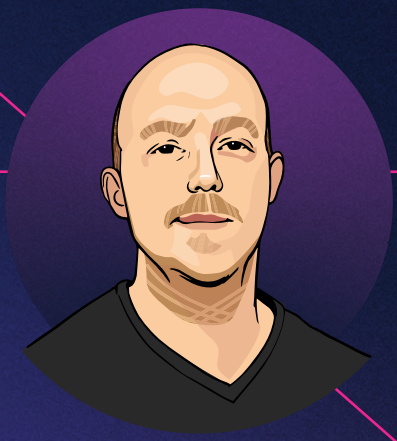
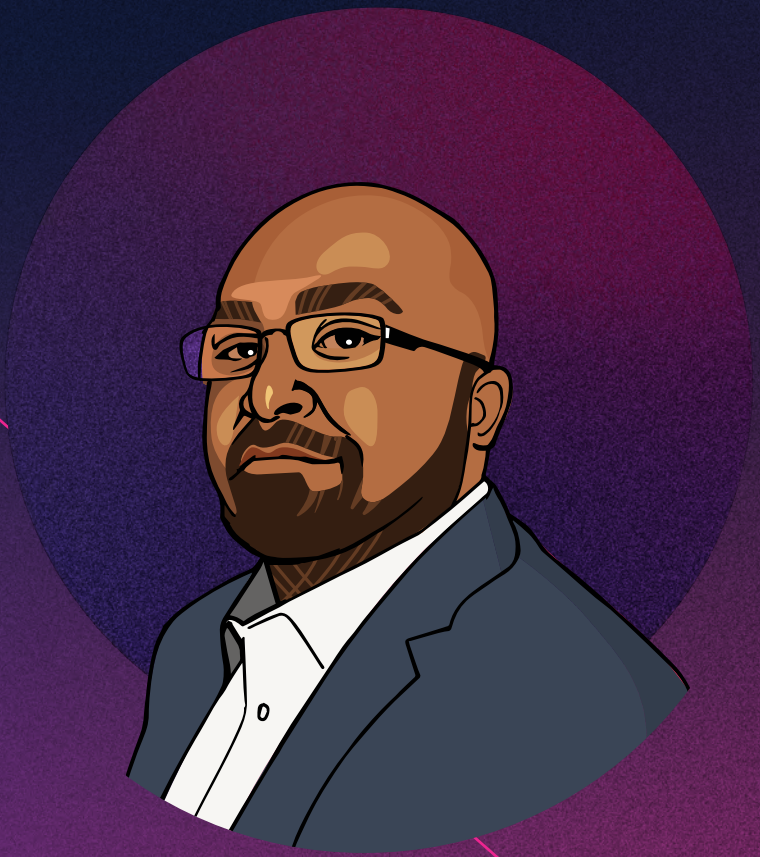
Volume 6

# EVOLUTION

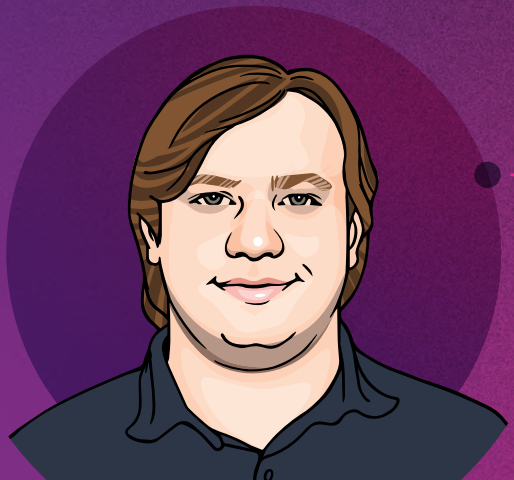
By Epiphan Video





# The Hero Issue

Celebrating the optimizers, luminaries, and mad scientists of video



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# Here's to the heroes!

## Celebrating the ones who brought us closer together through video

Those who've worked in AV for a long time know how easy it is to get carried away talking about product specs and the technology behind solutions. We often overlook the people who make it all possible. And never has the work of these professionals been more important than over the past two years.

We began to see various types of problem solvers emerging from the woodwork. Some drew on their wealth of experience to problem-solve, while others seized opportunities presented by a changing landscape to develop innovative, out-of-the-box solutions. Regardless of their pedigree, they form a community of overachievers leading the charge to help us all succeed. So here's to the luminaries, the architects, and all the AV heroes we've dedicated this latest issue of EVolution to. We hope their stories – which you will find throughout – inspire the same creativity in you that they've inspired in us.

Mike Sandler, President & CEO,
and Misha Jiline, CTO

# Celebrating the ever-inspiring heroes of AV

One of the great joys of being a manufacturer in this industry is witnessing the clever and unexpected ways customers use our products. There are the intelligent and intricate workflows devised. The devices pushed to their limits. The features repurposed for unforeseen ends.

Perhaps this is only to be expected when you release products into a space brimming with ingenuity and tenacity – into an industry replete with heroes who so deftly find ways forward in the face of barriers or setbacks. Their stories need to be told.

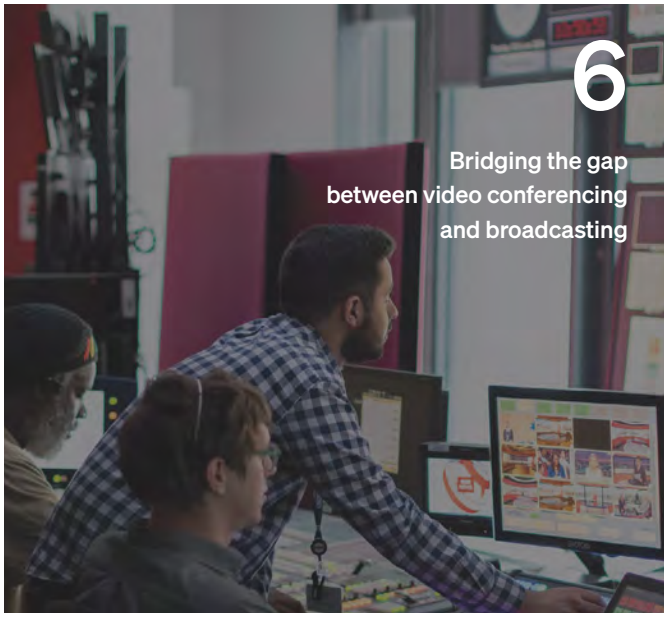
In this issue, we define and call attention to several kinds of AV heroes: the optimizers, the ninjas, the sages, the architects, and the luminaries. In the pages that follow, you will hear from and read about Epiphan customers who exemplify these archetypes. For example, there's Jeremy Prudhomme, an optimizer who, through the smart use of automation, can manage multiple studios remotely (page 17). And Tony Pearson, a luminary who led a massive lecture capture overhaul comprising over 250 rooms at the NC State University (page 23).

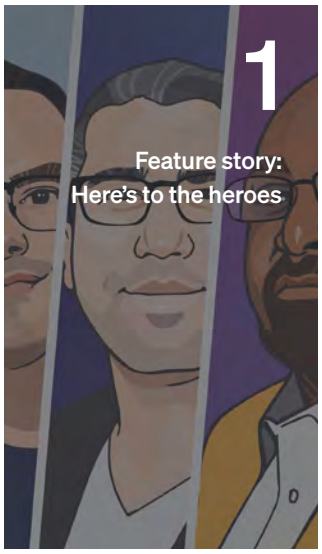
We are grateful that so many heroes choose us to enable their feats of technology. Many have done so by recognizing the universality of our devices and services. Unfettered from a single vendor or ecosystem, these heroes have greater space to dream up innovative solutions and applications. It is why we have such faith in our approach: in the hands and imaginations of the luminaries, the optimizers, and the mad scientists, open-system products are the building blocks of a new future.

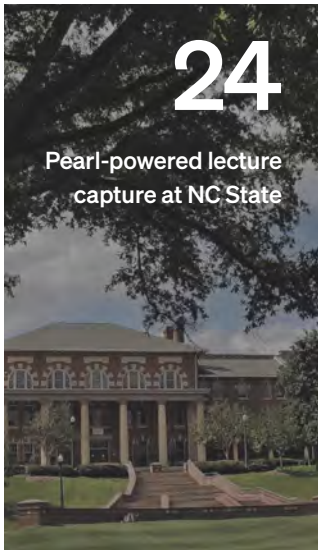
What our products inspire further inspires us, and it is this circle of inspiration that moves the industry forward. And what do we see on the horizon? In a word: accessibility. With the tools to create broadcast-quality content in the hands of the many, we all stand to benefit: producers, participants, and viewers alike (page 5). Equipping a new generation of content creators with the tools and know-how they need to produce world-class video will broaden the inspiration loop, pushing our industry even further.

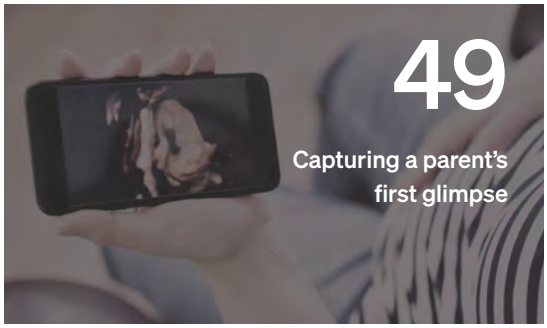
For our part, we will make this vision real with innovative services like Epiphan Unify and Epiphan Connect, which narrow the gap between the ease of video conferencing and the quality of professional broadcast. We look forward to building this future with you, continuing the circle of inspiration, and evolving together.

# Contents



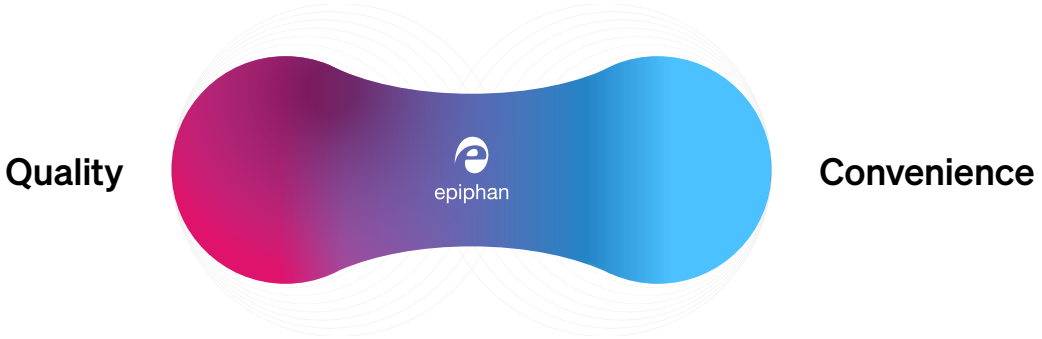

# Production at the intersection of quality and convenience

Video conferencing and professional broadcasting are, at first blush, worlds apart. The former is something anyone can use to get in touch with colleagues, friends, or family. The latter requires complex equipment that comes with barriers, either based on budgets or technical proficiencies.

But as media evolves, these two worlds are on a collision course. Turn on any news broadcast and you'll see experts joining the show via everyday video conferencing apps. Their audio may be poor and their video a bit choppy, but there they are on a professional broadcast from their tablet or phone juxtaposed next to professionally lit anchors in HD resolution.

Hardly anyone bats an eye when we see contributors join professional broadcasts with low-quality video and unstable connections. Though we all strive for quality, time – or the lack thereof – tends to choose convenience for us. When a story breaks in the broadcast world, they need immediate reactions and analyses from experts who may only have a laptop or phone. What we lose in audio fidelity and video resolution is an accepted trade-off to better understand what's happening in real-time.

Still, there's an argument to be made that the instant analysis would deepen our understanding even further if it didn't have to sacrifice quality. There must be a way to provide that valuable context quickly and conveniently with high-quality video and stable connections.




# Bridging quality and convenience: Epiphan Connect

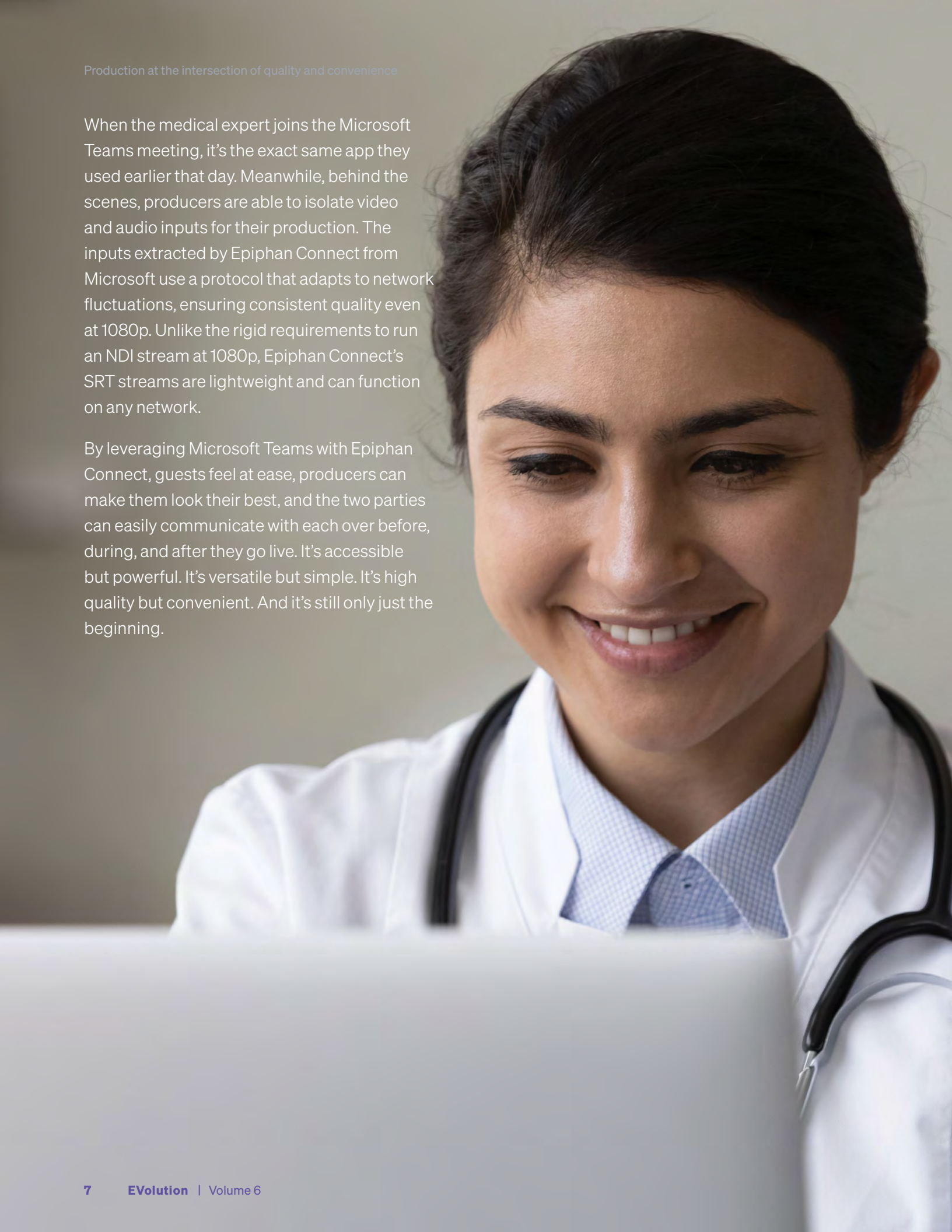
## Quality without compromising convenience. Stability without compromising flexibility. Familiarity without compromising power. This is what Epiphan Connect brings to the table.

Regardless of the broadcast's nature, whether it be a nationally televised newscast, an independently-run stream, or an internal address to employees, Epiphan Connect creates quality within convenience. Because it was time for the quality-convenience binary to end in favor of broadcasting without barriers.

Epiphan Connect gives you the power to extract Microsoft Teams participant feeds as well as screen-share content and transport them into your productions in full HD with isolated audio. This means the next time a national news show wants to bring on a medical expert for a live analysis of a developing situation, they can do so with a single Microsoft Teams meeting.

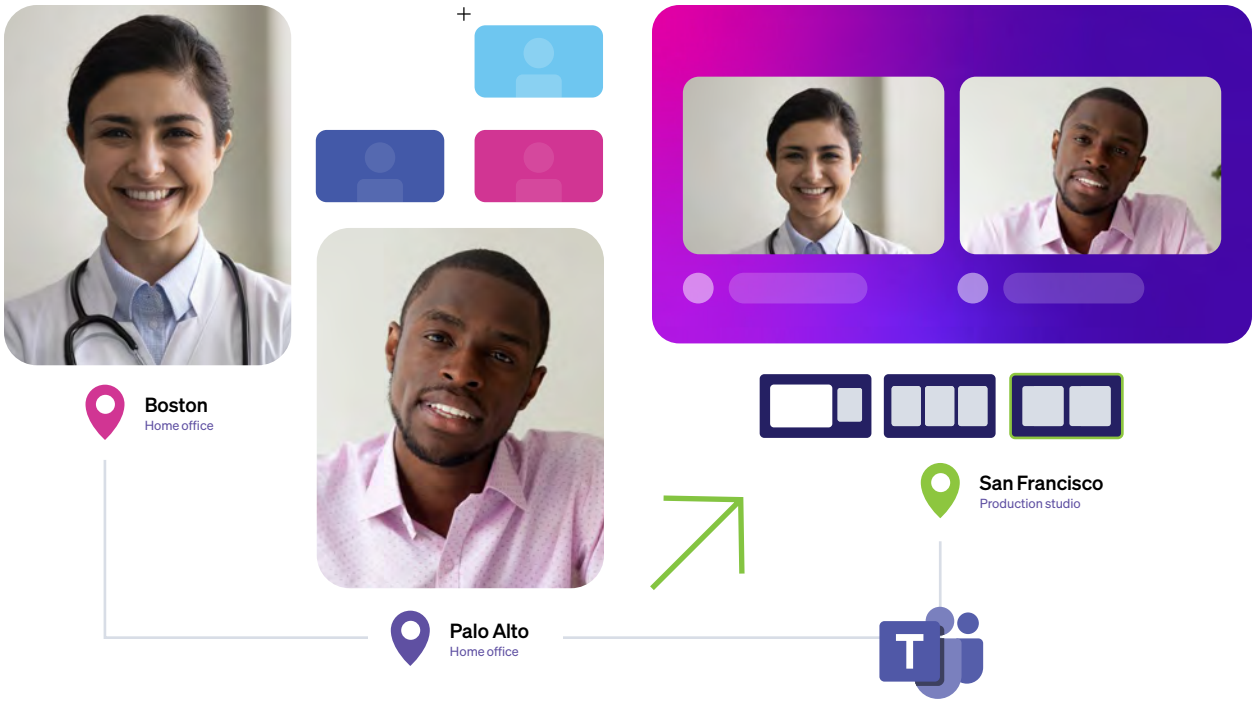
When the medical expert joins the Microsoft Teams meeting, it's the exact same app they used earlier that day. Meanwhile, behind the scenes, producers are able to isolate video and audio inputs for their production. The inputs extracted by Epiphan Connect from Microsoft use a protocol that adapts to network fluctuations, ensuring consistent quality even at 1080p. Unlike the rigid requirements to run an NDI stream at 1080p, Epiphan Connect's SRT streams are lightweight and can function on any network.

By leveraging Microsoft Teams with Epiphan Connect, guests feel at ease, producers can make them look their best, and the two parties can easily communicate with each over before, during, and after they go live. It's accessible but powerful. It's versatile but simple. It's high quality but convenient. And it's still only just the beginning.



This is just one example of how Epiphan Connect marries quality with convenience. And by no means is this technology reserved for professional broadcasts. It merely imparts the look and feel of a professional broadcast for any application without requiring a fully-equipped studio.

The applications for Epiphan Connect are endless. An everyday video conferencing app like Microsoft Teams is now a powerful production tool that bridges the gap between the two solitudes of quality and convenience. For the first time, quality and convenience can coexist. The only restriction now is our own creativity.

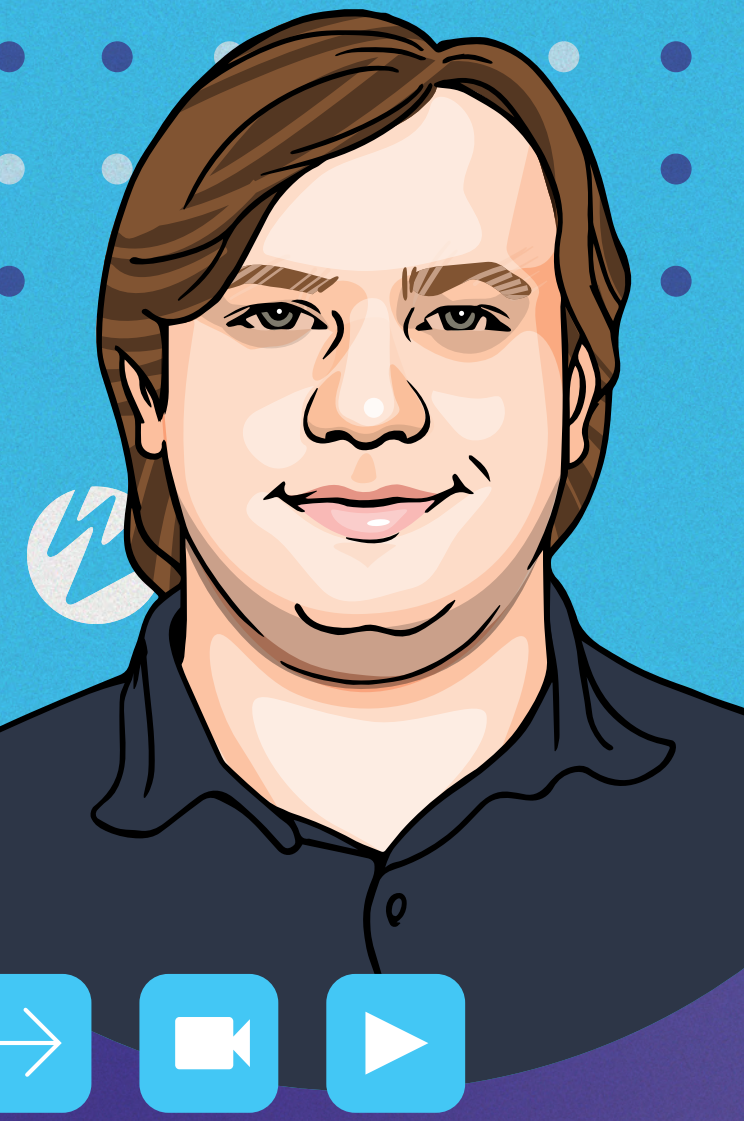



## Your journey with Epiphan Connect

Microsoft Teams' convenience combined with the low-latency, high-quality content unlocked by Epiphan Connect. The possibilities are endless. But we'd rather hear about actualities than potentialities.

**Scan the QR code to start your free Epiphan Connect trial and share your experience at info@epiphan.com**

The
Hero
Issue



# The Ninja

**Superpower:** Multitasking and production pipeline X-ray vision

**Motto:** "The show must go on."

This hero can comfortably run a live production with 20 remote participants while simultaneously juggling titling, switching, and backchannel communications. Can see miles down the AV-over-IP production pipeline. Able to pinpoint the source of an issue with a sniper's speed, accuracy, and precision.

During the pandemic, they were busy creating and relentlessly improving their elaborate live production workflows.

Flexible and resourceful, they exhibit rock-solid technology application skills. They like to get their hands dirty, capable of building practically any software or hardware solution from scratch. For the last year and a half, the Ninja has been a hot commodity.

*"I enjoy being the bridge builder to enable productions to continue. The most rewarding part for me is when the production crew forgets that they are doing a remote production since everything is set up to ensure they have the tools they need and to be comfortable in their role regardless of their location."*

**Jonas Dautel**
Head of Engineering at BSCMP Global


# How to produce live events with Microsoft Teams

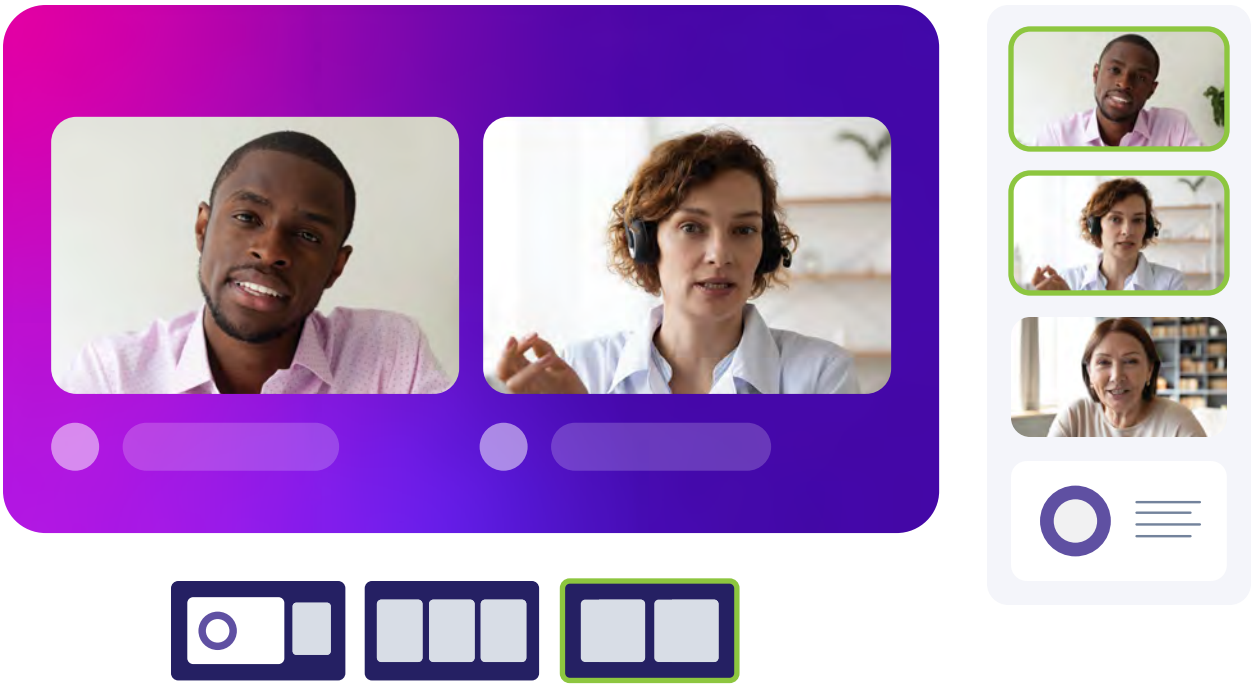
With 270 million users and growing, Microsoft Teams has become a staple of the modern workplace, streamlining how we communicate and collaborate with our colleagues and classmates no matter where they are. But it's more than just a way for us to work and learn together.

More and more, we're seeing hybrid and virtual event producers lean on Microsoft Teams to host their production. This is because most guests already use the app daily, creating a familiar environment that boosts their confidence before going live.

# Quick-Look Comparison

Let's go over the three ways event producers are using Microsoft Teams to elevate their hybrid and virtual events with isolated screen capture, NDI integration, and Epiphan Connect, and how you can elevate your own videos with this familiar app.

| | ISOLATED SPEAKER SCREEN CAPTURE | MICROSOFT TEAMS NDI | EPIPHAN CONNECT |
|---|---|---|---|
| **Number of participants** | Unlimited, but requires a dedicated computer for every participant | 3*<br>* possible to do more than 3, but quality drops as you add more | 9*<br>* per one Connect instance. You can add more participants if you add more Connect instances |
| **Max resolution** | 1080p | 1080p*<br>* resolution decreases with each additional participant | 1080p |
| **Isolated audio capture** | No | Yes | Yes |
| **Remote access** | No | No | Yes |
| **Requires additional hardware** | Yes | Yes | No |



# Good: Isolated speaker screen capture

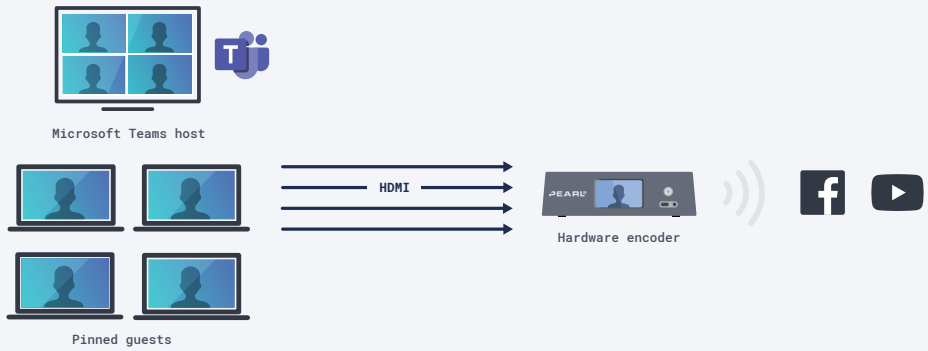
### Setting up isolated full screens:

**Effort level:** Triathlon

**Feasibility:** How much gear do you have?

**Results:** Decent, with a high risk of failure

- Start your Microsoft Teams call
- On separate computers, pin and fullscreen the individual speakers, creating the equivalent of an independent video signal
- Capture the separate speakers' feeds using a hardware encoder or streaming software
- Crop, mix, and switch between sources, add lower thirds or graphics in your production tool of choice




Setting up an isolated speaker screen capture is a perfectly functional (but clumsy) way to produce your hybrid or virtual event with Microsoft Teams.

For isolated speaker screen capture to work, your producer will need a separate device for each individual speaker and another for screen share content. If you plan on featuring five guests and a slide deck, you'll need six laptops all acting as sources, feeding into hardware or software encoders. The event's producer will also need to join the call from the six different computers, creating a crowded virtual studio.

It's doable. And some of the most experienced producers trust this method because it's what they've always had to do to get isolated, switchable video from Microsoft Team meetings.

But events with more than two featured speakers tend to be problematic when using this method as it takes up so much room, it's tough to monitor, and each device is susceptible to its own crashes and freezes. It's especially difficult when guests go off script and decide to share their screen – sending every layout out of whack.

Again, it's doable, but we recommend reserving this method for the experienced, steady hands already comfortable with and equipped for this method.

# Better: Microsoft Teams NDI

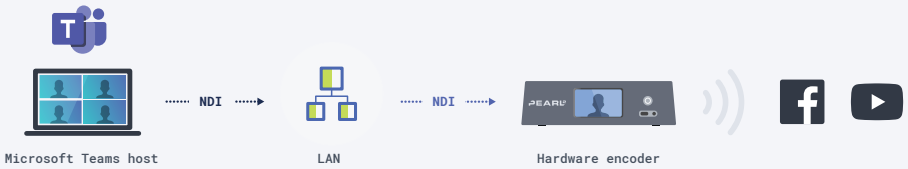
### Enabling NDI in Microsoft Teams:

**Effort level:** A steep hike

**Feasibility:** Very doable with admin access and available hardware

**Results:** High quality in controlled environments

- Start your Microsoft Teams call
- Check the settings to make sure NDI broadcasting is enabled. Contact your Microsoft Teams administrator if you don't see it available
- Click the "Broadcast with NDI" button
- Make sure your hardware or software encoder is connected to the local network.
- Add the speakers' NDI feeds to the encoder
- Crop, mix, and switch between sources, add lower thirds or graphics in your production tool of choice




NDI-out is an elegant solution, affording producers clean, high-quality video and audio. However, for best results, NDI should be used in controlled environments as it's been known to be a strain on networks and hardware performance.

A single 1080p NDI stream requires up to 100 Mbps. for consistent, maximum quality. And that figure rises exponentially with each NDI-out source. Three NDI feeds will require 300 Mbps. from your network. This may not be a problem with at a studio with 1 Gbps, but the average home internet won't be able to keep up with the demands.

Even on strong office networks, if someone else on the network decides to upload a video during the stream, it could all come tumbling down. The same is true if your operating system decides to refresh a background app mid-stream, as streaming NDI can put a CPU up to 90% usage. We strongly recommend using a hardware encoder to stream NDI-out because it can shoulder part of the load on your computer's CPU.

Microsoft Teams' NDI-out function can create an incredible end product, but it's ideal for controlled environments with dedicated hardware. Any fluctuations in network bandwidth or CPU usage can derail the stream's performance.

# Best: Epiphan Connect for Microsoft Teams

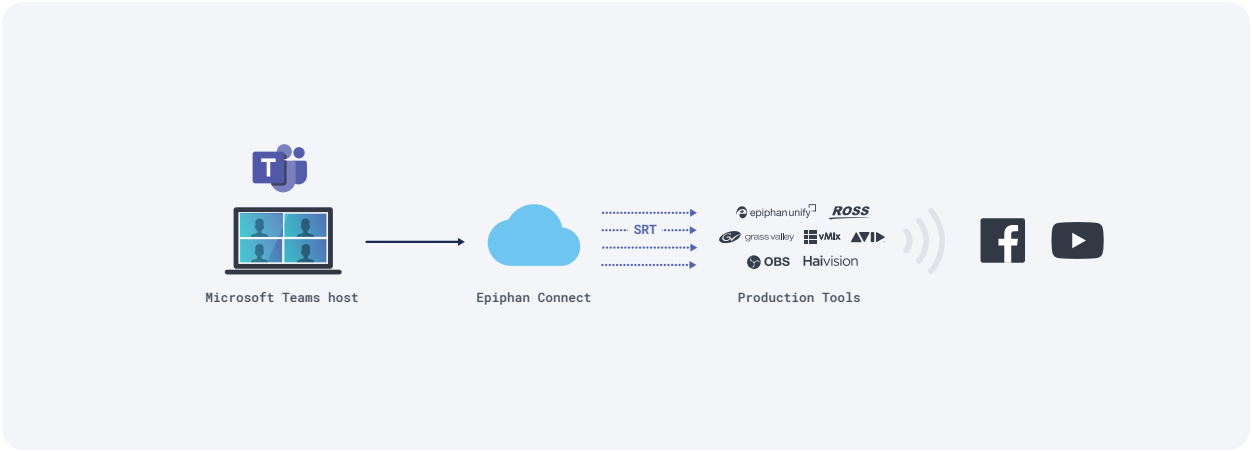
### How to use Epiphan Connect:

**Effort level:** A walk in the park

**Feasibility:** Cloud efficiency for greater flexibility

**Results:** Highest quality and vastly simplified setup

- Create an Epiphan Connect account and pair it to your Microsoft Teams account
- Paste the MS Teams meeting URL in Epiphan Connect
- Epiphan Connect bot joins the meeting
- Connect isolates each participant and screen share into separate feeds
- Pull the participants' isolated feeds into your production tool of choice
- Crop, mix, and switch between sources, add lower thirds or graphics in your production tool of choice




Epiphan Connect simplifies the production workflow, eliminating the need for local hardware, creating a true, cloud-based virtual event. Producers, like the participants, can be anywhere in the world. Once the participants' are isolated into separate feeds, they can be added into any production too where the output is unparalleled: full HD video, isolated audio, and the power to go wherever your creativity takes you.

This tool is the long-awaited marriage between convenience and power. It makes producing live events with Microsoft Teams easier for all producers. No more complex wire-webs or worrying about who else might be connected to the network. Start a meeting and let the cloud handle the packet transfers with full, real-time diagnostics.

It's been amazing to see the leaps and bounds we've made in such a short period of time. Not long ago, the only option to produce professional content through Microsoft Teams was isolated speaker screen capture. And while complicated for producers, it has always delighted guests with its simplicity. Now, with the emergence of Epiphan Connect, we've already found a way to convenience both speaker and producer.

epiphan connect

# Create your best video experience with Microsoft Teams

## Discover the power of Epiphan Connect

Scan the code to claim 1 month free!

**Learn more about Epiphan Connect at**
**www.epiphan.com/connect**

epiphan connect

1 Start a Teams meeting

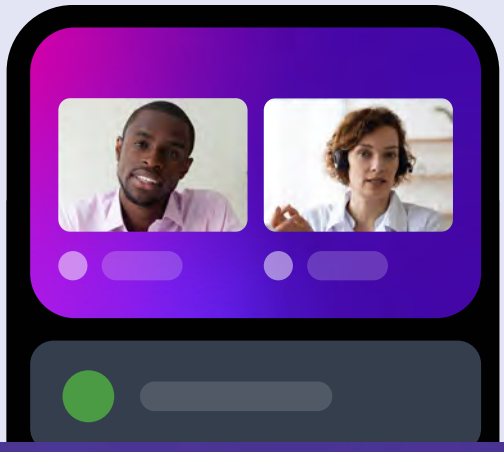

2 Extract individual video and audio feeds with Connect

SRT

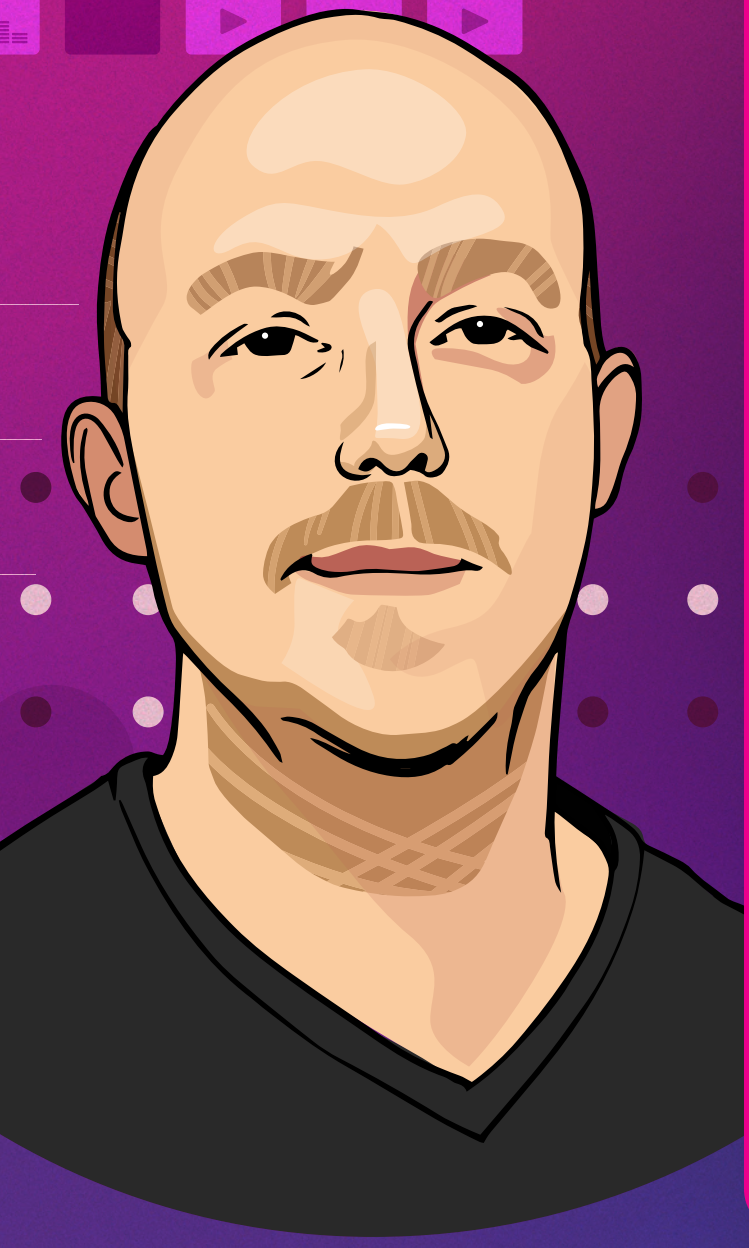
3 Create engaging content in your production tools

epiphan video ROSS grass valley
vMix AVID OBS Haivision

4 Share with your audience



The Hero Issue



# The Optimizer

**Superpower:** Finding shortcuts

**Motto:** "Work smarter, not harder."

The remote production Optimizer is always searching for ways to automate as many parts of the production line as possible, simplifying existing processes. AI, machine learning, and automation are this hero's sidekicks.

They might find themselves creating a fly-kit that they could easily ship to remote contributors or perhaps designing a self-serve video studio where clients would come in and record themselves at a touch of a button. To sleep well at night, they need to see efficiency in everything.

*"For me, the idea of optimizing workflows is always the key to saving time. Time is an essential part of video production now. You need to save time for yourself and your clients, and optimizing is the way to do that."*

**Jeremy Prudhomme, Founder of JEEMAN Productions**

# How a video producer ramped up operations with cloud-enabled efficiency

Ontario-based video producer Jeremy Prudhomme set up several one-touch video studios to scale and streamline its content production. At the heart of the solution are Pearl hardware and Epiphan Cloud, a cloud-based tool for remote production and device management.

# The challenge: Too much to create, too little time

JEEMAN Productions founder Jeremy Prudhomme faced an enviable challenge: fast-growing demand for his video production services. More and more clients were coming to him for short, vodcast-style marketing videos. There was only one problem: while the videos themselves were short and straightforward, the process of creating them was anything but.

To get the job done, either the assigned producer would travel to the client's location, or the client would travel to Prudhomme's studio for the shoot. In the former scenario, the producer would spend significant time traveling, setting up gear, shooting the content, tearing down, transferring the recordings from the storage media, and traveling back. In the latter, the set would have to be booked for that client for the entire day, limiting production capacity significantly. Either way, a short, five-minute final cut would typically take five long hours to shoot.

As demand continued to grow, Prudhomme was running out of production resources. So he had to find a way to boost production capacity and simplify on-demand video creation.

The plan was to build automated, single-touch video studios where clients could record on their own, with minimal remote oversight from a trained professional.

# The solution: Flawless remote production with Epiphan Cloud

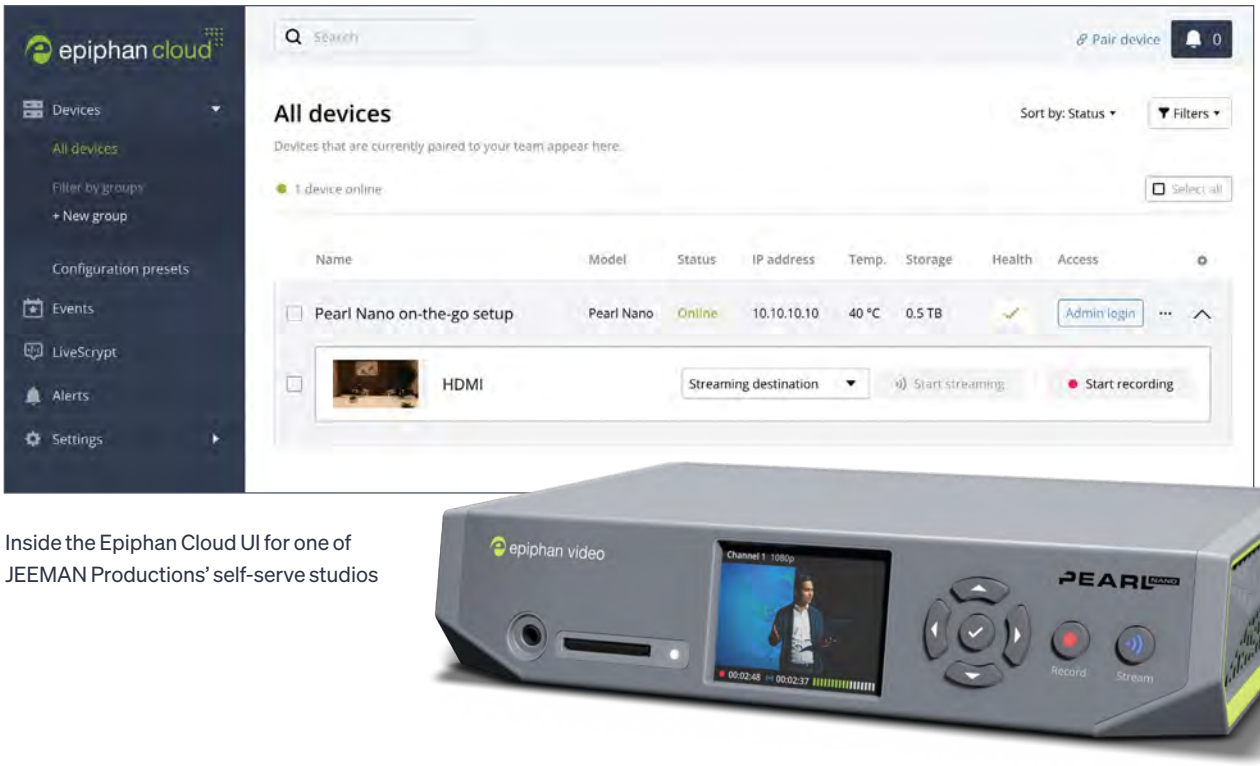
Prudhomme found his ideal remote solution in Epiphan products. Pearl encoders to capture high-quality assets from the studio cameras and microphones; Epiphan Cloud for remote access to device settings, control, and storage.

Prudhomme designed and built several self-serve video studios with Epiphan Cloud serving as the backbone for remote production control.

Epiphan Cloud gives the team complete remote access to the encoders via the Internet, including Pearl configuration, source monitoring, and live switching. They can log in to any Pearl through Cloud and configure it as though it was in their hands.

The team can ensure recording is running smoothly by monitoring the process and tweaking settings on the fly. Recordings are remotely accessible from Pearl's internal storage. Producers can download the footage immediately and begin post-production without delay.

> *"I can access the hardware from anywhere in the world. Easy access to files from anywhere is huge for me."*
>
> **Jeremy Prudhomme**
> Founder of JEEMAN Productions




Inside the Epiphan Cloud UI for one of JEEMAN Productions' self-serve studios

# The results: Boosted production capacity with optimized video creation

To date, Prudhomme has launched four self-serve studios and has plans to build more. Thanks to these new automated recording spaces, JEEMAN Productions was able to not only meet the demand for video content but also onboard several new clients.

Aside from helping Prudhomme grow his business, Cloud-powered remote production studios delivered other impressive benefits.

## Time-efficient operations

The new studios significantly increased the company's video production capacity. Before, the team could only travel to one location at a time, whereas now, they can receive and edit footage from four different studios simultaneously. Prudhomme expects to grow beyond four studios thanks to this model.

Cloud-powered studios take the legwork out of video production. Now there's no need for the producers to travel to the client's location, set up, and tear down equipment.

The team can work on multiple projects in tandem. With on-site production simplified, producers can focus on efficient post-production. And with video files available from anywhere, Prudhomme can easily outsource to more video editors regardless of their physical location.

## Fast content turnaround

Thanks to Epiphan Cloud, producers can download the footage remotely, start editing right away, and deliver the final product faster than before. With remote file download, there's no need to fuss around with SD cards or other media storage.

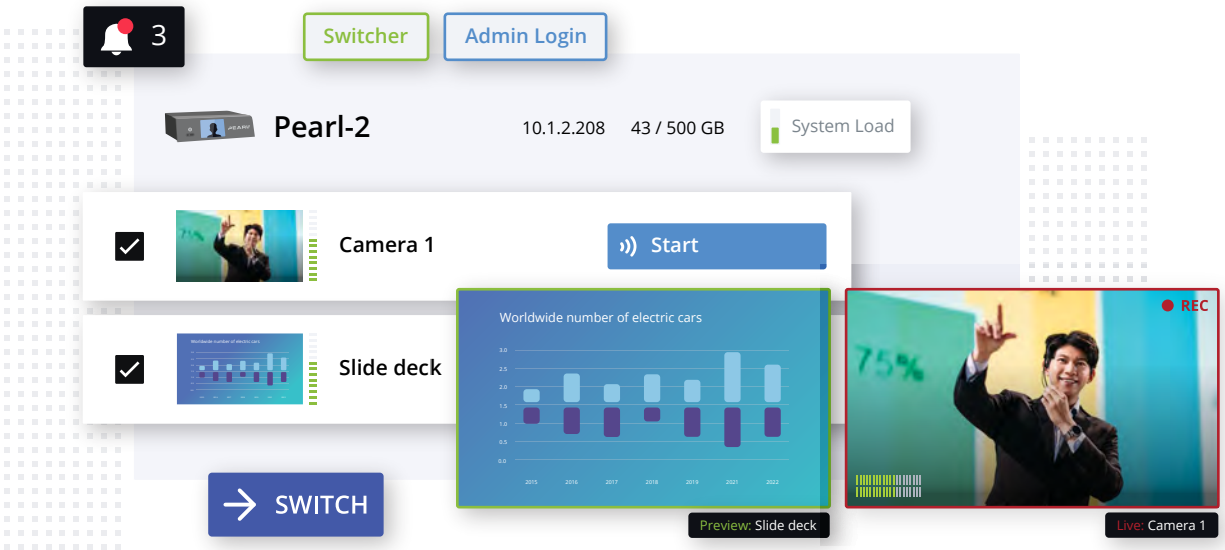
> *"Epiphan Cloud embodies the potential and possibilities of easy content creation. It's the future of video creation."*
>
> **Jeremy Prudhomme**
> Founder of JEEMAN Productions

## Full-confidence remote production

With full visibility into inputs and channels on every device, remote producers know they'll get the best raw footage possible. Epiphan Cloud's remote switching feature enables the team to produce live and recorded programs from a distance.

## A seamless experience for clients

Process optimization created a more seamless experience for the clients. Prudhomme organized the self-recording process in a way that eliminated user error. As he puts it, "Optimization eliminated many technical issues by removing potential points of failure. Clients come in, sit down, press one button, and that's it. They don't have to worry about a thing. And a confident client is a happy client."




JEEMAN PRODUCTIONS

Founded in 2019, JEEMAN Productions is an Ontario-based creative production company dedicated to creating compelling visual content. JEEMAN Productions' talented filmmakers deliver work of every scale and genre, from single-camera studio interviews to multi-camera, multi-crew commercial shoots.

The
Hero
Issue

# The Luminary

**Superpower:** Seeing the bigger picture

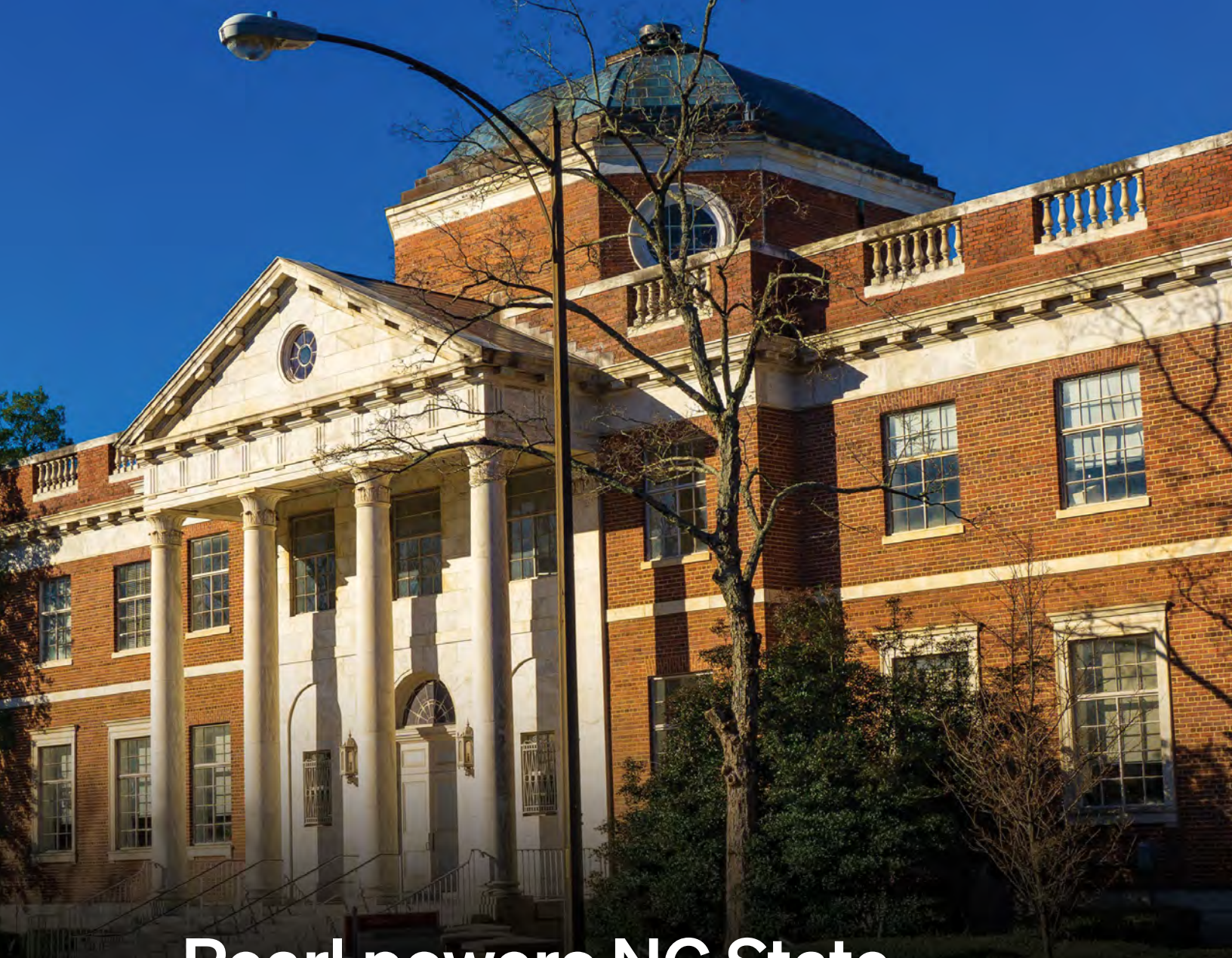
**Motto:** "Let's turn the ideas of tomorrow into the reality of today."

A forward-thinking visionary and a pragmatic dreamer. Excited about new technology, loves testing it and pushing it to the limit. While the rest of the archetypes are buried in day-to-day tasks, the Luminary is looking ahead. Their abundant professional experience allows them to make "predictions" about the next big thing (and they are usually right). Only it isn't blind luck – it's their wealth of knowledge and experience gathered over a lifetime in AV, actualized.

Chances are, the Luminary has once been an Engineer, a Sage, a Ninja – or all of the above.
They've been there, and they've done that.
Now, they're busy mentoring others and making AV dreams become reality.

*"I always like to know what is the roadmap of the new technology or product we are looking at. How did it evolve and where is it going? And most importantly, how sustainable is it? I like to get into testing new technologies early on so I can see behind the scenes. Testing gets me into the know and allows me to make an educated decision on whether we want to be in that arena."*

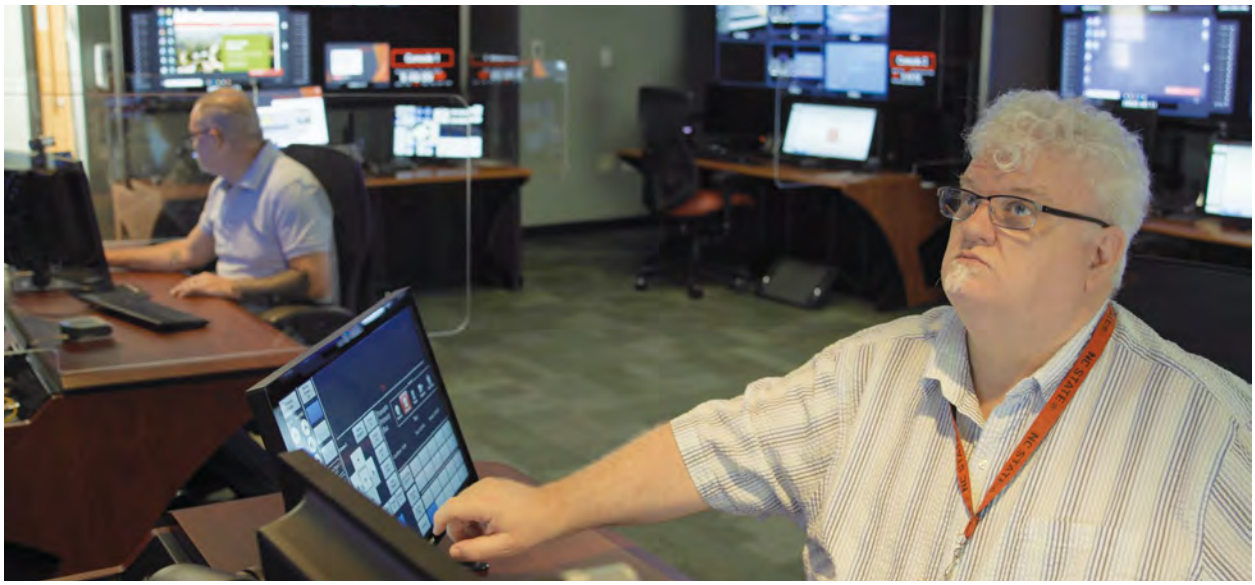
**Tony Pearson**
Senior Associate Director (DELTA) at NCSU



# Pearl powers NC State University's lecture capture for over 200 classrooms

Since its charter in 1887, NC State University was founded on the principle of providing an accessible, advanced learning environment for its students and faculty. The latest iteration of this rich tradition: equip over 200 classrooms with lecture capture technology powered by the Epiphan Pearl.

Pearl powers North Carolina State University's classroom capture for over 200 classrooms



# The Challenge: Quadrupling lecture capture capacity

When speaking to the faculty and administrative staff at North Carolina State University, it's clear how much their historical land-grant status matters. Land-grant universities were created across the United States in the late-1800s to make higher education more accessible to the average American. This tradition of accessible education lives on at NC State and requires constant upkeep to make sure the staff has the tools necessary to meet the needs of their students.

Because innovation and access are at the very core of NC State's values, they are no strangers to deploying lecture capture technology. Tony Pearson, Senior Associate Director of Digital Education and Learning Technology Applications (DELTA), recalls how in the 1990s the lecture capture initiative depended on a "Sneaker Net." Members of DELTA would walk around campus and pick up video tapes for duplication and distribution. Thankfully, the need to physically pick up and mail out tapes has become obsolete. But the demand for classroom capture has only grown since the years of Mr. Pearson's "Sneaker Net."

The existing lecture capture technology was primarily geared towards accommodating any student unable to attend classes physically. Given NC State's diverse student body, this might include military service members stationed abroad, international students, and students working full-time. As such, the scope of the lecture capture initiative was relatively small, with only 50 classrooms capable of streaming and recording. And it was at the professor's discretion whether or not to opt-in to have their classrooms recorded.

Year after year, however, when students submitted feedback and completed surveys, the demand for more recorded courses was consistently growing. Both in-person and online students saw it as a valuable addition to their learning experience. Even faculty members who participated in year-end surveys expressed an overwhelming desire to increase classroom capture, believing it could have a positive impact on student performance.

With a growing demand to provide more class recordings from in-class students, online students, and faculty members, NC State's DELTA went through an exhaustive evaluation period to find the solution that made the most sense.

> *"The idea behind classroom capture is not for it to replace coming to class, not to replace attending your courses, but instead to be another tool on your tool belt of learning technologies."*
>
> **Leisa Bolles**
> Director of Media Production Services (DELTA)

Whatever they chose as their classroom capture solution, it had to:

- Integrate with their existing AV infrastructure and content management system (CMS), Panopto.
- Have the option to be operated remotely.
- Easy to maintain without adding additional headcount.

Plus, the classroom capture solution had to make sense from a budgetary perspective. The only product that checked all boxes? Epiphan Pearl systems.

## Create broadcast-quality video anytime, anywhere

Pearl video production systems are reliable, intuitive – and fully remote controllable. Just log in to Epiphan Cloud's centralized dashboard to access these powerful edge devices from any location, enabling you to produce exceptional branded video from a distance.

**Discover Pearl systems at www.epiphan.com/compare-pearl-systems/**

# The Solution: Pearl Mini provides reliable support in the face of massive demands

NC State ended up choosing Pearl Mini hardware encoders as the primary workhorse for all lecture capture setups. With its two HDMI, one SDI, and dual professional XLR audio inputs, it was the perfect choice for in-room audio and video capture. Each room included a camera source, a computer source, and audio from a ceiling-mounted microphone.

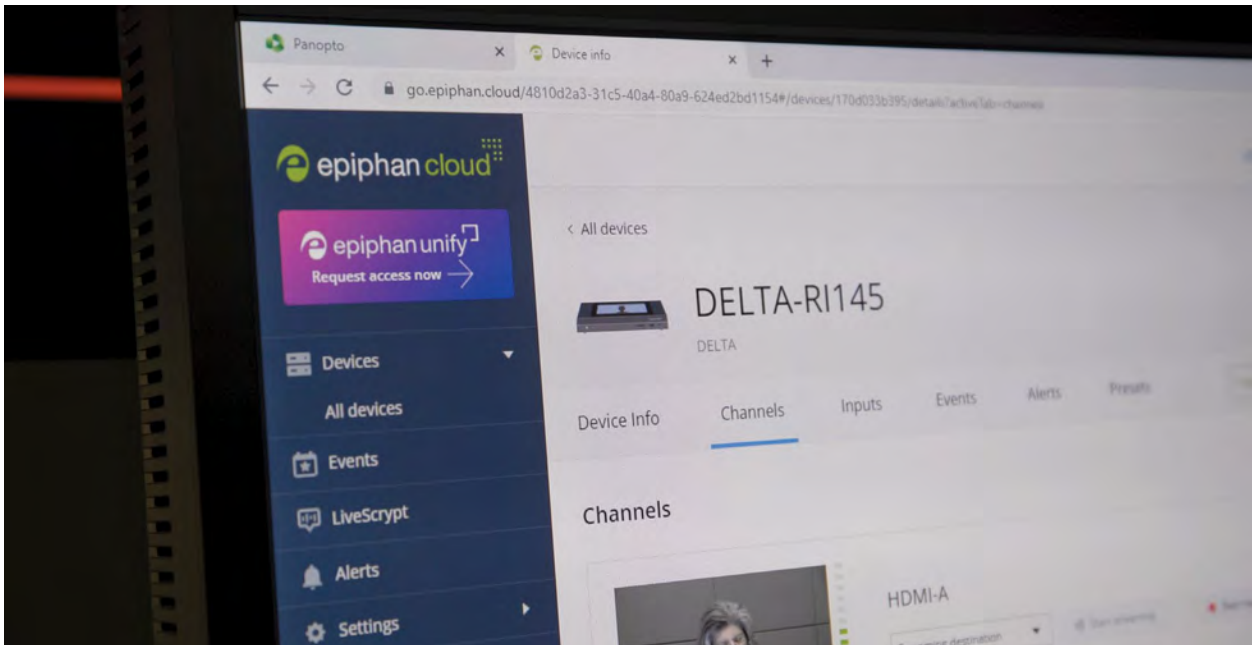
Right off the bat, NC State's DELTA staff were intrigued by Pearl's ability to integrate with all the existing and new equipment seamlessly.

Upon realizing that Pearl Mini would interact with the other components, DELTA had to evaluate it from the end-user experience. The team's idea of an ideal end-user experience was for it to be totally seamless. They didn't want the faculty to feel intimidated or overwhelmed by the technology. They didn't even want faculty members to notice it was there.

The integration with Panopto CMS delivered that seamless experience. It eliminated the need to show professors how to activate the Pearl Mini in their lecture halls. The faculty, already familiar with Panopto, pressed record just like they always did. And to accommodate any professors not yet familiar with Panopto, the DELTA team developed automated control functions through Pearl's compatibility with the Crestron Control Module. Professors could now walk into the lecture hall and begin teaching. The recording starts automatically, and the file is uploaded to NC State's LMS minutes after the lecture concludes.

*"You can plug a Pearl Mini into your AV infrastructure and expect it to work. It just works. Once you've configured it and had a setup on the network, it just works flawlessly."*

**Ron Bradley**
Classroom Technology Manager




With two key criteria met, the question of maintenance and monitoring still loomed largely. The DELTA team couldn't be in 200 different places at once. Well, they could be, thanks to Epiphan Cloud.

Included with all Epiphan Pearl products, Epiphan Cloud was developed to simplify remote production. Whatever apprehensions the DELTA team felt about being spread too thin were relieved by its inclusion. They could configure and monitor over 200 Pearl Mini devices on campus from a centralized admin panel on their web browser. Epiphan Cloud eliminated any need for legwork, making the scaled-up classroom capture more efficient to maintain than the previous iteration.

*"My favorite feature of the Pearl is that it works. It integrates into our existing AV infrastructure. And it's been cost-effective at the scale at which we were trying to increase our capabilities."*

**Leisa Bolles**
Director of Media Production Services (DELTA)

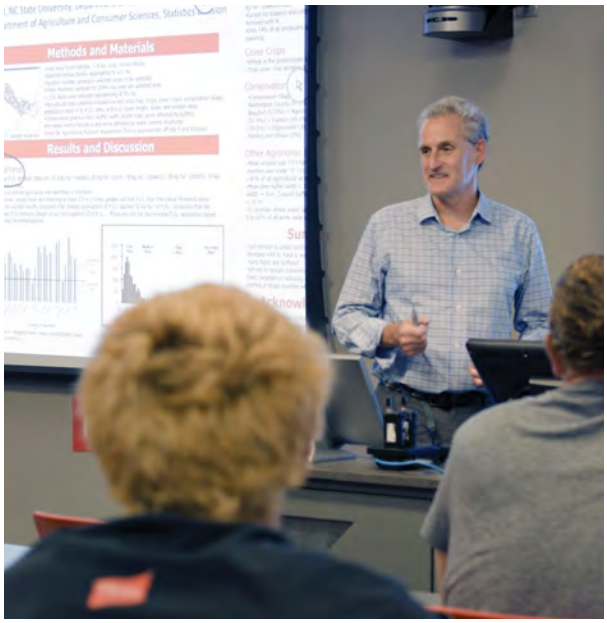
When scaling any service, a key metric of success is ensuring the growth doesn't compromise performance. Though the coverage has quadrupled, over 2,000 lectures are seamlessly captured and reliably delivered more efficiently than ever.

# The Results: A dynamic learning environment for all

Pearl Mini was designed with reliability in mind. At NC State, over 40,000 students depend on the resources Pearl delivers to reach their full academic potential. And DELTA depends on the Pearl Minis to uphold a 135-year legacy. By staking the success of their ambitious new venture on Epiphan, the impacts were tangible less than a year after adoption.

## Beyond the classroom

Though making sure classrooms were capable of state-of-the-art capture was the priority, like any higher learning institution, there's much more going on than just lectures. NC State has also outfitted specialty spaces with capture technology, allowing the team to record, stream, and share special events, meetings, presentations, and more. With this, students, faculty, and staff can stay connected with all facets of university life anywhere, at any time.




## Student engagement

Students who had long lobbied for increased classroom capture are taking advantage of the scaled-up resource. In two semesters of Epiphan supporting the expanded capture, recorded lectures have accumulated over 4 million views. Professors have noted that students rewatch lectures to prepare for assignments and exams. Students are markedly asking more specific and detailed clarifying questions about the material ahead of important evaluations.

It's a resource that's enhanced the on-campus experience, a safety net for any student unable to attend in-person, a connector for online students, and creates a more accessible environment for any students with disabilities.

> *"It kind of lets them play the semester forward and backward."*
>
> **Dustin Heinen**
> Assistant Teaching Professor / Classics

Pearl powers North Carolina State University's classroom capture for over 200 classrooms


## National recognition

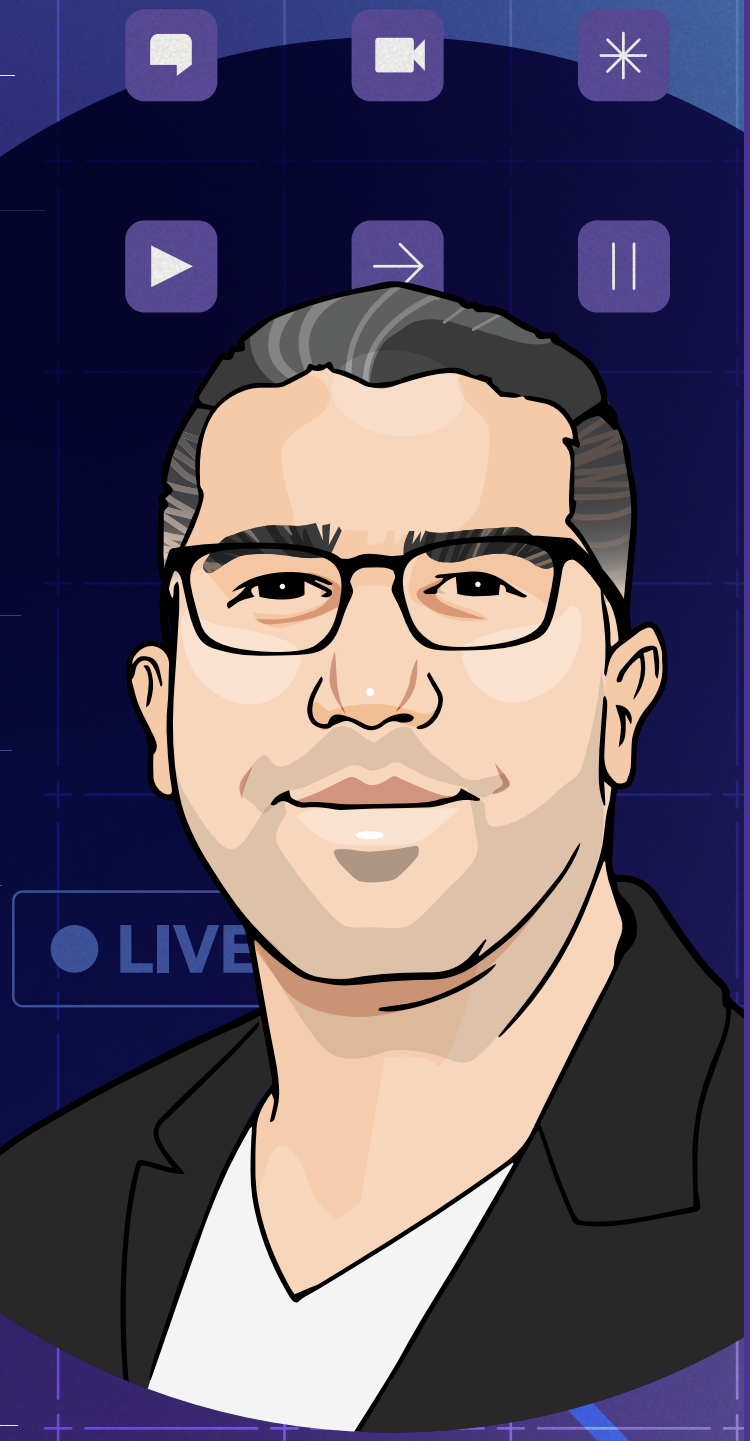
In its annual survey of 1,600 online degree programs, U.S. News & World Report selected seven NC State online programs in the top 10 of their respective disciplines.

Student achievement is a major factor in each ranking, but U.S. News also takes into account services and technologies. As a result, the thoroughness and reliability of lecture capture have been a huge differentiator for online programs. Linda Krute, the Engineering Online program director, told NC State News, "These are online degrees, but for the students, the experience is the same as if they were on campus. The same courses, same faculty, same homework, same exams, and ultimately the same diplomas."

As more and more institutions like NC State see the impact investing in classroom capture has on the quality of education for their students and the quality of life for their faculty and staff, it will soon be the standard. And once classroom capture becomes standardized across higher learning, we all reap the benefits of accessible education.

Whether you have an existing AV infrastructure that needs scaling up like NC State or you're starting from scratch, Epiphan is proud to offer a full slate of solutions to make streaming, recording, and monitoring simpler and more efficient.

The
Hero
Issue




# The Architect

**Superpower:** Perfectionism

**Motto:** "It works every time, 100% of the time."

Whenever this professional is presented with a problem, they immediately become eager to find a reliable solution (no matter how long it takes). They tend to think in diagrams, plotting signal flows and ingest points. Their moderate-to-severe perfectionism helps them polish each setup to a luster.

The tried-and-true Architect comfortably holds the entire weight of your production on their Atlassian shoulders. They're that wizard behind the scenes you never see, making the show run smoothly.

*"I am big on visualizing things. When it comes to working out solutions, it's almost like I think in diagrams. When I am presented with a problem, I immediately start imagining myself going through every step, from A to Z, and coming up with a solution. In my head, I feel like I am in VR. It's that visual process that helps me."*

**Mike Salas**
Live Event Producer at MSAVi PRO

# A practical guide: Remote video production

Remote video production is a tantalizing option for many producers because, in theory, it should provide more freedom, flexibility, and efficiency.

But there are a few things that need to be in place in order to unlock the theoretical freedom remote production affords.

# Remote accessible gear you'll need

Manufacturers are busy developing products that can be controlled from anywhere every day. The more remote and cloud-enabled gear you can acquire, the more flexibility you'll have to produce from anywhere.

**Here's a list of our favorite gear we like to have in our arsenal for remote production:**

## Camera

Pan-tilt-zoom (PTZ) cameras have long been a fantastic option for capturing live events when short-staffed because they offer a wide range of motion and customization that can be done hands-free.

Canon's CR-N500 and Panasonic's AW-UE100 offer both 4K and full-HD sensors and support the SRT streaming protocol. ARRI also features a line of remotely controllable cameras. These options are pricey but provide unparalleled control to capture live events and studio productions.

SRT-enabled cameras can send both video and audio directly to cloud production systems, or you can send the camera feed to an in-room encoder like Epiphan Pearl, which will then distribute them to your CDNs of choice.

## Lighting

Lighting sets the tone for the content. And while we're still waiting for a robot that can automatically roll out a three-point lighting setup, it is possible to do some basic lighting adjustments remotely. Brightness, temperature, and color can all be tweaked from anywhere with the right equipment.

CineMiranda by Ben Peoples Industries is a portable, remote-enabled lighting control that allows producers and lighting designers to control the mood and hit cues from anywhere. Plug in the lights, connect the device to an ethernet port, and you'll be able to change the color, brightness, and more from anywhere.

## Audio Mixer

Without good audio, it becomes exponentially harder to convey your message. Clear, balanced audio is a hallmark of professionalism and production value, which can be best achieved when plugging microphones into an audio mixer.

Soundcraft's Ui series of digital mixers are compact, but rugged, and have great networking capabilities. After connecting the XLRs on-site, thanks to the integrated web-browser-based mixer interface, you can adjust the channels, layer effects, and save presets from anywhere.

## Production system

Whether you're controlling cameras remotely or using static cameras, this is the heart of your setup. Having a dedicated production system specifically built to stream, record, encode, switch, design layouts, and act as a confidence monitor all-in-one mitigates any potential pain points – like overloading your PC's CPU when it tries to stand in for an all-in-one system.

Epiphan Pearl video production systems are a favorite for remote video production because they don't require VPNs or network tunnels to operate remotely. Using only Epiphan Cloud's centralized dashboard, you can monitor every piece of connected equipment, control the flow of the show, and know the audience is receiving the best possible quality from anywhere in the world.


Ultimately, PTZ cameras are nice to have. Remote audio mixers and lights are impressive. But a Pearl production system truly unlocks the potential of remote production. With just one Pearl production system, you have everything you need to produce videos remotely.

# 3 remote productions in practice

Now that you know what gear you need, let's look at three separate remote video production scenarios where this gear empowers you to create outstanding content.

## 1. Livestreaming an event

A company is launching a new product and wants to livestream the event happening at a hotel convention center downtown.

**Here's what you do:**

- Set up the room with the PTZ cameras and the lights, making sure their controls are functioning correctly over the network
- Connect the microphones to the audio mixer and ensure you can control the mixer over the network
- Connect your audio and video sources to the Pearl production system
- Sit back in your off-site office and run the event remotely!

Once everything's set up, all this gear and your livestream can be controlled from anywhere. Whether from the back of the room or from your office across town, you can change the mic levels, adjust the light's temperature, pan tilt or zoom, and switch between layouts conveniently.

## 2. Recording video content remotely

A startup is planning to launch a video podcast. One of the hosts works in the Seattle office while the other is based out of New York City. The only way to make their new content strategy viable is to record them remotely.

**Here's what you do:**

- Schedule a Microsoft Teams meeting with yourself, the hosts, and any guests they've booked
- Add the Microsoft Teams meeting to Epiphan Connect
- Once all parties have joined the Teams call, make sure the hosts – and maybe the guests too – have enabled their external microphones
- With the meeting underway, use Epiphan Connect to extract their isos to bring into Epiphan Unify to record the participant's feeds and the content share

By recording the show on Epiphan Unify, the content-share and each participant's feed was recorded directly to the cloud, giving the company easy access to the footage they need.

## 3. Producing a hybrid event

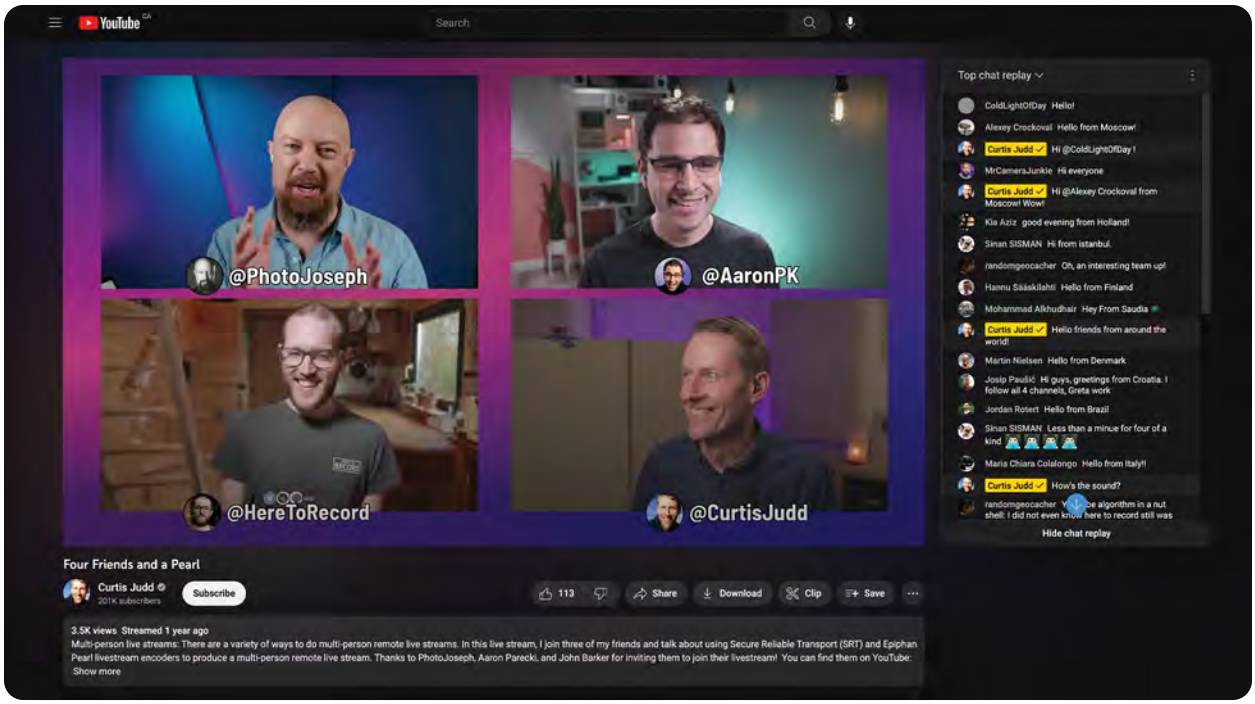
A client wants to host a hybrid livestream to kick off their company's upcoming rebrand. Two hosts can join from the studio, but there will be three guests joining remotely.

**Here's what you do:**

- Schedule a Microsoft Teams meeting for the participants
- Add the MS Teams meeting to Epiphan Connect
- Once the in-room and remote guest join, use Epiphan Connect to bring the extracted isos into Epiphan Unify
- In Unify, create branded layouts including the content-share from Teams
- Also in Unify, stream to your CDNs of choice, and don't forget to record your isolated video feeds to use the footage for another project

Epiphan Connect needs to be in your back pocket when producing hybrid events. It turns any MS Teams call into a virtual studio, giving producers stable, high-quality SRT streams, and puts guests in a familiar environment.

Though used by millions daily, it's still wise to go over the basics of MS Teams. Make time to double-check that guests know how to share their screens, where they can find the chat. And let them know you may speak to them directly as back-channel communication.




## Collaboration in a remote and hybrid world

We're still only scratching the surface of what's possible with remote and hybrid video production. The technology will continue to get better and, most importantly, the creativity within our industry will continue to push the boundaries of what's possible.

If you have developed your own remote production workflows, we want to hear about them. The more we share knowledge, the further we push the boundaries of what's possible. Start the conversation at info@epiphan.com

# The Sage

**Superpower:** Empowering others

**Motto:** “Sharing is caring.”

A life-long learner, the Sage is always eager to share their tech knowledge with others. Generous to a fault, they take the time to bring everyone into the fold (usually via excellent online video content). Excited about new technology, but also knows what’s proven and works. Tests equipment and setups so we don’t have to; graciously lets us know what works and doesn’t. They are the guiding light in the stormy sea of remote production technology and gear.

In addition to their main superpower, they also can recall any spec of any product ever made.

The Sage lives for the interaction with their community, because, ultimately, they want to see everyone succeed. Believes that with the power of the community, any problem can (and will) be solved.

*“I find it exciting to break new ground when it comes to applying technology. Many times technology companies are focused on the specifications and miss a huge practical application that really connects with a certain audience. One of the rewards for creating content is the feedback you get in the form of new ideas and perspectives given in comments and social conversations.”*

**Paul Richards**
Chief Revenue Officer at PTZ Optics


# SRT: A hybrid production superpower

Picture this: after months of back and forths, you finally book a high-profile panelist for your hybrid event. With their name attached, RSVPs are through the roof. The trouble is the coveted guest will be joining from a remote location where the air is thin and Internet connectivity is spotty at best.

All signs point to low resolution, choppy bitrate, grainy video. You could feature them as an audio-only guest... Or you could use your not-so-secret weapon: the Secure Reliable Transport (SRT) protocol.

# What is the SRT protocol?

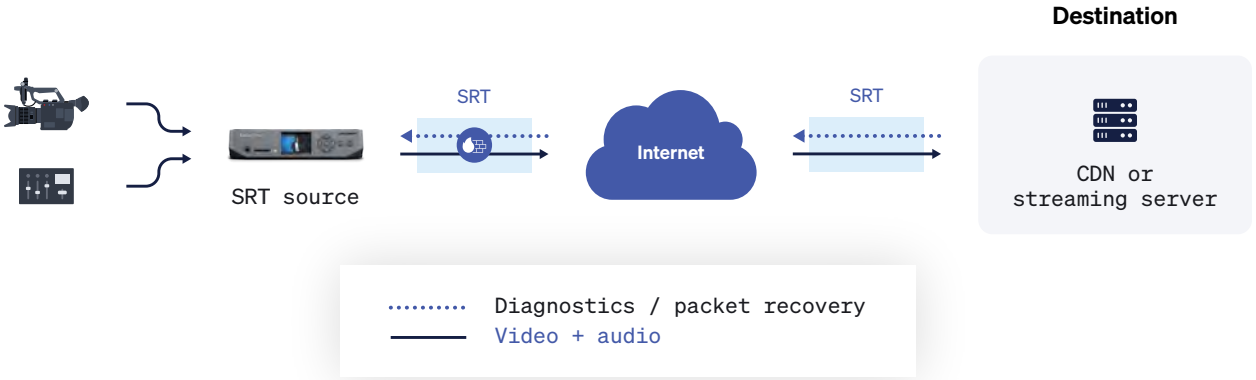
SRT is a way to bring high-quality, low-latency video over any network, even ones afflicted with limited bandwidth, thanks to dynamic endpoint adjustments and resilient design.

In real-time, it buffers and adjusts parameters to suit network conditions by continuously sending and receiving control data, allowing the stream to intelligently find ways to compensate for packet loss, jitters, and other threats to quality.

That high-profile guest you just booked can connect on video in their remote location with weak internet via SRT.

It does all this while delivering on the acronym's promise of security. The protocol offers up to 256-bit Advanced Encryption Standard (AES) encryption, safeguarding data from contribution to distribution.

Not only is SRT changing the way we stream online, but it also has traditional broadcasters intrigued. They may have finally found a cost-effective and logistically sound replacement for satellite trucks and private networks.




## Tuning SRT latency

Learn more about tuning SRT Latency at
www.epiphan.com/blog/srt-protocol/

# How to leverage SRT

Whenever you opt to stream with SRT, you're going to enjoy a clearer image and audio quality regardless of the network's stability. But, in order to take advantage of SRT's revolutionary benefits, you will need solutions to encode and decode the protocol.

Being an open-source, royalty-free technology that solves so many long-standing problems, over 500 companies develop, manufacture, and operate video encoders, decoders, CDNs, media gateways, capture cards, cloud infrastructure, and cameras that support SRT.

This growing ecosystem, known officially as the SRT Alliance, means there are plenty of options to choose from when you're exploring SRT.

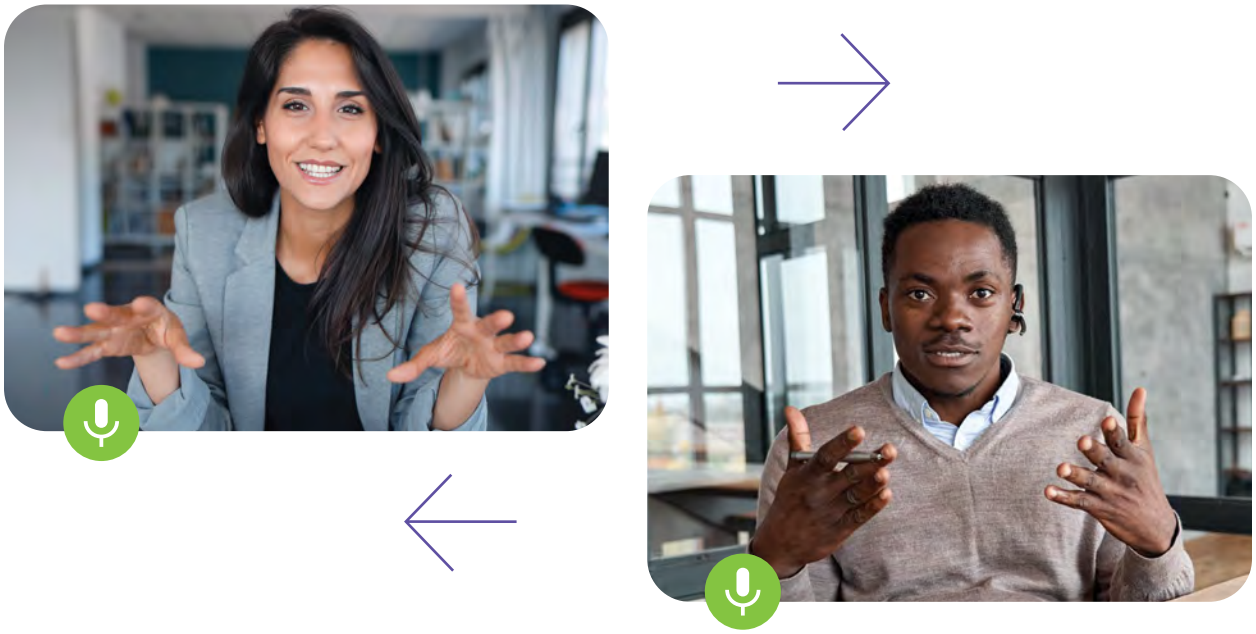
SRT ALLIANCE
SECURE RELIABLE TRANSPORT




One of the simplest ways to create an SRT feed is through Epiphan Connect. Epiphan Connect takes any ordinary Microsoft Teams meeting and isolates all participants into SRT feeds. Guests and contributors don't need to get a specific camera or video encoder, they simply click the Teams link and join the meeting as they already do every day. And with those isolated feeds, you can place them into any SRT-enabled production tool and produce high-quality content from anywhere.

# Establishing a backchannel for real-time communication

Because SRT typically adds latency to help manage the network, it's not ideal for two-way communication in real-time. For this reason, it's important to consider in an SRT-powered production, how guests will communicate with each other, and how producers communicate with the guests.



This is an especially useful application of Epiphan Connect. With Microsoft Teams already serving as the virtual studio, you can easily communicate with guests before and during the stream while simultaneously generating SRT streams.

And if you're not interested in using Microsoft Teams as your backchannel, you can set up a separate phone call, or videoconferencing meeting for communication that runs independently of the SRT streams.

# Become a hybrid hero with award-winning tools

Fully harnessing the power of SRT takes the right gear – like our award-winning Epiphan hardware encoders that give you advanced control over every facet of your SRT streams.

Pearl systems feature multiple built-in inputs for video and professional audio, simplifying setup by letting you directly connect advanced video and audio gear for the highest quality SRT streams. Plus, end-to-end control through Epiphan Cloud makes it possible to configure and test contribution encoders located anywhere in the world.

**Learn more about SRT protocol support on Pearl systems on our website at www.epiphan.com/srt**


PEARL2
epiphan video
epiphan video
PEARL
Record
Stream

# Epiphan Unify enables multi-camera motorcycle event stream with cloud-powered production

Established in 2000, the Ride for Dad initiative has raised over $37 million for the fight against prostate cancer. The proceeds from their annual events go to ground-breaking cancer research and life-saving public awareness campaigns about the disease and the importance of early detection.

# The challenge: Create a captivating live production of a group motorcycle ride

Capturing high-quality video from a motorcycle is challenging. Live streaming a fully switched, multi-camera, multi-rider production is an even more daunting task.

The quality of mobile video sources sent over an unbonded LTE connection is notoriously unpredictable. And producing a multi-camera program requires a solution for signal aggregation, switching, and mixing content remotely.

The moto club at Epiphan Video sought to overcome these challenges using Epiphan Unify, a cloud-powered production platform that leverages Secure Reliable Transport (SRT) streaming protocol for video inputs.

# The solution: Epiphan Unify cloud-powered production

Epiphan Unify offers the ultimate flexibility to record, switch, mix, and restream content from anywhere. In this case, the perspectives of three motorcycle riders were combined into a single program and streamed live to YouTube.

To capture video, each rider used a smartphone with a wearable or handlebar mount. The phones streamed video to Epiphan Unify through Softvelum's Larix Broadcaster mobile app. Like Epiphan Unify, the app supports SRT streaming protocol.

SRT can stream high-quality video over unpredictable networks thanks to features like configurable latency and packet recovery. Furthermore, SRT is compatible with H.265/HEVC codec, capable of reducing the required bandwidth by half compared to H.264/AVC codec. This powerful combination of SRT and H.265/HEVC allowed the riders to stream high-quality HD video directly to Epiphan Unify at a bitrate of just 1.5 Mbps and a configured latency of only 700 ms.

From there, a remote operator mixed these video sources in Epiphan Unify to create a polished multi-camera program complete with PIP layouts, branding, and titles. The program was then streamed to YouTube while simultaneously recording each ISO video source and the program itself. The remote operator first configured the program using Epiphan Unify's intuitive web-based interface, then managed the stream and switched between layouts using a smartphone.


# The Results: An engaging multi-camera live event video with minimal effort

The live program streamed to YouTube for nearly two hours without any interruptions. Viewers were engaged by opening speeches at the event and a variety of multi-camera layouts that provided the exciting POV perspectives of the three motorcycle riders. Branded graphics and YouTube links encouraged viewers to make a donation to Ride for Dad, and the titles let viewers know which rider's perspective they were viewing at any given moment.

As the riders ventured to rural areas and passed through areas with spotty cellular coverage, there were several short disruptions to their camera feeds. However, the SRT streams quickly recovered without requiring any adjustments. The Epiphan Unify operator could simply switch layouts to whichever rider's stream was available in these moments, creating a seamless experience for the viewer and ensuring the program remained consistently engaging.

The instantly available recordings of each rider's ISO and the program made post-production of highlight videos from the event fast and easy.

We received lots of positive feedback from the stream viewers, including Ride for Dad participants from other cities who praised the video quality. The Epiphan Video team raised $1,757 for this great cause and will continue to participate in future events.

Established in 2000, the Ride for Dad initiative has raised over $37 million for the fight against prostate cancer. The proceeds from their annual events go to ground-breaking cancer research and life-saving public awareness campaigns about the disease and the importance of early detection.

# Broadcasting the earliest of milestones with video

Concerts, conferences, lectures, weddings, birthdays, bar mitzvahs – there's no end to applications for video. So why not use it to capture one of the most exciting times for parents-to-be: that first glimpse of their little one on the ultrasound monitor?

That's exactly the opportunity the co-founders of BabyFlix saw back in 2014. Today, the San Diego-based BabyFlix provides its unique service through more than 100 clinics across the United States. Using the company's online platform, new families can share and preserve ultrasound imagery as live streams, on-demand videos, and photos. Cloud storage gives parents a convenient place to hold and secure their recordings.

It's yet another example of an increasingly apparent principle: Where there's something worth sharing, there's an opportunity for video. And for the business-minded, it's more evidence of the wisdom of investing in a robust video infrastructure or getting familiar with products that could serve as the backbone of a profitable venture.

# The birth (and boom) of BabyFlix

Many people are eager to share their ultrasound screenings with family and friends. But it's not always possible, or easy. Family members live far away or can't travel. The appointment timing might not work for everyone who'd love to be there. And capturing ultrasound images requires technical know-how that clinics might not have.

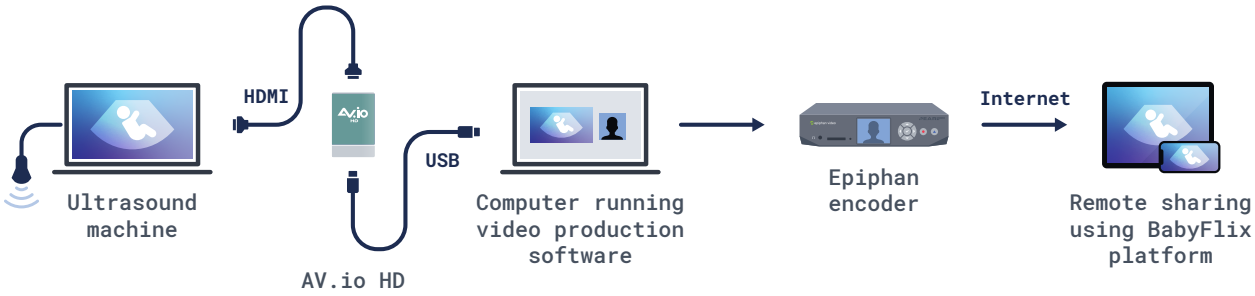
The demand for a platform like BabyFlix was inevitable in today's hyperconnected world, says Steve Corey, one of the company's founders. "The demographic of people having babies are sharing their lives online. it started to trend in the direction of, 'Hey, you know what? I'm online, I'm posting everything. Now I'd like my friends to participate in my ultrasound exam.'"

BabyFlix works with partner clinics to source, set up, and configure the technology that makes ultrasound capture and streaming possible. The platform sends participating parents instructions on how to invite others to tune in. During the examination, parents can interact with viewers on their mobile devices.

> *"The bottom line is, it's one of those things that makes people happy, being able to share a big milestone like this. It lets them turn it into something they can look back on."*
>
> **Steve Corey**
> Co-founder of BabyFlix

# Making ultrasound imagery shareable

Most of the 100+ BabyFlix-equipped clinics are powered by Epiphan encoding and capture products, which have earned an easy recommendation from BabyFlix.




The capture card – an Epiphan AV.io or internal DVI2PCIe Duo – brings the video signal from the ultrasound machine into a computer running video production software. That computer is connected to an Epiphan encoder, which handles the streaming and/or recording.

By relying on Epiphan hardware, BabyFlix can focus on refining its software experience, scale more quickly, and sidestep the many challenges that come with the hardware business – from supply chain and manufacturing snags to distribution and logistical issues.

> *"We've seen a whole host of things because we come into a lot of sites. Epiphan products are by far the best. It's the speed of encoding. It's the compatibility. With the video that's coming off of the machines, these aren't standard dimensions. It's not a clean signal. Epiphan products handle it. It's just a nonissue".*
>
> **Steve Corey**
> Co-founder of BabyFlix

# Growing the concept

The idea of sharing ultrasound imagery has come a long way – from static images to DVDs to digital recordings to live streams. And there's still plenty of room to grow. The company is looking into incorporating pre-appointment surveys, interactive video services, artificial intelligence, and other enhancements to take the concept to the next level.

"We're certainly not at the pinnacle yet," says Corey. "It will be more sophisticated, more interactive and engaging for people watching, more fun."

# Build your business with award-winning hardware

Have an idea for a video-driven venture? Looking to augment your current business with a video component or replace underperforming products or services? Look no further than Epiphan's suite of video production solutions. Versatile and reliable, Pearl hardware encoders support a broad range of video applications. And Epiphan Cloud gives you the power to record, stream, switch, and mix from anywhere in the world.


BabyFlix was founded upon a vision to enhance the imagery received from an ultrasound exam and improve upon the ways it can be shared. To meet this demand, BabyFlix has developed and launched a web based service and a state of the art application integrating the most successful elements of social networking and wizard-driven video editing.

# Inside Epiphan:
# Work hard, play harder

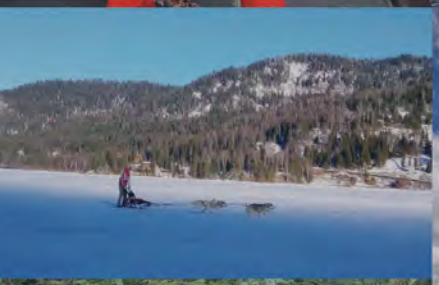
Here at Epiphan, we take play very seriously. After all, sports help keep us healthy and charged for the work day ahead. That's why nearly everyone you'll talk to here has a physical activity they are excited about, whether it's an intense competition or just for fun, staying fit or trying something new.

Sharing our extracurriculars with colleagues is a big part of our company culture. So we'd like to share a small slice of it with you too. Here are just some of the energetic activities Epiphaners enjoy.

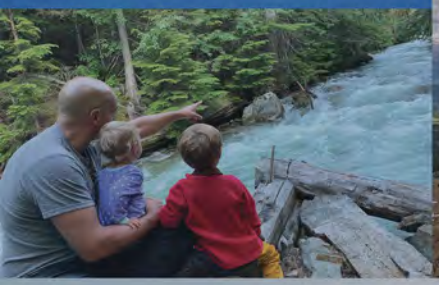
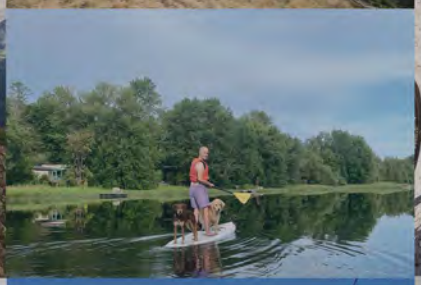
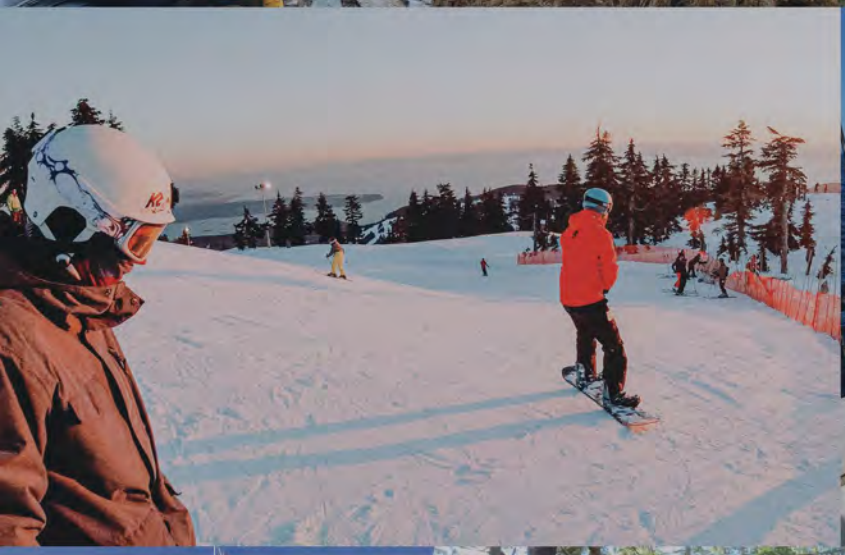


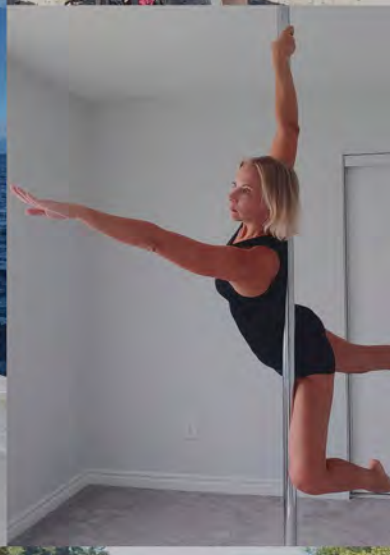




MOUNT KILIMANJARO
CONGRATULATIONS
STELLA POINT 5756M/18885 FT ASL
TANZANIA








## Epiphan Pearl Nano™

Use as a reliable, 4K-capable video distribution device, portable contribution encoder, or streamer and recorder add-on to a full production switcher. Now with H.265/HEVC video compression.

4K

**4096 × 2160 - 60fps**

## Epiphan Pearl Mini™

Simplify your lecture capture or live event production. Record, stream, and switch multiple HD inputs simultaneously.

HD

**1920 × 1200 - 60 fps**


## Epiphan Pearl-2™

Powerful, all-in-one live production system with 4K HDMI, 12G SDI, NDI, and the capacity for six simultaneous 1080p channels.

4K

**4096 × 2160 - 30 fps**


## Epiphan Pearl-2™ Rackmount

All the same features as Pearl-2 but designed for installation in a rack.


## Epiphan AV.io 4K™

Capture 4K over HDMI in perfect fidelity or use hardware scaling to capture any resolution needed for your application.

4K

**4096 × 2160 - 30 fps**
**1920 × 1080 - 60 fps**


## Epiphan AV.io HD+™

Capture 1080p video from any HDMI camera or device with nearly zero latency, bringing in audio through HDMI, the 3.5 mm input, or both.

HD

**1920 × 1080 - 60 fps**


## Epiphan AV.io SDI+™

Capture 1080p video from any SDI camera or device with nearly zero latency, bringing in audio through HDMI, the 3.5 mm input, or both.

HD

**1920 × 1080 - 60 fps**

## Epiphan DVI2PCIe Duo™

Internal PCIe capture card captures lossless video from dual-link and single-link DVI video sources, as well as VGA, HDMI, and SDI video sources with audio from SDI and HDMI sources.

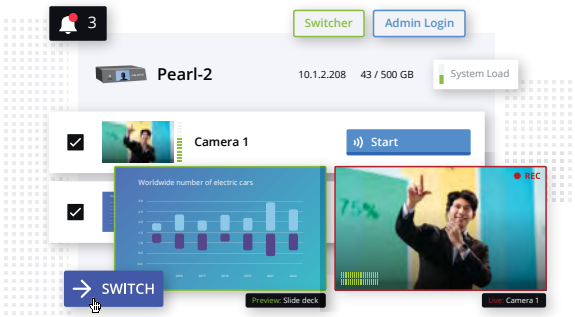
HD

**2560 × 1600 - 85 fps**
**2048 × 2048 - 85 fps**


## Epiphan LiveScrypt™

Real-time automatic transcription with built-in professional audio inputs, making it easier to achieve accurate AI-based transcription.

epiphan cloud




## Make video magic anytime, anywhere

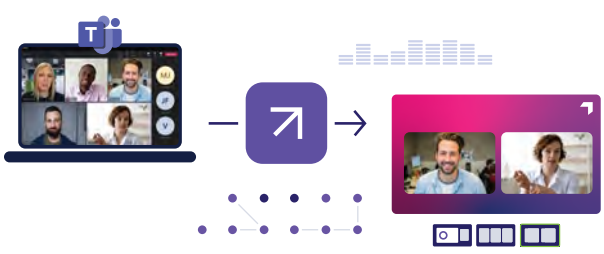
Control Pearl systems from anywhere with Epiphan Cloud™'s fully remote streaming and recording, monitoring, and switching. It's the easiest way to create broadcast-quality content from a distance.

epiphan unify

## Build a better hybrid workflow

Epiphan Unify™ enables you to remotely record, switch, mix, and restream 4K video from anywhere. Flexible and open platform, Unify will work with any production environment.

epiphan connect



## Produce broadcast-quality content with Microsoft Teams

Epiphan Connect™ bridges the gap between the convenience of video conferencing and the quality of broadcast.

LIVE @ epiphan

LIVE

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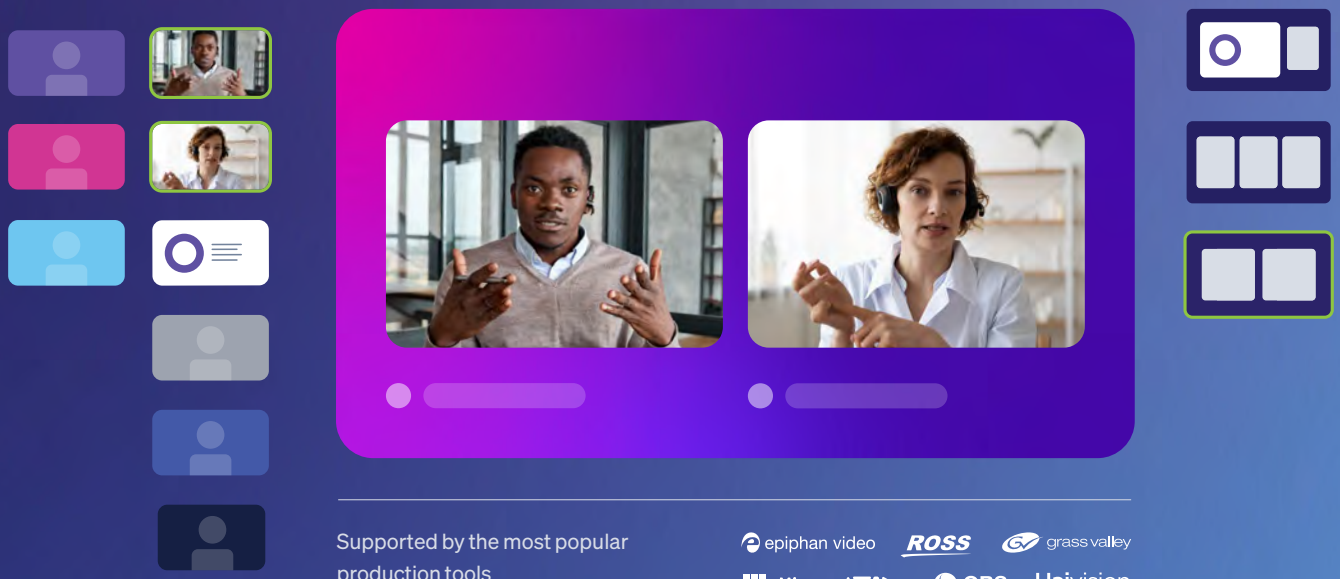
epiphan connect

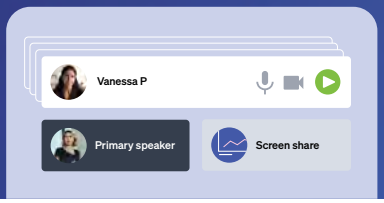
# Create your best video experience with Microsoft Teams



Supported by the most popular production tools

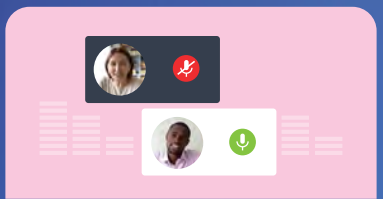
epiphan video · ROSS · grass valley · vMix · AVID · OBS · Haivision

## Let Teams do the heavy lifting




### Acquire up to 9 Teams sources

From Epiphan Connect, up to 9 different meeting participants can be acquired and sent to your production software.



### Mix with isolated audio feeds

Enjoy total control over who the audience hears in your broadcast with Epiphan Connect, which can isolate participant audio into separate tracks.


### Simplified, dummy-proof screen-sharing

Content shared in a Teams call can also be acquired into your production through Connect making on-the-fly content updates a breeze.

## Get started at www.epiphan.com/connect