

Involving Users in the Design of New ITS Systems (excerpts)

Jerry Werner, ITS Cooperative Deployment Network in Discussion with Barry Drogin, MTA Bridges and Tunnels

ICDN: How does ATM IDEAS differ from TransGuide or other "conventional" highway Traffic Management Centers (TMCs)?

Drogin: The primary difference has to do with our star structure; each of our bridges and tunnels is operated by a local traffic operations center (TOC) connected to an Operations Control and Communications Center (OCCC) on Randall's Island. I like to refer to the OCCC as a virtual TMC because it doesn't directly control or run the facilities. The OCCC has more of a regional view.

ICDN: How does ATM IDEAS fit in with the existing TOCs and the virtual control center concept?

Drogin: The ATM IDEAS system is integrating both our old systems and our new systems into a new core. We have decided which systems we will integrate, and which systems we will obsolete, phase out, replace, upgrade, and integrate later.

ICDN: How did you make sure that the new interface would be supportive of the many current tasks that take place in the TOCs?

Drogin: We performed a task analysis based on 24-hour observations of the desk areas of a representative bridge and tunnel. The contractor created process charts, multi-sheet spreadsheets detailing everything observed. This was summarized into statistical data about all of the tasks that take place in our TOCs.

ICDN: One purpose of this analysis was to make sure that the new system would support existing tasks. Were there other purposes?

Drogin: A second purpose was interior design. It's different from designing a traffic management center where nothing happens but traffic management. We are designing a system to be deployed into a space where other very important activities occur.

ICDN: I understand that you're using what's called "rapid prototyping" to help devise your user interfaces for this project.

Drogin: We are developing web browser-based software and simulated the primary interface into the system prior to actually connecting to real field devices. We simulate the web pages and ask "What does somebody click on, where do they go, how do they get from here to there?" We can see whether users are confused and clicking in the wrong places.

ICDN: Working with the eventual users in the design phase will gain you a lot more "buy-in" when it's time for deployment, right?

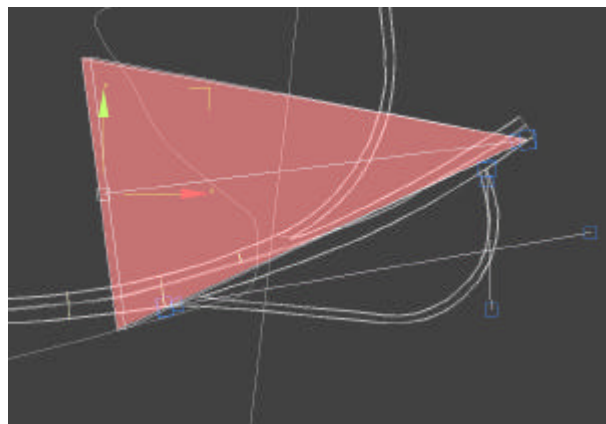
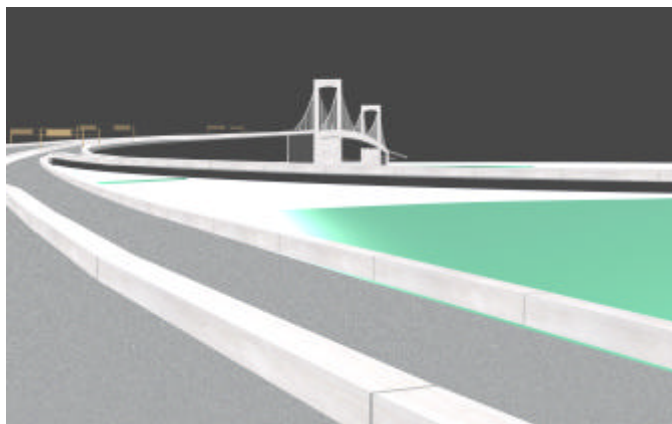
Drogin: It's critically important that users not feel that someone is throwing a system over the wall at them, that it meet their needs and can be integrated into their operations.

ICDN: How did that insight come to you, because a lot of engineers don't operate that way?

Drogin: There has been an evolution of thinking for business in general about wanting to be "customer-driven." If you are designing a product, engineers might come up with features and then get marketing feedback at a focus group. In our case, you're talking about a one-on-one relationship with the users.

ICDN: I understand that you're using a different and quite novel "visualization" approach to get early user feedback on a different project to install new CCTV cameras on a number of your facilities. Tell me about that.

Drogin: That project is underway simultaneous to the ATM IDEAS project. To listen to and please the users -- and also avoid mistakes -- we required the designer to do a 3-D visualization of all of our facilities. We plan to deploy VMS signs, and we wanted to make sure we didn't do something embarrassing like not realizing that a new VMS sign we were planning to put in obstructed our view of some other roadway. So we could try different camera placements to identify the best camera locations.



The Throgs Neck Bridge. a) 3D visualization from new camera. b) Software control of camera orientation and zoom.

As part of the design process, we showed the General Managers visualizations of what the cameras would see. Many were views from new poles, views they had never seen before. Rather than show them a plan and say, "There's a camera here that looks up this way"; they were able to see the views, and we could pan, tilt, and zoom the "cameras." They would ask, "From that camera, can you also see over here?" and we would swing it over and say, "Yes, you can see there" or "Another camera over there can see that view."

ICDN: Will you tie the new cameras into the graphical user interface you're developing for the ATM IDEAS project?

Drogin: ATM IDEAS is a 2-screen environment, and one of the screens has a quad of 4 videos. Currently we primarily have fixed traffic cameras, and 2 pan-tilt-zoom (PTZ) cameras at any facility coming into a single joystick. We found that with PTZ, you can double the amount of coverage you get at resolution, so we are deploying a lot more PTZ cameras. We are integrating them in with a common controller and we're bringing that into not only the desk area but into other offices and remote locations as well. So the distribution of the video and control of the new pan-tilt-zoom cameras are being done by the ATM IDEAS project.