether we expect to select one or two Discovery missions during the next cycle. The monetary award will not be less than \$450K for each mission selected for a concept study.

**Q:** Is the limitation on foreign participation still capped at 1/3 of Phase C/D costs?

**A:** Yes.

**Q:** Are there any formal constraints on weight, power, and volume?

**A:** No. We don't formally constrain these areas; this is up to you to devise.

**Q:** With respect to the Science Review panel makeup, are members of proposal teams allowed to be part of the review panel?

**A:** There are no specifics to offer here, but some general points: Last round we had roughly 27 proposals. We in Code S maintain that there will be no conflicts of interest and that the people on the panels cannot have any conflicts. This limits the number of available reviewers, but keeps the process clean. We do our best to come up with knowledgeable people in the field to review the capabilities, the science, etc., to review the proposals. It would be very burdensome to ask one panel to review 27 proposals, so we break down into subgroups based on general topics. In the past we had some comments on telescopes not being included in a formal panel, and we will take this into consideration. NOI's become extremely important in devising the review panels. As we try to pick persons to be reviewers, we are able to get a better idea of who will have conflicts based on your NOI's. So please, put in a good and detailed NOI and if you are not a proposer please volunteer to sit on the panel. Dr. Hertz added that there is a natural tendency in putting together proposals to put every competent scientist in a particular field in your proposal team. However, if you pick every competent scientist in the field, we will be forced to use an incompetent reviewer in your field...obviously this is an extreme statement, but the point is that your proposal will be reviewed by someone without a conflict, and thus don't put all the best of the best in the field on your team or someone less than the best will be left reviewing your proposal.

Dr. Vilas said that current PI's are welcome to "groom" future PI's, however, this will not be added as a requirement to the AO. Dr. Vilas does not believe that a good and competent "new" PI cannot lead an experiment that would be chosen.

**Q:** Will you cap Phases C/D and the whole mission separately?

**A:** Probably. Mr. Perry added that previous Discovery AO's have had two caps--a full mission OSS cost cap and a Phase C/D cost cap (the last mission had a \$190M Phase C/D cap and a \$300M full mission cost cap). There is still consideration to do the same or something similar for the upcoming AO, similar to yesterday's discussions regarding

New Frontiers, but there is no numerical value in mind here. The process and motivation is to have an additional amount of control over the cost allocation for the mission without being too restrictive. There will certainly be a funding profile in the AO which will help to control how much gets spent where, and for now the present plan is to do this as we have done it before.

**Q:** Is the limit of 1/3 of Phase C/D cost for contributions related to only foreign contributions or all non-NASA contributions?

**A:** This limit is for the TOTAL non-NASA contributions, foreign and domestic. This will likely be the case with New Frontiers, but we will consider discussions in this arena, too.

The Discovery process has incremental funding based on the demonstrated maturity of the project. You would not get more money until you demonstrate the maturity of the project at the various confirmation points. Thus, NASA must ensure that you have the maturity to get the money. Where you spend the commitment monies is not limited, but the value is limited to keep this a NASA-led mission.

**Q:** The Phase C/D cap may be overly constraining due to the large number of things that have to be done. In the past it has not been, and if you do choose to cap it, please be generous.

**A:** In contrast, you don't want to spend all your money before you get to Phase E.

**Q:** Please clarify the purpose for the Phase C/D cost cap.

**A:** As was just said, you must demonstrate that you are ready to go to work, to issue contracts, etc. You will not get to spend huge sums of money until you have demonstrated your readiness to do so.

**Q:** So it really seems like the point is limiting Phase B spending? Wouldn't it then make more sense to just limit Phase B spending directly?

**A:** We used to determine how much you could spend at Phase A/B, C/D, and E. It didn't make sense to do so and thus we got rid of all but two caps: now we have a total mission cap and a Phase C/D cap. We are still working the process trying to come up with the best methods. The C/D cap was retained to enable the proper amount of fiscal control and boundaries while the earlier caps and constraints were removed. We are interested in not spending too much money prior to confirmation or procure long lead items without the justification to do so. We also want to make sure that we have enough money for Phase E procedures as well.

Mr. Perry asked the audience if the Phase C/D cost cap has been a concern in the past?

**Q:** Well, yesterday it was said that the launch vehicle would be included in this cap. Will this be the same here?

**A:** There's not really a lot of latitude here. Phase C/D is where you will spend most of your money. There can be no contracts, etc, without confirmation so we are constrained to some extent to spend a lot of money in C/D.

There was a comment from the audience that funding profiles have indeed been major constraints, for if you don't have the money when you need it to retire risk, you don't retire risk, and this has been and continues to be a problem.

Dr. Vilas indicated that proposers should expect to be funded incrementally based on demonstrated project maturity.

A comment from the audience indicated that perhaps one area of concern is in Phase E. In many cases, Phase E costs will be higher for longer deep space missions. Thus capping Phases C/D penalizes shorter missions who may not have huge needs for Phase E.

Mr. Perry indicated that these comments and all the others would be taken into account for planning the next AO cycle.

Hearing no further questions, the floor was turned over to Mr. Steve Brody.

**SPEAKER: Mr. Steve Brody**

Mr. Brody is the (acting) Program Executive for the Discovery Program. He presented a talk on "What Happens After Selection." He added a note that if anything he says is contrary to the AO, the AO takes precedence always. This presentation is by no means intended to be exhaustive, rather it is simply a set of observations based on Mr. Brody's involvement in the four previous Discovery cycles.

Following selection (if you are selected) you become part of an "august group." Here you get to begin work on your logo, team shirts, and carry the very prestigious Discovery banner. There are numerous activities, including project workshops and lessons learned workshops to help you in the process of maturing your mission. There is a kickoff meeting at NASA HQ. Here you will get debriefed, meet NASA personnel you will be working with (Mr. Brody discussed the organizational chart here). You will meet Nancy Porter, the Program Analyst (Resources Division) who, along with the PE and PS will help you work through everything. The key players will interact at HQ to set requirements, milestones, etc., and then you work to establish contracts. This can take a long time and can be a very complex step, especially with external contracts.

You will work to develop Program Level (Level I) requirements, and the MDRA is written. The monthly reporting requirements include a 30 minute videoconference (PI, PM, and key players) to establish what has been done, progress, etc., and quarterly the meetings will be expanded to 1-2 hours.

**Q:** Is there a minimum amount of time between selection and when you can get on a contract? Typically we put the start of Phase B directly after selection, but is there a minimum time?



**A:** It depends upon the complexity of what needs to be done and put in place. Mr. Perry added that there could be bridge funding in the future to help with this, but for now: set a realistic start date based on the factors of what you want to do and will have to do.

Mr. Brody discussed the confirmation and validation processes circulating around the PDR. The confirmation process is the key gate to pass through. NASA doesn't want to commit a lot of money prior to this step. NASA will establish what you will need to do to demonstrate that you are ready to go forward, and will put together an independent team to sit in on the PDR to verify readiness. After PDR is the Confirmation Readiness Review with the Associate Administrator, which will demonstrate that you are or are not ready to move from Phase B to Phase C/D. Expect the confirmation process to take 4-6 weeks past the PDR, plan accordingly. This allows NASA and the team to problem solve and clear up details. Be sure to get all external agreements (anything from anyone that is external) in place as clearly and as early as possible *in writing*.

**Q:** Current law requires that NASA validate the project costs of major projects at the time of confirmation. I've heard that this will be moved to the start of Phase C/D. Has this been done and does the Chief Engineer's office still run the independent assessment?

**A:** (Dr. Hertz) When and who validates is in the procurement language. My understanding is that it is written into the appropriations process and the threshold is very low. We're working with Congress to try to get this adjusted to fit better with programs like Discovery. There are requirements for validation and they do come before confirmation, but we are still working on the processes. NASA is not legally allowed to confirm until the project cost is validated. Those requirements exist, but we are trying to optimize them to best fit this program.

Hearing no further questions, Mr. Brody turned over the floor to Dr. Vilas.

**SPEAKER: Dr. Faith Vilas**

Dr. Vilas gave a presentation covering issues related to NASA Center Management Oversight Options.

Dr. Vilas indicated that if a proposer should choose to have NASA Center Management, the contacts are Bill Cutlip at the NASA Goddard Space Flight Center and Gregg Vane at the NASA Jet Propulsion Laboratory.

**Q:** Can you give a quick overview of how this works...lets say I am a PI and I want to use one of these centers to manage my program? How about if I don't choose one of these centers to manage my program, will NASA assign one of them to me?

**A:** You do not have to use NASA management. But any proposers that do choose to elect the option of using NASA Center Management will have to pick between these two.

**Q:** There are some PI's that feel they can do everything through launch, after which time a CoI would be better suited for the lead roles. Would a proposal be penalized if a PI becomes a CoI and a CoI becomes a PI following launch, or at another stage?

**A:** I can't imagine a PI on a successful mission program wanting to give up the lead role, but my answer would be that you clearly say which people will be responsible for which roles throughout the mission, but keep the PI as the PI for the duration of the mission. Other people can be clearly delineated to different roles at different stages; just spell it out clearly in your proposal write-up.

**Q:** When will presentation charts and minutes be posted and available?

**A:** Within one month.

**Q:** Will Discovery have a bridge phase in the next round?

**A:** There is no definitive answer as yet, but we plan to go forward with this...

**Q:** Because the PI is supposed to bid the bridge, will it be part of the \$450K or in addition to it?

**A:** It would likely be in addition to the \$450K since it is funding that will be spent after Step II (Phase A).

**Q:** Please define bridge funding.

**A:** This funding acts as a bridge from Phase A (Step II) to Phase B for missions that are downselected. If Discovery chooses to do this as Explorer does, you propose in your original bid a portion of your Phase B funding as an advance, allowing you to begin your work immediately upon downselect. It is an option on the Phase A contract that you can get faster funding upon downselect, out of Phase B funds.

**Q:** Do you get the bridge funding immediately at downselect?

**A:** Yes, immediately upon downselect. Downselect is your confirmation that you will go on to Phase B. This option will then be executed on the contract. Without being downselected, you can not exercise this option on your contract. It simply acts to shift some of your Phase B money to the earliest available time at the beginning of Phase B.

Hearing no further questions, the session took a 15-minute break.

**SPEAKER: Dr. Phil Sakimoto**

[Dr. Vilas indicated that there had been an error in one of the charts presented earlier. It failed to say that Discovery is open to missions to detect extrasolar planets. All of the Solar System (except Mars and the Sun, as indicated before) and extrasolar planetary detection proposals will be considered.]

Dr. Phil Sakimoto next presented information about Education and Public Outreach Lessons Learned. He indicated that this was a great chance to talk about what has been done in terms of reviews of real E/PO proposals for missions. Ms. Rosalyn Pertzborn

manages the review processes themselves – however, she is out of town. Dr. Sakimoto stated that he would be giving the talk for her, and perhaps this is good as he is someone who is removed from the review process. Everyone has been really pleased with the level of attention that is being paid to E/PO. Everyone is benefiting. Dr. Sakimoto stated that he would present findings from some previous reviews and you will see some trends. Bottom line, the reviews tend to come out bimodally (not bell curve). You either paid attention (and thus did well), or did not pay attention to the E/PO requirements and thus get poor scores. There were very few proposals in the "good" category. Thus, the lesson is that if you pay attention and take the E/PO portion of the AO seriously, you can do well.

Dr. Sakimoto outlined characteristics of excellent E/PO programs. The key point is that "there is a clear connection between the mission's science objectives and the educational themes." Elements of bad E/PO programs include programs with substantial rhetoric but limited detail and substance, where nothing actually happens. Other proposals lack a clear theme or set of goals, are not linked to science mission, or have discrepancies between the budget proposed and level of activity proposed.

Dr. Sakimoto described the elements of strong and poor E/PO teams and gave advice as to how to structure a strong team and E/PO program. Dr. Sakimoto then described the elements and make-up of partnerships among strong and poor E/PO programs. He placed emphasis on the existence of letters of commitment and the importance of having everyone on-board and on the same page, rather than proposals indicating vague partnerships with no real commitments or specificity as to roles and goals. We want more than just "my name is on the proposal," we want to see *what* they will be doing in the letter of commitment. We have seen a case where a proposal listed a museum or other partner, but those "partners" have yet to even be contacted by the team.

Dr. Sakimoto described the importance of evaluation plans, especially for large-scale projects like Discovery which have larger scale E/PO programs. We are looking for well-designed plans, techniques, and proposals with independent evaluators present to measure the impact of the overall program as well as specific activities, and especially evidence that such evaluators are covered in the mission budget.

**Q:** Is it necessary to have the commitment of evaluators?

**A:** We are certainly happier to see the commitment, but there are ways to write it without the commitment. I don't want to say yes or no, the reviewers will be happier if "yes," the more you can do, the better.

**Q:** It seems like you are asking for more here than in the rest of the proposal...other "contractors" for the science proposal don't need LOC's in the proposal?

**A:** True, but it is good to have thought about it and sometimes you can't have details without having talked to the evaluator first. The best method is to have them involved from the beginning anyway. It is to your advantage to have this all in place ahead of time, and it is also helpful in building the whole E/PO program. Go as far as you can.

Dr. Sakimoto described the importance of alignment with reform efforts and the relevant national standards in science, math, and technology. He outlined the differences between strong and weak E/PO programs in these aspects.

In terms of training and involvement of underserved/underutilized groups, Dr. Sakimoto outlined that NASA is looking for a genuine effort to include all groups in your mission's E/PO program. We are looking for details as to how, where, who, etc...not just simple blanket statements. Good proposals show the involvement of the communities you hope to reach.

Dr. Sakimoto outlined some details on how to reach a greater impact capacity with an E/PO program, and elements of strong and weak E/PO programs in this area. As a rule, any specifics are always better than general statements. Work with educators, think about who you will be working with, what you will be doing, and how you will do it. A discussion on websites followed. Websites are extremely valuable tools, but don't go forth with the "if you build it they will come" mentality. A stand-alone web-site does not cut it; think about what will bring it to the attention of the people.

The bottom line is that you will do well if you take the E/PO section seriously, follow the guidelines, and include specifics on your plans, budgets, and management level parallel to the science and technical sections. If you take the E/PO section lightly, neglect the guidelines, and present only vague generalities, you will do poorly. It *is* important, to the future of our country, and to you personally. You have a unique perspective that nobody else has to offer, and you have an important role to play in boosting the status of U.S. math, science, and technology education and spreading excitement in space science. There have also been cases where E/PO has been a discriminator in selection. You do have a support network, people who can help you set and reach your goals. These people will not write your proposal, but they will help. Please pick up a brochure outside for further information.

Dr. Sakimoto thanked the participants and turned over the floor to Dr. Barry Geldzahler.

**SPEAKER: Dr. Barry Geldzahler**

Dr. Geldzahler presented details regarding the Planetary Data System (PDS). The presentation focused on some lessons learned from previous Discovery rounds. The Science Data Management Policy was also reviewed: the goal of PDS is to capture all the data it can and make it available to scientists and the public.

Dr. Geldzahler discussed common mistakes in data management areas of proposals. A large problem in the past has been lack of adequate budgeting for data archiving. Typically you should expect to spend 1-2% of the mission budget on data archiving. Plan accordingly. Get PDS involved early on in the project and work directly with PDS. Make sure that you capture all the data needed--I&T, ATLO, ground-based calibration, etc. -- and deliver it in the proper format. It can be very costly and time consuming to try

to clean up data that is delivered in the wrong format. Don't wait too long to begin archiving. Start it flowing right away.

Dr. Geldzahler pointed out mistakes made on the NASA HQ side as well, especially that there is not enough detail in the AO to correct some of the aforementioned problems and that PDS itself has been in the past poorly managed to the point of not being able to ensure proper and complete data capture.

Among methods NASA HQ and PDS are trying to incorporate to alleviate these areas of concern, Dr. Geldzahler indicated that changes to the AO are being made. Preliminary data management plans are due at PDR, final plans due at CDR. Data archiving plans have been made a part of the mission selection process, and mission Data Analysis Program funds can be withheld until all data is delivered, reviewed, and accepted by PDS. We were not happy about doing this, but it was something that we needed to do. PDR and CDR will probably have archiving specialists on the review teams. Fever charts for each project, which show how a project is progressing, will be made available on a PDS node-by-node basis, mission basis, and instrument basis. Charts will be shown at monthly reviews at HQ and JPL quarterly reviews, increasing visibility. They will also be shown at larger meetings, increasing the community pressure on PI's. PDS has also been elevated to Program status within SSE, and is being taken more seriously now than ever. A PDS Working Group has also been formed to review PDS operations and recommends actions to the Program Executive. Please refer to <http://pds.jpl.nasa.gov> for more information. It is a very useful website, please look at it.

**Q:** Do you only deal with SSE data, or do you work with Origins data too?

**A:** PDS is within the SSE enterprise, but we are working to link the other enterprises as well. For now, PDS primarily deals with SSE data.

Hearing no further questions, Dr. Geldzahler concluded his remarks and turned over the floor to Mr. Darrell Foster.

**SPEAKER: Mr. Darrell Foster**

Mr. Foster presented information regarding Expendable Launch Vehicle Launch Services. He explained that he works out of the NASA Kennedy Space Center, not out of NASA HQ, and explained that KSC is the center that manages and oversees launch vehicle operations. Mr. Foster explained that he leads planning services for ELV launch services at KSC. The charter for ELV launch services at KSC is to provide commercially available ELV services acquisition and management for NASA missions and customers. His program is funded by different missions, and their goal is to help ensure mission success. Launch is a high-risk portion of any mission, so there tends to be a lot of government oversight. Several functions were outlined.

**Q:** Where does the funding come from for the services you provide?

**A:** Our salaries are paid for by NASA Code M money. Each project pays for its launch vehicle, payload processing, and other mission-unique features. This structure may change when full-cost accounting is finally instituted.

Mr. Foster showed and outlined an organizational chart for the ELV and Payload Carriers Programs Office at KSC. KSC ELV tries to be involved in your mission at all phases. Online tools in pre-Phase A, advance mission MIM/MIT at Phase A, then transition to mission manager and mission integration during Phases C/D. They are also involved at some level in post-flight data review to try to help understand how the fleet is performing.

Mr. Foster outlined the MIT procedures (team formed in Phase B; Mission Integration Manager is your primary point of contact) and the insight and approval requirements per NPD 8610.23 (some government approval is needed, mostly in mission-unique areas; some audit functions are required as well). Mr. Foster explained Advanced Mission Planning and Design, indicating that they are somewhat limited by off-the-shelf commercial LV's, and recognized that this is a challenge and a constraint. Mr. Foster gave an overview of the ELV's on contract. Among the Delta family, all Delta II's, III's, and IV's (none active, although they can be purchased), are available. Costs and performances (general) were shown.

**Q:** In the AO, cost numbers tend to be binned. We only see the biggest cost. This is a constraint, how do we handle this?

**A:** We hear you loud and clear. We are looking for a happy medium. Service providers are very sensitive to figures being out in the open; public release issues are major issues. Legally, we can't release the actual values outside of the program office. The other problem is that to be competitive, we need to compete the launch services. Thus the figures given are NTE type figures, but it's really an open field. Prices can come down quite a bit in a real, competitive environment, and we hate for PI's to make decisions based on costs that could be and may end up lower than stated. We are trying to increase granularity, but it is hard.

**Q:** The alternative would be to understate costs, which wouldn't be good either.

**A:** Right. We're trying to be as close as we can, without being overly conservative.

**Q:** When is the Delta II for all intents and purposes "gone"?

**A:** We're basically Boeing's sole customer for the Delta II, and we're working with them on this. We have 3 or 4 missions a year -- not enough to keep the line up and running. We are trying to get a commitment to buy a bunch of them. We recognize the Discovery requirements, but beyond current knowns it is very TBD. So, today, the last buy is imminent. For the near term we are OK, but beyond then, we don't know.

**Q:** What about Delta III phase-out?

**A:** We will have to see how the first few Delta IV missions go. If they are successful, phase-out will be fast. The 2006-2007 timeframe is likely. Delta III was intended as a transition, not for extended use.

Mr. Foster further described that Atlas III and V are on contract. There are no new II's being ordered. Two successful Atlas III flights (one "A" and one "B") have occurred, both were flawless. There will be an Atlas V flight in August. Again, cost and performance trades need to use caution when comparing Atlas and Delta vehicles, for there can be no one-to-one comparisons made between them. There is no equivalency between the Atlas and Delta vehicles, so make sure you pay attention to such details in planning your mission.

Mr. Foster described available Small LV's, but these are probably not relevant to this program. There are also Pegasus XL and Taurus options from Orbital Sciences. The majority of Pegasus missions are SMEX, which may not number high enough to keep the Pegasus option afloat. Taurus also suffers from lack of business.

Mr. Foster turned to discussion of other "hot topics" in ELV. The commercial market affects what we can provide. We are working with DoD to lump requirements and block buy Medium-class LV's. NASA's Payload Processing Facility is being commercially out-sourced, and exceptions to this policy will be rare (perhaps limited to Mars and nuclear programs). AstroTech at the cape is most likely doing Deep Impact and Messenger, but this probably won't impact costs.

**Q:** Are the Vandenberg facilities no longer available?

**A:** The baseline plan should be commercial.

**Q:** Will cost be included in the information we are given?

**A:** Yes. Inclusive costs will be provided.

Among other topics discussed were the recompetition of the ELV engineering support contract, the resource drain of on-going ELV certification efforts, and the NLS solicitation Mars 05 launch service awarded to ILS/LMA on an Atlas III. We will be looking for NLS solicitation for the New Horizons launch service later in the year.

**Q:** Will Discovery allow foreign contributed ELV's?

**A:** Good question. Previously we have allowed them if they fall within the cost cap for contributions, and it will probably remain as such.

Hearing no further questions, Mr. Foster turned over the floor to Dr. Ben Clark [change from original schedule].

**SPEAKER: Dr. Ben Clark**

Dr. Clark expressed his gratitude for the opportunity for feedback. He discussed how the Discovery Program has evolved, starting with the first AO, which had two thick volumes, through the incorporation of a two-step process, but noted that it has evolved further. Now Step 1 is just about as hard as it used to be. There is a tremendous effort out there to

address good ideas. Restrictions on areas that could be bid would help greatly, and in this area eliminating Mars from the scope will help. Other issues of contention are increases in the amount of information requested without a corresponding page count increase. The cost cap has not increased sufficiently to match increasing requirements. Reserves and LV were at 28% in 1994 with Stardust, but this total has grown to 42% in the recent Scout Mission (7/02). If the cost cap could stay in tandem with the rising costs of ELV's, this would help greatly. Reserves are also higher these days than they used to be, because of feedback we get in debriefs. Thus, there is a growing cost squeeze, which is ok to some extent, for we need to be under this kind of pressure at some level, but we don't want to fall into the trap of "faster, better, cheaper" thinking. There is also worry about the Delta II no longer being available. Now we have higher DSN costs, especially for higher data yield programs, but no increase in the cost cap for this. Thus we are penalized for not getting more science, a sort of catch-22. ELV's are carried in proposals at higher than "real" costs: Stardust would have cost at least \$47M more today to do the same mission than it did in 1994.

It is very hard to do electric propulsion under the cap. A cap of \$350M would really help out here. This is not a huge increase, but it would make a huge difference. Finally, expectations on science are increasing. PI's are happy to ask for more, but there is a technical tradeoff in doing so. The last three selections (Messenger, Kepler, and DAWN) are very scientifically ambitious. Instrument costs are increasing, increasing project risk as well. If evaluators focus on the baseline and don't look at the floor, you may get a situation where you are not buying what you think you are buying.

**Q:** Floor? The point about the evaluation? Should the evaluation focus more on the floor?

**A:** Yes. I don't know how you'd weigh it, but...

**Q:** I heard that evaluators are buying too much science...?

**A:** Evaluators focus on the baseline mission. Cat I versus Cat II may be a promise for something more ambitious than what can actually end up happening. It is not often that you actually get to do everything in the baseline mission.

Dr. Clark concluded his comments and, hearing no further questions, turned over the floor to Dr. Carlton Allen.

### **SPEAKER: Dr. Carlton Allen**

Dr. Allen's presentation regarded Astromaterials Curation procedures at Johnson Space Center. This talk is applicable to sample-return missions. JSC has for the last 3 decades been the location to curate and distribute astromaterials. The goal is to get samples out to the science community. We process materials when they first arrive back at Earth, then distribute, document, and protect a "pristine" set. We are involved in forward planning efforts--talk to our office early on in your program development. We also do focused R&D in support of current and future sample curation. For lunar samples we have found



that preserving, protecting, and distributing samples in nitrogen is acceptable. We get hundreds of samples from Antarctica every year. These samples are already "contaminated," so we only use glove boxes and nitrogen to process "special" ones. The rest are processed in open-faced hoods in clean rooms. Cosmic dust has been collected in the stratosphere; we pick up lots of different materials, including extraterrestrial materials. We also have space-exposed hardware. Of interest to scientists and engineers is the impact of space on materials and hardware. Two sample-return missions are in space right now. Genesis will return (in 2004) a container that will be opened in Houston. Surfaces will be handled in a Class 10 clean room, specially built for Genesis samples. Stardust is also in flight, using aerogel as a collecting agent. This will return to Houston in 2006. So if you are planning to do anything related to any of these things, we can and will help you. We will have a dedicated Class 100 clean room with glove boxes. MUSES-C (ISAS launch in 2002-3) will be collecting asteroid "dirt." Use of a high-purity nitrogen glove box is planned for this material. We expect that many other sample return missions will be flown in the future.

The language in the current Mars Scout AO is important here, too. Basically, if you bring anything back, it must be done through this facility (JSC). Costs for curation must be included in the proposed cost. Anticipated costs will be provided (they were in the Library for Scout). The team delivers the materials to the facility, and then JSC does the rest (process, curate, and distribute). A fraction is then distributed to the science team as was pre-determined in Scout--and there will likely be a similar restriction in the next Discovery round. If you plan to go someplace with planetary protection implications, costs will be higher, depending of course on what needs to be done. We will have to design and construct a laboratory to receive your samples, staff it, and maintain it for 3 years following the sample return. Beyond 3 years, other programs (e.g., Cosmochemistry) will support curation. The estimate in the Scout AO was just over \$1.5M. This is not necessarily the rule for Discovery, but this is certainly a good starting point.

Dr. Allen opened the floor to questions. Hearing none, the session was adjourned for lunch for a period of one hour.

At 12:45 the meeting was re-convened by Dr. Vilas, who gave an announcement regarding name posting. She made it known that we would be posting names of attendees, and if anyone should not want their name posted to please let her or NPRS know within the week. Minutes would also be available, within one month. Following this announcement, Dr. Vilas introduced the next speaker, Dr. Harold Reitsema.

**SPEAKER: Dr. Harold Reitsema**

Dr. Reitsema, of Ball Aerospace Corporation, expressed his gratitude for having a chance for giving feedback and sharing lessons learned over the history of the Discovery Program. Dr. Reitsema outlined the involvement of Ball Aerospace in the Discovery

Program, including the support of 18 concepts for the 1992 San Juan Capistrano meeting, the support of over 40 PI-led teams in Step 1 AO's, involvement in 5 CSR's and in 2 flight missions, Deep Impact and Kepler. From this long history of active involvement in the Discovery Program, there have been some important lessons learned.

First, the 2-step AO process as implemented by the Discovery Program leads to strong missions. They are well-thought out in advance, have good management teams, an excellent science basis, well-understood risks, margins, and descopes, and the missions which have been selected have been able to meet costs and performance expectations. Other AO programs which are not implemented with the 2-step process do not have such a good track record (i.e., ESS Pathfinders), for the different structures leave a much less formal product in Step 1 and are much less developed than Discovery programs. Among the reasons for this success, Dr. Reitsema indicated that the science based, PI-led missions ensure that mission concepts are driven by the mission science objectives and that objectives are kept within the scope of feasibility. A critical point here is the single owner of the mission and the clear focus that results. Compromises are forced upon and decisions are owned by the single owner, the PI. The well-defined responsibilities, as credited by the TMC review process, mean that you don't get to Step 1 without thinking things through carefully. The TMC review makes risks visible and ensures a stronger initial concept and a clearer plan. Excessive optimism does not benefit anybody. People are challenged to stay within the scope of optimistic outlooks, etc, which is good to a point, except that it can be dangerous to be overly optimistic. Aggressive missions lead to a creep pattern that is hard to back out of.

Program stability is a key to Discovery success. The regular release of AO's, the stable upkeep and growth of cost caps with inflation and changing costs, etc., have helped to keep community participation at a high level. The stable mission scope and cost allows missions to mature with successive proposals, as debriefs ensure high quality future proposals and subsequent proposals benefit from continued study and technology development, as well as from lessons learned from missions that have been selected. These missions can mature, but an important part of this process is that the cost cap must incorporate and allow for this maturing to take place.

Dr. Reitsema offered some feedback on the two-step process, stating that this is an essential part of the Discovery process. The Step 1 focus on science also demands that the PI set a reasonable scope for the mission, requiring significant concept development to demonstrate that it will fit within the cost cap. This effort and expense is justified by the need to preserve the original scope during Step 2. People who don't do this well in Step 1 have more problems in Step 2.

The two-step process worried scientists at first, and certain tensions indeed remain regarding promising more than you can actually deliver, but overall the demand for significant concept development early on helps greatly with this and I think we've demonstrated that it can work. Narrowing the scientific scope in the AO however could help limit the work.

**Q:** When you say reduce scientific scope, do you mean reduce what is acceptable to propose?

**A:** Yes--perhaps focus on a smaller area of study or in less detail. Rather than ask for less info in the Step 1 proposal, narrowing the opportunities helps industry. Dr. Vilas added that Discovery does not do this and is not anticipated to do so. Mars Scout did but Discovery likely will not...

Dr. Reitsema discussed Delta II issues, and outlined that the rising launch vehicle costs are certainly concerning, especially the increases in proportion to the cost cap.

Dr. Reitsema outlined some suggestions on how the process could be improved. Among the suggestions were increasing the cost cap to match inflation, ELV cost increases, and programmatic liens. The page count could be increased because there is almost always more than can be put into the current limit (Dr. Vilas added that FYI this is under consideration). Another suggestion would be to increase the interaction with PI's during Step 1 science and TMC evaluations to address key weakness areas. This should be much less elaborate than in Step 2, could be conducted through email or interview, and would only address areas of uncertainty or confusion on the part of the reviewers. This is so that if there is an area where evaluators do not understand something in the proposal there would be some way to seek clarification by the proposers which could clear up what come up as confusing issues, and thus preventing perfectly good missions from getting killed.

In response to this point, Dr. Hertz remarked that this has been done before, on Explorer and on Discovery programs, but because of legal issues it is specifically limited to areas of clarification. You cannot look to improve the proposal itself. In the mind of the reviewers, many points of contention are not seen so much as issues needing clarification so much as issues needing improvement.

(Dr. Reitsema)-The point in mentioning this was to see if this option could be used to a greater extent...

(Dr. Hertz)-But you need to limit it only to issues of clarification. It is not an opportunity to present their proposals better, if this is the case then you need to give all proposers the same opportunities. Perhaps we should increase the page count, which could also cause more confusion, but the basic point is to be as clear as absolutely possible in your write-up.

Following this discussion, Dr. Reitsema mentioned some "Food for Thought" issues and then opened to the floor for questions.

**Q:** Dr. Reitsema's comment about the effort required in Step 1--don't ask for less but try to limit the domain of the program. Do you (Dr. Clark) have any comments here?

**A:** We'd like to see the domain limited, certainly, but then on the flip side of that coin is that some good ideas will get left out. Perhaps Origins could just be left as a separate cycle.

Dr. Reitsema, hearing no further questions, thanked the participants, once again expressing that Ball Aerospace is excited to have been and continue to be involved in the Discovery Program. He then turned over the floor to Dr. Jim Kaufman.

**SPEAKER: Dr. Jim Kaufman**

Dr. Kaufman presented information regarding Jet Propulsion Laboratory's involvement in the Discovery Program, and some lessons learned. His presentation was structured in three stages, Step I, Step II, and the Site Visit.

Among the Step 1 topics discussed were that the cost cap limitations eliminate some good science, the cost cap must be corrected for inflation, a feeling among proposers that they must top each consecutive winner with less buying power. If the cap is not increased, there runs a risk of having more mundane missions, perhaps even failures. Even the \$25M increase does not fully account for inflation and rising ELV costs. The early funding profile was inadequate and seriously impacted several missions, and the lack of up-front money leads to proposers being discouraged from long-lead procurements and may lead to schedule risk down the road.

**Q: (Dr. Hertz)** Do you think that the 36-month limit on Phase C/D is related to that or is this a separate constraint?

**A:** My experience is that the problem is more simply just not enough up-front money in Phase B. Sound project management practices say you should expect to spend 10-20% of your costs in Phase B, but the funding profile does not allow for this.

Dr. Kaufman discussed E/PO cost requirement issues. E/PO cost requirements have increased by a factor of about 10 since the 1998 AO, which is out of line with the 2% cost requirement limitation. This is more a comment for what you might have to do in Step 2, not so much for Step 1... E/PO proposals are treated as separate proposals, reviewed separately, there seems to be a total disconnect. These issues were raised 2 years ago regarding E/PO, but the office didn't change anything, and this non-responsiveness doesn't make for goodwill with the proposers.

(Dr. Hertz)- Look at the recently concluded MIDEX AO for the direction we will likely take into account for the next Discovery round. Your complaints are valid and we are trying to incorporate this feedback into the next Discovery AO.

Dr. Kaufman offered some suggestions regarding E/PO, including elimination of separate electronic submission of E/PO proposals, bringing the E/PO review process in line with the rest of the TMCO process, and elimination of current budget forms.

**Q:** What do you mean by "Bringing the E/PO review process in line with the reset of the TMCO process"?

**A:** Well, it is reviewed by a separate institution, in a different way, with a different abstract, and the E/PO reviewers aren't even looking at the rest of the proposal...

**Q:** Do you want the E/PO people, a completely separate community, to just do their review in line with the rest?

**A:** They aren't that different from the rest, and most of these problems have been solved...

The discussion turned to issues related to Launch Vehicle Capabilities.

There is a loss of good missions due to arbitrary, contract-based capability specs for determining ELV capabilities. This may be resolved by having more info on a website described earlier in the workshop proceedings. We want to see *actual* capabilities. The current allowable LV capabilities are published in a hard-to-read graphical format, and thus mission capabilities depend on the quality of the printer, the sharpness of the pencil, the mission designer's eyesight, etc. Perhaps the LV capabilities could be published in tabular format to aid in proper interpolation by teams. (Again, this problem seems to be solved by the introduction of the KSC ELV Performance Estimation website.)

Dr. Kaufman discussed concern over some "hidden requirements" in the Program Library. There are hidden requirements, beyond those in the Proposal Preparation Guidelines. It would be great to put all the requirements together, in one place, and give us a higher page count. It seems that some of the hidden requirements in many cases are asking for information that would likely not even be needed until Step 2--please take a good look at what information is needed at the Step 1.

(Mr. Wayne Richie of the LaRC ESSSO)- Anything we put in the AO is reviewed by HQ, and it takes a long time to get the AO out. We have been working diligently to get things out of the AO that HQ does not have to OK. They are telling you how you can facilitate the review.

(Dr. Kaufman)-All we are asking for is that a pointer be added back into the AO referring to these items...

(Mr. Richie)-If you put this all back into the AO, it will be much thicker and will take much longer to get released. These materials have been made available electronically, and it's not a good idea to put them back into the AO.

(Dr. Kaufman)-You should be able to understand what the AO requirements are asking for, and clearly so. Some of the requirements are out of step with what is needed at Step 1, and these are basically unfunded mandates...this hurts some proposers.

(Mr. Richie)-Our job is to make sure that what is proposed is doable. If you can't convince even those reviewers what is doable, and you have to give them enough information so that they can see that it is in fact doable, then the onus is on you.

(Dr. Kaufman)-Yes, but some of the information that is required early on is not necessarily required by Step 1. Without some of the level of detail asked for you can still see if something proposed will be feasible.

(Mr. Richie)-Generally we ask you to tell us to the level of your present knowledge what your concept is. It may suggest that what is stated is the full range of what is needed but it doesn't necessarily require you to put all of that in at the earliest stages...

(Dr. Kaufman)-But an empty table in the AO begs to be filled in. If SOMO requires a table, then you're going to fill it in. Either you make it up or you find it...

(Mr. Richie)-The point is, convince the evaluators.

Dr. Kaufman discussed issues regarding page count allocations, noting that the increased page count for E/PO, New Technology, and SDB was a welcome relief, but there were no adjustments made for the addition of Extended Mission, Participating Scientist Program, and Data Analysis Program. Mars Scout will be the model for the next Discovery AO, but it has a huge reduction in page counts...

(Mr. Perry)-We are probably going to increase the page count. If there are areas of your proposal that need more pages to describe adequately, it would most likely be very helpful both to proposers and evaluators to have more space...it is in the works.

Dr. Kaufman discussed the review process, indicating that the stated Discovery goals, objectives, and evaluation process were reasonable. However there seems to be inconsistency between program goals (for low-cost focused science) and the evaluation process in assigning major weaknesses, whereby a proposal with excellent science done well within resources at low risk was rated Category I, but received major weaknesses for not doing more science...

(Dr. Vilas)-If it got Category I, it couldn't have done much better!

(Dr. Hertz)-The Categorization Committee takes these inconsistencies into consideration. Hence the low risk rating...

(Comment from audience)-However, I have seen other inconsistencies in other programs...

(Comment from audience)-There is always a tension between the reviewers. Science reviewers want the most science return from the missions they select, and are not necessarily tuned into the cost cap issues. It must be looked into such that good focused programs are not downgraded due to these reviewers desires for more...

Dr. Kaufman discussed issues regarding Missions of Opportunity. Requirements for MoO proposals are only briefly addressed in Appendix B and are not well integrated with the rest of the AO. Dr. Kaufman suggested that they be re-worked to further integrate it, perhaps create separate appendices to spell out details, etc.

Dr. Kaufman shifted to issues relating to Step 2. First among these were NASA-directed changes in scope, especially funding delays that cause launch delays, requiring larger LV's, extended mission duration, and additional requirements that respond to NASA NIAT recommendations. The latter issue was well dealt with by NASA OSS, and the extra funding applied here showed both sides of the fence were working together towards the same goals.

A less appreciated situation was the arbitrary font change requirements (no requirements in Step 1, but there are in Step 2) which resulted in lots of wasted time and study money. We suggest that no such changes be required mid-stream, and make the requirement "make it readable."

An area of improvement cited was regarding communications with NASA HQ. Dr. Kaufman indicated that HQ has been very open to questions and has provided prompt

answers when appropriate following the blackout period, this has been excellent and an improvement over past AO cycles, they have felt more comfortable asking questions.

Further details on MoO...the same issues here as in Step 1: not enough guidance offered for what a MoO needs in the Concept Study Report as compared to a regular mission.

Dr. Kaufman shifted his discussion to issues regarding Site Visits. The main concern here was the steady increase in the number of written questions received prior to Site Visits. There was a dramatic increase in the numbers of these, especially for the last Discovery AO and PKB. The problem is that they arrive 3-5 days in advance of the Site Visit, and teams are already scrambling trying to figure out what to tell you in the meetings, and then you suddenly get drenched with many pages of written, detailed questions. Also, the number of telecon-related questions were out of proportion with the others.

(Dr. Vilas)-Questions are sent to teams with an equal amount of time before each site visit. They are seeking clarifications in certain areas. If you have lots of questions on telecons, they will outweigh the others...we are also trying to not give proposers a chance to improve areas about which we are asking questions, so much as simply to respond to the questions as originally proposed. Adding too much time gives teams a chance to improve such areas, rather than just answer questions according to how the proposal was written originally.

(Dr. Kaufman)-It seems that some engineers had trouble determining what was required at various steps...

(Dr. Vilas)-The questions answered at the site visit, although painful, generally clear up the areas we need clarification on...

(Dr. Kaufman)-We're not saying don't have the questions, or so many important questions, but the point is there are real human factors. If there are too many questions to answer it becomes ineffective. Perhaps the question/answer period of the site visit should be limited, or simply have another telecon to answer these questions, or maybe there shouldn't be a structured presentation at all at the site visit, just a Q/A period. Could we find a compromise to limit the number of hours of the site visit during which questions are answered so that the presentations for site visits can be done well?

(Dr. Vilas)-If questions remain unanswered and there are areas of confusion among the reviewers, who write the questions, you do yourself no good deed to limit this.

(Comment from audience)-But the past has shown admirable success with this method, what is the problem exactly?

(Dr. Kaufman)-But at what expense?

(Comment from audience)-I love the site visits! The inability to plan too far ahead allows the team to really show its character.

(Mr. Richie)-You guys are doing great. We are all working hard, proposers and reviewers.

(Dr. Vilas)-If we limit the questions, to let you present how you want to present, we may never get answers to the questions for which we really want answers. Overly structuring the Site Visit, although certainly easier for the proposing team, may actually hurt you. One of the things we do in preparing the questions is scrub the list multiple times. One of

the criterion tests we apply to the questions before we send them is "do we really have to have this information?" Will it make a difference in the evaluation? We make an earnest effort to limit the questions to those for which we really need answers, as a rule.

Everyone gets significantly better through the site visit process because it is through addressing these problems that the evaluation team wants answers so that we get the information we need to get a more complete perspective on what we need to know and understand. I am sensitive to schedules and time restrictions, but we do need answers to the questions we send. Perhaps we could send them earlier...

(Dr. Kaufman)-Especially concerning is the trend, the trend of increasing numbers of questions asked...

(Dr. Vilas)-Well, why is this the trend?

(Dr. Kaufman)-The question is are the proposals now less clear than before, or is a greater level of clarification more important now than before?

(Dr. Vilas)-There is a tremendous amount we learn in the site visits, much above and beyond the questions we ask and send out.

(Mr. Richie)-In order to do this [get all questions answered], however, you will have to make the site visit schedule longer. If you want a longer review period and want to wait longer to hear how you have done, the questions could be sent out earlier. Just remember, everything you ask for will cost you something in return.

(Dr. Kaufman)-But just as the proposal is limited to 40 pages, can the site visit be limited to a certain number of questions?

(Dr. Vilas)-We do work to limit the number of questions.

(Dr. Hertz)-We really do scrub the numbers and we only send out the questions that we don't think you can answer on the spot and that we really do need answers to.

Dr. Kaufman then discussed concern over creeping requirements on the CSR Guidelines. There were similar written questions asked of three recent proposals that required the generation of new information, not just clarification. Information requested, it seems, is not meant so much to clarify the information presented in the CSR but to expand its scope entirely. If there are changes you come up with across the board, let us know in advance, put it in the CSR, and we'll answer them (with more pages too, of course).

(Dr. Vilas)-I'm not sure I understand your concern as regards this...

(Comment from audience)-I've seen this done in other proposal situations. It is like the review team suddenly realizes that they wish they had asked certain questions but didn't...

(Dr. Vilas & Dr. Hertz)-We can discuss this offline. Show us specific examples, and also be prepared for us to not agree with you.

Dr. Kaufman then turned his presentation to miscellaneous issues. Major among these was that significant requirements were levied by NASA's Management Office at JPL on the CSR Task Plan, which had to cover Phases A-E just to get the \$450K to begin with their study. Can you help with this?

Having concluded his presentation, Dr. Kaufman thanked the Discovery Program officials and the participants of the workshop. He declared that he and those at JPL were



very excited for the next Discovery round, and were looking forward to doing it all over again! Hearing no further questions, he turned the floor over to Dr. Vilas.

### **ROUNDTABLE DISCUSSION PERIOD-Moderator: Dr. Vilas**

All speakers who were present were invited to the front of the auditorium to address any questions that may arise.

(Mr. Brody)-I wish I had a chance to acknowledge Dr. Paul Hertz publicly for all he has done, but as he has already left I will just make a small announcement and let him know personally.

**Q:** Recent NASA AO's used to ask for a "fact sheet." Now they ask for a "graphics cover page." I asked for clarification from two different people on two different AO's, and I was never able to get clarification on the difference between these things. If you use the term "graphics cover page" in the next AO, please tell me what it is.

**Q:** There have been lots of problems with the NASA cover page website...about 10-20 questions a week are put in from PI's alone...more instructions on the mechanics of the site would be very helpful.

**Q:** Another point is that there is a library web page with ancillary documents. Frequently I'll see that changes have been made somewhere within the page (indicated by a "last updated" date) but there is no indication as to what has been updated/changed. Is there some way to clarify this?

(Dr. Vilas)-For Step 1 proposals, please do not submit proposals with binders. Reviewers get the entire proposal, it is no longer split up by reviewers as it used to be, if that helps any in helping you figure out how to put them together.

**Q:** Please then define what kind of packaging you would prefer for Step 1.

**A:** There is no sense in getting pretty, bulky proposals, especially at Step 1. So don't waste your money. But it does say you can use them at Step 2.

**A:** At one time there was an intention of being able to separate parts of the proposal. We no longer do this, if that is helpful information for anyone. All reviewers get the whole proposal regardless of how much they are reviewing, we no longer split them apart.

**APL Perspective:** Comment first on the process--APL thinks this is a great process, we wouldn't change anything. Some of the comments made this afternoon seem to be simply marginal changes in what is a very effective process. From our perspective, the cost cap issue is very important. There is a lot of catching up that needs to be done here. It is more important that money provided for the CSR in Step 2 be adequate. \$450K is better than the original number, but yesterday I heard talk of \$1M for Step 2 for New Frontiers, and I would claim that a Discovery Step 2 is comparable in scale to a New Frontiers Step 2 as the efforts will be very similar. The number \$1M seems to be recognition of the

effort required. This is an area we feel strongly about and would provide some welcome relief...

(Dr. Kaufman)-I brought up a lot of negatives in my JPL perspectives talk, but let me be absolutely clear--we have a really polished cannonball, and Discovery is a really strong program all around. Our focus in our talk was simply just with the points of contention we have right now, not to be an indication of dissatisfaction overall on our part. We think it is a very strong program.

Hearing no further remarks, Dr. Vilas gave concluding remarks, thanked the participants, and wished everyone good luck in the next AO round.

The meeting was adjourned at 2:15 p.m.