Minutes of the Meeting of the Astronomy and Astrophysics Advisory Committee

October 7-8, 2010
National Science Foundation, Arlington, VA

Members attending:	Sarah Church	Jackie Hewitt
	Debra Elmegreen	David Koo
	Joshua Frieman	John Wefel
	Kim Griest, Chair	Brian Winer
	Martha Haynes	Charles "Chick" Woodward
Agency personnel:	Craig Foltz, NSF-AST	Jean Cottam, NASA
	Philip Puxley, NSF-AST	Wilton Sanders, NASA
	Elizabeth Pentecost, NSF-AST	Hashima Hasan, NASA
	James Ulvestad, NSF-AST (telecon)	Rita Sambruna, NASA
	Vernon Pankonin, NSF-AST	Ilana Harrus, NASA
	Jean Rene Roy, NSF-LFO	Bill Danchi, NASA
	William Miller, NSF-LFO	Miriam Quintal, NASA
	Randy Phelps, NSF-OIA	Dennis Kovar, DOE
	Jon Morse, NASA	Kathy Turner, DOE
	Ray Taylor, NASA	Stephen Merkowitz, OSTP
	Linda Sparke, NASA	
Others:	Michael Moloney, NRC	Kevin Marvel, AAS
	Roger Blandford, Stanford Univ.	Bethany Johns, AAS
	Tony Tyson, LSST	Randall Smith, CfA/Harvard
	Jared Crooks, Princeton Univ.	Randall Correll, Ball Aerospace
	James Murday, USC	

MEETING CONVENED 8:45 AM EDT, 7 OCTOBER 2010

The Chair called the meeting to order, and all participants identified themselves.

The minutes from the 20 May meeting were approved by the Committee with changes from the past AAAC Chair, Wendy Freedman and David Koo.

Elizabeth Pentecost, the AAAC Recording Secretary, reviewed the list of identified Conflicts of Interest (COIs) for the AAAC. There were several updates to the list provided. Those updates will be recorded and distributed before the February 2011 meeting.

Roger Blandford, Chair of the Decadal Survey Committee, provided an update on the survey report to the Committee. There was significant community engagement in the Survey with many white papers submitted to the Committee for consideration and review. The programs that were recommended by the Survey Committee were prioritized based on science objectives and built upon the existing astronomical enterprise. The Committee evaluated cost, risk, and technical readiness and contracted with the Aerospace Corporation to analyze the cost and risk of each of the programs and projects reviewed. Projects that were already started like ALMA and JWST

were not evaluated. Agency guidelines for the budget evaluation were that for NSF and DOE, the dollars were fixed (FY$2010) and for NASA, they were constant real year dollars (declining budget in $FY2010). The survey budgets provided an optimistic scenario for all three agencies. The Committee recommended a mid-decade evaluation by an independent standing committee.

Wefel asked about international involvement and cooperation and what the assumptions were that played into some of the recommendations of the Committee. Blandford replied that it was a large part of Chapter 3 in the report. Almost everything "Large" was a partnership. The managerial and planning consequences of international partnerships were getting harder all the time. Better coordination between strategic planning exercises was imperative. Now is the time to see what Europe is proposing under their *Cosmic Visions* decadal survey. Blandford spent time in Europe explaining the process and what the committee was doing; they understood the process. He noted that "If this report creates a ground for more collaboration and cooperation when this is mutually beneficial, then we will have done a good job." NASA has been actively engaged in discussions with ESA over a long period of time over projects of mutual interest such as Euclid.

Hewitt noted that decisions in Australia, China, and Europe represent huge shifts in the boundary conditions that the US makes strategic decisions in and the Committee couldn't possibly work through all the possible branches this might take and this would be one of the reasons for the DSIAC. Blandford replied absolutely. He is going to China to explain certain aspects of the report. The decadal process has considerable value. Interagency is just as important as international and private-public interactions. Building upon that to make efficient use of resources is extremely important.

The Chair noted that the charge of the AAAC is to assess the recommendations of the decadal survey. He asked Blandford what was the difference between the AAAC and the DSIAC? Blandford replied that what the NRC offers over the AAAC is that it is set up independently and the reports are independently reviewed. Astro2010 had 19 reviewers. This led to many improvements. There was less agency involvement in the deliberations of the group.

Haynes commented that the amount of deliberations of the committee, panels, etc. was astronomical. There was a huge amount of work involved in the process.

The Chair was appreciative of the costing exercise. Marcia Rieke (a member of the Survey Committee) noted that the NRC had to be very careful of about releasing the details of the costing exercise. Some of the information was proprietary. Even though the Committee made recommendations, some activities were still in competition. On the space side, costing data was involved as well as technology which could have been ITAR sensitive. The Aerospace Corporation became an extension of the NRC and the details became part of the working papers that were not to be released.

Pankonin asked whether the cost analysis considered decommissioning. Blandford and Rieke replied No.

Woodward noted that the AAAC looks at interagency interaction. Look forward on how agencies interact on some of the projects; one of the new things introduced is that the international aspect weights, much of the decision-making by the agencies in dealing with projects. Blandford replied it is hard to give general advice because each collaboration is different. There have been highly successful collaborations but the managerial challenges are getting harder each year.

Frieman asked Blandford whether he could comment on NASA's plans for the Wide Field Infrared Survey Telescope (WFIRST) and ESA's Euclid mission and the extent to which they are responsive to the Astro2010 recommendations. Blandford replied that WFIRST was the number one recommendation for space. It is similar to JDEM-Omega. WFIRST will complement Kepler by getting statistics of earth-like orbits. This is needed as input for a flagship mission in the next decade. WFIRST also complements LSST. It was recommended by the EOS Panel. There could a joint mission if it met all of the key science goals of WFIRST and the US would play a leading role. A minority role in Euclid was not among the recommendations.

The Chair asked who make these coordination and cooperation decisions; is it a scientific committee? The government ultimately makes the decisions. He hoped that an informed scientific community would be making major recommendation to inform those decisions in the United States. There is no body that is convened that would say how in a bilateral way NASA and ESA should do this.

Jon Morse indicated that a community announcement will be sent out to give the community a "heads up," about a Science Definition Team (SDT) will be put together and anyone will be allowed to be on the team. NASA plans for it to be very inclusive. Kathy Turner re-iterated that DOE will be allowed to apply to be part of the team, just like everyone else.

Koo noted that there is a move to assess costs of not only equipment but the people and time needed to extract the science out of these projects. The agencies do things differently in how they assess these costs. He asked how the Astro2010 considered the costs. Blandford replied that the Committee was very conscious of life cycle costs. They looked at the differences and conventions used by the three agencies. There were people on the Committee that were familiar with how the agencies run their programs.

The Chair asked Blandford whether he would be available for the rest of the day if Committee members had additional questions. Blandford indicated yes he would be available.

Vernon Pankonin, on behalf of Jim Ulvestad (who was participating by teleconference), reported to the Committee on NSF's efforts in carrying out the decadal survey report recommendations. The FY2011 NSF budget request to Congress had a 7% increase overall, but only a 2.5% increase for AST. AST operated under the U.S. science-funding priorities, however, astronomy does not easily map onto the Administration's science priorities, when compared to disciplines such as biological sciences, earth science, and engineering. Even though the AST budget has doubled over the past decade, there is no indication that the doubling will continue. The AST budget guidance to Astro2010 was that its purchasing power would remain constant. It is likely that AST can support a large fraction of Astro2010 only by significant reductions in current programs and facilities. The Division is aiming for a portfolio review well before mid-decade. This is very important as to how AST will respond to the Survey.

Projects such as ALMA have a huge impact on the Astro2010 recommendations. Annual ALMA operations cost ramp up from $11M in FY09 to $39M in FY15. These increases have to be accommodated within AST's base operating budget along with Astro2010 recommendations. Construction budgets come from the Major Research Equipment and Facilities Construction (MREFC) funding line in the budget but operations funding comes directly from the baseline AST budget. MREFC approval requires many steps and considerable time to execute. Any type of funding wedge for long-term MREFC funding for such projects as LSST will not begin to appear until the FY14-FY15 timeframe.

LSST, the top priority project recommended by Astro2010 has completed a significant amount of design and development over the last few years. The project is multi-agency and has involved multiple meetings between NSF, DOE, NASA, and OSTP. There will be meetings of the MPS Advisory Committee and the National Science Board to determine whether the project is ready to advance toward MREFC readiness. Nigel Sharp has been assigned primary programmatic responsibility for LSST. The optimistic scenario for LSST would be to pass the Preliminary Design Review (PDR) in FY2011 with a go-ahead from the NSF Director in FY2012 and initial MREFC funding in FY2014.

Ulvestad indicated the years outlined in the optimistic scenario were notional and in order to hold a PDR, AST would have to go before the NSB and ask their approval to proceed to PDR. This would essentially push the PDR into mid-2011. In addition, DOE would also have to have their reviews with respect to the camera. So being part of partnership agreements is figuring out phasing the reviews and presenting to each agency what is being done.

The Chair asked what AST could do about funding the project until MREFC funding would become available? Pankonin replied that AST would have to consider a request from the project for development funding to keep the team going.

The second priority was for a mid-scale innovations program. There is no budget line or proposed opportunities in AST at the ~$4M-$135M level. This NSF-wide issue is now being studied by the NSB. AST treats proposals of this type one at a time on an ad-hoc basis. Two possible scenarios for a mid-scale innovations program would be for AST to issue a solicitation in FY12 or FY13 if a funding wedge is available or to wait for a broader NSF-wide program. Management structure will depend on program implementation.

CCAT will be a complement to ALMA. It is currently in design and development for construction readiness in about two years. The earliest possible NSF construction funding would be FY2013 and this depends on solidifying partnerships, passing NSF critical reviews, and availability of funds. Increases for the small programs in AST will depend on a steadily increasing budget.

Woodward asked about the process for assessing how the Division would implement the small programs. Ulvestad replied that because the big projects like LSST and GSMT are so complex and need a lot of lead time and immediate attention, AST has put the small programs on hold. AST is thinking about theory and computation networks but this requires a little more coordination between the agencies. He will be talking with the NSF Office of Cyberinfrastructure to discuss these types of issues. OMB and OSTP are interested in these types of discipline areas. AST is thinking about things that can be presented as a package with a need for additional funds.

Astro2010 suggested a federal investment in a 25% share in one US-led next-generation optical telescope (GSMT). AST considers this extremely unlikely in the present budgetary environment. Any investment must meet the science objectives, have US community benefit, be technically feasible, have an operations plan and solidity of the partnerships, and any site issues that arise. Cost and risk analyses will be critical elements of the selection criteria. Don Terndrup has been designated as the AST program office to work on the investment selection. An assessment for federal investment will be carried out in FY2011 with initial MREFC funding around FY2017-FY2018. Anything that AST does will include recommendations from an external review committee.

Astro2010 also recommended a readjustment in the balance of current vs. future facilities. This would require an overall portfolio review that would include not only facilities but programs across the division. It also recommended a re-structuring of Gemini with an increased partnership share and a Gemini/NOAO consolidation. A new structure of the international partnership is under active discussion and will be further discussed at the November Gemini Board meeting.

The Chair asked that with a non-expanding budget, how many programs will actually get going? Do the proposed programs fit within the budget? Ulvestad reiterated that Astro2010 stated that nothing fits if the budget is flat. AST may have to reduce current programs in some way, hence the portfolio review. The portfolio review that AST would conduct now would take a broader look at the balance of whole program. For example, a decision to go ahead with a GSMT would have a real impact on the individual investigator program. If it looked like AST was getting out toward FY2017 or FY2018 and there was no way to sufficiently support operations of a GSMT, then it would not be proposed to the MREFC line.

Koo asked given that both telescopes anticipate a start around 2018, how does that phase in with MREFC funding since it does not include operations, only construction. Ulvestad replied that if you think of both projects, neither one can wait until NSF puts money in the MREFC line before starting. There may be strategies to spend monies from other partners early, and NSF later. There is risk on the project's part, and it is up to them to determine that. How partner funding phases in and the risk of partners coming and going is not ideal but it is the best we can do at this point in time. MREFC projects are not all astronomy. There are projects coming up in the future outside the directorate. There is no way to move GSMT earlier. There could be options with various projects and investment could be instrumentation not necessarily MREFC.

Koo asked about the rationale for not having a larger fraction of astronomers on the proposed GSMT down-select committee. Ulvestad replied that one option would be to have subcommittees that look at particular aspects but this has not been sorted out. AST views the decadal survey as establishing the astronomical priority of doing GSMT. The priority of deciding on a telescope on Mauna Kea or in Chile, requires astronomers to look at this. Of the selection criteria, all of which are important, only two are astronomy related. The cost and risk underlie everything. Don Terndrup will work on this very complex issue. He is working with a group of people in the division to sharpen up ideas for criteria and how do the evaluation.

Jon Morse reported to the Committee on NASA's efforts in carrying out the decadal survey report recommendations. NASA will work with NSF, DOE and OSTP to coordinate ground-based and space-based initiatives. Implementation of these programs will occur under budgetary conditions realized over the next decade. The EXIST and SIM missions were not included in the recommendations of the survey. The survey recommended investment in core research and technology programs, including the suborbital program. Currently the programs cover the entire spectrum but that may not be the case in the future. NASA is planning to release an Explorer Announcement of Opportunity (AO) in the fall which may have possible international collaboration. Purchasing power in 2010 is about what it was in 1990. The budget environment is different now and NASA needs to plan within the budget constraints.

Morse noted that NASA needed to make investments so that when the next decade rolled around, NASA had programs on the table that were feasible. The Program Analysis Groups (PAGs) would be the conduit for community involvement in the process of roadmapping.

The highest priority large mission for NASA recommended in the report was WFIRST, which could potentially have interagency and international partnerships. NASA will initiate a Science Definition Team (SDT) through an open call with scientists representing a complete range of all recommended science programs. A community announcement was released and a Dear Colleague Letter will follow in mid-October to help define the science goals and implementation. NASA is looking at interagency and international partners which may include SDT representation. NASA is talking with DOE about representation on the SDT. The budgetary and science environment in which WFIRST is developed will impact its implementation. The SDT will have to get all of the information from other projects such as LSST and other ground-based telescopes and any other space missions that might bear on the science goals and therefore optimize for the space mission you expect to make. The budget profile and schedule for JWST dominates considerations of when WFIRST development begins. Significant funds for the next large missions will not become available until after JWST launches. JWST occupies 40% of the Astrophysics budget and will probably continue to do so until it launches.

Prior to the release of Astro2010, ESA invited NASA to consider a 20% partnership in Euclid. NASA has science and engineering teams looking into the planning and optimization studies for Euclid and Plato. NASA indicated to ESA that participation would depend on compatibility with Astro2010 science priorities and recommendations and would be contingent on availability of funds and upon ESA's next down-select. NASA indicated to ESA that they would not pursue a partnership on Plato because it was not well-aligned with Astro2010 priorities for an exoplanet census. With regards to Euclid, the dark energy investigation is similar to the dark energy component of WFIRST and given the budget environment NASA is in, Euclid could be launched in the 2018 timeframe. WFIRST might not be feasible until 2022. NASA is assessing this with stakeholders in ESA and looking at a coordinated approach for space-based observations. Community announcement will be released for a Euclid NRA which is consistent with the current assumptions of the ESA AO and science management plan at the 20% level. NASA is keeping its options open for the Euclid partnership until it gets a better feeling about what the Astrophysics budget environment is and what the budget profile looks like for JWST. Also, NASA is waiting to see if ESA selects Euclid as its M-class mission. NASA has an opportunity to join Euclid but does not replace WFIRST because the science goals are different. Another option could be a single coordinated combined mission with a more balanced participation.

Haynes asked about the Explorer program and whether NASA will implement any of the smaller programs. Morse noted that JWST will keep NASA from augmenting anything. It will be difficult to accomplish the objectives of Astro2010 until JWST launches. The Explorer program is funded out of a different division but JWST has had an impact on other missions.

Impact of Astro2010 has been that there is something on the other side of JWST. There is now a program that pushes JWST to get launched.

Woodward asked about the interaction of community with the agency since Astro2010 is one way to engage the agency. What is the perception of that flow that provides input to the agency and what is NASA thinking about how missions are made and how the DSIAC might react to that? Morse replied that NASA is looking at a strong possibility of a delay in WFIRST and the Europeans going forward with Euclid. It is a scientific overlap, not a replacement for WFIRST. It is a cost-neutral approach to the science program of WFIRST. Elmegreen questioned whether it could really be cost-neutral, especially given that the use of that money now for Euclid would impact implementation of small and medium priorities.

Dennis Kovar reported on DOE's efforts in carrying out the decadal survey report recommendations. DOE has received guidance from HEPAP and PASAG and was waiting until the Astro2010 report was released for look at opportunities in the particle astrophysics program. DOE needs to make investments in the next generation capabilities. Funding levels have been reduced and that has forced DOE to make programmatic decisions on which initiatives to pursue and what is the proper balance between development and operations of tools and research. The delay in the LHC program and the decision to wait for Astro2010 has also postponed major decisions. HEP has focused on developing the domestic Intensity Frontier program for the future, preserving key investments at the Energy Frontier and Cosmic Frontier, and taking advantage of other scientific opportunities of investments are modest. Astro2010 has influenced the opportunities for High Energy Physics participation. The HEPAP PASAG report has recommended an optimized program over the next ten years at various funding levels in the areas of dark matter, dark energy, etc. Guidance from the Astro2010 report recommended to DOE a coordinated ground/space-based dark energy program and investments in such programs as LSST and WFIRST. Lower funding levels recommended LSST as the priority because DOE's role is critical (camera). DOE will participate in programs where high energy physics researchers and investments can play a significant role in and make significant contributions. DOE will consider proposals and partnerships as appropriate.

The Chair noted that the last time the committee met, Kovar showed a funding wedge for the Cosmic Frontier; programs have to fit within that number. Kovar replied that the number given to Astro2010 was a very optimistic budget given the fact they were going to participate in the doubling and it turns out that the budget has been adjusted. Funding profile is less than that. Griest asked another question, Is the fraction of the share of the Cosmic Frontier of the total budget going down because of the Tevatron extension? Kovar replied that the share of the Cosmic Frontier has been going up. Research programs grown but what has decreased is that DOE has been closing facilities. Any savings and reductions are because DOE is getting out of operating accelerators. The basic program will be maintained but it is the "bumps" in the investments that are uncertain. DOE is going to pursue dark matter experiments and participate in LSST. If WFIRST becomes real, DOE may discuss potential contributions with NASA. DOE has funding for future cosmic frontier experiments starting later in the decade.

Woodward asked about workforce development things. How valid are those numbers? Are they growing or collapsing? Turner replied that the numbers have increasing. The Cosmic Frontier fraction of the program has been going up but will not continue at that rate.

Woodward asked about bringing value added to various projects. Is technology transfer a part of that value-add? Kovar replied, yes. It is one of the major ones and that is why NSF would like to have DOE participate in LSST.

The Chair led the discussion on monitoring the Survey implementation. He was surprised how little of the survey was going to be implemented because of the budget constraints.

Wefel noted given the presentations by the agencies, what would be the purpose of the DSIAC in light of constrained budgets. What would they do? Elmegreen replied there were "trip wires" within the report, for example the Lisa Pathfinder, if that failed then it would lead to a different course. If it was immediate to determine Euclid and/or WFIRST, then the DSIAC could weigh in on this issue. Is it reasonable to go from 20% of Euclid and WFIRST when that wasn't in the report? The constraints are different now and it would be this committee that would provide advice on this issue initially.

Woodward noted that are a number of programs within the decadal survey recommendations, that are smaller and have different scopes and schedules that are doable. This would be purview of the Committee to help the agencies provide their planning processes. The objective is to present a balanced portfolio of activities.

Koo asked if the survey committee thought about international involvement in the DSIAC. Elmegreen replied that the report does recommend countries talking to each other but there is no formal mechanism.

The Chair noted that if the AAAC wanted an independent committee to look at WFIRST and Euclid, the AAAC could make a subcommittee. The DSIAC could be a subcommittee of the AAAC as well.

Moloney indicated that there could be different purposes for a DSIAC if it came through the NRC. There would be no one model. There may be a need for a committee such as this to tackle short-term issues or to assess the survey mid-decade, or even at the end of the decade a preparation for the next decade. There is no simple one-stop course for the decade. The NRC could set up a committee to do these activities, but it would have to have a specific purpose, and NRC committees take some time to be formed.

Blandford talked about the stewardship of the science vision. It was done and should start now. The second function of the DSIAC would be to clearly identify on a five-year time scale several specific issues with information you may not have now. There would be strategic choices based on "forks in the road." That would happen on a timescale of three to five years not on a timescale of ten years. The AAAC could garner opinions as one component of solving the problem. The agencies have been reacting responsibly to this too and see a need for this as well; the NRC is trying very hard as well. The AAAC needs to get together with the other parties to best implement the decadal survey recommendations. There needs to be the capability to make strategic choices that will be necessary over the decade.

Elmegreen noted that we needed to get something going now.

Winer noted that the two purposes of the DSIAC as articulated by Blandford were first, the annual monitoring of the survey. His question was, why does that aspect have to be repeated by somebody else since that is the purpose of the AAAC? The second purpose of the DSIAC is that there needs to be a decision because once you come to the fork in the road; you have to be ready to respond; that it would seem one could go to the NRC and set up a task force with a specific charge of here is the decision we need to make, go off and study it, and then make that decision. The first one is naturally satisfied by the AAAC. Blandford replied that, in his view, the two missing elements are the independence by the agencies and the reviews, which are critical to satisfying the first purpose. Winer sees the value of that on the second purpose but not necessarily on the first purpose.

Woodward noted that having members of the decadal survey on the AAAC will help to advance the stewardship of the survey. FACA rules may come into play in setting up task forces. Puxley noted that the agencies send a letter to the AAAC requesting that they form a task force to answer certain questions that need to be addressed.

Haynes noted that the AAAC should focus on what they can do in the short term. There is a report to be written by March 15 and the committee needs to think about what it should be doing.

Kovar stated that if the agencies wanted the AAAC to form a subcommittee, then there should be no reason why this could not be done. There should be no reason why this subcommittee could not be as credible as the NRC. The AAAC choose the members, define the peer review process. The whole question of independence, could be achieved by the AAAC. Morse says the composition of this committee is enhanced by having persons pulled persons from the survey committee as members of the AAAC for the corporate memory. It's the gray areas that need to be addressed by committees such as the AAAC or the DSIAC. NASA needs to talk with the NRC about their mechanics and what are the limitations. Pankonin stated that it is not the intent to create a single committee to cover all of the bases. Another major concern is not to create another committee that seems to have an overlapping or competing charge as the AAAC.

Hewitt noted that one of the best things that the AAAC could do is identify the issues that need to be addressed that would trigger a process to address the issues such as a task force. Haynes stated that what the AAAC needs to do is identify the questions that the agencies need to address and on what timescale. This can be stated in the annual report. The Committee needs to serve both the agencies and the community.

Wefel noted that Astro2010 was a balanced report and the medium and smaller programs were noted in the report even though the focus was on the big projects. The Committee should look at the balance between the large projects such as WFIRST and LSST and the medium and smaller programs. This is exactly where the AAAC can monitor what is going on.

Elmegreen asked how items got on the agenda. She and others on the Committee had received emails from the community, and did not know how the process worked. Puxley replied that the items can be sent to him, Griest, and Church and then they will be considered for inclusion on a future agenda.

The Chair noted that he had received a report from Kevin Marvel (AAS) about Plutonium 238. It's necessary for deep space missions. The important issue is that it is critical for future deep space missions; this type of power is needed. There is only one heat source for these missions and the decision lies in the Department of Energy. Marvel noted that just supporting the efforts of the agencies on this issue would be appreciated.

The Chair asked the Committee to think about what needs to be put in the annual report and to come back in the morning with ideas.

MEETING ADJOURNED AT 5:00 PM EDT, 7 OCTOBER 2010
MEETING RECONVENED AT 9:00 AM EDT, 8 OCTOBER 2010

The Chair called the meeting to order

The Committee decided on the 2011 meeting dates, February 22-23, 2011 (face-to-face); March 4, 2011 (teleconference); May 6, 2011 (teleconference); and, October 13-14, 2011 (face-to-face).

Pankonin provided an update on the NSF budget. The MPS FY2011 request is a 4.3% increase over the FY2010 budget. All of the divisions under MPS received an increase, with AST receiving only a 2.5% increase. Much of the MPS increase is in Discovery, which includes the fundamental "core" programs. Overall, MPS Division's Discovery lines increased 6.7%, with PHY being the highest increase in Discovery at 11.4%. There are new initiatives being

developed all of the time and there may be initiatives coming in 2012 that AST and PHY may participate in. AST will be trying to increase the base budget for the small program that were recommended but, a mid-scale innovations program.

Pankonin noted that the decadal survey reports in the past have always been well received by Hill staff, OMB, Congress, and NSF senior management. The decadal survey, historically, has served astronomy very well, given the size of the community.

Haynes noted that this survey was very different than previous surveys. It was organized differently, the approach to science first was different, and it did not come with a giant wish list. She asked the agencies think whether this approach was more successful or less successful than other approaches. The survey committee made some tough choices and made some people unhappy. Was this the right thing to do? Morse replied, yes, it was. The committee made the hard choices and the community will have to live with this. Even if the NASA budget does not change, NASA needed to see the changes for this planning cycle. The agencies are trying to manage expectations.

Morse provided an update on the NASA budget. He showed a science highlight; WISE finished its sky survey and is by far the deepest sky survey. The FY11 budget is basically flat. The future Explorers are held in Heliophysics Division until they are selected and then the money is transferred to Astrophysics. A plan is needed for the in-guide budget. The decadal survey is used to move the programs around. Each Science Mission Directorate (SMD) theme has to manage within the existing budget envelope. Astrophysics is staying on a plan. The decadal survey will be considered as part of the FY2012 budget process that the Committee will hear about in February. Managing its projects is very important, Getting to the launch pad and using its workforce efficiently as possible, is part of the overall management philosophy. You don't want to have a bunch of projects that do not get to the launch pad because then nobody is doing science. Success is measured by how many missions are launched doing science not how many get started. Astrophysics looks to the decadal survey for balance in its programs.

JWST plans to have all of its mirror segments coated before the end of the next year. The launch readiness date is current June 2014. The independent technical review panel report is expected to be released by mid-October and it will go through an internal review. Progress since the confirmation review in 2008, It went through the CDR in the spring and has made very good progress technically. It is the planning that has been taking more time and costing more money. This is a very challenging project with this new technology.

Frieman asked whether NASA has looked at descopes in JWST. Morse replied that there have been descopes all along the way. It was originally an 8m telescope and is now a 6.5m telescope. There was a science assessment team in 2005 that looked at what performance could be relaxed and still achieve the main JWST science goals. They backed off of diffraction-limited performance down to 1 micron and accepted 2 microns. NASA is looking at whether there are tests that are driving the costs up. They are assessing whether there is acceptable risk in all the test programs. All of the instruments will be delivered this fiscal year. It is very difficult to descope now. Planning is still difficult to get right.

Astrophysics has started a senior review of its research and analysis programs. The program needs to be linked to NASA's strategic goals and metrics need to be used to actively manage its portfolio investments.

Kovar provided an update on the DOE budget. The High Energy Physics (HEP) budget has been eroded by inflation over the past twelve years. The FY2011 request is a 2.3% increase over the FY2010 budget. DOE is making big investments in its programs even with relatively flat budgets. It is a balanced program of projects in all three frontiers. The U.S. LHC program is supported at a level that will allow researchers to play a leading role in extracting physics from the data obtained and in planned upgrades to the detectors. The research program is supported at a level that will help maintain a productive workforce. Advanced technology R&D is continuing to support high risk, high impact initiatives as well as developing and maintaining core competencies important for the U.S.

The Chair asked that in light of flat budgets, how did the high energy community pick between LSST and WFIRST? Kovar replied that HEP asked the PASAG to prioritize the areas where DOE could contribute. They made clear recommendations on dark matter, gamma-ray and cosmic ray experiments. With regards to dark energy, the PASAG noted that they were not qualified to give guidance on a coordinated space-based or ground-based program on dark energy, and that whatever DOE wanted to do in this area, it would be as a partner to another agency. The PASAG was looking to Astro2010 for clearer guidance and Astro2010 recommended that DOE participate in LSST as a first priority, in limited funding scenarios.

Frieman noted that Astro2010 was not just the astronomy community. There were persons on the committee in the particle astrophysics community and that was done deliberately. The chair of the committee has an appointment at a DOE laboratory. Steve Ritz, PASAG, was a member of the committee. There is not this disconnect between the communities. The PASAG deliberately did not make a decision on this issue. The scale of Astro2010 was in a better position to deal with this issue than the PASAG.

Haynes asked whether DOE has a funding profile that could help the NSF's position with LSST. Kovar replied that DOE has a specific set of deliverables. DOE and NASA are in close contact. Each of the agencies has to make its case. DOE needs to know what NSF what are going to do something. Haynes continued with an additional question. Is there something that the AAAC can do to facilitate a discussion between NSF and DOE? Kovar replied that a strong endorsement of whether DOE is responding in a responsible way to Astro2010 would be helpful. Winer suggested a common talk in the context of LSST at a future meeting.

The Chair asked again of the agencies what the AAAC could do in response to Astro2010. Morse replied that it hopes the AAAC will help manage expectations. There are more ideas than funding available. Pankonin replied that managing expectations will be needed. He would like to have reactions to the high-level implementation plans that were presented by the agencies and provide input as to whether the agencies are going in the right direction. Kovar reiterated the same.

Jean-Rene Roy, on behalf of Mark Coles, Deputy Director of NSF's Large Facilities, provided an update on the Business and Operations (BO) Advisory Committee, which provides advice to the Director of the Office of Budget, Finance, and Award Management at NSF, on issues related to oversight, integrity, development, and enhancement for improved performance of NSF's business operations. The Subcommittee on Partnerships in Governance and Funding of Future Multi-Users Facilities explores issues that relate to governance and funding processes for the NSF-funded facilities. Since funding for facilities is likely to come from multiple partners and NSF might be partner, the subcommittee looks at funding mechanisms that optimize facilitating the participation of US scientists in large-scale international projects. Lessons learned from governance of other large-scale international initiatives might inform future collaborations to best

protect NSF's interests while being equitable to all partners and providing greatest return to US science. The Subcommittee will prepare a report to the B&O Advisory Committee. A meeting is scheduled for October 20-22 at NSF. Representatives from other agencies and individuals with direct experience with large projects will be represented on the subcommittee. This is the first time that the subcommittee will be looking at partnerships and funding processes.

Haynes asked if the report will be sent out for public comment. Roy replied that the report will be made public but whether the report will be sent out for public comment has not been decided.

The Chair led the discussion on what the Committee might like to see in the report. Some of the items to be included: (1) reaffirming the Decadal Survey and how much hard work went into the report, and the agencies are responding strongly to the recommendations; (2) emphasizing the incredible science that is being done and the investments that are currently taking place; (3) managing expectations; (4) encouraging continued reference of the survey well into the decade; (5) detailing of what the agencies are doing in responding to the Survey recommendations; a reaffirmation of what the charge is for the AAAC and acknowledge that the four new members to the Committee served on the Decadal Survey committee; (6) issue of the DSIAC and the role of the AAAC in relation to that committee; (7) emphasizing the balance across the programs at all of the agencies; (8) selecting highlights that identify investments already taking place; (9) confidence to the community that the AAAC has a presence on the Hill; (10) concern of the impact of JWST on the rest of NASA's programs. There was a suggestion that NASA provide an update at the next meeting; (11) note the fact that NSF is looking at a portfolio review which is a good thing

Marvel provided a report on Plutonium 238 which stresses the fact that this material is vital to deep-space missions. The issue is whether the AAAC should include a response to the problem in their annual report. Woodward suggested that making a statement of recognition that it is an important issue to the planetary science community should be sufficient. Marvel noted that it will not only have a long-term effect on the planetary community but on the astrophysics community as well. The Chair asked Woodward to draft a short letter to the Agencies outlining the concerns and the AAAC's acknowledgement of the issue. He will circulate the letter among the Committee before it goes to the Agencies.

Frieman drafted a letter (with discussion by the Committee) from the AAAC to the Agencies about WFIRST and Euclid. The Committee endorses NASA keeping open is option of a possible partnership with ESA on the Euclid mission. Frieman will be circulated to the Committee for comments with the final version sent by the Chair to the Agencies on behalf of the Committee. The letter will be put on the AAAC web site and the AAS, the American Physical Society's Division of Particles and Fields (DPF), and the Division of Astrophysics (DAP).

The Chair mentioned that Kovar had made a suggestion that there be a community time at meetings to provide comments on issues in a public forum. Haynes noted that the Committee needed to be careful in organizing this because the AAAC does not want to have the big projects coming in and giving a sales pitch on their projects. This should not distract from the Committee's ability to do its job. Elmegreen suggested that the comments be submitted in advance in written form. Puxley reminded the Committee that the agenda is part of the FACA notice and once it is published then those are the agenda items to be discussed. There could be a general item on the agenda that might include some issues that the community would like to have discussed. The Chair will work with Puxley and Church on how this will be done.

The remaining item concerned the DSIAC. Blandford requested that the AAAC think about it and see how the AAAC can work with such a committee. Wefel noted that Astro2010 looked at all of the science and pulled everything together. Making that science happen is the job of the Agencies. It is the charter of the AAAC to oversee what the agencies are doing and keep everything on track. It is not for the AAAC to make a mid-course correction. If the community wants that, then they ask the NRC to have a committee to do that. Haynes (after re-reading the charge of the AAAC) commented that the AAAC should stick to its charge, and if the charge is to assess how progress is being made, and if there are issues regarding the process of implementations that should be identified, then the AAAC should make recommendations on how to keep the progress on track. The AAAC fulfills part of the role of the DSIAC. The Chair asked the members to put together their ideas and send them to him.

MEETING ADJOURNED AT 1:00 PM EDT, 8 OCTOBER 2010