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# A Whole New Audio World

By: Alan Hardiman

## Sound Design for Disney's *Aladdin*



Above: The Cave of Wonders. Masque Sound supplied *Aladdin*'s sound gear.

*Aladdin*, the new musical produced by Disney Theatricals, has taken Broadway by storm. The stage version of the popular animated film won rave reviews for its inventive staging by Casey Nicholaw, the Tony-Award winning performance (as Aladdin's genie) by James Monroe Iglehart, and the lavish design (scenery by Bob Crowley and lighting by Natasha Katz).

Ken Travis' sound design for *Aladdin* is based on a source-oriented reinforcement approach, encompassing 40 wireless mic channels, distributed through a Studer Vista 5 console via 192 matrixed TiMax output channels to some 200 d&b audiotechnik loudspeakers arrayed throughout the theatre.

"On this show, I had more toys than usual," Travis says. "Disney really wanted a cinematic sound design, a big immersive experience like you'd get on a Disney ride, but they didn't want it to be distracting. So they gave me everything I asked for in order to achieve that. A sound mixer who worked on the film version of *Aladdin* sat with us one day and said, 'I know how I would do this on a film, but how the heck are you doing it live?'"

The system design enabled Travis to create new sound design elements that in the past were unattainable. "A good example is the spooky voice in the lair of Jafar [the show's villain]," says Travis. "We wanted the voice to be kind of creepy without making the audience aware that the sound was being manipulated to come from any particular direction. We just wanted to keep the voice moving and floating around your head. Then when he gets angry, it seems to come up from under

your feet when the subwoofers start shaking the floor, and the voice image goes right to the center cluster.

“By contrast, when Aladdin sings the intimate song, ‘Proud of Your Boy,’ they wanted it to be all about him, so the sound has to image exactly to him. But a couple of scenes later, when we go to ‘A Friend Like Me’ [the wildly extravagant Act One closer] with the Genie, it suddenly has to become very big throughout the theatre, with every big and whistle you could ask for.”

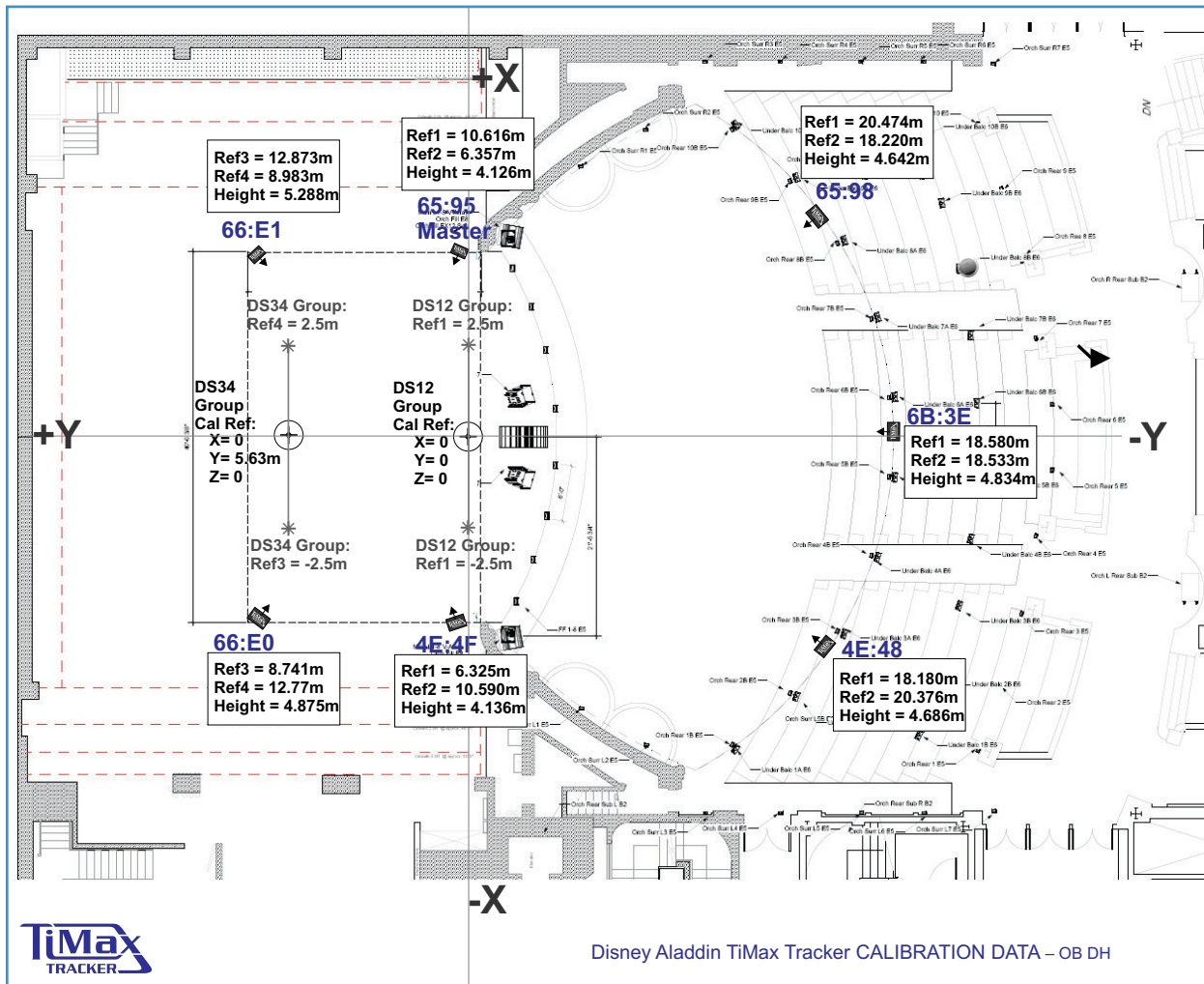
In one of the show’s most magical sequences, Aladdin and Princess Jasmine, his love interest, take a ride on a magic carpet. “When Aladdin and Jasmine rise up in the air on the carpet, if you close your eyes, the audio

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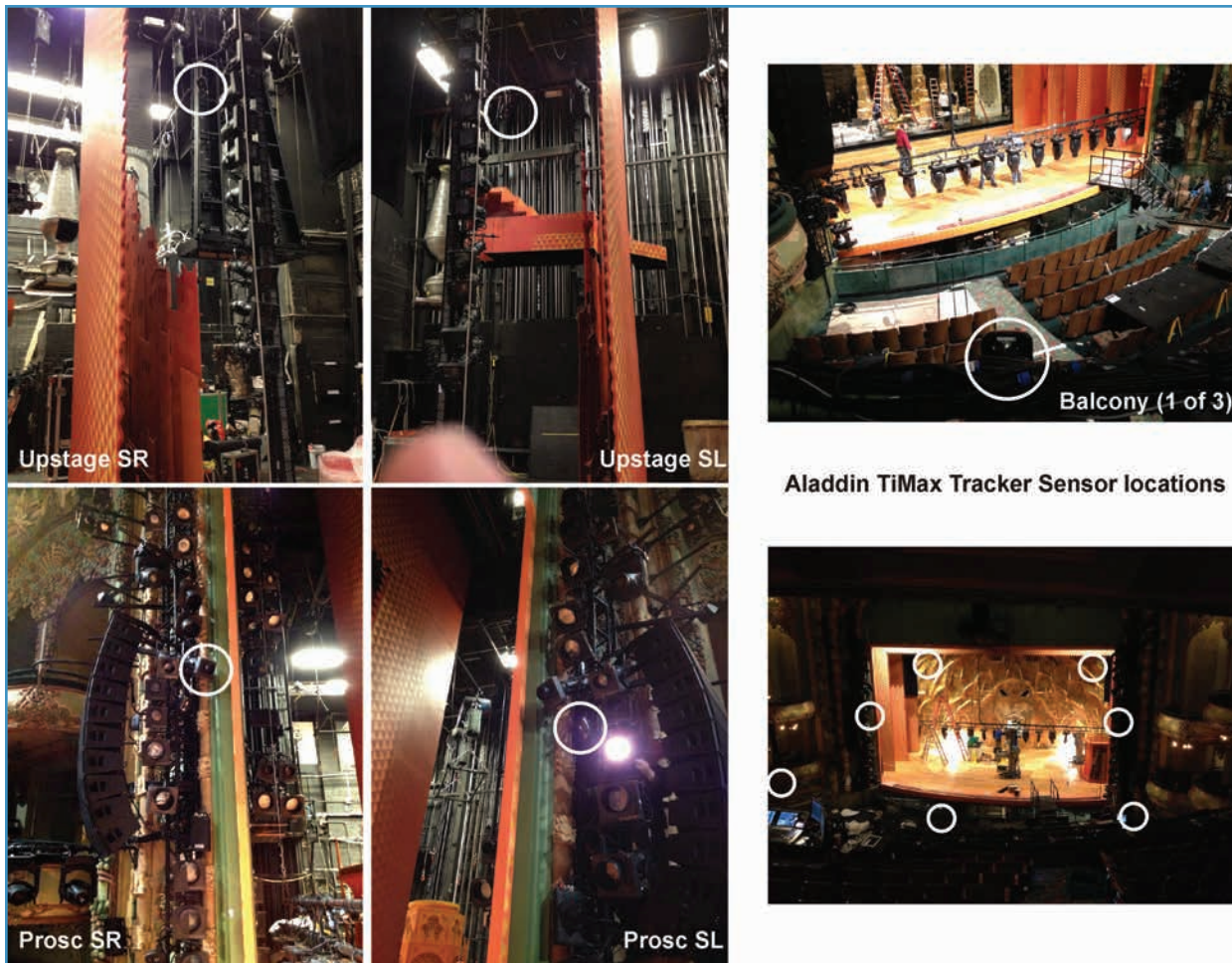
— Travis

goes right up with it,” Travis says. “We sat with the actors when they got to watch it, and even they were like, ‘Wow! The voices are coming right from the actors’ mouths!

“What we like about the system is that it never calls attention to itself, but it adds a ton. And we’re doing it on all three levels—the orchestra, mezzanine, and balcony all have the same



This map shows the layout of TiMax Tracker sensors.



Aladdin TiMax Tracker Sensor locations

These photos show the seven PoE Tracker radar sensors in the New Amsterdam Theatre.

system, so everyone gets the same show,” he says.

The key to both the pinpoint localization and immersive surround is the

manipulation of image definitions created in the three 64 x 64 TiMax Soundhubs, each image definition being a unique set of levels and delays

**“Because Travis’ sound design involves very robust low-frequency effects, such as the 20Hz rumble that accompanies the ceiling collapse in the Cave of Wonders, he conducted a seismic test prior to the show’s opening. ‘We broke three chandeliers with the subs during the tryout in Toronto, and we didn’t want to do that again in The New Amsterdam Theatre with its amazing plaster work. So we ramped the levels up over a few days and then had it tested, and we got the OK. Nobody wants the ceiling to collapse.’”**

from each individual microphone or effects input to each loudspeaker channel. As actors move from one of 14 pre-defined stage zones to another in any direction—left-right, front-back, up-down—the preset image definitions morph seamlessly from one to another automatically in real time, following data input from the TiMax Tracker system. Unobtrusive 1"-square radar tags worn by performers are tracked via time of arrival and angle of arrival by seven distributed PoE sensors, yielding positional information accurate to within 6" in any dimension. The Tracker information is input to the Soundhubs as a MIDI data stream, triggering each input’s image definition and the gradual transitions from one definition to another as each performer

moves around the stage.

Similarly, immersive and localized sound effects replayed from QLab are spatialized and steered via MIDI data from QLab that triggers dynamic delay-based pans preprogrammed using the TiMax PanSpace graphical object-based pan programming screen, which allows the designer to drag input icons around a set of image definitions superimposed on a .jpg image of the stage and theatre.

“Every single loudspeaker array and box in the house is time- and volume-curved for each zone,” Travis explains. “When performers travel from extreme right to extreme left, there’s about a 3dB level difference, but the time shifts 14ms. As they move vertically, up on the carpet for example, we’re subtracting time to the center cluster.”

Such small differences in the timing of delays from each zone to each loudspeaker permit each audience member to localize the performer accurately, no matter where he or she is seated, in contrast to conventional amplitude-based panning, which works well only for those seated near the center line of the theatre. This aids in maintaining realism and clarity, and eliminating audience stress, which can be caused by trying to figure out who is speaking or singing.

The loudspeaker system includes more than 200 d&b audiotechnik cabinets. The front left and right arrays are each comprised of eight d&b V8 cabinets, while the center cluster includes six V8s and four V12s. Low-frequency effects are handled by six V-Subs, arrayed horizontally on the trusses, and two J-Infra subs. Eight E5 light-weight two-way cabinets and two E12X compact subs handle front-fill duties. Proscenium side-fills are provided via a single E8 on each side.

Sound is distributed throughout the three seating levels via 105 E5s and 42 E6s. The balcony is reinforced by a supplementary left-center-right system comprised of three full-range Q7s, while the orchestra has a pair of dedi-

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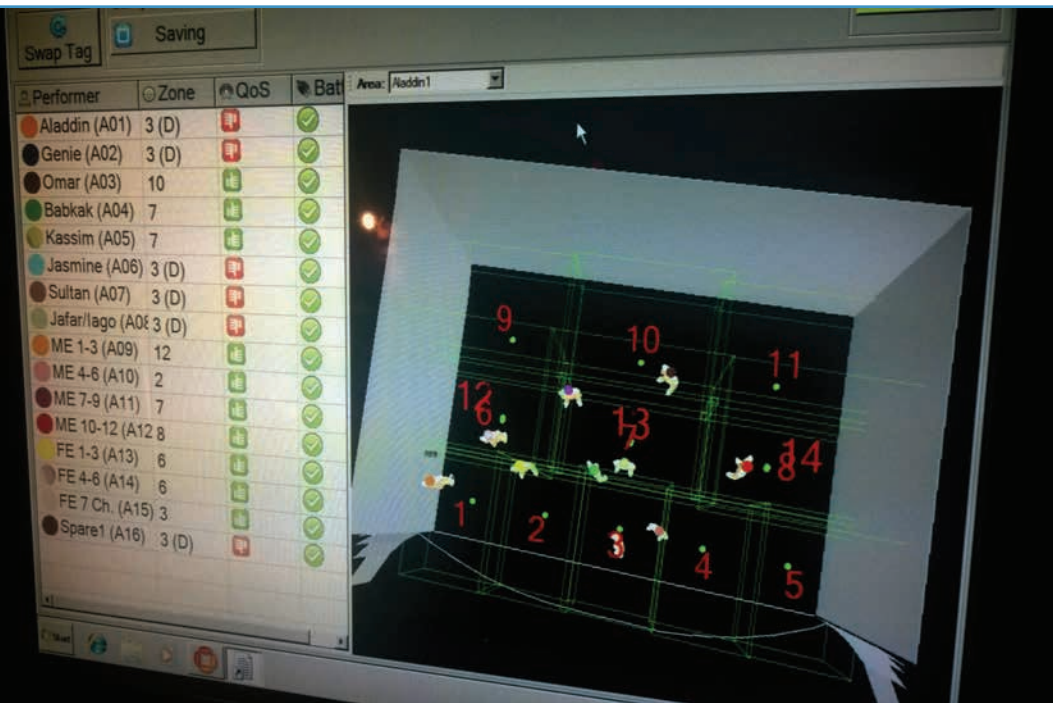
cated Ci7-TOP horn-loaded cabinets arrayed center-left and center-right.

Foldback to the performers is distributed around the stage through 12 E8s,

three E5s, and a pair of E12X subs. Power to the system is provided by 80 D6 and 20 D12 amplifiers.

Because Travis' sound design involves very robust low-frequency effects, such as the 20Hz rumble that accompanies the ceiling collapse in the Cave of Wonders (where Aladdin meets the Genie), he conducted a seismic test prior to the show's opening. "We broke three chandeliers with the subs during the tryout in Toronto, and we didn't want to do that again in The New Amsterdam Theatre with its amazing plaster work. So we ramped the levels up over a few days and then had it tested, and we got the OK. Nobody wants the ceiling to collapse."

"I love the way d&b voice their boxes—you really don't have to EQ it. There's one EQ cut of about 2dB on the arrays at around 250Hz to take care of the room, and one delay adjustment to align the sub array. Other than that, all the delays and EQs are done with TiMax," he says. Every



A plan view of the 14 stage zones on the TiMax Tracker programming screen.

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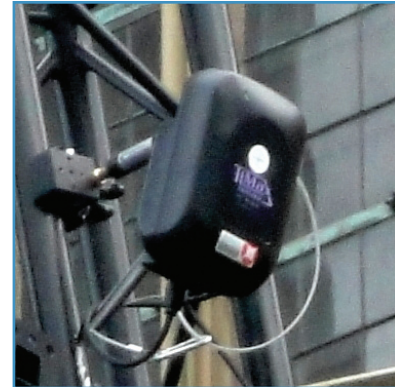
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TiMax Soundhub input features four-band parametric EQ, and beyond the level and delay adjustments provided to set image definitions in the matrix, there is a further control layer of level, delay, and eight-band parametric EQ on each of the 192 TiMax output channels.

Several noteworthy elements in Travis' approach to miking performers arose from the sheer number of costume changes and the proliferation of turbans worn by the cast. "In one scene alone, there are more than 70 costume changes in four minutes. Everyone's putting on various turbans and taking others off, so anybody with a speaking part has a redundant mic built into a turban just in case it ever gets pulled out of position," he says. "In fact, some people wear up to three mics at a time. I never want to see a mic, and we run them a little high in the hair line so they get covered. Wherever possible, the transmitters are also fitted into the turbans."


Because the Genie is bald and doesn't wear a turban, his mic is built into a prosthetic made for his chin. "He wears a DPA 4061 and a Sennheiser MKE 1 for redundancy. The only reason he can't wear two DPAs is the weight, because of the way the prosthetic is attached. But you never see a mic on him at all," he says. "We empower our actors to handle their own mics: We show them how to wear them, then take them to the console with a dresser and a hamper with all their costume changes in it, and we EQ each mic to get it right where we want it for each costume change. Then we let them hear what they sound like when the mic is not in the right place, and that makes them want to wear it correctly.

"I have an amazing team in associate sound designer Alexander Hawthorn, front-of-house mixer Gabe Wood, production audio by Lucas Indelicato, and Marie Renee Foucher and Bill Romanello taking care of mics



A close-up view of one of the TiMax Tracker sensors.

and RF. We learned how to operate TiMax quickly so that no one's ever waiting on sound," Travis says.

"Aladdin is one of those shows where the director can play stump-the-sound-designer. Go ahead; ask for anything. This system is the Genie." 

## DOUG FLEENOR DESIGN



Controllers



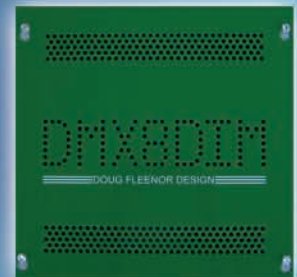
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