

AeroPro™ 6.0 Control & Data Acquisition Software

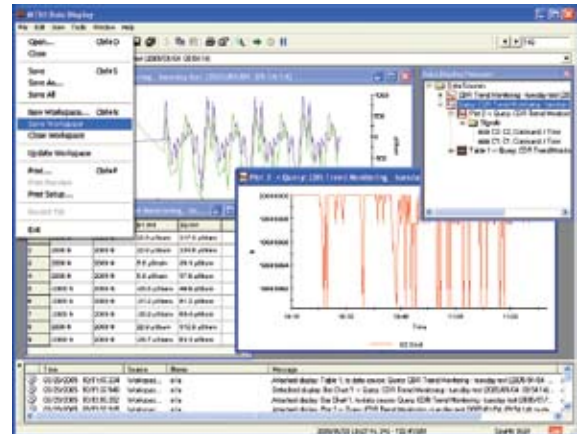


Streamline test setup, simplify the acquisition of high quality test data and accelerate aerospace structural test execution

AeroPro 6.0 software, the latest version of MTS' proven control and data acquisition software for aerospace structural testing, features a host of advanced test-acceleration utilities, new FlexTest® controller compatibility, expanded data acquisition capabilities and an array of tools to streamline the setup and operation of even the most complex structural testing program.

Tightly-Integrated Control & Data Acquisition (DAC)

Like prior AeroPro releases, version 6.0 is the only structural test management tool capable of supporting up to 360 control channels and 10,000 data acquisition channels within a single, tightly integrated user interface. Combining these functions within the same interface eliminates the need to support multiple software applications and enables the real-time display of synchronized



control and data acquisition information – both in the lab and remotely – to put a wealth of test information at users' fingertips.

Test-Accelerating Control Loop Optimization Tools

The release of AeroPro 6.0 software marks the introduction of C3 Performance and Profile Segment Optimization, two test-accelerating additions to an already robust arsenal of control loop optimization tools.

Developed through close collaboration with NRC Canada, C3 Performance is a new cross-coupling compensation utility that can dramatically accelerate complex structural tests without compromising accuracy or introducing additional strains on test articles. In highly coupled actuation schemes, multiple actuators exert different forces on the same portion of a test article simultaneously.

C3 Performance is designed to improve test efficiency and accuracy under such conditions by fully compensating for the influences of all actuators present. C3 Performance also streamlines structural test setup by eliminating the need to input cross-coupling data manually and allowing the use of unit load cases to provide automated coefficient generation.

The screenshot shows the 'Cross Coupling' table in the AeroPro 6.0 software interface. The table lists four actuators (C1, C2, C3, C4) and their respective feedings and cross-coupling coefficients. The coefficients are arranged in a matrix format.

Name	Feeding	Cross Coupling			
		C1	C2	C3	C4
C1	0.00 kgf	2.138	1.707	2.000	1.200
C2	0.00 kgf	1.500	0.400	1.600	0.900
C3	0.00 kgf	2.200	1.200	1.700	0.100
C4	0.00 kgf	0.900	0.600	0.200	1.400

Profile Segment Optimization (PSO)

optimizes flight - or profile - segment times to ensure the fastest possible test execution. This is accomplished by monitoring errors between command and feedback during transitions and adjusting transition times as needed to improve the next play out of the same profile. Not only will PSO increase test speeds where possible, it will also slow down tests where needed to stay within pre-set error limits - allowing tests to run unattended for longer periods. Because PSO is an iterative process, the more often a profile is run the

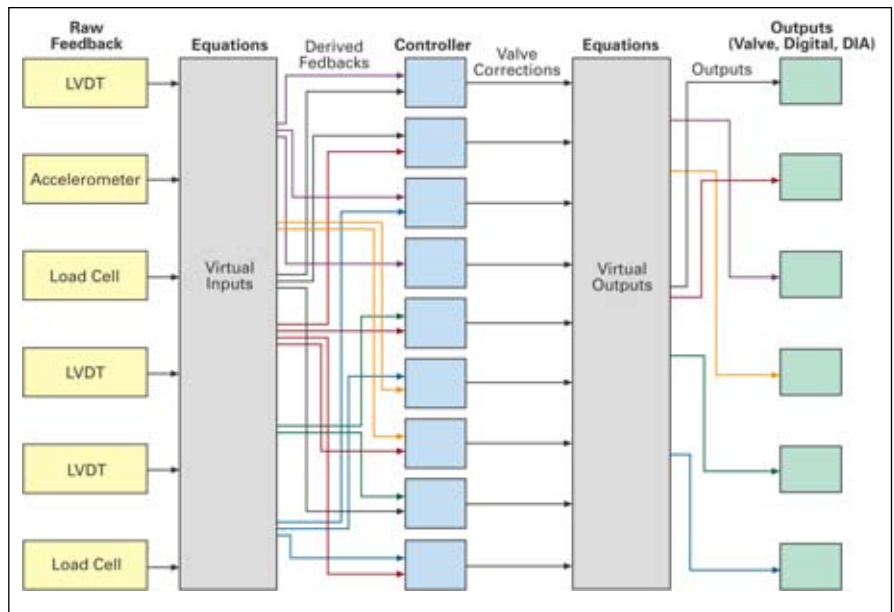
Name	Start of Segment Action	Time	Shape	Load ID	End of Segment Action	Enable	Reference Time
1 Profile Row 1	Load 1	0.50 sec	Sine	1: Load Condition 1	Crane	<input checked="" type="checkbox"/>	2.00 sec
2 Profile Row 2	Crane	0.50 sec	Sine	5: Load Condition 5	Crane	<input checked="" type="checkbox"/>	2.00 sec
3 Profile Row 3	Crane	0.50 sec	Sine	6: Load Condition 6	Crane	<input checked="" type="checkbox"/>	2.00 sec
4 Profile Row 4	Crane	0.50 sec	Sine	7: Load Condition 7	Crane	<input checked="" type="checkbox"/>	2.00 sec
5 Profile Row 5	Crane	0.50 sec	Sine	2: Load Condition 2	Crane	<input checked="" type="checkbox"/>	2.00 sec
6 Profile Row 6	Crane	0.50 sec	Sine	8: Load Condition 8	Crane	<input checked="" type="checkbox"/>	2.00 sec

more streamlined its transition times will become. Additionally, PSO can automatically adjust profile times to correspond with any changes in test hardware.

Calculations in the Loop

AeroPro 6.0 also features powerful Calculations in the Loop functionality, which enables advanced users to introduce sophisticated calculations into the control loop and run them at the system update rate, dramatically expanding their ability to address even the most complex structural test scenarios. Armed with this powerful feature, engineers can orchestrate increasingly complex tests to account for physical realities that could not be addressed in the past. It also allows organizations to implement their own proven methods for speeding up fatigue tests. This level of sophistication and flexibility frees AeroPro users to take their structural tests as far as their ability and imagination allow.

Additional control loop optimization features in version 6.0 include Forward Loop Optimization (FLO) and a connection to external customer defined Dynamic Link Libraries.



Compatible across MTS Controller Platforms

AeroPro 6.0 software is designed to work across three generations of versatile MTS controller platforms. It is fully compatible with several models of the new FlexTest controller family, including the FlexTest 60, FlexTest 100, and FlexTest 200. The FlexTest family is based on a modular architecture that features uniquely field-upgradeable processors. The ability to upgrade the processors makes it easy to enhance the controllers to meet future test requirements and easily accommodate lab expansions and updates. AeroPro 6.0 software continues to support Aero STTM, FlexTest GT, and legacy Aero-90 control systems.



FlexTest 200
40-channel
8 stations
multi-box capable



FlexTest 100
16-channel
8 stations
multi-box capable



FlexTest 60
8-channel
6 stations
standalone

Extensive Data Acquisition Functionality

AeroPro 6.0 software offers the most extensive data acquisition functionality in the industry to accommodate a wide variety of test applications and program budgets.

The software supports an array of leading data acquisition hardware, such as HBM and VXI Technology™, to meet any aerospace structural testing challenge:

AeroPro-MGCplus Platform -

This highly configurable DAC platform provides the flexibility and scalability to easily support small to high channel counts in a proven, high performance hardware platform. It is particularly adaptable, using 8-channel plug-in cards to easily address specific channel counts or sensor types. It also delivers a number of state-of-the-art features, including

automatic lead wire resistance compensation for improved data integrity, the flexibility to address all bridge completion resistance connections, and support for TEDS.

The software also offers a Digital Data Interface (DDI) for integrating digital input from vehicle bus or onboard monitoring sources directly into the data acquisition stream.

AeroPro-EX1629 Platform -

Developed to leverage the full power of AeroPro software, this extremely capable DAC platform is well suited for channel counts up to 10,000, and presents a versatile solution for scaleable applications with its modular 48-channel-design. It delivers a high degree of software configurability, allowing users to create settings on a channel-by-channel basis. It is easily rack mountable, and includes advanced features such as high data resolution, built-in bridge completion, built-in 16 bit digital I/O, advanced calculations within the hardware, and support for Transducer Electronic Data Sheets (TEDS). Newly introduced AeroPro 5.2 software enables the deployment of VXI E1529B and EX1629 hardware in the same test.



AeroPro-EX1629 Platform



AeroPro-MGplus Platform

Streamlined Test Setup

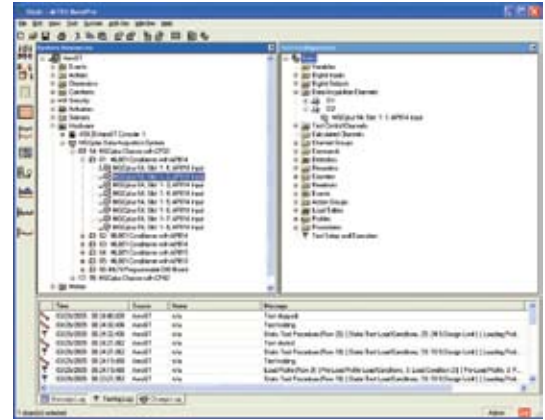
AeroPro 6.0 software features an easy-to-use drag-and-drop interface and intuitive navigation to speed test creation and configuration. The interface is highly customizable, offering multi-level user security and the ability to access test data remotely through a network or other secure connection.

A variety of wizards enable test engineers to easily import existing test profiles, load conditions, calculated channel configurations and historical calibration information.

A database of constants greatly simplifies the development, inputting

and editing of advanced equations, and custom waveform generation capabilities allow users to refine tests to meet the most exacting requirements.

Calibration operations, such as shunt verification, can be performed automatically on any number of channels with the results outputted to easily sorted tables. Users also can group channels and perform tuning operations in tables instead of being forced to tune one channel at a time.



Efficient Test Operation & Data Sharing

AeroPro 6.0 software offers powerful runtime automation features. Custom command scripts allow the execution of system and control panel commands to be triggered by the click of a mouse or automatically by an event that occurs during testing. This capability can also be employed to automatically prompt the display of custom messages, add messages to the test status, or send messages to remote pagers. A laboratory's hydraulic power unit can even be controlled directly from the AeroPro control panel.

Test data analysis is enhanced by the ability to view test status, scan data or continuous run-time data with multiple data types in a single display. Targeted queries can be run across huge amounts of data

to isolate the information that matters most. Users can easily choose from hundreds of channels to display, and quickly organize data in time plots, bar charts, X-Y plots, tabular displays and more. And test results gleaned with AeroPro software can be easily exported into spreadsheets, tab delimited files or XML.



Unrivaled MTS Support and Application Expertise

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