NASA TV UHD
Behind the Scenes
Joel Marsden & Scott Woods
Harmonic, Inc.
May 2016
NASA Timeline to Date

2015

April
NAB Initial Discussions

May
Unsolicited Proposal

Summer
Testing

Sept
IBC/NASA Announcement

Nov
Channel goes live

Dec
UHD/HDR/High Frame Rate Launch

April
NAB “Aurora Borealis from Space”

2016
NASA TV

- 1 SD, 2 HD channels
- In-the-clear
- SES AMC-18C
- Limited pay-tv distribution
NASA TV UHD Overview

Very high resolution video & imagery

North American Satellite Transponder Bandwidth

Spectrum X UHD Playout

Electra X UHD Encoding

Service & Operations

Global Broadcaster & PayTV Operator Relationships
How did we get here?
NASA TV AND NASA TV UHD

NASA MARSHALL SPACEFLIGHT CENTER/ATLANTA UPLINK

NASA TV1-3 (SD/HD)
Electra X2

NASA UHD
Electra X3

Spectrum X
ProStream

ProMedia X
Origin

SESC-AMC-18
ProView

Pay-TV Operators

Internet

UHD TV
September 15th Announcement
NASA TV UHD Channel Format

• Showcase beauty of space imagery
• Long, slow-moving shots
• New-age background score
• Programs arranged thematically
• Commercial-free
• Some HDR (High Dynamic Range) content available
NASA UHD TV Programming
NASA TV UHD Workflow

Image collection, review, transfer
Ingest colorization editing graphics, titles
Program review and playlist approval
Playlist load and equipment configuration
Transmission
Pay TV Operators
Consumer
Four MAC clients process TB of NASA RED RAW footage
- Store all footage and processed content on MediaGrid
- Paint out dead pixels with Adobe After Effects
- Color grade footage with DaVinci Resolve
- Edit with Final Cut Pro, and other 3rd party tools
- Create animations of images with Cinema 4D
- Set to music, add text & graphics along with name, logo and branding of program – Adobe Create Suite
- Submit to NASA for approval
NASA TV UHD Workflow

Once content is approved by NASA:
- Export 2 masters from MediaGrid & load in playlist
- Load content on Spectrum X
- Compress old NASA channels with Electra X2
- Transmit new programs with Electra X3
- Content sent to the “Bird”: AMC 18C satellite
NASA TV UHD Workflow

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Transmission

Pay TV Operators
Consumer

PayTV operators make content available to consumers:
- Equipment
- Channel packages
- Access
Challenges with the Content

- Camera Shake
- Critical Focus
- Bad pixels (cosmic rays)
- Stuttering time lapse
- Higher and lower resolution
- Large file sizes
Orbital 4 Launch – December 3rd

- Kennedy Space Center
- ISS resupply
- Cooperative event production
- Rapid post-production turnaround
- On the channel on Dec. 4th
ACCESS TO NASA TV UHD
In North America
Set-top Boxes and TVs

- Samsung
- ViXS
- LG
- Broadcom
- Sony
- Sigma Designs
HDR

- Standard(s) still emerging
- Footage shot with many cameras can be HDR processed
- Experimenting with HDR experience
- Hope to publish reference clips
- Expect showcases at CES
Broadening the Content Base

- NASA scientific projects
- NASA facilities
- Archival imagery
- New events, missions
Conclusions

- A unique exercise in bringing an early UHD channel to market
- An opportunity to build a unique experience
- Non-commercial nature cultivates cooperation
- It’s available – For Free!
Thank You