OVERVIEW

The Scanning Habitable Environments with Raman & Luminescence for Organics & Chemicals (SHERLOC) instrument is a deep ultraviolet (UV) Raman Fluorescence instrument selected as part of the Mars 2020 rover instrument suite. SHERLOC will be mounted on the rover arm and its primary role is to identify carbonaceous species in martian samples. The SHERLOC instrument requires a calibration target which is being designed and fabricated at JSC as part of our continued science participation in Mars robotic missions. The SHERLOC calibration target will address a wide range of NASA goals to include basic science of interest to both the Science Mission Directorate and Human Exploration and Operations Mission Directorate.

PARTNERSHIPS / COLLABORATIONS

This project is a unique integration of science and engineering across NASA Centers (JSC, JPL) and industry (Jacobs).

INNOVATION

The calibration target will include advanced space suit materials to serve as both calibration targets for the SHERLOC instrument, as well as for testing the resiliency of those materials under martian ambient conditions. A martian meteorite will also be included in the target to serve as a well-characterized example of a martian rock that contains trace carbonaceous material.

OUTCOME / PROJECT SCHEDULE

- Selection of Calibration Target Materials: Jan-Sep 2016
- Preliminary Target Design: Jun-Sep 2016
- Final Design (CDR): Jan 2017
- Fabrication and Environmental Testing: 2017 / 2018
- Completion / Delivery: Feb 2018 (EQM), Oct 2018 (FM)
- Mars 2020 Mission Launch: Jul/Aug 2020

SPECTRAL TARGETS

1. AlGaN on SiC
   Raman Calibration (1 of 3) 265 nm emission
2. Intensity Standard
   Raman Calibration (2 of 3) 400 cm⁻¹ Raman scatter
3. UV Reflective Mirror
   Raman Calibration (3 of 3) 262.9 nm reflection of 2° laser line
4. Gallium Nitride (GaN)
   Fluorescence Calibration 360 nm emission
5. Spectralon
   Ambient light/Spectral range Diffuse ambient light reflection
6. Mars Meteorite
   UV Raman/Fluorescence Map Education Public Outreach

SUIT MATERIALS

1. Orthofabric
   Outer layer of Thermal Micrometeoroid Garment (TMG)
2. Polycarbonate
   Advanced space suit helmet visor
3. Teflon
   Outer layer of glove; gauntlet
4. nGimat coated Orthofabric
   New dust resistant coating on outer layer of TMG
5. Dacron
   Restraint layer
6. Vectran
   Restraint layer

IMAGING TARGET(S)

- Color (RGB) / Grayscale Target(s)
- Modulation Transfer Function (MTF) / Distortion Target
- Education and Public Outreach (geocache and other graphics)