# Modicon 984 PLCs provide control for space shuttle crawler/transporter.

**Aerospace**

**United States**

What moves at 1 m.p.h. and weighs 3000 tons? No, not the world's largest PLC. However, a Modicon 984 PLC plays a big part in moving the space shuttle from its hangar and refurbishment area to the launch pads at the Kennedy Space Center.

Moving at 1 m.p.h. and weighing 3000 tons each, the two shuttle crawler/transporters at the Kennedy Space Center are the largest land vehicles ever built. The two delivery vehicles were recently refitted with new control systems featuring Modicon 984 controllers.

*The space shuttle inches toward launch pad 39B.*

A major benefit of the new PLCs are their ability to force a function should a sensor fail and the crawler/transporter stop. The hydraulic steering system of the crawler/transporter has 16 isolation valves that must open within 1/2 second of each other. If one of the valves failed to open in time, or to open fully, the crawler would automatically shut down and remain immobilized until the source of the fault was identified and corrected.

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*The space shuttle in its hangar.*

*The shuttle on the crawler/transporter.*

*Liftoff!*

The original control systems for the units were based on traditional relay logic and were replaced by early PLCs in the mid-seventies. By the early 1980s PLC failures were adversely affecting shuttle processing operations and Lockeed Space Operations was given the contract to replace the control systems on the crawler/transporters. The Modicon 984 was chosen for its compact design to minimize the potential for vibration failure and to reduce space requirements.

Since the installation of the Modicon 984 PLCs, whenever failures of the crawler/ transporter occur, operators know exactly what failed and where it is located. Maintenance is also simplified with display screens and logic that automatically reconfigure the system to a maintenance mode with a few keyboard strokes. Afterward thew system is easily switched back to run mode.

Currently, analog functions are being added, along with additional engine room instrumentation. Lockeed is also considering distributed PLC functions by installing a Modbus Plus LAN and adding small PLCs in the engine room and other areas for gathering data and performing additional logic tasks.

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