Oman National Seismic Network - Kinemetrics systems deliver high performance and extraordinary reliability for over 20 years

CASE STUDY

The Earthquake Monitoring Centre (EMC) is a national Omani research centre, located at Sultan Qaboos University. EMC was established in 2001 to record local, regional, and global earthquakes. The EMC receives real-time data streams from remote seismic stations for further seismic data processing, alerting, and archiving. The recorded data is also used for studies on local seismicity and geophysics as well as for advanced seismic research. One main objective of EMC is to establish seismic hazard maps, which can be used by planners and engineers to reduce the risk of earthquake damages.

EMC network Aspen remote station.

Kinemetrics' open-architecture Aspen seismic monitoring and information platform, consists of 20 remote seismic stations and the Data Centre, it has been designed to support additional network augmentations without any interruption to concurrent operations.

All of Oman's EMC network Aspen remote stations are exclusively based on Kinemetrics' Quanterra® 26-bit (Model Q330HRS) field data acquisition systems, Kinemetrics' surface EpiSensor accelerometers as well as the Streckeisen broadband STS-2, and STS2.5 seismometers. The EMC Aspen Data Centre operates the commercial and mission-critical Antelope data acquisition and processing software.

Oman's urban strong-motion stations were added over time since EMC Aspen network interception is equipped with the Kinemetrics EpiSensor accelerometers and Obsidian field data acquisition systems. Those stations are configured for real-time and dial-up operations, where the Antelope data acquisition software supports both modes of operations.

The same Aspen technology implemented in the **USArray/TA** project, delivered **99.8%** data return over **~1,800** installations in more than **ten years of operation**.

After ten years of successful operation in the continental USA, the current **USArray/TA** phase comprises of 280 Aspen stations operating in Alaska, in a harsh environment like never before, and stays operational until 2021 when removal begins. By the end of this U.S. National Science Foundation USArray/TA sponsored project, large numbers of Aspen stations will be transferred to the Alaska Regional network, operated by the University of Alaska, Fairbanks.

All Aspen broadband remote stations operate in the harshest of weather conditions. The data streams are collected at EMC's Data Centre located in Muscat, also streaming simultaneously to Oman's General Directorate of Meteorology to support the Tsunami monitoring mission. Aspen's Antelope software performs data acquisition, seismic signal detection, earthquake location, magnitude determination, data archiving, data exchange, and State-Of-Health (SOH) monitoring.

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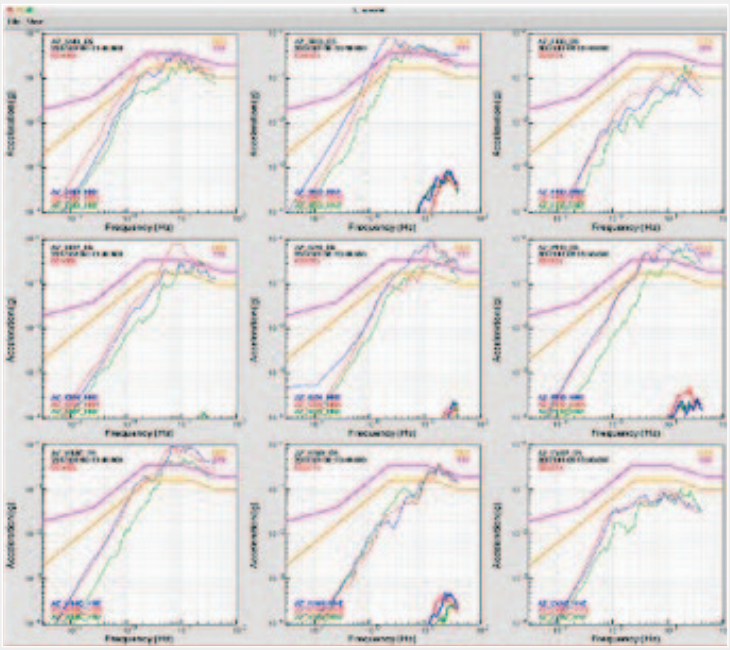

The data from the real-time strong-motion stations contribute to generating the real-time acceleration response, which allows the real-time monitoring of the exceedance of design spectra.

QUALITY INSTRUMENTATION

Keeping up with technology adds value to ever-demanding research. The broadband seismometers, accelerometers, and data loggers implemented in the Aspen platform are the most trusted as well as the best performance scientific instrumentation globally known. Aspen Platform implementation of high-end Commercial-Off-The-Shelf (COTS) communication VSAT, 3G/4G/5G Gate Routers and/or Wi-Fi allows end-users to keep up with an ever-changing scene in communications technology while staying in evolving tech trends.

FLEXIBILITY AND SCALABILITY

Kinemetrics Aspen platform with an open-architecture approach allows a seamless gradual network augmentation without running into roadblocks.

SYSTEM EVOLUTION

The Kinemetrics' Aspen open-architecture platform allowed the EMC-SQU seamlessly to increase the number the stations without any software or hardware modifications year after year. Lately, Antelope's latest module, the Bighorn that comes with the Antelope software distribution, provides new ways of monitoring the impact of earthquakes in urban areas and on the significant critical infrastructures.

DATA RETURN

The MTBF of Kinemetrics products and solutions is measured in tens of years. Typically, the data return of Kinemetrics networks and systems is at or above 99%.