National Aeronautics and Space Administration

Earth Science Subcommittee of the NASA Advisory Council

[Teleconference]

August 31, 2011

NASA Headquarters

Washington, D.C.

MEETING MINUTES

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Lucia Tsaoussi
Executive Secretary

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Byron Tapley
Chair

Submitted:
Mark Bernstein
ZantechIT Services
September 7, 2011

The NAC Earth Science Subcommittee
Teleconference
NASA Headquarters
August 31, 2011

The teleconference commenced August 31, 2011, at 1:05 p.m., when Lucia Tsaoussi established that a quorum was present. [Participant list attached as appendix.]

Lucia Tsaoussi affirmed that the major item of business was to discuss summaries of the performance of the Earth Science Division in its assigned task areas, and to attach a color-coding [green/yellow/red] that rated performance in that area.

Objective 2.1.2: Progress is enabling improved predictive capability for weather and extreme weather events.

Raymond Hoff noted that general climate studies were not covered in this objective. He called attention to the opening of the overview, which he regarded as weak. He noted that instead of requesting individuals concerned to write a letter, they had been provided with a draft for modification. He noted that seven pages of instrumentation appeared in the appendix. Further, he thought the papers identified as samples of work were not impressive; his understanding was that there were 111 weather-related papers that could have been chosen from, but had all been passed over. He believed selecting from that list would have led to a stronger report; however, he did not regard himself as in a position to do this: he simply felt a better job could have been done. He asked whether there had been a decision to reduce the importance of the applied sciences in this area.

Jack Christy said there was no intention of decreasing the importance of this area: the program in question was not a large one and in recent years had been focused on hurricanes. The GRIP [Genesis and Rapid Intensification Processes] campaign had been undertaken late in the year and one could not expect it to have as yet been the basis of papers. He did not see any change in programmatic emphasis. He noted that one of the five Earth Ventures had been selected from this area. Raymond Hoff said he was pleased to hear that emphasis was being maintained. He noted that many papers had been done on clouds, adding that one could argue that these were radiation science rather than weather related. Byron Apley said he believed the phrase "improve predictive capability for extreme events" was a very weak descriptor.

Other comments were sought. Byron Tapley said he believed Byron Apley raised a relevant point: he believed Objective 2.1.2 was one of the weaker sections; his first reaction was that it did not merit a 'green' rating, but then he had seen some fairly exciting things described in the supplemental material. That information appeared not to be included in the short summary, which was, after all, the portion of the report that would be looked at most closely.

Lucia Tsaoussi said that the rating given related to the resources the program had available. She noted that, typically, efforts were made not to report a given achievement in multiple areas. She said she would request Ramesh Kakar to consider rewriting this section. Ramesh Kakar said there was not enough material about GRIP, which took place last year, and will be more fully reported in the future. Raymond Hoff said he would submit a markup

of the 111 weather-related areas and leave it to Ramesh Kakar to determine if they had been reported in other areas.

Byron Tapley said that since this was an agency goal, the funding sources mattered less than the composite question of whether the goals had been met.

Raymond Hoff said that some reports that were not being used elsewhere could be included in this section. He thought the breadth of the program was broader than indicated: in particular, he felt the final paragraph was weak. He believed adding the work on clouds that had been undertaken by Calypso would strengthen it.

There was a request from the floor that the objectives of the meeting could be restated.

Lucia Tsaoussi said the objective was to rate the performance of Earth Science in six different performance metrics. As part of this, some background information was supplied on major accomplishments and on peer-reviewed literature. Each program was rated, she said, in terms of the goals set for it and the resources made available for achieving those goals. Regarding ratings:

'Green' meant that goals had been met given the resources available.

'Yellow' meant that not all goals had been met.

'Red' meant that goals had not been met, nor had any other result of unusual value been achieved.

One participant commented that the task of the Earth Science Subcommittee was to rate success in each area, and to supply a more voluminous appendix. The rating should be based on the information provided; however, there was a question: if the rating was other than 'green,' would it in fact be 'green' if the material was better presented. If that was so, then the write up should be improved; if that was not so, then the 'yellow' rating should be explained.

Byron Tapley suggested that the group move reasonably quickly through those areas with which there was general satisfaction and then return to those that were questionable.

Raymond Hoff said he would be happy giving this area a 'green' because he had looked at the accompanying material.

[Echo effect disrupted conversation from minute 37 to 42.]

Lucia Tsaoussi stated that the group was not charged with assessing the rewrite, but with assessing the program; to identify it as other than 'green' required some shortfall in the program as presented.

Raymond Hoff said additional findings were required. He noted that he had not read all 111 of the papers cited earlier, but it would be worth scanning the list to see what should be included. He believed any program that generated 111 published papers was working well.

The question was posed: how does that long a list of papers get filtered down for highlights.

Lucia Tsaoussi said that was something for the writer of the individual section to decide; she noted there was no further meeting at which an assessment could be made in this area.

Byron Tapley said that if the group was in substantial agreement that there was justification for voting green, he urged the committee to vote according, with the understanding that the writing – particularly the third paragraph – would be revised to better reflect what had been accomplished in this area. Byron Tapley asked if the recommendation of 'green' was accepted; it was. There was agreement that the section will be expanded to include known program accomplishments.

Mark Simmons asked Lucia Tsaoussi whether the appendices were passed along to the 'higher-ups'? Lucia Tsaoussi said not; what went to Congress was a shorter version of the report. Byron Tapley said the paragraph-long explanation had a fairly long lifetime. Lucia Tsaoussi agreed, saying that the paragraph-length material was included in the annual report to Congress.

Objective 2.1.1: Progress in understanding and improving predictive capability for changes in the ozone layer, climate forcing, and air quality associated with changes in atmospheric composition.

Daniel Jacob took the lead on presenting this section. He noted that this objective carried the shortest written; he felt the statement that SPoRT [Short-term Prediction Research and Transition] sponsored research on a number of weather events did not tell anyone anything. He was concerned with this write-up; which, he said, might merit a yellow. He noted that the three areas that support the three write-ups all relate to papers that are in press.

Efi Foufoula apologized for joining the conversation late; the material included in Objective 2.1.1 about predictive capability seemed very thin and did not present a good picture of what was being done.

Valerie Mawdsley said it appeared the front portion of the report was passed among quite a ways to people who would not read the supporting statement; that the assessment was 'green,' she felt, was less important than the write-up. If the statement is weak, the 'green' assessment may give the impression that the subcommittee was simply patting itself on the back.

Lucia Tsaoussi noted that the write-up produced by the subcommittee would be edited by agency for consistency of format and re-written in language more intended for a non-scientific audience; she noted that the rating supplied by the group was not the same as the rationale for that rating. Byron Tapley urged those present to submit by email any additions they thought should be included.

The comment was made that certain specific programs might be in jeopardy unless their successes were called to the attention of Congress; this was particularly the case of the third paragraph of the assessment.

Byron Tapley commented that anything NOT included by the subcommittee would, per force, not be in the final report. He asked if there were any dissensions from a 'green' rating. None was expressed.

Objective 2.1.3: Progress in quantifying, understanding and predicting changes in Earth's ecosystems and biogeochemical cycles, including the global carbon cycle, land cover, and biodiversity.

Daniel Jacobs described this section as "great." He believed it covered important areas in which NSA made notable contributions; it did a good job of highlighting the past years accomplishments, though some picking and choosing had been involved. He, personally, might have selected different matters to highlight. He would give the section a 'green.'

Byron Tapley invited comments. Several participants agreed with Daniel Jacob's assessment. Byron Tapley suggested that the group transmit a recommendation of green. Daniel Jacob said that any corrections to he had he would send directly to Lucia Tsaoussi.

Byron Tapley asked whether the group viewed this category as 'green.'

One participant added more could be added to the maritime part; for example, it would be expedient to report the support NASA had given during the Mexican oil spill. Anna Michalak said she thought it was advisable that several specific examples of scientific results be included in each section: this, she said, would make the writing more specific and catch. It needed to be made clear, she added, that these were being offered only as examples and not as the sum total of what had been accomplished. Another speaker suggested that the less-than-careful reader might be inclined the read the examples as though they were indeed the sum total of accomplishments. Byron Tapley noted that the appendices attached to each objective did not travel "very far up the tree." If the important ideas were not in the summary, they would not be transmitted to further. His own belief was that if one started including examples, it did tend to define them as accomplishments. Anna Michalak said that one purpose of the write was to clarify for people outside the field what is was that was understood this year but had not been understood last year; further, here are the things now being worked on; and here are things we know we do not know.

Bryon Tapley said the question was how much substantive progress needed to be added. He invited anyone who wished to submit a sentence of paragraph on particularly accomplishments to do so. The suggestion was repeated the NASA activity related to the oil spill be called out; Byron Tapley agreed that it was a high visibility activity.

The group consensus was that a 'green' rating should be applied.

Objective 2.1.4: Progress in quantifying the key reservoirs and fluxes I the global water cycle and assessing water cycle change and water quality.

David Siegel said the first paragraph provided a good summary of the science highlights; however, the writing style in the second paragraph cold be improved – information was missing about campaigns already carried out in Canada, Australia and elsewhere. If there was a desire to include more examples, then that could readily be done. He urged a 'green' rating.'

One participant called attention to the first paragraph, which suggested that MERRA [Modern-Area Retrospective analysis for Research and Applications] was identified as not adequately capturing the natural system; further explanation was needed as to why this was the case and what data other systems were supplying. David Siegel stated that the particulars were outside his area of expertise. Bryon Tapley asked, relative to the overall goals, was sufficient use being made of the SWOT [Surface Water Ocean Temperature] data. This drew the comment that as yet there were no specific products from NASA that made use of this data.

Byron Tapley observed, as a general note on word choice, that referring to things as 'discoveries' rather than as 'findings' read more powerfully. He asked if there were any

suggestions for the text. Several participants urged bringing the supporting material forward in the text.

Byron Tapley asked if anyone objected to assigning this objective a 'green.' No objections were raised.

Objective 2.1.5: Progress in understanding the roles of ocean, atmosphere, land, and ice in the climate system and improving predictive capability for future evolution.

Connie [NAME?] presented this section as much better than others she had seen: the summary was good; the writing was good, particularly given that, as its prime audience was Congress, it was not overcrowded with too much detail. The first paragraph talked about how predictive capacity had been improved; the second provided information on sea level rise; the third covers polar regions; the fourth focuses on remote sensing; the first explains the contribution of diagnostic modeling. She thought the summary was adequate because it is an appropriately high level; the appendices provided very good summary. She personally found the assessment a pleasure to read; very complete, with interesting results. She proposed a 'green' rating.

Bryon Tapley requested comments.

David Siegel said he liked everything but the final paragraph: if, he said, one was to look for the 'where' related to the 'decadal time scales' then he could not find it; he did not see the follow through and demonstration for that part. He noted that the objective referred to 'improved predictive capability' but he did not find this claim to be supported as other claims were. A second participant said that, as a member of the community, he was aware that such work had been done, but it was not shown in this statement. However, as only a summary would be delivered to Congress, he had no real problem with the circumstances. David Siegel rejoined that he still had difficulty finding the particular claims of how the predictions were included.

Koni Steffen commented that the objection appeared to be that the final sentences were coming across more as assertions than as statements justified by what is put forward in the appendix. She asked if, given this, a 'green' rating was still merited. David Siegel said: Yes.

Byron Tapley asked if one could cross out the final sentence and still have a 'green.' The suggestion was made that the documentation in the appendix needed to be improved. Byron Tapley requests that an alternate paragraph be submitted.

Byron Tapley asked if the recommendation of 'green' was accepted; it was.

Objective 2.1.6: Progress in characterizing the dynamics of Earth's surface and interior and forming the scientific basis for the assessment and mitigation of natural hazards and response to rare and extreme events.

Mark Simmons said Objective 2.1.6 read quite well and showed how this program was a mix between infrastructural components and a snapshot of some of the science results of the past year. Sometimes, he noted, the whole geodetic infrastructure is forgotten; this structure has been very successful and effective for NASA. The report, he said, included a section on geodesic imaging; mostly about radar and GPS. It described recent

developments in GPS; the use of space geodesy for responding to natural hazards [which he thought it wise to include] and covers, even if not in detail, the continued success of GRACE [Gravity Recovery and Climate Experiment]. Overall, he thought the report had more than enough detail to support a 'solid green' ranking. He commented that he believed the reports, generally, were somewhat lab-centric. Finally, he believed the report gave a good description of Destiny [Dark Energy Space Telescope], which he believed was an important part of the divisional activities and of the decadal survey.

Bernard Minster believed it was also useful that the report mentioned the value of international collaborations and of domestic collaboration between various federal agencies. This, he believed, was important to highlight. He had no problem giving this area a 'solid green.' He said he understood Mark's concerns: efforts on Destiny needed to continue because otherwise there was a danger of a loss of momentum among those people who were engaged in the effort.

[John LaBreque] stated that sole studies have been supported into landslides, but these studies had not as yet led to publications. Further, it was difficult to access landslide areas when actual movement was occurring; it was possible that reading might be made by orbiting satellites. Certainly, he said, this was a goal of Destiny. Frankly, he added, the resolution and accuracy of the data created thus far was somewhat marginal; no related publications currently exist. In response to an offer from the floor, John LaBreque asked that any pertinent information be submitted. Mark Simmons said considerable information was missing; the question, however, was whether there was sufficient evidence for the solid green.'

[Woman/foreign] said she was all in favor of 'green'; however, natural hazards were not as well support.

Byron Tapley noted that much of what was developed under this subprogram was important to other disciplines. For example, unmanned aircraft had contributed to the cryospheric activities; further, they had created images of beautiful slow moving landslides along the San Andreas Fault.

Byron Tapley noted that there was no requirements that Destiny be in place for this objective to be judged 'green.' The comment was made that the conversation that had been held about Destiny should not be 'distilled' out of existence. Byron Tapley noted that this section would not be carried to carry forward in its current length. He asked if there was agreement on judging the section as 'green.' Agreement was expressed.

Mark Simmons affirmed that he would be circulating some comments.

Lucia Tsaoussi said this section should perhaps be reduced in half.

The comment was made from the floor that this series of assessment tended to understate or ignore the role played by technology. Lucia Tsaoussi said that these agency metrics were the only ones upon which this subcommittee expressed a judgment; technology and science areas were also subject to review, but not by this body.

Efi Foufoula commented that it appeared only one article was in *Nature*; none in *Science*; that from Goddard Space Center, there was only one of each; and only one from Langley. She believed more should be done to make the science work being accomplished known to the general public. Byron Tapley said he believed this reflected the fact that databases were drawn from the centers; he believed the situation would appear differently if the data reflected the Agency at large. This prompted the comment that the only information that

could be relied upon in terms of publications was the progress reports; however, no one went over all of them to cull the results; further, these reporters were not always themselves comprehensive.

Byron Tapley noted that sometimes, the missions themselves did a better job of tracking their own publications with their own databases. Perhaps the Division should tie into that effort. He did not intend this as a criticism; he was extremely pleased with the information put together for this report and thought it a very useful document.

Raymond Hoff said the first thing he did with the summaries was to give them to his graduate students to read through; he applauded any program manager that followed up on the grant reports and put the papers into an available document. Efi Foufoula said that documents were created to track progress; she would like to see some uniformity in their format. Two approaches were suggested: the first was a center-based reference; the second was a community-wide approach. The latter would be a larger task and would require greater uniformity.

Lucia Tsaoussi said there did not appear to be a great many corrections; they would move to revise the document swiftly. She raised the possibility of an October meeting, but general sentiment was opposed: the originally intended purpose was to review budget information, but it did not appear that information would be ready in October. She then suggested a November meeting, asking people to indicate their availability November 7-18.

Raymond Hoff announced that he would be leaving board at end of October; he thanked all for the experience of the last three years.

NAC SCIENCE MEETING REPORT
Byron Tapley

Byron Tapley described the most recent NAC Science Meeting as intense: the NAC Science Committee met first, followed by the NASA Advisory Committee session. He, acting as substitute, chaired the NAC Science committee meeting. The key issue was the situation with the Destiny. The recommendation drafted and carried forward stated that this was a mission that was important to overall science needs and needed to go forward. The statement said that a directive calling for lower-cost alternatives was being considered; the expectation was that there would be a compromise between the mission cost and science objectives. The presentation was made by Michael Freilich, with the recommendation that it go forward to the NAC.

Byron Tapley called attention to various other matters:

One, in astrophysics, was the status of the James Webb Telescope. As those present were likely aware, this was the top astrophysics recommendation in 2001; the project was still in implementation mode, with targeted launch late in this decade. The question of funding raised some concern.

Second, four decadal surveys were pending. There was discussion as to how the 'lessons learned' presentations could be used to respond to these reports; there was also discussion

about getting them carried forward in a compatible mode. Additionally, there was discussion of creating some grading system for use mid-way through the planning cycle.

Third, the recommendation was made that the NAC Science Committee should support the SMD [Systems Mission Directorate] in its task of promoting public relations activities.

Fourth, Byron Tapley observed that the Science Committee generally saw value in meeting directly with OMB [Office of Management and Budget], but wanted to defer doing so until the budget situation was sufficiently clarified as to make the time worthwhile.

ESD UPDATE:
Michael Freilich

Michael Freilich presented a short programmatic summary of Earth Science Division activities:

Aquarius was launched in June. Spacecraft and instruments had been checked out; they were operating in science mode as of last Thursday. He believed the data would be 'unquestionably useful.'

NPOESS Preparatory Project was moving toward an October 25 launch; it arrived at Vandenberg on August 30, 2011, and had been shipped to its launch site for final integration and testing. Michael Freilich noted that NASA and NOAA were collaborating on various aspects of this important research mission.

Efforts in the northeast of take air samples were going exceeding well on all fronts; Michael Freilich characterized this as an unprecedented and unalloyed success -- many more flights had taken place in the period than originally planned. Weather and conditions had been excellent in terms of dynamic range – from clear to cloudy to putrid. He noted that the P-3 aircraft being used flew quite low and attracted considerable media attention. He felt it was widely understood that the measures were being made had to do with air quality.

Regarding EB-2 [Ethernet Brain], Michael Freilich said the Announcement of Opportunity [AO] was out on the street; a 'nice number' had been received against a final deadline of September 15, 2011. The draft AO for the EB instrument call was in its final stage; Michael Freilich anticipated that it would be out for community input early next year.

On satellite missions, he noted that work was nearly finalized on the on the SWATH mission; the French were involved in this effort, which looked to a 2019-2020. On Stage III; ISS, Michael Freilich noted a few small technical issues had occurred; the challenges had been surmounted by the NASA Jet Propulsion Laboratory. He believed 'the things over which we have control' were going well; difficulties related to things outside that control, specifically, on obtaining a launch vehicle.

Mr. Freilich said that ISAT-2 and SMAP were on course. The former has put in place a contract for the instrument; the latter is driving toward a launch in late 2014. Once again, the availability of a launch vehicle was a significant issue. ISAT might be part of a dual launch with a second payload, possibly DMS-B, on the Atlas-5. Given that the DMS-B launch was mandatory, NASA might obtain launch capability very inexpensively.

On Destiny [Dark Energy Space Telescope], Michael Freilich said efforts continued to fund studies that reflected various cost constraints and therefore the capability of variable missions. A request to do this had come from OMB. He noted 'a lot of turbulence' between

SMD and OMB regarding budget and between NASA and OMB relative to the FY'13 budget submission. Additionally, there was the issue of the FY'12 budget; Congress had only five working days remaining in which to pass such a budget; therefore, a Continuing Resolution was likely. He requested the group's forbearance on one point: a significant number of scenarios were floating around; he urged individuals not to latch on to any of them as fact but to await more solid information.

Overall, he said, he believed it had been a productive summer; things could turn sour quickly, he noted, if Congress rejects our budget.

Byron Tapley asked about the relationship between the FY'10 Continuing Resolution and the FY'11 Continuing Resolution. Michael Freilich said the applicable Continuing Resolution budget figure was the lower of the previous year's level and of the President's budget request; as the President's budget request had been for an increase, the FY'11 figure stood. Michael Freilich was asked if the Continuing Resolution applied to the Agency as a whole or separately to Earth Science; Byron Tapley thought it very unlikely that Congress would make changes at the program level.

The comment was made the Canada was making significant cuts into its center that studied the ozone layer. This situation was reported as being tracked; indeed, the Canadian facility was facing a 25 percent cut in personnel; some of those people might be coming to NASA. The comment was made that the Canadians were under severe budget pressure; particularly in their space agency. Michael Freilich noted that the present was a bad time to undertake long-term data acquisition, as everybody's funding was going down around the world.

On additional matters, Michael Freilich noted that the Senior Review had recommended that the Division continue all its missions; budget existed to do so.

On CloudSat, Michael Freilich announced that tremendous difficulty had occurred beginning in April owing to battery problems. The batteries were beyond their design life. Due to what he termed the 'superb' performance of a JPL team, CloudSat was now operating, though only on ten percent of the battery power for which it was designed. Efforts were being made to return the vehicle to science mode; failing this a decision may be needed to move it into a terminator orbit.

Michael Freilich noted that UARS [Upper Atmosphere Research Satellite], which was no longer a NASA responsibility having been declared some years ago to be space debris, would be making an uncontrolled re-entry in the next 60 days. It consisted, he said, of 'a lot of metal.' While the satellite was not NASA responsibility, the opportunity was being taken to point out the contribution UARS had made to understanding upper atmospheric processes.

Byron Tapley thanked Michael Freilich for his presentation and all involved for their participation in the telecom.

Lucia Tsaoussi reminded all persons with comments to submit to do so promptly by email, so that a revised version could be distributed soon.

Appendix A:
NASA Advisory Committee Earth Science Subcommittee
[Membership: April 2, 2011]

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APPENDIX B: Participants, August 31, 2011 Teleconference

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Richard Dissly	Ball Aerospace
Erin Duggins	Hay Group
Jared Entin	NASA
Efi Foufoula	University of Minnesota
Lawrence Friedl	NASA
Raymond Hoff	University of Maryland
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