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Project Profile – Airport Runway Testing

Overview

"Airport pavement design today is very much the result of extrapolating empirical methods of highway engineering origins, some 50 years old. Over 20 years ago, limited full-scale tests were conducted to adapt these methods to accommodate heavier, more complex aircraft. The basic underlying theoretical foundations, although adequate at the time, do not offer a satisfactory method to systematically address the new configurations and high aircraft loads of tomorrow's aircraft; continued use could very well lead to unnecessarily thick pavements. The introduction of the Boeing 777 aircraft in 1995 and the planned introduction of a new generation of heavy civil transport aircraft by manufacturers from both sides of the Atlantic has necessitated a need to develop new pavement design procedures based on sound theoretical principles and with models verified from full-scale test data."

- Excerpt from the FAA William J. Hughes Technical Center newsletter.

As a means to this end, on April 18, 1996 the US Government awarded a contract to DMJM/Cornell Joint Venture of Virginia to design and build the U.S. National Airport Pavement Test Facility at the William J. Hughes Technical Center.

Essentially the facility consists of a load frame (pictured at right) to simulate aircraft landing wheel assemblies, a section of test pavement 900 feet long and 60 feet wide, and instrumentation to monitor dynamic and static conditions during the test sequences.



Construction Technologies Laboratories (CTL) was awarded the contract to design, install and operate the 1000+ sensor primary pavement research instrumentation network. This included storage and communication hardware/software integration and coordinating with construction of the test pavement.

What We Did

Canary Systems was awarded the contract by CTL to supply the static instrumentation data acquisition system hardware and software. The static instrumentation consists of Soil Moisture Gages to monitor moisture content of the subgrade materials, Temperature Gages to monitor the temperature of the concrete and crackmeters to monitor the breakdown of the concrete during the course of testing, all together over 130 instruments.

A MultiLogger System was supplied with (5) 32-channel MultiMux's to accommodate up to 160 channels of instrumentation. Some of the key features of the hardware supplied greatly simplified the installation of the instrumentation monitoring system. For example, the MultiMux's were supplied with DaisyMux capability where a single 5 pair cable could be used to interconnect all the multiplexers. This saved on cable and installation cost because a single cable ran the 900 foot length of the test pavement section. Also, the system included the MultiSensor Interface from Canary Systems so each channel is configured under software control for the type of instrument connected. This avoided the usual requirement to dedicate each multiplexer to a particular type of instrument. Each multiplexer could accommodate any combination of the 3 basic instrument types used.

MultiLogger software from Canary Systems was also supplied with the system to make configuration, monitoring and data collection simple, even for the novice user.

Who to Contact

Regarding the instrumentation program:

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Regarding the National Airport Pavement Test Facility:

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