

# Grading and mastering Billy Lynn - the ultimate challenge

FilmLight



## From Ang Lee's creative vision to the technical implementation.

To tell the story of a soldier who returns to the USA damaged by his time in Iraq, director Ang Lee tore up the cinema rule book. *Billy Lynn's Long Halftime Walk* was shot at 120 frames-per-second (fps), with high dynamic range and extended colour gamut, and in 3D.

For those fortunate enough to see it in its native format, the result is startling. Far from the sense of distance that 24fps film creates, this puts you right in the action. It is not that this is a window into the world of the story: you are absolutely there, bullet casings flying past your face.

This was Ang Lee's vision, but to make it a reality Sony Pictures called in some experimental technical and creative support. Canadian Ben Gervais has been a camera assistant in his time, as well as a broadcast engineer and post-production technician. Today he is a workflow consultant, and on *Billy Lynn* he is credited as Technical Supervisor.

"Working with the studio, we decided to shoot at 120 because that would give us the flexibility to create the multiple formats that would be shown in theatres. Then we can generate 60 because it's exactly half the frame rate, and we can generate 24 because it's a fifth," he explained.

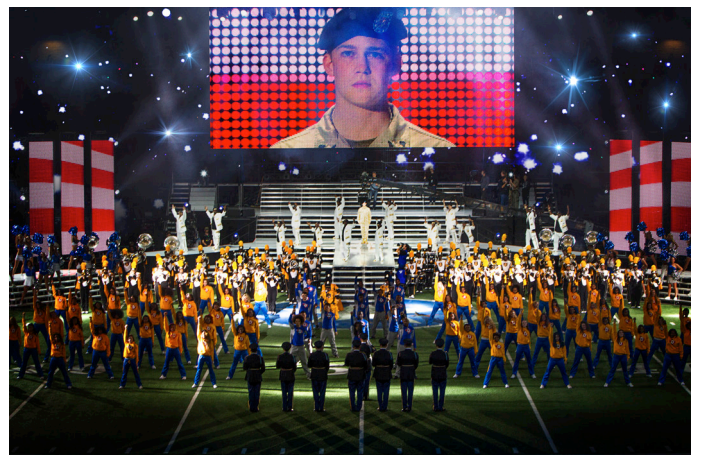
"Ang likes to push boundaries and he wondered what watching the film in 120 would look like. No one had ever seen it before," Gervais said. "With the help of Christie Mirage digital projectors, and media servers from 7thSense Design, we tried it - and it blew our minds. When the lights came up after we saw it the first time, we were all just sitting there stunned. We knew we had to show this to audiences, because it's remarkably different to what people are used to seeing."

So the plan was not just to shoot in 120 frames 3D, but to make that a key deliverable because a small number of theatres would be set up to show it. Which, in turn, meant they had to find a solution to post it.

### The look of the movie

"Ang wanted a very realistic look, to immerse people in Billy's experience," Gervais said. "On set, he and DoP John Toll went for a flatter, more natural look, as light didn't have to be so contrasted or dramatic.

"We used realism as a guide. The high frame rate means you see much more than you would normally see in a movie, and Ang wanted to make the audience feel what it was really like," he added. "What does the heat of Iraq feel like, when it is so damn hot that the light is oppressive? That is something most people never get to sense."



### Baselight's high performance 120fps 4K stereoscopic 3D

The creative vision was one thing: realising it technically was quite another.

"Ang was insistent that we do the DI in 4K 120 stereo and so at that point, I looked at every vendor to see who could provide a system that plays back real-time 120 frame 4K stereo," said Gervais.

"FilmLight were really the only people who stepped up to the plate."



So Baselight was identified as the only platform that would allow them to see what they had actually shot, and how the movie was coming together during production and post. But its usefulness went much further than just its power.

"Once we actually got the Baselight X in, we discovered that the system could handle a lot of what we needed to do in conform too, which really saved us in many ways," he explained. "For example, frame blending, which we had to deal with a lot because we were experimenting with having different frame rates in the same scene. We were using an external software package to do that but it also needed 50 frame handles.

"So how do we take a completely conformed movie and expand every shot with 50 handles? It just so happens that Baselight's Timeline Sort tool has that ability."

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That flexibility and power, even at a low level, meant the team could 'trick' Baselight into doing exactly what they wanted it to do. A lot of the viewing was done through Baselight too, in their DI lab in New York.

"With a 120 frame 4K stereo movie, you're talking about 300 to 400 terabytes of data - it's not quick to render, it's not quick to

move over the network, it's not quick to do anything. So to move the playback functionality into Baselight meant that, aside from a little bit of caching time, we had pretty much instantaneous feedback, which made DI on the 120 frame version possible."

During production they had three Baselight systems to play back dailies. These systems were packaged up and shipped out to Morocco, which stands in for Iraq in the battle scenes, and then shipped back to New York for the final post, not least because of the huge amount of data accumulated - over 100 terabytes for the final conform. It was here that the Baselight X was added to the project.

Despite the power of the Baselight, post was a protracted business.

Colourist Adam Inglis worked on the movie for three to four weeks, setting the looks for the full 120fps 4K 3D version. Inglis's colleague Marcy Robinson then came on board to finish off the colour on this version and grade all the other deliverables - apart from the additional grading for Dolby Vision HDR, which was handled by Doug Delaney.

"The ambition of *Billy Lynn's Long Halftime Walk* was intimidating, a new cinema format that had never been done before," Inglis commented. "The format was so integral to the look of the film that we had to grade in full 3D/4K/120fps with all the technical difficulties that came with that.

"My trepidation was eased somewhat since we used Baselight for the grade," he said. "I've graded on Baselight since the very early days of DI, back when 2D/2K/24fps was itself a daunting prospect. It's always been a system at the forefront of innovation, but with a foundation so solid that it can adapt to new challenges.



"I only had a week with DoP John Toll to set the look of the film before he had to leave for another project," Inglis recalled. "We initially planned to just set looks for each scene but by the end of that week we had a grade on the entire film. I cannot think of another grading system I would rather have on such a demanding job. When going out on the frontier, you need the best survival equipment available, and we had it with the Baselight."



Finishing

Looking at the finishing, Gervais found that his initial choice of Baselight was fully rewarded.

"Whenever we ran into an issue, we would say 'there must be a tool on Baselight that lets us do this', and usually after a little bit of searching - this is a very complicated tool as well as powerful - we would find that thing. Like the timeline sorting," he explained.

"Another challenge we had was, because we had our in-house VFX artists rendering into the Baselight directly, we would get through a lot of versions very quickly: as soon as they would version up we would have it."

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As technical supervisor, Gervais wrote a significant amount of custom code to keep track of versions, EDLs and more. "I thought it was going to be really tricky to keep track," he said. "Then I thought, what if we put a Baselight wildcard in an EDL?"

"I was pretty sure it was going to break it," he admitted. "But we did a test and it worked. It would match all the versions of that VFX shot, and it would ask us which one we wanted to use. Things like this make for really handy time-saving. They simplify and speed up what you are trying to do."



He added, "Baselight X can play back both eyes at 4K 120Hz and at the same time allow creative multi-layer grading plus 3D geometry correction. By providing the very high frame rates for real-time uncompressed playback combined with an interactive grading system, Baselight X provided a pretty smooth creative and immersive experience.

"All around it just checked every box for us."



Steve Chapman, CEO and co-founder of FilmLight said, "You really have to see this work to understand the experience. It is absolutely unique and a very different task from normal colour correction.

"In the first few seconds you realise you haven't seen anything like this before," he explained. "The suspension of disbelief is almost immediate. We never see fast panning movement in film or if we do it's choppy and blurred. The footage in *Billy Lynn* is pin-sharp, so anything that might be fake - makeup, facial expressions, physical actions, and of course colour correction - would be immediately exposed. It's a risky strategy for any film-maker to take but one that really pays off for Ang Lee in *Billy Lynn*."

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