NASA's Living With a Star Program Analysis Group 2021 – 2022

https://lwstrt.gsfc.nasa.gov/lpag

Main Objective of the LWS Program in 2021,2022 is the process of analyzing ways to improve the effectiveness of FST reporting and FST selections.

NASA Living with a Star Program Analysis Group

LPAG Purpose:

The NASA Living with a Star (LWS) Program Analysis Group (LPAG) serves as a community-based interdisciplinary forum for soliciting and coordinating community input for Living with a Star objectives and for examining the implications of these inputs for architecture planning, activity prioritization and future exploration.

LWS Program Ex Officio:

Simon Plunkett, *NASA HQ*
Madhulika Guhathakurta, *NASA HQ*
Shing Fung, *NASA GSFC*

Executive Committee (EC) Co-Chairs:

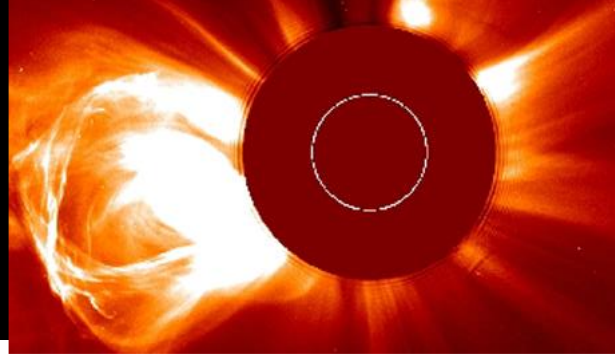
Anthea Coster, *MIT Haystack Observatory*
Sabrina Savage, *NASA MSFC*

EC Members:

*Ian Cohen, JHU/APL
*Robert McCoy, *University of Alaska-Fairbanks*
Seebany Datta-Barua, *Illinois Institute of Technology*
Chuanfei Dong, *PPPL Princeton University*
Heather Elliott, *Southwest Research Institute*
Fan Guo, *Los Alamos National Laboratory*
*Thomas Immel, *UC Berkeley*
*Ryan McGranaghan, *Astra, LLC*
*Alexei Pevtsov, *National Solar Observatory*
*Olga Verkhoglyadova, *NASA/JPL*
Angelos Vourlidas, *JHU APL*
Shasha Zou, *University of Michigan*

LPAG: https://lwstrt.gsfc.nasa.gov/lpag

Overview of LPAG's role to the LWS program



LPAG provides information to HQs through the annual report (e.g., FSTs, SSA revisions). **It is not an advisory board.**

The LPAG has the ability to implement SIGs/SAGs for focused guidance.

SIG = Science Interest Group. SAG = Study Analysis Group.

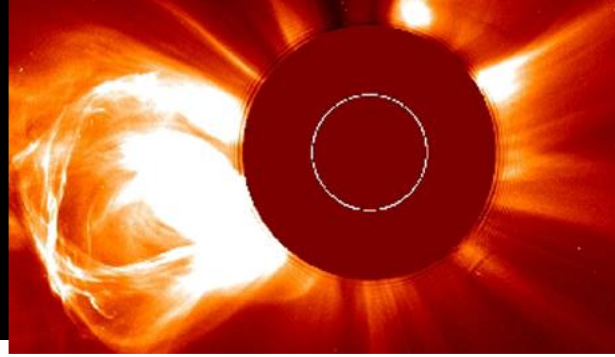
The LPAG can examine ways to optimize the LWS program: e.g., team reporting, traceability.

The LPAG can comment on the science, strategic capabilities, tools and methods of LWS proposals.

The LPAG can provide comments on parts of the LWS infrastructure such as the Jack Eddy program.

***2020 LPAG EC Report: https://lwstrt.gsfc.nasa.gov/assets/docs/lpag/LPAG_2020_Report.pdf**

Focused Science Topics (FSTs) and Strategic Science Areas (SSAs)



FSTs are one of the major ways the community can influence NASA research topics.
In 2020, LPAG solicited the community for new FST topics in 2020, and from those received 22 new FSTs were crafted. These FST topics form the basis of ideas used by NASA HQ for 2+ years to craft the final ROSES LWS solicitations.

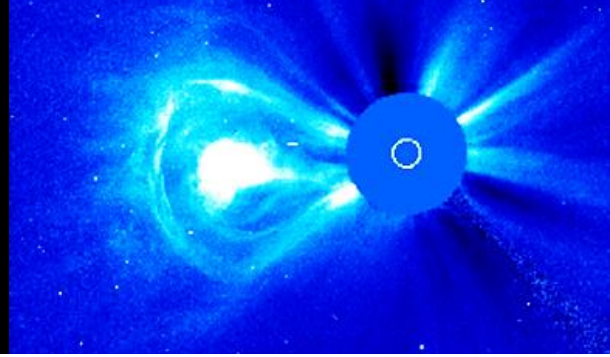
SSAs are long-term targeted areas of system science used to guide LWS activities.
In 2019, the LPAG expanded, refocused and reordered the 7 SSAs developed in 2014. The new SSAs seek studies that address the underlying physics.

- **In 2020, 22 new FSTs were proposed that will be used for ROSES 2021 and beyond.**
- **In 2019, 10 draft SSA's were proposed.**

***2019 LPAG EC Report: https://lwstrt.gsfc.nasa.gov/assets/docs/lpag/LPAG_EC_report_2019_12_31.pdf**

***2020 LPAG EC Report: https://lwstrt.gsfc.nasa.gov/assets/docs/lpag/LPAG_2020_Report.pdf**

FST Themes and Team Formation



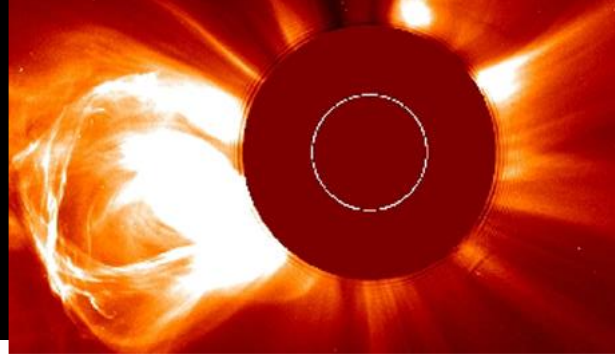
Action to LPAG/HQ: Consider forming a task force to evaluate the progress on the FST themes. Look into ways of coordinating the information more logistically (e.g., by theme, color, etc.) rather than just by listing ROSES solicitation.
Action to web-team: Add topic or solicitation title next to the ROSES AO identifier.

While the team formation is still considered the best option, **team cohesion and implementation was noted as a high concern.** Leadership of teams discussed in detail. Low cadence of full team meetings (1-2 times a year with ~20 people) is not effective. Should a teaming plan be imposed? (e.g. two team-wide mtgs/year, monthly telecons?)

Training suggested for teams and team leadership (mentorship).
The NASA DRIVE Science Centers gave Team Science training to all teams, would this be effective?
Example training: MSU Toolbox Dialogue Initiative (used by NASA for DRIVE centers) | KnowInnovation; Toolbox Dialogue Initiative; FourSquare; IDEO (used by NSF Convergence Program for cross-disciplinary groups). Possibly assign a task force.

Provide tools for coordination/collaboration (e.g., Miro, Mural, Gather.Town, Github [https://github.com/rmcgranaghan/data_science_tools_and_resources/wiki/Links], etc.)

Focused Science Topics Reporting



Estimating and improving the effectiveness of FST reporting and selection of topics

LPAG 2018* noted

Strong benefit if FST team leads prepared final reports that could be posted on the LWS TR&T website.
Suggested two versions of this report per FST might be useful: a brief summary and a more extended summary

Brief summary (~ 1 page) with bulletized lists of:

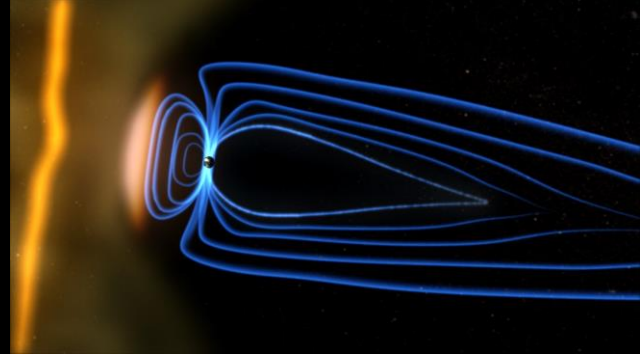
- Research highlights
- Remaining challenges and open questions
- Team dynamics

Extended summary

- What was accomplished by the FST, both by the individual proposal units, and by the team as a whole? What scientific capabilities were added or improved?
- What are the next steps for this topic? What challenges and open questions arose which could not be addressed by this FST, and which would therefore be good challenges for future FSTs? What are the remaining gaps that need to be filled?
- What synergies emerged from the team dynamic?

***2018 LPAG EC Report:** https://lwstrt.gsfc.nasa.gov/assets/docs/lpag/2018_LPAG_EC_Report_Final_11_30.pdf

Discussion of Cross Discipline/System Science in LWS



How can we ensure the inclusion of this fundamental part of LWS?

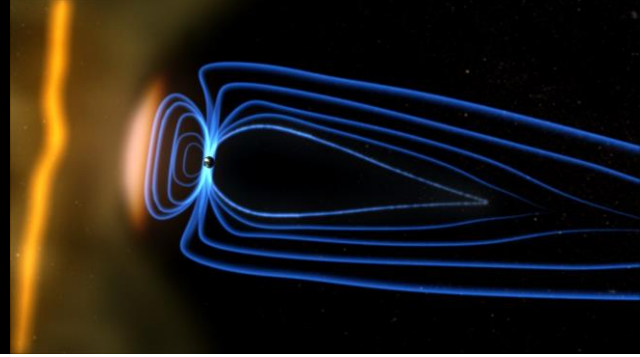
Lack of clarity about what science is covered by LWS, e.g. does LWS cover exoplanet atmospheres and habitability

Discuss different ways that the cross discipline research related to LWS be promoted and supported.

Consider a mechanism for Inter-Divisional proposing opportunity for truly innovative, across domains and inter-disciplinary proposals addressing a set of strategic research directions at NASA.

The Sun-Climate topic is one such research direction which is inter-divisional.

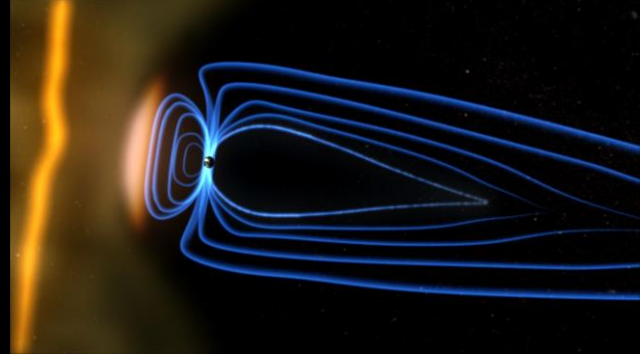
Strategic role of Sun-Climate in LWS



Discussion:

Suggestion that LPAG consider formulate a plan of action for improving the science interest and progress on Sun-Climate questions

Discussion of the Sun-Climate Topic



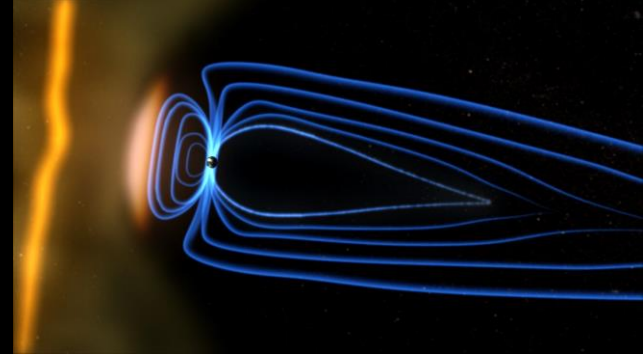
The Sun-Climate topic is one such research direction which is inter-divisional. How should this be addressed within the LWS program? This topic brought up a lot of discussion at the last LPAG meeting and will be revisited this year.

- How do we define “Climate” SSA IX brought a lot of discussion within the LPAG. SSA IX clearly refers to climate on Earth, not in near-Earth space. Long-terms effects are described as solar variability. SSA IX seems to be about chemistry. This topic will be re-visited by the LPAG.

- Should Include space climate be included in LWS?

- How low in the Earth’s atmosphere should LWS be funding research? Should there be a boundary?

Pros and Cons of AI/ML in LWS



Discussion:

Use Data Science as a more general term that includes both ML and other advanced statistical methods

We want to engage data scientists to be involved in LWS.

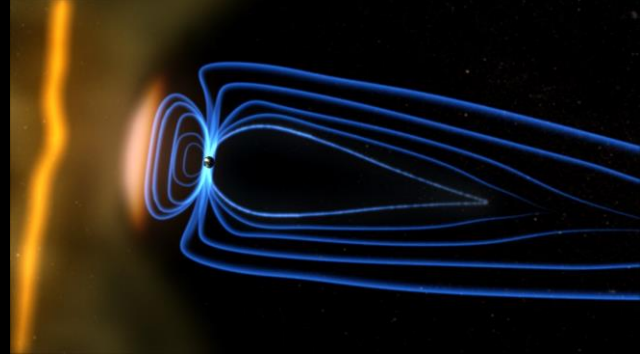
LWS data are unique and may benefit data scientists by advancing their tools and models.

1) Science—driven data science
2) Explainable AI (scientific understanding requires a narrative around the result)

Growing community of people familiar with data science/AI/ML, e.g. NASA Center for HelioAnalytics

Suggestion: the LWS program should emphasize the data preparation and data/result usability components of data science

AI/ML in LWS



LWS Tools & Methods Program call in ROSES 2021 emphasized AI/ML with 12 pertinent selections

HELIOPHYSICS

A partnership between NASA UCAR COMMUNITY PROGRAMS | CPAESS

HOME HISTORY VISION SUMMER SCHOOL RESOURCES JACK EDDY FELLOWSHIPS LWS INSTITUTE PHOTO GALLERIES

JACK EDDY POSTDOCTORAL FELLOWSHIPS

For early-career PhDs

The Jack Eddy Fellowship at a glance

Established by NASA's Living With a Star program and UCAR/CPAESS in 2009, this prestigious fellowship program is named after pioneering solar researcher John A. "Jack" Eddy. The two-year fellowship is designed to train the next generation of heliophysics researchers. It matches early-career PhDs with experienced scientists at U.S. host research institutions.

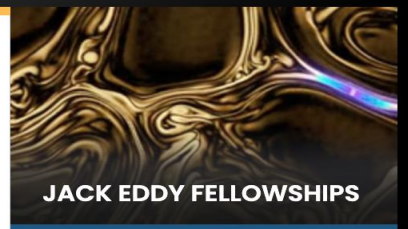
Several new appointments are made annually.

PREFERENCE GIVEN TO:
Recent PhDs (PhD within 3 years) whose project directly addresses the objectives of the LWS program.

APPLICATION DEADLINE:
Mid-January of the award year

RECRUITMENT ANNOUNCEMENT

HOW POSTDOCS APPLY



SEE CURRENT FELLOWS & ALUMNI

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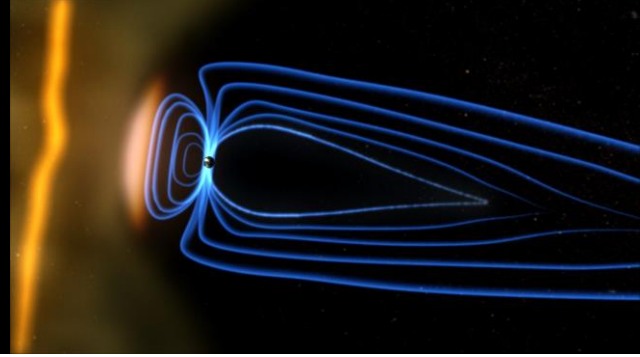

Finalize LPAG 2021 report.

Finalize FST reporting and modifications or adjustments to themes and team formation.