

DEPARTMENT OF THE NAVY
SBIR/STTR TRANSITION PROGRAM
SPOTLIGHT

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Optimax Lenses Help Mars Rover Look for Signs of Life

By Jennifer Reisch

NASA's Mars 2020 mission is studying Mars habitability, seeking signs of past microbial life, collecting and caching samples, and preparing for future human missions. The Mars 2020 mission, which will last at least one Mars year (about 687 days), is part of NASA's Mars Exploration Program, a long-term effort of robotic exploration of the red planet. Navy SBIR technology from the past 10 years has helped advanced NASA's capability in some of these missions.

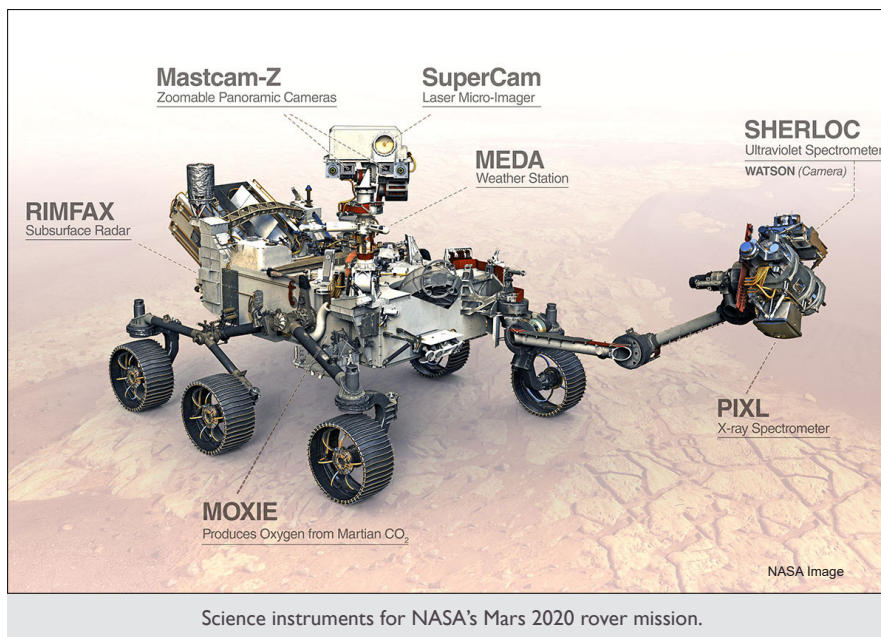
The Mars Perseverance rover launched on July 30, 2020, from Cape Canaveral, Fla., and landed on February 18, 2021, on the Jezero Crater on Mars with some lenses developed by Navy STP participant Optimax Systems, Inc. (Optimax) on board. The company's lenses are included in two key systems of the rover: the Mastcam-Z and SHERLOC.

"We've had a long history of working with NASA. It's core to who this company is. It's something that we've always celebrated here, being able to be a part of these challenging programs with NASA," said Joseph Spilman, director of sales and marketing at Optimax.

"We have been on every Mars rover in some shape or form to date. We were on Curiosity in 2011 and Spirit and Opportunity before that," said Tori

Uthe, marketing communications manager at Optimax.

Scanning Habitable Environments with Raman & Luminescence for Organics & Chemicals (SHERLOC) is an ultraviolet spectrometer. "The rover will be selecting

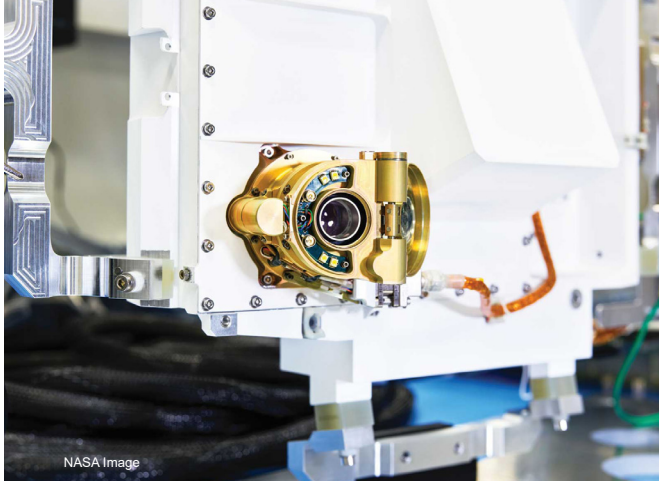


Science instruments for NASA's Mars 2020 rover mission.

samples from Mars and analyzing them in this SHERLOC instrument. SHERLOC uses an ultraviolet spectrometer, using ultraviolet light in an attempt to determine what the samples are made of. What is the chemical make up? Is there

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A close-up view of an engineering model of SHERLOC (Scanning Habitable Environments with Raman & Luminescence for Organics & Chemicals).



The twin Mastcam-Z cameras, shown with a pocket knife for scale,

anything that could have been created from life? Or left over from life?” explained Spilman.

Mastcam-Z is a multispectral stereoscopic imaging instrument based on the Mastcam instrument that operated on the Mars Curiosity rover. “Mastcam-Z looks like the rover’s head. On this system there are two cameras just like humans have two eyes. These zoom lenses are extremely high precision imaging cameras. Optimax made the lens components that are used in these zoom lenses,” said Spilman.

There were some real challenges associated with making each of these systems, Spilman said. “The Mastcam-Z system has very tight tolerances on all the lens components, tolerances that are very much out of the ordinary for most optics manufacturing companies. Through our Navy SBIR projects, we were focused on grinding and polishing, developing processes with different types of materials and exotic shapes, and also metrology systems. Those Navy projects

helped us to be quicker, to push the envelope, accept these big polishing challenges, and allowed us to change what we do internally to satisfy NASA programs. A decade of Navy SBIR work has improved our manufacturing process, which is contributing to NASA’s Mars missions.”

Optimax is a high-precision optics manufacturer located in Ontario, NY, that builds the optics behind breakthrough technologies in aerospace, medical, and consumer electronics. For more information visit the company website at <https://www.optimaxsi.com/>.



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