

## **HED: NFL FOOTBALL ENTERS A NEW DIMENSION**

Deck: Live 3D HD NFL Game Shown in Select Digital Cinemas

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### **New York, N.Y.**

On December 4, 2008, the NFL offered a VIP audience in three digital cinemas, in Boston, Los Angeles, and New York, the first-ever live 3D HD broadcast of an NFL football game—between the San Diego Chargers and Oakland Raiders—and a sneak peak at what many predict is the future of television.

In the same way that HDTV gave sports fans at home the perspective of the best seat in the house, 3D HD goes a step further, giving viewers the sensation of being virtually on the field and in the midst of game action.

“You really do feel like you’re down on the field, and watching the players run right into your living room. It was a magical experience watching this game in 3D HD,” said Glenn Adamo, vice president, production and media operations for the National Football League, in New York, N.Y.

“This event was primarily a test designed to enable us to better understand the optimal way to cover live football in 3D HD,” said Adamo. “We think it was a terrific success in that we learned how beautifully the game translates into three dimensions.”

### **FORMAT WITH A FUTURE**

While this experimental presentation was delivered via satellite to three digital cinemas, the key players involved—the NFL, 3ality Digital (3D HD production specialist), and RealD (3D HD projection specialist)—all agreed that this 3D HD technology could become “the new normal” of television viewing, trumping HDTV in a few years. This upgrade to the TV viewing experience would be contingent upon cooperation by consumer electronics manufacturers, broadcasters, and industry standards bodies.

Because the Chargers/Raiders game was also carried live (from Qualcomm Stadium in San Diego) on NFL Networks, this made it easier for the NFL and NFL Networks to coordinate production logistics for two side-by-side telecasts—for HDTV and 3D HD—with 5.1 surround sound.

The 3D HD show was produced by 3D HD specialist 3ality Digital, which provided specialized 3D HD cameras. Some of the Emmy Award winning football cinematographers from NFL Films operated these 3D HD cameras, which Adamo said helped maintain a consistent NFL Films production style of presenting the best views of the game.

## **PRODUCTION FLEXIBILITY**

3ality Digital employed two types of 3D HD cameras—side-by-side and beam splitters—which they designed and built expressly for 3D HD production using off-the-shelf HD camera equipment from Sony, including the Sony 1500 and F950 models, as well as one rig based on a Cunima MCU1 HD camera.

With five side-by-side cameras and three beam splitter camera rigs—arranged around the field, end zones, announce booth, and on sideline carts—Director Bob Levy and Producer Steve Beim had the creative flexibility to get the shots they wanted and make the show much more dynamic.

“If you’re trying to capture action that’s 20 feet or more away from the camera, you’re typically going to want to use the side-by-side rig. But for action that’s closer than 20 feet to the camera, you’re going to want the flexibility of the beam splitter camera,” said Howard Postley, chief operating officer and chief technology officer for 3ality Digital.

## **SPECIALIZED CAMERAS**

Like the name implies, the side-by-side camera rig has two HD cameras positioned right next to each other. However, Postley said, “Unless you’re working with very small cameras and lenses, you can’t get them close enough to shoot a shot closer than 10 to 15 feet.”

The beam splitter’s two cameras are positioned perpendicular to each other, with one shooting straight out and one pointed up or down at the other camera. Both are shooting at a beam splitter, with a very expensive mirror, so both images get reflected through the same mirror. This enables both lenses to overlap more closely than is possible with the side-by-side camera.

The lenses were Fujinon 22:1 ENG HD telephoto lenses. Larger box lenses, such as the 100:1 and 88:1 types common in live sports, were not used because the image stabilization systems in these lenses treat each lens independently. “Because they don’t stabilize the two lenses in precisely the same way at the same time, this causes a sort of wave effect which you’d never see in 2D, but in 3D it’s very pronounced and it drives our image processors nuts,” Postley said.

“Perfect mechanical and optical alignment is the key to watching a 3D HD program without eye strain,” Postley said. “And perfect alignment is also the key to overlaying graphics on the 3D HD video.”

## **TECHNICAL CHALLENGES**

Graphics, such as player statistics, the game clock and score box, were used during the game, and the director had fun experimenting with their placement—having them either jump out at the viewers or recede in the background. However, 3D versions of the first and ten line and distance-to-go graphics that are superimposed

on the field were not used because of the complexity involved with pulling these illusions off credibly. Postley said that by mid-summer 2009, they hope to have an image processor that can handle realtime compositing of 3D HD and remedy the problems of superimposed graphics.

“We faced lots of technical challenges because there were lots of things in this broadcast that had never been done before,” Postley said. 3ality Digital also employed a lot of new equipment, including new rigs, coordination software, image processor packaging, and fiber systems.

The HD production truck was Voyager 8 from Crosscreek Television, in Alibaster, Ala., which offers 38 channels of EVS, as well as 12 Sony HD cameras, designed to cater to high-profile sports telecasts by ESPN, CBS, and others.

3ality Digital placed a stereoscopic 3D monitor on the truck so that the director could preview what was being broadcast in 3D HD (while wearing specialized RealD 3D glasses). They also added an image processor box that plugged in outside the truck to deal with the camera feeds, and provided a stereographer and several convergence operators to handle the 3D HD image processing.

The 3D HD signal was then compressed to 20 Megabits and transmitted via satellite by Technicolor Digital Cinema to the three theaters in Boston, Los Angeles, and New York, which are run by Clearview Cinemas, Mann Theaters and National Amusements respectively.

### **GETTING RealD**

RealD, in Beverly Hills, Calif., provided the delivery platform, including 3D HD projection hardware, software, and comfortable, polarized 3D eyewear used in digital cinemas. RealD has licensed its 3D HD digital cinema technology to over 100 exhibitors in 30 countries, and over the last three years, expanded to 6500 screens under contract. RealD now has over 90-percent of the 3D HD digital cinema market.

“At this NFL event, we wanted to demonstrate that there is an opportunity here...beyond movies...to show live sports and concerts...and that the technology has gotten extremely good,” said Michael V. Lewis, chairman, chief executive officer, and co-founder of RealD.

“In the lobbies of the three theaters, we had 3D HDTVs that were using our technology to show the event so that people [wearing the glasses] could continue watching as they got their food and drinks,” said Lewis. “So we just demonstrated that we have this solution to make it happen in the home.” A small percentage of HDTVs by leading consumer electronics manufacturers already support 3D HD display.

### **FOX SPORTS SHOW AT CES**

3ality Digital and RealD will demonstrate their capabilities again at the upcoming Consumer Electronics Show (CES) in Las Vegas. On January 8, 2009, the BCS college football championship game (between the University of Florida and University of Oklahoma in Miami) will be shot and transmitted in live 3D HD by 3ality Digital in partnership with Fox Sports. Sony has agreed to sponsor the event, arranging for the live game to be seen in the 2,000-seat RealD equipped digital cinema within the Paris Las Vegas hotel. The game will also be broadcast nationally to 80 3D-enabled theaters through a partnership with digital cinema provider Cinedigm.

“At some point, every type of display device, including handhelds, laptops, and HDTVs, will support 3D HD viewing,” said Lewis. “And we believe that we’re about three to five years away from getting standards established and having 3D HD become available in a significant way in the home.”

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