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A comparison of next generation mid-band broadband seismometers and traditional sensor technologies

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Mid-band seismometer systems usually have shorter period responses and higher noise floors when compared to broadband seismometer sensors. These seismometers have been hugely popular with permanent seismic networks and temporary experiments alike due to their cost-effectiveness, portability and relative ease of deployments which allow for network densification and quick deployments. Güralp have historically led the way with such sensors with the 6T and 40T series which have been used globally in challenging environments over the last decades for local and regional seismic monitoring applications. GSL have built on this tried and trusted platform to develop the next generation of mid-band sensor technology.

The Güralp next-generation smart sensor module is designed to be able to operate at any angle, without the use of a mechanical gimbal system. This allows for the entire sensor package to be rotated during installation and deployment without sacrificing data quality and means that all three components of the sensor to be manufactured to the same design, eliminating inconsistencies in performance between horizontal and vertical components whilst still maintaining an orthogonal orientation for redundancy. The new generation of sensor makes use of novel materials and techniques to drastically improve the noise performance over traditional mid-band sensors.

The sensor components include digital elements to the feedback loop, allowing for the sensor module to have an on-board serial server. This facilitates greater interoperability with Minimus based digitizer platforms, including automatic pulling of sensor serial number, sensor module SOH channels and the ability to remotely adjust the long period corner between options of 1s and 120s. This therefore makes the sensor module incredibly easy to deploy and mitigates against previous requirements for multiple instruments of varying responses.

The sensor module has now been successfully developed into a number of different packages for varying deployment scenarios including borehole (the Radian), offshore (Aquarius and Maris), vault (Certimus) and posthole (Certis) application. All packages make use of the latest digital technologies to reduce power consumption down to <300mW.