

ERIC K. SUTTON

BIOGRAPHICAL SKETCH

Space Weather Technology, Research and Education Center, (SWx TREC)
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Professional Preparation

- 2008 Ph.D., Aerospace Engineering Sciences, University of Colorado at Boulder
- 2005 M.S., Aerospace Engineering Sciences, University of Colorado at Boulder
- 2002 B.S., (Honors) Mechanical and Aerospace Engineering Sciences, University of Missouri-Columbia

Appointments

- Senior Research Associate, SWx TREC, University of Colorado, 2018–present
- Chief, Ionosphere and Thermosphere Section, Air Force Research Laboratory, 2017–2018
- Deputy Chief, Drivers and Impacts Section, Air Force Research Laboratory, 2017
- Research Physicist, Drivers and Impacts Section, Air Force Research Laboratory, 2009–2017
- Postdoctoral Research Fellow, Aerospace Engineering Sciences, University of Colorado, 2008–2009

Membership, Service, and Awards

- Member of SWORM working group for Next-Step Extreme Space Weather Benchmarking of Upper Atmosphere Expansion
- Member of NASA-LWS Satellite Drag Capabilities Institute
- Organized American Geophysical Union Space Weather Sessions
- Organized Coupling, Energetics and Dynamics of Atmospheric Regions (CEDAR) workshop sessions
- Served as subject matter expert for White House Office of Science and Technology Policy's Earth Observations Assessment
- Member of SWORM working group for Phase-1 Extreme Space Weather Benchmarking of Upper Atmosphere Expansion
- Member of Air Force Space Command Astrodynamics Innovation Committee Reentry Working Group
- Member of Space Weather Workshop Steering Committee (2016–2018)
- UCAR Outstanding Team Accomplishment award (2016)
- AFOSR Star Team Award (2015–2017)
- AFRL International Team Award (2014)
- AFRL/Space Vehicles International Team Award (2013)
- Member of AGU, (2002–present)

Leadership Activities

- Directed an AFRL portfolio of basic and applied research projects by initiating three AFOSR projects, guiding two STTRs through Phase 2 and beyond, and advocating for customer funds (2011–2018)
- Co-led the AFRL Integrated Solar EUV / Ionospheric Impacts project (2015–2018)
- Initiated the Low-Earth Orbit Atmospheric Model Validation (LEO-VAL) project for AFRL's Detect, Track, Identify & Characterize (DTI&C) program (2015)
- Principal Investigator of AFRL's Orbital Drag Environment (ODE) program (2011–2012)

Research Activities

- Conceived of and developed data assimilation engines for physics-based neutral density during disturbed geophysical conditions
- Produced a global dataset of upper atmospheric density and winds spanning more than a solar cycle
- Conceived of and developed a hybrid model to replace current operational satellite drag models
- Developed realistic physics-based simulations of minor species transport
- Developed theories of thermospheric transport explaining neutral composition and ionospheric anomalies

- PI of AFOSR-sponsored projects (2011–2018) to advance thermospheric theory and develop coupled thermosphere-ionosphere models and physics-based data assimilation engines

Selected Publications

- Eyigüler, E. C. K., J. S. Shim, M. Kuznetsova, Z. Kaymaz, B. Bowman, M. Codrescu, S. Solomon, T. Fuller-Rowell, A. Ridley, P. Mehta, and **E. K. Sutton** (2019), Quantifying the storm-time thermospheric neutral density variations using model and observations, *Space Weather*, 17, 269–284, doi:10.1029/2018SW002033.
- Bruinsma, S., **E. K. Sutton**, S. C. Solomon, T. J. Fuller-Rowell, and M. Fedrizzi (2018). Space weather modeling capabilities assessment: Neutral density for orbit determination at low Earth orbit, *Space Weather*, 16, 1806–1816. doi:10.1029/2018SW002027.
- Weimer, D. R., M. G. Mlynczak, J. T. Emmert, E. Doornbos, **E. K. Sutton**, and L. A. Hunt (2018). Correlations between the thermosphere's semiannual density variations and infrared emissions measured with the SABER instrument, *Journal of Geophysical Research: Space Physics*, 123, 8850–8864. doi:10.1029/2018JA025668.
- Fuller-Rowell, T., J. Emmert, M. Fedrizzi, D. Weimer, M. V. Codrescu, M. Pilinski, **E. K. Sutton**, R. Viereck, J. Raeder and E. Doornbos (2018), Chapter 21: How Might the Thermosphere and Ionosphere React to an Extreme Space Weather Event? in *Extreme Events in Geospace*, ed. N. Buzulukova, doi:10.1016/B978-0-12-812700-1.00021-2.
- Sutton, E. K.** (2018), A new method of physics-based data assimilation for the quiet and disturbed thermosphere, *Space Weather*, 16, 736–753, doi:10.1002/2017SW001785.
- Huang, C. Y., Y. Huang, Y.-J. Su, T. Huang, and **E. K. Sutton** (2017), High latitude neutral mass density maxima, *J. Geophys. Res. Space Physics*, 122, 10,694–10,711, doi:10.1002/2017JA024334.
- Lei, J., et al. (2016), Contrasting behavior of the F2 peak and the topside ionosphere in response to the 2 October 2013 geomagnetic storm, *J. Geophys. Res. Space Physics*, 121, 10,549–10,563, doi:10.1002/2016JA022959.
- Sutton, E. K.** (2016), Interhemispheric transport of light neutral species in the thermosphere, *Geophys. Res. Lett.*, 43, doi:10.1002/2016GL071679.
- Pedatella, N. M., J. Oberheide, **E. K. Sutton**, H.-L. Liu, J. L. Anderson, and K. Raeder (2016), Short-term nonmigrating tide variability in the mesosphere, thermosphere, and ionosphere, *J. Geophys. Res. Space Physics*, 121, 3621–3633, doi:10.1002/2016JA022528.
- Sutton, E. K.**, Thayer, J. P., Wang, W., Solomon, S. C., Liu, X., and Foster, B. T. (2015), A self-consistent model of helium in the thermosphere, *J. Geophys. Res. Space Physics*, 120, 6884–6900, doi:10.1002/2015JA021223.
- Shim, J. S. et al. (2014), Systematic Evaluation of Ionosphere/Thermosphere (IT) Models, in *Modeling the Ionosphere-Thermosphere System* (eds J. Huba, R. Schunk and G. Khazanov), John Wiley & Sons, Ltd, Chichester, UK. doi: 10.1002/9781118704417.ch13.
- Vickers, H., M. J. Kosch, **E. K. Sutton**, L. Bjolund, Y. Ogawa, and C. La Hoz (2014), A solar cycle of upper thermosphere density observations from the EISCAT Svalbard Radar, *J. Geophys. Res.*, 119, 6833–6845, doi:10.1002/2014JA019885.
- Sutton, E. K.**, S. B. Cable, C. S. Lin, L. Qian, and D. R. Weimer (2012), Thermospheric basis functions for improved dynamic calibration of semi-empirical models, *Space Weather*, 10(S10001), doi:10.1029/2012SW000827.
- Crowley, G., D. J. Knipp, K. A. Drake, J. Lei, **E. K. Sutton**, and H. Luhr (2010), Thermospheric Density Enhancements in the Dayside Cusp Region During Strong By Conditions, *Geophys. Res. Lett.*, 37(L07110), doi:10.1029/2009GL042143.
- Sutton E. K.**, J. M. Forbes, R. S. Nerem, and T. N. Woods (2006), Neutral Density Response to the Solar Flares of October and November, 2003, *Geophys. Res. Lett.*, 33(L22101), doi:10.1029/2006GL027737.
- Sutton, E. K.**, J. M. Forbes, and R. S. Nerem (2005), Global Thermospheric Neutral Density and Wind Response to the Severe 2003 Geomagnetic Storms from CHAMP Accelerometer Data, *J. Geophys. Res.*, 110(A09S40), doi:10.1029/2005JA010985.