blair3sat

blair3sat presents SIRVLAS, a Space-based Ionosonde Receiver and Visible Limb-viewing Airglow Sensor cubesat instrument suite.

our mission

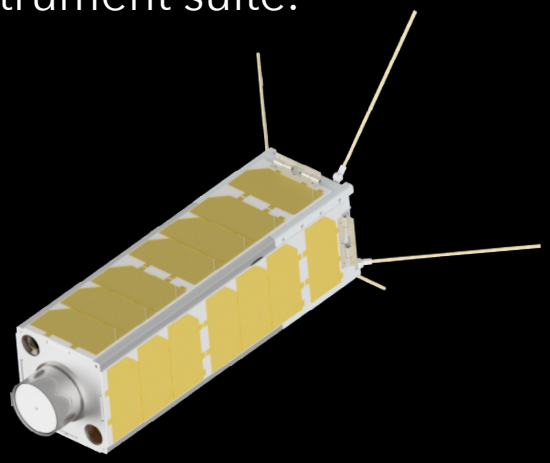
Plasma in the ionosphere refracts electromagnetic waves affecting over-the-horizon radar and both long-range terresterial and satellite communications systems. Furthermore, this plasma is *anisotropic* which means it's density changes with respect to time, altitude, and geographic location; this makes it very difficult to model. **Improving measurments and models would improve wireless capabilities by enabling some systems to more effectively mitigate ionospheric effects.**

Currently there are two main observation methods: ionosondes and airglow detectors. Briefly, ionsondes are radar sounders that sweep from 2-20 MHz; different frequencies reflect at different heights which can be used to construct a profile. Airglow detectors: optical detectors that measure electron density by observing the photons emitted from ionized atoms.

SIRVLAS receives ionosondes from space while detecting airglow.

Benefits of Receiving Ionosondes from Space:
- Current (ground-based) ionosondes only take measurements along the path from TX antenna to RX antenna; SIRVLAS measures everywhere along the orbital path, adding another dimension to the data.
- Some signals from ionosondes never reflect back to Earth and are never used in estimating ionospheric state; SIRVLAS captures these signals.
- Combining RF data from SIRVLAS with ionosonde data would allow more spatially precise mapping of the ionosphere.

Benefits of Measuring Airglow Concurrently:
- More information about the ionosphere leads to better estimates.
- Previous airglow detector missions only measure airglow and are not easily correlated with other measurements of ionospheric phenomena.
- Spatiotemporally-correlated measurements of ionosondes and airglow could enable development of a data-assimilative model of the ionosphere



who are we?

We are a 100% student-run organization that intends to be the first high school team to deploy a scientifically valuable instrument on a CubeSat. We practice various forms of engineering and science, business writing, and fund seeking. Students also work with mentors from several prestigious research laboratories in the DC area In addition to constructing our instrument, we are also involved in outreach programs aiming to increase interest in science and research in younger students. Lastly, all of our data and code is and will be publicaly available.

get in touch

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