

# Flexibility in Frame Rates

IMAGO proposal towards EDCF-T and  
SMPTE DC-28

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DC 28 meeting, Amsterdam 28 June 2006

# Kommer Kleijn

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- Kommer is a member of EDCF-T European Digital Cinema Forum – Technical Module
- IMAGO is a full member of EDCF
- Kommer Kleijn represents IMAGO within EDCF-T
- EDCF provides input to SMPTE DC-28

# IMAGO

- IMAGO would like to thank and congratulate the DCI and the DC28 work groups for impressive and much appreciated work on color space, pixel geometry and security
- IMAGO, is concerned about movie image quality, both in theaters as well as how their movies will render on televisions and home cinema systems.
- The IMAGO frame rate proposals are about image quality, enhanced cinema experience for the customers, enhanced creative possibilities for filmmakers and better interoperability

# The IMAGO Proposals

- The IMAGO Proposals are about enhancements film could never provide economically, but that digital equipment is now capable of
- 2003 -2004: higher frame rates, lower frame rates and stereoscopic imagery
- 2005: in reaction to the publication of the DCI spec, two points were added: “60 rather than 48” and “speed changes during the show”

# The IMAGO Proposals

## summary

- Support of 60 fps frame rate, not 48
- Allow for frame rate change during the show.
- Support for other common existing and legacy film projection frame rates (8, 12, 16, 18, 20, 22, 25, 30, 50, 60)
- Lets standardize how to represent stereoscopic 3D imagery
- Keep an evolution path open for full resolution and 3D at higher frame rates (film can do it today)

# Avoid Frame Rate conversions

- Frame rate conversions are very damaging to moving images, They often leave artefacts, often hurt movement quality and image quality and especially hurting 3D perception of stereoscopic moving imagery. For these reasons, frame rate conversion should not be considered as a solution for solving frame rate issues.

# Support for 60 fps frame rate, not 48

- 48 may not transfer well for video distribution
- 48 introduces a new frame rate in an industry that has already too many
- 60 is already in use in the industry and should probably be supported anyhow
- Risk of proprietary systems
- Frame rate conversions are causing substantial damage to moving imagery

# Full resolution, also at higher frame rates

- The DCI specification limits resolution to 2k at the frame rate higher than 24 fps.
- Even if technology and economics may indeed limit bandwidth for some time to come, we feel it is not a good idea for a standard to impose such limits. This may conduct to proprietary versions once the technology and economics will allow for higher resolution at high frame rates.
- We propose the standard will include an evolution path for that future so that interoperability will be assured also in the future.

# Allow for frame rate change during the show

- Allow higher frame rates to be used more economically in the beginning of DC deployment, by limiting the higher frame rates to specific scenes within a movie
- Allow archive footage within a movie to run at its native speed
- Different frame rates may have different atmosphere: a new creative possibility

# Support for other common projection frame rates

- Legacy and existing frame rates in the industry 8, 12, 16, 18, 20, 22, 30, 60
- Ability to run material originally shot for television to run at their native speed if projected in a movie theatre, or if used in a movie: 25, 30, 50, 60
- Frame rate conversions are causing substantial damage to moving imagery

# Standardize how to represent stereoscopic 3D imagery

- Actual strong interest in Stereo movies
- To avoid emergence of proprietary versions of 3D copies, we suggest the standard would define how to represent stereoscopic 3D
- We have learned that a SMPTE working group has been started on the subject, which we think is very good news

# Imago proposed container levels

- 8 container levels in stead of 3

# Thank you

Please download the proposal on

[www.IMAGO.org](http://www.IMAGO.org)

Please feel free to contact me

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# 30 fps

- Once Digital Cinema will be generalized and the need for a 35mm copy of a movies will have disappeared, and digital capture will have become mainstream, then it will very probably become more advantageous for American movies to shoot in 30 (and later 60) fps.
- Better movement reproduction in cinema projection and subsequent TV releases
- Does away with the 2:3 pull down movement artefacts on TV and DVD releases of the movies
- Does away with the need of costly 24 fps video playback systems on set
- Greatly simplifies post production methods (time code, 2:3 pull down issues)
- Cameras can run in sync with mains and generators, less problems with HMI / neon flicker etc.
- for many of these reasons, many European productions are already using 25 fps for many years.

# 60 fps over 24 fps

- 60 fps has the same advantages as 30 fps, plus dramatically enhanced movement reproduction quality.

# 25 fps

- Many European movies are shot at 25 fps
- In a DC theater these movies can be shown at their correct speed instead of 24 fps
- Quite a few projectors in European cinemas run at 25 fps today
- Support for 25 fps worldwide would be a minimum requirement