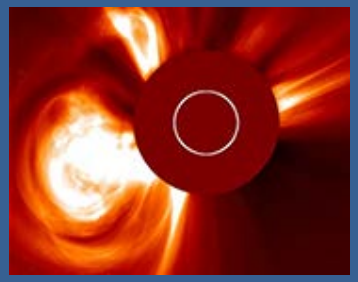
NASA, ESA Spacecraft Track Solar Storm Through Space



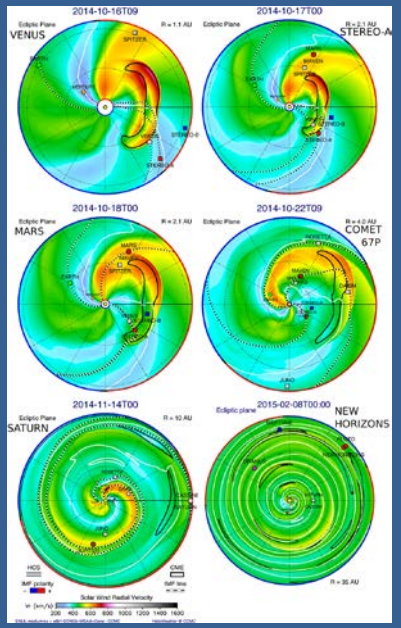
NASA/ESA SOHO image from LASCO C2 taken at 20:48 UT of the October 2014 CME. Credit: Witasse, et. al (2017).

On October 14, 2014, the NASA/ESA SOHO spacecraft observed a powerful coronal mass ejection (CME) associated with an M1.1 solar flare. An international team of scientists from Europe and the United States, including two NASA centers, used data from 10 NASA and ESA spacecraft to track the CME from the Sun out to the edge of the heliosphere where NASA's Voyager 2 spacecraft may have observed it in March 2016.

This particular CME first caught scientists' interest by accident. Scientists were looking at another set of observations, the interaction between Comet Siding Spring and the Martian atmosphere, and noticed solar wind disturbance around Mars. The team used models from the Community Coordinated Modeling Center (CCMC) based at NASA Goddard to provide more context about the CME that had interfered with their measurements.

After they realized that comet 67P — and therefore ESA's Rosetta spacecraft, then orbiting the comet — was also lined up to be right in the path of the CME, they began hunting for other observations. After exploring data throughout the solar system from multiple sources, the team was able to confirm seven direct detections of the CME. They found that ESA's Venus Express measured the CME indirectly, and two additional NASA spacecraft, New Horizons and Voyager 2, had probable detections of the CME. The team was able to track the CME out to the edge of the heliosphere, the last of which occurred more than a year after the CME burst from the Sun.

The wealth of data collected directly in the path of this CME is a boon for scientists working on space science simulations. This new information provides the most comprehensive look to date at how the speed of a CME evolves over time. This new set of observations adds key information to the models needed to track how material moves and changes throughout space in the solar system — crucial to understanding the medium through which our spacecraft travel, as we venture farther and farther from home.



Stills of the solar wind velocity in the ecliptic plane from a CCMC model simulation showing the CME propagation, at the times of the CME's closest approach to Venus, STEREO-A, Mars, comet 67P, Saturn, and New Horizons. The full simulations are available at http://ccmc.gsfc.nasa.gov; run numbers Leila_Mays_092716_SH_1 and Leila_Mays_100116_SH_1. Credit: Witasse, et. al. (2017).