

2018 National Solar Observatory (NSO) Users Committee Report

To: Dr. Valentin Martinez Pillet, Director National Solar Observatory

The NSO Users Committee (UC) met 08-09 May 2018 at the NSO HQ in Boulder, Colorado.

Committee members participating: Bain, Braun, Casini, Choudhary, Henney (remote), Jess, Lin, McAteer (chair), Muglach

All members have been invited for 3 year memberships (ending May 2021), at the discretion of the NSO Director.

NSF participants: Neff (remote)

NSO participants: Berukoff, Hill, Martinez Pillet, Rimmele, Uitenbroek

External participants: Rast (CU Boulder, DKIST SWG chair), Centeno (HAO), McIntosh (HAO, remote)

We are grateful to Jennifer Ditsler for her coordination of the meeting logistics, to Kowalski for his lunchtime science presentation, and to members of both NISP and DKITS for their presence.

We thank Craig Deforest and Alysha Reinard for their many and valued contributions to the UC during their terms and we wish them good tidings in their future endeavors.

The charter of the UC is to provide feedback and advice on status, desired enhancements, and future new developments of NSO facilities and operations. As discussed at the UC meeting, we aim to provide feedback in this report as a bulleted list of recommendations and remarks within 1 month of the meeting and we look forward to hearing back from the director within 3 months in response to each recommendation provided. The 10 recommendations should not be considered ranked in any particular order.

The chair remains available to the Director to discuss any items at any time during the year.

Submitted on behalf of the NSO Users Committee this 22nd day of June, 2018

on behalf of the NSO Users Committee
Dr R.T.James McAteer (chair)

UC recommendations arising from the May 2018 Users Committee meeting

The UC provides the following 10 recommendations for the NSO Director to consider at his discretion. We look forward to hearing back from the Director before October 2018 in regards to which recommendations have been accepted and which actions have been planned.

- **NISP priorities should be to finalize the planned GONG instrument upgrades and improve metadata related to available products.**

NISP is clearly rich with ideas and concepts as evidence by the multiple meetings, discussions, new data products, and instrument improvements. The UC would like for NISP to ensure that such a wide variety of ideas does not detract from delivery on those specific items that the community would like to see ASAP.

Of the many and various plans presented at the meeting for short term plans, we recommend a ranked priority list of:

1. Continue the GONG zero-point calibration and correction work, including (but by no means limited to) finishing the new modulator deployment at all six sites as a priority. The community should be informed with a schedule for this deployment. Incorporate daily site calibration procedure to insure ZP offsets are minimized throughout the year.
2. Finalize selection and secure new upgraded GONG camera.
3. Improve documentation and web pages to better help users navigate currently available products, along with data product version documentation (also see recommendation below).
4. Secure the NSO 1964-2003 newly recalibrated/corrected magnetogram archive and run the archived data through all appropriate NISP product pipelines for public access.
5. Incorporate post processing corrections (e.g., angular alignment adjustments) to past near real-time products to insure high quality archive for retrospective studies.
6. Incorporate autoVMBICAL as part of quick-reduce pipeline after validation, and testing seeing and image sharpness estimates to individual magnetograms before 10 min average.
7. Include HMI far-side algorithm to improve detection coherence on timescales of 12 hrs.

Similarly for longer term NISP plans, of the two main ideas presented at the meeting, we recommend NSO focus on a ranked priority list of:

1. Continue development and promotion of SPRING. Develop SPRING to continue next generation SOLIS+GONG legacy, assisting to meet the future need of national Space Weather demands. Encourage wide participation of US based users of space weather products to design such a project. Considering the time scales of such projects, we recommend intensification of such effort
2. Finalize and hand-off C-MAG development as soon as possible.

- **NSO continue to promote DKIST in large scale, long term national efforts.**

As the funding model for DKIST changes, with construction nearing completion and operations on the horizon, it is key for NSO to continue promote DKIST in solar newsletters and scientific conferences and to pursue every opportunity within NSF and nationwide to promote this project. Specifically, (i) the 10 Big Ideas program appears to have specific areas in which DKIST can be promoted, and (ii) the decadal surveys are on the horizon and community input on DKIST should be solicited. The UC are glad to see NSO are already planning for these two items and we would like to be kept informed with updates on all efforts to promote DKIST.

- **NSO promote the role of Education and Public Outreach in Hawaii.**

We are glad to see that EPO at NSO is now extended to teachers in an effort to build on public relations on Hawaii. While we realize that EPO could not be funded from construction funds, we see great value in efforts for NSO to promote the availability of future funding to build on these EPO efforts, especially as DKIST moves forward with press associated with first light.

- **NSO should pursue the completion of the MOU with KIS .**

The UC is excited to see that the delivery for the single-etalon VTF should be arriving on schedule for early/mid 2020. We would like to be informed when the MOU is completed and signed with regards to the construction and installation of the VTF's second etalon.

- **NSO provide more clarity on the role and membership of the TAC**

Turning a SUC into an observing proposal is not automatic, and will clearly require extra work by the users. To help with this. at the 2019 UC meeting we would like to see a tool prototype for creating observing proposals so the community can start on this process. This will assist the community in identifying the level of detail on scientific justification, and executable observable, that the TAC are expecting to receive.

Clearly the choice of which observing proposals will be ran will depend a lot on the TAC. At the 2019 UC meeting, the UC would like to see details on when the TAC will be formed, the proposed membership of the TAC, and how decisions on time allocation will be made. The community would welcome a overview of the decision tree that NSO may adopt for allocating time.

- **NSO provide more clarity on how the multiple SUCs will be turned into a comprehensive Critical Science Plan**

The Critical Science Planning workshops have clearly invigorated the community into preparing for DKIST. However turning these SUC (which vary in completion, age, viability, and need for DKIST) will now be a critical in keeping the community engaged. We would like to see clarity on how NSO plans to role this CSP excitement forward into operations. One option to track such efforts arising from the CSP is that those data arising from observations performed as part of the CSP could be tagged in someway to allow those users who have worked on the SUC to identify the data.

We would like the SWG to identify a specific date when the SWG will be looking at the SUCs with a critical eye to make their determination of what will be included in the CSP and what will not. More communication and clarity to the community on how a SUC will end up in the CSP could be a means of convincing more people to include more detail.

- **NSO determine and finalize DKIST data policy**

The community is preparing for DKIST data, but would like a better picture as to what data will be available and when. We realize these plans are still being created, and we look forward to more clarity on this policy at the 2019 UC meeting.

On the data center, we would like to hear the result from the August 2018 Data Center review at our follow up telecon. At the 2019 UC meeting, it would be useful to see a mock-up front end website / entry portal into the data center.

On data retrieval, the UC would like to see details on how data will be tagged and searchable (e.g., by observing proposal number?, by FIDO configuration?, other FITS information in a fashion similar to Hinode or IRIS?) We would also like more details on how scientists will be alerted that their proposal has been ran.

On data policy, the UC would like to have representation on the data policy charter committee. The UC would prefer for the data policy to be close to finalized by the next UC meeting,

- **NISP commit to their timeline for upgrades, and track these as they are completed.**

We are glad to see NISP pushing forward with their plans for upgrades to GONG and installation of SOLIS. These data play a critical role in the science of many users and we eagerly await the completion of these plans. As such, at the 2019 UC meeting, we would like to see progress measured against the timeline as presented at the 2018 UC meeting.

In bookkeeping, NISP should keep a living online record of when changes to GONG data are made and the impact of these changes on the data. This document should be widely advertised, and easily accessed. All modifications to GONG (and VSM), should be noted and publicized - what was performed? why was it performed? what difference has that made? and how have the data been improved? Members of the UC are happy to assist by commenting on these documents and webpages as they are created.

Having considered the 4 options for tunable H-alpha filters, NISP should now select their top choice, move forward with their plan and timeline, and report back to the UC on the progress with this.

- **NSO consider providing some mixture of level 1+ data products, and training on the community generation of level 1+ data products.**

The DKIST user community in USA consists of some whose research is in improving higher level data from DKIST data (aka inversions) and we want to see that community grow. On the other hand, there are many in the USA community who would prefer the physical parameters (temperatures, velocities, densities, magnetic field) to use in their research. As such, we encourage NSO to consider providing both some standard tools and guide and the community in their use / upgrades and to provide some standard popular minimum data products (perhaps just one photospheric line and one chromospheric line) with the appropriate "user-beware" label.

The NSO is already tapping into other community efforts (e.g., the HAO summer school led by Dr Centeno) and we encourage them to continue with this by lending support, personnel and expertise when they can.

We realize this effort is entirely dependent upon funding, and that such level 1+ data would be considered above and beyond the current funding, however we emphasize the differing requests for both training, and for products, from different parts of the community at large. In

order to promote funding for this, we encourage the NSO to lead any efforts they can and support any other community efforts that exist.

- **NSO generate requirements on their partnerships with BBSO and the SSOC**
(McAteer recused, Braun assigned as chair for this discussion).

Although the NSO has minimum active role at the DST or BBSO, they are still providing effort and equipment and so the community should expect something in return. For example, NSO could allow their scientists to consider instrument concept developments at the DST. NSO should consider how the specific unique aspects of data from DST (wide availability of instrumentation? high cadence?) and data from BBSO (IR? MCAO?) can be used by the community to complement DKIST science. NSO should consider requesting that some data from these telescopes should be provided back to NSO and made available to the community (perhaps through NISP data center?)

Other UC Remarks arising from the May 2018 UC meeting

As stated by the NSO director, it is in the Cooperative Support Agreement Statement of Work that NSO should critically evaluate scientific community needs. The UC can play a key role in such evaluation. With this in mind and in preparation for the DKIST era, the UC recognizes that the NSO Director may elect to rotate some members off the UC and / or increase numbers in UC over the next few years.

We welcome the inclusion of more big-picture science research ideas, developed as part of NSO-personnel research time, in future UC meetings. These would be similar to the presentation by Dr Uitenbroek in the 2018 meeting. One or more of these each year by NSO personnel would be warmly welcomed by the UC, and we ask the Director consider promoting this opportunity around everyone at NSO. We would happily dedicate one or more session to hearing about how the new scientific research at NSO will benefit the community.

We recommend retaining short status updates to one morning of the UC meeting and then keeping an afternoon and a morning for longer items on specific subjects. We encourage the NOS Director to solicit specific discussion items from everyone at NSO and he can communicate these to the UC chair for future meetings.

We continue to be very impressed on the progress with DKIST construction. At 83%, and entering the integration, test, and commissioning stage, we congratulate the entire DKIST construction team on all their efforts to date.

The DKIST data center plans are well connected to the construction and ops plans. There seems to be some good connections between these teams and we encourage more.

The DKIST data policy is clearly still a discussion item and we will be very happy to play a role in these efforts.

We applaud NISP on moving SOLIS to BBSO and we look forward to keeping the data gap to only 1 year by starting observations by October 2018.

As a follow up to the 2017 UC report, we would like to hear about the details of the SHINE (2017) session on coronal science. Was this a good experience? Any plans for follow ups?