

DKIST Access and Data Policy



DKIST Science Policy Advisory Committee

Version 3



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1. PURPOSE AND SCOPE

The Astronomy and Astrophysics Advisory Committee (AAAC)—that advises the National Science Foundation (NSF), the National Aeronautics and Space Administration (NASA) and the U.S. Department of Energy (DOE) on selected issues within the fields of astronomy and astrophysics—published in 2014 general guidelines on principles for access to large Federally funded astrophysics projects and facilities. These guidelines apply to the Daniel K Inouye Solar Telescope (DKIST). They are available here:

https://www.nsf.gov/mps/ast/aaac/aaac_2014_principles_for_access-v2.pdf

Following the AAAC guidelines, the purpose of the policies described in the present document is to enable the best science within constrained resources to realize large astrophysics projects and facilities for the benefit of the DKIST’s stakeholders and the broader astrophysics community. We formulate here science policies for access to the DKIST observing time and the applicable data rights.

As part of the peer-review process, the policies described here will allow the DKIST Time Allocation Committee (TAC) and the National Solar Observatory (NSO) to resolve potential conflicts, by prioritizing the interests of the broader community in a manner that reflects their level of involvement in the project and in agreement with the 2014 AAAC recommendations.

2. DKIST IMPLEMENTING CONSORTIUM AND GENERAL USERS

Recognizing that the primary goal of the Astrophysics Community is to produce the best understanding of our Universe, the AAAC recommendations state the following:

“Implementation of large astrophysics projects and facilities should be organized to enable the best use of their resources. A balance must be struck between preserving the opportunity for the implementing consortium and the funding partners to reap the benefits of the resulting data, and participation by the wider community, to ensure the best science possible.”

It is thus necessary to establish what NSO/AURA¹ and the NSF consider as the implementing consortium and the funding partners, hereafter referred to as the DKIST Stakeholder Community (DSC). DSC consists of:

1. The NSF science community as represented by the US-based solar, heliospheric, and astronomical scientists,
2. The US and International instrument development and site partners, and
3. Any future DKIST operation’s partners.

The DKIST construction project includes two international consortia that contribute to the first generation of DKIST instruments and that are part of the DSC (point #2 above). Specifically:

1. The Leibniz Institute for Solar Physics (KIS) in Freiburg (Germany) is the PI institution for the Visible Tunable Filter (VTF). This collaboration is described in agreement 20100910 between AURA and KIS.
2. The Queens University Belfast (QUB, UK) is the leading institution of the UK DKIST Consortium (UKDC) that provides visible detectors for several of the DKIST first-light instruments. This collaboration is described in the Mutual Benefits Agreement between AURA and the UKDC.

Both collaborations include provisions for Guaranteed Time (GT) for the respective consortia with a given number of days. The present document does not modify these provisions, but it establishes guidelines for the implementation of GT via the DKIST TAC.

Other partners granted with DKIST Guaranteed Time, also part of the DSC, are:

1. The University of Hawaii (UH) as the landlord of the Observatory with 13% of the Observing Time as per the UH Lease Agreement.
2. The Native Hawaiian Community, as reflected in the UH Lease Agreement (with a maximum of 2% per observing cycle).

¹ Association of Universities for Research in Astronomy

3. DKIST SCIENCE PHASES

This section identifies the science phases that DKIST will use on its path to regular operations. First solar observations occur during the Integration, Testing and Commissioning (IT&C) phase of the DKIST construction project as governed by Cooperative Support Agreement (CSA; AST-1011851) between NSF and AURA. This phase, called the Science Verification Phase (SVP) below, is intended to validate basic scientific capabilities of the telescope and the instruments but it is, by no means, exhaustive. During this phase, the priority is not given to the acquisition of high-impact science data but to test instrument basic performance. However, the acquired data can have some scientific use subject to the policies described here.

At the end of construction, the facility will be handed over from the DKIST construction project to the DKIST operations team. All activities will then become part of the operations CSA (AST-1400450), and DKIST will begin a ramp-up phase where additional functionalities of the telescope, instruments, and the data center will be progressively added and tested. After this phase, known as the Operations Commissioning Phase (OCP), regular operations start.

The DKIST Science Working Group (SWG) is elaborating with the community a set of observations that take advantage of the DKIST capabilities and that address compelling science enabled by the facility. This set of observations forms the DKIST Critical Science Plan (CSP) containing specific Science Use Cases (SUCs) that are prototypical observing proposals.

This document distinguishes between three consecutive science phases:

1. Science Verification Phase (SVP). This period occurs during the scientific verification of the telescope-instrument system as part of the DKIST Integration, Testing & Commissioning (IT&C) activities. The purpose of this data is the scientific verification as described in the corresponding IT&C plan. These observations occur during the facility construction phase under the CSA-03 (AST-1011851).
2. DKIST Operations Commissioning Phase (OCP). This period will represent the first opportunity for the DSC and the GU to submit proposals for early science in a shared risk mode intended to fully commission the facility. To ramp-up towards a smooth and successful broad community use of the full capabilities of DKIST, the OCP aims at:
 - Fine tuning the proper functioning of all facility subsystems including operational procedures, and tools; transitioning staff and training them for an operations environment, and other aspects of the facility not commissioned during ITC (like additional Coudé table configurations, etc.).
 - Producing and consolidating instruments' pipelines and data analysis strategies in collaboration with the instrument teams and worldwide experts.
 - Furthering the scientific validation of various instruments' modes of operations.
 - Commissioning the DKIST Data Center.

Once the facility starts executing experiments derived from observing proposals, the duration of the OCP is expected to be one year. Any extension of this phase will need to be documented by the DKIST operations team and approved by the DSPAC.

During this period, NSO will make a series of calls for scientific observing proposals to the community detailing in each one of them the available functionality, in particular describing:

- The status of the DKIST proposal preparation and submission tools.
- The telescope capabilities and calibration (image quality, polarization calibration, coronal capabilities, etc.).
- The instruments and the available observing modes.
- The Coudé table configurations available
- The data pipelines intended for development as part of the scientific exploitation of the data from the call.
- The level of functionality of the Data Center and the aspects that are commissioned during the call.
- Any additional operational restriction that applies.

This phase aims at ramping up increasingly complex capabilities towards an end-to-end use of the “DKIST system” and will naturally be more prone to problems and non-optimal conditions (shared risk). The purpose of the OCP is to solve as many of these issues as possible. During the OCP, it may be convenient for proposal PIs/teams to spend periods at NSO facilities working together with the facility experts in order to process OCP observations and achieve the commissioning goals. NSO/DKIST will investigate ways to support the participating scientific teams by providing in-residence periods in Boulder/Maui.

Planning for this phase is done by the DKIST operations team in consultation with the instrument teams participating in the call (the instrument teams are represented by the instruments’ PIs and the UKDC PI). The DKIST operations team will decide the number of calls necessary for the OCP phase. Before publicly announcing the first OCP call, the DKIST operations team will present the text of the announcement to the DKIST SWG who can suggest additional clarifications of the text while maintaining the scope of the call.

The teams submitting observing proposals in each OCP call will have to describe, in addition to the science case, how they plan to work within the existing limitations and how they can contribute to the commissioning objectives of the call. Selection of observing proposals during this phase will be made by the TAC, including the DKIST science team and, as required, the instrument partners participating in the call. The ranking will consider the scientific merit of the proposal, but also the specific contributions to the OCP phase objectives. The selected observing proposals will be announced on the NSO/DKIST website.

The OCP calls will strongly encourage participation by the broader US community. Proposal ranking will include weighting, agreed upon by the TAC, for, in order of priority, 1) a PI from a US institution, 2) proportionally higher number of co-Is from US institutions.

The OCP calls will also encourage the adaptation of existing CSP SUCs to observing proposals that match the limitations of the respective calls. Proposals related to a CSP SUC will have priority over similar proposals outside of the CSP when those proposals are judged by the TAC to address essentially equivalent science.

The data obtained during this phase will be made publicly accessible via the DKIST Data Center following the applicable policies described below.

These observations occur after the end of the SVP and in the context of the NSO Operations CSA-1400450.

3. Critical Science Plan (CSP) Phase. The CSP SUCs were created under the assumption of the DKIST full functionality being available. Thus, the CSP phase as it was defined starts after the OCP phase.

Existing SUCs in the CSP have a lead PI and are identified by a reference number. They include an explanation of the scientific case and the observing details (targets, instrument suite, and wavelengths, etc.). The lead PI is responsible for transforming a SUC into an observing proposal and submitting it to the TAC using the DKIST provided proposal preparation and submission tool. Once converted into an observing proposal, the DKIST TAC will rank them scientifically in conjunction with all of the other observing proposals received during the submission window.

Proposals related to a CSP SUC will have priority over similar proposals outside of the CSP when those proposals are judged by the TAC to address essentially equivalent science.

For those SUC where the required levels of solar activity do not occur over the first years of operations, the TAC will continue applying a prioritization of proposals developed as part of the CSP and as the solar activity levels increase.

These observations occur after the end of the OCP in the context of the NSO Operations CSA-1400450.

4. Open skies phase. This phase refers to the regular, steady-state, operations phase of the DKIST. It includes observing proposals submitted to and ranked by the DKIST TAC outside the context of the CSP. This phase is the primary mode whereby the broader community access DKIST.



These observations also occur after the end of the OCP phase in the context of the Operations CSA-1400450.

Phases 3 and 4 run in parallel. They will strongly encourage participation by the US community. Proposal ranking will include weighting, agreed upon by the TAC, for, in order of priority, 1) a PI from a US institution, 2) proportionally higher number of co-Is from US institutions.

The DKIST operations planning should strive to address the largest possible number of the CSP SUC during the first years of operations while still leaving room for excellent science that lies outside of the CSP

4. DKIST ACCESS

The DSC has access to DKIST observing time and archived data subject to the policies described in this document.

The broader international solar community will participate as General Users (GU) and will have access to the DKIST observing time and archived data subject to the policies presented here.

DKIST observing time is open to all scientists from the DSC and the GU.

This document establishes provisions to ensure that the primary DKIST stakeholder, the US solar and astronomical community, is represented at adequate levels in the scientific exploitation of the DKIST. The DKIST Science Policy Advisory Committee (DSPAC) will track and evaluate the level of this participation during the early science phases of the DKIST and can revise these provisions as needed in subsequent versions of this document.

The DSC and the GU will obtain access by submitting observing proposals to the DKIST TAC (see Appendix A), which requires registering on the DKIST user's database and using the on-line DKIST proposal preparation and submission tools.

DKIST observing proposals are peer-reviewed based on the overall scientific merit by the DKIST TAC. After the TAC quantitative scientific assessment and ranking of the observing proposals, the NSO Director or his/her designee will further rank them considering the provisions explained in section 3 that promote the participation of the US community.

5. DKIST DATA RIGHTS

All DKIST data is owned by the NSF. Access to this data for use by observers and the solar community follows the policies outlined in this document.

DKIST will carry out observations after a scientific peer-review prioritization and technical feasibility validation by the DKIST TAC of the observing proposals. The DKIST TAC produces a quantitative ranking of proposals for each cycle. DKIST notifies the PIs when their observing runs are executed. After the observations, the data transfers to the DKIST data center that generates Level-1 data products for each observing proposal. Level-1 data will include all necessary metadata. The DKIST data center will make the data accessible via their infrastructure once the data has been produced and validated through basic Quality Assurance (QA) criteria by the DKIST data center. The DKIST data center notifies the PIs once the data is available for retrieval. Proprietary periods start counting at the time of this notification.

NSO/DKIST staff will have access to observational data at all times, as necessary for technical analysis and performance tuning. Also, NSO staff members formally assigned to perform data QA can download and use proposal data for the purpose of creating level-1 and higher data products.

Until any applicable proprietary period expires, NSO staff may not make scientific use of or publish DKIST observational data from proposals for which they are not PI, including projects they support, without explicit and documented PI permission.

All DKIST data will be made publicly accessible after the applicable proprietary period expires. Access to this publicly accessible data is made available through the DKIST data center.

This document distinguishes between six types of data depending on the phase in which the observations are made or other specific circumstances:

1. Science Verification Data. This data is obtained during the SVP.
2. DKIST Operations Commissioning Phase Data. This data is obtained during the OCP.
3. Critical Science Plan (CSP) Data. The CSP Data is the result of observing proposals executed and that originate from an identified by number CSP's SUC.
4. Open-Skies Data. Open skies data refers to all DKIST data obtained from the execution of a regular observing proposal submitted to the DKIST TAC or as part of the Director's Discretionary Time (DDT).
5. Ph.D. project Data. This data is obtained as part of a Ph.D. student research plan. The PI of the proposal needs to be the Ph.D. student. The DKIST TAC will give this status to those proposals that request this classification and that include all necessary information (Ph.D. funding agency, Ph.D. timeframe, etc.).

6. Synoptic Data. DKIST synoptic data is acquired as part of a DKIST synoptic campaign defined as a program that extends beyond one proposal cycle and approved by the DKIST TAC.

For these data types, the corresponding DKIST calibration data shall be accessible through the data center upon request and with adequate justification, after the relevant Level-1 science data has been produced.

The following policy restrictions apply to different data types.

5.1 DKIST INSTRUMENTS' SCIENCE VERIFICATION DATA RIGHTS

Publication of scientific results from the SVP as soon as realistically possible is encouraged.

The DKIST operations teams and the instrument partners can use the data obtained during the SVP for scientific publications if the data has the necessary quality and after the calibration has progressed to the point where the results are unequivocal for submission to a peer-reviewed journal. NSO will coordinate all publications of the SVP data. The SVP data is proprietary to the DKIST project, and its use for publications purposes requires approval by the NSO Director or his/her designee, and notification to the cognizant NSF program officer.

When a publication opportunity that uses SVP data is identified, the NSO Director or his/her designee will determine if any of the existing CSP SUC addresses similar questions. In case a similarity is identified, the NSO will notify the PI of the SUC and make the Level-1 data also available to his/her team. Any such opportunity does not count against future observing proposal based on the pertinent SUCs.

Utilization of calibrated data for submitting a scientific publication will be followed by the immediate availability to the community of the corresponding data via the DKIST data center with no additional proprietary period.

5.2 DKIST OPERATIONS COMMISSIONING PHASE DATA RIGHTS

The language included in this section in previous versions made no assumptions on the functionality of the Data Center at the start of operations. The COVID-19 delays of the construction project have provided additional time for the Data Center to adopt the requirements laid out by the DSPAC for the Open Skies phase (Section 5.4) and Ph.D. Data Rights (Section 5.5). The DSPAC recommends implementing the requirements in Sections 5.4 and 5.5 from the start of the operations, including OCP, with no intermediary stage.

5.3 DKIST CRITICAL SCIENCE PLAN DATA RIGHTS

The language included in this section in previous versions made no assumptions on the functionality of the Data Center at the start of operations. The COVID-19 delays of the construction project have provided additional time for the Data Center to adopt the requirements laid out by the DSPAC for the Open Skies phase (Section 5.4) and Ph.D. Data Rights (Section 5.5). The DSPAC recommends implementing the requirements in Sections 5.4 and 5.5 from the start of the operations, including OCP, with no intermediary stage.

5.4 DKIST OPEN-SKIES DATA RIGHTS

Data resulting from an observing proposal submitted to the TAC and executed by the facility will have a proprietary period of 6 months. During this period, only the observing proposal's science team has access to the Level-1 data. The NSO Director or his/her designee can approve extensions of this proprietary period after appropriate justification based on compelling scientific or technical reasons not existing at the time when the data was originally made available. Exceptions will not be made for failures to use the data in a timely fashion due to lack of manpower or funding.

The observing proposal's PI can waive this proprietary period at any time.

5.5 DKIST PHD PROJECT DATA RIGHTS

Data resulting from a PhD Project observing proposal selected by the TAC and executed by the facility has a proprietary period of 1 year. During this period, only the proposal's PI has access to the Level-1 data. The NSO Director his/her designee can approve extensions of this proprietary period after appropriate justification based on compelling scientific or technical reasons not existing at the time when the data was originally made available. Exceptions will not be made for failures to use the data in a timely fashion due to lack of manpower or funding.

The observing proposal's PI can waive this proprietary period at any time.

5.6 DKIST SYNOPTIC DATA RIGHTS

Data resulting from a DKIST synoptic program will have no proprietary period.

6. DKIST GUARANTEED TIME

The OCP will commission all the DKIST subsystems and produce a, currently lacking, understanding of the time required to operate the facility in its various operational modes (Service vs. Access Mode Observing²). The OCP will produce the necessary data to account for the required time—including all the preparatory time—to properly operate different observing modes and instruments' setups. This knowledge is needed before the DKIST operations team can correctly account for the fraction of the time that is available for scientific observations on subsequent calls after the OCP.

Existing partner agreements for Guaranteed Time include either a specific number of days or a percentage of the total observing time. The time accounting expertise to properly acknowledge these guaranteed observing periods will only be available after the OCP. In particular, it is expected that the accounting for the number of days (or percentages of time) will be different in Service or Access mode. During the OCP the DKIST team will work with the GT partners to establish proper time accounting procedures for the various operational modes. Allocating GT before these procedures are available is unfeasible and should not be pursued during the OCP. The DKIST TAC will start using these time accounting procedures for GT in subsequent calls after the OCP.

During the OCP, the DKIST team will inform the DSPAC on the progress made in the definition of these time accounting procedures. The DKIS team will request advice on the necessary policies required for the implementation of GT following the OCP. At this point, the DSPAC will generate a new version of the present document that includes the GT allocation policies.

We note that, in their role as instrument partners, it is expected that GT partners participate in the OCP phase at a level similar, or larger, than what the GT allocation will produce.

² Service-Mode observations are planned and executed by the DKIST operations team on behalf of a Proposal PI when observing and solar conditions are suitable, and technical readiness is assured. Access-Mode observing is performed when the PI is present, overwatching, and guiding the observing process.

7. DKIST DIRECTOR'S DISCRETIONARY TIME

A maximum of 10% of the total time available for observations in one cycle may be dedicated to the execution of DDT projects. Proposals for DDT do not have a specific deadline but use the same DKIST proposal preparation and submission tools. Proposers should provide a clear justification of why the proposal should be considered for DDT allocation and was not submitted through the regular cycle calls. To qualify for DDT usage, the proposals must not duplicate a currently approved proposal and must belong to at least one of the following categories:

- Proposals requiring the immediate observation of a sudden and unexpected astronomical event (“immediate” should be understood as within a period of 1 solar rotation following DDT approval).
- Unpredictable target of opportunity proposals requesting observations of a high impact and timely scientific topic, motivated by developments that have taken place after the regular proposal submission deadline.
- Proposals asking for follow-up observations of a program recently conducted with DKIST or any other observing facility, where a quick implementation is expected to provide breakthrough results.
- High technical risk programs requiring non-standard observing modes.
- Special projects that the NSO Director or his/her designee feels are important for the good of the Observatory, such as time that allows effective and efficient use of scheduling of the telescope.

The NSO Director or his/her designee can establish a Director's Discretionary Time Committee to evaluate specific proposals when duplicate DDT proposals occur. After selecting a DDT proposal, the NSO will inform the DKIST TAC chair.

Generally, data obtained during Director's Discretionary Time will not be subject to any proprietary period and will be made public immediately. However, these programs may, at the Director's discretion, be made subject to a similar 6-months proprietary access period (or 12-months for PhD students-led proposals).

As is the case for any regular proposal, observing overhead (time required to prepare the optical set-up, calibrations, etc.) are counted in the calculation of total observing time used by a DDT proposal.

The NSO Director or his/her designee will report on the usage of DDT on an annual basis to the AURA's Solar Observatory Council and the NSO's Users Committee. DDT usage will be detailed in the corresponding Annual Progress Report and Program Plan and the reasons for implementing proprietary periods.

The DSC and the GU can apply for DDT.

8. DKIST TARGETS OF OPPORTUNITY

Observing proposals submitted as a ‘Target of Opportunity’ (ToO) should be limited to those in which a target could be anticipated, but not specified in detail (target, location, and time). Some examples may include flares, flux emergence, or erupting filaments. Like standard proposals, these proposals must be submitted during the cycle proposal window. The DKIST TAC will review ToO proposals in the same manner as all other proposals, including the need for resubmission at the end of each cycle if not executed. In those cases, the NSO will implement a simple resubmission process for ToO proposals by including a flag indicating resubmission of a previously approved proposal.

During a specific cycle, a ToO might not be active because of incompatibilities with the capabilities included in this call. Activation of a ToO might require interactions between the proposal PI and the DKIST operations team.

As is the case for any regular proposal, observing overheads (time required to prepare the optical set-up, calibrations, etc.) are counted to calculate the total observing time used by a ToO proposal.

Data resulting from a ToO observing proposal has a proprietary period of 6 months. The NSO Director his/her designee can approve extensions of this proprietary period after appropriate justification based on compelling scientific or technical reasons not existing at the time when the data was originally made available. Exceptions will not be made for failures to use the data in a timely fashion due to lack of manpower or funding.

The ToO observing proposal’s PI can waive this proprietary period at any time.

The DSC and the GU can apply for ToO.

9. DKIST DATA PUBLICATION POLICY

9.1 REGULAR PUBLICATIONS

All publications using DKIST data will contain the following acknowledgment:

‘The research reported herein is based in part on data collected with the Daniel K. Inouye Solar Telescope (DKIST), a facility of the National Solar Observatory (NSO). NSO is managed by the Association of Universities for Research in Astronomy, Inc., and is funded by the National Science Foundation. Any opinions, findings and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the National Science Foundation or the Association of Universities for Research in Astronomy, Inc.’

All publications will explicitly refer to DKIST and the instruments involved in the list of facilities.

9.2 EARLY SCIENCE PUBLICATIONS

The DSPAC encourages the DKIST team and the instrument partners to publish facility and instrument papers for future reference promptly. NSO will coordinate a joint effort to ensure that all relevant aspects of the DKIST system are covered in these papers in a timely manner.

Publications of DKIST data obtained during the SV phase will be coordinated by the NSO. The NSO Director or his/her designee will ensure that all DKIST team members and instrument partners that have participated in the acquisition of data and that deserve co-authorship are included in the publications.

Publications of DKIST data obtained during the OCP phase will be coordinated by the NSO. The corresponding observing proposals science teams will lead these publications. The NSO Director or his/her designee will ensure that all DKIST team members and instrument partners that have participated in the acquisition of data and that deserve co-authorship are included in the publications.

The NSO Director or his/her designee will consider unifying all or a fraction of the SVP and OCP publications into a single volume in a high impact journal.



APPENDIX A: THE DKIST TIME ALLOCATION COMMITTEE

<https://nso.edu/dkist/proposal-review/>