

Extreme Data Acquisition

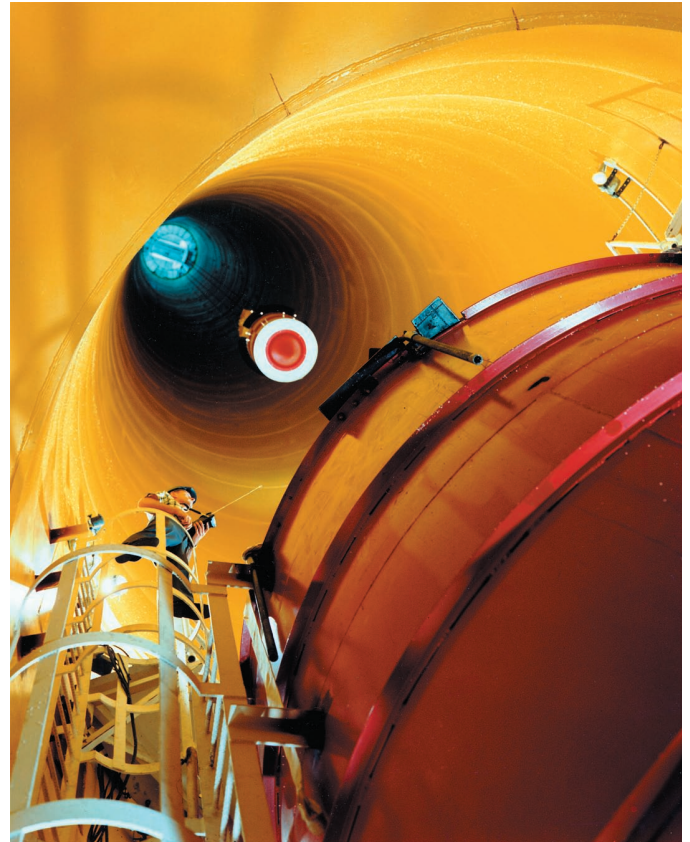
NASA's Zero Gravity Research Facility (Zero-G) is the largest Microgravity testing environment in the United States. It allows NASA-funded researchers to simulate the effects of weightlessness on components and hardware designed for flight aboard NASA's Space Shuttle. On Earth, weightlessness can be modeled in a vacuum chamber by putting an object in a state of free fall.

The Zero-G facility includes a 140 meter long steel vacuum chamber that is 6.1 meters in diameter and is surrounded by an 8.1 meter diameter concrete-lined shaft extended 155 meters below ground level. An object placed inside a test capsule that is dropped in the vacuum chamber can obtain a state of near weightlessness for approximately 5.18 seconds as it drops a free-fall distance of 132 meters.

NASA selected KineticSystems' DAQ532 data recorder to collect critical data such as voltage, acceleration, and temperature of the free falling device under test within the capsule. DAQ532 data recorders were mounted into five different free-falling capsules that are required to each perform different sets of tests. The flexibility, robustness, and ease of configuration of the DAQ532 data recorder set it apart from the competition.

Any of the DAQ's 32 differential input analog channels can be activated and assigned a sample rate up to the aggregate maximum of 50k samples/second. The DAQ532 provided the most choices of gain/filter combinations via signal conditioning and allowed NASA researchers to easily fine-tune test setups. Data was captured before, during and after the capsule's free-fall for a total of approximately 10 seconds. Once the capsule is retrieved by overhead crane, the data is transferred via Ethernet, or via the unit's CompactFlash, to a PC using KineticSystems' included VersaDAQ™ software.

VersaDAQ's simple, yet powerful user interface, allowed NASA researchers to easily configure channels and sample rates, activate record mode, perform calibration, and control any of the DAQ532's



functionality with a few mouse clicks and pull-down menus. The data conversion utility provided in VersaDAQ allowed collected data to be easily ported to other applications such as MATLAB or LabVIEW for further data analysis or to Excel for report generation or inclusion in other documentation.

The DAQ532 responded to all of NASA's requirements for a robust and easy-to-use data recorder. It was the only data recorder robust enough to withstand the extreme conditions, such as very high temperature and shock upon impact, of the vacuum chamber in the Zero-G test facility.

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