

# SMPTE Technology Webcast Series

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Enabling Global Education

## Joel E. Welch

*Director of Education  
SMPTE*



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# SMPTE 2020 - Special Discount

## 10-12 November



**Hey ACES 101 Attendees!**  
Use code **aces101** for **10% off** the cost of registration to **SMPTE 2020**.

There are registration packages and price points that work for anyone in any situation.

Take a tour to learn more about the remote conference experience at [2020.smpte.org](https://2020.smpte.org).

Or, scan this to go directly to the registration form with the Standards Community discount already applied.



# SMPTE 2020 – 10-12 November

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## Five Reasons Why You Should Attend

- 1) Connect with Our Global Community.** SMPTE 2020 will work for everyone across multiple time zones. A supplemental program will accommodate our colleagues in the Asia Pacific region.
- 2) Your conference – you won't miss a thing!** You will have access for 30 days after the event to ALL live and on-demand content including technical sessions, trainings, keynotes, e-sports competitions, and more
- 3) Flexible and comfortable learning environment.** Attend from the comfort and safety of your home or office leaving you with more energy to dedicate to the content that matters most to you.
- 4) Price point for everyone.** This event is accessible to everyone. Subsidized lower prices are available for educators, students, those facing hardship, and anyone registering from developing nations. Our "Pay It Forward" package is all-access and allows individuals who can pay more during these times the opportunity to help others.
- 5) This year's theme: "Game On."** spotlights the world of e-sports. A full day of programming will explore this convergence to understand both the unique and common requirements that make e-sports thrive.

Use code **aces1010** or **Scan now for your personalized discount!**





# Virtual Course: Understanding the Digital Cinema Package (DCP)

If you are a professional in media production, distribution, or mastering, you can leverage the Digital Cinema Package (DCP) to enable innovation, automation, and cost savings.

## After taking the course, you'll be able to:

- Summarize the technical and business advantages of implementing SMPTE DCPs
- Discuss the various file types and their functions in a SMPTE Digital Cinema Package
- Outline the SMPTE DCP mastering process
- Explain how the SMPTE DCP manages Timed Text
- Describe how the DCP helps overcome the challenges of international versioning
- List the necessary requirements global DCP distribution



Use code **SMPTE50** for **50% off the cost of registration**  
Scan or visit [smpte.org/dcp](https://smpte.org/dcp) to learn more.



**Jack Watts**

Jack is an independent  
media solutions consultant.  
London, UK.

# SMPTE Technology Webcasts



Enabling Global Education

- Series of monthly 60- to 90-minute online, interactive webcasts covering a variety of technical topics
- Free professional development benefit for SMPTE members
- Sessions are recorded for member viewing convenience.

# Housekeeping



Enabling Global Education

- Please indicate you want to ask oral question by indicating such in the chat box
  - If you do not have a microphone, please submit your questions via text
- SMPTE provides a PDF of select slides used during webcasts in exchange for your feedback
  - Once your feedback is submitted, you will automatically be redirected to the PDF for downloading
- Please feel free to post or blog about today's webcast on your social media platform of choice

@smpteconnect

#SMPTWebcast



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# ACES '101'

Standards-based Color Managed Workflows



SINCE 1916

September 17, 2020

# ACES '101'

Standards-based Color Managed Workflows



Annie Chang



Carol Payne



Nick Shaw



Alex Forsythe



Joel E Welch  
Moderator

# Class Agenda

## The basics

- What is color management?
- What is ACES?

## ACES current and future states

- Development efforts and organization
- Logo and service provider program
- ACES community
- What about broadcast?

## Wrap up

- Panel Discussion
- Questions





# What is Color Management?

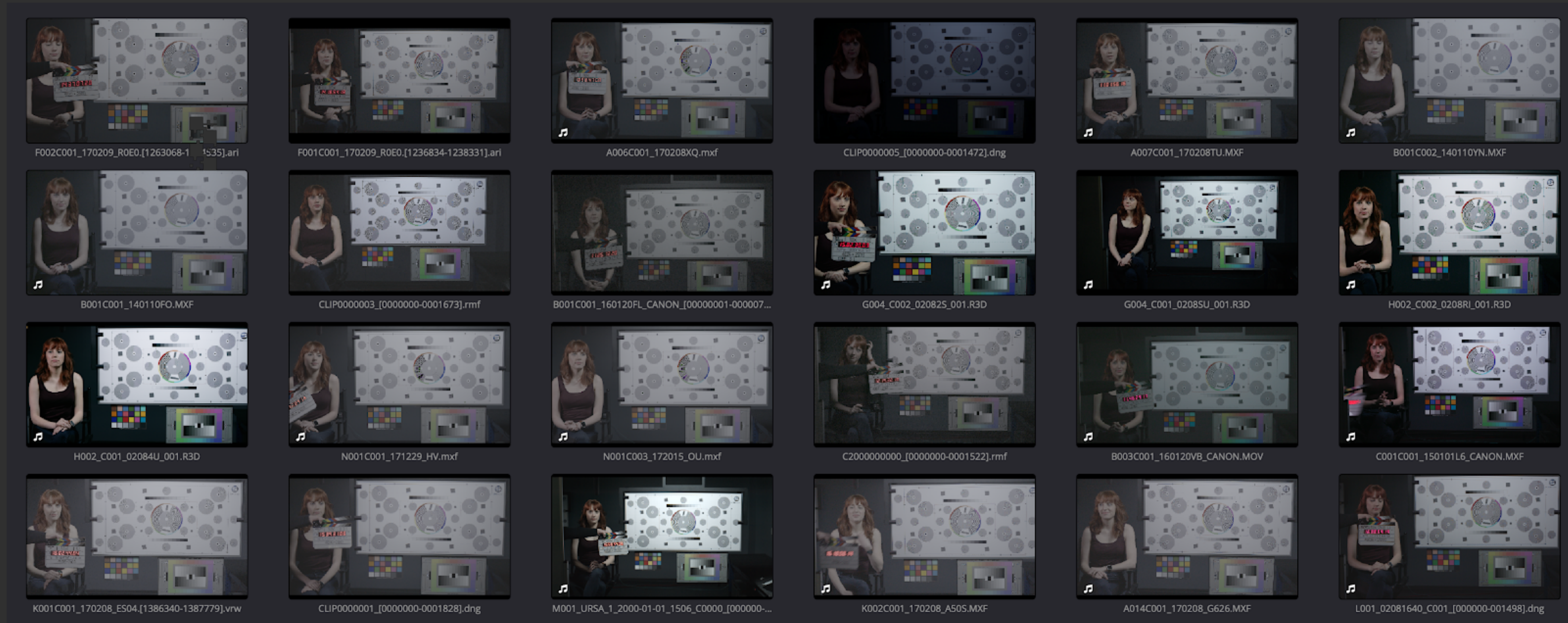


# The goal

To keep all departments aligned to a **common vision**, by providing consistency in **image reproduction** and **creative intent**.

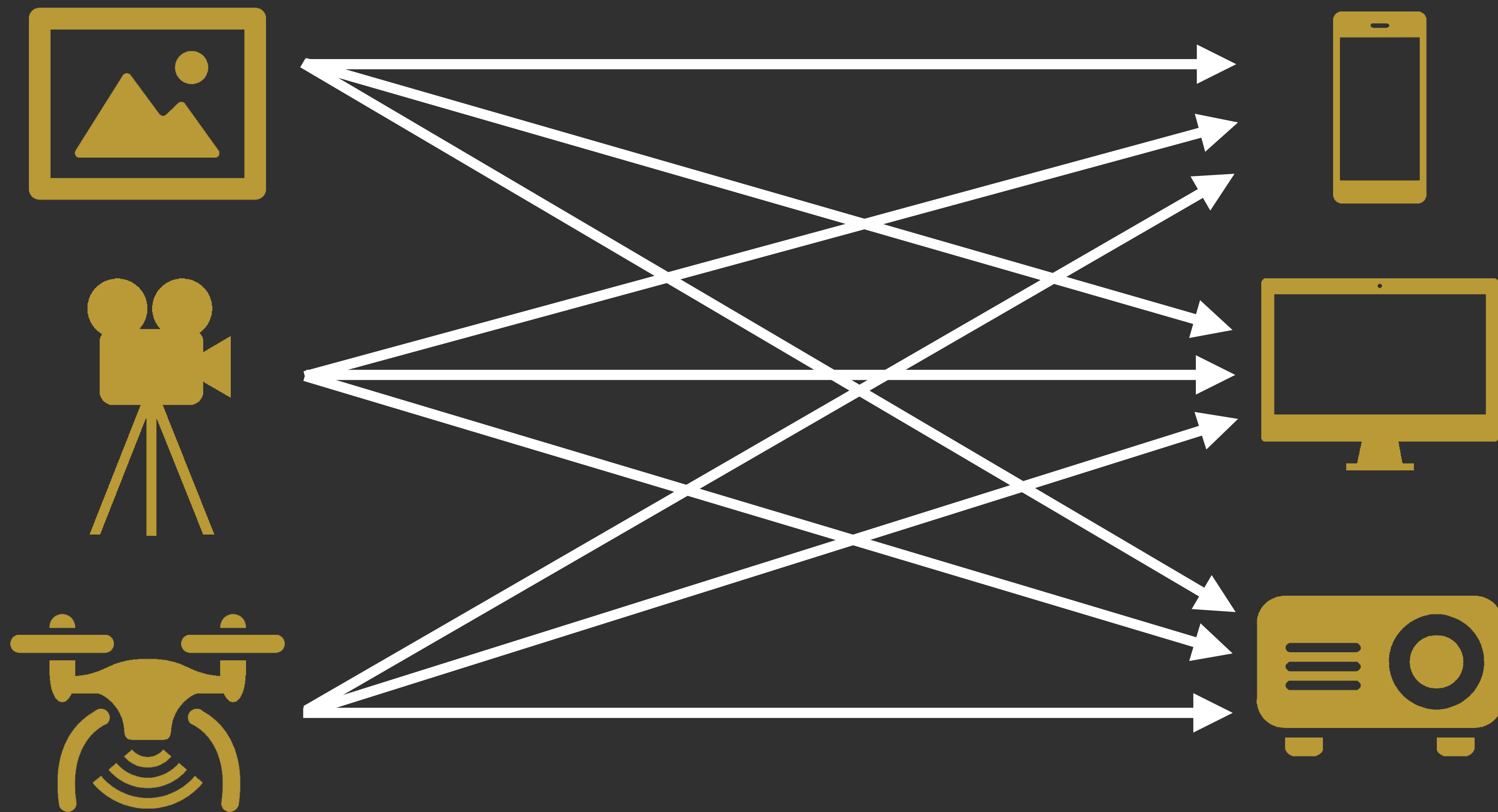


# The problem

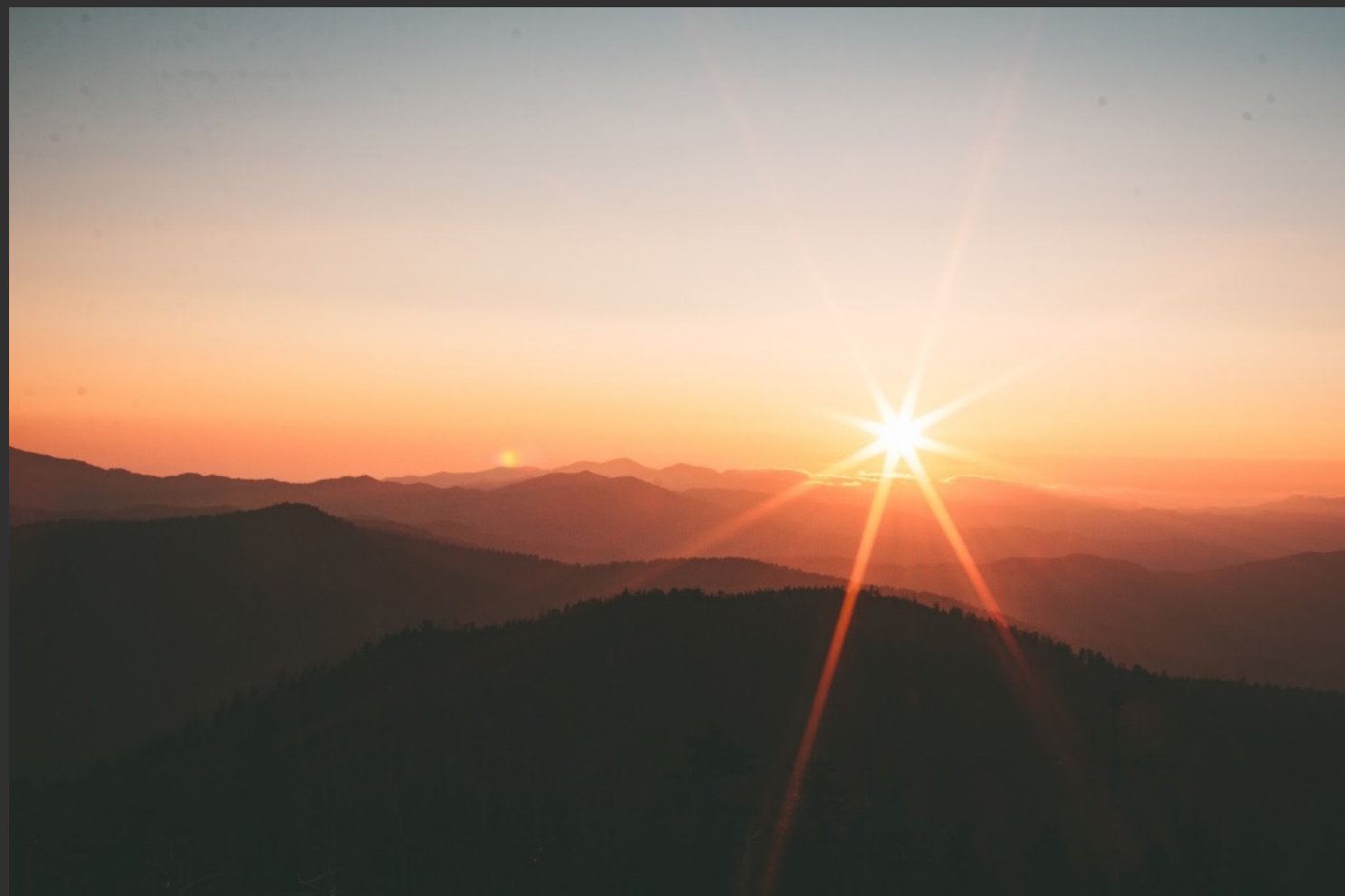




# “Lost in LUTs”

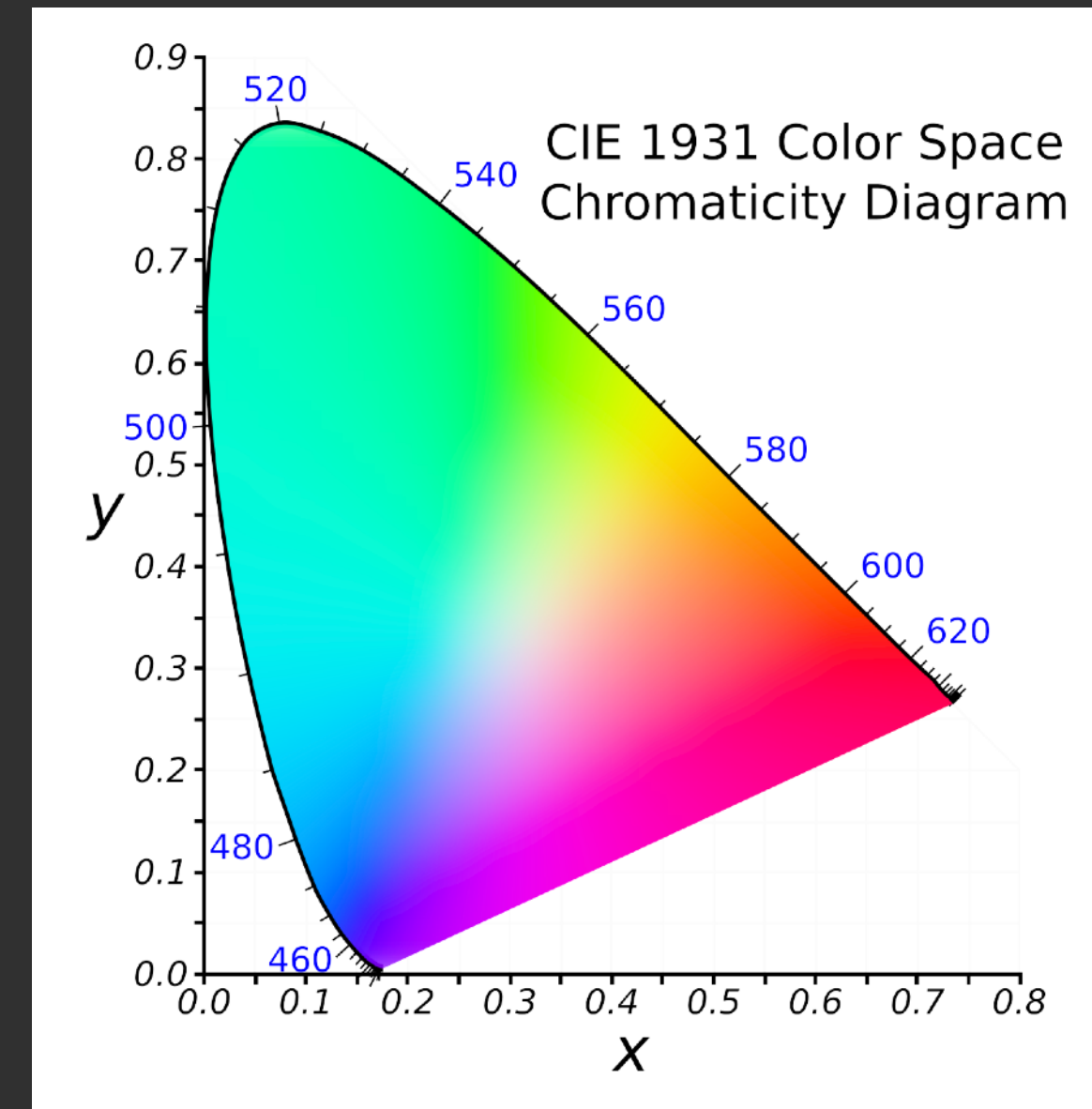
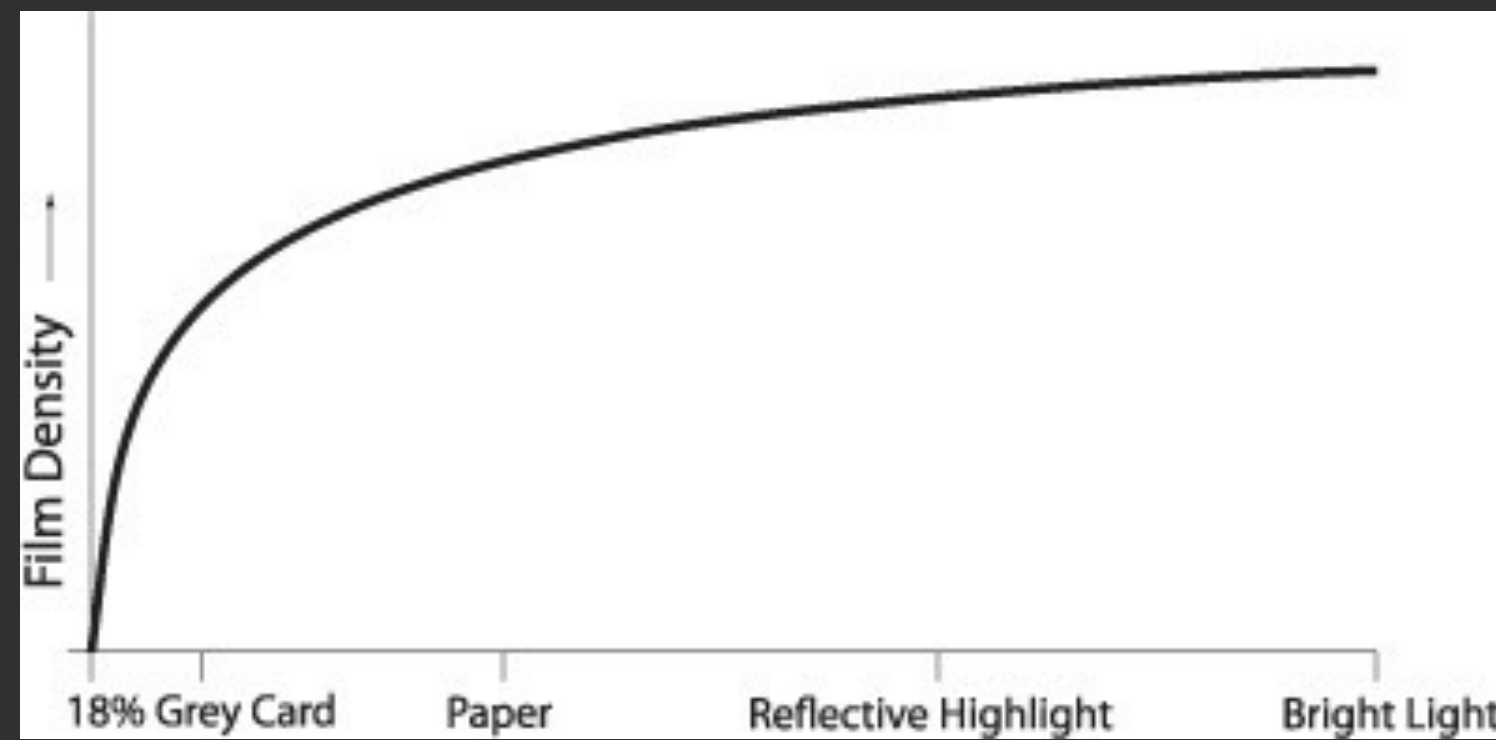


# Capturing Images



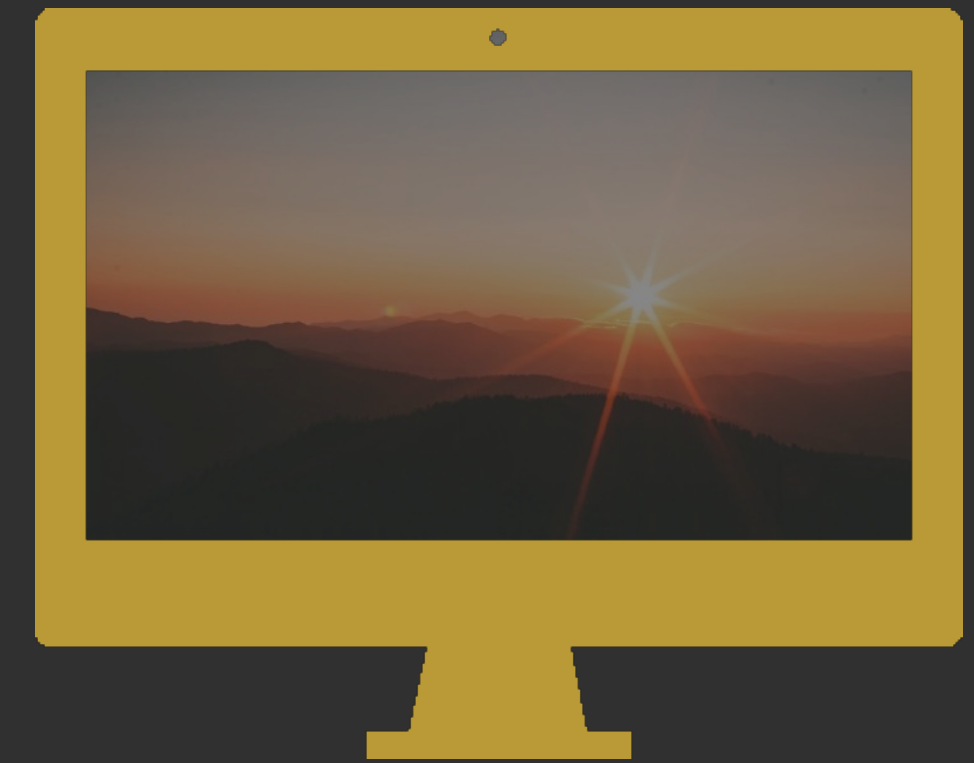
Digital cinema cameras are capable of capturing very **high-fidelity** information from the real world.

# Image Containers



Utilizing wide-gamut colorspaces and high dynamic range.  
.exr, .dpx, .ari, .R3D, etc

# Display Limitations



Display technology is not capable of reproducing the color and dynamic range we can capture.

# Display-Referred Workflow



Results in color decisions **tied to a display.**



# Scene-Referred Workflow

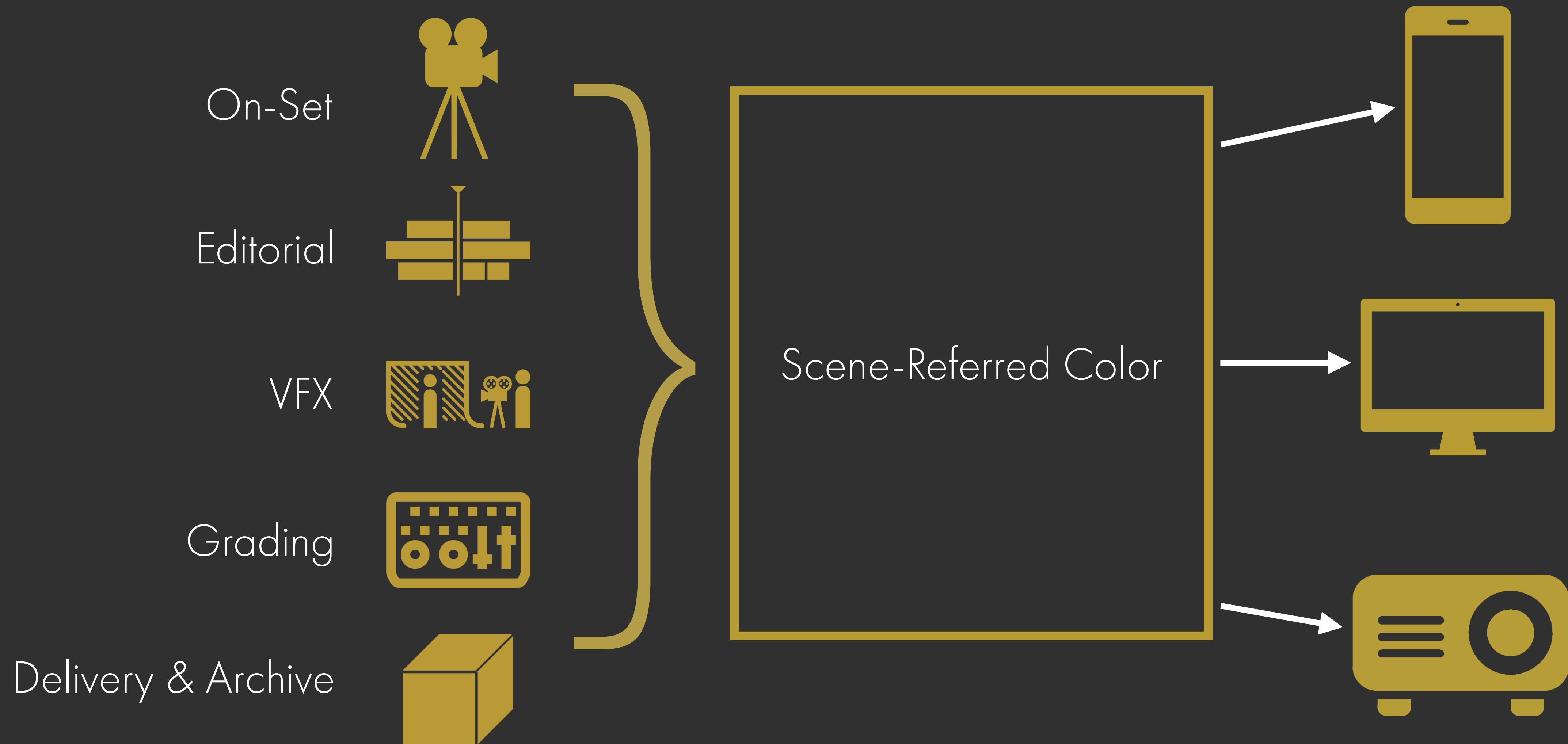


Adjust the **scene color** independent of the display.

# Unique Sources & Outputs



# Department Alignment



# Goals of Color Management

## Confidence for the creative

- Consistency in maintaining the look

## Handle mixed image sources

- Different cameras, CG material, graphics

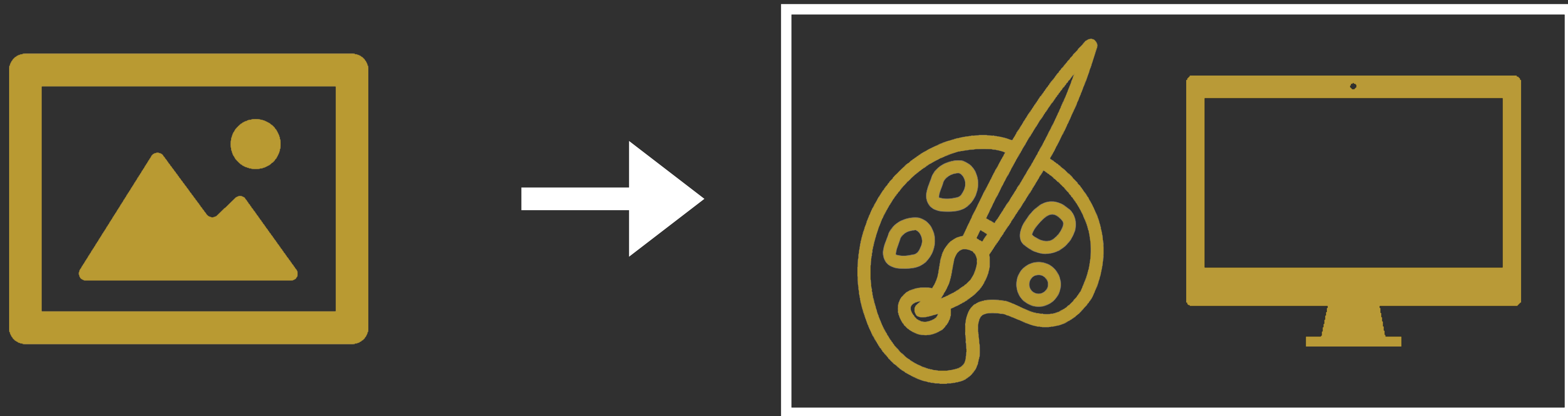
## Protect fidelity of image data

- Longevity of content



Questions?

# Display-Referred Workflow





# Scene-Referred Workflow



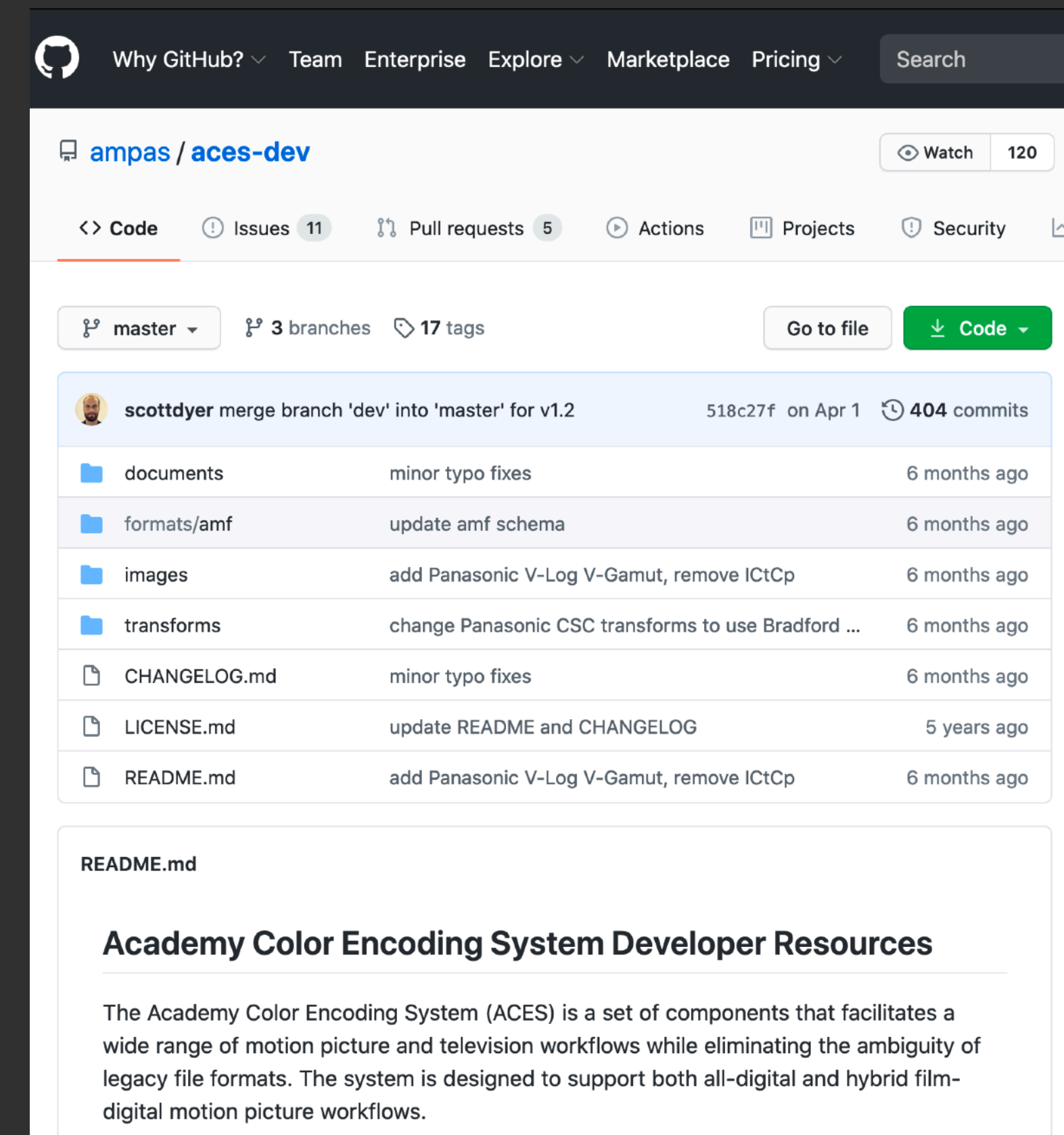
# ACES is a standardized scene-referred approach

Open Source – <https://github.com/ampas/aces-dev>

Consistent across a range of applications

On-set, DI, Compositing, CGI

OpenColorIO (OCIO)



Why GitHub? Team Enterprise Explore Marketplace Pricing Search

ampas / aces-dev Watch 120

Code Issues 11 Pull requests 5 Actions Projects Security

master 3 branches 17 tags Go to file Code

scottdyer merge branch 'dev' into 'master' for v1.2 518c27f on Apr 1 404 commits

documents	minor typo fixes	6 months ago
formats/amf	update amf schema	6 months ago
images	add Panasonic V-Log V-Gamut, remove ICtCp	6 months ago
transforms	change Panasonic CSC transforms to use Bradford ...	6 months ago
CHANGELOG.md	minor typo fixes	6 months ago
LICENSE.md	update README and CHANGELOG	5 years ago
README.md	add Panasonic V-Log V-Gamut, remove ICtCp	6 months ago

README.md

### Academy Color Encoding System Developer Resources

The Academy Color Encoding System (ACES) is a set of components that facilitates a wide range of motion picture and television workflows while eliminating the ambiguity of legacy file formats. The system is designed to support both all-digital and hybrid film-digital motion picture workflows.

# SMPTE Standards

ST 2065-1 – ACES core color encoding standard

ST 2065-2 – Academy Printing Density

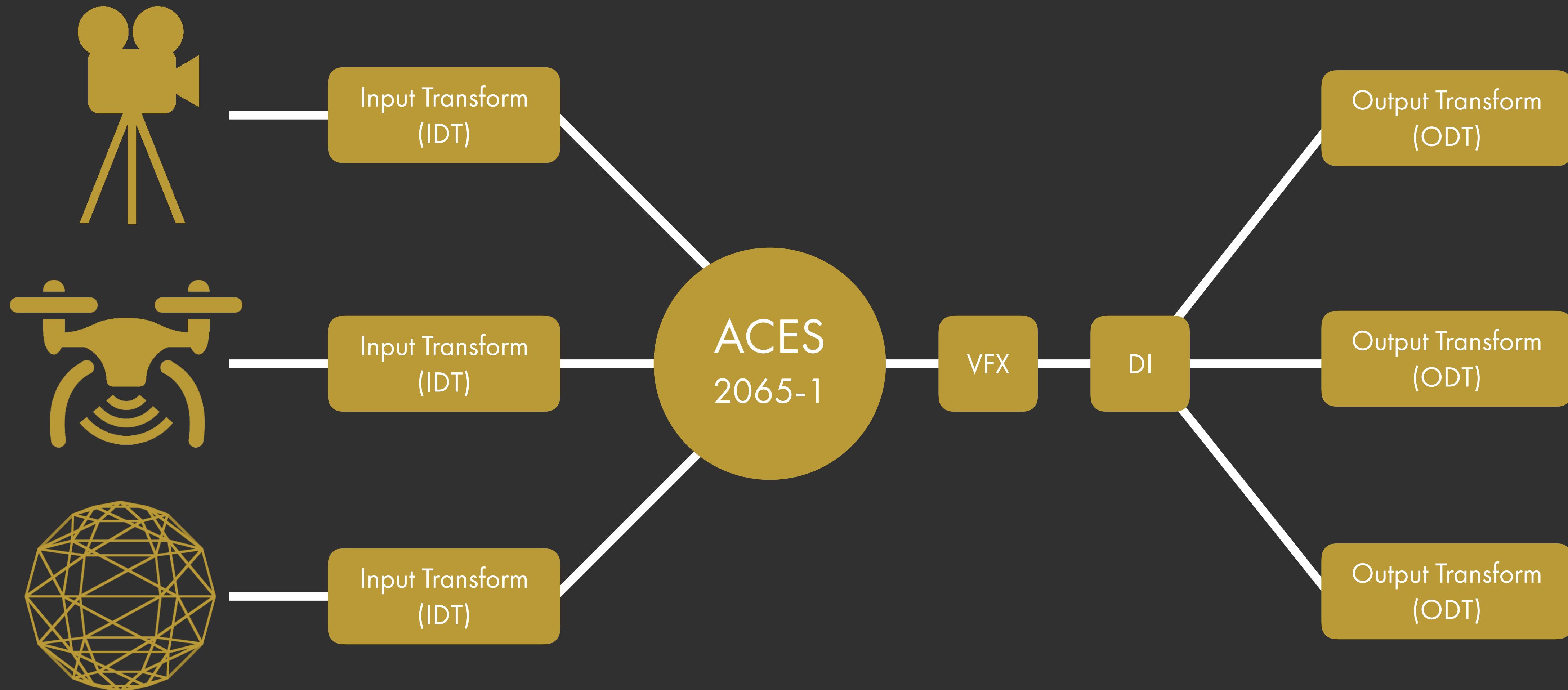
ST 2065-3 – Academy Density Exchange Encoding

ST 2065-4 – ACES Image Container File (EXR)

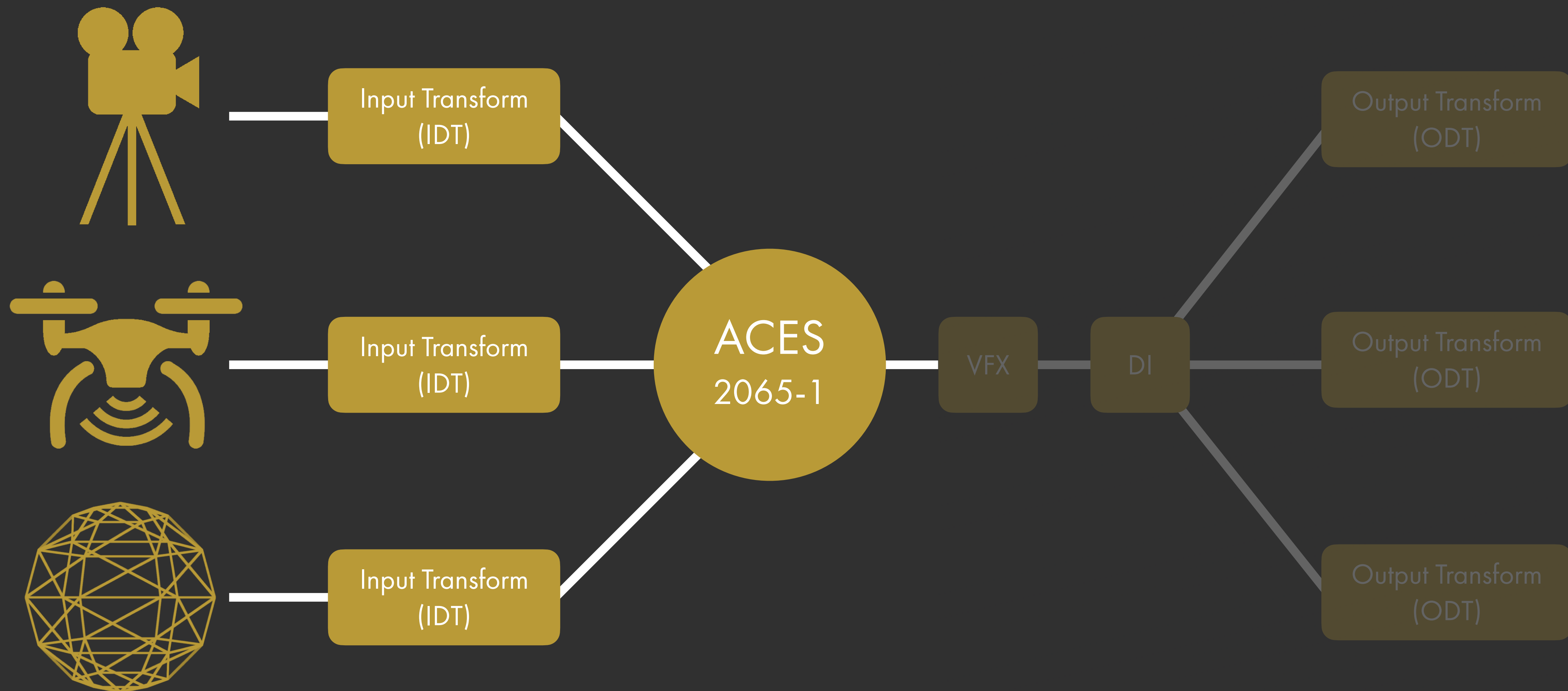
ST 2065-5 – MXF wrapped EXRs

ST 2067-50 – IMF App 5 for delivery and archive

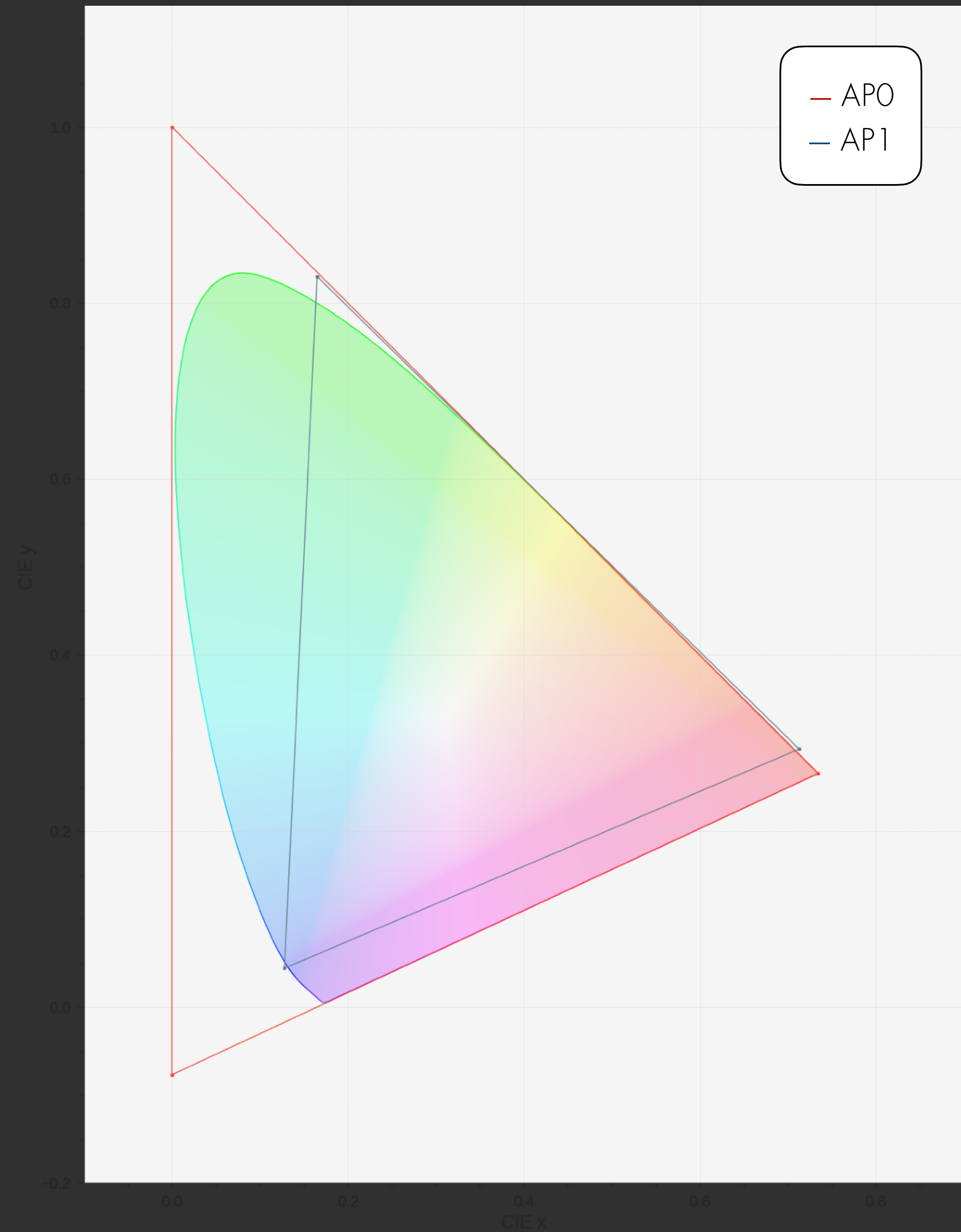
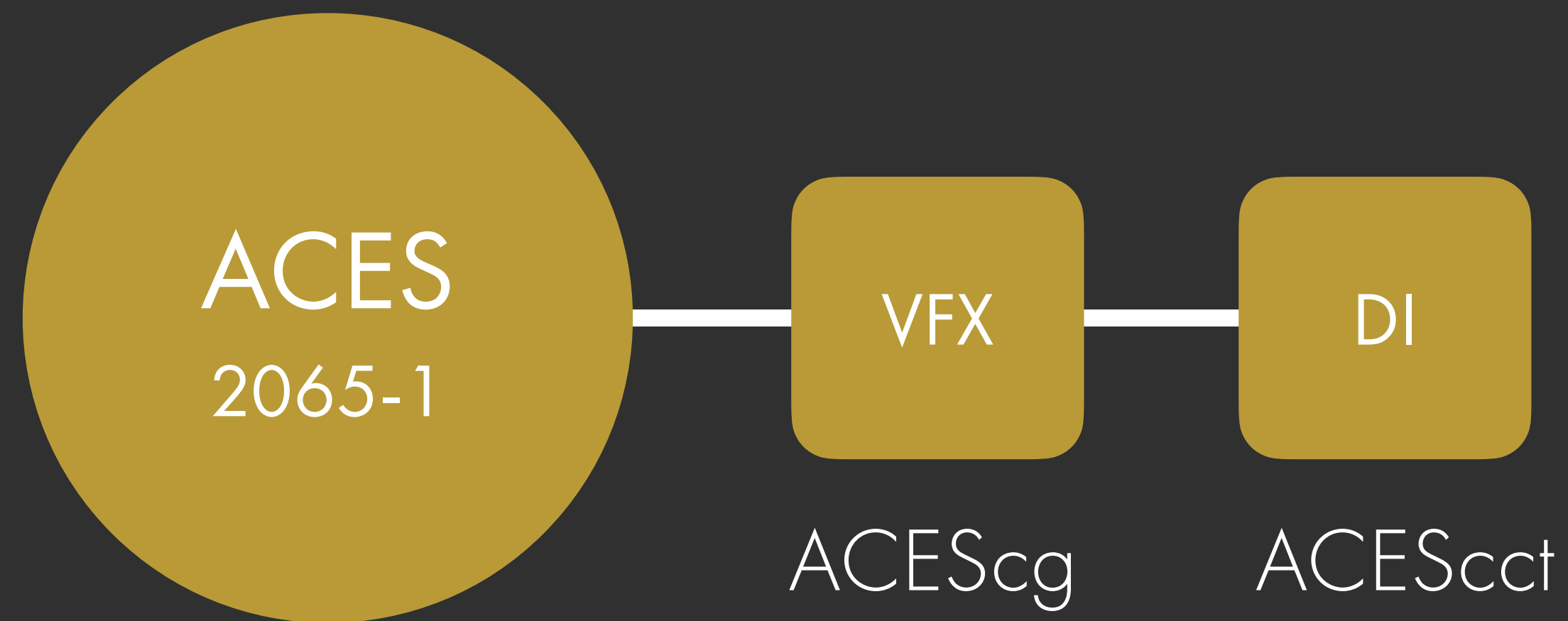
# ACES Block diagram



# Input Transform

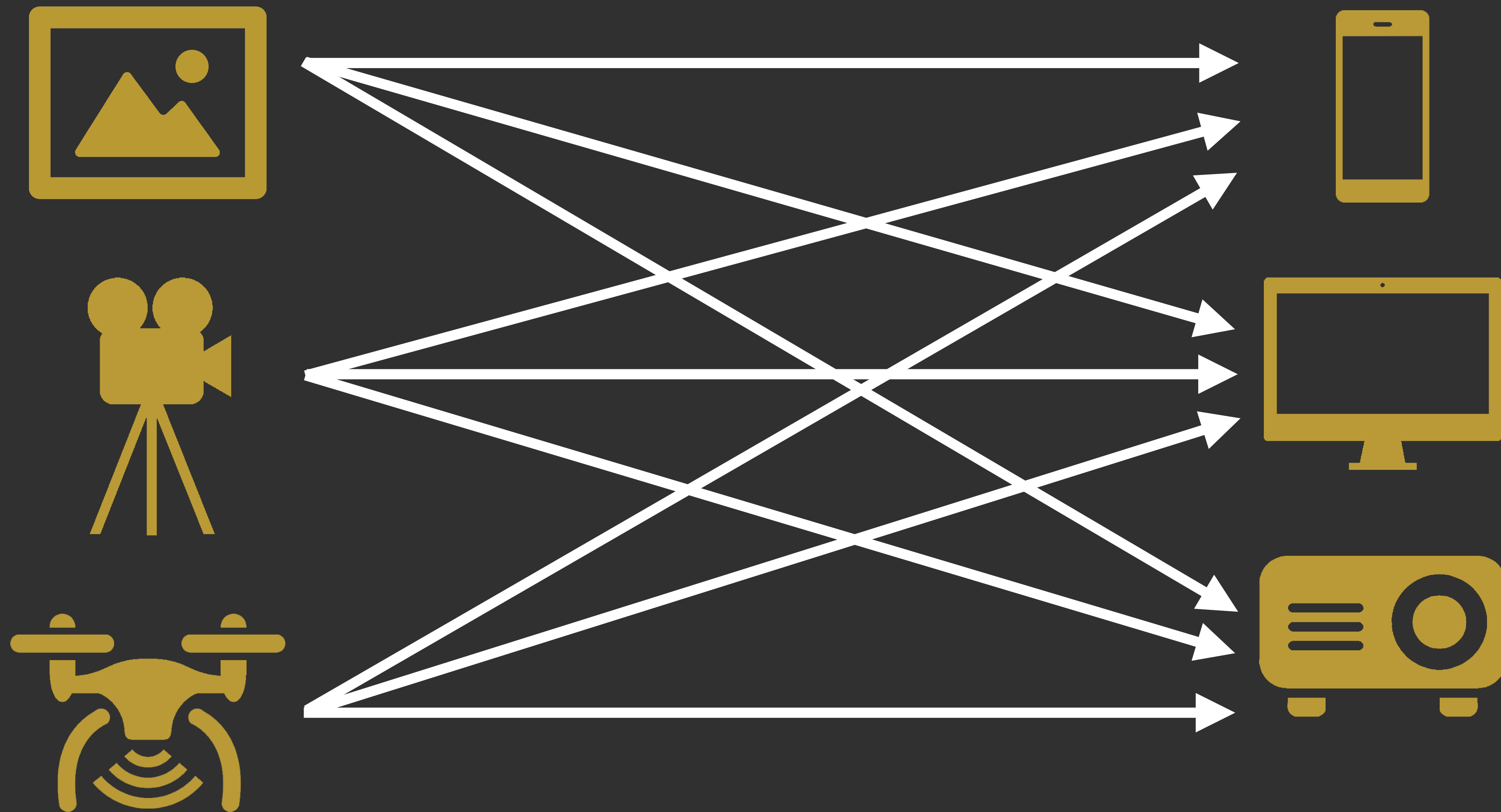


# Working spaces

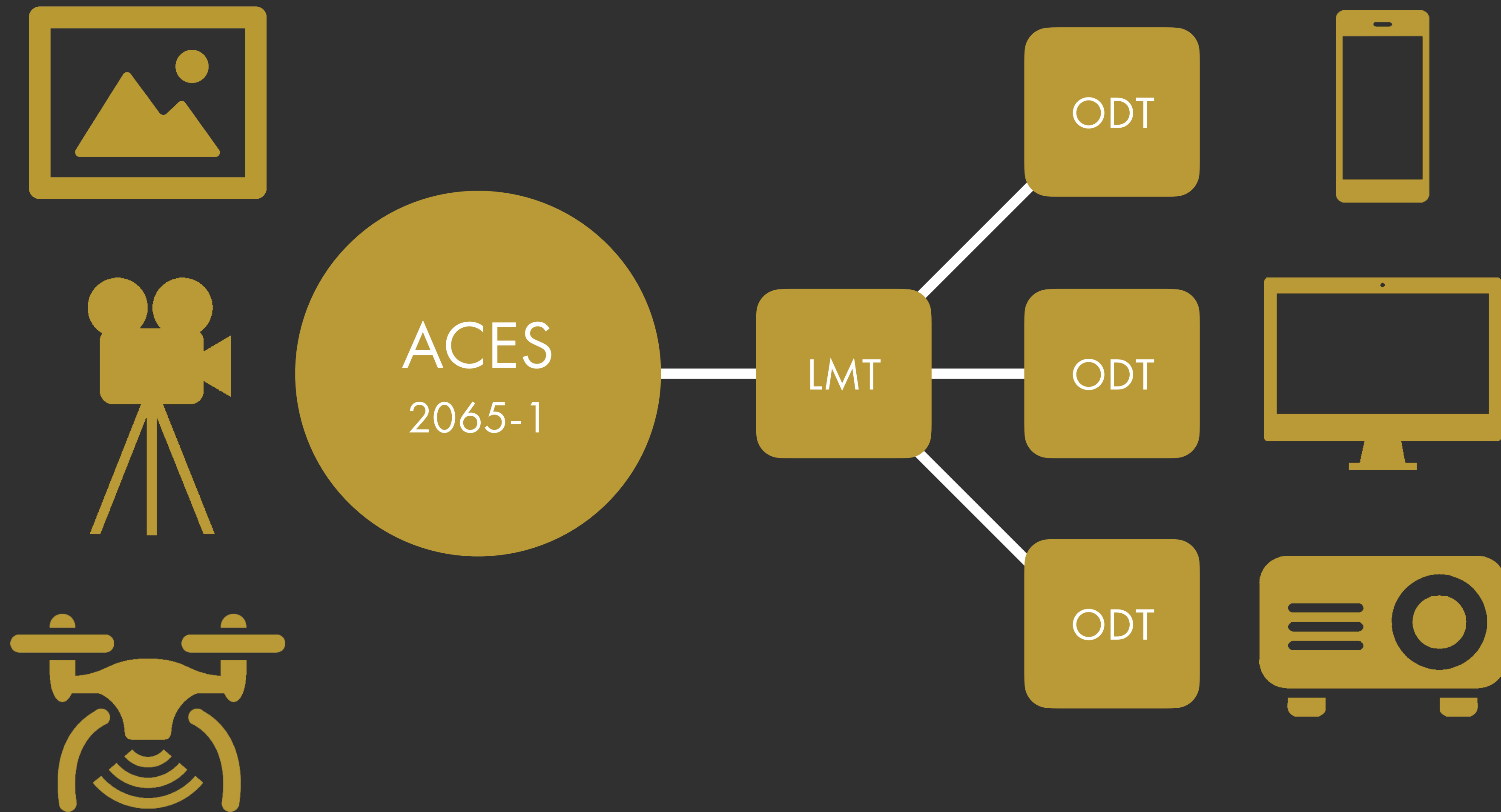




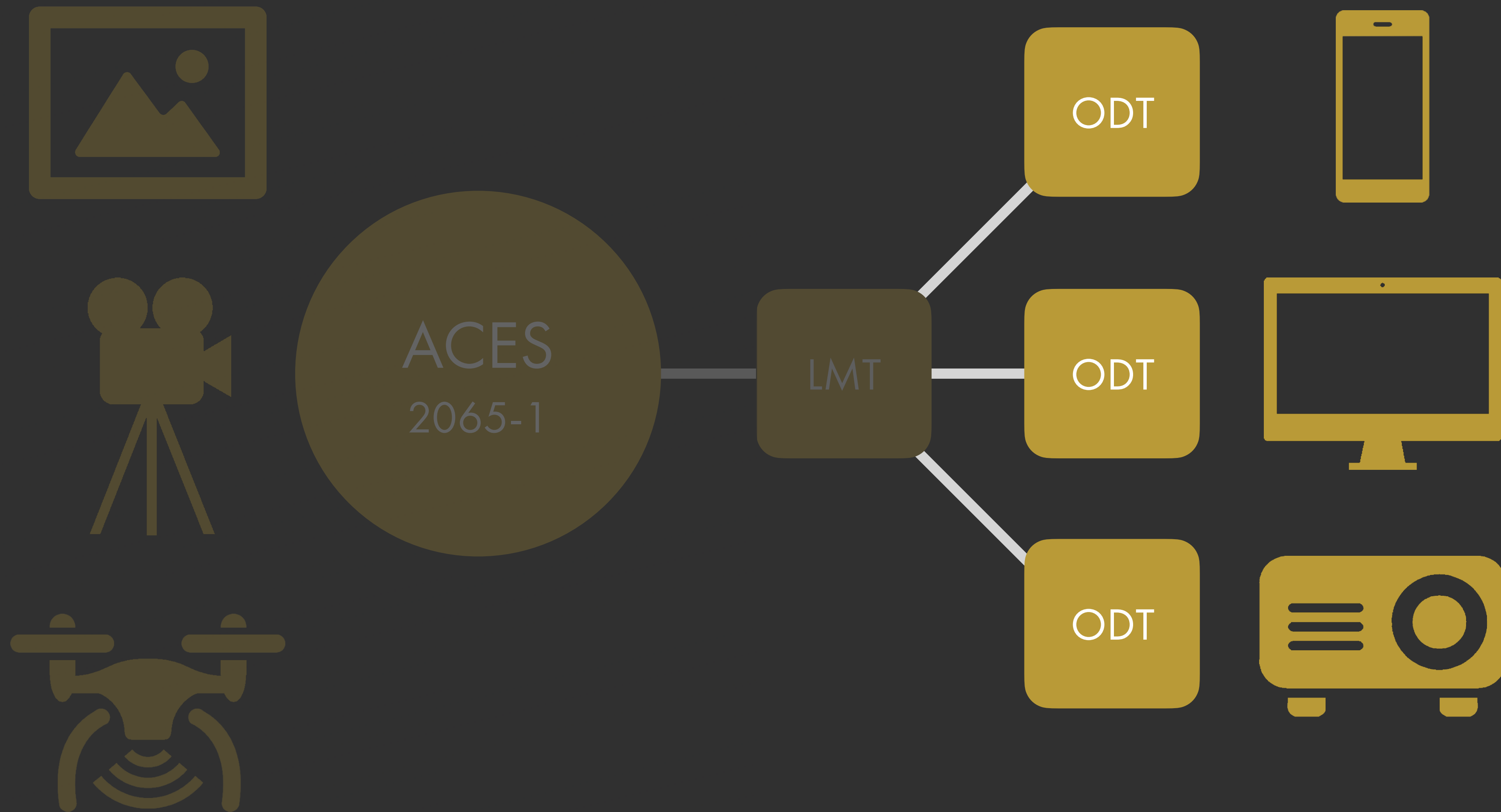
# Plethora of LUTs



# Look Transform



# Output Transform



# Delivery & Archive

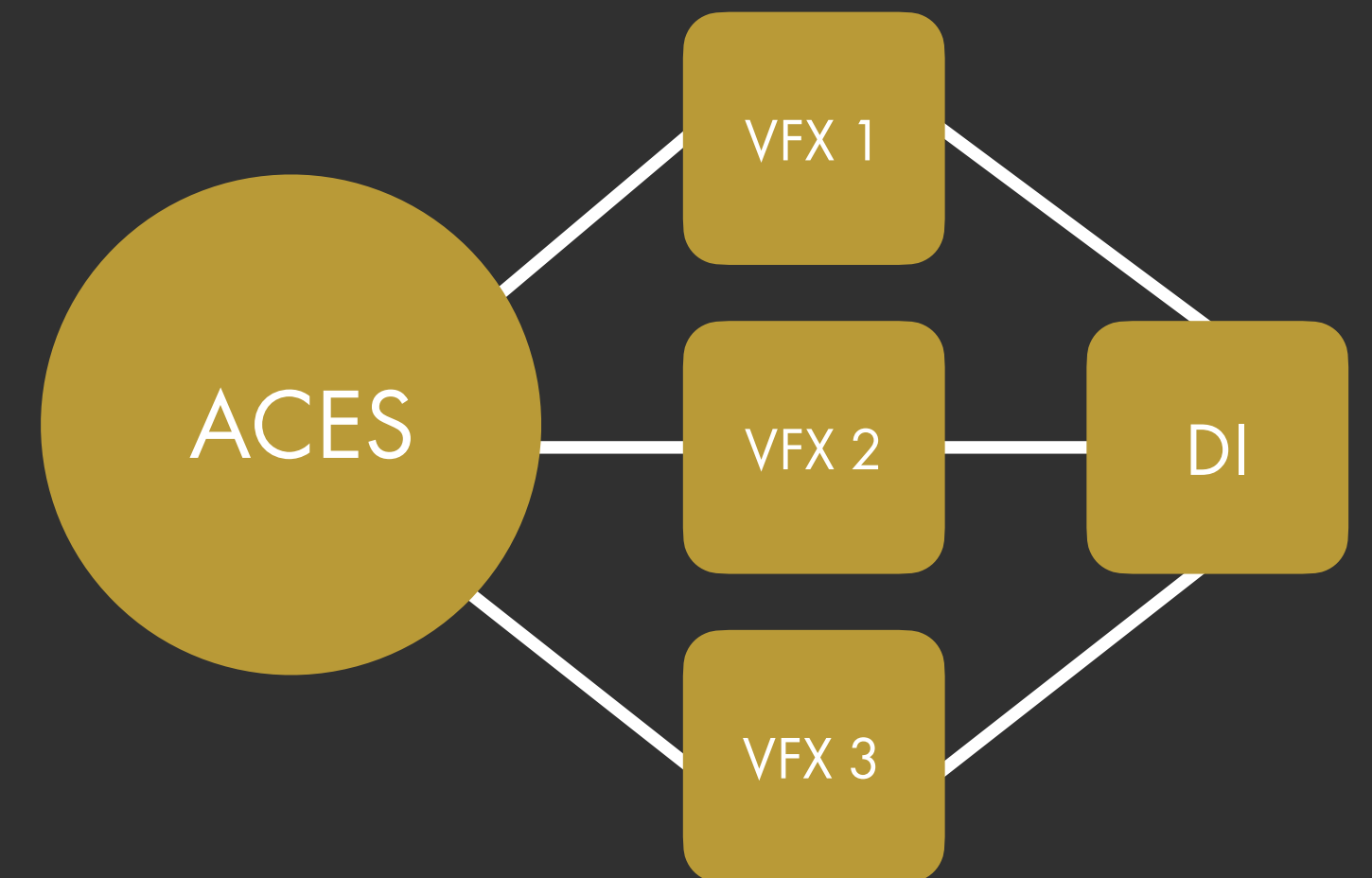


# Who Benefits from ACES?

Productions that are **multi-camera** and **multi-vendor** can keep color and file formats **consistent** and **re-usable**

Studios that have **multiple productions** can get a **consistent** color pipeline and archive

Smaller productions such as documentaries and animations can **simplify color management** while maintaining the **widest dynamic range** in their images



Questions?



# Current & Future States of ACES

# ACES Development Process

## Old process (leading up to ACES 1.0)

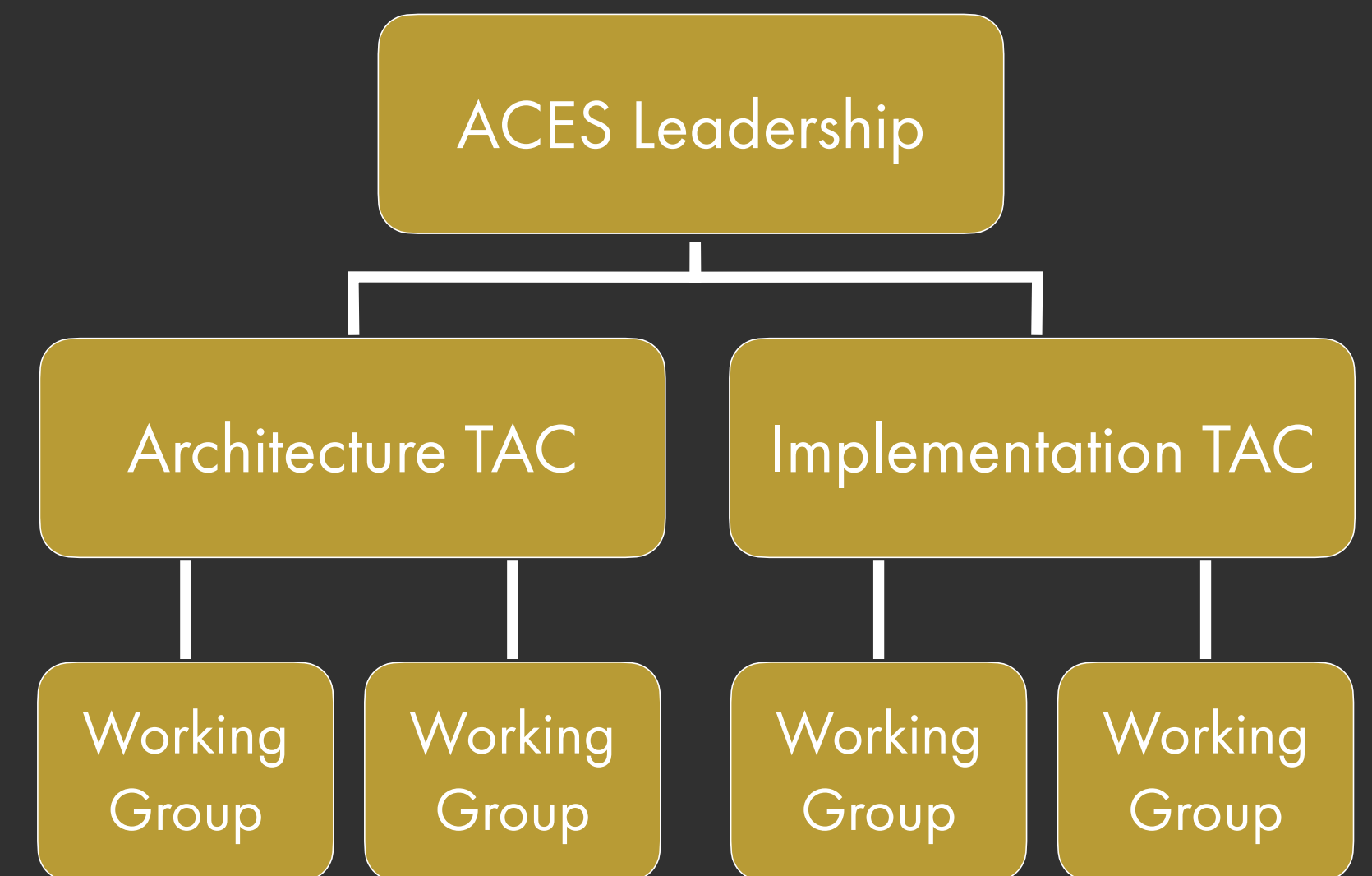
- Seemed like “Academy project” and not a “community project”
- Development process and decisions were not as easily accessible to implementers and end-users as desired

## New Process (ACESNext)

- Give more oversight, development, test and implementation responsibility to the community of engineers, end-users and other stakeholders who rely on the system

## New Organization

- Technical Advisory Councils (Architecture & Implementation)
- Working Groups



# ACES Versions & Working Groups

## Now: v1.2

- New version of Common LUT Format (CLF)
- ACES Metadata File (AMF) replaced ACESclip
- Other minor improvements

## Next Year: v2.0

- High level goal is to “delight” the industry
- New, more “neutral” output transforms based on v1.1
- Robust gamut mapping
- Validation tools for CLF and AMF
- Better reference implementations, documentation and best practices
- Revisiting film: tools, test materials, input transforms
- Considering staged approach: e.g. ACES 2.0, 2.1, 2.2 ... roll features out as they are ready

SMPTE Standards will be updated as needed

### Implementation WGs

- ACES Metadata File
- Common LUT Format
- Input Transforms (IDT)

### Architecture WGs

- Gamut Mapping

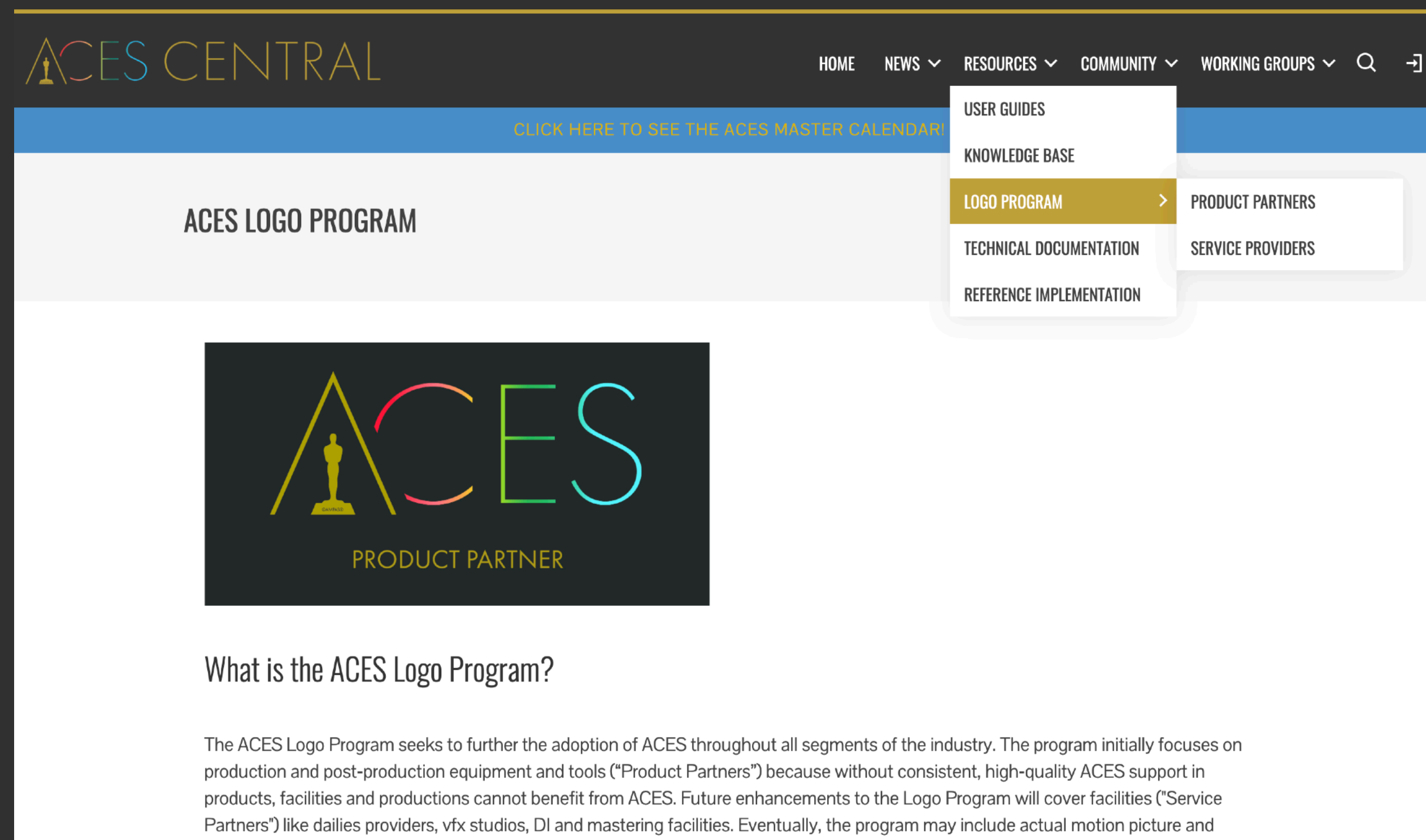
### Coming Soon

- Output Transforms
- Compression (VFX)

# ACES Logo Program

**Product Partners** - Hardware and Software manufacturers – 31 members

**Service Provider Tier** - for VFX, DI, Dailies and other vendors coming soon...



The screenshot shows the ACES Central website. The top navigation bar includes links for HOME, NEWS, RESOURCES, COMMUNITY, and WORKING GROUPS, along with search and accessibility icons. A blue banner below the navigation bar contains the text "CLICK HERE TO SEE THE ACES MASTER CALENDAR!". The main heading is "ACES LOGO PROGRAM". A dropdown menu is open over the "RESOURCES" link, showing options: USER GUIDES, KNOWLEDGE BASE, LOGO PROGRAM (highlighted), TECHNICAL DOCUMENTATION, and REFERENCE IMPLEMENTATION. A secondary dropdown menu is open over "LOGO PROGRAM", showing "PRODUCT PARTNERS" and "SERVICE PROVIDERS". Below the heading is a large image of the ACES logo with an Oscar statuette, labeled "PRODUCT PARTNER". The text "What is the ACES Logo Program?" is followed by a paragraph explaining the program's goal to increase ACES adoption in production and post-production equipment and tools.

ACES CENTRAL


HOME NEWS RESOURCES COMMUNITY WORKING GROUPS

CLICK HERE TO SEE THE ACES MASTER CALENDAR!

ACES LOGO PROGRAM

USER GUIDES  
KNOWLEDGE BASE  
LOGO PROGRAM >  
TECHNICAL DOCUMENTATION  
REFERENCE IMPLEMENTATION

PRODUCT PARTNERS  
SERVICE PROVIDERS



What is the ACES Logo Program?

The ACES Logo Program seeks to further the adoption of ACES throughout all segments of the industry. The program initially focuses on production and post-production equipment and tools ("Product Partners") because without consistent, high-quality ACES support in products, facilities and productions cannot benefit from ACES. Future enhancements to the Logo Program will cover facilities ("Service Partners") like dailies providers, vfx studios, DI and mastering facilities. Eventually, the program may include actual motion picture and

# ACESCentral.com and Community

## Discussion Forums

- Get help
- Give help
- Participate in Working Group discussions

## Working Groups

- Get involved ...
- Looking for new energy, programmers, etc.

The screenshot shows the ACES Central website's "Working Groups Home" page. The header includes the ACES CENTRAL logo and navigation links for HOME, NEWS, RESOURCES, COMMUNITY, and WORKING GROUPS. A blue banner below the header contains the text "CLICK HERE TO SEE THE ACES MASTER CALENDAR!". On the right side, there is a dropdown menu for "WORKING GROUPS HOME" with options for "ACTIVE GROUPS" and "ARCHIVED GROUPS". The main content area features the heading "Working Groups Home" and a paragraph: "If you're new to our Virtual Working Group structure, please note the following:". This is followed by a bulleted list of four items: "Working Group Meetings are conducted on GoToMeeting", "Schedules, documents, to-dos, etc. are hosted on the specific VWG workspace linked.", "Discussions are hosted on ACESCentral.com in the specific VWG Community Forum Discussion categories linked below.", and "All participants agree to have read and accept the VWG Participation Guidelines.". Below this, there is a section titled "Active Working Groups" with two entries: "ACES Metadata File (AMF) Implementation" and "Common LUT Format (CLF) Implementation". Each entry includes a "Purpose" statement, the "Chair" name, and the "Opened" date.

ACES CENTRAL

HOME NEWS RESOURCES COMMUNITY WORKING GROUPS

CLICK HERE TO SEE THE ACES MASTER CALENDAR!

WORKING GROUPS HOME

ACTIVE GROUPS

ARCHIVED GROUPS

### Working Groups Home

If you're new to our Virtual Working Group structure, please note the following:

- Working Group Meetings are conducted on GoToMeeting
- Schedules, documents, to-dos, etc. are hosted on the specific VWG workspace linked.
- Discussions are hosted on ACESCentral.com in the specific VWG Community Forum Discussion categories linked below.
- All participants agree to have read and accept the VWG Participation Guidelines.

### Active Working Groups

[ACES Metadata File \(AMF\) Implementation](#)  
Purpose: Provide tools and tests to assist in the implementation of the ACES Metadata File (AMF)  
Chair: Dan Tatut  
Opened: 10/31/2019  
[Community Forum Discussion Area](#)

[Common LUT Format \(CLF\) Implementation](#)  
Purpose: Provide tools and tests to assist in the implementation of the Common LUT Format (CLF)

# Note about ACES and Broadcast

## Scene-Referenced Workflow



Episodic content ✔

Shoot and posted content ✔

Camera shaded content (Live) ?



# Panel Discussion



Annie Chang



Carol Alynn Payne



Nick Shaw



Alex Forsythe



Joel E Welch  
Moderator

Let's continue this conversation!

[ACESCentral.com](https://ACESCentral.com)

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