**National Science Foundation • Office of Inspector General**
4201 Wilson Boulevard, Suite I-1135, Arlington, Virginia 22230

**ALERT MEMORANDUM**

**DATE:** March 31, 2016

**TO:** Ms. Martha Rubenstein
Office Head and Chief Financial Officer
Office of Budget, Finance, and Award Management

Dr. F. Fleming Crim
Assistant Director
Directorate for Math and Physical Sciences

**FROM:** Dr. Brett M. Baker
Assistant Inspector General for Audit

**SUBJECT**: NSF's Oversight of the Daniel K. Inouye Solar Telescope Construction Project, Report # 16-3-004

The Daniel K. Inouye Solar Telescope (DKIST)[1] project was first approved by the National Science Board (NSB) in 2009 for $298 million, with $152 million coming from NSF's Major Research Equipment and Facilities Construction account and $146 coming from Recovery Act funds. In August 2013, the project cost was re-baselined from $298 million to $344 million and the award expiration date was extended from December 31, 2017 to July 31, 2019. A re-baseline occurs when there is an increase in the NSB-approved total project cost, an extension beyond the approved end date of the award, and/or there is a major scope change of the project. In this case, the re-baselining of the DKIST award amount and end date was due to delays in permitting. The project is being constructed in Maui under a cooperative agreement with the Association of Universities for Research in Astronomy, Inc. (AURA).

The purpose of this memo is to bring to your attention potential cost and schedule risks to the DKIST project.[2] At this point, NSF can make necessary corrections and improve its ability to ensure that it has the financial and project information it needs to adequately oversee the DKIST project and to ensure that federal funds invested in scientific research are spent responsibly.

Our examination of NSF's oversight of DKIST revealed issues that pose cost and schedule risks including the lack of an independent project cost estimate, limited information to support project

[1] DKIST was formerly called the Advanced Technology Solar Telescope (ATST).

[2] This review was conducted in accordance with the Quality Standards for Inspection and Evaluation. Inspection steps included interviewing NSF staff, reviewing previous audit reports, and reviewing NSF documents.

expenditures, and the lack of an incurred cost audit. By addressing these issues promptly, NSF could limit potential loss of scientific capability from de-scoping due to cost overruns, decrease the risk of unallowable costs being charged to the award, and reduce schedule delays.

In addition, it is worth noting that DKIST is being constructed under a cooperative agreement with AURA. According to a NSF FY 2014 financial viability review of AURA, at the time of the review AURA held 16 active NSF grants/cooperative agreements representing total funding of nearly $1.35 billion. As noted in our previous report on the Large Synoptic Survey Telescope (LSST), financial viability assessments of AURA conducted by NSF in FY 2013 and 2014 revealed questions about the entity's financial viability, such as [redacted]. NSF informed us that it has requested that Booz Allen Hamilton (BAH) conduct an independent assessment of AURA's financial viability to clarify seemingly conflicting information provided by AURA. It received the final results of that review on March 15, 2016, after our draft report was issued. In the future, we plan to conduct an in-depth assessment of AURA, including an examination of AURA's financial viability.

*NSF Lacks Assurance That DKIST Proposed Costs are Reasonable*

It is essential for cost information for proposed budgets for large facility projects to be accurate, current, and adequately supported to ensure that the costs to government are reasonable and allowable. With the DKIST project, neither the original cost proposal nor the re-baselined cost proposal could be audited, and an independent cost estimate has not been obtained. As a result, NSF lacks assurance that DKIST's proposed costs are reasonable.

Beginning in 2010, auditors identified serious flaws in DKIST's budget proposal. Two attempts to audit the original $298 million proposed budget found the cost proposal was inadequate for audit. The first inadequacy memo, in March 2010, citied four major deficiencies (unsupported estimates and outdated vendor quotes; lack of support for labor costs; lack of support for indirect costs; and unallowable contingencies) and concluded that the budget proposal was unacceptable for audit. The second inadequacy memo, in October 2010, found that none of the four deficiencies had been corrected and again concluded that the proposal was unacceptable for audit.

In August 2013, the National Science Board approved a re-baselined $344 million award to construct the DKIST project. Since the original award was made (for $298 million) in January 2010, permitting and legal challenges to the project's location atop Haleakala resulted in a construction delay of approximately 2.5 years. In October 2012, NSF conducted a re-baseline panel review of the project's scope, budget, schedule, and risk management plan. The panel stated that "the most significant weaknesses relate to bias (overly optimistic) and lack of an independent cost estimate."

Auditors began attempting to audit the re-baselined project in April 29, 2014. On September 30, 2014, auditors disclaimed an opinion on the re-baselined cost proposal, stating that the data provided was so significantly flawed that the proposal could not be audited. Deficiencies auditors found in the re-baselined cost proposal included unsupported estimates, outdated vendor quotes, and unallowable contingencies.

In light of these serious deficiencies noted by the auditors in 2010 and 2014, and the NSF's review panel's findings in 2012, an independent cost estimate was clearly warranted, but NSF has not yet obtained one. An independent cost estimate, is conducted by an organization outside the acquisition chain, using the same detailed technical information as the program estimate and is a comparison with the program estimate to determine whether it is accurate and realistic. Without an independent cost estimate, NSF lacks assurance the proposed DKIST costs are reasonable.

Instead of conducting an independent cost estimate, the NSF Grant's Officer completed a reasonableness review in May 2014, after the award had been updated with the estimated $344 million of the total project's cost as a result of the re-baselined budget. A reasonableness review is one of the eight types of independent cost reviews described in the GAO Cost Estimating and Assessment Guide. It is noteworthy, however, that the most rigorous independent review is an independent cost estimate.

Unlike an independent cost estimate, a reasonableness review addresses only a program's high-value, high-risk elements and can simply pass through program estimate values for the other costs. The purpose of the reasonableness review was to select project cost elements from the re-baselined budget to determine if the sampled costs were reasonable and adequately supported by documentation. This review sampled $55 million, or 16 percent, of total project costs, and made 31 recommendations related to documentation to support certain materials costs, a rationale for two positions with salaries greater than 20 percent of the market average, support in the cost book with respect to escalation costs, and adjustment for domestic travel costs. Several of the recommendations impacted costs, including over $105,000 in incorrectly calculated travel and $44,619 in unsupported cost for facility equipment.

In January 2016, the Grants Officer who conducted the reasonableness review in 2014 told us that she was still working with DKIST on the recommendations and on establishing the total project cost. As of January 2016, 29 of the 31 recommendations from the May 2014 reasonableness review were still open. At that time, NSF could not provide us with an estimate of the cost impact of these 29 recommendations. Due to the significant time that passed since the issuance of the final reasonableness review, NSF requested updated information from AURA to ensure current information was used while resolving the pending recommendations noted in the May 2014 review. According to the Grants Officer, as of February 2016, she had received the additional information from AURA and determined that reduction in the total project cost was not necessary and the total project cost was reasonable. The Grants Officer forwarded resolution of the remaining 29 recommendations to senior management for final approval, but as of March 4, 2016 had not received management approval.

Although the reasonableness review is not as rigorous as an independent cost estimate and despite the fact that it only examined 16 percent of the project's costs, at this point it provides the only real information NSF has about the reasonableness of the project's proposed costs. It is troubling, therefore, that NSF needed almost two years to resolve the recommendations. NSF senior management should ensure that it takes appropriate action to address the recommendations arising from the reasonableness review.

Finally, although the project has been re-baselined and NSF has stated that it is committed to improving rigor and oversight of its processes, as discussed later in this report, more delays are

possible, and another re-baselining may be needed. If a future re-baselining occurs, NSF should obtain an independent cost estimate as part of that process. Absent an independent cost estimate, NSF will continue to lack assurance that proposed costs for DKIST are reasonable.

*Lack of a Plan to Address Impact of Permitting Delays Increased Project Costs*

As early as the preliminary design phase and before construction started, NSF was aware of the risk of permitting delays for this project. The *ATST NSF Preliminary Design Review* submitted to NSF on November 13, 2006, recommended that NSF develop a risk response plan to address a potential permitting delay. As part of this review, we requested a copy of the plan, but NSF was unable to provide it to us. The NSF Program Director indicated that NSF was to include the risk plan for permitting delays in the NSF Internal Management Plan (IMP) for DKIST.

We found that the IMP, does not contain a risk response plan to address a permitting delay. It was not clear to us whether NSF developed a risk response plan, but did not include it or whether NSF did not develop a risk response plan at all. Developing, implementing, and maintaining important project documents is a basic element of sound project management, and it is troubling that NSF was unable to produce a critical document. Given that NSF knew about the likelihood of permitting delays, it makes sense for the agency to have developed a plan to mitigate costs.

As noted previously, in 2013, the NSB added an additional $46 million to the DKIST project at re-baselining raising total project costs from $298 million to $344 million. The NSF Program Director stated that the $46 million increase was due to unknown project delays caused by permitting. The Program Director informed us that although NSF recognized that the permit for DKIST construction likely would be contested, NSF did not anticipate a 23-month delay. As a result of this delay, he stated that the need to pay staff, who could not work during the pendency of the court cases created a "standing army" effect, which increased costs by $15.2 million. Costs were further increased by $8.5 million due to price escalation that occurred during the delay. [3]

There are currently two outstanding legal appeals before the Hawai'i Supreme Court which continue to challenge permits for DKIST. Given the recent (December 2015) decision by the Hawaiian Supreme Court in a similar case regarding the Thirty Meter Telescope construction project on Mauna Kea, Hawai'i, a December 2015 DKIST Project Execution Plan & Construction Status Review identified these appeals as "black swans", (i.e. low-probability, high-impact risks to the project). While all lower court rulings on these appeals have been in favor of the project, and the associated requests for injunctions to project construction have been denied, the panel noted that the cost associated with another extended permitting delay could exceed the remaining cost and schedule contingency. Therefore, in December 2015 the panel again recommended that NSF and the awardee develop a plan for handling a potential delay due to reassessment of the existing permits. In particular, the panel recommended clearly assigning responsibilities for the cost and schedule impacts. The panel stated that AURA and NSF should "reassess the risk from the two pending Hawai'i Supreme Court cases and work with the NSF to develop a strategy for reaction to adverse court rulings that may result in 1 to 2 year halts in onsite construction, and the resulting DKIST re-baseline."

[3] A standing army refers to personnel who have been hired and are being paid, but are not able to perform the tasks they were hired to do because of delays in other areas.

Without a plan to characterize and mitigate delay costs, there is a risk of cost overruns, which could give rise to de-scoping that undermines the scientific capacity of the project. In fact, the project has already undergone de-scoping exercises and could face more. The 2012 Advanced Technology Solar Telescope Project Re-baseline Panel Review for the National Science Foundation stated, "…the project has already implemented several de-scoping exercises and any remaining scope reduction candidates will impact the science performance.." The November 2015 project status report stated that "[any] issues that arise that are beyond our ability to handle through risk management must be handled through de-scopes."

In light of the risk of further delay and the possibility of additional de-scoping, it is essential that NSF take steps to address risks posed by permitting delays, especially the need to determine what actions it can take to minimize "standing army" costs during periods of extended work disruptions. The Program Director informed us that he received AURA's response to the Project Execution Plan Review, which will help assess the costs associated with permitting delays. As of March 2, 2016 the Program Director stated he was still working on the analysis of AURA's response including a plan to deal with potential delays.

*Improved Information about Indirect Cost Rate Structure and Award Expenditures is Needed*

Indirect costs represent expenses that are not readily identified with a particular function, but are necessary for the general operation of an organization. Examples of indirect costs include salary and related expenses of accounting personnel, rent, and utilities, among other things. Because they benefit multiple activities, indirect costs are not charged directly to a Federal award but are to be allocated equitably to all of the organization's activities. An indirect cost rate is the mechanism for determining the proportion of indirect costs each activity should bear; the cognizant federal agency is responsible for approving indirect costs rates based on a recipient's indirect cost proposal submission.

In January 2014, after the re-baseline and modification to the award, NSF's Cost Analysis and Audit Resolution Branch (CAAR) conducted a pre-award review, which identified several areas of concern, including the complexity of the project's indirect cost rate and the risk of inconsistent application and interpretation of different indirect cost rates. Among other things, CAAR found that there appeared to be "no single organizational contact at either AURA or NSF that has complete organizational knowledge of the entire rate structure or its history."

CAAR noted that several times, it had expressed concern to AURA about the complexity of its rate structure and its application practices. Among other things, CAAR stated that AURA management and its NSF-funded Centers are issued three different rate agreements and maintain over 23 separate indirect and recharge rates with NSF in a single fiscal year, each of which must be updated annually with NSF. Further, CAAR found that the complexity of the current rate structure has resulted in the submission of proposal budgets that use different combinations of rates and bases, which has created challenges for both NSF and AURA with respect to the consistent application and interpretation of the different rates and bases.

CAAR also stated that a 2013 NSF Business System Review noted concerns with the rate structure and stated that it was often difficult for a single NSF reviewer to adequately understand

and verify the rates and bases for them. The complexity of the rate structure could potentially lead to inconsistent application and/or misapplication of rates on proposal budgets.

Based on its findings, in January 2014, CAAR recommended that specific costs be removed or withheld from the proposal including facilities use fees; over $700,000 in business service fees, and more than $96,000 for IT rate proposals. The grants officer told us in January 2016 that she had not removed these costs as CAAR recommended and that she was waiting to receive and evaluate additional information from DKIST before recommending whether the costs should be removed. According to the Grants Officer, as of February 2016 she had received the additional information from AURA and had determined that reduction in the total project cost, either direct or indirect costs, was not necessary and the total project cost, including the indirect costs, was reasonable. The Grants Officer forwarded her decisions to senior management for final approval but as of March 4, 2016, had not received management approval.

NSF also requested that OIG conduct an institution-wide corporate level audit of incurred costs, including indirect cost rates and associated methodology because of the complex rate structure and the risk posed by the number of different rates and applications. OIG plans to conduct an incurred cost audit of AURA in FY 2016, which will include an assessment of the reasonableness of AURA's indirect cost structure. It is important to note that NSF has a management responsibility to ensure that indirect cost rates are reasonable, and in light of the serious concerns CAAR identified, it is essential that NSF act promptly to ensure that DKIST proposed costs are reasonable and allowable under federal requirements.

Compounding the risk of unreasonable and unallowable costs being charged to the government, we found that the monthly reports NSF receives to enable it to see how funds are spent contain only a "budget report" summarizing monthly expenditures rather than detailed expenditure information. Absent such detailed information, NSF cannot tell if unallowable expenditures are made and cost overruns are occurring. NSF did not originally have detailed information about how funds were spent in the NEON project, but has been requiring such information since the potential $80 million cost overrun for NEON was disclosed in June 2015. In light of the lack of clarity about DKIST proposed project costs, it is especially important for NSF to have better information about actual costs under an award.

*Attention to Previous Recommendations to Certify Earned Value Management System and to Validate Data Could Help Improve Oversight*

NSF receives monthly reports with earned value management (EVM) information for DKIST, which it uses to measure project schedule and costs. Our review of the $473 million Large Synoptic Survey Telescope project (LSST), which is also managed by AURA, found that NSF did not verify the data LSST provided in its EVM reports and had not certified the project's EVM system. The poor quality of the information in EVM reports for the NEON project was one of the reasons why the cost overrun for that project was undetected for so long and demonstrates the importance of a robust EVM process.[4]

Certification of an EVM system is needed to ensure that an awardee maintains an acceptable EVM system, which includes data to support scheduling of work and interim progress measures,

[4] NSF's Management of Potential $80 Million Cost Overrun for NEON, Report #15-3-001.

among other things. Our examination of thresholds other federal agencies use when determining whether an awardee's EVM system should be certified found thresholds of $10 million and $50 million, much lower than the cost of the LSST and DKIST projects.

Validation of data submitted by an awardee is an important tool for monitoring a project's spending and progress. Validating data enables the user to ensure that the data and reports can be used for planning, risk mitigation, corrective actions, and for forecasting schedule and cost outcomes. If data is not validated, there is an increased risk that the information is inaccurate and will not correctly assess the project's progress. Therefore, accurate, reliable, and timely information is critical to an effective EVM system.

In its response to our LSST alert memo, NSF indicated that it has begun evaluating the benefits of EVM system certification as a requirement for large scale facilities and that it will validate the EVM data for LSST as part of its 2016 annual review process. The EVM system for DKIST has not been certified and the data DKIST provided in its EVM reports has not been validated. During this review, NSF told us they plan to have an independent external consultant validate the EVM data as part of DKIST's annual project review process in 2016.

*DKIST Has Depleted Almost All Contingency Specifically Planned for Schedule Delays but May Face Additional Delays*

Revised NSF policy now requires that the total project cost estimate include budget contingency to cover foreseeable risks (or "known unknowns") at a 70-90% confidence level when the baseline is originally set following the Preliminary Design Review, and that any cost increases not covered by contingency be accommodated by reductions in scope of the project.

At the time of the 2013 re-baseline, the DKIST Project ran a Monte Carlo simulation of the construction schedule at the request of the Review Panel. The simulation showed that in order to achieve an 80% probability of schedule success the DKIST Project required approximately 12 months of schedule contingency. The Project Manager identified an additional month of schedule contingency based on his concerns regarding adequate schedule contingency during the Integration, Testing and Commissioning phase of the project, bringing the total required schedule contingency to 13 months. However, only 7 months of the 13 months of schedule contingency was funded. With only seven months funded, the NSB approved an estimated award end date of July 2019. The NSB resolution states, "... the latter award should be extended through FY 2019, consistent with the revised schedule for the beginning of full science operation of the ATST in July 2019."

DKIST has used six of the seven months of the schedule budget contingency. However, NSF informed us that the project is facing close to another three months of additional slippage unless AURA's recovery plans are successful. NSF stated it has sufficient remaining budget contingency, $36.9 million as of October 31, 2015, to cover the additional delays because other non-schedule contingency risks were not realized. However, if AURA is unable to recover the schedule delays the project end date would have to shift from the Board approved award end date of July 31, 2019 to September 19, 2019.

According to NSF, the NSB also approved six months of additional unfunded schedule contingency. NSF stated with the additional six months of unfunded schedule contingency the

NSB approved end date would be January 2020, even though the NSB resolution and the award letter use a June 2019 estimated end date.

Funding the additional six months of contingency at the time of re-baseline would have cost an estimated $5.5 million. Because NSF did not fund this amount, if it ultimately needs to use this additional schedule contingency, it will have to fund that use, which increases the risk of a budget overrun. According to the NSF Program Director, the project does have the necessary budget contingency to cover costs until January 2020 because other non-schedule contingency risks were not realized. However, the Office Head of the Large Facility Office, when asked whether there was sufficient budget contingency to cover the six months of unfunded schedule contingency, indicated that the question was complex and whatever amount would be sufficient would depend on the nature of the delay, remaining risks, and what other mitigation strategies the project can still employ.

Further, as noted previously, DKIST is facing a potential delay of unknown duration as a result of legal challenges before the Hawai'i Supreme Court. Although NSF informed us that the project was 63 percent complete, only one month of schedule contingency budgeted for schedule delays remains. Therefore, continued delay is both a schedule and a funding risk.

Finally, NSF's Program Director told us that there is a potential delay of up to a year in a telescope instrument, which is being provided by the project's European partner. While we recognize that NSF has limited control over production of this device, this possible delay presents another challenge and emphasizes the importance of close monitoring and careful advance planning to address schedule delays.

**Conclusion**

Our December 2015, alert memo brought to NSF's attention potential cost and schedule risks to the LSST project and our September 2015 memo examined the factors contributing to a potential $80 million cost overrun for the NEON project. This alert memo raises serious concerns about possible cost increases and schedule delays for DKIST.

For more than four years, we have been urging NSF to strengthen oversight and accountability of its high-dollar cooperative agreements for its large facility construction projects including DKIST, LSST, and NEON. It is imperative that the Foundation take swift and decisive action to ensure that costs for these projects are reasonable and supported by adequate documentation so that taxpayer dollars are used efficiently and promised scientific benefits are achieved.

**Recommendations**

In light of the foregoing, we recommend that the NSF Chief Financial Officer and NSF Assistant Director for the Directorate for Math and Physical Sciences take immediate action to improve NSF's oversight of AURA's management of DKIST. Such actions should include, but not be limited to, the following:

1. In the event NSF has to re-baseline the total project cost again due to additional delays, obtaining an independent cost estimate of any new re-baselined proposal.

2. Approving at the NSF senior management level the resolution of the issues identified in CAAR's January 2014 DKIST review and the Grants Officer's May 2014 reasonableness review to develop the final total project cost for DKIST and adjust the award accordingly.
3. Developing a plan to mitigate risks of future permitting and other delays.
4. Requiring DKIST to report additional detailed expenditure information.
5. Validating AURA's EVM data for DKIST, and certify AURA's EVM system.
6. In future construction projects, ensuring that needed schedule contingency is funded.

**Agency Response and OIG Comments**

NSF requested that we obtain an official response from AURA on the DKIST report. The issues identified and the actions that should be taken are addressed to NSF management. For that reason, we provided the draft report to NSF, and we will not be obtaining an official response from AURA. We are planning an in-depth assessment of AURA, which we will begin soon. We have made changes in the body of the report, where appropriate. We have attached NSF's response in its entirety as an appendix to this report and summarize NSF's response below.

NSF's response addressed our recommendations and commented on other information included in the draft report. NSF stated that it agreed with the report's recommendations. Among other things, it agreed to develop a plan to identify potential impacts and mitigate risk of potential permitting delays, to validate AURA EVM data, to conduct a review of DKIST budget and schedule contingency, and to amend the cooperative support agreement as needed.

NSF also provided updated information on the Booz Allen Hamilton (BAH) study of AURA's financial viability which was completed on March 15, 2016. While BAH found that AURA's financial ratio, which is used by NSF to assess financial viability, was in the acceptable range, the BAH report also noted [redacted] As noted previously, we plan to conduct an in-depth assessment of AURA, including an examination of AURA's financial viability, in the near future.

While NSF's response states that NSF has determined indirect cost rates to be reasonable and that no unallowable costs have been identified with respect to the indirect cost rate structure, CAAR's reviews, as outlined in the OIG's report, cited significant concerns with AURA's indirect cost structure. In addition, NSF's Director's Request for 2016 placed priority on the NSF OIG auditing AURA's indirect cost rates and associated methodology, which indicates NSF's Senior Management does have concerns with AURA's indirect cost rates. Thus, AURA's indirect cost rate structure is a risk, and the NSF OIG plans to include an examination of AURA's indirect cost rate structure in its future assessment.

Finally, in its response NSF states that the reasonableness review it conducted was adequate to assess the costs for the DKIST re-baselined proposal, and that the OIG's assertion that NSF only reviewed 16% of the costs during the reasonableness review did not accurately reflect the level of analysis completed by NSF. The 16% figure is directly supported by the Grants Officer's Reasonableness review. In addition, although the *GAO Cost Estimating Guide* includes eight independent reviews, the Guide notes that some reviews are more stringent, and therefore provide greater assurance that costs are reasonable. For example, the Guide states"…the most rigorous independent review is an independent cost estimate. Other independent cost reviews

address only a program's high-value, high-risk, and high-interest elements and simply pass through program estimate values for the other costs. While they are useful to management, not all provide the objectivity necessary to ensure that the estimate going forward for a decision is valid."

In light of the problems identified in both the original and the re-baselined cost proposals, which were so deficient that they could not be audited, a rigorous review of any revised DKIST cost proposal as a result of project delays is essential. To ensure to project costs are fair and reasonable, we urge NSF to use an independent cost estimate as it is the most rigorous review and will provide support that a proposal estimate for NSF's largest awards are valid.

In accordance with OMB Circular A-50, Audit Follow-up, please provide our office with a written corrective action plan to address the report's recommendations. In addressing the report's recommendations, this corrective action plan should detail specific actions and associated milestone dates. Please provide the action plan within 60 calendar days of the date of this report.

If you have any questions about this alert memo, please contact me, at 703-292-7100, or email at bmbaker@nsf.gov.

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**Appendix: Full Agency Response**


# National Science Foundation
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## Memorandum

**REVISED DRAFT**

**DATE:** March 30, 2016

**FROM:** Martha A. Rubenstein /s/
Office Head and Chief Financial Officer
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F. Fleming Crim, Ph.D. /s/
Assistant Director
Directorate for Math and Physical Sciences

**TO:** Brett M. Baker, Ph.D.
Assistant Inspector General for Audit
Office of the Inspector General

**SUBJECT:** NSF's Response to Official Draft of the OIG Alert Memorandum, NSF's Oversight of the Daniel K. Inouye Solar Telescope Construction Project

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Thank you for the opportunity to provide comments to the Official Draft of the OIG's Alert Memorandum directed to NSF's Oversight of the Daniel K. Inouye Solar Telescope Construction Project (DKIST).

NSF observes that this official draft OIG memo is presented in two parts: (1) a narrative with assertions and conclusions, many of which have already been resolved, overtaken by events, or otherwise addressed; and (2) recommendations for NSF action. The draft coalesces a wide variety of issues associated with several years of award performance, and many of the OIG's assertions are unrelated to the final recommendations.

Our response is presented here in two parts. First, we address the recommendations set forth in the draft memo. Second, we address key concerns that are raised within the body of the memo but that are not brought forward by the OIG as issues with associated recommendations. Many of these issues, addressing critical aspects of the DKIST award including the financial viability of the awardee and NSF's efforts to ensure the reasonableness of the DKIST cost estimate, clearly warrant NSF responses. Because this initial response is based on the text of the Official Draft provided to date, we would also request the opportunity to update our comments based on any further substantive revisions to the Alert Memo prior to issuance. Further, considering the fact that this Alert Memo raises issues concerning the awardee that will be publicly posted by the OIG, we request that consideration be given to a process that would allow the awardee to respond directly to aspects of the memo.

Following careful review of the OIG's recommendations, NSF's initial responses are as follows:

1. In the event NSF has to re-baseline the total project cost again due to additional delays, obtaining an independent cost estimate of any new re-baselined proposal.

   NSF Response: NSF agrees with this recommendation to the extent that, should NSF have to re-baseline the project again, it will consult the *GAO Cost Estimating and Assessment Guide* to determine whether an independent cost estimate (ICE) or another type of cost review is more appropriate, given the state of the project at the time.

2. Approving at the NSF senior management level the resolution of the issues identified in CAAR's January 2014 DKIST review and the Grants Officer's May 2014 reasonableness review to develop the final total project cost for DKIST and adjust the award accordingly.

   NSF Response: NSF agrees that NSF senior management should review and approve the resolution of the 2014 reviews. In fact, this requirement has already been established based on revised procedures previously implemented by NSF. In accordance with NSF Standard Operating Guidance, a Cost Proposal Review Document (CPRD) will be executed to fully document cost analysis performed, and will require review and approval of the DACS Cooperative Support Branch Chief and DACS Division Director. Following recent revisions, any unresolved issues where CAAR and the Grants Officer are not in agreement concerning resolution will be escalated through BFA management for final disposition.

3. Developing a plan to mitigate risks of future permitting and other delays.

   NSF Response: NSF agrees with this recommendation to the extent that it will work with the Project to develop a plan that identifies potential impacts and mitigates risk of delay (to the extent possible) due to the pending permitting litigation and other known risks. This will be conducted as part of the Project's already established routine risk assessment process.

4. Requiring DKIST to report additional detailed expenditure information.

   NSF Response: NSF agrees with this recommendation in that the NSF continues to work with AURA and the DKIST project office to provide up-to-date, detailed expenditure information for DKIST on a monthly basis. AURA and the DKIST Project have been responsive to NSF requests for additional information through an ongoing iterative process.

5. Validating AURA's EVM data for DKIST, and certify AURA's EVM system.

   NSF Response: NSF agrees that DKIST EVM data should be validated/verified, similar to what was recently completed on the Large Synoptic Survey Telescope (LSST) project. With respect to certification, NSF is evaluating best practices and policies implemented at other federal agencies as it considers costs, benefits and other impacts.

6. In future construction projects, ensure that needed schedule contingency is funded.

NSF Response: Funding the cost impacts of using schedule contingency is standard practice on NSF construction projects. NSF agrees that it will conduct a review of DKIST budget and schedule contingency for clarification and will include details in the next amendment to the cooperative support agreement.

NSF looks forward to developing a plan that will address the OIG's recommendations, with the shared goal of proper oversight of the DKIST project.

In addition to our responses to the specific recommendations set forth in the draft memo, and to provide context, NSF also considers it important to respond to a number of assertions made within the body of the memo but not brought forward by the OIG as issues with associated recommendations.

First, the report relies upon assessments of AURA conducted by NSF in FY 2013 and FY 2014 to raise questions concerning the awardee's financial viability, noting that an independent assessment of AURA's financial viability was pending. NSF has been working with AURA to address previously identified issues associated with financial viability, and has actively engaged with the organization on this matter. Based on additional documentation from AURA, the organization's current ratio for FY 2013 and FY 2014 is above 1.0, indicating financial health. As of this date, NSF has confidence in AURA as a financially viable organization with the capabilities to complete the DKIST project, and will continue to monitor AURA's financial health through its normal oversight. Our analysis has included the independent assessment referenced by the OIG, which has now been completed. Similarly, NSF continues to address the issue of AURA's indirect rate structure and its application practices. The agency has seen no situation where the current rate structure has resulted in unallowable costs being charged to the Government. Second, the Alert Memo references previous attempts by the Defense Contract Audit Agency (DCAA) to audit DKIST cost information, and states that previous cost proposals were determined by DCAA to be inadequate. Consistent with previous responses on this subject, we note that NSF has determined that proposal information provided by AURA to be adequate for determining fair and reasonable cost estimates for the DKIST award. Initial DCAA auditor findings, which were not made available by the OIG to NSF until after issuance of the award, were subsequently dispositioned by the agency, and a final Audit Resolution Memorandum (ARM) was issued by NSF and accepted by the OIG.

Another audit's findings associated with the re-baselined proposal are still pending, as the OIG notes within its draft Alert Memo. We emphasize that the resolution of this audit is still pending, at least in part, so that NSF may accommodate the OIG's request to update the document to include certain information. Meantime, NSF has determined (pending a final review) costs proposed by AURA to be reasonable for establishing the revised estimated cost of the re-baselined project. While the OIG maintains that these estimates continue to include amounts for "unallowable contingencies," NSF continues to maintain that, under the January 2015 decision by the NSF Audit Follow-up Official as well as 2 CFR 200, there are no unallowable contingencies. With respect to the lack of support for indirect costs, NSF, as the cognizant audit agency for AURA, has previously determined these indirect cost rates as reasonable.

Third, we note that the Report criticizes NSF's decision to rely on a reasonableness review of DKIST's re-baselined cost estimate, and states that an independent cost assessment "was clearly warranted." NSF disagrees with the OIG's assertion. NSF determined that a reasonableness review completed by the agency was the most appropriate option in consideration of previous independent expert panel and business system reviews and the maturity of the project estimate at that time. If we were making that same assessment today under our strengthened policies following the *GAO Cost Estimating and Assessment Guide*, the agency would have come to the same conclusion. Further, the draft Alert Memo marginalizes the GAO reasonableness review approach, stating that "it only examined 16 percent of the project's costs." This statement does not accurately reflect the level of analysis and what was performed by NSF. In accordance with strengthened procedures that have been implemented by NSF for reviewing large facility cost information, NSF completed both a sampling of direct costs such as labor, materials, and other direct costs, consistent with government accepted cost analysis techniques, and completed a full review of the application of indirect costs. NSF also conducted a review of previously incurred costs as part of the agency review, as advocated by the OIG. This review provides the agency with the information necessary to determine estimated costs to be reasonable for the re-baselined proposal. While being aware of the delayed timeframe in finalizing the recommendations arising from the reasonableness review, we note that all previous analyses conducted by NSF, both through panel reviews and the business systems reviews conducted by the cognizant Grants Officer and the Cost Analysis and Audit Resolution Branch, have indicated no substantive cost issues requiring adjustment of the established award amount.

Finally, responsive to the OIG's statement that certification of the AURA Earned Value Management (EVM) system is required, we refer the OIG to our response to the OIG LSST Alert Memo (OIG Report 13-3-001). As we have advised the OIG, currently the Program and the Large Facilities Office (LFO) review EVM data for all NSF construction projects on a monthly basis. The LFO has begun evaluating the costs and benefits of EVM System certification for Large Facilities and mid-scale infrastructure projects. Any total project cost thresholds or additional requirements for either certification or validation/verification will be benchmarked against best practices and policies implemented at from other federal funding agencies (including DOE and NASA) and codified in new internal Standard Operating Guidance.