



KECK REVIEW

Presented to
AstroPhysics Subcommittee
October 3, 2016

Review Objective

- The current five-year CA ends on February 28, 2018.
- The objective of the review is to:
 - *develop findings that reflect the pros and cons of continuing this partnership for another five years.*

Scope of Review

- Review the detailed information provided by NExSci
 - *NASA programs conducted in the past five years*
 - *Keck Science Strategic Plan 2016 relevant to future NASA science missions*
- Evaluate the contribution/productivity of Keck to support NASA missions and achieve NASA strategic goals.
- Estimate the promise of Keck in the next 5 years towards support of NASA missions.
- Prepare a list of findings to present to NASA's Astrophysics Subcommittee

Review Panel Members

- Doris Daou – PSD, NASA HQ --- Chair
- Ken Johnston – USNO (Retd)--- Co- Chair
- Joel Bregman – U. Michigan
- Kathryn Flanagan - STScI
- John Gagosian – APD, NASA HQ
- Michael Garcia – APD, NASA HQ
- Susan Lederer - JSC
- Thomas Statler – PSD, NASA HQ

Ex-officio

- Hashima Hasan – Keck Program Scientist
- Mario Perez – Keck Program Executive

Review

- Presentation by NExSci
- Q&A
- Major Panel Discussion Points:
 - *The time allocation for strategic programs (key science) directed by NASA Headquarters and mission support vs. general science, and*
 - *The cost of the program.*

- Combined funding for WMKO, the community and NExScl is constant during CAN period at ~\$6M/yr with small year-to-year variations

Item	Approx. Budget line, \$M
WMKO (NASA Cooperative Agreement, CAN)	\$3.8M
Funding to Observers	\$0.9M
NExScl Funding	\$1.3M
<i>MOWG/TAC Support</i>	<i>\$0.1M</i>
<i>Keck Obs. Archive incl H/W, Award Admin, Remote site support, NExScl Infrastructure</i>	<i>\$1.2M</i>
Grand Total	\$6.0M

Summary List of Findings for Continuing the CA with Keck = PROs

- Cost effective for future missions as well as maximizing scientific results of operational missions.
- Keck has state of the art instrumentation with significant technical improvements in 2018-2023
- Keck will be a very important resource for maximizing the scientific productivity of the JWST, TESS and WFIRST as well those already flying
- NASA is purchasing Keck nights at a very good price and has a well developed relationship that works well and is led by excellent individuals
- The proposal over subscription rate demonstrates that the community places a high value on NASA Keck time and that this will continue into the future
- NASA support is also used to aid in and enhance the interpretation of archival Keck data.

Summary List of Findings for Continuing the CA with Keck = CONs

- The amount of Keck time assigned at present to key science projects < 30%,
- The definition of mission support is not well defined, making it difficult to evaluate the effectiveness of this CA in supporting NASA missions by US scientists.
- Value of \$1.2M toward archive is not yet good (<140 papers in 9 years versus the reported thousands citing Keck+NASA missions in the past 5 years), though it is improving steadily.
- NASA has paid additional for nights beyond the 45 per semester covered by the CA, in order to provide direct MS. Extra nights were at \$90K/nt. This was done for WISE MS.
- Does not provide access to the sky south of the Keck declination range
- Given that many well equipped large telescopes, including national observatory telescopes, are or will be ON Line In the 2018-2023, It may be wise to consider their use

Summary

- NASA Keck Support Has:
 - *Demonstrated Support of SMD Missions*
 - *Is Needed to Maximize Productivity of Future Missions*
 - *Good Value for the Cost*