

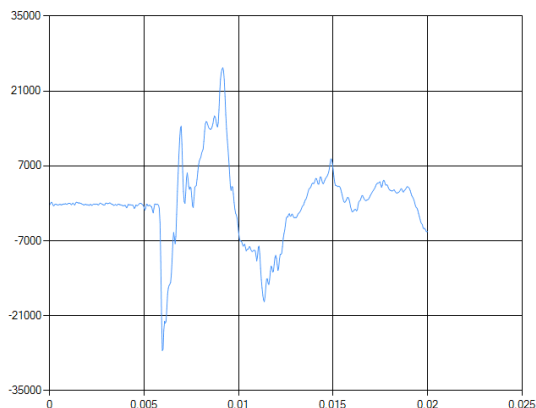


## DSP-DF200 Advanced Lightning Sensor

The sensor was designed with a capability to perform several functions at the same time with zero dead time.

The main functions are to have a capability of concurrently monitoring lightning events from:

1. Cloud to ground events within about 1000 km of the sensor allowing for accurate location of approximately 200 to 300 km rms.
2. The initial reflection from the ionosphere allowing location of events occurring at distances from about 1000 km to 2000 km.
3. Very long range lightning propagating in the earth/ionosphere wave guide (typically known as sferics). This allows location to 3000 km and beyond.



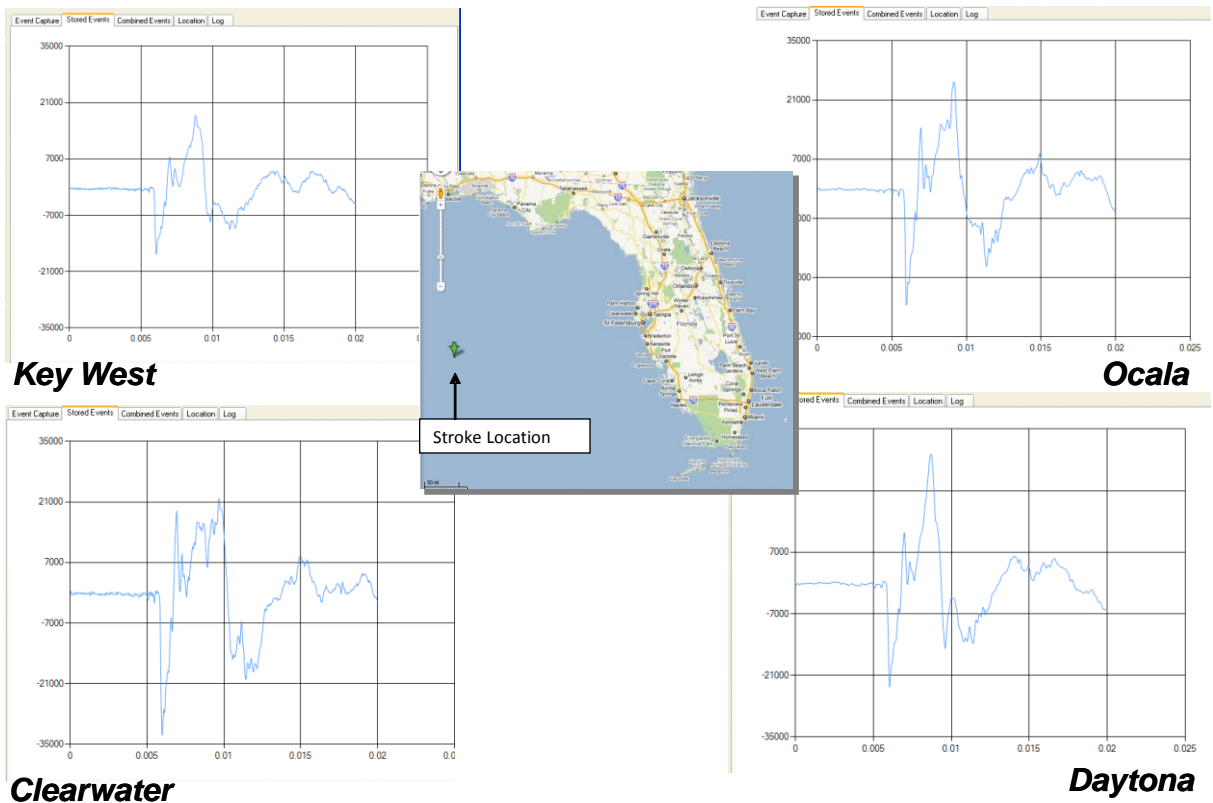
The DSP-DF200's core processing power is provided by a DSP specific Field Programmable Gate Array (FPGA). Legacy systems have utilized a traditional processor that buffers data over a period of time, and then analyzes the results offline. The technology breakthrough offered by an FPGA is true parallel processing. FPGA devices differ from traditional processors because processors are only capable of executing a single instruction at a time. Even "dual-core" processors have limitations since they are only processing 2 instructions simultaneously. However, FPGAs provide **truly parallel processing** and can perform nearly unlimited logic functions **simultaneously**. This provides a tremendous advantage for applications which require zero dead-time because there is no processing lag or offline processing. Due to the FPGA's parallel processing paths, the device is capable of receiving multiple channels of 16-bit data at 50Msps, and processing the data streams real-time using parallel logic paths. Furthermore, each 16-bit A/D input channel can then be fanned out to multiple processing paths with zero loss, zero time delay, and zero dead time. This revolutionary technology is capable of implementing numerous filters, numerous algorithms, and many channels simultaneously using true parallel processing.

The sensor then distributes the real time data recorded by the sensor to several IP's in binary or encrypted format.

The sensor can receive a string of coefficients from a download stream that allows for the calculation and insertion of narrow or broadband filters. These filters are then automatically calibrated to correct for their group timing delay before the time tagging of any events.

The sensor uses a proprietary mix of GPS timing as well as an OCXO (oven controlled crystal oscillator) allowing for time tagging to 5 nanosecond accuracy.

Record the waveforms received from the received lightning signature and forward them on demand to the central processor.



Utilizing a high sensitivity, low noise wideband receiver, state of the art digital filters and equalizers, along with precision GPS time reference, the sensor is able to characterize and categorize the lightning stroke.

With state-of-the-art digital signal processing performance, the DSP-DF200 provides unparalleled stroke detection through the use of multistage, adjustable window, tuned filters followed by banks of filter processing.