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Multi-Spectrometer Compatible Data Acquisition System for Deep-sea In-situ Radiation Measurement

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Radiation measurement at deep-sea environment helps to get a better understanding on deep-sea sedimentation, geological structure, radiation monitoring and so on. However, reports about radiation of natural deep-sea environment are rare, especially about deep-sea in-situ gamma radiation measurement. Two gamma spectrometers and two neutron spectrometers are going to be used in deep-sea in-situ radiation measurement. Aiming at different scientific goals, the four spectrometers can develop multiple kinds of measurements, including dose of gamma rays, energy spectrum of gamma rays, energy spectrum of characteristic gamma rays with neutron capture process, and time spectrum of thermal neutron. In this paper, a multi-spectrometer compatible data acquisition (DAQ) system is proposed. The DAQ provides features of readout, visualization, data process algorithm and file input and output. To benefit from high reusability and low coupling, the DAQ system is based on Model-View-ViewModel architecture. With a customized application layer protocol, the DAQ can be is fully compatible with the four different spectrometers. Besides supporting of real-time control, the DAQ system also provides a way to program the spectrometers to execute an unmanned mission, so that the spectrometers can load a time table from a built-in flash memory and run automatically.

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