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EarthScope's Transportable Array: Concepts and Practice in Managing Quality Control for Seismic Networks

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The Transportable Array (TA) element of EarthScope / USArray is a large deployment of 400 high quality broadband seismographs that is operated by the Incorporated Research Institutions for Seismology (IRIS), and is part of the EarthScope Program sponsored by the National Science Foundation. The scale and rolling nature of this array requires a careful design of quality control methods and has driven the development of a streamlined implementation that is useful even in much smaller seismic network efforts.
The result is a very good data return rate and signal quality for the Transportable Array.

We detail aspects of the underlying concepts that contribute to the success of the array, in particular the automated collection of status information, and its use in presentation of online status tables, and the evaluation and issuing of alerts of operational problems. These tables are immediately available to the field service personnel, allowing them to rapidly address a situation if they are in the area. Status and operating information is further compiled into database tables from which automated reports are generated that typically cover performance over a longer time span-daily, weekly and monthly. This combination of alerts, online views of station status and reports allows management to review and coordinate a plan of activities weekly to address issues. This last step, which applies management priorities and judgment to the process, serves to engage the entire team toward resolving issues quickly.

We present examples of the availability of detailed diagnostic information and the clear online presentation that allows efficient investigation of single station issues or screens of whole groups of stations by any member of the organization- and much of it is open to the public. The underlying software is split into two components: (1) the server-side BRTT Antelope Environmental Monitoring system for data acquisition and storage, and (2) the client -side web presentation layer which is built on open source software packages that are available freely online. The web presentation layer is standards compliant and therefore platform agnostic. Many of the web layer components are distributed for free online within the BRTT Antelope contributed code repository.