Delivery methods are evolving...

**Legacy**
- Rec 709 for TV
- sRGB for Web
- Rec2020 video (not HDR) for broadcast / cable / blu-ray

**Today**
- Rec 2100 PQ or HLG for Netflix / Amazon / other....
- Brighter devices
- Rec2100 HDR 10+ for Blu-Ray

**Coming...**
- HDR Internet Video to Desktop Monitors and Mobile...
  - (iMac Pro / MBP has 500 nits)
  - YouTube HDR
- Dynamic standards
  - Dolby Vision, Samsung?

**Need to deliver in** higher dynamic range and wider colour gamut

Pro Res / AS11

IMF?
What is Colour Space?

1. Tone Curve (eg, Gamma / Log / Linear)
HDR Tone Scales
What is Colour Space?

1. Tone Curve (eg, Gamma / Log / Linear)
Types of Colour Space

**Scene Referred**
Based on acquisition colourspace, eg, ARRI Log C Wide Gamut (Camera)
Scene Linear Rec 709 (CG)

Limitation: Unsuitable for viewing

**Display Referred**
Based on monitoring colourspace, eg, Rec 709

Limitation: Limited dynamic range and colour gamut

**Generalised Working Colourspace**
eg, ACES CG (for CG & compositing), ACES CCT (for Colour Grading)

**Container Colourspace**
eg, ACES 2065-1, large enough for future-proof interchange and archival
CIE 1931 Spectral Locus (All visible colour)
Colour Gamut Comparison
Colour Space Standards: Nomenclature

- Rec 709 2.4 Gamma
- Scene Linear sRGB / Rec709
- ACES 2065-1 Linear
- ACEScg Linear AP1
- ACEScct Log AP1
- P3 D65 Dcinema
- Rec 2100 Rec2020 PQ
- Rec 2100 Rec2020 HLG
Choosing Colour Primaries

Use your main Camera Gamut
Advantage: no conversion to working colourspace required

Use your display gamut
Advantage: No display conversion required*

Use ACES CG / CCT (Similar to Rec 2020)
Advantage: Flexible

*Don’t use Rec 709 for WCG delivery!
Which Colourspace?
Which Colourspace?

Input
ARRI Log C Wide Gamut
Scene Linear sRGB/Rec 709
Rec 709 Video

Working
ARRI Log C Wide Gamut

Viewing
HDR10 Rec 2100 PQ
P3 Rec 709 Video

Archive
ARRI Log C Wide Gamut (Graded)

Preserves acquisition colourspace
Unsuitable for compositing
Which Colourspace?

**Input**
- ARRI Log C
- Wide Gamut
- Scene Linear
- sRGB/Rec 709
- Rec 709 Video
- sRGB Graphics

**Working**
- Scene Linear
- Rec 709 / sRGB

**Viewing**
- Rec 2100 PQ
- Rec 2100 HLG
- P3
- Rec 709 Video

**Archive**
- Scene linear
- Rec 709/sRGB

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Colour fidelity lost from acquisition
Not as much colour detail as display
Which Colourspace?

Input
- ARRI Log C
- AWG
- Sony S-Log 3
- Red Log
- Dragon Colour
- ACEScgcg AP1
- Scene Linear
- sRGB

Working
- Linear ✓
- ACEScgcg Linear (Comp)
- ACEScct Log (Grade)

Viewing
- Rec 2100 PQ
- Rec 2100 HLG
- P3
- Rec 709 Video

Archive
- ACES 2065-1
- Linear AP0

Colour fidelity maintained through post to delivery
Lossless archive
Where is Colour Management in Flame?

• Project Management
• MediaHub / Import Options
• Desktop / Media Panel - Edit Colour Space
• Viewing
• Conform
• Timeline; Pre-processing and FX
• Action
• Batch; Colour Mgt. node, Clip Options, Render / Write File Options
• Export; Advanced Options / Use Lut
Colour Management in Flame Family
SynColor

• Applies to Flame Family & Maya

• A Collection of Colour Transforms for viewing and conversion

• A Collection of Colour Policies comprising;
  - Overall policy defining working colourspace for project
  - File import rules
  - Viewing Rules

• Preset policies stored in...
  /opt/Autodesk/presets/<Flame version>/colourmgt

• User modified / exported policies stored in...
  /Applications/Autodesk/Synergy/SynColor/Shared
Resources

Flame
• area.autodesk.com/flame-central
• knowledge.autodesk.com/support/flame-products
• feedback.autodesk.com
• youtube.com/user/FlameHowTos
• Facebook ‘LOGIK’ Flame user group

General
• Netflix delivery specs - help.prodicle.com
• ACES - https://acescentral.com/