



ACCEPT

REFUSE

# Viewer's Choice

Director David Slade  
and cinematographers  
Aaron Morton, NZCS and  
Jake Polonsky, BSC  
discuss the intricacies of  
photographing the interactive feature  
*Black Mirror: Bandersnatch*

**By Samantha Dillard**

**"People think there's one reality, but there's loads of** them, all snaking off like roots. And what we do on one path affects what happens on other paths." As they trip on LSD, Colin Ritman (Will Poulter) explains to protagonist

Stefan Butler (Fionn Whitehead) the premise of *Black Mirror: Bandersnatch* — the show they're actually in. "When you make a decision, you think it's you doing it, but it's not," Colin says. He moves a confused Stefan to the balcony of his high-rise apartment. "We're on one path," he continues. "Right now. Me and you. And how one path ends is immaterial. It's how our decisions along the path affect the whole that matters."

And then the viewer must choose which character is going to jump over the balcony and fall to his death.

A standalone feature within *Black Mirror* — a Netflix science-fiction anthology series — *Bandersnatch* is the streaming platform's first interactive program aimed at adults. Set in 1984, it follows Stefan, a young programmer, as he adapts a branching-path novel called *Bandersnatch* into what he hopes will be a pioneering interactive video game. As he delves further into his work, however — and as the viewer makes choices for him — Stefan begins ques-

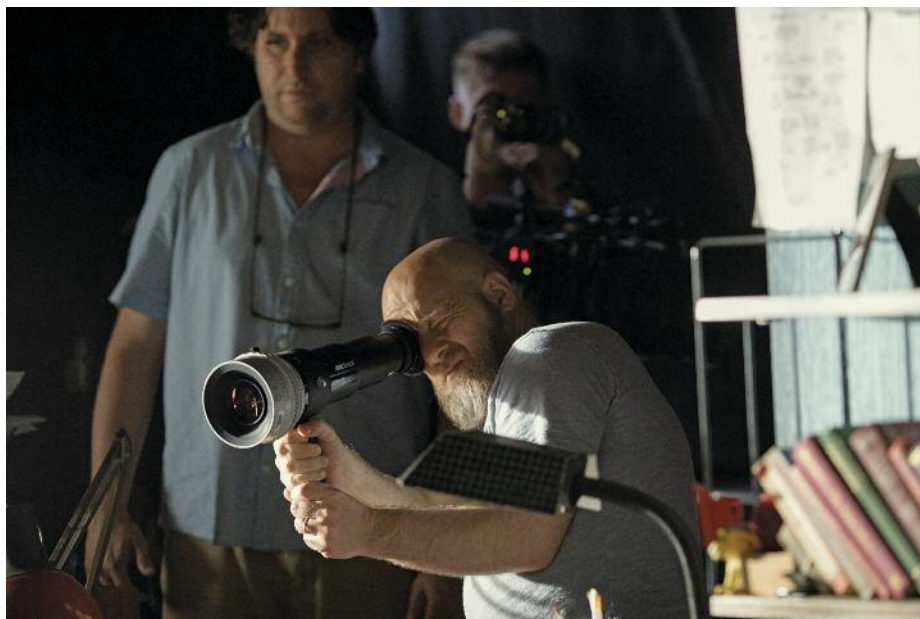
tioning the level to which he has control over his own actions.

The direction of the narrative largely depends on decisions made by the viewer, which include seemingly inconsequential judgments — like choosing a breakfast cereal — as well as more disturbing and sinister determinations, like whether or not to kill people and, subsequently, to chop up or bury a body.

“When I was going through it all and preparing it, I had to try to see everything holistically,” says director David Slade, whose work includes TV episodics *Hannibal* and *Breaking Bad*, and the feature *30 Days of Night*. “The idea that there is one way through [a narrative] is the thing that defines a director — [but for this project], I had to say, ‘Okay, I acknowledge that that is not on the table anymore.’”

Aaron Morton, NZCS — who had previously collaborated with Slade on the *Black Mirror* episode *Metalhead* — was originally assigned to the project as the sole director of photography, but during prep, as the complexities of *Bandersnatch* came into focus, it was decided that the shooting schedule needed to be pushed to allow for more thorough preparation. As Morton was committed to another project that intersected with the end of the new 35-day shooting schedule, Jake Polonsky, BSC — who had photographed *Black Mirror*’s pilot — was hired to complete the shoot. “As we got deeper into prep, we realized what a monster this was going to be compared to any ‘normal’ shoot,” Morton offers.

Though the description provided to Netflix viewers indicates a 90-minute run time, the whole of *Bandersnatch* in fact contains “approximately 4.5 hours of viewable footage in total,” Morton reports, and is divided into 250 segments — all based upon *Black Mirror* creator and writer Charlie Brooker’s screenplay. As Polonsky attests, the script was “incredibly hard to read, as it



◀ *Black Mirror: Bandersnatch* viewers are compelled to make pivotal decisions on behalf of computer programmer Stefan Butler (Fionn Whitehead) as he designs a game that’s eerily similar to the Netflix interactive movie he’s actually in. ▲▲ & ▲ Director David Slade works alongside cinematographers Jake Polonsky, BSC and Aaron Morton, NZCS, respectively.

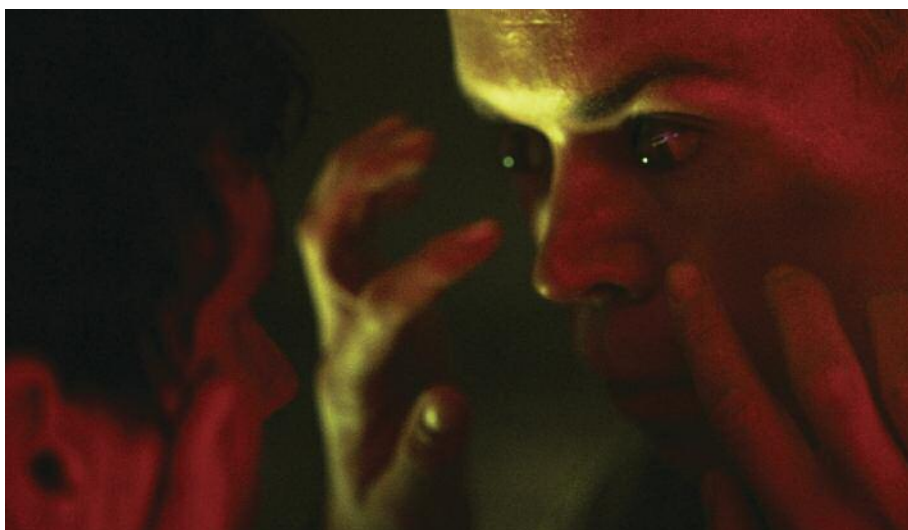
contained every possible configuration of the story.” Slade notes, “You realized you couldn’t fudge anything. You couldn’t put anything on the shelf and wait until later. You had to go through all of it, [and] think all of it through. Otherwise there could be serious problems, because if it didn’t work on paper, it wasn’t going to work.”

Polonsky was brought in at the

end of prep, which allowed for early familiarity with the visual trajectory. Even though this was the first time that either cinematographer had shared a project — and that Slade had collaborated with two directors of photography — all three filmmakers enthusiastically note how seamlessly the shoot was executed. “It was really fortunate that [Jake] was able to come in before we even started shooting,”



# Viewer's Choice



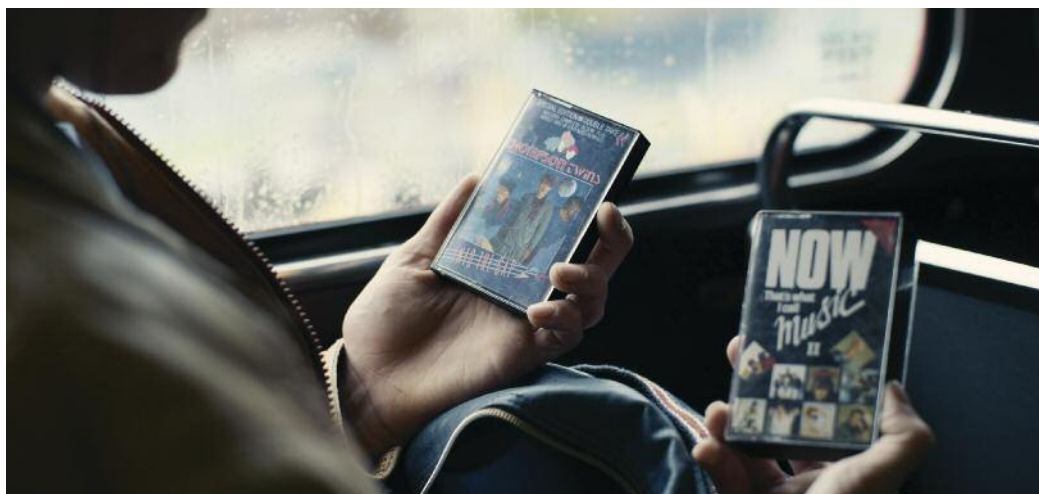
While they trip on LSD, Stefan is mesmerized by the melting eyes of game designer Colin Ritman (Will Poulter), who tells Stefan that one of them must leap from the high-rise balcony. The shifting light patterns for the interiors in this sequence were created with the aid of custom LED fixtures developed by Panalux and gaffer Shaun Mone.

says Morton, who's known for his work on *Orphan Black* and *American Gods*. "The amount the show was pushed — which extended-out prep — meant we were able to plan, and Jake could come on knowing he was doing certain sequences; our schedule was pretty locked in. [Polonsky was present while we were] establishing our world, and was privy to our decisions leading up to the beginning of the shoot. So Jake saw where we were taking it before it was handed off to him."

Polonsky — whose credits include *Billions* and *Doctor Who* — adds, "From my point of view, it was great [co-photographing], because Aaron and David had done a lot of great prep and made a lot of really interesting decisions. So on a technical level [my role] was to continue, and stay true, to those decisions. I was very happy to run with that. But obviously, at the point where you take over, it's not like a [running series] that already exists and there's been loads of different episodes, so we're all kind of making it up a bit as we go along."

*Bandersnatch* primarily pressed into service two Arri Alexa 65s, paired with Arri Prime DNA lenses. The production also employed an Arricam LT with Bausch & Lomb Super Baltar lenses, an Arriflex 416 with a Zeiss Vario-Sonnar 12-120mm (T2.4) Super 16 zoom (an Optex-converted Zeiss 10-100mm [T2] 16mm zoom), and a Nizo 156 Macro "Silver" Super 8mm camera with its standard Schneider Kreuznach 7-56mm (f/1.4) zoom. The production also employed a selection of vintage broadcast cameras: an Ikegami HL-79E and HL-79D — each paired with Canon J13x9B 9-117mm (f/1.6) zooms — and a JVC 1900 series. The Arri cameras were supplied by Arri Rental outside London, and the broadcast cameras "by Dicky Howett from Golden Age TV [Recreations]," Morton notes.

Morton further reports that the Arri lens package included 28mm-



When a choice is offered to the audience, the viewer has 10 seconds to act. This is called the “fuse,” Slade says — and the filmmakers worked to give these moments significance and tension. The viewer’s options appear onscreen with a banner that shrinks as time passes and sound builds. “A decision was made to create a photographic element for [those moments as well],” Polonsky explains.

“We knew that there would be a necessary pause when the choice is being made, so we wanted to build tension into that pause,” Morton says. “We went with a feeling of ‘foreboding.’ As Stefan is making up his mind about what to do, we would slowly flag certain lamps to try and make it feel like a shadow is passing over him.” Polonsky reports that this also involved bringing down the foreground light.

Morton adds that he enjoys in-camera lighting cues, and that such effects were further refined by Soret’s work in the grade. “I think those [fuse] moments are a big part of why the whole show has quite a tense feel to it,” Morton says. “As you make more choices, the stakes keep getting raised.”

Slade notes, “This was a Charlie Brooker conceit: If you didn’t make choices, [*Bandersnatch*] would make bad choices for you. The idea was to make the audience complicit [in the decision].”

150mm Prime DNAs, “plus the 58mm T Type, a prototype 200mm, and a 300mm Prime 65.”

The main-narrative through-line was shot via large-format digital capture and framed for a 2.20:1 aspect ratio, while flashback and dream sequences were filmed on 4-perf Super 35mm negative and framed for 1.33:1. “I wanted to be quite cinematically aggressive,” Slade says. “Each format has a meaning.”

The film negative was processed at the Kodak Film Lab London, and scanned at 4K resolution at Digital Orchard and recorded to 16-bit 4K DPX FilmLog files. Dailies were provided by Technicolor London.

Regarding the production’s digitally captured footage, Morton attests, “It’s a great pleasure to be able to shoot Alexa 65 large-format. David and I talked a lot in prep about wanting to feel like we are experiencing the story with Stefan. [We] didn’t ever want it to be observational. [We

wanted] the decisions you are making for Stefan to feel even more personal — so we tended more toward a close-and-wide feel, as far as lens choices. We wanted to feel the optical characteristics of the glass wherever possible. I love the way the Alexa 65 contrasts with the other formats that we used. There was no mistaking that we were showing people something different.”

“There were a lot of scenes in Stefan’s bedroom where he’s programming, and we wanted to try to make them visually interesting, and [ensure that they] keep changing,” Polonsky says. “By happenstance, we discovered that the DNA lenses had some great flaring characteristics — not anamorphic-type streaks, but strange rainbow stars if you hit them at a particular angle



The viewer has helped Stefan choose which record to purchase at a WHSmith shop.





At the offices of fictional gaming company Tuckersoft, Stefan and Colin confer with executive Mohan Thakur (Asim Chaudhry).

## TECH SPECS

2.20:1, 1.33:1

Digital Capture,  
4-perf Super 35mm,  
Super 16mm,  
Super 8mm

Kodak Vision3 500T 5219, 7219

Arri Alexa 65, Arricam Lite,  
Arriflex 416;  
Ikegami HL-79E, HL-79D;  
JVC 1900 series;  
Nizo 156 Macro

Arri Prime DNA,  
Bausch & Lomb Super Baltar,  
Zeiss Vario-Sonnar zoom,  
Canon J13x9B zooms



with a torch or a [DLH400 daylight] Dedo. [Gaffer] Shaun Mone did a great job of finding that spot and arming-in a light source to start to make those scenes feel slightly otherworldly as Stefan retreats further into his mind." Slade adds, "In some ways, this is all a portal into this one character's brain, and he's losing his mind,

[so we] thought about it from the point of view of lens flare and the diffraction of light."

Polonsky notes that *Bandersnatch* was a two-camera production "when we were shooting most of the scenes with the Alexa 65. The film sections were one-camera."

In terms of the divergent paths'

visual languages, Morton says, “The whole piece has a visual signature that really only changes as each very different ending rears its head. When it becomes an action film, we went crazy with handheld, increased contrast, and used the Clairmont Image Shaker. When Stefan suddenly finds himself on a movie set, we removed any graded look and went with a very straight 709 look [in post-production]. The [sequence on the train] is told in flashback, which we shot in 35mm with a beautiful set of Super Baltars and rear nets — a set of old Fogal stockings I’ve been carrying around for years.”

Morton notes that the show LUT created for monitoring the shoot “became a starting point for the [final] grade,” which was performed at Technicolor London with a FilmLight Baselight color-correction system. “[Technicolor supervising colorist] Jean-Clément Soret and David did a phenomenal job in the grade, of finding a different feel for each of these endings.”

Though the name of the production alludes to a real ‘80s-era video game of the same title — which met a similar fate to Stefan’s game in one of the production’s various endings — the term “bandersnatch” originated as the name of a fictional creature in Lewis Carroll’s novel *Through the Looking-Glass*. And as the filmmakers explain, one of the project’s pivotal scenes occurs when Stefan climbs through a mirror and emerges through another mirror as a five-year-old, with the first section of the sequence captured digitally and the latter on 35mm film.

“It was a really f---ing complicated shot,” the director candidly recalls. Morton concurs, “It was a tricky one to figure out.” Polonsky, who photographed both sections of the sequence, recalls that it “involved the most discussion of anything I was involved in. Our [production] designer, Catrin Meredydd, built a double set — so we



“The Tuckersoft office was a location, but we completely remodeled the interior and made it a lot more ‘80s,” Morton says. “We replaced the overhead lighting with a grid pattern that was a bit of a subliminal tip of the hat to the blockiness of 8-bit computer games.”

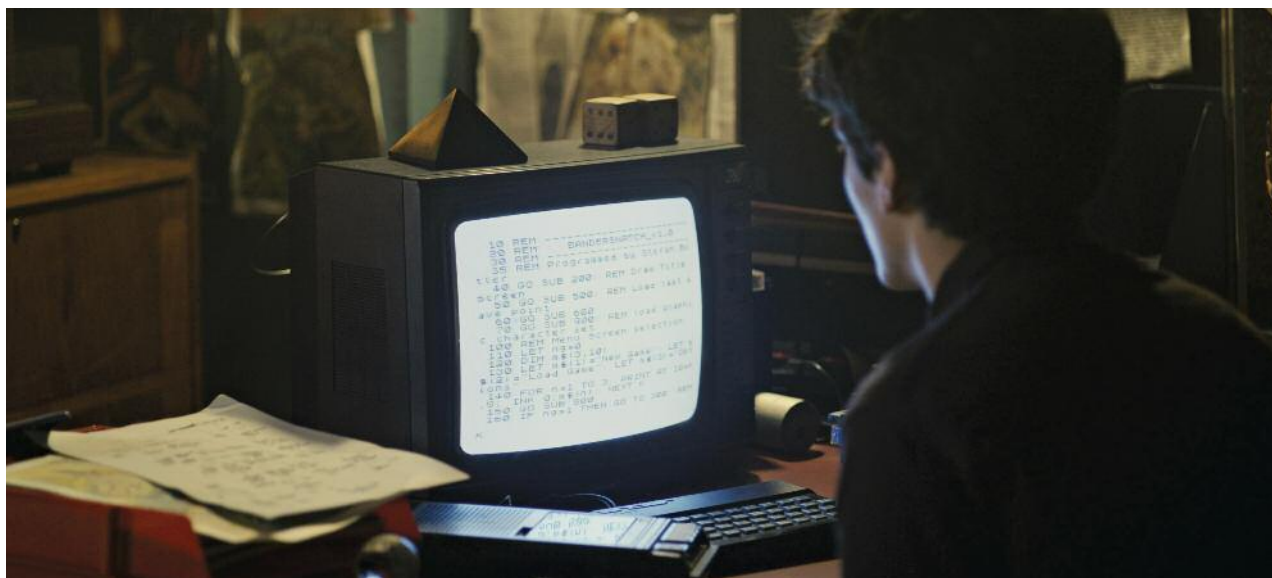
had the bathroom, a hole where the mirror was, and a replica [mirror-image bathroom] on the other side. [The two sets] were attached to each other, so the ‘reflection’ was a real set one could film in and see into.” In post, Polonsky adds, “we had to put in the reflections and stitch the shots together.” Regarding such key visual-effects elements of the production, Morton lauds the “seamless work

from our VFX brothers and sisters.”

Another essential sequence the filmmakers point to is the LSD trip — which was largely photographed by Polonsky and bookended by footage shot by Morton — and it is the scene of which Polonsky is proudest. “That whole sequence I’m so in love with,” he says. “I think every element works so brilliantly.”

The scene culminates in the





**"There were a lot of scenes in Stefan's bedroom where he's programming," Polonsky notes, "and we wanted to try to make them visually interesting, and [ensure that they] keep changing."**

sequence on the balcony, which was photographed by Morton and is Slade's favorite moment. "I realized the necessity of that location, which was a real balcony [at Trellick Tower high-rise in North Kensington, London], 26 floors up," the director says. Morton adds, "The guys were standing on the edge at that height — fully harnessed with professional stunt support, of course."

"[There was] very little room to work with, and a very finite amount of time and critically restrictive

shooting conditions," Slade continues. "I think it transformed that scene. We had a crane, and we had various ideas about how we were going to shoot it, but at a certain point, putting the camera on Aaron's shoulder and getting him very close wasn't what I expected to do, but it was the right thing to do. Aaron's camera suddenly had all of the power, and it fed into the performance of the actors. The balcony scene is a great example of cinematography becoming quite an important voice in the story.

"I'm a control freak," he adds, "so to be able to be in a situation where I could let go a little bit and pass a lot of it to Aaron was thoroughly enjoyable to me, and I think it's a wonderful scene as a result. It was a symbiotic thing."

The interior sections of the drug-trip scene were shot on stage at Wimbledon Studios in London, where the shifting light patterns that enhanced the hallucinatory look were aided by custom fixtures. "Shaun and Panalux developed some custom RGBW LED strips that could be controlled down to each diode," Morton says. "Because of this, we were able to program patterns in them that enhanced what Stefan and Colin were going through in their LSD trip. [The strips] were compact enough to fit inside practical fluoro fittings."

"We used nine RGBW LED ribbons in diffused Perspex inside [fluorescent-tube-style] housing," Mone elaborates. "We based the idea on the [Digital Sputnik] Voyager [LED tube], which wasn't released yet, and also on the Astera [LED tube], which was released about two months after we wrapped! We had the assistance of Panalux R-and-D to assemble [the custom fixtures], and then assist desk op Pete Scott in setting up the LED mapping for the effect and the speed

we wanted. Once we sorted this [out], we installed LED ribbon into the practicals and added it to the effect.

“When we shot at Trellick Tower,” Mone continues, “we used the SkyPanel [S360-C] to create the color change, as two days previous [the software was] released to control each of the 12 [light engines] in the 360 head, individually.”

Mone adds that the Translite material in Colin’s apartment — which created the exterior cityscape that appears through the on-set window glass — was front-lit with Panalux FloBanks for day-interior shots, while “old-school SkyPans [lit from] behind the Translite for night.”

The gaffer further reports that the production’s workhorse lighting fixtures tended to be Arri’s SkyPanel S360-C and S60-C LED units, and Aladdin’s Bi-Flex1, Bi-Flex2 and Bi-Flex4 flexible bicolor LED panels.

The day-interior scene in the upstairs section of Colin’s apartment, — where Stefan meets Colin’s partner, Kitty (Tallulah Haddon) — was shot at Trellick Tower as well.

It can be argued that *Bandersnatch* has between five and 10 “main” endings, as well as additional, smaller ways to end given narratives. But the reality that may be tough for some viewers to accept is that the production — which was edited by Tony Kearns — has no “correct” path or ending. As Slade notes, even an ending that might be one of the filmmakers’ favorites “wouldn’t be the right way.”

Despite this, the director and cinematographers agree there is one ending they most prefer. [Ed. Note: Spoilers!] The sequence depicts five-year-old Stefan — having emerged from the mirror — riding a train with his mother, and then cuts to present-day Stefan dead in his psychiatrist’s office. Polonsky photographed the first section on 35mm film, on a moving train and employing predominately natural light, while Morton shot the latter via digital capture.



▲▲ One of *Bandersnatch*’s numerous possible endings includes a scene featuring a young Stefan (A.J. Houghton) with his mother (Fleur Keith), shot on Super 35mm on a moving train. ▲ For another ending, captured on Arri’s Alexa 65, the filmmakers shot in the style of an action film. Morton recalls, “We went crazy with handheld and increased contrast, and used the Clairmont Image Shaker.”

Mone notes that the office was lit via Arri’s 18K Arrimax through ½ CTS and into two 4’x4’ mirrors and two 3’x3’ mirrors. Additionally, two ungelled 6Ks were aimed into the

background, and a 6K bounce was employed for the side window.

“When you come back to the doctor’s office,” says Morton, who describes this sequence as his

Super 16mm, Super 8mm and broadcast-camera capture were called upon to enhance period accuracy, particularly for instances when action appears on a television screen within the production. The filmmakers’ realism mandate even extended to photographs depicted in an on-screen book, which were captured on 35mm film. “Because we were doing something so metaphysical, it was important to me to try and use the actual formats, rather than approximate the look of a format,” Slade explains. Morton adds, “[It] helps legitimize the craziness [as the story progresses], when the things that you know from the era feel real. That’s what helps give the rest of the piece some reality.”





No. 1 Croydon in London was used for this exterior of the Tuckersoft offices. This shot is an apt example of the production's eschewing of blue- and greenscreen. "I didn't want to use bluescreen — ever, for anything — so we didn't," Slade attests.

favorite, "you wrap around [Stefan] to reveal the cop, the doctor and his father, [and that Stefan is dead]. I thought that was a nice wraparound."

He adds, "I love what Jake did with the train. [The full section] mixes the light and the dark."

Though the director describes

this ending as "suicide by five-year-old child," and notes that "there's nothing 'nice' about that," he opines that it's "the warmest and most emotionally resonant [ending], because it takes in all of the human relationships that Stefan had. He's an emotional character, and that ending gives you the most access to his emotions."

Offering due credit to the work of his colleagues, Morton attests, "I had a fantastic team of people with me on this job, all of whom made enormous contributions. The camera team was incredibly supportive — camera operator Tony Kay, 1st ACs Phil Smith and Tommy Holman, 2nd ACs Tom Lane and Dan Henderson, DIT Luis Reggiardo, and data wrangler Alessio Ciattini. Ed Lancaster, our key grip, saved my butt every day with rigs and solutions, as did gaffer Shaun Mone." Polonsky adds that Smith and Holman "handled the



**SCENE SOLUTION**  
 YOUR PREMIER  
 CAMERA CAR TECHNOLOGY  
 COMPANY  
 310.418.3311  
 info@filmousa.com  
 filmousa.com

**HEADS • ARMS • CARS • EXPERTS**  
 Your behind the scenes partner for solving  
 the most extreme moving pictures.

**filmotechnic**  
 USA

FACTS	NEW TECHNOLOGIES	EXPERIENCED TALENT	KEY LOCATIONS
<ul style="list-style-type: none"> <li>AUTHENTIC RUSSIAN ARMS</li> <li>ACADEMY AWARD WINNING TECHNOLOGY</li> </ul>	<ul style="list-style-type: none"> <li>TELESCOPING/FIXED ARMS</li> <li>GYRO STABILIZED HEADS</li> <li>CAMERA CARS, TRUCKS &amp; ELECTRIC CARTS</li> </ul>	<ul style="list-style-type: none"> <li>TEAM OF FILMMAKERS, FABRICATORS, DRIVERS, TECHNICIANS AND SUPPORT PERSONNEL</li> </ul>	<ul style="list-style-type: none"> <li>ATLANTA</li> <li>DALLAS</li> <li>DETROIT</li> <li>HAWAII</li> <li>LOS ANGELES</li> <li>ORLANDO</li> </ul>

demanding exactitude of the large-format focus brilliantly.”

The filmmakers are very happy with the reaction the project has received, though they are quick to stress that *Bandersnatch* presented a number of significant challenges. “It was really hard, which is worth saying,” Slade says. “I had an amazing production team and amazing producers — but we were only *just* making it. It was a very, very hard format to do, particularly [on a] television schedule. Part of my security was knowing that if I’ve got all these amazing people working with me, and it’s still *this f---ing hard*, then there’s very few people who are going to be able to do this.”

He adds, however, that “having worked with Aaron before provided an ease when we were [doing] incredibly complicated things — [since we were able to] hand off to each other, work on our strengths, and trust each



Stefan rides a bus toward a variety of possible fates.

other. And having Jake come into that and become part of that process allowed it all to work very well. I really enjoyed it, even though it was really difficult.”

“I think Charlie did a brilliant thing in writing a script where the content was utterly in sync with the form,” Polonsky offers. “The lead

character believes he’s not in control of his own actions, and, indeed, he isn’t, because you, the viewer, are — and in the film, [Stefan] is made aware of that. So Charlie actually completely subverted the idea, while creating a very satisfying interactive experience.” ♦

[www.osram.us/HMI](http://www.osram.us/HMI)

OSRAM HMI®  
**50  
YEARS**

## Light is eye catching HMI® DIGITAL

HMI DIGITAL's high-performance, single-ended metal halide lamps provide extremely bright light, daylight color temperature, and high CRI that every film set requires. To meet the evolving needs of high-speed filming, HMI DIGITAL has reduced flicker when used with high-speed electronic ballasts. These features, paired with a more robust design and UV-Stop, make HMI DIGITAL lamps ready to light the next generation of on-screen classics.

To learn about HMI DIGITAL's comprehensive features, benefits and types, visit [www.osram.us/HMI](http://www.osram.us/HMI)



Light is OSRAM

# OSRAM

HMI is a registered trademark of OSRAM GmbH.