Ficam | CINÉMA AUDIOVISUEL MULTIMÉDIA

SDI sur IP, enjeux et standards

harmonic

Frédéric Guiot

Sales Director, Production & Playout
EMEA

Who we are

The Worldwide Leader

in video delivery infrastructure

Enabling amazing video experiences

Harmonic-at-a-Glance

403M$	1 300	SILICON VALLEY	>5 000	>90M$
2018 Net Revenue	Employees	Headquarters	Media & Service Provider Global Customers	R&D Spend

Global Presence

harmonic

Corporate / Regional HQ / R&D Locations

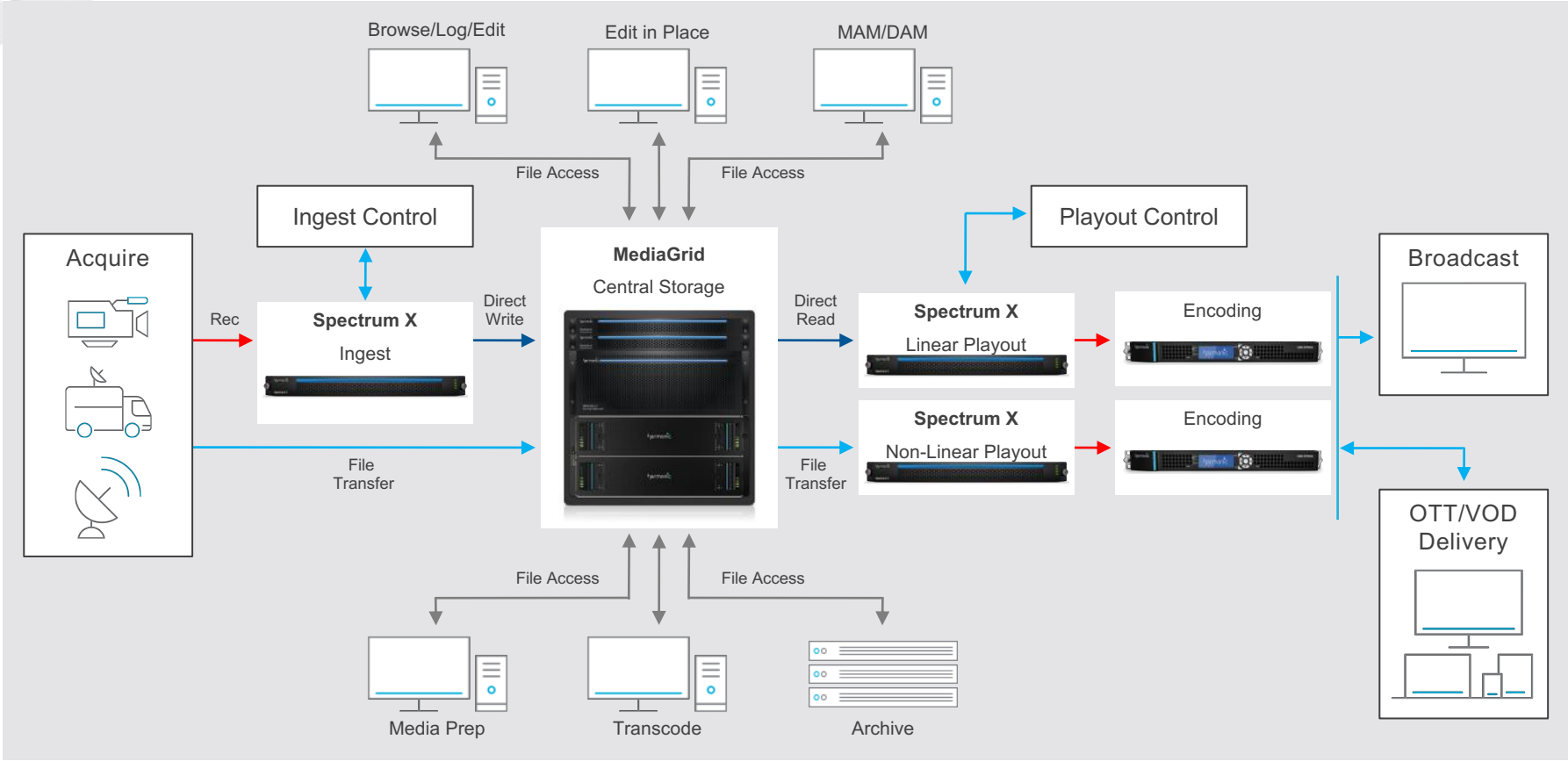
Sales & Services Support Centers

Our Customers

harmonic

Les enjeux

Studio Production

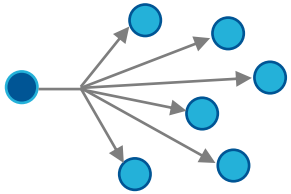


SDI Router

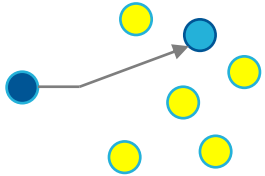
- Routes for signals are made by direct control of the crosspoint matrix
- Router tables help sub-divide the router

Multicast At A Glance

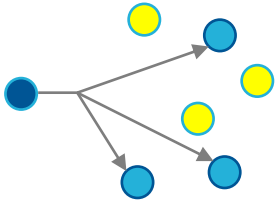
- Broadcast: One to all within the subnet



- Unicast: One to one, routable. Destination defined by sender

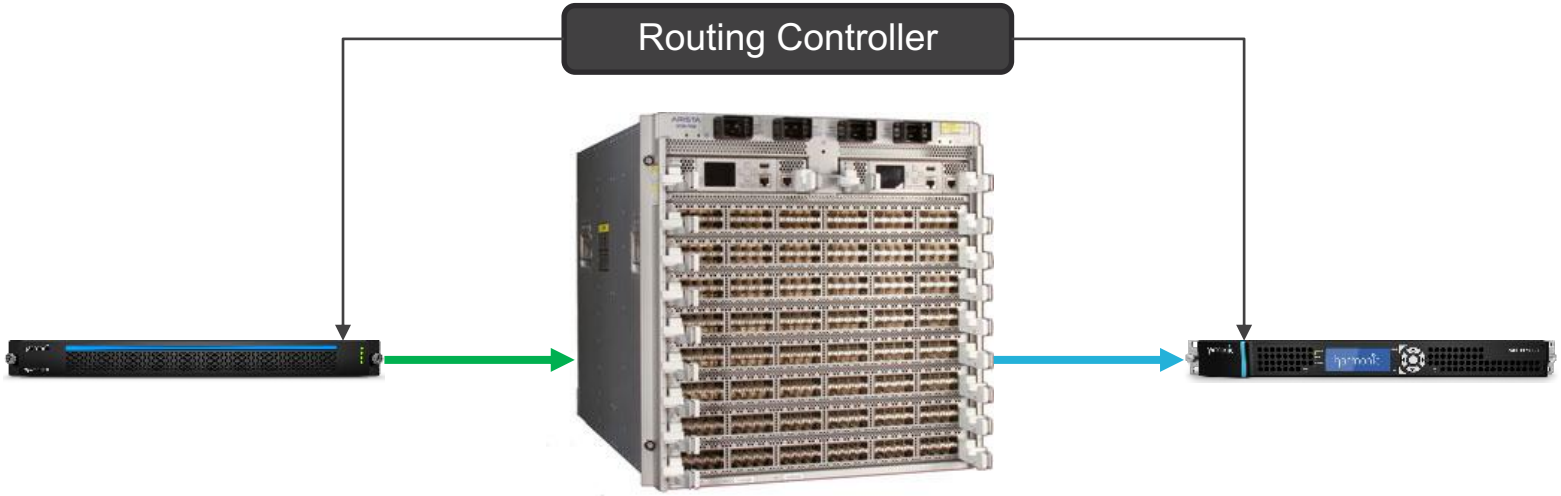


- Multicast: One to none, one or many, routable
  - Similar concept to SDI routers, BUT destination defined by receiver!



- Multicast is a good fit for live uncompressed media
  - Typically there is a one to many fan out
  - The senders do not know who needs to consume their output
  - More efficient for sending endpoints, and network infrastructure – no traffic redundancy
  - Receiver redundancy is easy to achieve

IP Routing



- Edge devices make the switch – receiver device switch for frame alignment
- The routing controller communicates with edge devices only – not with the router itself
- The routing controller tells a receiver to switch to a different multicast source

What is so Great About IP?

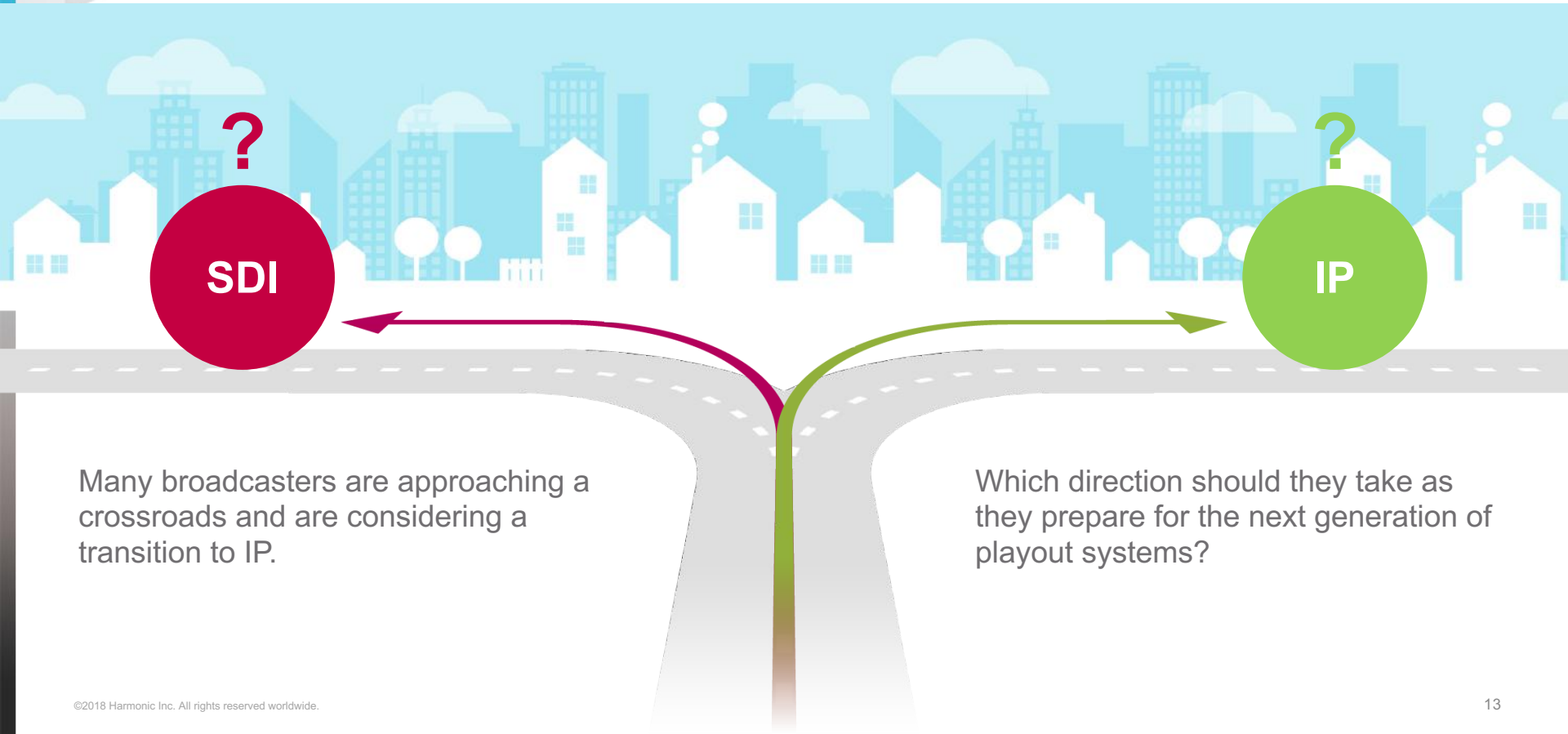
- IP lets you **scale and adapt** in rapidly changing environments
- **Single medium** for all media
- **Virtualized & Bare metal** environment

How Audio Breakaway Routing is Used in Production

- Cameras with sound
- Microphones
- Capture/playback

- Video switcher composes the video
- Audio mixer creates the audio mix

- Distribute the recombined signal



Many broadcasters are approaching a crossroads and are considering a transition to IP.

Which direction should they take as they prepare for the next generation of playout systems?

Spectrum X SMPTE ST 2110 Playout

Summary of Baseband Over IP Server Capabilities Per Chassis

GA Available September 2018

Live Inputs = 2 per chassis*

Up to 2 live inputs per chassis when in playout mode
SD, 720p, 1080i

Playout Channels = 4 per chassis*, XDCAM HD

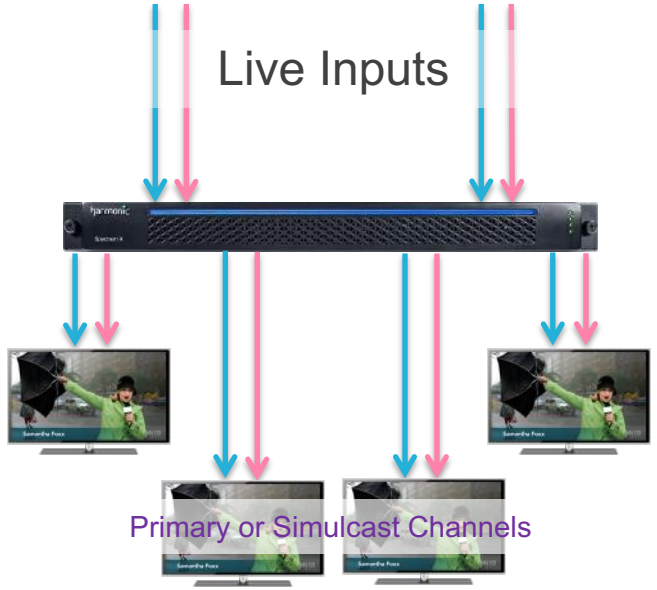
720p, 1080i

Simulcast output for each playout channel
720p, 1080i; Consumes 1x playout channel per simulcast output

Graphic branding for each playout & simulcast channel
Static and animated, lower third, roll, crawl, full screen, RSS, DB etc

Switching for each playout & simulcast channel
Clip <> live, video & audio effects, audio track management

SMPTE 2110 with and without SMPTE 2022-7
2022-7 seamless protection switching; choose simulcast *OR* 2022-7 to support 4 unique outputs



4 Outputs

Configure as primary / simulcast

SMPTE ST 2110 with 2022-7 Flow "A"
SMPTE ST 2110 with 2022-7 Flow "B"

2022-7 is not required, but adds flow redundancy as a cost option

** Requires 10G IP input chassis*

Note: No ingest channels can be running when configured for output

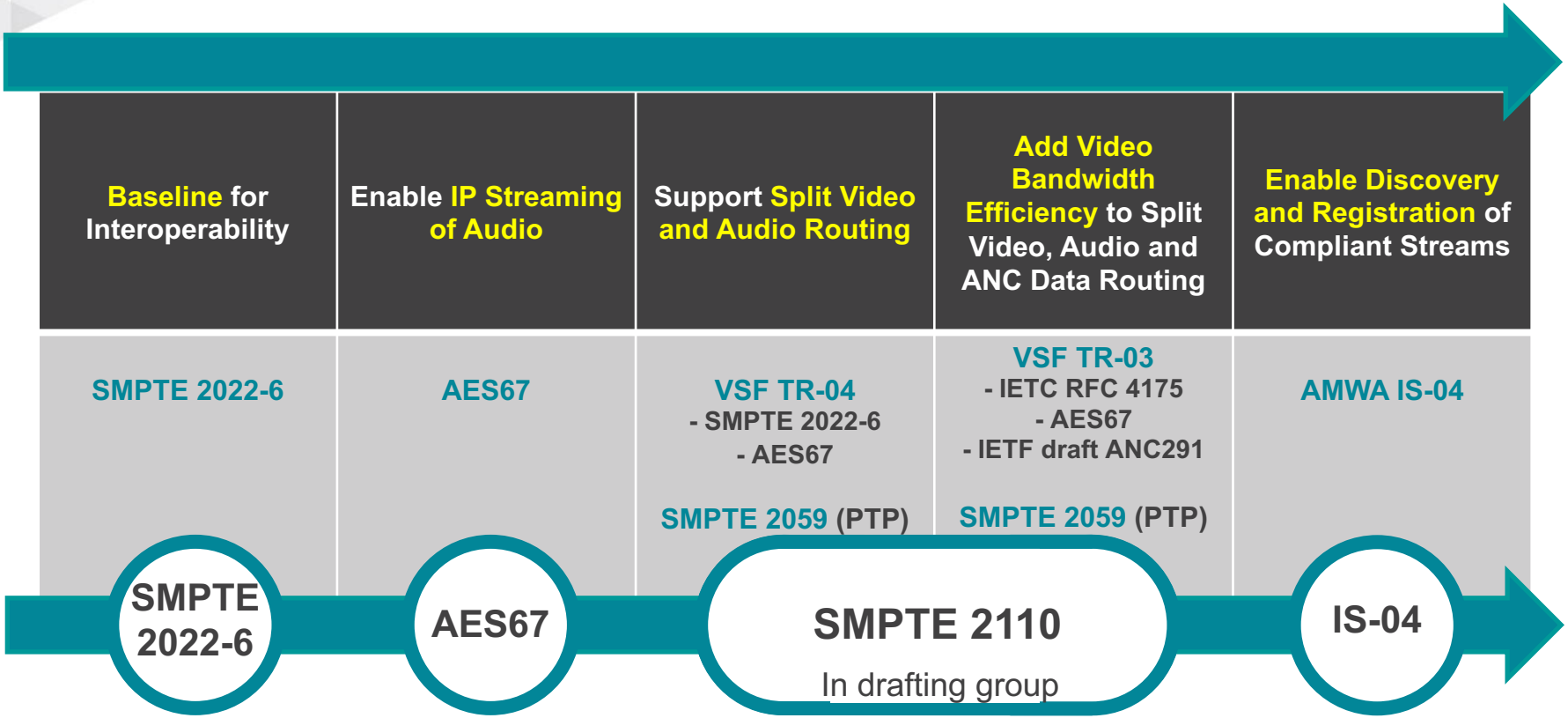
Standards & Organizations

What's Influencing the IP Transition

- Harmonic is **active in standards** that are driving the migration from SDI to IP

- AIMS approach to standardization **utilizes existing standards** and includes cooperation with AMWA NMI and VSF. This aligns with Harmonic's approach to the IP transition
  - Harmonic was an early member of AIMS, joining in December 2015
  - Harmonic was already active within AMWA NMI and VSF as well as SMPTE working on standardization and interoperability initiatives for IP I/O

AIMS Roadmap



Technologies for Fully Functional IP Facility

The EBU has defined technologies needed for a fully functional IP-based media facility to function

Enables you to:

1. Buy new equipment
2. Connect it to your network
3. Configure it for use with a minimum amount of human interaction

"For the purposes of engineering, constructing and maintaining professional media facility infrastructures… the industry requires the ability to easily integrate equipment from multiple vendors into a coherent system"

TR 1001-1

The EBU has defined technologies needed for a fully functional IP-based media facility to function

Enables you to:

1. Buy new equipment
2. Connect it to your network
3. Configure it for use with a minimum amount of human interaction

"For the purposes of engineering, constructing and maintaining professional media facility infrastructures… the industry requires the ability to easily integrate equipment from multiple vendors into a coherent system"

Progress So Far

harmonic

Industry Development Focus

- 2110
- 2022-6
- 2022-7

- PTP (2059)

- IS-04
- IS-05
- IS-07
- IS-08
- LLDP

- DHCP
- API/CLI config
- SNMP

- HTTPS API calls
- EBU R 148
- EBU R 143

- **Transport** mostly resolved (compression and HFR not withstanding)
- **Timing** has some issues and complexity
- **Discovery & Connection Management** protocol adoption taking time
- **Config & Monitoring** not adopted and needs significant work
- **Security** not adopted and needs significant work

Progress So Far

- 2110
- 2022-6
- 2022-7

- PTP (2059)

- IS-04
- IS-05
- IS-07
- IS-08
- LLDP

- DHCP
- API/CLI config
- SNMP

- HTTPS API calls
- EBU R 148
- EBU R 143

- **Transport** mostly resolved (compression and HFR not withstanding)
- **Timing** has some issues and complexity
- **Discovery & Connection Management** protocol adoption taking time
- **Config & Monitoring** not adopted and needs significant work
- **Security** not adopted and needs significant work

Transport & Timing – JT-NM Tested

SMPTE ST 2110 Testing at FOX, Woodlands, Houston TX

- Event took place week of 18 March
- First event of its kind to test 2110 compliance
- Spectrum X tested with good results!
- Awarded a JT-NM Tested badge
- Spectrum X was featured in the IP Showcase booth at the 2019 NAB Show

JT-NM
Sponsor

EBU IRT
Test Administrators

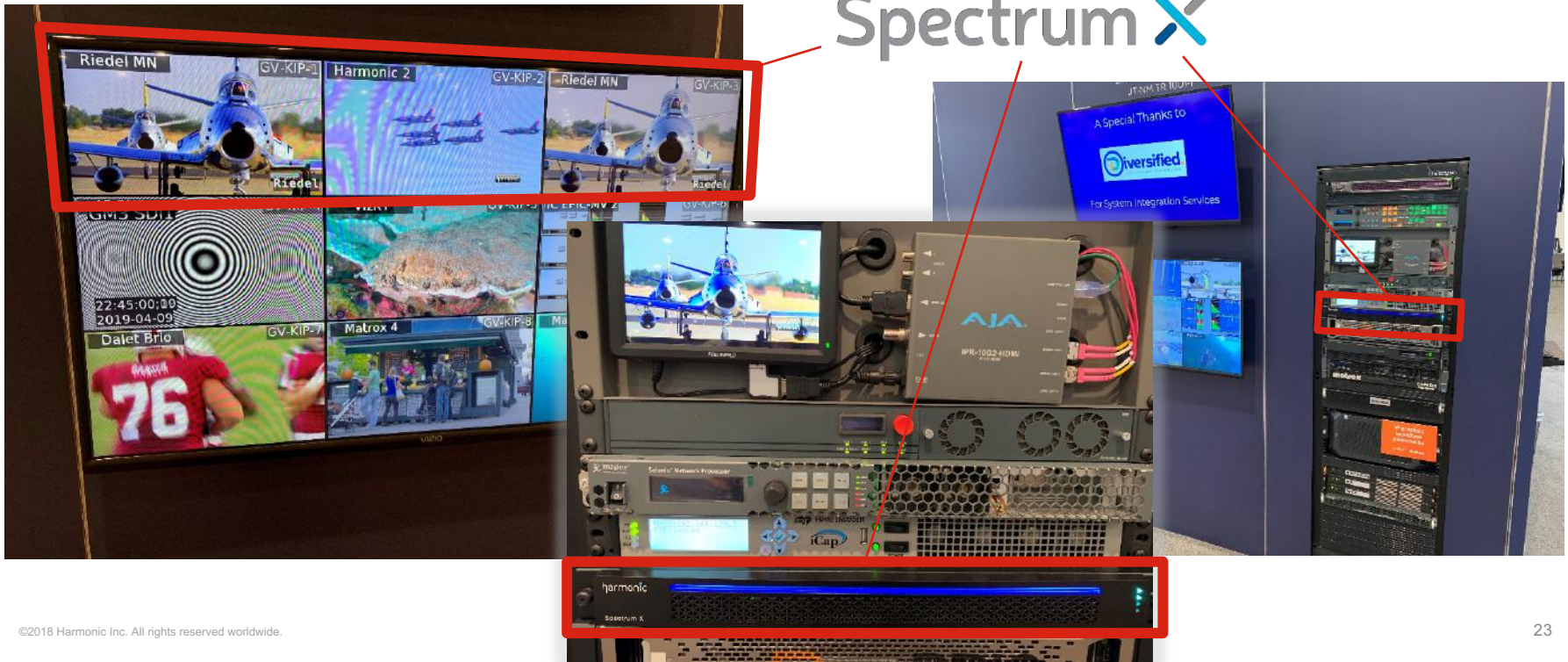
Discovery & Connection Management @ NAB 2019

harmonic

Simplifying network configuration
and flow routing with JT-NM TR 1001-1

Shows our support for AMWA IS-04 and IS-05

Spectrum X



Q&A

Frédéric Guiot

Sales Director, Production & Playout
EMEA