American Society of Cinematographers
Motion Imaging Technology Council Progress Report 2020

Lens Committee

Co-Chair: Jay Holben
Co-Chair: Michael McDonough, ASC, BSC
Vice-Chair: Christopher Probst, ASC

Formed in the fall of 2016 the Lens Committee has been hard at work examining multiple issues facing cinematographers and filmmakers today with regard to cinema optics. There are several projects that the Lens Committee is currently involved in.

Comprehensive Cinema Lens Database

At the forefront of the Committee's work is the Comprehensive Cinema Lens Database, a project originally started by Committee co-chair, Jay Holben and vice-chair, Christopher Probst, ASC, to catalog the technical aspects of all cinema lenses in history.

The database currently lists more than 3,800 cine-style optics from the evolution of cinema to today's modern lenses along with as much technical information as can be gathered for each lens: Manufacturer; Original format designed for; Type (Prime or Zoom or Specialty); Shape (Spherical or Anamorphic); Special identifiers: family name, model number, genealogy, attributes; Focal length; *f* or T stop calibration; Maximum aperture; Minimum aperture; Close focus distance (MOD) (imperial & metric); Manufacturer stated image circle; Year/decade of introduction; Country of origin; Number of iris blades; Number of glass elements; Number of glass groups; Number of aspherical lenses; Number of exotic glass elements; Type of coatings; Type of focus mechanism (cam or helical); Focus rotation; Iris rotation; Zoom rotation; Front diameter; Front filter thread diameter; Length (imperial & metric); Weight (imperial & metric); Any mounts available for the lens; Intelligent electronics; Lists of films shot; and any special notes. The information recorded in the database is meticulously researched, corroborated and vetted. As the database evolves and through conversations with cinematographers and assistants, we are expanding the data fields to provide even more detail. We are also investigating interlinking the database with other existing data sources just as VFX lens distortion mapping data and image circle/illumination coverage data.

The ambitious goal of the CCLDb is to offer detailed technical data for any cinema-style lens that has ever been used on a film camera in the history of motion picture production.

The Database will reside on the ASC website as a free service to the community and will continue to be updated and refined on a constant basis.

Lens Metadata

Since the origin of the Lens Committee, the investigation into the protocol, potential standardization, promotion and further integration of lens metadata has been a primary goal. The original intention was to examine the various technological approaches and solutions, namely the Cooke /i and Arri LDS systems, and to examine the potential for a uniform standard for the industry.

Internal lens metadata requires a computer chip and built-in encoders within the lens that transmit specific data to the camera: focus distance, iris setting, zoom focal length are the common pieces of information that are recorded per frame of recorded image. Further expansion on this data includes specific lens vignetting/shading and distortion data per stop, focal distance and focal length at a per-frame resolution. This expansion of the metadata, coupled with software programming in the post suite, allows visual effects artists to “dial out” the shading and distortion, completely or partially, from the image in order to create “clean” effects and then re-apply the distortion and shading to whatever degree is artistically required. This form of additional data – currently available in the Zeiss CP.3 and Supreme Prime lenses (“eXtened Data” (XD)) and in the Cooke S7/i primes (/i^3) – eliminates (or greatly reduces) the need to shoot distortion and shading tests in preproduction; a task that has beleaguered visual effects supervisors and camera assistants for many decades.

Virtual cinematography and game engine interfaces with traditional production methodology depends heavily on the availability of extremely accurate lens metadata in real time in order to drive virtual focus, iris, and zoom interaction with real world cameras. This new area of technological development will drive the development of more accurate data from lenses. Cooke are currently in development of technology to extend their /i technology from 2D tracking into full 3D tracking. To this end, Cooke are currently in development on a toolset that uses 3D Equalizer, a well know 3D CGI tracking solution that offers the level of precision that high end visual effects and game engine interfaces require.

Currently the focus of this project is to investigate the needs and desires of the post production community, cinematographers, camera assistants and software designers regarding lens metadata: how they wish to utilize it, how it might best be of benefit to them, what new data can be recorded/included to be of aid. The committee's secondary goal is in educating these various disciplines in the industry about the technology and its possible applications. This effort has also joined forces with the MITC's Motion Imaging Workflow Committee Advanced Data and Metadata Management Subcommittee under the chair of Jesse Korossi as well as the Metadata committee under chair David Stump, ASC, who has been liaising with the IMAGO Technical Committee on the topic as well.

Filter Classification Subcommittee
Chair: Matthew Duclos

The Filter Classification Subcommittee strives to quantify and qualify a variety of diffusion class motion picture filters. The motivation behind this mission is not only to further the available knowledge of currently camera diffusion filter choices, but also to catalog the same parameters in vintage filters as well.

Lens diffusion filters are a bit of a voodoo science and many cinematographers only have the opportunity to test a select few for a specific project and then end up employing the filters that are already familiar with on future projects. The exact mechanism of image manipulation is often not clear and generally comes down to highly subjective “taste” for a specific project's look; descriptors of filters often fall into nebulous labels such as: silky, smooth, creamy, soft, etc. There is a phenomenal wealth of filters from which to choose and crafting a more precise calibration system that clearly identifies the nature of image manipulation will allow the cinematographer to choose their filter with more accurate application to their creative needs. Further, the ability to choose an alternate filter when a desired one is unavailable seems to be a complicated process requiring further subjective testing and a lot of guess work.

There are three primary characteristics under investigation for classification: halation, contrast, and resolution.

The proposed testing is twofold: Firstly, an objective attribute measurement system that is purely agnostic of camera and lens to quantify the three parameters. Secondly, two subjective tests utilizing traditional photography and both human and computer analysis to measure the amount of alteration each filter makes to the three parameters listed above; one a series of technical photographs and another a series of more “cinematic” photographs to demonstrate the filter's attributes.

One of the most practical uses for this classification effort will be to identify the three characteristics with a firm metric. If measured and recorded accurately, this would allow cinematographers to investigate vintage diffusion filters that may no longer be available and match as close as possible to modern diffusion filters with similar characteristics.

The Subcommittee will endeavor to formulate an empirical testing methodology and classification system to objectively measure the image manipulation aspects of all currently available lens diffusion filters and classify them within a numerical system (proposed to be 0-100 in each category) in an effort to provide the cinematographer more precise information to inform their selection of available filtration. A particular theoretical filter might have a 25 contrast adjustment, 60 resolution adjustment and 15 halation adjustment. If the cinematographer likes

the contrast and halation factor of that filter, but is unhappy with the amount of resolution difference, they need only seek out another filter that has the same contrast and halation rating, but a different resolution rating. It provides a more technically accurate system of selecting specific filters for further testing based on objective and empirical data. The data will be offered to the individual manufactures, many of whom are participants of the Subcommittee, to label/identify their filters.

Current Subcommittee members include cinematographers, representatives and technicians from Tiffen, Schneider and Formatt (three of the top diffusion filter manufacturers), lens manufacturers, rental houses, cinematographers and optical experts.

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