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A Trio of Space Satellites Launch to Study the Sun's Violent Side ^[1]

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Cape Canaveral, Florida — A group of space weather satellites lifted off Wednesday morning to closely observe solar storms that can produce dazzling auroras but also disrupt communications and threaten astronauts in flight. The three satellites soared from NASA's Kennedy Space Center shortly after sunrise aboard a SpaceX rocket. Their destination: a solar orbit observation post 1 million miles (1.6 million kilometers) from Earth, each with its own mission.

Altogether, the NASA and National Oceanic and Atmospheric Administration (NOAA) satellites, plus related costs, are valued at about \$1.6 billion. NASA's Joe Westlake calls it "the ultimate cosmic rideshare" by sharing a rocket to save money. Leading the lineup is NASA's Interstellar Mapping and Acceleration Probe, the first to be deployed. It will examine the outer boundaries of the heliosphere, the protective bubble of gas driven by the solar wind surrounding our solar system.

As an added benefit, IMAP will be able to provide early warnings of solar storms — a valuable 30-minute alert — for astronauts exploring the moon under NASA's Artemis program. Officials expect the observatory to be fully operational in time for four astronauts to fly around the moon and return next year.

Also flying is NASA's smaller Carruthers Geocorona Observatory, which focuses on Earth's outermost glowing atmosphere that extends far beyond the moon. It is named after the late scientist George Carruthers, who invented the ultraviolet telescope that Apollo 16 astronauts left on the moon in 1972.

NOAA's new space weather observatory will be boosted into full-time, around-the-clock forecasting service. It will track solar activity and measure the solar wind to help keep Earth safe from threatening flares. Officials expect NASA's satellites to be in position and operating early next year, and NOAA's spacecraft by spring. NASA is contributing more than \$879 million for its two missions, while NOAA's share is \$693 million. While NASA already has a fleet of solar-observing spacecraft, the agency's science mission chief, Nicky Fox, said these new missions offer more advanced instruments that will deliver more sensitive measurements.

"Just being able to put all that together to give us a much, much better view of the Sun," she said. The goal is to better understand the Sun to better protect Earth, according to officials. As spectacular as they are, the northern and southern lights will not be the focus of the missions. During a preview of NASA's upcoming Artemis lunar mission, science officials said Tuesday that these new space weather missions will improve forecasts and provide vital alerts if major solar activity occurs. If that happens, the four astronauts will temporarily shelter in a storage area beneath the capsule's floor to avoid elevated radiation levels.

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