

APPLIED SCIENCES ADVISORY COMMITTEE

June 20, 2013

NASA Headquarters Teleconference

Washington, DC

1-4 pm EDT

Meeting Minutes

Kass Green, Chair

Peter G. Meister, Executive Secretary

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Welcome

The Executive Secretary of the Applied Sciences Advisory Committee (ASAC), Mr. Peter Meister, opened the meeting. Mr. Lawrence Friedl introduced and reviewed the teleconference agenda, representing the Spring 2013 meeting of the ASAC, noting that six months had elapsed since the last one. The agenda was designed to identify items to tee up for the ASAC Fall meeting, and to provide an update on the Applied Sciences Program (ASP) and Earth Science Division (ESD). ASAC Chair, Ms. Kass Green, welcomed meeting members. Mr. Meister announced that ASAC would undergo its Federal Advisory Committee Act (FACA) training during the Fall meeting, marking its nominal transition from the Applied Sciences Advisory Group (ASAG) to ASAC.

Review of 2012 outcomes

Mr. Friedl provided a brief refresher on the ASP, including its three principal lines of business: Applications; Capacity Building (especially in developing countries); and support for Mission Planning Activities, entailing planning for future missions with greater societal benefit.

Mr. Friedl reviewed the outcomes of ASAC's October 2012 meeting. He noted that while a letter containing specific recommendations was transmitted to the ESS, the subcommittee has not formally received it; the letter will be reviewed at its next formal meeting. ESS did receive an information-only briefing on the President's FY14 budget, yet this event wasn't a formal ESS meeting per se. Ms. Green requested that the letter be moved further up the chain of communication. Mr. Friedl and Mr. Meister took an action to follow up this request with Dr. Lucia Tsaoussi, to essentially re-send the letter to ESD Director Dr. Michael Freilich, noting that as the ASAC is now a FACA-ruled advisory committee, findings and recommendations can go directly to the ESD Director.

ASAC Letter contents

Mr. Friedl described ASP's response to the ASAC recommendation to increase the consideration of applications in mission planning, in light of the mid-decadal assessment for Earth Science. ESD is now in the discussion phase for the first Earth Venture (EV) missions Announcement of Opportunity (AO), for both instrument and suborbital missions, and will raise this issue of applications. Both Cygnus (mission) and Tempo (instruments) have clear applications dimensions to them. The Surface Water Ocean Topography (SWOT) mission, currently in phase A, has applications dimensions that have been substantiated in its Level 1 requirements. ESD is continuing to work on this and will consider it in upcoming Earth Venture calls. Dr. Susan Moran commented that she had just finished writing a relevant handbook chapter for the Soil Moisture Active Passive (SMAP) mission, and offered to send it forward to ESD. Dr. Brad Doorn agreed to follow up with Dr. Moran on this communication.

Responding to recommendations on developing methodologies to determine the value of applications, ASP has issued a primer on its websites, and also provided a presence at the recent Geospatial World Forum, an annual workshop that assesses the benefits of Earth observation programs. On researching methodologies, ESD is still writing a solicitation on the topic, to be issued soon. Language regarding the impact of analysis is being put into this solicitation. Dr. Bill Hooke noted that some language on the presentation slide regarding methodologies for increasing/accelerating values and requested that it be made more explicit.

Noting a specific recommendation, Mr. Friedl reported that ASP does not yet have a permanent Disasters Program Manager. The Science Mission Directorate (SMD) took the opportunity in May to raise the issue to the senior leadership level, including Administrator Bolden. Dr. Frank Lindsay is ending his tenure in this position in June (on paper), but is looking to extend the position to the end of the calendar year. This action does not fulfill the recommendation, but it keeps Dr. Lindsay in place for the interim.

In response to the recommendation that the Capacity Building position be made permanent, Mr. Friedl reported that while there is a limitation on the number of ESD positions, the directorate is considering extending Dr. Nancy Searby in the position for another year, (through October 2014), while dealing with the matter of not having the billets for permanent hires. ASAC's recommendation for the placement of a permanent Communications manager is subject to the same issue, as there are limitations on physical space allocated for ESD. While the directorate acknowledges the issue, it is much more of a division-wide item that ASP would like to address, to align with ESD activities.

With respect to better characterizing users, while ASP agrees with this recommendation, there has been minimal progress since October. Ms. Green requested that this topic be addressed at length, both specifically and generally, in the Fall meeting. Mr. Friedl took an action to address user characterization in the Fall meeting agenda.

With respect to Applications Readiness Level (ARL) inclusion on the NASA ASP website, ASP has been addressing this internally, and has carried out some recommendations. A formal metric has not yet been developed for tracking publications, but ESD has been giving guidance to principal investigators (PIs) on reporting on ARLs and metrics in general.

ASP has also made efforts in strengthening the role of value-added intermediaries and brokers—Capacity Building is doing much more on this than other areas. In coordination with the user characterization, this subject is also something to address in the Fall. Mr. Woody Turner observed that Mission Applications representatives are leading in this area too.

With respect to recommendations on data access, NASA's Land-Atmosphere Near Real Time Capability for Earth-Observing Systems (LANCE) held a user working group meeting (LANCE receives partial support from ASP). Overall, Friedl noted that there has been minimal change since October on data access topic, though ASP agrees with the need for greater progress and

plans to address this further at the Fall meeting. Ms. Martha Maiden et al. have concurred with the recommendation regarding the responsibility of the Distributed Archive Access Centers (DAACs) to provide pre-launch test data. Dr. Moran mentioned having sent out an email, describing how a SMAP requester had obtained pre-launch data within 24 hours, and praised the huge leap in promptness. She asked if the DAACs would be able to receive better support for doing this excellent work. Mr. Friedl ensured Dr. Moran that such praise will be passed on to Dr. Freilich and to the DAACs as well. Ms. Green expressed appreciation for the feedback.

Dr. Bill Hooke commented that it seemed the last 6 months have been tumultuous, especially given sequestration and FY13 budget discussions. Friedl noted that the period has been more time limiting than budget limiting. In addition, ASP was focused on contributing to ESD strategic planning efforts, which took time from pursuing some actions from Fall 2012 meeting.

ESD and Applied Sciences Update

Mr. Friedl presented the President's FY14 budget request for ESD and ASP. He noted that the past six years of requests vs. appropriations have been fairly stable and flat, though not necessarily accounting for inflation. In addition, he noted that ESD has been given increased scope and responsibilities for the FY14 budget. This increase can be viewed as a positive in that the Administration recognized value of Earth Science. The topline number for ESD is approximately \$1.85B. On the budget chart shown, the adjustments within the rows simply reflect shifts in mission phasing rather than changes in priorities (e.g., Land Imaging activities is now bookkept in the Earth Systematic Mission line).

Budget features include new items in scope, such as the sustained land imaging program (which will not necessarily be a copy of Landsat 8). ESD is looking at how to provide land imaging data products for the community and is pursuing studies for different options. ESD has also been given responsibility for climate sensors originally intended for the Joint Polar Satellite System (JPSS)-2 mission; the National Oceanic and Atmospheric Administration (NOAA) originally managed these sensors. These sensors are Clouds and the Earth's Radiant Energy System (CERES) sensor, Total Solar Irradiance Sensor (TSIS) and Ozone Mapping and Profiler Suite (OMPS)-Limb. ESD is also carrying out related activities for the Deep Space Climate Observatory (DSCOVR) spacecraft to help prepare for launch. The ESD budget allows for 8 mission launches plus DSCOVR by 2021. Dr. Peg Luce noted that she was involved in a study on the land imaging issue, due in 2014.

The year 2014 is expected to be active in terms of launches; ESD is planning 3, possibly 4 launches, including Global Precipitation Measurement (GPM), Orbiting Carbon Observatory (OCO)-2 and SMAP. SAGE-III will be launched to ISS, the launch may be moved out to early 2015. The ESD Airborne program is looking to be very active in 2014-15 as well. The SMAP mission is entering its environmental testing phase, and GPM is exiting its testing, preparing for a February 2014 launch.

ASP update

ASP is currently going through the first downselect in the new 2-stage project awards. The water resources applications areas is getting reports this month from the feasibility phase. The program is looking at the continuation of a subset of these activities during the application phase, and will be able to provide more information in October about how it went. The intent is to get partners' "skin in the game."

In Spring 2013 ASP released a primer, which has gotten a good response.

An application transfer activity is also in progress; NASA has been supporting wildfire activities with unmanned aerial vehicles (UAVs), carrying the Autonomous Modular Sensor (AMS) scanning spectrometer, and NASA is now transitioning it to the Forest Service for operational purposes. A transfer ceremony was held to mark this permanent loan to the Forest Service, which has modified its aircraft to accommodate the sensors. NASA can always borrow AMS back, but for now it is being managed with Forest Service funds.

May 2013 was a heavy month for disasters, during which NASA supported the Moore, OK tornado aftermath, aiding in post-damage assessment. Other events covered were the Mount Pavlov eruption in AK, during which NASA provided support via its volcanic ash advisory system; ESD is also starting to use OMPS test algorithms in this area, as well as Suomi NPP data. ESD provided data for fire damage assessment in California, as well.

Beyond the division, the National Civil Earth Observations Strategy issued by the White House in April calls for a plan to prioritize the investments in the various Earth-observing systems. NASA is following up with a plan to respond to this strategy, currently under review.

Mr. Friedl noted that the Applied Sciences Program has received awards for its work in knowledge transfer activities, including recognition of the Applied Sciences 2011 annual report and the *Earth as Art* book/app.

NASA is exploring ways to respond to the National Climate Assessment draft report for public comment, released in January 2013. The assessment is looking to incorporate comments and issue its final version in early 2014. NCA serves as another means of communicating science knowledge to the public and illuminating its impacts. ASP has also been working at NASA centers, exploring various climate models in an attempt to the understand risks and vulnerabilities at each center, and is also planning to hold a workshop in Washington, DC to analyze climate change vulnerabilities and preparedness in the Capital. ASP had a contractor examine private sector offerings of climate adaptation planning and did not discover substantial efforts, thus, ASP has determined thus far that NASA is not competing with the private sector in support of climate adaptation planning.

Mr. Friedl reported on results from the 2013 Earth Science mission Senior Review, which assessed ESD missions that have moved past their prime phases; a total of 13 missions underwent review. In terms of importance to the national interest, Aqua, Terra and TRMM gained very high utility ratings; Aura, Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations (CALIPSO), CloudSat and several other satellites had high utility ratings, and Active Cavity Radiometer Irradiance Monitor Satellite (ACRIMSAT) and the Earth Observing (EO)-1 mission were determined to have some utility. Overall findings are publicly available and are categorized in terms of science, national interest and relative risk. The Senior Review has recommended that EO-1 be terminated in 2016/17, and JASON-1 operations be reduced in the same timeframe. Mr. Friedl took an action to provide the Senior Review report to ASAC. Dr. Moran commented that a key issue to the utility score seemed to be related to data access. Mr. Friedl felt this was more of a chicken-egg issue, as better access to short latency data provides the best use for applications. He suggested that perhaps Dr. Lindsay could provide another breakdown of results to show the scores for the latency issue.

Addressing another aspect of the Senior Review's National Interests panel, to illustrate its value, Mr. Friedl noted that EO-1 data had once been difficult to use, and that the team had revised its website to improve access in response to the review. Mr. Kevin Murphy, commenting on behalf of the LANCE team, noted that most data are available but hard to use. If it's easy to get to and it's free, people will use it. The most highly rated missions tended to be the oldest, and pretty systematic. In response to a question, Mr. Friedl noted that Landsat 8 is a United States Geological Service (USGS) mission and will not be part of a NASA Senior Review, but any NASA-operated land imaging missions will eventually be folded into a future Earth Sciences Senior Review.

Capacity Building Study

Dr. Searby briefed the ASAC on a Capacity Building Program (CBP) assessment held in May 2012. Since that time, findings have been synthesized and a report issued. To provide an update on the assessment, Dr. Searby addressed the assessment report's six findings. The CBP is now working these findings at the program element level, as well as at the program level. The intent is to bring this issue back before the ASAC in the Fall so that ASP/CBP can embark on strategic planning and the development of a five-year plan. Part of the forward work is to achieve a consistent nomenclature and approach. SERVIR is a joint venture between NASA and the US Agency for International Development (USAID). There is a new SERVIR Applied Sciences team, with 11 investigators, and a new contract with USAID to help with demand-related tasks. Dr. Searby reviewed other findings, including a response to the recommendation to strengthen NASA's Earth Sciences program on the data side. CBP is working with ESD Data Systems (Martha Maiden) to determine gaps and overlaps. ESD is also working to broaden the US Water Partnership, addressing water issues in the developing world, and developing a portal for NASA water data. In response to a question from Dr. Ceccato, Dr. Searby noted that CBP has not done the same exercise with the other three program elements. Once SERVIR has been assessed,

however, the exercise can apply these to the other three areas. Asked if had been following the TIGER Capacity Building efforts with the European Space Agency (ESA) in Africa, Dr. Searby replied that while CBP has a relationship with TIGER, it is not strong. The program is more involved in the Committee on Earth Observing Satellites (CEOS) and government organizations, but this effort has lately included some initial conversations with TIGER staff. There is work under way to detail everyone's efforts on a publicly available map, and CBP is hoping to move this forward.

Dr. Searby took an action to see if there is an interest by TIGER to be included in the next SERVIR meeting in Nairobi, while commenting that TIGER has its own program, and it will be a challenge to engage their interest. The SERVIR Applied Science team is considering holding annual meetings, which may be able to include and integrate those boundary agencies.

In response to a finding on building relationships, CBP is trying to tap expertise at different NASA centers. All four program elements have some center involvement, which can be strengthened. CBP is also strategically cultivating a broader partnership. SERVIR is working to broaden to non-governmental organizations (NGOs) and civil societies and is already addressing some needs, but it is a challenge to prioritize different partnerships. In response to the sixth finding on tracking impact of its activities, CBP is looking at the best ways to do this, and welcomes advice on best practices.

Dr. Searby summarized the briefing by reiterating CBP's intent to meet in the Fall to develop a five-year strategic plan. She welcomed feedback on any items missing, or on prioritizing findings. Ms. Kass asked if a subcommittee were necessary for further guidance. Mr. Friedl felt that obtaining input from individual committee members would be appropriate, given the merit of having a formal ASAC response, and that a subcommittee too would be helpful as a reply. Any members interested in forming a subcommittee were instructed to email Ms. Green, Mr. Friedl and Mr. Meister. The goal would be to have the committee's overall sense of the report by early September. Dr. Nancy Dickson asked to hear more about developing tools to integrate natural science databases and social sciences. Mr. Meister took an action to provide guidance to ASAC as to individual comments and the formation of a subcommittee.

Data Latency Study

Dr. Frank Lindsay provided an update on an ASP data latency study. The study, managed by people at Goddard Space Flight Center, began in Fall 2012 and has been extended beyond its original ten-month schedule. A Steering Committee has been formed, including representatives from mission teams and data processing centers, for a total of about 12 people. The study is acquiring community input through an online professional review system, which will generate a report with user requirements for latency-specific data. A final report is expected in Fall 2013. Thus far the study team has held two teleconferences, and is using a survey to gather more data. The survey has been distributed to 5000 people, with 526 respondents so far. A draft report is

currently being written and is due to the Steering Committee on 1 July. The survey is designed to provide information on how users use data now, and extrapolate this information for future use. Next steps will include linking survey respondents to existing missions. Data products are well understood, but the team wants to make sure it is looking at a full complement of data products, and understands how and why low latency will facilitate work.

The final report may provide a foundation for a follow-on effort. Mr. Friedl noted that the goal is to gain a sense of how to prospectively assess, by a new mission confirmation review (MCR), how to serve both research and application needs in terms of latency and felt that the report would prove to be of broader value to the community. ASAC members requested an Executive Summary or pre-release of the report prior to the Fall meeting.

Human Dimensions in Earth Systems Science

Mr. Friedl reported on some broader strategic planning efforts within ESD, Science Mission Directorate, and NASA (i.e., Executive Council, EC). The next NASA Strategic Plan is due in February 2014, including planning for the International Space Station (ISS), Mars, and aeronautics. The Agency has been pursuing a series of strategic implementation planning (SIP) activities across major elements of NASA, and Earth science is one of the elements. ASP contributed to ESD efforts to develop materials for the EC and SIP. Part of the ESD focus for SIP inputs was on human dimensions in Earth systems science; overall, the human dimension is not well represented at present in Earth system science and requires further activity to boost understanding of its role in the Earth system. This focus is reflected in a number of recent studies from the National Academies, the recent USGCRP strategic plan, and an international declaration at the 2012 Planet Under Pressure symposium, calling for better comprehension in this area.

Mr. Friedl noted that NASA and SMD/ESD is particularly examining and considering what role it would play vis a vis roles by or partnerships with other organizations who may be more suited for such a topic. ASP is seeking advice from ASAC in terms of information and perspective, and whether NASA might partner with other organizations working on broader societal issues. Friedl also noted that NASA Earth Science research and applications occur in the context of broad societal challenges, thus, NASA's work might serve some global interests, such as in food security and fresh water availability. ESD has been asked by the NASA Executive Council to put together a longer list of what these challenges are, as well as a prioritized list of top items that NASA could address in terms of what humanity might be facing over the next 30-40 years. ASP is leading this study for ESD.

In this context, Mr. Friedl also referenced a recent study of the geospatial services industry by the Boston Consulting Group, which showed that the industry is maturing. Mr. Friedl noted that one issue to consider is the role Earth observation products do or could serve in the services that industry is providing.

ASP is also thinking about environmental situational awareness, especially how NASA Earth-observing and environmental “intelligence” missions can enhance this awareness, such as serving carbon and commodities markets or how climate change affects food security and humanitarian efforts. Friedl invited comments from ASAC. He also noted that NASA’s role in the topic of human dimensions is still very much up in the air, and ESD would need to consider how to partner with agencies that have social sciences interests and/ or pursue partnerships with economics professionals and industry.

Open Discussion and Review

Related to the human dimensions topic and issues of societal importance, Dr. Hooke addressed the issue of disaster prediction and response, citing as an example the *Weather-Ready Nation* slogan of the National Weather Service (NWS). He mentioned that the Department of Homeland Security is also interested in this discussion. He noted that NASA has resources that can help assess risk, develop mitigation plans, and create a community mindset to use tools. He suggested that NASA try a few pilot projects in some communities. Most communities are not ready for disasters. This is a community resilience issue, and related to not knowing what technologies are available. Dr. Hooke felt that private-sector meteorologists would be willing to bridge technology with need. Instead of doing this separately from the NWS, NASA could help build community awareness, and solve 21st century problems with 21st century tools.

Mr. Friedl replied that ASP is currently just working to collect the broad set of ideas and topics at the moment and looking for input to expand the set. For the study he noted that, as an example, NASA is identifying what the major think tanks are saying. Eventually, after a priority set of topics is determined, ESD will need to ask where NASA can/should play a role as well as what is NASA’s unique piece of the problem. Ms. Green asked if the human dimensions effort differed from identifying societal benefit. Mr. Friedl cited food security as an example of a major societal challenge that cuts across numerous topics and aspects of Earth system science, as opposed to the agricultural elements of Earth-observing missions, which serve a part of food security topic. Ms. Kass recommended looking back at the societal benefit effort, which circles back to an ASAC recommendation to focus on the value of applications.

Dr. Gail commented that the conversation goes way beyond NASA; one useful thing NASA could do is build tools and capabilities, which could contribute some means of avoiding surprises through the use of space-borne data, such as the recent flattening of the global temperature increase. Dr. Peg Luce suggested looking at areas where NASA can make a unique contribution in helping humanity solve some of these problems. Dr. Pietro Ceccato recommended improving connections to Socioeconomic Data and Applications Center (SEDAC) in terms of human dimensions, which may be an under-recognized resource in this area. There are some discrete activities with SEDAC in climate assessment, but the discussion will probably widen. SEDAC certainly has applications in human health and food security.

Dr. Macauley suggested that Bob Chen brief ASAC on SEDAC, and expressed a similar thought for representation from the Carbon Cycle Science Working Group, perhaps through a briefing from Carol Jones, who is also reaching out for the human dimension, and a briefing from the Board on Environmental Change in Society (NAS). Mr. Meister took an action to follow up on this suggestion. Dr. Macauley also mentioned that the ESD director has asked for a new study on the idea of continuity, to identify protocols to help inform when systems should be continued for science or application purposes; perhaps Mr. Friedl could brief the National Research Council (NRC) on this. Mr. Meister took an action to follow up on this suggestion as well.

Mr. Friedl described how ASAC would communicate as a new FACA committee. Under the new arrangement, the overall standing of the committee has increased. Input will now be given directly to Dr. Freilich, bypassing the chain of the NASA Advisory Council (NAC). Dr. Freilich will now be responsible to respond to ASAC input. In addition, because the chair of the ASAC sits on the Earth Science Subcommittee (ESS), this is another avenue for input.

Committee members were briefly polled to arrange the next meeting, tentatively scheduled for 8-9 October.

Public Comment Period

No public comments were noted.

Summary of Actions

- Form a subcommittee to look at CBP and individual comments. Dr. Searby to craft some language on direction.
- Send out slides regarding the Boston Consulting Group's Geospatial Industry Report
- Send out report from 2013 Earth Science Senior Review when publicly available
- Request to ASAC for identifying organizations dealing with global problems
- Re-send the ASAG/ASAC Fall 2012 letter to ESD Director Dr. Michael Freilich. Further develop language regarding methodologies for increasing/accelerating values to make it more explicit
- Applied Sciences to address user characterization in the Fall meeting agenda.
- Examine interest by TIGER to be included in the next SERVIR meeting in Nairobi
- Topic/briefing by SEDAC, CCSWG, BECS, others on human dimensions
- Examine idea for briefing to NRC's study on continuity

Appendix A Attendees

Applied Sciences Advisory Committee Members

Kass Green, *ASAC Chair*, Kass Green and Associates
Pietro Ceccato, Columbia University
Nancy Dickson, Harvard Kennedy School
Susan Moran, USDA Southwest Watershed Research Center
Molly Macauley, Resources for the Future
William B. Gail, Global Weather Corp
Bill Hooke, American Meteorological Society
Peter Meister, *ASAC Executive Secretary*, NASA Headquarters

Other Attendees

Terry Blankenship
Allison Leidner
Kaitlin Chell
Estelle Dodson
Brad Doorn
T. Jens Feeley
John Haynes
Sarah Hemmings
Marchel Holle
Francis Lindsay
Peg Luce
Alfred McEwen
Kevin Murphy
Marian Norris
Ana Parados
Kenton Ross
Nancy Searby
Randy Showstack
Marcia Smith
Justin Tilman
Woody Turner
Amy Walton

Other Attendees

Joan Zimmermann

Appendix B

Agenda

APPLIED SCIENCES ADVISORY COMMITTEE

June 20, 2013

1-4 pm EDT

The dial in number is 800-779-5797 pass code ASAC

The Adobe Connect link is <https://connect.arc.nasa.gov/asac>
Enter as a guest using your name.

Session 1: Welcome and Meeting Objectives

Welcome and Opening Remarks (*Green, Friedl, Meister*) **1:00 – 1:10**

Introductions (*All*) **1:10 – 1:15**

Agenda and Meeting Overview (*Green, Friedl*) **1:15 – 1:20**

Session 2: Review of 2012 Meeting Outcomes

Status Update on ASAG Findings (*Friedl*) **1:20 – 1:40**

Session 3: ESD and Applied Sciences Update

Applied Sciences/ESD FY14 Budget (*Friedl*) **1:40 – 1:50**

Applied Sciences Programs Update (*Friedl and Others*) **1:50 – 2:05**

Results of Earth Science Senior Review (*Friedl*) **2:05 – 2:20**

Session 4: Capacity Building Study

Overview of Capacity Building Study/Findings (*Searby*) **2:20 – 2:30**

Discussion of Capacity Building Study (*led by Friedl/Searby*) **2:30 – 2:45**

Session 5: Data Latency Study

Overview of Data Latency Study (*Lindsay*) **2:45 – 2:55**

Discussion of Data Latency Study (*led by Friedl/Lindsay*) **2:55 – 3:10**

Session 6: Human Dimensions in Earth System Science

Introduction of Topic (<i>Friedl</i>)	3:10 – 3:20
Discussion (<i>led by Friedl</i>)	3:20 – 3:30
<u>Session 7: Open Discussion and Review</u>	
Discussion (<i>Led by Green, Friedl, Meister</i>)	3:30 – 3:45
Public Comment	3:45 – 3:50
Review action / Due Dates (<i>Green, Friedl, Meister</i>)	3:50 – 4:00
<i>Adjourn</i>	<i>4:00</i>