



# SIGNAL LOST

Broadcast's road to C-band replacement.  
An industry event report from The Hive Group

June 2026

THE  
**HIVE**  
GROUP 

Supported by





Brad Cheney  
President, North American  
Spectrum Alliance



## Executive summary

The FCC's upper C-band auction targeting between 100 and 180 MHz of spectrum that broadcasters have relied upon for decades, represents a fundamental transformation in how American media is distributed. This is not an abstract policy discussion. It is a structural disruption to infrastructure that has underpinned broadcast contribution and delivery across the United States for the better part of four decades.

As the government advances towards an auction designed to raise the US Treasury somewhere near or above \$100 billion, every broadcaster, content owner, and distribution partner faces a fundamental change to the way they do business. The question is no longer whether this transition will happen. It is whether the industry will be ready when it does.

The Hive Group's Satellite Replacement Breakfast at NAB 2026 brought together senior leaders from Disney/ABC/ESPN, Fox, Paramount/CBS, AWS, Eluvio, Globecast, LTN, Lumen, SES, Synamedia, Zixi and many others to ask and begin to answer the hard questions. What does satellite replacement actually look like? What are the technical options? How reliable can IP delivery be at broadcast grade? How does reimbursement work this time around? And critically, how long do we have?

The honest answer, across every panel and every speaker, is that there is no silver bullet. C-band delivers three properties that the industry has come to expect everyday: reliability close to five nines, a nationwide footprint that reaches from Alaska to the Caribbean in one shot, and a fixed cost model regardless of the number of receive locations. No single alternative technology replicates all three simultaneously.

What comes next will be a hybrid a combination of Ku-band satellite, managed IP networks, fiber, 5G, LEO, and cloud infrastructure, orchestrated in ways that are only now becoming possible.

What stood out from the discussion was not just the quality of the technology on display, but the spirit of collaboration and early action. The organizations represented as sponsors of this report Amagi, AWS, SES, Eluvio, LTN, Lumen, Globecast, Synamedia, SES and Zixi are not waiting for the Report and Order to be finalized before building the solutions the industry needs. Broadcasters like Disney, Fox, and Paramount are not waiting for certainty before testing alternatives. That instinct to act early, even in the face of regulatory ambiguity, is the right one.

This report captures the substance of that conversation: the background context drawn from the Hive Group's No Safe Harbor white paper, the first-hand broadcaster perspectives from the panels, and the sponsor contributions that outline what the technology landscape actually looks like today. It is intended as a useful reference as the industry navigates what will undoubtedly be a demanding but ultimately transformative period ahead.

“ This is not just a technology transition. It is a business transformation. The organizations that begin now will define the terms of it.”

Brad Cheney  
President, North American Spectrum Alliance



# The C-band crisis: no safe harbor

The US Federal Communications Commission (FCC) is advancing the auction of between 100 and 180 megahertz (MHz) of upper C-band spectrum (the 3.98–4.2 GHz range) for 5G and future 6G services. The auction must be completed by July 2027 under the One Big Beautiful Bill Act, passed by Congress in July 2025.

For broadcasters, this is a structural disruption to the satellite-based distribution infrastructure that has underpinned contribution and delivery across the United States for decades. This is the second major C-band reallocation in less than a decade, following the 2020 Auction 107 that cleared the lower C-band spectrum (3.7–3.98 GHz). Then, broadcasters adapted by migrating precisely into the spectrum now under threat. This time, however, the disruption is structurally different: the upper C-band is the last viable C-band range, and no comparable fallback exists within it.

## WHAT C-BAND PROVIDES AND WHY IT MATTERS

For decades, C-band satellite delivery has served as the backbone of broadcast distribution across North America. Its dominance rests on three properties that are exceptionally difficult to replicate with alternative technologies:

- › **Reliability:** C-band signals are largely immune to rain fade, the attenuation caused by heavy rainfall that affects higher frequency bands such as Ku-band. For live events, breaking news, and emergency broadcasting, this near-five-nines reliability has become a foundational operational assumption.
- › **Reach:** A single satellite footprint covers the entire continental United States, plus Alaska, Hawaii, Puerto Rico, and the Caribbean. Every affiliate, cable headend, and pay TV distributor within that footprint receives the signal simultaneously, regardless of their terrestrial infrastructure.
- › **Cost predictability:** Transponder lease costs are fixed. Whether delivering to 10 or 10,000 receive locations, the satellite cost does not change. For national networks with hundreds of affiliates, this is a commercially significant structural advantage.

No single alternative model matches all three properties simultaneously. That is precisely what makes the forced transition structurally hard, and why the choice of replacement technology involves trade-offs that every broadcaster must model carefully against their own infrastructure footprint.

## THE PREVIOUS AUCTION AND WHY THIS IS DIFFERENT

In 2020, the FCC conducted Auction 107, which cleared 280 MHz of the lower C-band spectrum (3.7 – 3.98 GHz) for 5G use. That auction generated over \$81.2 billion in bids at the time the largest spectrum auction in US history. Incumbent satellite users, including broadcasters, were relocated into the upper 200 MHz. Industry associations have argued that the FCC gave explicit assurances that the upper C-band would remain protected. Many broadcasters invested significantly in new equipment and capacity in that band. Those investments are now potentially stranded.

The defining operational difference between this auction and Auction 107 is the absence of a safe harbor. In 2020, broadcasters had somewhere to go. This time, every broadcaster displaced from the upper C-band must migrate to a fundamentally different distribution technology. There is no equivalent remaining C-band space to move into.

“C-band is hands down the preferred transport for live events, due to its reliability and signal quality.”

Rebecca Hanson  
Director-General, NABA



## THE REGULATORY TIMELINE

On November 20, 2025, the FCC unanimously adopted a Notice of Proposed Rulemaking (NPRM) to examine the reallocation of the upper C-band (3.98–4.2 GHz). The mandate comes from the One Big Beautiful Bill Act, which directed the FCC to complete competitive bidding for at least 100 MHz of upper C-band no later than July 4, 2027. That deadline is statutory it cannot be moved without new legislation.

Final rules have no officially published FCC target date, but the statutory July 4, 2027 auction deadline implies a rulemaking conclusion no later than mid-2026 if there is to be any meaningful window between regulatory certainty and auction completion a window that is already compressed for broadcasters.

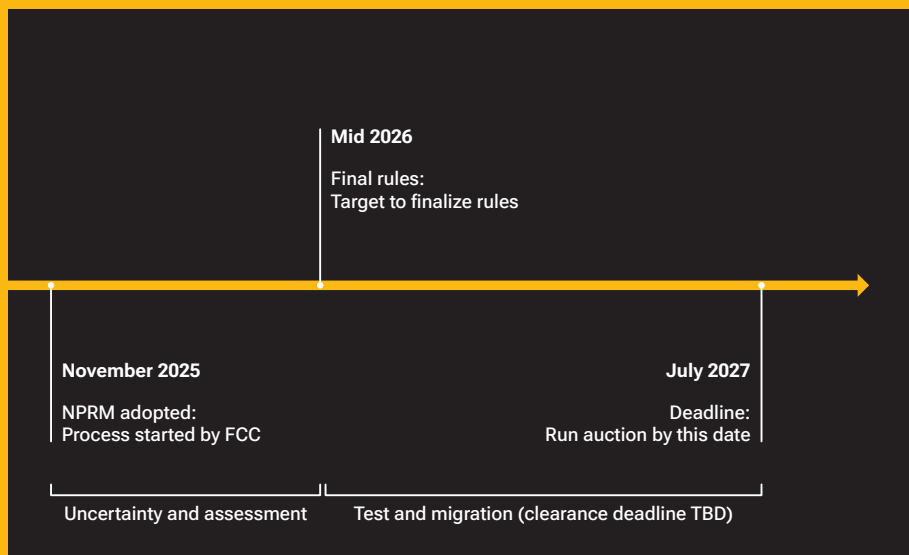


Figure 1: The auction timeline.  
Source: Hive Group No Safe Harbor  
whitepaper



## THE SPECTRUM AT STAKE

The FCC is proposing to auction up to 180 MHz (the maximum usable range) rather than the 100 MHz minimum mandated by Congress. The difference is crucial for broadcasters:

- › At 100 MHz, some broadcasters may be able to remain in the band with compression and repacking, preserving elements of the existing satellite infrastructure.
- › At 180 MHz, viable C-band broadcasting in the United States effectively ends. Every broadcaster would need to migrate to an entirely different distribution model.

The aviation industry adds a further constraint. The Federal Aviation Administration (FAA) and Airlines for America have indicated that radio altimeters operating in the adjacent 4.2 – 4.4 GHz band must be protected from interference. Airlines for America has stated publicly that they can only accept interference from terrestrial operators by 2030 a significant gating item on the overall transition timeline, as noted by Deepak Mathur of SES during our breakfast panel.

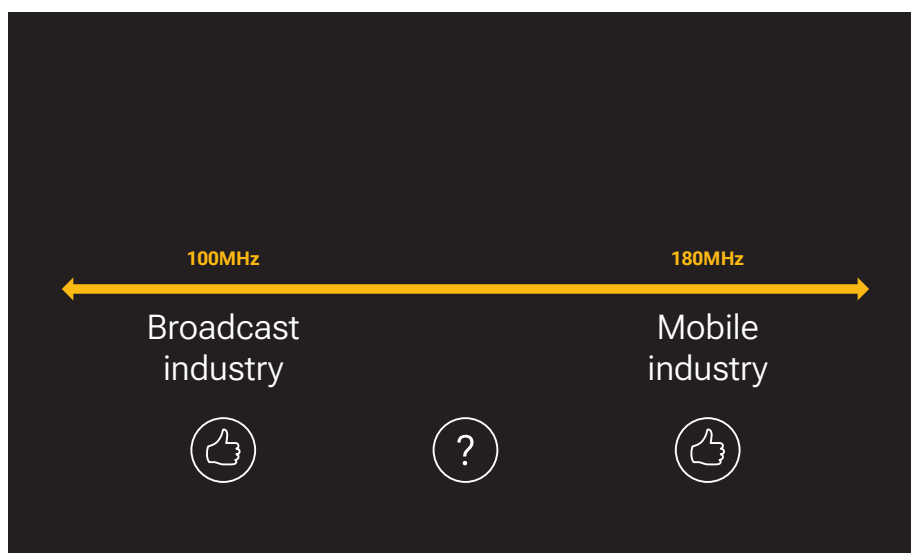


Figure 2: The main stakes in the spectrum auction. Source: Hive Group No Safe Harbor whitepaper

# What the major networks are facing

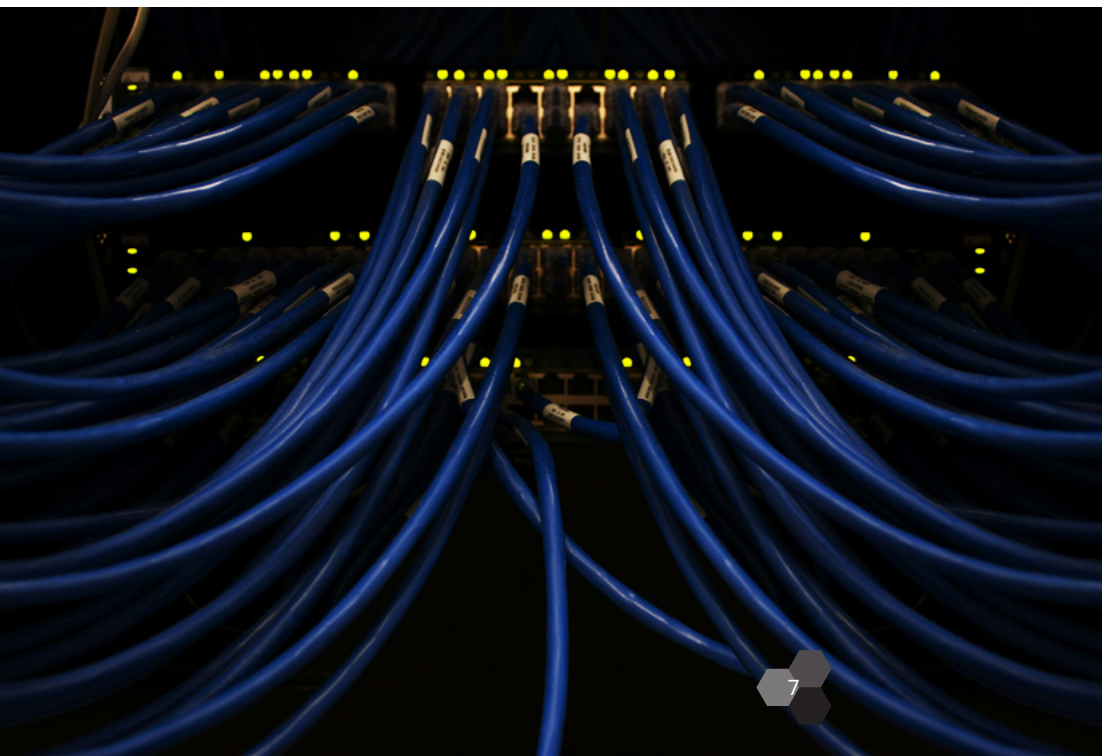
The first panel of the NAB 2026 breakfast featured Dave Johnson (Disney/ESPN/ABC), Alastair Hamilton (Fox), and Ken Fuller (CBS/Paramount), moderated by Brad Cheney. Their discussion offered an unfiltered look at how the largest broadcast networks in the United States are approaching the transition. The themes that emerged were consistent: the challenge is real, the timeline is tight, no single solution will suffice, and the industry must start now.

## SCALE OF THE CURRENT DEPENDENCE

The sheer scale of current C-band dependence became apparent early. Dave Johnson described Disney's acquisition infrastructure alone: 96,000 live feed inbounds year to date, with 15 percent of those arriving via C-band satellite. The distribution picture is even larger, with ESPN and Disney's other linear networks requiring seamless delivery from Bristol, Connecticut and the Woodlands, Texas simultaneously, with failover between the two facilities in a way that allows no hits to content.

Ken Fuller described CBS's distribution model as operating on two separate satellites with separate paths into affiliate stations, a redundancy model that has delivered the reliability the network requires for decades. Alaska, Hawaii, and Caribbean affiliates already operate with internet backup in some cases, which Fuller acknowledged provides useful early learning, but the challenge of scaling that model to the entire CBS affiliate network is significant. For a normal broadcasting day, CBS manages an East Coast feed and a West Coast feed; on NFL Sundays, that rises to twelve separate feeds with affiliates shifting between them in real time.

Alastair Hamilton from Fox highlighted the point-to-multipoint nature of satellite which no terrestrial alternative yet matches cleanly at scale. Fox currently operates two broadcast satellites and three cable satellites in the US, with international traffic to Latin America and other regions. Converting broadcast affiliate antennas from C-band to Ku-band alone assuming sufficient Ku-band capacity is available, (which Hamilton noted is not yet guaranteed) would take nine to eleven months for Fox's properties alone, which he described as optimistic.



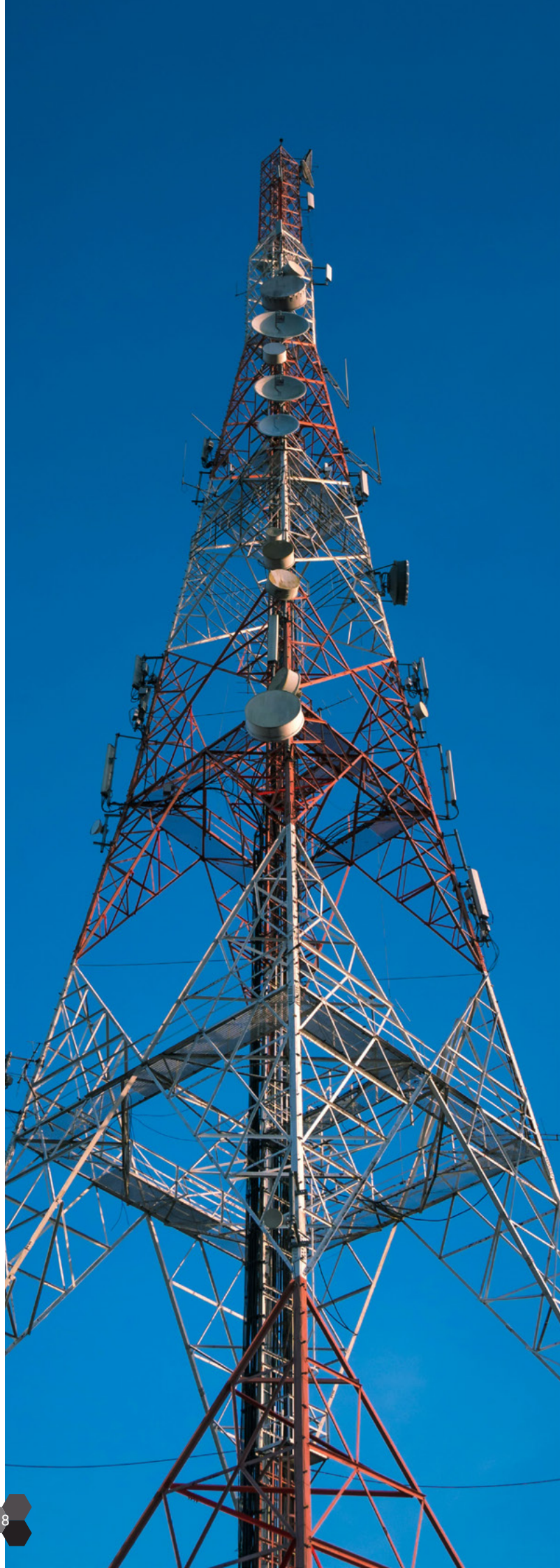
## THE FIVE KEY REQUIREMENTS

Across the discussion, the broadcasters converged on five core requirements that any replacement architecture must meet. These are not aspirational goals; they are operational necessities:

- › **Quality:** Content must be delivered at broadcast grade, without degradation that would be perceptible to viewers or that would compromise production workflows.
- › **Reliability:** The target is five nines (99.999% availability). The difference between five nines and four nines is approximately four minutes of downtime per month material for live sports and news.
- › **Availability:** Coverage must reach the full national footprint, including Alaska, Hawaii, Puerto Rico, the Caribbean, and every affiliate in the distribution chain, including those served by small MVPDs with limited connectivity.
- › **Latency:** Deterministic, low-latency delivery is essential. Remote production workflows for live sports require camera feeds that are synchronized across multiple locations. Evening news must begin at 6:30 Eastern, not 6:30 plus a few frames or seconds.
- › **Deterministic switching:** The ability to switch between feeds and backup systems in a predictable, frame-accurate way, without visible disruption, is non-negotiable for broadcast operations.

“ **Quality, reliability, availability, latency, and deterministic delivery. Those are the five key tenets. We have that in today’s world and we need to be able to maintain it.**”

Ken Fuller  
CBS/Paramount



## THE LAST-MILE PROBLEM

The most technically complex challenge that emerged from the broadcaster panel was not the core network; it was the last mile. As Alastair Hamilton noted, internet outages in major markets can run for hours. The 190 markets Fox monitors showed levels of internet instability that he described as “quite alarming.” The core network, once traffic reaches it, is generally manageable. It is the last mile transition that presents the real challenge.

Ken Fuller articulated the particular problem of smaller MVPDs. For the top five or six cable operators, multiple connectivity options exist. But there are more than 700 smaller MVPDs beyond that list. Getting ten gigabits or more of video content into a facility that may not have a full ten-gigabit connection, and doing it with the resilience required for broadcast, is not a problem that any single vendor has yet solved at scale.

Alastair Hamilton called for a “gateway box”: an intelligent edge device capable of receiving across multiple network technologies and selecting the best available path at any given moment, whether that is Ku-band, 5G, fiber, or the public internet with packet recovery. This architectural pattern a software intelligence layer above diverse physical paths, emerged as the consensus direction from both the broadcaster panel and the technology vendor panel that followed.

## TIMELINE AND REIMBURSEMENT

The consensus on timeline was clear: the transition will take every minute of the five years the NPRM contemplates, and possibly more. Dave Johnson noted that there is not yet sufficient Ku-band capacity in orbit to move everything currently on C-band. Alastair Hamilton said nine to eleven months for antenna conversion alone at Fox, and that was optimistic. Ken Fuller noted that the cable operators, who are responsible for their own antenna infrastructure, will take additional time.

On reimbursement, the broadcasters were united in their concern that the model used for Auction 107 which was fundamentally a capital equipment exercise is inadequate for a transition that generates ongoing operational expenditure. The previous auction’s cost catalog was described as “skinny.” This transition will require reimbursement for opex as well as capex, potentially over a ten-year period. The process of claiming reimbursement in 2020 required individual employees’ W-2 forms and took two years just to recover the cost of filters. A more streamlined and comprehensive framework will be essential.

“ This is not replacing satellites. I see it as augmenting them. We’ll forklift traffic to Ku-band and supplement with terrestrial paths. The end goal is to get as close to the reliability of C-band as we can.”

Ken Fuller  
CBS/Paramount



# The technology alternatives: what the vendors said

The second panel brought together eight technology vendors, including Amazon Web Services, Eluvio, Globecast, LTN, Lumen, SES, Synamedia and Zixi to present their solutions and respond to the broadcasters' requirements. What emerged was a rich and sometimes contrasting picture of the technology landscape, united by a shared acknowledgement that no single approach is sufficient.

## KU-BAND SATELLITE: SES AND THE NEXT GENERATION

SES presented the clearest case for satellite continuity. Deepak Mathur (SES) outlined the company's next-generation Ku+ architecture: new high-powered satellites with C-band uplinks cross-strapped to Ku-band downlinks, designed to concentrate power on high-rain zones across North America. The approach retains the existing uplink infrastructure broadcasters have invested in, requires only antenna retrofits at the receive end (3.7m to 2.8m Ku antennas), and aims to preserve the ubiquity that satellite uniquely provides.

Mathur was transparent about the timeline constraints: the gating item is the FAA and aviation industry, which has publicly committed only to 2030 as the date by which radio altimeters on all US and inbound international aircraft can accept interference. SES's RFP to satellite manufacturers is live. The architecture is defined. But the end-of-2030 timeline is not within SES's control to accelerate.

The SES Ku+ solution integrates standards-based terrestrial packet recovery technology to further enhance resiliency: satellite remains the primary distribution mechanism at scale, and if temporary weather-related attenuation affects the signal, the terrestrial recovery network automatically restores missing packets. This hybrid model avoids the cost of deploying full-time terrestrial feeds to every endpoint while still providing an additional protection layer.

## MANAGED IP DISTRIBUTION

LTN, represented by Rick Young, made perhaps the most striking claim of the morning: the timing problem people are worried about is already solved, at least for LTN. The company is today present in 1,400-plus broadcast stations, delivering content, with a project underway that will bring that number to 1,700 within months. LTN is already moving channels from satellite to IP. The network was built, from day one, specifically for broadcast video, not repurposed from data or enterprise infrastructure. LTN's network delivers a 5.9 nine SLA (99.999% availability), supports multicast delivery with synchronized latency to every location globally, and covers 98% of MVPD eyeballs today with a commitment to reach 100% by the end of the year through partnerships with the ACA and NCTC. The requirements the broadcasters articulated on the first panel including reliability, deterministic delivery, ubiquity, latency discipline were, Young said, exactly the requirements that guided LTN's network design from the beginning.



## DECENTRALIZED CONTENT ROUTING: ELUVIO

Michelle Munson, CEO and co-founder of Eluvio, described the Global Broadcast Fabric, a decentralized any-to-any content routing architecture built over TCP/IP that directly addresses the economic incompatibility of satellite and IP that broadcasters have historically faced. The Fabric generates just-in-time outputs for each downstream receiver from a single distribution path, meaning the cost per receiver does not scale with the number of receivers. One distribution serves all receivers, whether they are B2B broadcast affiliates receiving transport streams over SRT or D2C consumer endpoints receiving HLS.

The Fabric delivers sub-500ms end-to-end global latency with sub-millisecond jitter, implements SMPTE 2022-7 decentralized multipath phase-lock synchronization for path diversity, and provides the operational control demanded by broadcast engineering teams through an API-driven Live Stream Manager and VIP Command Center. Munson noted that Eluvio is already working with several major broadcasters on live production workflows, and that the technology works: "The most important thing about our stuff is it works, full stop."

## THE CONTROL LAYER: ZIXI

Alan Young from Zixi reframed the challenge in a way that resonated strongly with both the broadcaster and technology panels: most organizations don't have a transport problem; they have a control problem. C-band is reliable not because of the physics of the spectrum, but because broadcasters deal with one system, not five. The operational certainty is a product of unified control, not spectrum properties. What comes next must replicate that unified control, even as the physical transport layer becomes heterogeneous.

Zixi's platform achieves five-nines availability through SMPTE 2022-7 hitless merge across diverse paths, or through packet recovery mode where a primary path is supplemented by secondary paths that recover only the packets the primary cannot deliver. Zixi's ZEN Master orchestration layer coordinates across multi-protocol workflows, extending control into third-party IRDs embedding the Zixi SDK. The result is that an operator can manage a five-nines network as one homogeneous system, regardless of whether the last-mile path is Ku-band, LEO, 5G wireless, fiber, or ISP.

Zixi already supports hundreds of local TV stations operating in the cloud, delivering network feeds to platforms including YouTube TV, Hulu + Live, and Fubo. In the twelve months prior to the event, Zixi Software processed 1.7 exabytes of video traffic approximately 450 gigabits per second continuously.

### Better than Satellite Economics & 10X Less Expensive than Legacy Cloud

Unlimited dynamic outputs from one Fabric distribution, allowing for the economics of satellite/broadcast multi-point distribution along with the advantages of over-the-top distribution



**No "egress charge fan out"** – unlike "cloud" video IP solutions



**No charges** for unused distribution time



**One distribution** for all downstream takers with broadcast and D2C HLS-based outputs



**No Inter Fabric Transit charges**



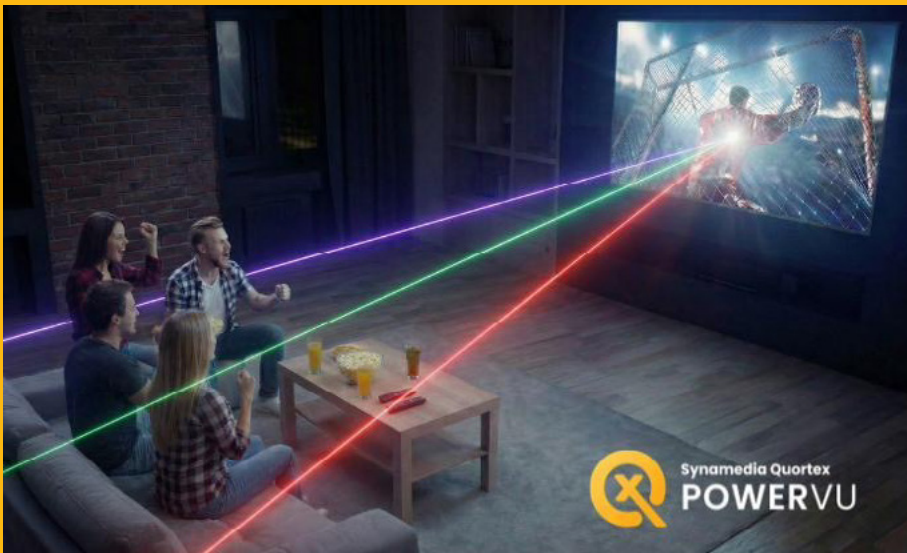
**Dramatic cost savings,** simplification and efficiencies

Fabric. A decentralised any-to-any content routing architecture built over TCP/IP

## SOFTWARE-DEFINED DISTRIBUTION: SYNAMEDIA

Kenelm Dean from Synamedia articulated a principle that resonated across the room: broadcast services should not be tied to spectrum, geography, or infrastructure. Distribution networks may change, but services must remain consistent. The Synamedia platform comprising Quortex, PowerVu, and the Media Edge Gateway (MEG) is built around this software-defined philosophy, decoupling services from the underlying transport and absorbing transition complexity within the platform rather than in the customer's operations team.

The Quortex cloud-native control layer delivers end-to-end service visibility across satellite, managed IP, public internet, and CDNs. PowerVu extends trusted broadcast-grade security and operational control into hybrid environments. The MEG provides secure control at the hybrid edge, anchoring distribution as services extend beyond traditional C-band delivery. Synamedia views the transition not as a one-time disruption but as the acceleration of a shift already underway from single-network dependency to hybrid, multi-network distribution.



Synamedia Quortex PowerVu.  
Cloud-native control across hybrid  
distribution

## COMPARING THE TECHNOLOGY ALTERNATIVES

The following charts, drawn from the Hive Group No Safe Harbor white paper, summarize the key trade-offs between the available technology alternatives and illustrate the cost model differences between satellite and IP distribution.

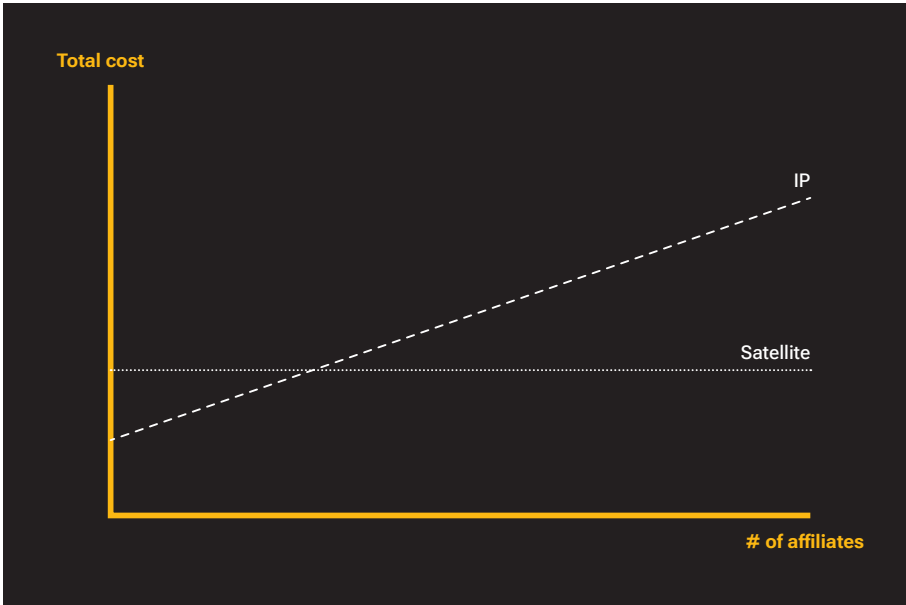


Figure 3: Satellite vs. IP economic models compared. Source: Hive Group No Safe Harbor whitepaper

MODEL	KEY STRENGTH	KEY LIMITATION
Ku-Band	Familiar operational and cost model	Rain fade issues make it a partial replacement, not a like-for-like
Managed IP (IP-TS)	Unlocks new capabilities: DAI, regional feed variants, etc.	Rural last-mile gap is real and unevenly distributed
Public internet and video transport protocol	Lower cost and widely available infrastructure	Less reliable for live, time-sensitive broadcasts
Hybrid IP (Fiber + 5G/LEO)	Only option that approaches C-band resilience by design	Not deployable at speed due to integration complexity

Figure 4: Key pros and cons of technology alternatives to C-band. Source: Hive Group No Safe Harbor whitepaper

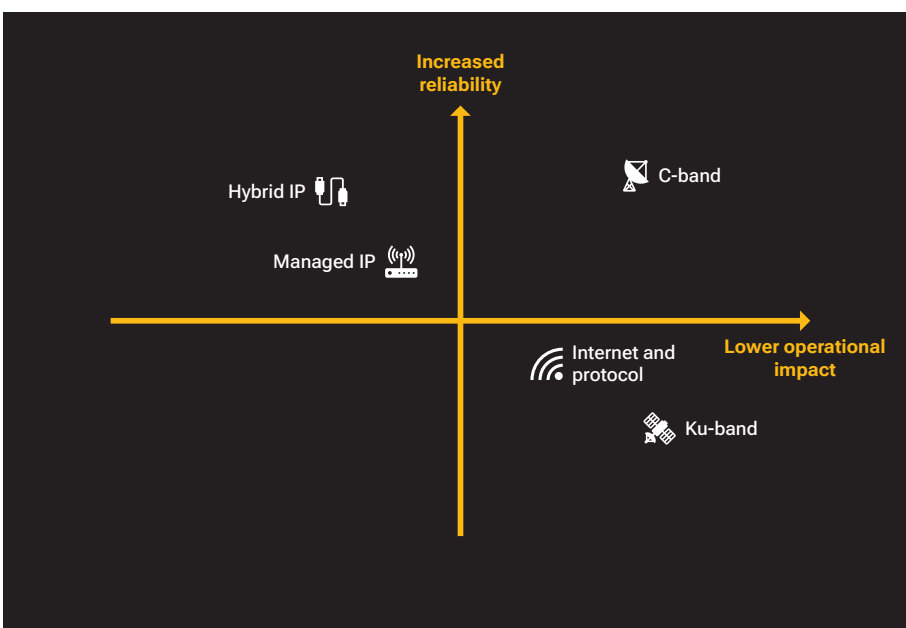


Figure 5: Reliability and operational impact of different technology models. Source: Hive Group No Safe Harbor whitepaper

# Key themes and strategic implications

## THERE IS NO SINGLE TECHNOLOGY SOLUTION

The single most important conclusion from both panels was stated repeatedly, from multiple perspectives, by broadcasters and technology vendors alike: there is no silver bullet. No one technology replicates C-band's combination of reliability, reach, and cost efficiency on its own. What comes next will be a hybrid, and likely a different hybrid for different parts of every broadcaster's distribution portfolio.

The implication is that the transition cannot be solved with a procurement exercise. It requires architectural design. Broadcasters need to map their affiliate footprint site by site, understand the connectivity reality at each location, model cost across multiple scenarios, and build a hybrid architecture that is appropriate for their specific topology. That work takes time, and the time to begin is now.

## THE TRANSITION IS ALREADY UNDERWAY

A theme that emerged from the technology vendor panel was that the transition is not a future event; it is happening now. LTN is already moving channels from satellite to IP. Eluvio is already supporting live production workflows with major broadcasters. Zixi is already in production at hundreds of local TV stations delivering national network feeds. SES is already engaging with satellite manufacturers on next-generation Ku+ architecture. Broadcasters that treat this as a future problem are already behind.

## THE FIVE-YEAR WINDOW IS NOT GENEROUS

The NPRM contemplates a maximum transition window of five and a half years. Every broadcaster on the panel said they expected to need every minute of that time, and several said it was optimistic. Converting broadcast affiliate antennas alone takes nine to eleven months per network. Building sufficient Ku-band orbital capacity will take years. Deploying managed IP infrastructure to hundreds of affiliates at a time requires engineering resource and vendor coordination at a scale the industry has not previously attempted.

The organizations that begin the assessment, the testing, and the vendor conversations now will have options when the regulatory deadline forces decisions. Those that wait for certainty will find themselves making consequential choices under statutory pressure, with less data and less leverage.

## THE REIMBURSEMENT MODEL MUST BE REDESIGNED

The reimbursement framework from Auction 107 was designed for a capital equipment migration. The upcoming transition generates ongoing operational expenditure that the previous model does not accommodate. Industry associations must engage the FCC on a comprehensive reimbursement framework that covers opex for a minimum of ten years, accounts for rising bandwidth requirements as resolution standards improve, reflects the complexity and labor involved in managing hybrid multi-vendor architectures, and applies a far simpler claims process than the previous exercise.

## INTERNATIONAL DISTRIBUTION ADDS COMPLEXITY

The US C-band transition does not end at the border. Every major US broadcaster distributes internationally. Latin America, Canada, and the Caribbean all rely on US satellite distribution in ways that terrestrial IP networks do not cleanly replicate. The transition planning must account for international distribution as well as domestic, and the solutions are not identical.



# Sponsor contributions

The following contributions have been provided by the event sponsors. Each reflects the perspective of the contributing organization and is presented here as a companion to the event discussion.

## THE CASE FOR NEXT-GENERATION KU-BAND DEEPAK MATHUR, SES



The North American media distribution industry is undergoing one of the most significant infrastructure transitions in decades - the Upper C-band transition.

While the industry conversation often focuses on the challenges associated with this shift, the transition also represents a major opportunity to modernize broadcast distribution networks and unlock the full potential of a new generation of Ku-band satellite infrastructure.

During the recent HiveGroup panel discussion on the future of satellite replacement, Deepak Mathur emphasized that the industry should not frame the transition as a move away from satellite. Instead, the focus should be on how advanced Ku-band architectures, combined with complementary terrestrial technologies where needed, can re-create the resilient and flexible C-band distribution ecosystem in Ku-band, while positioning the industry for the future.

As Mathur noted during the discussion, the title "satellite replacement" itself is misplaced. The future lies in retaining the significant benefits of satellite reach, resilience, economics, and ubiquity, while tackling the likely loss of most or all of the mid-band spectrum in which the industry operates today.

At the center of this evolution is SES's Ku+ solution. For decades, C-band satellite spectrum has served as the backbone of television distribution across North America because of its exceptional reliability, broad geographic coverage, and highly efficient one-to-many delivery model.

However, changing spectrum requirements are reshaping the operational landscape and accelerating the need for new distribution strategies. Rather than treating this as a limitation, SES sees the transition as an opportunity to introduce a next-generation Ku-band architecture designed specifically to address the evolving needs of broadcasters.

The new satellites are designed with significantly higher power levels and focused coverage optimized for high-rain zones across North America. By concentrating additional power in regions more susceptible to high levels of precipitation, SES can substantially improve signal availability and overall distribution performance. Importantly, the architecture also incorporates highly reliable C-band uplinks cross-strapped to Ku-band downlink transponders. This approach combines the resilience and stability of

C-band contribution with the flexibility and efficiency of next-generation Ku-band distribution. The result is a much higher level of availability compared to traditional Ku-band systems while preserving many of the operational advantages broadcasters rely on today.

Another major benefit of the Ku+ architecture is its ability to retain much of the existing deployed infrastructure across both contribution and distribution environments. By maintaining compatibility with established workflows and transmission facilities, broadcasters can minimize operational disruption and avoid unnecessary infrastructure replacement costs.

In practical terms, satellite remains the primary distribution mechanism, delivering the scale and efficiency required for large-scale linear television and live event distribution. If temporary weather-related attenuation affects the satellite signal, the terrestrial recovery network can automatically restore missing packets to the receiver, enabling seamless content delivery without visible disruption. This hybrid recovery model is highly efficient because it avoids the cost and complexity of deploying full-time terrestrial delivery feeds to every endpoint while still providing an additional layer of protection during temporary impairment events.

The broader significance of the Ku+ approach extends beyond the immediate C-band transition. It reflects the direction the entire media industry is heading: integrated hybrid ecosystems where satellite, IP, fiber, and cloud technologies each contribute their strengths to create more flexible and resilient distribution architectures. Satellite continues to provide unmatched scale, reach, and efficiency for mass content distribution. IP technologies bring flexibility, targeted delivery, cloud integration, and personalization.

Together, these technologies create stronger and more adaptable media networks capable of supporting evolving viewer expectations. As the industry continues adapting to changing audience behavior and technology demands, Ku-band is emerging not simply as an alternative distribution path, but as a powerful opportunity to modernize media delivery for the future. With next-generation satellite design, enhanced resiliency mechanisms, and intelligent hybrid integration, Ku+ demonstrates how innovation can strengthen reliability, preserve operational continuity, and unlock new possibilities for broadcasters across North America.

## A NEW PATH FORWARD: DELIVERING BROADCAST ECONOMICS AND QUALITY VIA ELUVIO'S GLOBAL BROADCAST FABRIC

MICHELLE MUNSON, CEO & CO-FOUNDER, ELUVIO



One lesson was abundantly clear coming out of this year's NAB show. Broadcasters want to retain both the high quality and cost-efficiency of satellite distribution while benefiting from the addressability and versatility provided by IP. But, conventional legacy solutions are failing them because these twin goals remain architecturally incompatible.

Conventional cloud distribution approaches for live broadcast are built on a hub-and-spoke, egress-fan-out model: one ingest point fans out to "N" receivers, and both cost and resource consumption scale with "N". Satellite avoids this by broadcasting a single signal that every receiver can tune to, but at the cost of flexibility, addressability, and over-the-top integration. Point-to-point fiber alternatives preserve performance but sacrifice the one-to-many reach that satellite provides. No IP solution has simultaneously solved these competing interests, until now.

Eluvio's Global Broadcast Fabric is the first commercially available means to replace legacy satellite distribution, fiber point-to-point connections, and ground-to-cloud multi-point egress solutions for live broadcast feed distribution. It provides the first unified zero-copy platform for broadcast, streaming and AI video intelligence. One decentralized Content Fabric distribution simultaneously serves every downstream taker — B2B broadcast affiliates and D2C consumer endpoints — from a single ingest workflow, with no file copies at any stage.

For broadcasters, it represents a new path forward: a decentralized any-to-any content routing architecture in which one distribution through the network generates just-in-time outputs for any number of receivers without duplicating traffic or incurring incremental resource costs. Fundamentally, it's the first commercially viable means to replace satellite distribution without sacrificing broadcast quality or cost efficiency.

Global latency is sub-500ms end-to-end and jitter is sub-millisecond, ensuring exceptional broadcast quality. Path resilience is achieved through SMPTE 2022-7 decentralized multipath phase-lock synchronization — providing the kind of path diversity required for premium live sports and news, without centralized control or single points of failure. This is the first successful implementation of SMPTE 2022-7 at this scale over IP.

The economic model is a radical departure from legacy clouds and CDNs. There are no egress fan-out charges and no internal Fabric transit charges. Receiver count does not affect cost. Equally important, there are no fees for unused distribution time — a structural advantage over capacity models that charge regardless of consumption. The Fabric's any-to-any routing means the ten-thousandth receiver costs no more to serve than the first. This is satellite economics rebuilt for IP, extended with over-the-top flexibility and the operational control demanded by forward-looking broadcaster engineering teams.

Security is enforced at the architecture level, not bolted on. Multi-layer AES encryption with proxy re-encryption creates per-session key spaces. Per-session authorization automatically enforces availability windows, geo-restrictions, ACLs, and entitlements for both B2B and D2C endpoints. Multi-DRM for D2C delivery and SRT encryption for B2B are built in.

In addition, Eluvio also provides AI analysis and inference inline within the streaming media generation and distribution pipeline, producing frame accurate, fully-aligned textual and multi-modal labels, embeddings, and metadata, for both live and VOD content. It harnesses AI data just-in-time, enabling unlimited AI personalization and transformation of video, audio and image content. This first-of-its-kind implementation also operates with zero file copies, zero file movement, and zero re-transcoding at every stage: analysis, metadata generation, derivative creation, and delivery.

At Eluvio, we have been building toward this capability since our founding seven years ago. The broadcasters and sports organizations we are working with are running production workflows on the Global Broadcast Fabric. And, they are meeting broadcast-grade performance requirements over IP, with an any-to-any distribution model, at satellite-competitive economics. Broadcast transformation is not imminent. It is already here. Learn more at <https://eluv.io>

## SATELLITE REPLACEMENT AT A CROSSROADS: LTN'S PERSPECTIVE FROM NAB 2026 RICK YOUNG, SVP, HEAD OF GLOBAL PRODUCTS, LTN



At this year's Satellite Replacement Breakfast during the NAB Show 2026 in Las Vegas, one theme consistently rose above the noise: the industry is no longer debating if satellite distribution will evolve — the conversation is now centered on how quickly organizations can operationalize the transition to IP without compromising reliability, scale, or business continuity.

For broadcasters, content owners, sports networks, and distribution partners, the urgency is real. Spectrum pressures, rising operational costs, infrastructure consolidation, and changing audience expectations are accelerating the need for more flexible distribution architectures. At the same time, the industry remains appropriately cautious. Satellite has served as the backbone of broadcast operations for decades because it works — consistently, globally, and at scale.

From LTN's perspective, the future is not about replacing reliability. It is about modernizing it.

Throughout the breakfast discussion, attendees emphasized that the next phase of media distribution will require infrastructure capable of supporting linear television, live sports, FAST channels, streaming workflows, regionalization, and real-time monetization simultaneously. Legacy architectures were never designed for this level of agility.

### **IP-native distribution changes that equation.**

The industry's shift toward hybrid and fully managed IP workflows is enabling broadcasters to move beyond rigid, one-to-many delivery models into environments where feeds, formats, and destinations can scale dynamically based on business need. This flexibility is becoming increasingly important as organizations manage more live content across more platforms than ever before.

"The conversation has fundamentally shifted from experimentation to execution," said Rick Young, SVP, Head of Global Products at LTN. "Broadcasters are no longer asking whether IP can support mission-critical distribution. They are asking how quickly they can deploy scalable, resilient architectures that support the future of live content delivery while maintaining the reliability audiences expect."

A key takeaway from the discussion was that the transition is no longer purely a technology conversation — it is a business transformation conversation.

The consensus in the room was clear: broadcasters are looking for proven operational models, not experimental infrastructure.

The sports and live events market especially highlighted this shift. Premium live content continues to raise the stakes for distribution performance, particularly as audiences increasingly consume events across linear and streaming platforms simultaneously. Reliability expectations have not changed simply because workflows are becoming more software-driven. If anything, expectations are higher.

"At the end of the day, broadcasters need flexibility without adding complexity," Young added. "The organizations that succeed in this transition will be the ones that can modernize incrementally, maintain operational continuity, and scale efficiently across both linear and digital ecosystems."

That evolution signals an industry entering its next major infrastructure chapter.

For LTN, the takeaway from the Satellite Replacement Breakfast was straightforward: the future of distribution will be defined by flexibility, resiliency, and operational simplicity — and the organizations that modernize strategically today will be best positioned for the next era of live media delivery.

## ZIXI PERSPECTIVES FOLLOWING THE HIVE GROUP'S BREAKFAST AT NAB ALAN YOUNG, ZIXI



The Hive Group's C-band Breakfast at NAB was less about technology than about consequences. The broadcasters on the panel: ABC, CBS, and FOX, were not focused on which transport medium replaces C-band. They were articulating what C-band does for their operations, and what they stand to lose if the replacement does not preserve those behaviors. Three concerns surfaced repeatedly:

- › The need for C-band-equivalent availability and deterministic latency.
- › The recognition that no single technology can replace C-band.
- › The need for sufficient time and a reimbursement model to effect a smooth transition.

Those three concerns share an architectural root: live distribution is moving from a system that bundled transport and control into one that separates them. C-band does not just move bits. It embeds failover assumptions, affiliate accountability, rights enforcement, and operational certainty. What comes next cannot be one technology. Ideally, it will be the same high-level operational layer broadcasters use today, with new layers feeding into it from below. To operators, the workflow should still look and feel like C-band, even when what runs underneath is something else entirely. That is what broadcasters and content owners need to preserve operational certainty in the transition. This is exactly the architecture Zixi's platform is built around.

### Availability and latency

Five-nines (99.999%) availability is achievable today by using two or more diverse paths (for example, Ku-band satellite and fiber) and Zixi's platform running a SMPTE 2022-7 hitless merge across them at the receive site. Where two full-time diverse paths are not feasible, Zixi's Platform runs in packet-recovery mode: a primary path carries the stream, and secondary or tertiary paths recover only the packets the primary cannot, provided the paths are genuinely diverse (for example, fiber primary, LEO secondary) still achieving Five-nines across heavily contended paths. Availability is measurable on a site-by-site, path-by-path, channel-by-channel basis, which lets operators hold each underlying provider accountable for the SLA they signed.

Latency is handled in two modes inside the Zixi Platform: Dynamic Latency continuously adjusts to the lowest value network conditions allow; Fixed Latency locks to a defined value at each receive site.

### No single technology replaces C-band

This is the most important of the three concerns, because it is the thesis of any honest transition plan. Each receive site will likely have a different connectivity profile (Ku-band, LEO, 5G wireless, fiber,

ISP) drawn from multiple providers and sometimes managed by different parties. That heterogeneity is the operational problem. ZEN Master serves as the operational foundation beneath this, coordinating across multi-protocol workflows and extending control into third-party Integrated Receiver Decoders (IRDs) embedding the Zixi SDK. The effect is that an operator can configure a Five-nines network and manage it as one homogeneous system, regardless of last-mile path. That single operating posture is what makes C-band reliable, so it delivers Five-nines. Not the spectrum itself, but the fact that operators deal with one system, not five. This is not theoretical. Zixi already supports hundreds of local TV stations operating in the cloud, delivering network feeds in IP to platforms including YouTube TV, Hulu + Live, and Fubo. The interoperability layer is in production today.

### Timeline and reimbursement

The FCC will set the timeline in the forthcoming Report and Order on the Upper C-band, expected later this year. Zixi has participated actively in that proceeding since it opened in February 2025, to ensure the FCC is fully informed of available technologies and the operational challenges facing broadcasters and content owners who depend on C-band. In a recent ex parte briefing, Zixi advocated for full reimbursement of both one-time transition costs and ongoing incremental costs above current C-band costs. In parallel, Zixi is already supporting current C-band users through transition planning and execution.

The transition is not purely defensive. IP-based distribution, or a hybrid IP and Ku-band model, opens operational headroom that C-band cannot match:

- › Regionalization and localization on a finer granularity than C-band capacity allows, where demand for regional variants has been pressing against available supply.
- › Dynamic ad insertion against IP-native advertising stacks, which is material to broadcaster revenue mix.
- › The ability to improve the audiovisual quality of content (resolution, frame rate, dynamic range) without over-encoding. Less decoding and re-encoding in IP workflows preserves origination quality and reduces end-to-end latency.

None of those upsides are automatic. IP creates flexibility. Flexibility without control creates operational risk. The broadcasters at the Hive Group breakfast were right to surface those three concerns, and right to recognize that no single technology answers any of them. Zixi provides the software control layer that makes IP behave deterministically, preserving the operational certainty C-band provides through the transition. Most organizations don't have a transport problem. They have a control problem. By leveraging Zixi during this C-band transition, the broadcasters can evolve their workflows to solve these problems.

## THE VIEW FROM G MORGAN, GLOBECAST



The challenges that the US broadcast industry is facing around C-band replacement were easily the hottest topic at NAB 2026. What makes this different from the previous technology shifts in our industry is that this is being driven by an FCC mandate rather than being market driven by technology, commercial or operational changes.

Through previous technology shifts such as Analog to Digital, MPEG2 to MPEG4, SD to HD, MPEG over IP, and then through cloud migration, it was the customers who were on the forefront in each chapter who were leading the charge in close collaboration with the partners in the ecosystem.

A government-led mandate leads to many unanswered questions, especially around the scheduling milestones and the commercial impact (e.g., reimbursements), which has many of the industry's key decision-makers hesitant to chart a course.

Globecast remains closely monitoring all developments related to the C-band sunset and are actively engaged with key industry stakeholders, including SES and North American Broadcast Association (NABA), through regular calls, working groups, and coordination efforts. In parallel, we maintain ongoing dialogue with our customers and our strategic technology partners to ensure alignment with evolving requirements, product roadmaps, and execution timelines.

At "The Hive Group – The Future of Satellite Replacement Breakfast" during NAB, we heard a very consistent and unified message from the panelists. Broadcaster leaders Dave Johnson from Disney, Alastair Hamilton from Fox, and Ken Fuller from Paramount made it clear that any replacement of C-band as a distribution method must meet the current standard of quality, availability, and latency.

As a fully managed service provider, Globecast's primary role is to collaborate closely with our technology partners to enable and support our customers' chosen transition strategies. We recognize that there is no single path forward—customers are evaluating a range of options, including migration to Ku-band, IP-Distribution, Cloud, or hybrid models.

Our focus is on ensuring readiness across all scenarios. This includes:

- › Supporting satellite transitions, including Ku-band migration and SES' "Cross-Strap"
- › Enabling IP distribution workflows and infrastructure
- › Designing, integrating, and operating hybrid architectures that combine satellite and IP distribution.
- › Providing operational excellence with end-to-end managed services to reduce complexity and risk

Globecast is committed to delivering flexible, scalable, and reliable solutions that allow our customers to navigate the C-band transition with confidence, regardless of the path the customers choose.

Please keep in mind that for Globecast, C-band migration is more than a theoretical concept. We have already lived it, and it was self-imposed. Over the last two years, with our facility transformation program, we eliminated nearly 100 satellite antennas globally by transitioning intake and distribution of video services to IP-first infrastructure.

We also built a new broadcast facility in Westlake Village, California, and refreshed our facilities in Paris, London, Singapore, and Johannesburg. We did this in tight collaboration with a best-in-class ecosystem of technology partners and service providers, and it was seamless for our customers without disruption. This customer base includes major cable networks, live sports operations, and OTT platforms across five continents.

The experience reinforced an important lesson: successful technology transitions are not primarily about technology. They are about planning, operational discipline, ecosystem coordination, and risk management.

As the industry navigates the future of C-band, the discussion should move beyond identifying a replacement technology and focus instead on ensuring operational excellence and business continuity throughout the transition. The broadcasters that emerge strongest will be those that maintain flexibility, build resilient architectures, and collaborate with partners with real-world migration experience.

## RESILIENCE BY DESIGN: RETHINKING BROADCAST DISTRIBUTION FOR A HYBRID FUTURE

**KENELM DEAN, DIRECTOR OF SOLUTION MANAGEMENT FOR DISTRIBUTION, SYNAMEDIA**



As the FCC progresses its inquiry and proposed rulemaking on more intensive use of the upper C-band spectrum, broadcasters are once again reminded of a hard truth: spectrum certainty is not a permanent operating assumption. To meet this new challenge, broadcasters need a transition strategy.

Here at Synamedia, we don't view spectrum changes as a onetime transition problem. They are the natural acceleration of a shift already underway from singlenetwork dependency to hybrid, multinetwork distribution, where software provides the resilience, scale, and efficiency instead of depending on any single transport.

By designing resilience in our software platform rather than inheriting it from any single network, we help customers evolve their distribution architectures incrementally and confidently. This approach runs through our portfolio including our Quortex platform which supports cloudnative scale across multiple delivery networks; PowerVu, which provides consistent, broadcast operational control; and Media Edge Gateway (MEG) which provides a security and continuity as services move beyond C-band.

### The Shift to Software-Defined Broadcast Distribution

Our approach is built on a simple but powerful principle: video distribution should not be tied to spectrum, geography, or infrastructure. Distribution networks may change, but broadcast services must remain consistent.

Satellite Cband distribution has worked for decades because it provides a deterministic network that abstracts complexity and allows affiliates to point a dish and receive the broadcast consistently with workflows built around satellite performance. As spectrum pressure increases, it is now imperative to use software to deliver performance and reliability, rather than physics. This ensures customers will have the flexibility to mix and match distribution networks and last mile connectivity.

Synamedia's solutions are designed to:

- › Decouple services from the underlying transport, supporting multiple protocols
- › Enable parallel delivery such as satellite and IP models
- › Absorb transition complexity within the platform, not the customer's operations team
- › Provide customers choice and flexibility to mix and match to distribute services
- › Reduce reliance on static infrastructure, capacity constraints, and static systems with distribution that scales based on operational needs.

### Resilience by Design

As distribution paths diversify, broadcasters need resilience built into the software platform. Synamedia platforms provide orchestration, monitoring, and control across multiple transport types, enabling rapid rerouting and fault recovery without manual intervention. We enable satellite and IP to coexist within a single operational model. Our platforms support redundancy, path diversity, and rapid failover across satellite and IP networks, without requiring manual intervention.

### Quortex PowerVu: Control and Security Across Hybrid Distribution

As Cband architectures give way to hybrid, multinetwork distribution models, operational confidence depends on control, visibility, and security across every network path. With the FCC examining further upper Cband reconfiguration and mixeduse scenarios, distribution platforms must be able to absorb these changes without any disruption to services.

Synamedia Quortex's cloudnative control layer delivers endtoend service visibility across satellite, managed IP, public internet, and CDNs - allowing operators to scale, monitor, and optimize distribution dynamically, rather than relying on any single deterministic network. In addition, PowerVu extends trusted, broadcastgrade security into hybrid environments, ensuring consistent content protection as services move beyond closed satellite networks and into IP and CDN delivery.

### Media Edge Gateway: Secure Control at the Hybrid Edge

As upper C-band spectrum shrinks and customers turn to hybrid architectures spanning satellite and IP, the edge becomes a critical control point. Synamedia MEG is a secure end device that anchors distribution as services extend beyond traditional C-band delivery. MEG enables broadcasters to safely bridge satellite feeds into managed IP, internet, and CDN environments while maintaining operational integrity, security, and service continuity.

Together, Quortex PowerVu MEG delivers softwaredesigned resilience - an approach that is aligned with emerging hybrid standards that augment legacy satellite delivery with IPbased recovery, rather than forcing disruptive replacement.

PowerVu remains foundational for customers transitioning off Cband. Broadcasters have long trusted PowerVu for satellite control and conditional access, but PowerVu has evolved to support native IP and hybrid satelliteIP environments, allowing customers to preserve existing workflows while extending distribution beyond satellite.

PowerVu allows operators to:

- › Secure content consistently across satellite and IP paths
- › Maintain service continuity during phased transitions
- › Protect premium content as it moves into more open networks

For many customers, PowerVu is the stabilizing anchor that makes C-band spectrum transition possible without service disruption.

### **The Strategic Payoff**

While transitioning off C-band brings challenges it also provides an opportunity to:

- › Lower longterm distribution costs
- › Increase service agility
- › Improve resilience and redundancy
- › Prepare for future spectrum and regulatory shifts

Our software defined approach ensures that customers are not reacting to policy decisions but staying ahead of them.



# The transition is coming. The question is who will be ready?

The upper C-band auction is not a repetition of Auction 107. In 2020, broadcasters had somewhere to go. This time, they likely do not. That structural difference cascades into everything else: the technology choices, the cost models, the reimbursement framework, the timeline, and the operational complexity that every broadcaster must now manage.

The technology alternatives exist. Ku-band satellite, managed IP distribution, hybrid fiber and 5G architectures, decentralized content routing, software-defined broadcast platforms these are not theoretical. They are in production today, delivering broadcast-grade content to affiliates, cable headends, and streaming platforms at scale. The transition from C-band is not waiting for the technology to be ready. It is waiting for the industry to act.

The organizations that use the period before rules are finalized to begin the assessment, map their affiliate connectivity, test hybrid configurations, and open commercial discussions with vendors will be in a fundamentally better position when the Report and Order forces decisions. Those that wait will find themselves under statutory pressure with less data, less commercial leverage, and less room for error.

The Hive Group will continue to convene the industry around these questions.

We thank our event sponsors Amagi, AWS, Lumen, SES, Eluvio, LTN, Zixi, and Synamedia for their support and contributions to this report, and we thank all the broadcasters, technology vendors, and industry leaders who participated in the NAB 2026 breakfast.

The conversation continues.

**“ We’re actually not doing what we did last time, which is we’re having a conversation about what the future looks like and what we want it to be.**

**That five-year timeline gives all of us time to make sure we’re building the technology that actually drives the business forward, and not just replacing what we did yesterday.”**

Brad Cheney  
President, North American Spectrum Alliance

## ABOUT THE HIVE GROUP

The Hive Group is a specialist marketing and intelligence agency serving the Media and Entertainment, broadcast technology, and AV industries. Founded by industry leaders Clare Plaisted and Lisa Collins bringing together the expertise of PRComs and Dovetail Creative, the company combines deep sector knowledge with data-driven strategy and a strong network of industry relationships.

The Hive Group works with technology brands to define their message, sharpen their positioning, and connect with the right audience. Services span strategic marketing, brand narrative development, go-to-market planning, sales enablement, thought leadership, and exhibition strategy and activation.

The company supports clients at major industry events including IBC, NAB Show, ISE, InfoComm, Broadcast Asia, MPTS, and CABSAT.

Alongside its marketing and agency work, The Hive Group produces independent research, whitepapers, and executive briefing events that help media and technology leaders understand and navigate change in the broadcast and streaming industries. The Satellite Replacement Breakfast is one of its flagship convening formats, bringing together senior leaders to address the defining infrastructure challenges of the moment.



THE  
**HIVE**  
GROUP 