

NOAA's SWFO Program: CCOR-1 and the SWFO-L1 Observatory at Lagrange 1

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Abstract: NOAA has been upgrading its observational space weather capabilities through the Space Weather Follow On (SWFO) program developed in close collaboration with NASA. First, the Compact Coronagraph 1 (CCOR-1) has been designed by NRL to detect and track CMEs, based on the lab's heritage of developing solar imagers. CCOR-1 was launched to geostationary orbit onboard NOAA's GOES-19 satellite in June 2024. It is superior to legacy coronagraphs in terms of spatial resolution, dynamic range, S/N ratio, dynamic SEP-effect removal, and latency among other parameters. It is regularly used at SWPC (see also RT images at <https://www.swpc.noaa.gov/products/coronagraph>), NASA's M2M, and international forecast centers, while several tools like jHelioviewer have been adapted to ingest its images. As expected, observations from GEO are limited by eclipses (regularly, but relatively rarely) and earthshine (more frequently and less predictably) so these applied-science problems are being worked on. Campaigns are underway to compare imagery with that of LASCO/C3, SolO/METIS, DKIST, and other instruments, and contribute to the CME catalogs and other tools of the solar community. Second, on September 24, 2025, the Space Weather Follow On – Lagrange 1 (SWFO-L1) spacecraft was launched as a rideshare with NASA's IMAP and CGO missions, all of which will be orbiting the Sun-Earth Lagrange 1 point (L1). SWFO-L1 carries a nearly identical coronagraph, CCOR-2, as well as three instruments to measure the solar wind plasma properties, interplanetary magnetic field (IMF), and suprathermal-particle flux to replace NOAA's legacy DSCOVR mission. (Separately, a set of real-time datastreams from IMAP will be replace the operational function of NASA's ACE mission as a backup to SWFO-L1.) The spacecraft is currently in the final stage of the Lagrange Orbit Insertion (LOI). I will provide information on instrument capabilities and data access and mention the status of spacecraft commissioning and product validation.

Bio: Dr. Dimitris Vassiliadis obtained his PhD in physics at the University of Maryland, College Park. His research over several years at NASA/Goddard Space Flight Center focused on solar wind-magnetosphere coupling, high-latitude ionospheric electrodynamics, radiation belt dynamics, and their space weather implications. He developed predictive models from interplanetary and geospace satellite datasets (ACE, GOES, POLAR, SAMPEX, Wind, etc.) and ground magnetometer array measurements. He later taught physics and astronomy in academia where he led student projects on payloads for nine sounding rockets and a cubesat. He joined NOAA/NESDIS to work on space weather applications where he is the Space Weather Follow On (SWFO) scientist and serves on Space Weather Next and other satellite projects.