

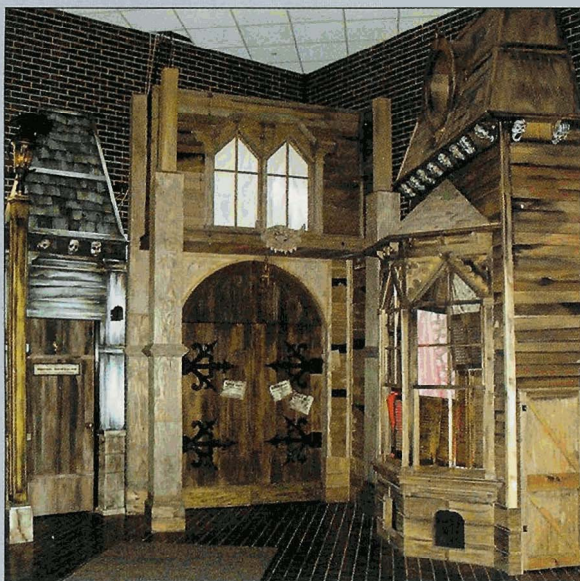
A High-tech Haunted Hotel

Assembling a state-of-the-art system in a college environment

by John Huntington



Having an audience run screaming from the theatre is generally not a good thing. However, at the Gravesend Inn, this was the goal! This high-tech haunted-hotel attraction had its fifth annual showing in October, 2004 in the theatre of the entertainment technology department of New York City College of Technology (City Tech). Over three days, more than 1,200 people enjoyed the attraction, which was sponsored by the campus producing group Theatreworks. This collaborative project gives students the opportunity to work on a state-of-the-art, theme park-level attraction, different only in that it was built using some standard theatre techniques instead of concrete and conduit. The project is also a legitimate excuse to use just about every piece of high-tech gear we own, and, each year, we continually refine successful parts of the attraction, and incorporate new areas, while pushing the state of the art as much as our budget will allow.



At the Gravesend Inn this year, the audience controlled the show, although, if we did our jobs well, few, if any, spectators would know. A number of sensors were located throughout the attraction, and audience members were free to move at their own pace. A Mediaion Manager show-control system (which I designed and programmed) monitored the audience positions, and each zone of the attraction was interactively triggered as a small group of spectators entered. Each area was totally independent, so the system was completely asynchronous (there was no shared time reference). This was a prime example of a show that simply would not be possible without show-control technologies—even with free student labor, there was no likely way a dozen or so operators could (or would want to) do the tedious job that Manager did: waiting for audience members to enter an area, then reliably triggering an intricate sequence of cues over the eight or so hours the attraction was open each day.

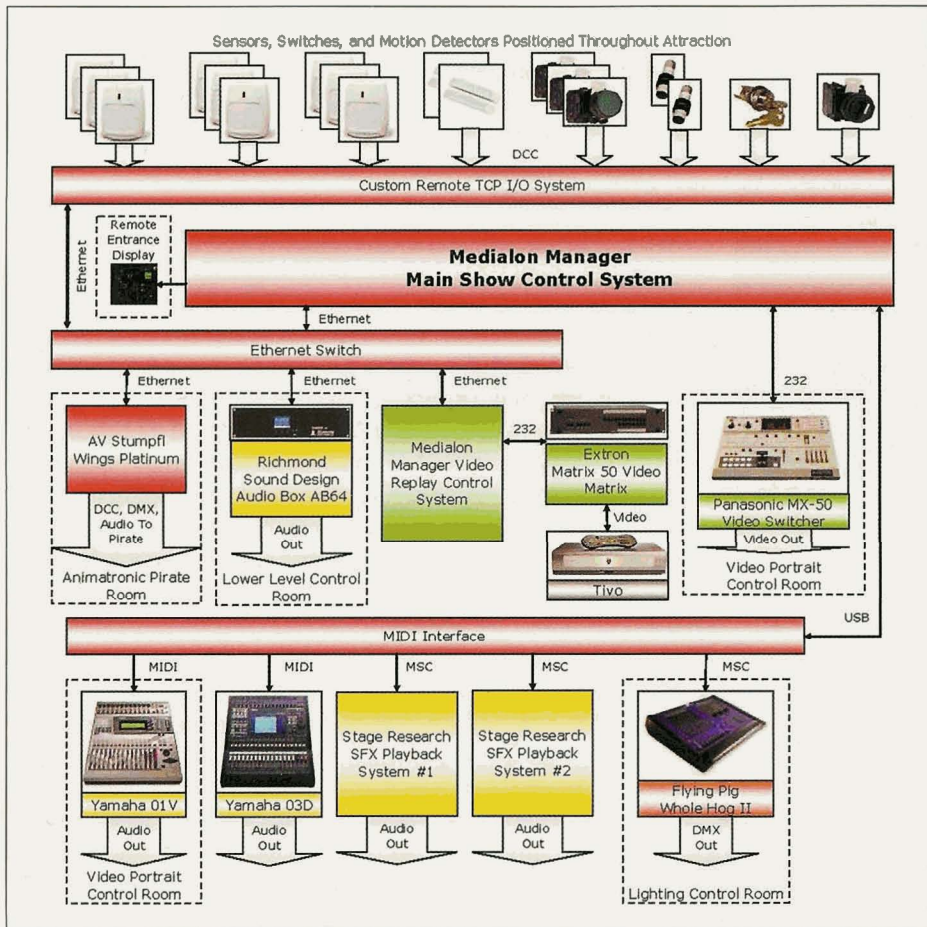


ALL PHOTOS: CHIP SCOTT

Top: Visitors to the Gravesend Inn met up with an animatronic pirate. Center: The exterior of the attraction. Bottom: Visitors who completed the trip through the Gravesend Inn watching others on infra-red surveillance cameras.

The show

Spectators queued up in the lobby, then entered the attraction down a dark stairway themed as a graveyard, where they were greeted with thunder and lightning (some younger audience members didn't make it past these first effects). At the bottom of the stairs, a performer welcomed guests to a room where an animatronic pirate told the wretched story of the fictional hotel's history. Next, they viewed a haunted bathroom, then proceeded down a hallway where a gust of wind blew out the lights. They were next greeted by the bellman of the hotel, then entered a haunted bedroom. Leaving there, they encountered an upside-down room, then a dumbwaiter accident, and a coffin containing a vampire. Next in the maze were two animatronic characters telling a brief story (there were three stories, so the experience was different each time spectators went through). Audience members were then



The heart of the control system was a Medialon Manager show-control system, designed and programmed by Huntington.

surprised by a portrait that came to life (a performer on live remote video); next, they exited the maze only to discover that they were actually walking on the stage of the theatre, and that others have been watching them on infra-red surveillance cameras throughout their trip! They were even more surprised to see themselves on the big screen, as this year we added instant replay.

While this has always been a highly collaborative project, with many contributions from students, staff and faculty, the overall theme of the Gravesend Inn was developed by production designer/director Norma Chartoff and producer/artistic director Charles Scott. This year, new faculty technical director Chris Higgins oversaw the complete renovation and rebuilding of all scenery and added some additional pieces to the lobby display.

The components—lighting, audio, video

Due to the independent and asynchronous nature of the show, a typical theatrical lighting console with one or two faders would not work for this attraction. Lighting designer John Robinson, who oversees the electronic labs for the entertainment technology department, chose the Flying Pig Systems Wholehog II from City Tech's array of consoles. Each area of the attraction ran on its own fader, and cues were fired by the show-control system via MIDI show control (MSC), with each individual fader responding to a particular MSC cue list. Robinson's design, which covered thousands of square feet over three levels, used over 100 conventional fixtures, High End Dataflash strobes, and more than a dozen moving lights, including ten Martin Professional MiniMAC profile units, two High End Systems Studio Spot



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Howard Ungerleider
Lighting Designer—Rush

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— Howard Ungerleider

HIGH END SYSTEMS



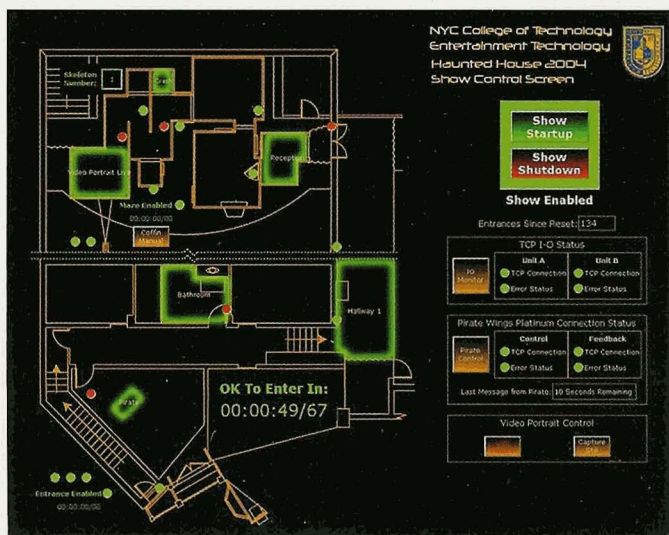
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250s, and one High End Technobeam.

Graduating senior Josh Flower designed a large and sophisticated audio system for the attraction, featuring over 25 speaker systems from Meyer, EAW, and other manufacturers spread over more than a dozen separate zones. Due to the number of discrete outputs and simultaneous, asynchronous playback sequences required, Flower chose to divide the audio playback over three systems. Two Stage Research SFX systems

The system could be started or shut down with a single mouse click; the screen provided real-time audience-position and system-status monitoring.

output the audio cues on the upper levels of the attraction, while for the lower levels, a stand-alone AB64 AudioBox system, generously donated to City Tech by Richmond Sound Design, provided complete effects playback, output, and routing. Each area of the attraction was allocated one or more cue lists on one of the three playback systems, and these lists were triggered using MSC from show control. Music throughout the attraction was composed by faculty member Dr. David B. Smith.

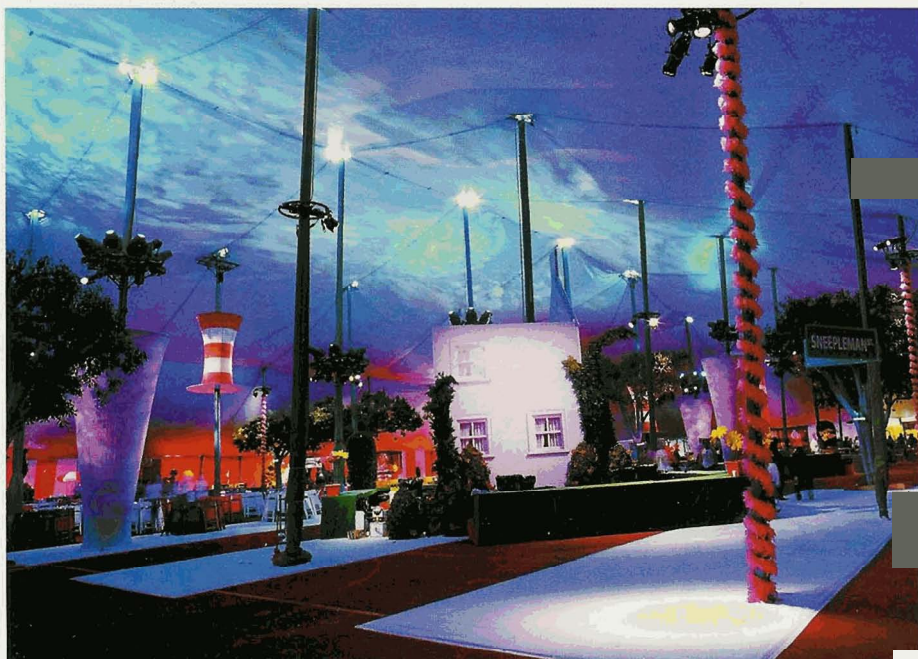
Graduating senior Lisa Yamakawa redesigned the video systems for this year, and added instant replay for the surveillance systems. We used a low-cost Tivo consumer digital-video recorder in an easy-to-use configuration operated by a student replay operator. A local Medialon Manager system allowed the operator to select which surveillance camera to input to the Tivo; alternatively, the student could select a composite image of all the cameras. An Extron Matrix 50 switcher, generously provided by Scharff/Weisberg, switched video into the Tivo, while a Yamaha 03D (which was actually part of the main sound system) routed corresponding local microphone audio into the Tivo. The local Manager system also allowed the operator to select either live mode (direct composite image output of all the cameras to the projector in the theatre) or replay, which took the output of the Tivo to the main screen, and then set the 03D into a mode to

route Tivo audio playback into the audience area. Robinson also added a moving-light flourish to this cue to indicate to the audience what was live and what was replay. Using the Tivo remote and the mouse, student operators eventually became expert instant-replay operators.

The pirate room was designed to operate in a completely stand-alone way, since it also operates as an animatronic lab for the students throughout the year. A Wings Platinum system, generously provided by AV Stumpf, output all the audio for this room, controlled the pirate's electro-pneumatic valves, and output DMX to the moving and conventional lighting fixtures in the room. Wings was triggered via TCP/IP messages from Manager, which was programmed to actuate when the motion detector in the room was triggered. Wings also sent active status messages back up to Manager over the network.

Putting it all together with show control

The heart of the control system was a Medialon Manager show-control system which I designed and programmed [see illustration, page 67]. A variety of sensor types were used, depending on the application. Alarm system motion detectors were used in most rooms to detect the presence or absence of spectators. Where more precise interaction with the show-control system was



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needed, photoelectric sensors were used. Most of the performers also ran their own lighting, sound, and video cue sequences through a number of hidden controls, and crew members could pass through without triggering areas through the use of hidden local lockouts.

This year, I started the process of shifting everything to Ethernet connectivity wherever possible, and all the sensor inputs to the Manager system came into the system via some inexpensive Modbus TCP-controllable industrial I/O systems, built into a custom configuration that I designed and the students built.

Because the attraction is disassembled and reassembled every year, these systems are based on a modular wiring scheme I developed using Cat-5 cable and RF-45 connectors. With this approach, nearly any type of contact closure-based sensor, switch, or other device that can operate on 12VDC power can simply be plugged in, replaced, or changed as needed. I wrote some code for Manager to poll these TCP I/O boxes, and this information was reported into Manager as a variable.

The whole system could be started up or shut down with a single mouse click (see illustration, page 68) or key switch actuation by the house manager. Once the system was started, no show-control operator was needed, but audio/video/control and lighting technicians were on hand whenever the attraction was operating in case of a system malfunction.

With people waiting up to an hour in line to go through a short attraction, audience throughput was, of course, a big concern. This year, I implemented a flexible system to minimize the time between groups. To tell the entrance greeter when to let spectators in, the program turned on a practical porch light in the lobby scenery through the Hog. When spectators entered, the program sensed that the door opened, and the program turned the entrance light off. The entrance program then entered a holding pattern of indeterminate duration, since we didn't know how long the spectators would take to go down the stairs (some went quickly, others turned around and ran out the front door!). Once the group entered the pirate room, triggering the Wings Platinum system through Manager, a one-minute countdown started for the next group to enter. At the end of the countdown, the

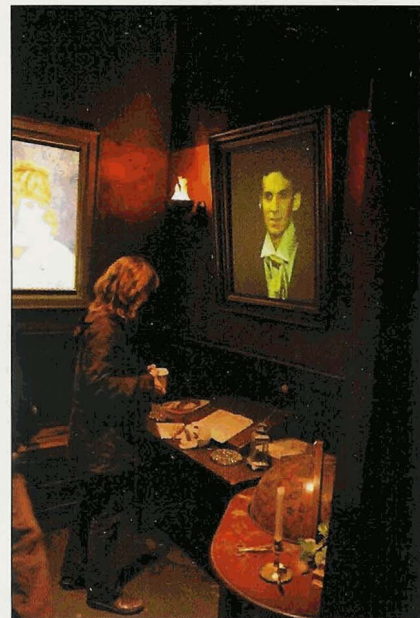
porch light was turned on, the first group left the pirate area, and the new group started down the stairwell. If audience members exited, left, or bypassed the pirate, a two-minute countdown clock ensured that the system would reset properly.

Throughout the rest of the attraction, control was generally centralized through the Manager, Hog, SFX, and AudioBox systems. Each area essentially was a mini-show that was performed only when spectators entered a particular area (when no spectators were present, nothing except background sound and preset lighting would operate). Each area also had a timed lockout, to ensure that multiple people in a single group didn't retrigger the show in each area multiple times.

While almost every performer in the attraction interacted with the show-control system in some way, the most sophisticated interaction was the video portrait performer. When each actor's shift started, he would take a still "picture" by pressing a button which, through Manager and a serial command, captured a still frame in the Panasonic MX50 video switcher. The actor then watched the audience members on video cameras and listened on a hidden earpiece; when their victims entered the portrait gallery, the actor pressed a footswitch (also connected to Manager), which put the video switcher into live mode. This mode routed the performer's image to the projector, and also sent a MIDI message to the Yamaha 01V console for that area, bringing his mic live into the video portrait room.

Each year of the Gravesend Inn's existence, the crowds have been growing, as has the sophistication of the attraction. This high-tech project has become one of the cornerstones of our entertainment technology program, giving students design, technical, and production opportunities they wouldn't get through any traditional theatrical show, and offering the faculty and staff challenges not found in any theatre training program. We will be reprising, improving, and updating the system for Halloween 2005, so be sure to stop by or even get involved backstage! 📶

John Huntington is an associate professor at City Tech, teaches show control at the Yale School of Drama, and consults through his company Zircon Designs. He can be contacted through www.zircondesigns.com



Gravesend Inn Haunted Hotel

Producer/Artistic Director:
Charles Scott

Production Designer/ Director:
Norma Chartoff

Technical Director:
Chris Higgins

Lighting Designer:
John Robinson

Costume Designer:
Alex Bartlett

Makeup Designer:
Mark Manalsman

Sound Designer:
Josh Flower

Video Designer:
Lisa Yamakawa

Show Control System
Designer:
John Huntington

Assistant Technical Director:
Hilary Downesvogel

Master Carpenter:
John Tamerlani

Audio/Video/Control System
Master: Sebastian Bentivegna

Master Electrician
Shawna Cathey