



## **Global Constellation of Next-Generation Ultra-Spectral Geostationary Observatories: GeoMetWatch Six-Satellite-STORM-System (S4)**

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GeoMetWatch (GMW) is licensed by the US Government to operate a global geostationary ultra-spectral imaging/sounding system. GMW leverages the state-of-the-art technology developed by NASA and NOAA to provide an affordable and innovative solution to deliver a constellation of next-generation ultra-spectral sensors that will provide frequent, global infrared/visible measurements for weather, climate and environmental use, but at a fraction of the cost of conventional, dedicated systems. GMW's license allows for a method to deliver these advanced data with limited export control restriction.

GMW is partnering with the key science and technology developers in the NASA GIFTS and NOAA HES programs, namely Space Dynamic Laboratory (SDL), the developer of GIFTS sensor, and Space Science and Engineering Center (SSEC), the developer of GIFTS/HES science, algorithms and ground processing system. By leveraging these capabilities, GMW and its partners are developing an advanced sensor dubbed, "Sounding & Tracking Observatory for Regional Meteorology (STORM)". STORM is a derivative of GIFTS which has more than 1000 hours of comprehensive testing.

GMW is licensed to observe and deliver simultaneous imaging and sounding products. Each STORM sensor package is designed to make measurements in:

- Pan Imaging band at 300m ground sample distance (GSD).
- Visible/Near IR bands (0.5 - 3.5 micron) at 500m GSD.
- Ultra-spectral IR Data (4.3-15.2 micron) with 0.6-2.5 cm<sup>-1</sup> spectral resolution at 2km GSD, depending upon customer requirements.

GMW will provide a minimum of Level 1b data (calibrated and navigated radiances) from each band/channel. GMW can also provide derived sounder weather products (Levels 2 and 3) such as high vertical resolution profiles of temperature and water vapor, altitude resolved water vapor winds, and highly accurate sea surface temperature, land surface emissivity, and other customer-specified multi-dimensional atmospheric and surface products. In addition aviation, pollution, fire, renewable energy, and trace gas products can also be provided. All these data and products are to be delivered in near real-time (< 30 minutes) around the clock.

GMW first launch is slated for 2015, with the full complement GMW global constellation, comprised of the Six-Satellite-STORM-System (S4), to be fully deployed by 2019-2020. Each GMW STORM sensor makes full-disk observations in all bands every 20 minutes to 1 hour. Regional observation (~1000km x ~1000km) modes allow faster observation of severe weather events, such as hurricanes/typhoons, every 1-2 minutes. Larger regions, or customer-specified observation areas of special interest, are possible with various high temporal resolutions ranging from 5 to 15 minutes.

In this paper, we'll unveil the exciting and challenging GeoMetWatch-STORM project, and to discuss the planning status, sensor characteristic, processing system design, and weather and environment application demonstration.