

ADVANCED DATA ACQUISITION FOR BLAST EFFECTS RESEARCH

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Precision weapon performance, response of next Generation protective structures, physiological systems response and close-to-the-source explosion effects research require extreme blast and impact resistant data acquisition. Ideal systems are self-contained, high-resolution, highly adaptable and remotely programmable. Capabilities must include rapid set-up, reconfiguration, recovery and processing of acquired test data. Conventional, cable-linked data acquisition can not survive in the extreme blast effects regions of current interest. A family of autonomous digital data acquisition (DAQ) module/systems has been developed to meet these rigorous demands. The basic module is an approximate cube of 3.8 cm and contains all electronics and power to acquire, store and download data when coupled to any standard transducer. The DAQ module, with coupled transducer, is contained in a hardened protective canister to measure forces and pressure in extreme blast and shock environments. The small size of the module allows a large number to be implanted in physiological (anthropomorphic) response models to monitor a range of effects (such as blast pressure, sound pressure level, optical and thermal pulse and fragment impact). This new system is readily adaptable for use at remote locations for corollary effects monitoring from a range of sources beyond explosive tests, such as remote seismic and weather stations. The design allows modular stacking to build any required number of data channels. Function control is by expendable signal lead connection to a notebook PC. Recorded test data are downloaded directly from the recovered module into the PC for on-site processing and analysis. An add-on module allows second-level DAQ control and data recovery via a telemetry link from a master control station located some distance from the site. This is especially attractive for long-term measurement at remote or difficult to access locations. or where many repeat tests are conducted.