



**Aspen** is a distributed open-architecture system designed to provide comprehensive environmental data collection and processing. **Aspen** uses the latest developments in sensors, digitizers, communication and computer networking technologies, along with recent findings in earth sciences research.

Since it is built around data neutral principle, Aspen solution represents a new paradigm in environmental monitoring and is ideal for monitoring seismic events from local, regional, national and global networks and arrays.

The concept of open architecture is central to the **Aspen** environment because it will not only support your current requirements but also can be easily adapted to meet your future needs.

#### Aspen Field Station

At remote sites, the **Aspen** Field Station consists of the transducers, Quanterra and/or Kinemetrics datalogger, power subsystem and the communication interface.

The communication interface transfers continuous and/or on-demand data to the designated **Aspen** Data Centers using standard duplex serial interface or standard TCP/IP Level 4 protocol over radio, telephone or satellite communication links.

#### Aspen Data Center

The Aspen data center is the place where the most critical processes are run under supervision of the Antelope system software. Aspen data center computing infrastructure consists of server, storage, clients and network components scaled to meet your monitoring objectives.

The Aspen Server collects all incoming data streams from the remote sites or from other tied-in Aspen systems, processes data, archives raw data and results, generates automated notifications by email and/or SMS, and forwards data streams to other networked data centers.

The **Aspen** data center provides full functionality for seismic network and array operations and control. This includes real-time data acquisition to non-volatile disk ring-buffer, interactive control and command of field equipment, system state of health monitoring, and real time automated data processing (detection, picking, seismic event association, seismic event location, archiving). It also provides interactive and batch processing, information system functions, automated distribution of raw data and processed results, batch mode seismic array processing and a powerful development toolkit for extending and customizing the system.

# Aspen

## Environmental Monitoring System

### FEATURES

- Open-architecture modular design concepts throughout
- Distributed real-time and on-demand data acquisition and processing capability
- Unique data neutral and completely data driven architecture
- Highly configurable and adaptable to any environmental monitoring system requirements
- Tie-in capability of virtually any seismic network in the world
- Lowest latency system in industry, suited for earthquake early warning systems (EEWS)
- Distributed real-time system monitoring and command & control capability
- Comprehensive automated seismic event information in near real-time
- Network size independent - Aspen scales only with hardware used
- Ring buffer size limited only by maximum file size ring buffer
- Archives raw data and results
- Client/server TCP/IP paradigm
- Supports all telemetry with standard duplex serial interfaces or standard TCP/IP Level 4 protocol over multiple physical interfaces
- Unique on-line and off-line processing tools
- Offers tools with Relational Database Management System (RDBMS) for rapid access to earthquake information
- Rich development toolkit
- Implemented by several largest seismic networks in the world today<sup>1</sup>

### BENEFITS

The Aspen systems are architected, integrated, tested, and optimized to work together cutting complexity and reducing costs. This results in easier deployment and path to upgrades, and more efficient overall systems management.

The Aspen systems engineered by Kinemetrics' Open Systems and Services (OSS) Division are preassembled across every level of the technology stack. The integration work is done for you so new services come online quickly. Your IT team can focus on improving service levels and adding value to your operation.

Aspen extreme performance translates into getting the job done faster, better, and more economically than it has been done before. It's the hallmark of Kinemetrics' system design and the ultimate approach to simplify seismic networks operation and long-term operational costs.

By utilizing commercial, off-the-shelf products from highly-reliable and high-volume manufacturers, **Aspen solution** provides the greatest network reliability, scalability, flexibility, security, and the lowest total cost-of-ownership.

1. USArray is one consisting of ~ 500 stations.