

A DEDICATED CONSTELLATION FOR GLOBAL GPS LIMB SOUNDING

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Long-term averaging of GPS occultation (limb-sounding) data promises to yield atmospheric measurements of unprecedented precision, vertical resolution, and absolute accuracy. A constellation of six orbiting occultation receivers can achieve a refractivity precision equivalent to 0.1 K in temperature within a climate region corresponding to 1/30 the earth's surface, with just a few weeks of data. Vertical resolution can be better than 1 km. This offers perhaps the most promising approach yet to detecting and discriminating among subtle forced climatic signals, which may amount to only a few tenths of a Kelvin average temperature change per decade. To avoid confounding true climate signals with aliased diurnal, seasonal, and other effects, global sampling must be rigorously controlled, implying a constellation with a strictly defined and maintained configuration. **GPS-CLIM** (for "climatology") is a proposed constellation of six **microsatellites** now under review for NASA's Earth System Science Pathfinder Program. The principal science objective is to acquire a comprehensive global occultation data set to test and refine global climate models and help trace the origins of observed climate signals. Designed by Spectrum **Astro Inc**, the 10-kg, notebook-size "**CLIMsats**" can be packed into the secondary payload space on such launch vehicles as the **Delta II**, **Taurus**, and **Pegasus**. To achieve the required uniform global coverage, the mission will distribute the six satellites about two high-inclination orbit planes, by means of two separate launches three months apart. The satellites will be made largely with commercial grade parts to minimize cost. Future **CLIMsats** can be built and launched for less than **\$1M** each. This opens up the possibility of low-cost expansion of the constellation to dozens of satellites within just a few years.

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