Redefining Local Sports Production, Video Coaching Solutions, and Wireless EFP

A JVC White Paper

In the United States, the business of sports is enormous. There are literally millions of participants in organized sporting activities across the country, from professional teams with national (and international) followings to elementary school teams with smaller fan bases built around families and communities. The appetite for viewing sporting events by the general public seems insatiable, with the potential for viewing contests online or on portable "smart" devices fueling the ever-increasing demand for content. JVC has launched three initiatives that target unique segments of the sports market: *local sports production, video coaching solutions, and wireless multi-camera EFP.*

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Local Sports Production

Local sports production is an area which often has limited personnel and equipment resources. In fact, some coverage is dependent on a single camera operator. To help enhance single-camera local sports coverage, JVC is introducing the GY-HM200SP camcorder with embedded score panel graphics. The camera produces a real-time score overlay on recorded and streamed HD video output without the use of an external CG and production switcher. As a result, one person can shoot the game, insert graphics, record, and stream the production live directly from the GY HM200SP.

In-camera Score Overlays and Customization

The camera receives score info directly from a mobile device

Ideally, the GY-HM200SP receives score information directly from a smartphone or tablet connected wirelessly to the camera using an intuitive GUI, or it can interface directly to the sports venue's own scoreboard controller through a wired or wireless interface. The camera includes basic layouts to cover a variety of sports, but JVC will also be able to customize the overlay with the names and logos of teams.

Examples of Custom Score Overlays

Football Overlay

Team Names, Score, Quarter, Time Clock, Downs and Time Out markers

Type 1 Overlay

Type 1 features Team Names, Score, Period or Quarter and Time Clock

Type 2 Overlay

Type 2 features Team Names and Number of Games Won, Score, and Period or Quarter

Simple to operate, fully featured, professional camera

Beyond the built-in graphics overlay, the GY-HM200SP features a built-in HD streaming engine with Wi-Fi and 4G LTE connectivity, which allows live HD transmission directly from the GY-HM200SP to content delivery networks (CDNs) like Ustream and YouTube, as well as the ProHD Broadcaster server powered by Zixi, Wowza Streaming Engine, and other hardware decoders. The ability to stream live video directly from the camera to an online audience or a local PEG (Public, Educational, and Government) access channel is critical for schools or districts with limited resources. YouTube, for example, offers free live event streaming, while a local cable headend can be equipped with an affordable JVC BR-DE800 ProHD Decoder to allow live broadcasts of the feed. Simplicity in the field is also important, because camera operators often are not responsible for camera setup. Once a network has been setup in the GY-HM200SP, streaming is as easy as pointing the camera and pressing a button.

The GY-HM200SP also includes all the professional features of the GY-HM200, including a 1/2.3-inch BSI CMOS imager and integrated 12x zoom lens with optical image stabilizer and 24x dynamic zoom in HD mode. The camera records 4K Ultra HD (150 or 70 Mbps), 4:2:2 Full HD (50 Mbps), and SD footage to nonproprietary SDHC/SDXC memory cards. Other features include dual XLR audio inputs with built-in phantom power that are mic/line switchable, an integrated handle with hot shoe and dedicated microphone mount, and SDI and HDMI video outputs.

Video Coaching Technology

Another growing market is video coaching technology. While the process is frequently labor intensive, it is also an effective way to share information. For example, a football team can record practice with several cameras, then upload the footage to a server or cloud-based platform with tailored software that allows the coaching staff to add notes and drawings to the video. As a result, players and coaches can study the team performance.

One of the major criticisms of video coaching solutions, however, is the time required to upload and annotate footage. JVC has formed a new partnership with XOS Digital, the leading provider of digital coaching technology for sports organizations, to improve video coaching workflows. Used by hundreds of professional and college sports teams, XOS Thunder HD is one of the most sophisticated systems available, with the ability to include positional tracking and biometric data for every athlete.

- **VISUALIZATION** – Help players and coaches to understand the meaning behind the player performance biometric data
- **UNIVERSAL** – Integration with any player tracking platform
- **PREPARATION** – View player paths and biometric data right on the practice field

Most video applications do not require the actual time of day, but it is essential data for the metrics used in player tracking and biometrics recording systems. With its built-in GPS capability, the new JVC GY-HM650SC ProHD camera retrieves coordinated universal time (UTC) via satellite and embeds a real-time reference within the video metadata, which synchronizes multiple cameras and biometric data collected by player tracking devices. As a result, the system allows a coach to instantly find a portion of video associated with any specific biometric or positional data point.

In addition to the ability to include UTC time-stamp data within its recording, the GY HM650SC can include specific metadata related to the type of play (offense, defense, kickoff, etc.) via an intuitive mobile GUI. The metadata can then be interpreted by the XOS Thunder platform, allowing the system to automatically categorize and separate plays into appropriate folders, which can save hours of post-recording cutting and tagging from the traditional coach workflow.

To avoid time consuming uploads, coaches can send footage directly to the analytics platform as a stream or FTP upload after each play via 4G LTE connection or Wi-Fi using the GY-HM650SC's built-in streaming tools. As a result, footage does not have to be uploaded manually, so coaches and players can review footage as soon as the game or practice is complete. Plus, high-quality HD footage can be simultaneously recorded to SD cards in the camera for backup or archive purposes.

Beyond its built-in UTC and live streaming capabilities, the GY-HM650SC camera includes all the professional features of the GY-HM650 mobile news camera. With its integrated Fujinon wide angle 23x zoom lens and three 12-bit CMOS sensors, the lightweight camera offers superior low-light performance and excellent sensitivity (F11 at 2000 lux). Audio features include a built-in stereo microphone, two XLR inputs with phantom power, shotgun mic holder, headphone jack and separate input for a wireless mic receiver.

Wireless Multi-Camera EFP

Pulling cable is one of the most time consuming tasks for setup and strike, especially for sports productions involving golf courses or other large outdoor areas. JVC has introduced an IP-based solution to produce single or multi-camera live sports coverage without camera cables. Its Private MESH Video Network combines JVC's advanced camera encoding technology with the Silvus Bi-Directional Radio System to transmit very high quality HD video from remote locations with extremely high streaming reliability. The system works with select ProHD and4KCAM cameras equipped with integrated streaming technology.

The JVC Private MESH Video Network simplifies setup without sacrificing reliability, because it avoids bandwidth congestion issues that typical IP streaming solutions can encounter when using public Wi-Fi or broadband networks. It provides up to 85 Mbps, which is more bandwidth than traditional cellular or bonded cellular transmission systems. The private network also provides a secure direct encoded video stream, and delivers much larger transmission distances than Wi-Fi systems. Because it is a private network, the signal remains strong and reliable, even in a crowded stadium with thousands of spectators using their mobile devices.

With built-in Zixi Advanced Streaming Technology (AST) featuring forward error correction and new adaptive bit rate technology, JVC's GY-LS300, GY-HM200, GY-HM650, GY-HM850, and GY-HM890 camcorders maximize bandwidth to deliver high-quality live HD video with lower dropout and connection loss than standard UDP transmission. Two-way communication through the network allows camera setup and adjustment from remote locations, so unmanned cameras can be part of the production.

Network setup is simple and built around the use of mobile MESH nodes. Each node in the JVC system is a Silvus Transceiver Radio, which serves as both transmitter and receiver. Best routing decisions are made automatically, and the network can be administered from any radio. The result is a flexible, self-managing, and self-healing network. All streams operate at the same frequency, but each antenna transmits a unique data stream that is recovered at the receiver via sophisticated signal processing.

Broadcasters have several radio choices, including a camera node that directly attaches to a JVC camcorder and receives an encoded stream directly from the camera, mobile relay node for use in vehicles, fixed relay node for more permanent installations in venues where broadcasters often return to cover live events, and destination access point node that serves primarily as the receiver for live transmission or file transfer. Radio frequencies can be in either the licensed BAS band, assuring broadcasters no interference, or in the unlicensed band.

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