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GUIDE TO

PTZ CAMERAS



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PAN-TILT-ZOOM CAMERAS: IDEAL FOR VIDEO REINFORCEMENT AND LIVE STREAMING

By Jason Neureiter (AV Network)

PAN-TILT-ZOOM (PTZ) HD cameras offer seemingly endless possibilities in video reinforcement and live streaming applications. A few notable advantages include small size, a variety of mounting positions, IP video interface, third-party controllers, open-source control software, and easy configuration and operation by non-professionals.

There was a time when high-quality video cameras were very large, very expensive, and almost impossible for non-professionals to operate. In those days, video reinforcement, let alone streaming on the Internet, was out of reach for the small- to moderate-sized organization, for whom the equipment and the trained staff were just out of reach. Fortunately, those days are past, thanks to the appearance of PTZ high definition cameras.

They are small enough to hold in your hand, and they can be mounted in a variety of positions: on a wall or a ceiling, on a pole, or even on a pulpit. As the name implies, PTZ cameras are complete systems that include the electro-mechanical devices that facilitate remote panning, tilting, and zooming.

PTZ cameras can be controlled using a joystick controller or simply a laptop computer: a Mac, a PC, a Linux box, or even a Raspberry Pi, via gigabit Ethernet or a serial digital control interface such as RS-232C or RS-422. Several PTZ cameras can be daisy-chained on the same interface cable, obviating the requirement for a home run to each camera.

Control and video backhaul may be accomplished over



Ethernet using Network Device Interface (NDI)i, a free, open source, lightly compressed, bidirectional interface that may be downloaded from the internet for any commonly-used operating system. Such an interface can simultaneously backhaul multiple frame-accurate HD video signals, along with controlling the cameras with which they are associated. In addition, cameras may be powered over Ethernet using a Power over Ethernet+ (PoE+) switch, which facilitates a single-cable interface to the camera. PoE+ can supply up to 25.5 watts of DC power on CAT-5 cable.

For those who prefer a multi-cable approach, many PTZ cameras also include High Definition Serial Digital Interface (HD-SDI) and High Definition Multimedia Interface (HDMI) video ports as well as RS-232C/RS-422 serial digital control ports.

PTZ cameras and associated peripherals have brought a whole new panoply of opportunities for video reinforcement and online streaming, combining high quality, high definition video with IP control and backhaul, all at a reasonable price. Add in the fact that these systems may be configured and operated by the tech-savvy amateur, and it's hard to go wrong. Your organization can have highly professional-looking high definition video reinforcement and streaming affordably, without the requirement to hire a professional video staff. PTZ cameras and their ancillary equipment and interfaces represent a new day in video reinforcement and streaming for the moderate-sized budget.



INDUSTRY LEADER IN PTZ CAMERAS OFFERS COMPREHENSIVE LINEUP

OFFERING THE INDUSTRY'S most comprehensive, innovative pan-tilt-zoom (PTZ) camera line, Panasonic has a distinguished legacy as the industry's innovation leader. Our best-in-class family of professional PTZ cameras and controllers feature 12 PTZ models built to meet an array of customer requirements, from video streaming to complex VR/AR systems. All of our professional PTZ cameras feature support for Power over Ethernet (PoE) through either PoE+ or PoE++ that require only a single cable to supply power, control and video.

We offer a range of models for streaming to mid-level applications including the AW-UE4 4K/HD wide angle, AW-HE38 HD HDMI and AW-HN38 HD NDI, AW-HE40H HD HDMI, AW-HE40S SDI and AW-HN40 HD NDI, AW-HE42 FHD SDI/HDMI and the AW-UE70 4K and AW-UN70 4K NDI.

For demanding applications, we offer the industry's top-of-the-class models – the new AW-UE100 4K 60p, AW-UE150 4K 60p,, and the AW-HDR140 ultra-rugged outdoor unit. In addition, Panasonic has integrated its high-end PTZ cameras

with Tecnopoint floor, ceiling dollies and Totem systems, so producers and directors can seamlessly add new camera moves like never before, automating aspects of productions by creating key frames for specified movements. End users can now go beyond the basic moves of a simple dolly or a jib and create impressive, super-smooth imagery for events, broadcasts, productions, faith services, streaming, IMAG and more.

Panasonic markets a powerful line of remote camera controllers, including the AW-RP150 with a large 7" Touch Panel GUI Monitor and the new AW-RP60GJ with a 3.5-inch LCD screen and joystick for smooth PTZ camera control. In addition, Panasonic offers the free PTZ Control Center software to set-up and control your camera on a Windows laptop or desktop PC; the LiveCTRL app on an iPad Pro to set-up, control and livestream up to 4 Panasonic professional PTZ cameras; and a web browser for a PC, Mac or mobile device such as an iPhone, iPad or Android device. This browser is a free, yet powerful option for camera control and setup.



CAPTURE 4K/HD VIDEO IN THE MOST DEMANDING LOCATIONS THANKS TO THE NEW AW-UE100 STREAMING PTZ CAMERA

AS THE INDUSTRY'S first PTZ camera to offer 4K/60p picture quality with high-bandwidth NDI and Secure Reliable Transport (SRT) transmission, the AW-UE100 delivers super smooth and super quiet PTZ operation to enhance productions without distractions.

The UE100's super smooth and super quiet operation is the result of its high-precision Direct Drive Motor, which assures a noise level of NC30 or less, enabling shooting in locations like concert halls or a studios where quietness is essential. The UE100 allows you to create immersive and engaging virtual broadcasts without high costs. You can construct VR/AR systems easily and cost effectively with the UE100 since you no longer need an additional tracking system. Real-time camera tracking data (pan/tilt/zoom/focus/iris) can be output together with a synchronized signal from the UE100 over IP network via Free-D protocol.

This high-quality, high bandwidth NDI camera addresses your need for increased flexibility and versatility by offering:

- Low latency live video transmissions with high-bandwidth NDI for transmitting 4K/60p video at speeds of approximately 250 Mbps and for transmitting full HD video at approximately 100 Mbps, all over a single LAN cable.
- Various IP transmission protocols, including NDI®, SRT, and FreeD for AR and AR applications, achieving flexible video production with high-quality 4K 60p/50p video. A 12G-SDI, 3G-SDI and HDMI outputs are also supported, allowing you to be ready for a wide range of shooting situations, from live streaming of events to studio production.
- RTMP/RTMPS support enables direct upload of video to live-streaming services such as YouTube Live and Facebook Live.
- A 24x optical zoom and a 74.1° horizontal viewing angle allows distant subjects to be captured clearly whether in tight spaces or large venue halls.



AUTO TRACKING SOFTWARE SUPPORTS AUTOMATED LECTURE AND PRESENTATION CAPTURE

AVAILABLE FOR SINGLE camera operation (AW-SF100) or multi-camera operation (AW-SF200), Panasonic Auto Tracking Software supports automated lecture and presentation capture with high-precision tracking using motion detection, facial recognition and new body detection powered by Deep Learning Algorithms.

With the ability to track a person and manage multiple PTZ cameras independently, this software is well suited to such environments such as classrooms, lecture halls, auditoriums, conference rooms and stage environments. When activated on a PC connected to the same network as your camera system, the software automatically detects

a person in front of a PTZ camera, and makes the camera follow that person to allow for easier control operations. The use of “motion detection” technology makes it possible to track the subject with minimum tracking error regardless of where the person is facing. This allows to keep the lecturer tracked even when is writing on a blackboard showing his/her back to the camera.

Compatible with AW-UE150, AW-UE100, AW-HE130 series, AW-UE70 series, AW-HE42 series, AW-HE40 series and AW-UE4 PRO PTZ cameras.

Panasonic Auto Tracking software is available for a 90-day free trial.



EXTENDING WORSHIP BEYOND THE CHURCH WALLS WITH PTZ CAMERAS

FOUNDED IN 1976 and nestled in Denton, Texas, Denton Bible Church is a non-denominational church that averaged 4,000 congregants each Sunday across its three services. With the demand for digital content and streaming increasing amongst Church congregants, Denton Bible Church made the commitment to replace its outdated camera system with new technology to provide live-streamed content. The need increased further as social distancing measures were put in place due to the pandemic, which is why the Church sought a solution that would be flexible, deliver high-quality content and create a worship environment that would accompany the needs of its congregants, regardless of where they chose to worship.

“We were stuck in an SD/HD environment using a camera system that was 15 years old,” said Preston Fuqua, technical director at Denton Bible Church. “We knew we needed a product that was on the leading-edge and offered multiple options to achieve the end results we were looking for.”

Denton Bible Church deployed five Panasonic AW-UE150 4K pan-tilt-zoom (PTZ) cameras throughout its sanctuary. To customize the viewer experience and enable more depth in their volunteer rotations, the team also deployed two AW-RP150 touchscreen remote camera controllers. Additionally, the PTZs large 1” sensor and 20X optical zoom allowed the Church to zoom in two times further

with exceptional image quality, allowing congregants to enjoy higher quality streams to fully immerse themselves into their at-home service as they would in-person.

“Once the Panasonic’s PTZs were installed and we saw the images they produced, we were blown away. The IP control on the remote camera controller is spot on and exceeds our expectations due to the controller’s ability to manipulate multiple cameras at once and simultaneously output 4K. It was hard to even compare our old set up to the new.”

Soon after Denton Bible Church implemented Panasonic’s UE150 PTZ cameras and remote camera controllers, COVID-19 hit the United States and streaming services became a priority. With the technology in place, the Church was able to quickly transition to fully streamed Sunday services and midweek events. Once the capabilities were seen by their senior pastor, a new weekday series was started during the shelter-in-place mandate. When paired with its streamed Sunday services, the Church was able to serve approximately 6,000 viewers.

Having the ability to stream and connect with families remotely in their congregation during quarantine opened the pastor’s eyes to a whole new way of doing ministry and teaching. As a result, Denton Bible Church’s online viewership has increased beyond what they have historically seen for in-person Sunday service attendance.



PTZ CAMERAS HELP UK CATHEDRAL LIVE STREAM MASS

LIVERPOOL METROPOLITAN Cathedral has installed Panasonic's PTZ camera system to live stream Sunday Mass to its audience of 5,000 per week. With the coronavirus pandemic and continued social distancing restricting worshippers attending mass, Panasonic AW-HN40 PTZ cameras with optical zoom capability and NDI/HX output have been installed to provide worshippers with an innovative live streaming solution.

Panasonic partner Adlib, an audiovisual solutions company with a longstanding relationship with the cathedral, initially provided a temporary solution to address the aftermath of the lockdown but after a successful pilot recommended Panasonic AW-HN40 PTZ cameras to be permanently installed as a discreet, professional-quality system. The optical zoom capability of the cameras was particularly important for the installation. A single Panasonic PTZ camera has the flexibility to be used for a wide shot that shows off the entire cathedral, or an extreme close up of the priest or readers, using a selection of pre-set camera movements. The second camera is similarly versatile, being used for wide shots of the choir,

close-ups of the organist, and a variety of shots looking into the Chapel of the Blessed Sacrament.

"Initially, there was some concern that the cameras would be too conspicuous but a demo quickly showed that the cameras were very discreet and their availability in both white and black to suit different parts of the cathedral made them blend in even better," said Tim Robinson, Adlib installation project manager. "Ultimately, the dean and his staff were so taken with the shots we could get from a central position, they asked that the camera be installed in an ideal location that we never would have thought possible."

Panasonic PTZ cameras provided the correct combination of cost-efficiency and for the cathedral's needs and the new system has been so successful that the cathedral now plans to live stream more services to its socially distanced congregation.

"The system is so easy to use," said Katie Lucas, cathedral event manager. "We're not technically minded, however we managed to stream our first mass all by ourselves, with a member of the Adlib team sitting next to us, just in case."



PEPPERDINE UNIVERSITY UPGRADES 160+ CLASSROOMS WITH HYBRID CLASSROOM SOLUTION FEATURING PANASONIC PTZ CAMERA

TO PROVIDE A fully remote learning environment for the Fall 2020 semester to support faculty and students, Pepperdine University installed EduFLEX, a hybrid classroom technology solution inclusive of Panasonic's AW-HE38H HD Pan-Tilt-Zoom (PTZ) camera. The private, Southern California University sought technology to move its classes online that would be easy to install and operate, intuitive and flexible for users, and provide an engaging environment to accommodate both synchronous and asynchronous learning.

Together with ClearTech, Altadena, CA, the University's preferred AV technology provider, Pepperdine deployed the hybrid IP-based solution with Panasonic's PTZ cameras in 166 classrooms across its five campuses to support distance learning for its graduate and undergraduate community.

Professional video technology played a big part in the University's solution to ensure its professors had the tools needed to teach online with their pedagogy, despite not having students physically in the classroom. Pepperdine's faculty and students use the Zoom video conferencing platform for virtual classrooms and hybrid online courses.

"We didn't want our faculty to feel like they had to re-learn something, depending on where they were. We needed a

solution that would be completely location agnostic, so no matter where you're teaching, you could walk into the room and it was going to feel the same as every other space," said Jared Mukai, Ph.D., manager of AV technologies and special projects at Pepperdine.

"There were a lot of complexities we needed to work through on a very tight timeline to ensure we'd be ready to support our students and teachers with online class instruction by mid-August. We evaluated various scenarios and knew we needed a solution that could support all types of learning environments, but especially distance learning most immediately," continued Mukai. "ClearTech's EduFLEX solution with Panasonic's PTZ cameras was the obvious choice given its reliability, flexibility and capacity to transform distance learning environments into engaging teaching experiences."

The Panasonic AW-HE38H PTZ camera within the EduFLEX system offers many benefits for remote learning including: superb HD video quality, precision 22X optical zoom to capture crisp close-ups, a wide viewing angle and pan/tilt range, PoE+ for easy installation and power supply via LAN cable, and USB and microSD card built-in recording.



NEW WORLD SYMPHONY LEVELS UP ITS PERFORMANCE HALL WITH PROFESSIONAL PTZ CAMERAS

WHEN NEW WORLD Symphony (Miami, FL), a unique post-graduate orchestral academy under the artistic direction of 11-time Grammy award-winning conductor and co-founder Michael Tilson Thomas was preparing for its first international livestreamed WALLCAST® concert, the academy's video production team realized that in order to capture more dynamic point-of-view (POV) video, their cameras needed an upgrade to compliment the Performance Hall's video production system.

Although New World Symphony's Performance Hall was already equipped with AV technology, the professional POV 'lipstick' cameras NWS utilized lacked modern features, flexibility, and most importantly, 4K video quality and color shading. As a result, the camera operators' ability to broadcast dynamic 4K video was restricted.

"The challenge we faced was two-fold as we needed to find a solution to replace our existing lipstick, point-of-view cameras with remote control capabilities that integrated

smoothly into our Telemetrics environment," said Clyde Scott, director of video production and resident projection designer at New World Symphony.

Seeking flexible solutions, New World Symphony added seven Panasonic robotic AW-UE150 4K/UHD 60P pan/tilt/zoom (PTZ) cameras and an AW-RP150 touchscreen remote camera controller. The AW-UE150's exceptional video quality, wide 75.1-degree viewing angle, and quiet pan-and-tilt performance made the camera the perfect choice to meet the academy's goals and objectives. Furthermore, the AW-RP150's one-hand operation joystick and large touch-panel LCD screen for monitoring and menu settings complimented the Symphony's production infrastructure.

"With Panasonic's 4K PTZs, our camera operators can jump between camera angles to capture different perspectives of the performance to put our audience directly into our musical performances. It's really quite magical what we can capture and seamlessly broadcast with this technology," said Scott.



LIVE/ON-DEMAND SPORTS STREAMING SERVICE DAZN USES 4K/HD PTZ CAMERAS FOR “THE PAT MCAFEE SHOW”

DAZN, THE LONDON-BASED global over-the-top (OTT) subscription video streaming service that expanded to the United States last year, has invested in seven Panasonic AW-UE150 4K pan/tilt/zoom cameras to support production of its recently-launched daily offering, “The Pat McAfee Show.”

With McAfee—the former Indiana Colts’ Pro Bowl punter—as headliner, the show streams live on DAZN from 10 a.m.-noon ET Monday through Friday. McAfee is also creating football-focused segments for DAZN Canada and Germany, where the streamer has NFL rights. Additionally, DAZN has begun video streaming McAfee’s podcast, which has expanded to three times each week. McAfee is also a commentator for ESPN’s coverage of Thursday night college football games.

According to DAZN’s Technical Operations Director Petro Mynch, the summer build-out for the show, working with McAfee’s existing warehouse space in Indianapolis, represented the very first ground-up field studio implementation for the company. “Pat continues to work with his longtime crew, but this is really DAZN’s first opportunity to associate our brand with football, and we wanted a high-end, future-proofed production studio,” he said. (DAZN continues to build a footprint in the U.S. with several recent rights deals for boxing and MMA programming.)

Mynch explained that five AW-UE150s are permanently installed in the Indianapolis studio, with the remaining PTZs placed in McAfee’s mobile studio. At least one show per

week is produced on the road, keeping up with McAfee’s travel schedule. DAZN likewise invested in two companion AW-RP150 PTZ control surfaces (one each in the Indianapolis and mobile studios), and three Panasonic BT-LH1770 17” Panasonic monitors (two installed in Indianapolis, one in the mobile van).

“As a host, Pat is always on the move, very kinetic, so robotic cameras were a natural choice for us,” Mynch said. “We wanted our production kit to be good for at least a few years, and while we presently produce in 1080i/59.94, we have built-in 4K acquisition with the UE150. Our research identified Panasonic as a leader in the PTZ field, with the UE150 at the top of any list of remote cameras.”

“We built the studio on an extremely accelerated schedule, and Panasonic worked with us very quickly in terms of delivery and training. There is no on-site engineer, it’s literally all hands on deck with camera ops, and everyone has been impressed with the UE150’s ease of set-up and use,” he added.

Mynch went on to cite the UE150’s superb picture quality, as well as the plug-and-play abilities of the AW-RP150 remote controllers and the real-time color correction support afforded by the BT-LH1770 monitors. “Beginning with our very quick studio build, then moving on to demanding weekly live production assignments, the UE150s and support gear have worked impressively well and dependably,” he noted.



201 PRODUCTIONS TAKES 4K HDR FLY-PACKS WITH FIELD CAMERAS AND PTZ CAMERAS ON THE ROAD WITH PHISH

201 PRODUCTIONS (Clayton, MO), specialists in multi-camera live coverage of major music tours, festivals and corporate events, utilized new 4K mobile fly-pack systems equipped with Panasonic HDR-capable cameras (AK-UC4000 studio/field and AW-UE150 pan/tilt/zoom cameras) on the cross-country tour of legendary rock band Phish.

The company also made extensive use of a smaller fly-pack comprised of six AW-UE150s on a nine-show spring tour with a new band, Ghosts of the Forests, fronted by Phish's Trey Anastasio.

201 Productions' principal Trey Kerr explained that, with the purchase of five AK-UC4000s and six AW-UE150 PTZs with AW-RP150 controllers, the company's primary fly-pack systems now boast HDR capture across all the cameras. (Cameras with HDR are capable of capturing brighter whites and/or deeper blacks.)

"Concert productions are the mainstay of our business, and the combination of larger camera sensors, 4K

and HDR affords us so much clarity and exceptional performance in low light," Kerr said. "We're committed to providing the best available solutions for our clients, and given music performances' varying contrast levels, with HDR we are able to capture the wide gamut of what we're trying to shoot."

201 Productions' chief assignment for Phish is live production, but the company is also tasked with providing a feed for live webcasts on LivePhish.com, as well producing performance videos for the band's YouTube page and archiving each concert.

"There's so much functionality with the AW-UE150 and the AW-RP150 controller," Kerr said. "It was so impressive how we were able to start a move, then transition to another camera, and it was simply remarkable what we could accomplish with only two people.

"Because of AW-UE150's advanced features, we are now able to bring our same professional, award-winning production values to smaller, lower-budget events."



TBN INTEGRATES PTZ CAMERAS, TECNOPOINT DOLLY SYSTEMS IN NEW YORK CITY, TUSTIN, CA FACILITIES

TBN, THE WORLD'S largest Christian television network, has equipped new studio sets at its Tustin, CA and New York, NY facilities with 16 AW-UE150 4K 60p PTZ cameras, seven AW-RP150 camera controllers, and TecnoPoint Tuning software, totem systems and floor and ceiling dolly systems.

Larry Haley, TBN's director of network operations and engineering, said that TBN chose the Panasonic UE150/TecnoPoint combination for several factors. "One is the trifecta that everyone usually looks to obtain – features, price point and support. The Panasonic and TecnoPoint partnership, along with the features that the products brought, the price points and the Panasonic support that's been good with us over the years, answered all three of those."

"Another factor, which was a unique discovery and worked to our advantage, is the new UE150 has a much wider field of view (than its competitors). With the short distances we were shooting in the sets, this gave us a whole new option we were not expecting to get with this type PTZ camera. Obviously, looking at the 4K capabilities, we were future proofing as well."

Panasonic support, Haley added, has been amazing and "all of it has come together better than I could have hoped." "We would definitely recommend the Panasonic PTZ cameras and the TecnoPoint equipment and we're already looking to use them for other projects at the network," Haley said.



THREADED FILMS CREATES DYNAMIC, INTERACTIVE EXPERIENCES REMOTELY ON TWITCH VIA PTZ CAMERAS

THREADED FILMS, a boutique production studio in Chicago, IL, partnered with creative team, Project Adventure, and Twitch software developer, Warp World, for their latest film project. They quickly realized the need to modernize their studio to fulfill their goal of creating a new style of dynamic and interactive content. To meet the demands of the project, Threaded Films needed affordable yet feature-rich technology to be used in their home studio to boost creativity and execute a live production remotely—all while adhering to shelter-in-place mandates.

Seeking a flexible yet comprehensive solution, Threaded Films integrated two Panasonic AW-HN38 PTZ cameras into their production infrastructure to create high-quality, live-streamed and recorded content for their latest film project on Twitch. The PTZ camera's high sensitivity and high resolution captures quality video remotely and transmits it via high-efficiency low bandwidth NDI|HX data transfer.

Threaded Films streamlined its remote production capabilities resulting in increased flexibility and scalability for their team, delivering a more visually engaging production without a high price tag. Threaded Films' project includes a lot of puppetry work—a form of theatre performance not seen on Twitch very often. In order to capture a scene, their previous studio setup would have needed a substantial amount of infrastructure to record one single shot. Since Panasonic's PTZ cameras support

one-cable solutions via Power over Ethernet+ (PoE+), their crew no longer needed to deal with multiple cables. Due to the cost-effective PTZ cameras, Threaded Films has eliminated the need for complicated electrical wiring, reduced installation costs and simplified their deployment, saving time and money.

"We were trying to bring a different style of entertainment to the world of streaming on Twitch, meaning we were aiming to produce content in a form that could be characterized as traditional film or like a live TV show," said Ross Gerbasi, co-owner of Threaded Films. Under pressure to keep projects moving and to meet production deadlines, Gerbasi engaged with Panasonic to identify Threaded Films' creative and operational needs. "To create a modernized production studio, we needed to come up with creative ways to solve problems on an indie-streamer-style budget," Gerbasi continued. "PTZ cameras were the creative solution we needed, opening up our eyes to another world of infrastructure that we didn't know existed."

Incorporating two Panasonic AW-HN38 PTZ cameras into Threaded Films' production studio infrastructure offered their team many benefits with zero downsides. Thanks to their precision 22X optical zoom lens, wide field of view, smooth PTZ functions and exceptional image quality, the HN38 cameras allowed Threaded Films' crew to capture dynamic and interactive content, while meeting their creative visions.



For [more information](#) on Panasonic's PTZ camera family, camera controllers, control software and robotic dollies, columns and software, visit us.panasonic.com/broadcast

If you are interested in a demo, please contact
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