

DKIST Critical Science Plan Workshop #9: Long-Term Studies of the Sun

Introduction to the Critical Science Plan / Life cycle of a
Science Use Case

DKIST Critical Science Plan (CSP)

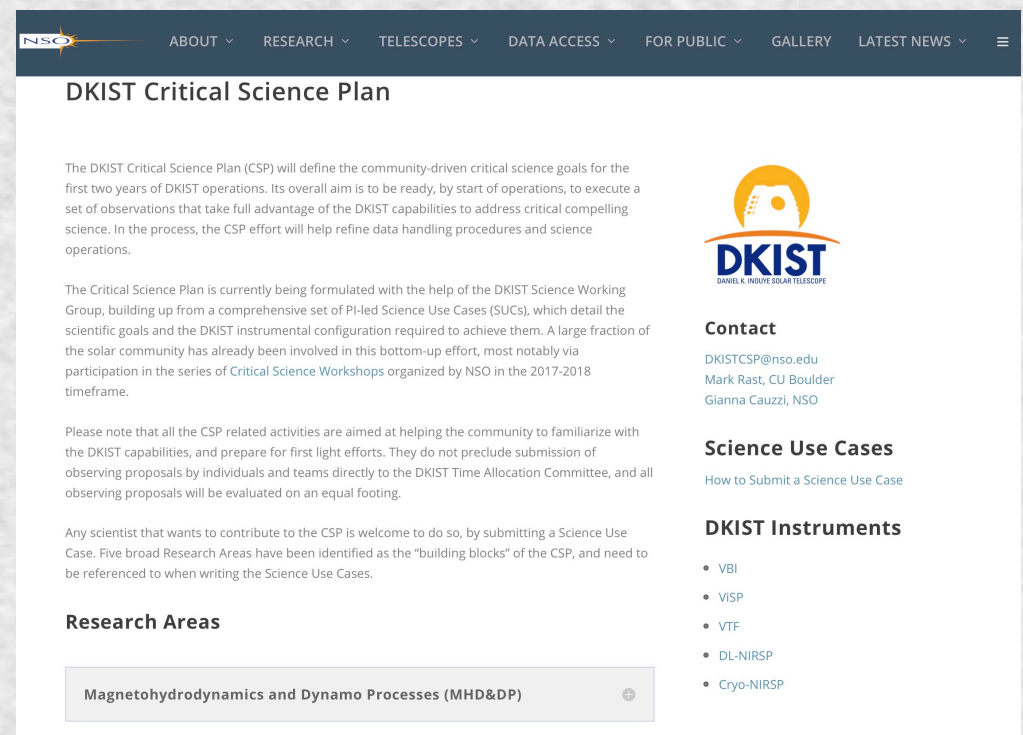
Aim: To be ready *as a community*, by science first light, to execute a set of observations exploiting the DKIST capabilities to address critical, compelling science in the first two years of operations (nominally 2020, 2021).

Bottom-up approach, community based. Workshops one of the tools, but NOT exclusive

<https://www.nso.edu/telescopes/dkist/csp/>

Critical Science Plan Structure:

- Research Areas
- Research Topics
- Science Use Cases



The screenshot shows the DKIST Critical Science Plan website. The header includes the NSO logo and navigation links: ABOUT, RESEARCH, TELESCOPES, DATA ACCESS, FOR PUBLIC, GALLERY, and LATEST NEWS. The main heading is "DKIST Critical Science Plan". The text describes the CSP's goal to define community-driven critical science goals for the first two years of DKIST operations. It mentions that the CSP effort will help refine data handling procedures and science operations. The page also notes that the CSP is currently being formulated with the help of the DKIST Science Working Group, building up from a comprehensive set of PI-led Science Use Cases (SUCs). A large fraction of the solar community has already been involved in this bottom-up effort, most notably via participation in the series of Critical Science Workshops organized by NSO in the 2017-2018 timeframe. A note states that all CSP related activities are aimed at helping the community to familiarize with the DKIST capabilities and prepare for first light efforts. They do not preclude submission of observing proposals by individuals and teams directly to the DKIST Time Allocation Committee, and all observing proposals will be evaluated on an equal footing. A scientist that wants to contribute to the CSP is welcome to do so, by submitting a Science Use Case. Five broad Research Areas have been identified as the "building blocks" of the CSP, and need to be referenced to when writing the Science Use Cases. The "Research Areas" section is partially visible, showing "Magnetohydrodynamics and Dynamo Processes (MHD&DP)". On the right side, there is a DKIST logo (Daniel K. Inoué Solar Telescope) and a "Contact" section with the email DKISTCSP@nso.edu and names Mark Rast, CU Boulder and Gianna Cauzzi, NSO. Below that is a "Science Use Cases" section with a link "How to Submit a Science Use Case" and a "DKIST Instruments" section with a list of instruments: VBI, VISP, VTF, DL-NIRSP, and Cryo-NIRSP.

DKIST Critical Science Plan (CSP)

As a community we must:

- understand forthcoming capabilities
- define science goals
- compile Science Use Cases

- complete Science Use Cases
- coordinate to form a complementary set of PI lead teams
- convert Science Use Cases into PI led Observing Proposals

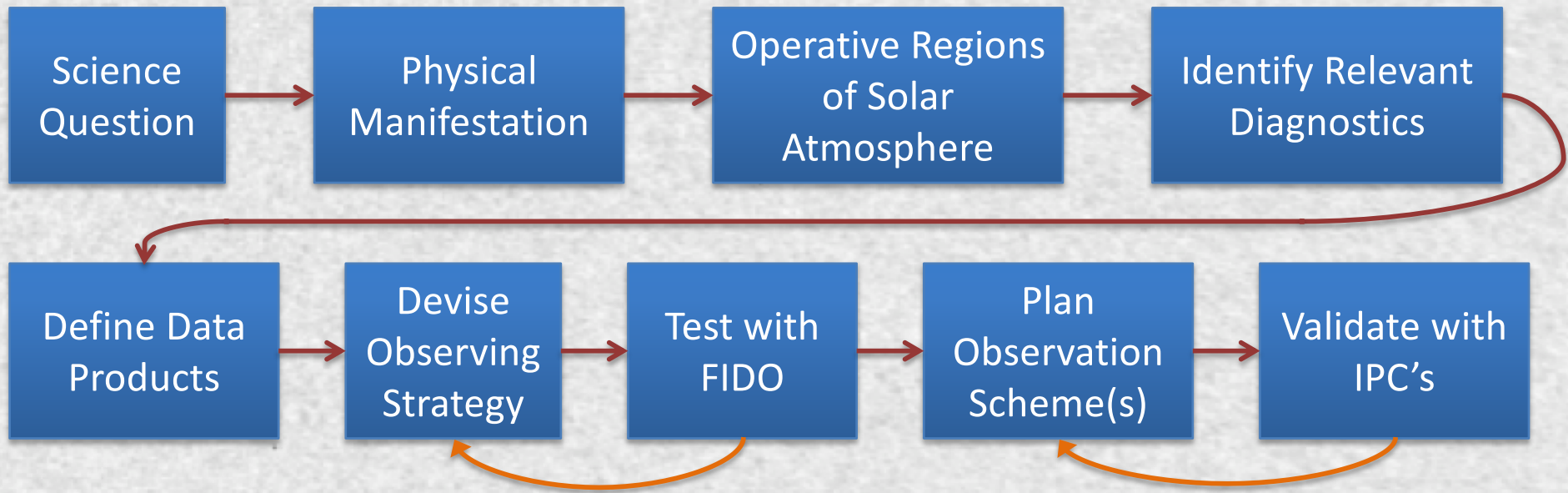
This will enable:

- Service Mode observations
- Scientific analysis
- PI led publication of first-light results

At this workshop:

Develop a set of well defined, complementary **Science Use Cases**, detailing the topics to be investigated, the reasons why DKIST is necessary, and the type of DKIST observations necessary to address the science.

1. Formulate science context and goals; specify *why* DKIST
2. Identify observational needs (spectral lines of interest, pattern, cadence, sensitivities)
3. Determine useful DKIST instrument suite
4. Assess instrument performance capabilities



<http://nso-atst.atlassian.net/>

Collaborative JIRA environment for Science Use Case development

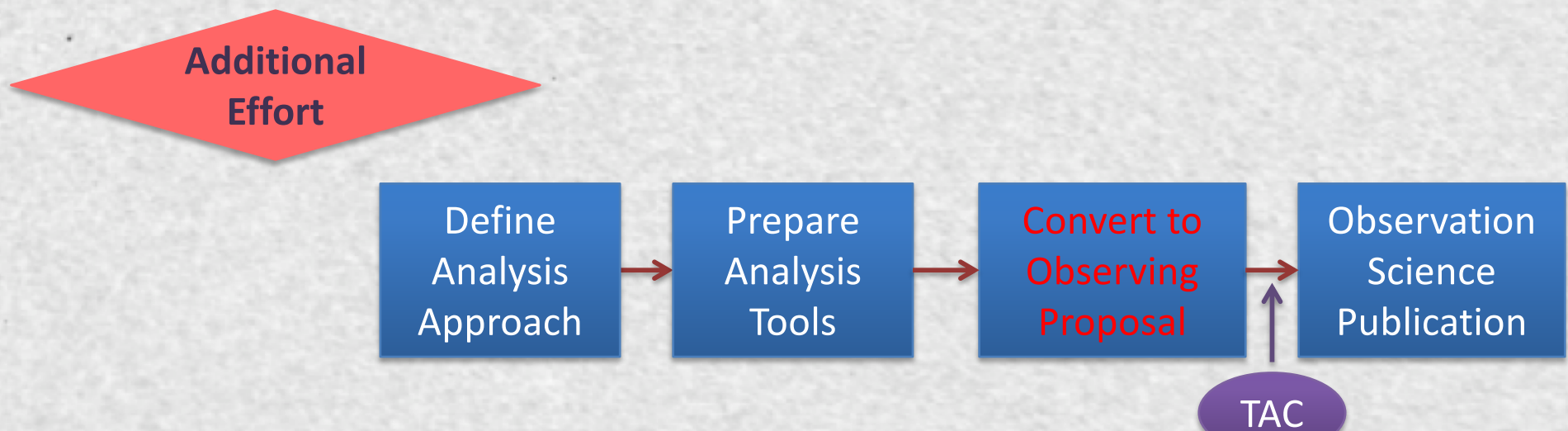
If you do not yet have an account, **email an account request to:**

DKISTCSP@nso.edu

Science Use Cases provide feedback to DKIST. The existing (and future) Science Use Cases will inform the project about:

- Science most relevant to the community;
 - Instruments, lines, modes of operation most requested (desired?) by the community;
- ↓
- Allow definition of efficient operation, data management

After this workshop: Conversion of Science Use Case to Observing Proposal



Role of the DKIST Science Working Group (DKIST SWG)

DKIST Science Working Group

| Count | Last Name | First Name | Affiliation | Country | Status | Start of term |
|-------|----------------|-------------|-------------|---------|----------------------|---------------|
| 1 | Bello-Gonzales | Nazaret | KIS | Germany | Member | 2014 |
| 2 | Cao | Wenda | NJIT | US | Member | 2013 |
| 3 | Cauzzi | Gianna | AO | Italy | Member | 2005 |
| 4 | DeLuca | Ed | Harvard | US | Member | 2017 |
| 5 | dePontieu | Bart | Lockheed | US | Member | 2015 |
| 6 | Fletcher | Lyndsay | U. Glasgow | UK | Member | 2002 |
| 7 | Gibson | Sarah | HAO | US | Member | 2017 |
| 8 | Judge | Phil | HAO | US | Member | 2003 |
| 9 | Katsukawa | Yukio | NAOJ | Japan | Member | 2014 |
| 10 | Kazachenko | Maria | CU | US | Member | 2018 |
| 11 | Khomenko | Elena | IAC | Spain | Member | 2018 |
| 12 | Landi | Enrico | Michigan | US | Member | 2017 |
| 13 | Petrie | Gordon | NSO | US | Member | 2017 |
| 14 | Qiu | Jiong | MSU | US | Member | 2011 |
| 15 | Rast | Mark | U. Colorado | US | Member | 2013 |
| 16 | Rempel | Mattias | HAO | US | Member | 2015 |
| 17 | Rubio | Luis Bellot | IAA | Spain | Member | 2002 |
| 18 | Scullion | Eamon | Northumbria | UK | Member | 2014 |
| 19 | Sun | Xudong | IFA | US | Member | 2017 |
| 20 | Welsch | Brian | Wisconsin | US | Member | 2017 |
| 21 | Goode | Phil | NJIT | US | Co-I | |
| 22 | Knoelker | Michael | HAO | US | Co-I | |
| 23 | Rosner | Robert | U. Chicago | US | Co-I | |
| 24 | Kuhn | Jeff | IFA | US | Co-I & Instrument PI | |
| 25 | Rimmele | Thomas | NSO | US | Ex-Officio | |
| 26 | Casini | Roberto | HAO | US | Instrument PI | |
| 27 | Lin | Haosheng | IFA | US | Instrument PI | |
| 28 | Schmidt | Wolfgang | KIS | Germany | Instrument PI | |
| 29 | Woeger | Friedrich | NSO | US | Instrument PI | |

- SWG will try to articulate the community vision of essential DKIST science through the Critical Science Plan
- The SWG will identify Science Use Case overlap and suggest team consolidation
- The SWG will examine whether the science proposed in the Science Use Cases requires DKIST capabilities, and give feedback to PIs
- The SWG will aim to minimize, NOT adjudicate, conflicts
- **DKIST Time Allocation Committee is final arbitrator, and will determine the order by which the Observing Proposals are executed**

Important Points:

1. This process is iterative – CSP structure (that you see on the website) is intended as a helpful but non-rigid framework and the science will evolve.
2. The CSP process is not exclusive (all welcome) nor unique (direct submission of observing proposals to the NSO DKIST Time Allocation Committee (TAC) under a standard submission and review process will also be possible). **The CSP (and this workshop) advantage is informational.**
3. Observing proposals developed as a result of participation in the DKIST Critical Science Plan effort (including this workshop) will be reviewed by the DKIST TAC along with proposals submitted outside of the CSP structure.
4. There is *no* automatic conversion of Science Use Cases to Observing Proposals – **success is dependent on continued engagement beyond this workshop proper and beyond the completed Science Use Case.**
5. The development of the CSP in advance of the start of operations helps the DKIST project beyond science definition – it helps in the development of essential operations and data management tools

<https://www.nso.edu/telescopes/dkist/csp/>

- Critical science description (living document) with links to Science Use Case titles and abstracts, and ultimately their full text
- Links to Instrument and other summary documents
- Links to beam-splitter configuration and data rate analysis tool (FIDO)

NOTE: Links to ALL documents, FIDO tool, and IPCS can be found at <https://www.nso.edu/telescopes/dkist/csp/docs/>

<http://nso-atst.atlassian.net/>

Collaborative JIRA environment for Science Use Case development, and ultimately Observing Proposal development

<https://www.dropbox.com/sh/uzwdc03ayovxr5o/AABuZbWtCnfPqG8F2zHaeCFta?dl=0>

Dropbox link with summary documents (Instruments, Data Handling System (DHS), Facility Instrument Distribution Optics (FIDO), JIRA User's guide), and Instrument Performance Calculators (IPCs)