ATMOSPHERIC & SPACE TECHNOLOGY RESEARCH ASSOCIATES

SCIENCE + TECHNOLOGY + APPLICATIONS // *Bringing it all together*

SPACE WEATHER EXPERTISE

ASTRA is a Small Business located in the aerospace hub of Boulder, Colorado (CO).

We leverage our **scientific and engineering expertise** to develop unique solutions in HF radar and radio, GPS systems, satellite remote sensing, CubeSats, and LIDAR.

Our customers include the **DoD, NASA, federal agencies, universities and industry.**

R&D, ENGINEERING, & PRODUCTS

GPS Development • Robust real-time space weather monitoring solutions measure Total Electron Content & Scintillation parameters through Ionospheric Space Weather Monitors on ground (CASES), ocean buoys and smallsats (GAMMA)

HF Radar Technologies • Construct dynamic images of HF reflection surfaces with mapping capability for Traveling Ionospheric Disturbances (TIDDBIT system)

CubeSat Tech & Instrumentation • Miniaturized space-science systems including unique sensorsat capabilities for remote and *in situ* sensing:

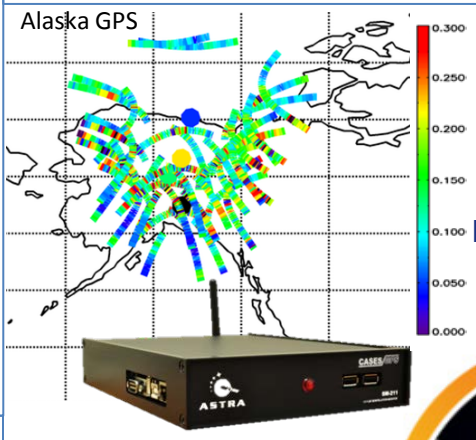
- ✧ UV Ionospheric Imaging System
- ✧ Ionospheric Electric Field Probes
- ✧ Topside Ionospheric Sounder
- ✧ Remote Sensing Thermospheric Neutral Wind Profiler

Real-Time Space Weather Modeling • Ionosphere-thermosphere modeling, forecasts, nowcasts, historical analyses

Software & Simulation Tools • Analysis of Alternatives tools and Predictive Atmospheric Specification for mission planning and procurement decisions

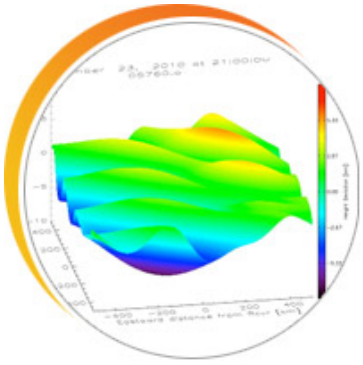
LIDAR • Non-contact portable precision liquid depth measurement (including semi-transparent media)

HIGHLIGHTS



Real-time Ionospheric Scintillation Monitoring / Forecast & Data Products

HF Radar Technology for TID Mapping



CubeSat Missions: NSF DICE; AF DIME, SIPS & TSS; and NASA SORTIE & MiRaTa

PAST PERFORMANCE

Core competencies in Research and Development, Engineering Services, and Commercial Product Sales for SMC, AFRL, ONR, NASA JPL and Goddard, NSF, and research universities. Various public and private awards as prime and subcontractor.

COMPANY INFORMATION

CAGE: 419Z4 **FOUNDED:** 2005
DUNS: 60-1975803
NAICS: 541712 (primary), 541330, 541690, 541990, 334519, 541512

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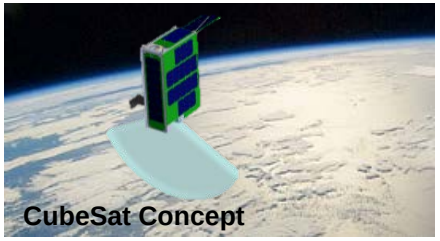
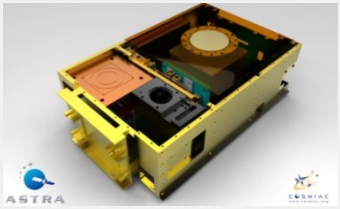
ASTRA *Space*
Selected Missions & Instruments

❖Science
❖ Technology
❖ Applications
Bringing It All Together

ASTRA

Mission	Description	Instruments	Other: Plug-n-Play Avionics
DICE (NSF)  **Form: Two 1.5U CubeSats**	**2011 launch** ***Flown* – first successful observations of SED's and FAC's from a CubeSat** Fastest comm. rates achieved by scientific CubeSat	• **Two Langmuir probes** to measure in-situ ionospheric plasma densities. • Science and attitude **magnetometers** • **Four electric field probes** on 5-meter cable booms	**SIPS** **Scanning Imaging Photometer Systems (UV Imager)**  CubeSat Concept **Form: 6U** **Low cost and versatile sensor for UV remote sensing of the ionosphere** Capable of providing almost continuous monitoring of the night-side ionosphere. Resolves ionospheric structures at 1 vertical TEC unit (better than GPS TEC) • **UV Detector (photometer)** • **Scanning mirror**
DIME (Air Force)  **Form: 1.5U**	**Currently being built for the Air Force.** DIMESat is a Constellation pathfinder mission for monitoring electric fields in Low-Earth Orbit implementing lessons-learned from on-orbit experience with DICE.	**Other Instruments:** • **Scanning UV Photometer (SIPS)** • **RF Remote Sending & Sounder** • **Wind Profiler** • **GPS-based Space Weather Monitor**	
SORTIE (NASA)  **Form: 6U**	**Est. launch 2018** **NASA LCAS**. SORTIE will provide information on the distribution of wave-like structures in the plasma density of the ionospheric F-region.	• **Miniaturized Ion Velocity Meter** for measuring ion drifts • **micro-Planar Langmuir Probe** for measuring small-scale plasma structures	**Topside Sounder**  **Low power FMCW HF Sounding instrument to make topside measurements of the ionosphere from a CubeSat platform.** **Form: 12U**