PUNCH mission to image Sun's outer corona enters Phase B

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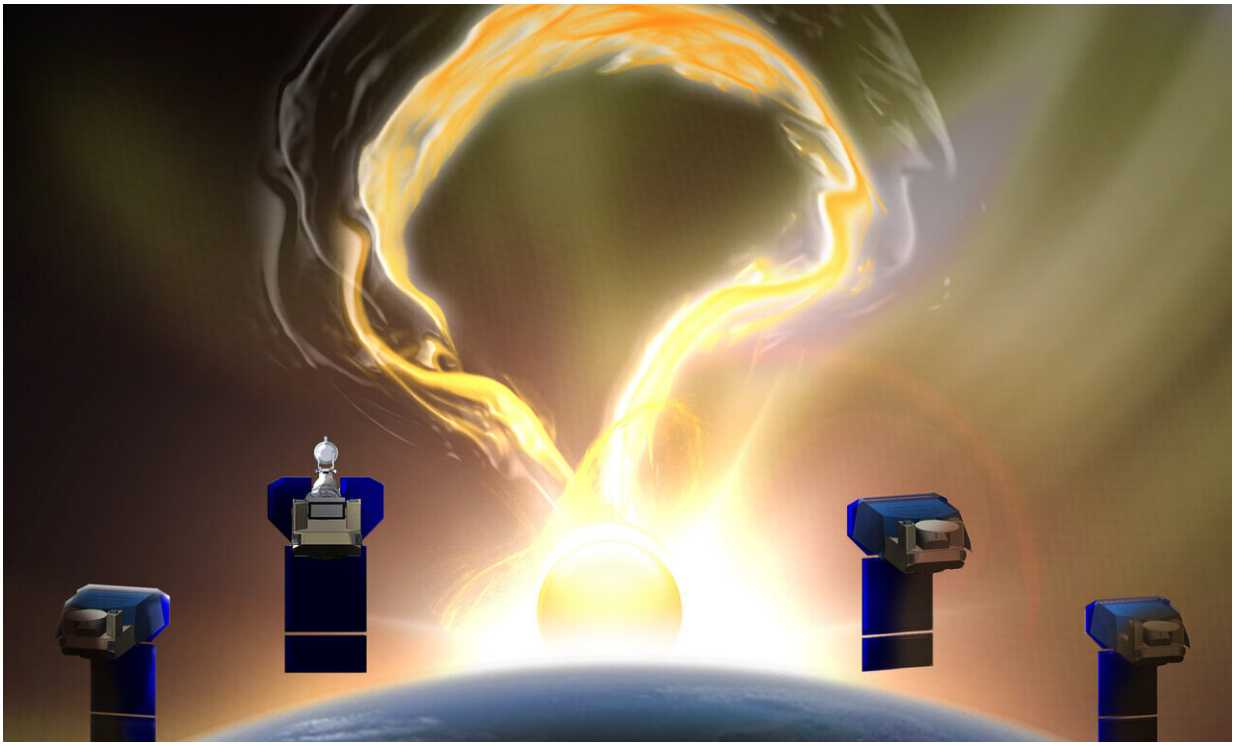

PUNCH is a planned constellation of four suitcase-sized satellites that will orbit the Earth, studying how the Sun’s corona connects with the interplanetary medium, to better understand how coronal structures infuse the solar wind with mass and energy. Credit: Southwest Research Institute

The Polarimeter to Unify the Corona and Heliosphere (PUNCH) mission has entered Phase B, which marks the transition from concept

study to preliminary flight design. The mission, led by Southwest Research Institute, is set to launch in early 2023 and will image the Sun's outer corona and beyond.

NASA selected SwRI in June 2019 to lead the PUNCH mission. PUNCH consists of four microsatellites the size of suitcases that will orbit the Earth in formation to study how the Sun's atmosphere, or corona, connects with the interplanetary medium, and to provide the first global images of how the solar corona infuses the solar wind with mass and energy.

"In this phase, our team will advance the mission concept to a preliminary full design of the mission," said Dr. Craig DeForest, scientist and program director in SwRI's Space Science and Engineering Division. "The overall goal for the phase is to refine our existing concept design and make sure all the elements can come together on a practical level."

Phase B will last nearly a full year. Throughout the process, SwRI will collaborate with the U.S. Naval Research Laboratory (NRL) and the Rutherford Appleton Laboratory in Oxfordshire, England.

"SwRI's role is to build the four spacecraft and operate the mission, in addition to creating the Wide Field Imager, which is capable of imaging objects a thousand times fainter than the Milky Way," DeForest said.

The NRL will produce the Narrow Field Imager, which captures the outer corona itself, and Rutherford will contribute the high sensitivity digital cameras used by each of the PUNCH instruments.

In addition to the primary instruments, PUNCH includes a student-built instrument, "STEAM" which stands for "Student Energetic Activity Monitor." The instrument is an X-ray spectrometer that captures a

running X-ray spectrum of the Sun, providing valuable diagnostic data that can help the PUNCH team understand how the corona is heated as well as how the solar wind undergoes its initial acceleration from the surface of the Sun.

"We're very excited to have an instrument created by undergraduate research students from all across Colorado," DeForest said. "The students will gain real, hands-on participation in a NASA project and that kind of experience is invaluable."

Provided by Southwest Research Institute