# SSEC

## Space Science and Engineering Center

## Instrument and Software Development Capabilities

WISCONSIN
UNIVERSITY OF WISCONSIN–MADISON

SSEC

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## Space Science and Engineering Center

Instrument and Software Development Capabilities

**SSEC delivers world-class engineering solutions for scientific research and operational systems, specializing in the design, development, and deployment of advanced instruments and software systems for terrestrial, airborne, and space applications.**

**With decades of experience, our multidisciplinary teams work closely with scientists and researchers to transform scientific requirements into robust precision-engineered systems.**

**We are a trusted partner for government and academic research including Department of Energy, NASA, National Science Foundation, NOAA, and the Department of Defense.**

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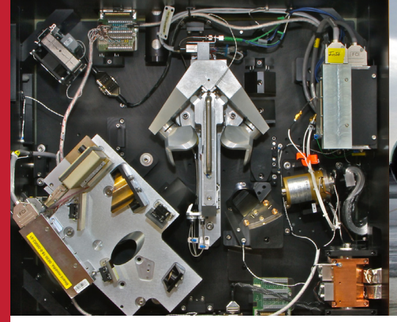


## Software Engineering

- Automated real-time satellite data ingest and instrument control systems
- Geophysical retrieval algorithm development, testing, and deployment
- High throughput computing infrastructure for global satellite data processing
- Interactive satellite data analysis and visualization

## Mechanical & Thermal Engineering

- Detailed design, finite element analysis, fabrication, and testing-specializing in precision opto-mechanical systems
- System design for operation at cryogenic (<1 K) temperatures
- Design, analysis, and optimization for vibration isolation
- Design for space and harsh environments, including for deployment in the Antarctic
- Assembly, test, and calibration labs
- Precision temperature metrology traceable to NIST within 5 mK
- Development of multi-instrument mobile research laboratories for scientific field deployments

## Electro-Optical Engineering

- High spectral-resolution Lidar systems
- Fourier Transform spectrometers, including imaging systems, used for infrared hyperspectral remote sensing
- High-accuracy NIST Traceable instrument radiometric calibration within 0.1K
- Novel blackbody sources that provide end-to-end on-orbit absolute calibration

## Satellite Ground System Reception & Data Processing

- 60+ years receiving, processing, and archiving satellite
- Ingesting and processing 8+ TB of data daily from 30+ satellites
- Supporting NOAA/NESDIS constellations including JPSS, GOES, GeoXO, and NEON
- Supporting NASA projects and missions including VIIRS Atmosphere-SIPS, PREFIRE, TROPICS, and PolSIR

## Electrical Engineering

- Signal processing, power electronics, RF systems
- Embedded controllers, Field-Programmable Gate Array platforms
- Space-qualified electronics
- Full in-house assembly and testing labs
- Serial and parallel communication system development

## Project Management & Systems Engineering

- Highly integrated end-to-end project execution
- Project development approach flexible and scalable to project needs
- Requirements-based project development & interface control
- Scalable quality assurance and safety programs, compatible with ISO 9001
- Deep experience planning and executing scientific field deployments around the globe


## Contact

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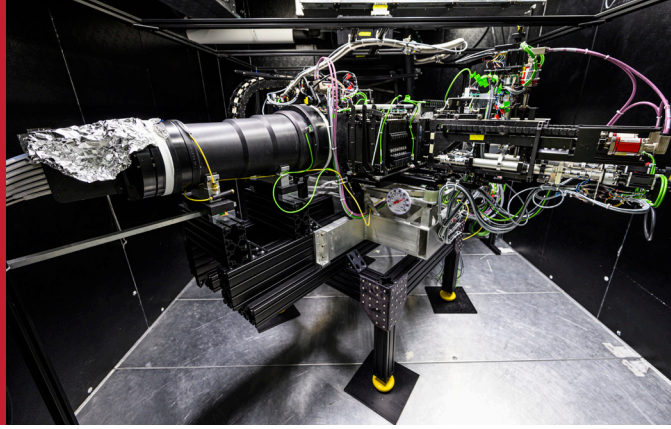
# Current and previous instruments and software engineering



- **S-HIS** – Scanning High-resolution Interferometer Sounder (NASA/NOAA aircraft)
- **HSRL** – High Spectral Resolution Lidar (NSF/DOE ground/aircraft)
- **IDP** – Ice Drilling Program (NSF, ice coring & drilling, subglacial rocking coring in polar regions)
- **ASIPS** – Atmosphere Science Investigator-led Processing System (NASA)
- **CSPP GEO** – Community Satellite Processing Package for Geostationary Data (NOAA)
- **ProbSevere** – AI-driven severe weather forecasting (NOAA)
- **Ground Data Processing Facilities** for PROSIR, PREFIRE & TROPICS (NASA)
- **CrIS** – Cross-Track Infrared Sounder Level 1B Algorithm Development (NASA)
- **NGFS** – Next Generation Fire System (NOAA)
- **ARI** – Absolute Radiance Interferometer (NASA flight demo)
- **AERI** – Atmospheric Emitted Radiance Interferometer (ground-based)
- **NIRWALS** – Near InfraRed Washburn Astronomical Laboratories Spectrometer for Southern Africa Large Telescope (NSF, WARF, SALT)
- **GIFTS** – Flight calibration sources (NASA)
- **HSP** – Hubble Space Telescope High Speed Photometer (NASA)
- **DXS** – Diffuse X-ray Spectrometer (NASA Space Shuttle)
- **NFR** – Galileo Jupiter Probe Net Flux Radiometer (NASA)

*Photo credits: Jeff Miller, Marsha Wolf, SSEC, NASA*

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