LASP specializes in the design and development of flight instruments and spacecraft, with a focus on game-changing technologies.

**Engineering Capabilities**

**Quick Facts**

LASP has built 30 instruments for 15 operating missions: GOES-17, GOLD, TSIS-1, GOES-16, MMS, MAVEN, STPSat-3, Van Allen Probes, SDO, New Horizons, AIM, SORCE, THEMIS, TIMED, Voyager

LASP is developing 21 instruments for 16 missions: NASA: TSIS-2, PSP, Europa Clipper SUDA, MatISSE LAMA, CLARREO Pathfinder, FOXSI/SPS, CSIM, CTIM, CUTE, MinXSS-2 NOAA—GOES-T & U EXIS UAE: Emirates Mars Mission EXI, EMUS

LASP has experience on NASA, NOAA, and Air Force contracts, as well as commercial partnerships.

LASP has launched 200 sub-orbital rocket experiments.

**Full Lifecycle Program Management**

- Science requirements definition to publication of data
- Hardware and software design, build, test, and delivery
- Financial and schedule management

**Systems Engineering**

- Requirements development and verification
- Interface control
- System analyses
- Resource tracking and management

**Quality Assurance**

- ISO 9001:2008 compliant
- Inspections for compliance to NASA and industry standards
- Safety, ESD, and contamination control

**EEE Parts Engineering and Procurement**

- Ensuring EEE part mission assurance requirements are met for design, quality, radiation and traceability

**Electrical Engineering**

- Low noise, high precision detector interface electronics
- Complex DSP and SoC FPGA design
- Custom low and high voltage power conversion
- Open-loop and precision closed-loop control

**Flight Software**

- Embedded systems to control flight instruments and spacecraft
- Ground systems such as S/C simulator software, telemetry analysis software, and FPGA diagnostics software
- Custom time slice architecture and VX Works RTOS
- NPR 7150.2 A compliant

**Mechanical and Thermal Engineering**

- Optical and electromagnetic fields instrument design, analysis, and test
- One-time and extended life mechanisms and gimbaled platforms
- Thermal control design and testing of detector, payload, and spacecraft systems
- Spacecraft structures, kinematic mounts and vibration isolation, electronics packaging

**In-House Production Operations**

- Workmanship certified assembly and polymersics technicians
- CNC machining with CMM verification capabilities

**Calibration and Test**

- Optical design and detector development for X-ray to infrared wavelengths
- Full characterization capability with NIST-traceable calibration standards
- Vacuum and thermal environmental testing facilities
Current Projects and Recent Flight Hardware Deliveries

Instruments for multiple environments: ground based, suborbital, LEO, GEO, lunar orbiting, interplanetary

**MMS ADP/SDP and DSP**
- Four MMS spacecraft launched March 2015
- On-board, low power and configurable digital signal processing (DSP)
- A total of 48 LASP-provided space mechanisms
- Four 30-meter tip-to-tip electric field dipole antennas, each comprised of two 12.5-meter coilable structures and two 2.25-meter deployable antennas

**MAVEN IUVS—Imaging UV Spectrograph**
- Mars orbit insertion September 2014
- Image intensified 2D detectors
- High wavelength resolution
- Vibration damped kinematic mounts

**TSIS SIM, TIM—Total and Spectral Solar Irradiance Sensor**
- Launched Dec. 2017 to the ISS as a follow-on to the SORCE collection of Total Solar Irradiance (TSI) and Spectral Solar Irradiance (SSI) data for the long-term climate record

**TCTE—TSI Calibration Transfer Experiment**
- Total Irradiance Monitor (TIM) hosted on the Air Force STPSat-3 launched in November 2013
- Rapid instrument development: contract start to spacecraft integration in only six months

**GOES-R/S/T/U EXIS—EUV and X-ray Irradiance Sensors**
- Uses silicon detection with custom six-channel ASIC and embedded processor (system-on-a-chip)

**MinXSS—Miniature X-ray Solar Spectrometer**
- NASA nanosatellite measuring the intensity of the solar soft x-ray spectrum from 0.4 keV to 30 keV since deploying from the ISS in May 2016

**Van Allen Probes REPT and ECT—Relativistic Electric Proton Telescope**
- Measures protons 20–100 MeV
- Measures electrons 2–25 MeV
- Customized radiation shielding and particle collimator

**GOLD—Imaging UV Spectrograph**
- NASA SMEX Mission of Opportunity, launched Jan. 2018
- Hosted payload on SES-GS communications satellite in geostationary orbit
- FUV spectrograph, 132–162 nm wavelength range
- Images atmosphere response to geomagnetic storms

**HySICS—HyperSpectral Imager for Climate Science**
- Demonstrates climate science radiometric accuracies in shortwave spectral region
- Single HgCdTe FPA covering 350–2300 nm at <0.2% radiometric accuracy and 6 nm spectral resolution
- Science flights in September 2013 and August 2014 on a high altitude balloon aboard the Wallops Arc Second Pointer and gondola

To learn more about LASP engineering capabilities, contact Tom Sparn at 303-492-2475 or tom.sparn@lasp.colorado.edu.