First implementation of the Advanced Transportation Controller (ATC) Standard Debuts in Houston

Could Lead to More Technology at the Street Corner

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Harris County, Texas -- which includes the greater Houston area -- is the first site to deploy both controllers and cabinets that comply with the long-awaited (but still preliminary) ATC standard. This emerging standard -- the ATC 2070 controller standard is now under ballot by NEMA, ITE, and AASHTO -- could make the deployment of advanced traffic control technologies, such as real-time, traffic-adaptive systems -- more feasible for routine use on major city streets and arterials.

The ATC standard involves three separate and interrelated components, the traffic controller itself, the cabinet, and the application programmer interface (API). (Refer to the white paper, **Advanced Transportation Controller Standards Overview**, and the **ITE's ATC web page**, for more information.) A fully functional prototype ATC system was displayed for the first time at the recent ITS America Annual Meeting in Miami Beach, FL, and Harris County has already installed over 20 of these cabinets in the greater Houston area.

Figure 1: Paul Olson, P.E. (FHWA), Jack Whaley, P.E. (Director, Houston TranStar), and Raj Ghaman, P.E. (FHWA) show off the new ATC cabinet at ITSA2001.

The prototype ATC system on display at ITSA2001 was controlling a diamond interchange and an adjacent 8-phase arterial. "That's really hot," says Paul Olson, an ITS Engineer for the FHWA's Western Resource Center, and author of the ATC white paper. "Before [an ATC controller system became available], we needed to have three separate traffic controllers and cabinets, all running on a fixed cycle length all day, every day. So it was a very inefficient operation in periods of very low traffic volume."

Olson says that a number of urban areas are planning to install ATC equipment in addition to Houston, including Las Vegas, Los Angeles, San Francisco, and Portland, OR. "We're going to get a whole lot of competition," he says, adding "hopefully not so much competition that we drive the competitors out of business, but more competition than we've had in the past. It's going to lead to additional innovation than we've seen in the past, more competitive pricing, and it's going to be a good deal for a lot of consumers, because they'll be able to buy from more vendors and not have the stock issues they've faced in the past."

The initial standard for the ATC 2070 controller requires that all vendors use the same communication ports, use interchangeable modems, and run the OS/9 operating system. The initial ATC 2070 standard also requires a specific processor (Motorola 68360), however the final ATC controller specification will allow for different processors. According to the FHWA's Olson, the following version of the ATC standard -- tentatively expected by the end of 2002 -- will be a "more functional standard" and thus will allow more implementation flexibility and the freedom to use different operating systems.

Raj Ghaman, P.E., Travel Management Team Leader for the FHWA's Office of Operations R&D in McLean, VA, sees the emergence of ATC-compatible traffic control equipment as an important enabler for newer and better control technologies. "Today, to implement ITS technologies like closed-circuit TV cameras, highway advisory radio, and changeable message signs, you require a controller cabinet and controller for each device, which doesn't make sense. You generally don't have the real estate at each street corner to implement everything you want," Ghaman says. "This is the first cabinet that allows you to put multiple, competing types of devices in the same cabinet."

The ATC cabinet sports several major improvements over previous 2070 and NEMA cabinets, Ghaman says. With traditional cabinets, devices are interconnected via wires. The back panel of the new ATC cabinet uses new "serial interface units" that eliminate interconnecting wires between components (e.g., controllers, load switches, detectors) and enable remote "health monitoring" of the system possible.

Figure 2: Loose wires are conspicuously absent in this rear view of the new ATC cabinet.

The ATC controller contains slots to accommodate different "daughterboards," each of which can hold its own processor, memory, battery backup, and communications chips. Those daughterboards allow users to incrementally add new capabilities to their controllers as they become available and funds permit. Those daughterboards will be interchangeable between ATC controller manufacturers -- competing products will use the same processor and memory, and have identical pinouts.

Ghaman adds that these emerging ATC systems facilitate the deployment of traffic-adaptive control systems that can adjust traffic signal timing on-the-fly as changes in traffic volumes warrant. (See the ICDN's September 2000 interview with Ghaman, **Exploring Adaptive Control Software**, for background information.) "When we developed RT-TRACS [which stands for 'Real-Time Traffic-Adaptive

Control System'), we used 2070 controllers because it has slots for multiple CPUs, and our RT-TRACS software and kernel reside on one of those CPUs. This allows you to run both adaptive RT-TRACS and signal control on the same controller, which is a very cost-efficient way to go. Adaptive control software would definitely be one of the functions that this ATC cabinet and controller can support."

Paul Olson can be reached at 415-744-2659, Paul.Olson@fhwa.dot.gov
Raj Ghaman can be reached at 202-493-3270, raj.ghaman@fhwa.dot.gov

- Jerry Werner