

Astrobiology News June 2017: Touching the Nearest Star

Last June, I wrote about some of our Sun's effects on Earth (other than the very obvious ones) and it seems appropriate to continue to write about our nearest star during the month of the summer solstice. NASA recently announced a new name for a mission scheduled for launch next year: the *Parker Solar Probe*¹ honors University of Chicago Professor Emeritus Eugene Parker², a pioneer in solar astrophysics since the 1950s. The probe will skirt the Sun's outer atmosphere (the *corona*), approaching seven times closer than any previous spacecraft. Many energetic events that affect the Earth and human technologies originate in the Sun's corona. This mission will enable us to predict better the magnitude and timing of these events, which in turn will help protect our increasingly technology-dependent society from the potential threats of *space weather*³.

The idea of a solar probe isn't new – it's been recommended by the National Academy of Sciences since 1958; however, the technical challenges to designing such a mission have been formidable. The temperature of the Sun's corona is roughly a million degrees, much hotter than the visible "surface" of the Sun. The *Parker Solar Probe* is expected to help solve the puzzle of why the corona is so hot. At its closest approach, the front of the spacecraft will reach a temperature of about 2,500 degrees Fahrenheit and endure solar radiation intensities 475 times higher than we do on Earth⁴. The probe's instruments will be protected by a 4.5-inch thick carbon-composite heat shield, but proper orientation of the spacecraft will be critical to its longevity!

As it happens, many people across the continental United States will have the opportunity to actually *see* the Sun's corona this summer. Last month, Clergy Letter Project member Jon Cleland Host wrote about the upcoming solar eclipse on August 21st. I'd like to add my voice to Jon's in encouraging you to experience this rare and awesome spectacle! The path of totality (where viewers can experience the Sun completely covered by the Moon, enabling them to see the much fainter extended solar corona) will follow a 71-mile-wide band stretching from Oregon to South Carolina. Partial phases will be visible from the entire continental United States, weather depending of course! Check out the Adler Planetarium's web page⁵ for more information, including necessary eyewear for viewing partial eclipse phases. Folks who live in or near Chicago can come visit Adler's latest temporary exhibit, *Chasing Eclipses*, to preview the total solar eclipse experience and "meet" historic eclipse chasers.

Finally, NASA's Space Grant Consortium is coordinating an effort utilizing 55 teams that will launch balloons from 30 locations along the path of totality to live stream footage of the Moon's shadow from the edge of space – a feat never done before⁶. The Adler Planetarium's *Far Horizons* group⁷ is one of the participating teams. As for myself, if things go according to plan, I'll be taking video of the eclipse from a Cessna

310, flown by my spouse, so maybe – just maybe – I can finally avoid clouds and check “see a total solar eclipse” off of my bucket list!

Until next month,

Grace

¹ <https://www.nasa.gov/content/goddard/parker-solar-probe>

² This is the first time NASA has named a spacecraft after a living person.

³ Space weather refers to conditions in space near Earth (such as radiation and charged particles emitted by the Sun) that can affect human activity and technology.

⁴ <https://www.space.com/37044-nasa-parker-solar-probe-mission-infographic.html>

⁵ <http://www.adlerplanetarium.org/events/solar-eclipse-08-21-17/>

⁶ <https://eclipse2017.nasa.gov/nasas-space-grant-ballooning-project>

⁷ <http://www.adlerplanetarium.org/education/far-horizons/>