

## CASE STUDY

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### Stereoscopic Imaging with the Phantom Flex4K



The two matched Flex4Ks in a side-by-side stereo rig.

#### WHEN IT'S TOO FAST TO SEE, AND TOO IMPORTANT NOT TO®

The Phantom Flex pushed the boundaries of high-speed imaging and with the Flex4K, Vision Research has opened up a new dimension in regard to resolution and frame rate. With the ability to shoot at 1,000 frames-per-second at 4K resolution, and with new firmware updates that unlock sought after features such as audio recording and ProRes 422 HQ, the camera is in a class of its own and has been adopted as a must-have for professionals in live sports broadcast, commercial and cinema applications.

At 4K resolution, the breathtaking images captured at 1,000 fps are awe-inspiring and convey an entirely new emotional experience that traditional frame rates simply cannot deliver, and that experience is elevated even more so when 3D is inserted into the mix. A lot of work goes into stereoscopic imaging – twice the cameras equals twice the data and more so, twice the complexity of the setup. Synchronization is also paramount and ensuring each camera is perfectly matched with the other is critical for a successful production, especially if the event you're capturing is a one-time only occurrence such as the world renowned 24 Hours of Le Mans endurance motor sport race in Le Mans, France.

A feature film from New Black Films Productions, titled *Le Mans 3D*, has a debut scheduled for January 2016. With exclusive track, pit and team access, the team behind the film captured the high-speed action of the race in blistering 3D as

*GreenHausFilms* is an experienced and flexible service provider for digital cinema cameras used on feature films, commercials, music videos, documentaries and more in Cape Town, South Africa. GHF focuses mainly on High Speed and is always trying to push boundaries to ensure the best results. The company was founded 2009 by Karl Schmidt, one of the leading HighSpeed technicians and operators in South Africa.  
[www.greenhausfilms.com](http://www.greenhausfilms.com)

#### About the documentary

Presented in astonishing 4K 3D, and offering full theatrical 3D and 2D features, 3D and 2D TV hour versions, and a full feature and cut-down version for IMAX, *Le Mans 3D* tells in incredible detail, the full story of the 2015 race.

Widely recognized as one of the closest and most thrilling events for many years, six drivers and their teams are followed as they put everything on the line in the pursuit of victory.

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well as the stories behind the men and teams that take part in it. The production consisted of 10 cameras – eight RED Dragons and two Phantom Flex4Ks. The 3D rigs utilized were two mirror and two side-by-side configurations. The Phantom Flex4Ks were used in one of the side-by-side rigs over the course of two days capturing the explosive high-speeds of the vehicles as they took to the course in Le Mans. The Flex4Ks used for *Le Mans 3D* were provided by Karl Schmidt of GreenHausFilms in South Africa, and Martin Pabuk Dolejš of Studio Mirage in Czech Republic. The two companies provided Phantom camera technicians and worked alongside Director of Photography, Sam MacCurdy, to ensure the camera bodies performed flawlessly while on location.

### Preparation and Testing

Prior to shooting, GreenHausFilms and Studio Mirage first needed to ensure that both camera bodies were exact, testing each for quality and similarity. Comparative testing took place in Prague where each body was put through tests that analyzed sensors, firmware, and back focus. Both cameras were identical, matching perfectly once updated with the current firmware from Vision Research. The two bodies also needed to be synced with one operating as the slave (left camera/left eye) and master (right camera/right eye). Once synced, each Phantom Flex4K would capture and scan the fast action of the race at the exact same moment in time. Timecode syncing was also executed using an additional connection between each of the camera bodies. As with all settings, once synced, the master-slave rule applies with any adjustments being made on the master camera body translating automatically to the slave, including the master SMPTE.



The 3D Flex4K rig ready to shoot.

After syncing, the two Phantom Flex4Ks were subjected to a series of live testing, capturing over 200 high-speed clips. When reviewing the footage, the team was pleasantly surprised in regard to the results. Not only were the images captured by the slave and master remarkably similar, but each was file was identical in bit size and frames.

“Usually, when you’re working with 3D, you will often have some frame and/or file size difference, or slight offsets from frames in pairing clips between the master and slave camera,” said Karl Schmidt. “It’s typically not a problem if one

clip is a bit longer or shorter than the other as its mostly just up to 4 fps in my experience; however, with the two Flex4Ks we tested, every single clip recorded by the master and slave matched 100%.”

## On Location



*The crew on location during recording.*

GreenHausFilms and Studio Mirage assembled the two Phantom Flex4Ks in the side-by-side 3D rig for the first time when on location in Le Mans. Each was paired with 135mm Zeiss Ultra Primes with the rigs completely mobile for transportation around the track to adapt to information passed down from the production team which was given access to all live race information as well as team radio conversations between box and driver. Actual shooting took place on June 13<sup>th</sup> and 14<sup>th</sup> 2015.

“We had access to pretty much every part of the track,”

added Schmidt. “As much as I loved every minute of this job, it was probably one of the most dangerous environments I’ve worked in. Imagine standing at the end of a long stretch of tar and watching cars at incredible speeds, often over 200 miles per hour, come toward you, braking at the very last second to turn a corner. It took some getting used to!”

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## Post

For enhanced workflow and to maximize the use of the Phantom Flex4K 3D setup on the track, GreenHausFilms and Studio Mirage employed Vision Research’s CineStation® and CineMag® interface. A four second recording captured at 1,000 fps at HD resolution can take up to 15 minutes to download from the camera via standard GB Ethernet. That 15 minutes is valuable time that the camera is offline, especially when its sole purpose is to capture high-speed action such as that taking place on the track of the 24 Hours of Le Mans. The CineMag and CineStation turned this workflow ideology upside down, giving users the ability to record footage directly to hot-swappable, non-volatile memory that can be effortlessly removed from the camera and downloaded offline while new memory is attached and the camera continues to stay online with no downtime.



*Le Mans 24-Hours Grandstand.*

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### About Vision Research:

Vision Research designs and manufactures high-speed digital imaging systems used in applications including defense, automotive, engineering, science, medical research, industrial manufacturing and packaging, sports and entertainment, and digital cinematography for television and movie production.

The Wayne, N.J.-based company prides itself on the sensitivity, high-resolution and image quality produced by its systems, robust software interfaces, and reliability and versatility of its camera family – all which continue to stand as benchmarks for the high speed digital imaging industry.

Vision Research digital high-speed cameras add a new dimension to the sense of sight, allowing the user to see details of an event *when it's too fast to see, and too important not to*™. For additional information regarding Vision Research, please visit [www.visionresearch.com](http://www.visionresearch.com).

Vision Research is a business unit of the Materials Analysis Division of AMETEK Inc., a leading global manufacturer of electronic instruments and electromechanical devices.



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The CineMag docks with the CineStation that quickly offloads files. To download clips captured on the track, the team connected the CineStation to a new MAC Pro equipped with Glue Tools Séance software. The files were then transferred to a 48 TB 8 Bay RAID via a 10GbE / Thunderbolt 2 switcher. As a backup, files were also downloaded via PCC which exactly matched the original files.



*The team had access to every part of the track.*



*Phantom Flex4K pictured with battery, viewfinder and lens accessories.*

Clip pairs were aligned in AVID Media Composer and synced from the first frame. "I didn't need any timecode or indication of where the clips were matching. The system never let us down during the two days of shooting and worked flawlessly without any problems or interruptions. I look forward to seeing how it all comes together," added Schmidt.

*AMETEK Vision Research's digital high-speed cameras are subject to the export licensing jurisdiction of the Export Administration Regulations. As a result, the export, transfer, or re-export of these cameras to a country embargoed by the United States is strictly prohibited. Likewise, it is prohibited under the Export Administration Regulations to export, transfer, or re-export AMETEK Vision Research's digital high-speed cameras to certain buyers and/or end users.*

*Customers are also advised that some models of AMETEK Vision Research's digital high-speed cameras may require a license from the U.S. Department of Commerce to be: (1) exported from the United States; (2) transferred to a foreign person in the United States; or (3) re-exported to a third country. Interested parties should contact the U.S. Department of Commerce to determine if an export or a re-export license is required for their specific transaction.*