Your abstract has been submitted for the 2017 AGU Fall Meeting. You will receive an email confirmation.

If you do not receive an email confirmation, please contact agu@confex.com to ensure your abstract was submitted and to have a confirmation email sent to you.

This page indicates that you have completed your abstract submission and an email confirmation will be sent to you.

If you do not receive an email confirmation, please contact agu@confex.com to ensure your abstract was submitted and to have a confirmation email sent to you.

This confirmation does not guarantee that your abstract was accepted and only confirms that your abstract will be submitted for consideration by the Program Committee.

In this system, there is no 'Draft' option. Once the abstract is submitted, you may review, edit or withdraw your abstract until the deadline of 2 August 2017 23:59 EDT/03:59 +1 GMT.

Do not withdraw a paid abstract submission if edits are needed or to begin a new submission. You may make any edits to your abstract until the submission deadline.

Abstract fees are nonrefundable.

Once submitted, your abstract will need to be withdrawn if you no longer wish to have it considered by the Program Committee.

---

ultra-Stable Spectrometer for Sky-Scanning, Sun-Tracking Atmospheric Research (5STAR)

Stephen E Dunagan1, Roy R Johnson1, Jens Redemann1, Brent N Holben2, Beat Schmid3, Connor Joseph Flynn4, Lauren Fahey5, Samuel E LeBlanc5, Jordan Liss6, Meloe S Kacenelenbogen7, Michal Segal-Rosenhaimer8, Yohei Shinozuka8, Robert P. Dahlgren9, Kristina Pistone1 and Yana Karol10, (1)NASA Ames Research Center, Moffett Field, CA, United States, (2)NASA Goddard Space Flight Center, Greenbelt, MD, United States, (3)Pacific Northwest National Laboratory, Richland, WA, United States, (4)PNNL, Richland, VA, United States, (5)Bay Area Environmental Research Institute Sonoma, Sonoma, CA, United States, (6)NASA Ames Research Center, Santa Cruz, CA, United States, (7)BAERI, Moffett Field, CA, United States, (8)BAERI/NASA Ames Research Center, Moffett Field, CA, United States, (9)CSUMB/NASA Ames Research Center, MS245-4, Moffett Field, CA, United States, (10)Universities Space Research Association Moffett Field, Moffett Field, CA, United States

Abstract Text:

The Spectrometer for Sky-Scanning, Sun-Tracking Atmospheric Research (4STAR) combines airborne sun tracking and sky scanning with diffraction spectroscopy to improve knowledge of atmospheric constituents and their links to air pollution and climate. Direct beam hyperspectral measurement of optical depth improves retrievals of gas constituents and determination of aerosol properties. Sky scanning enhances retrievals of aerosol type and size distribution. Hyperspectral cloud-transmitted radiance measurements enable the retrieval of cloud properties from below clouds. These measurements tighten the closure between satellite and ground-based measurements. 4STAR incorporates a modular sun-tracking/ sky-scanning optical head with optical fiber signal transmission to rack mounted spectrometers, permitting miniaturization of the external optical tracking head, and future detector evolution.

4STAR has supported a broad range of flight experiments since it was first flown in 2010. This experience provides the basis for a series of improvements directed toward reducing measurement uncertainty and calibration complexity, and expanding future measurement capabilities, to be incorporated into a new 5STAR instrument. A 9-channel photodiode radiometer with AERONET-matched bandpass filters will be incorporated to improve calibration stability. A wide dynamic range tracking camera will provide a high precision solar position tracking signal as well as an image of sky conditions around the solar axis. An ultrasonic window cleaning system design will be tested. A UV spectrometer tailored for formaldehyde and SO2 gas retrievals will be added to the spectrometer enclosure. Finally, expansion capability for a 4 channel polarized radiometer to measure the Stokes polarization vector of sky light will be incorporated. This paper presents initial progress on this next-generation 5STAR instrument.

Keywords: atmosphere; climate; pollution; radiometry; technology; hyperspectral; fiber optic, polarimetry

---

Session Selection:
Advances in Spectral and Polarimetric Remote Sensing of the Atmosphere, Land and Ocean

Submitter’s E-mail Address:
Abstract Title:
ultra-Stable Spectrometer for Sky-Scanning, Sun-Tracking Atmospheric Research (5STAR)

Requested Presentation Type:
Assigned by Program Committee (oral, panel, poster, or lightning poster talk)

Previously Published?:
No

AGU On-Demand:
Yes

Abstract Payment:
Paid

For non-students only: I do not want to be involved in OSPA or the Mentoring program.

First Presenting Author

Presenting Author
Stephen E Dunagan

Primary Email: Stephen.E.Dunagan@nasa.gov

Affiliation(s):
NASA Ames Research Center
Moffett Field CA (United States)

Second Author

Roy R Johnson

Primary Email: roy.r.johnson@nasa.gov
Phone: 650 604 1131

Affiliation(s):
NASA Ames Research Center
Moffett Field CA (United States)

Third Author

Jens Redemann

Primary Email: Jens.Redemann-1@nasa.gov
Phone: 8052188729

Affiliation(s):
NASA Ames Research Center
Moffett Field CA (United States)

Fourth Author

Stephen E Dunagan@nasa.gov
Ninth Author

Jordan Liss

**Primary Email:** jordan.liss@nasa.gov

**Affiliation(s):**

NASA Ames Research Center
Santa Cruz CA 95062 (United States)

Tenth Author

Meloe S Kacenelenbogen

**Primary Email:** meloe.s.kacenelenbogen@nasa.gov

**Phone:** 6506043374

**Affiliation(s):**

BAERI
Moffett Field CA 94035-0000 (United States)

Eleventh Author

Michal Segal-Rosenhaimer

**Primary Email:** michal.segalrozenhaimer@nasa.gov

**Phone:** 9728292808

**Affiliation(s):**

BAERI/NASA Ames Research Center
Moffett Field CA (United States)

Twelfth Author

Yohei Shinozuka

**Primary Email:** Yohei.Shinozuka@nasa.gov

**Phone:** 6506043696

**Affiliation(s):**

BAERI/NASA Ames Research Center
Moffett Field CA (United States)

Thirteenth Author
If necessary, you can make changes to your abstract submission

- You may access your submission to make any edits or submit another abstract by clicking here.
- Your Abstract ID# is: 233727.
- Any changes that you make will be reflected instantly in what is seen by the reviewers.
- After the abstract proposal is submitted, you are not required to go through all submission steps to make edits. For example, click the "Authors" step in the Abstract Submission Control Panel to edit the Authors and then click save or submit.
- When you have completed your submission, you may close this browser window or submit another abstract Abstract Viewer.

Tell us what you think of the abstract submission process