

Rethinking Frame Rate

100fps as a modern capture format

STRUCUTRE

1. Introduction
2. HFR Basics
3. Cinematic HFR - „Good Vibrations“
4. Rethinking Frame Rate
5. Live-Demo
6. Q&A

WHO WE ARE



MARTIN HÜBSCH

- B.Eng. Audiovisuelle Medien
HdM Stuttgart (2016-2020)
- Freelance Cameraman



DANIEL GROOTZ

- Directing Filmakademie BW
- B.Eng. Audiovisuelle Medien
HdM Stuttgart (2016-2020)
- Freelance Director/Cameraman
- AD for multiple TV-Series

WHAT IS HFR?

Capturing and playing back video at frame rates above the standard 24/25 fps
(48fps, 50fps, 60fps, 96fps, 100fps, 120fps)

Paradox

Every aspect of filmmaking involves expecting Frame Rate



TECHNICALLY SUPERIOR

- Reduced Judder and Motion Blur
- Studies show improved clarity, realism, viewer comfort
- Neurological studies confirm more natural perception

AESTHETIC PROBLEM

- Controversial reception
 - „Breaks cinematic illusion
 - „Soap Opera Look”
 - „Too sharp, to artificial”

HFR IN CINEMA

- Developed by Douglas Trumbull in 1984
- Showscan: 70mm film at 60fps
- Directors like Bertolucci, Spielberg and Cameron were enthusiastic and wanted to use it for their films

„I had just witnessed the most realistic motion picture I had ever seen in my life – incomparably more realistic than anything I had ever seen before on a movie screen.

It is the future of the cinema”

– Roger Ebert in *The Daily Sentinel* 1986

Will Showscan change the future of the cinema?
By Roger Ebert
mm film which moves through the projector a-half times more frames than

Showscan offers more clarity, detail
By GARY HAYNES
KHT News Service
Each frame is tack-sharp, and even when the camera is panning
ville, Ala.; Springfield, Mo., and
Dallas, New Mexico, which runs

Dramatic changes loom in television future
By Roger Ebert
LOS ANGELES — The television set of the future will have a picture of such high quality that
five times as much information as today's TV. And since today's average TV set only actually picks up less than half the information that is contained in the broadcast
Trumbull emphasizes that High Definition TV is not the same thing as digital TV, which is coming into the marketplace right now. Digital TV is a high-tech
the conversions to smaller auditoriums, and begin offering something spectacular, like Showscan, in big movie palaces. It is ironic, but not surprising, that
culations in his head. "Three times two and a half times three equals...an image that provides more than 20 times as much in-

FILMS FIGHT BACK WITH A HIGH-SPEED WONDER

aking out of wine and the raising cheers in the Showscan offices in new industrial park in nearby Mandalay, is the consequence of early a decade's work.

In 1975, Trumbull and Paramount made a joint venture called Future General to explore the technological horizons of the movies. (Investment research and development by the major studios all but dried up after antitrust was divorced from exhibition under the antitrust consent decrees of the early 1950s.)

One of Trumbull's several free-ranging lines of inquiry was in fact frames-per-second. Question: Is 24-48 the ideal? Did it evoke the highest visceral responses from the viewer?

To find out he conducted some elaborate tests: shooting the same event at a wide range of frames per second then showing the various footages to viewers who were asked to record pulse rates, respiration, skin tension.

WHAT he discovered, Trumbull says, was that visceral response to images appeared to peak at 60 (repeated) frames-per-second and level off thereafter.

Paramount lost interest in Future General and Trumbull had a potentially significant discovery and no one to go with it. It was clear, and most still is, that the major studios are not going to start making films in a new system that no theaters are equipped to project and that the exhibitors are not willing to invest in.

Trumbull thought he could improve on the robotized entertainment the parlor was providing and in 1982 he and Brock became partners.

By now Brock has built four Showscan theatres adjoining pizza parlors in Dallas, Springfield, Mo., Huntsville, Ala., and Fairfax, Va. Each, Trumbull says, is profitable.

The theatres are equipped to project Showscan's 70mm, 60-frames-per-second film with its modified Dolby six-track sound. The surroundings also reflect Trumbull's careful planning. There are between 60 and 100 seats in steeply raked tiers with each seat precisely sited for an optimum view of the 30-foot-wide curved screen. Because of the relatively short throw from the projector and the closeness of seats to the screen, the images appear relatively larger and more embracing than in more conventional cinemas.

TO date, Trumbull has made two short films in the Showscan format, both created to be entertaining in their own right but also to show off the capabilities of the system.

Big Ball is kids' fare, a kind of out-sized soccer game played up and down sand dunes with big-bumpered beach buggies pushing around a ball five feet in diameter. There are good guys and bad guys, mean tricks (non-injurious) and some truly stomach-clenching action shots from the point of view of the players.

DOUGLAS TRUMBULL with his Showscan system: videos and TV can't compare



A still from the movie 'The Good, the Bad and the Ugly' showing three men in a vast, rocky cemetery. Clint Eastwood stands on the left, Lee Van Cleef in the center, and Eli Waller on the right. The background is filled with numerous tombstones and rolling hills under a clear sky.

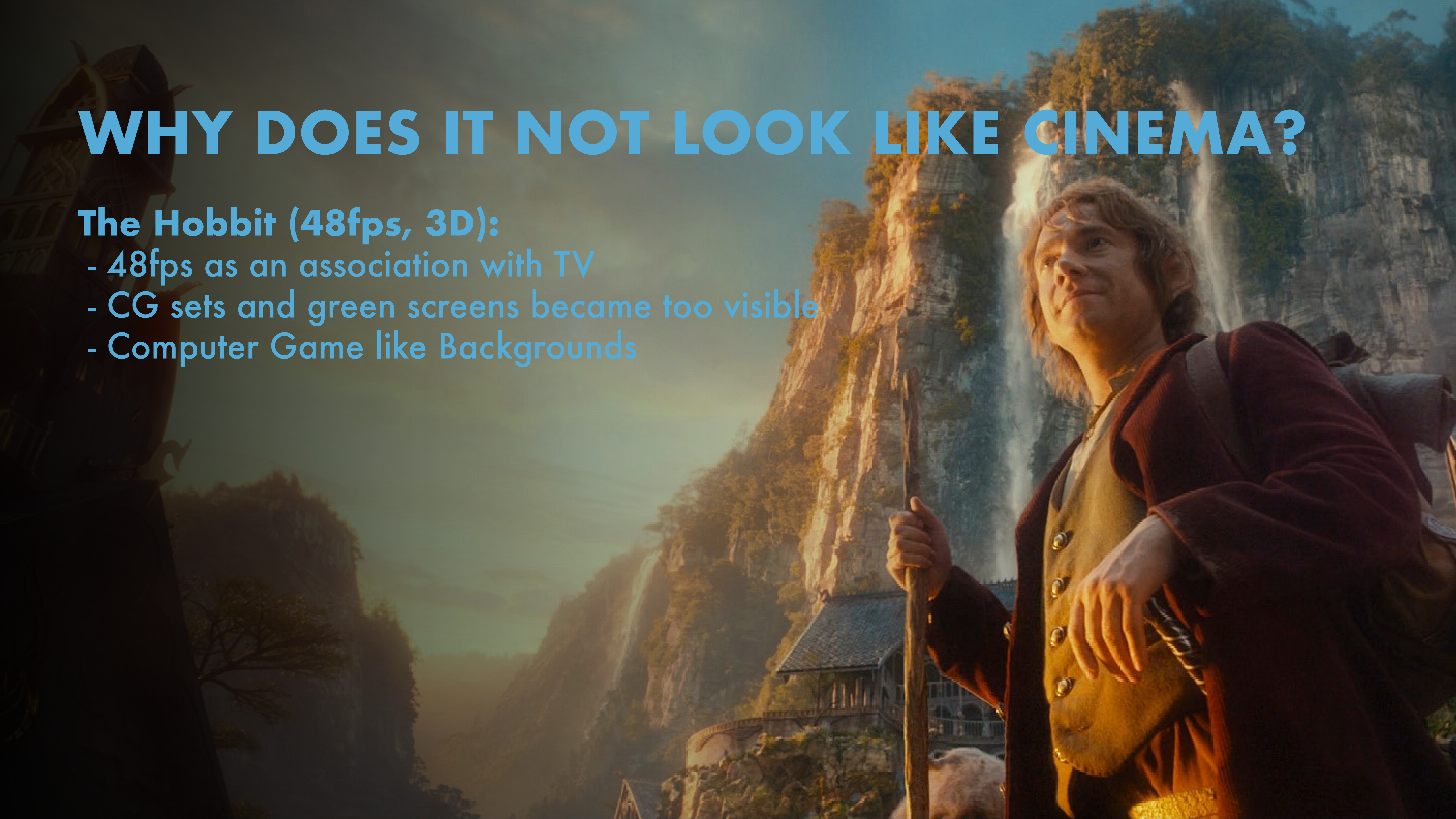
STUDIOS: „We produce in Showscan,
when you upgrade your Cinemas“

CINEMAS: „We upgrade our cinemas,
when you produce in Showscan

WHY DOES IT NOT LOOK LIKE CINEMA?

The Hobbit (48fps, 3D):

- 48fps as an association with TV
- CG sets and green screens became too visible
- Computer Game like Backgrounds



WHY DOES IT NOT LOOK LIKE CINEMA?

Ang Lee (120fps, HDR, 4k, 3D):

- Radical new „Digital Cinema“ approach
- Maximum visual clarity & realism

„The film industry is trying to make digital look like film. (But) it's a different media. All I know is, that there is something in digital cinema which has an enormous beauty, which all has to do with new forms of light, contrast of light, saturation, resolution and frame rate.“ - Ang Lee



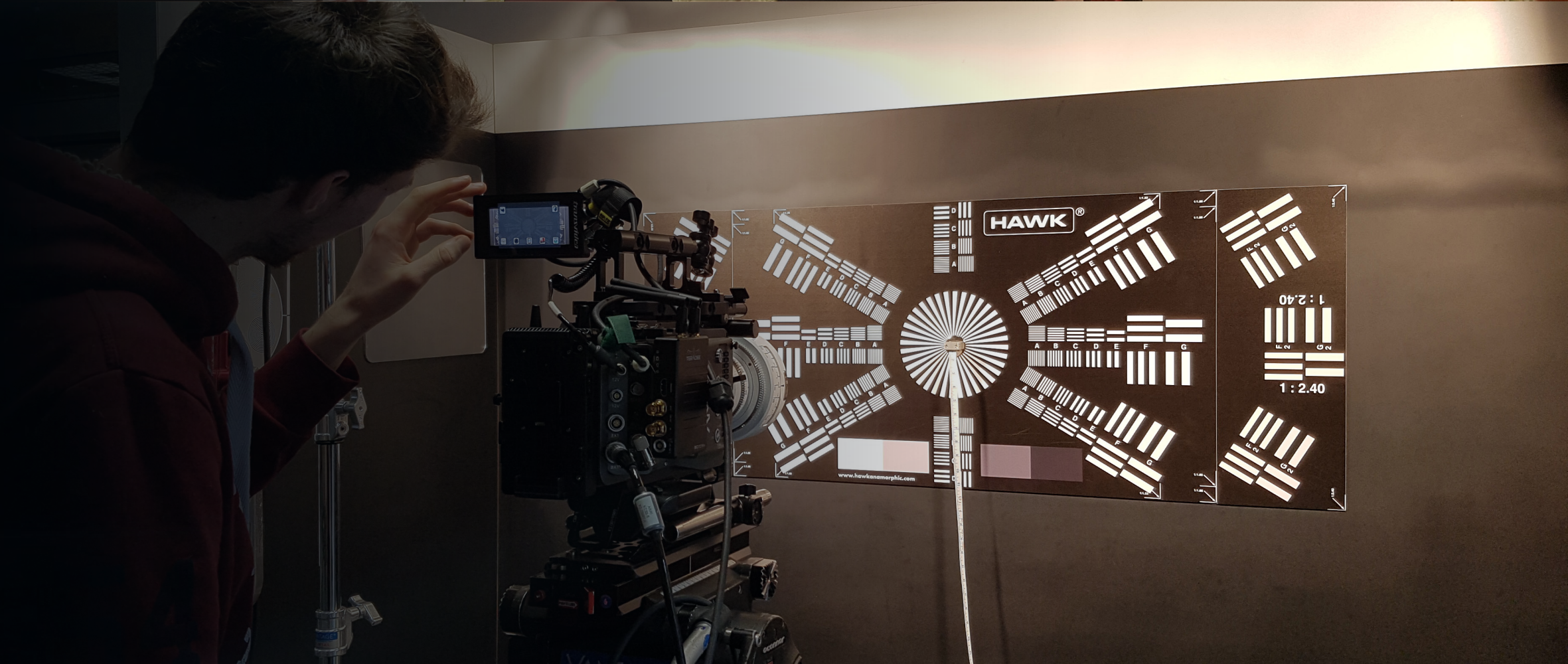
OUR PROJECT - „Good Vibrations“

Our motivation:

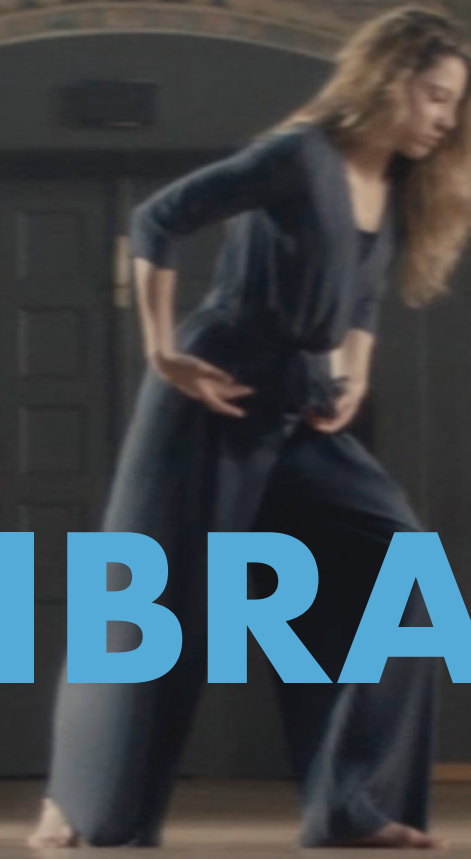
- We didn't hate HFR – just parts of the look
- Tried to blend cinematic tools with HFR

Our approach:

- Capture @100fps 360° Shutter Angle
- Anamorphic Lenses (Hawk Vintage 74 2x)
- Moody, Contrasty Lighting
- Shallow Depth of Field
- 2,4:1 Aspect Ratio
- Film Grain



GOOD VIBRATIONS



OUR PROJECT - „Good Vibrations“

Our Findings:

- HFR can have a Cinematic Look
- Frame Rate is a creative parameter like color, lens, light
- HFR is good for some shots (Pans, Fast Movement, HDR)
but can also be distracting for some moments
- Huge Adaption for HFR, hard to switch back to SFR
- 100fps/360° Shutter is a great Master Capture Format

OUR PROJECT - „Good Vibrations“

Limitations & Future Work:

- Solution for switching Frame Rates in the Editing Process (Not in Nuke)
- Workflow Converting 100fps to 25fps/180° not practical
- 100fps Timeline not practical - and maybe not needed ?!
- Not confident shooting HFR without easys „Fallback-Workflow“ to 25fps/ 180°

EDISON - Rethinking Frame Rate

Essence:

- HFR more as a capture format, less as a delivery format
- Not „Scared“ to shoot HFR in fear of Soap-Opera Effect (25fps 180° Fallback Option)
- Variable Frame Rates & “RAW” Shutter Angle as creative tools
- Plugin integrates right into the Editing Software (Resolve)
now Compositing/ Rendering needed

Shoot 100fps+ -> Deliver 50fps

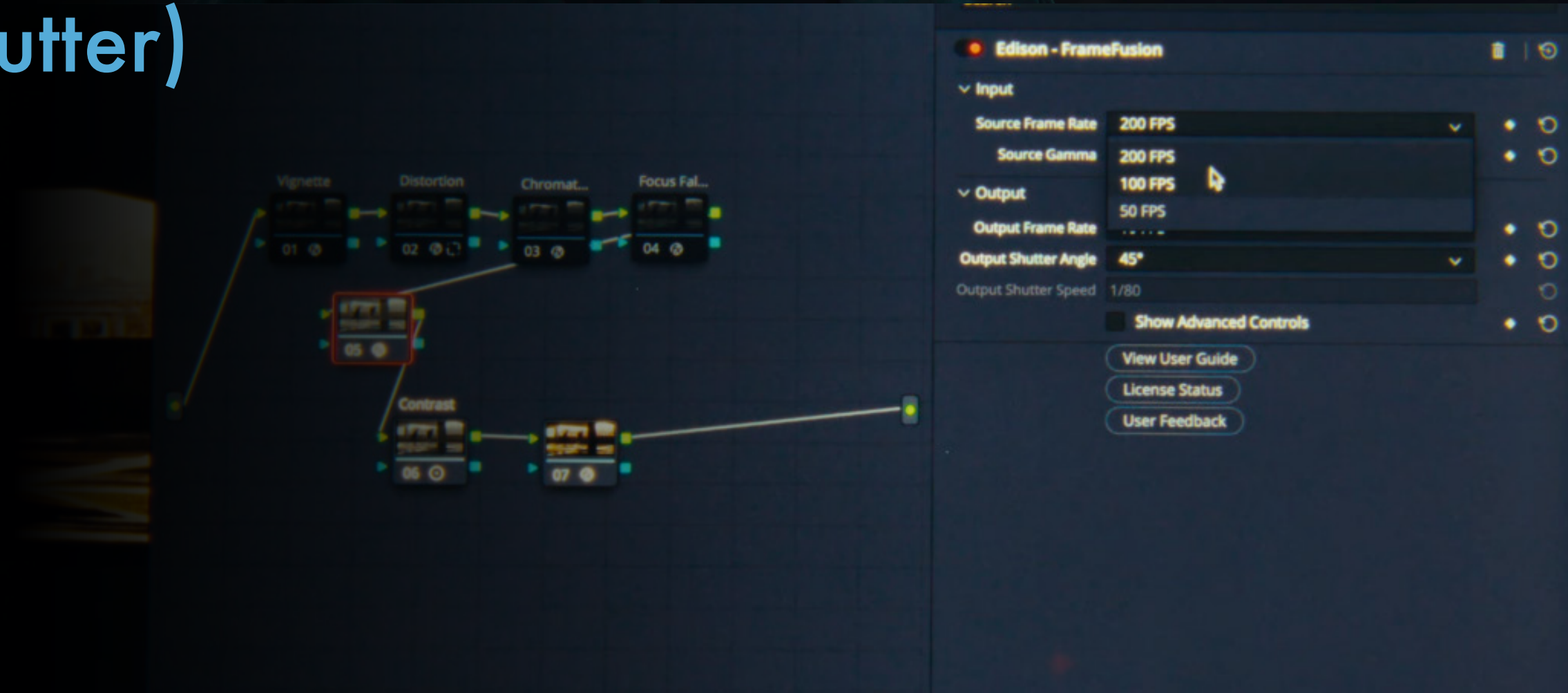
EDISON in action: Skate Spec Ad

Challenges:

- Documentary-style approach (SloMo/ RealTime Mix)
- „Fake 50fps“ videocamera aesthetic:
- Slow shutter effects:
- FPV drone footage
- Different Frame Rates/ Cameras on Set (RED, GoPro, Videocam)

Technical Specifications:

- RED Komodo-X & Sony FX3 (100fps 360° Shutter)
- GoPro/ FPV Drone (200fps / 360° Shutter)





EDISON X MORTY FILMS



Q&A

