Heliops

NEVER LOOK BACK

Shotover Cameras' M1,
A smaller high-tech
stabilized image platform

STORY BY **LEIGH NEIL**
PHOTOS BY **NED DAWSON**


Helicopters
AIRFILM
SHOTOVER
SHOT
OVER

New Zealand's countryside and companies have become well known in the movie industry; respectively for their spectacular, varied grandeur and smart, high-tech abilities. Few outside the industry, however, are aware of the major inroads a small Queenstown company has made into the field of stabilized image capture platforms.

> Purwin was not only one of the movie industry's most experienced, highly regarded and sought-after aerial photography pilots, but also a very astute, successful and entrepreneurial businessman.

Shotover Camera Systems specializes in the design and production of some of the most advanced gyro-stabilized gimbal systems available in the world today, used extensively in the production of everything from advertising and electronic news-gathering (ENG) to the biggest budget blockbuster movies, and the company has just launched its newest smaller, lightweight gimbal system. Shotover is now a subsidiary of the Californian company Helinet Aviation and, while an acknowledgement of that type is usually just a matter of formal corporate courtesy, in this case it is a crucial part of understanding just how the New Zealand company came to be what it is and how successful it is today. The company name is highly apropos, named for the Shotover River in Queenstown, where the company is based, but also an accurate description of what their aerial photography products provide.

Brad Hurndell is Shotover's CEO and has been with the company since its inception under kiwi ownership back in 2009, being the very first person employed by the startup. He explained to HeliOps that the late Alan Purwin assembled a group of investors comprising leading cinematographers, directors of photography, and motion picture pilots, to purchase a majority shareholding in the company in December 2012, through his company Helinet, when Hurndell demonstrated Shotover product for them and he recognized the obvious potential in the design ingenuity the small company had to offer. Purwin was not only one of the movie industry's most experienced, highly regarded and sought-after aerial photography pilots, but also a very astute, successful and entrepreneurial businessman. He started out as an agricultural pilot before recognizing the opportunity for a much more organized and professional approach to aerial photography as movies became more and more dependent on it. Accordingly, he co-founded West Coast Helicopters in 1987, later merging it with Helinet Aviation when he bought it in 1998. Tragically, Purwin and


Glacier
Southern Lakes Helicopters

a Colombian colleague were killed in a 2015 aircraft crash in Colombia while working on the Hollywood production 'American Made', but not before he had seen Shotover introduce several new aerial photography systems that have become the most desirable platforms for movie-makers, pilots, photographers and operators. Hurndell also is quick to point out that if Purwin and his colleagues had not bought into the Shotover projects, it is highly unlikely that the company would have experienced any major degree of success in the movie industry as those men are major stakeholders and the main core of aerial photographers and pilots for the industry.

Shotover's range of products includes an aerial photography drone system and several camera gimbal systems but the first major, readily recognizable design was the Shotover Camera Systems K1, which incorporates design evolution and fine-tuning garnered from the experience and expertise brought to the table by users and the investor group. This large, 6-axis gimbal system has become the preferred go-to equipment for Hollywood's elite filmmakers and has been used in the production of 150 movies or more. The first movie to use

Heliops


Southern Lakes
HELICOPTERS QUEENSTOWN LTD
Glacier
Southern Lakes Helicopters

the K1 platform was the 3D film 'Walking with Dinosaurs' and since then its credits include such blockbuster titles as 'The Hobbit', 'Bladerunner 2049', 'Jurassic World' and 'Jurassic World Fallen Kingdom', 'Alien Covenant', 'Avengers, Infinity War', 'Guardians of the Galaxy Vol 2'; the list goes on and on. The K1 offers features and capabilities so much improved over competitors' older, less advanced machinery that early this year it won an academy award, the Scientific and Engineering Award, for the system's concept, design, engineering and implementation. Hurndell considers that factors contributing to the award are the K1's full 6-axis freedom and direct look-down capability, its light weight and that it allows the helicopters to carry out more aggressive maneuvering while maintaining the K1's control and stability; all resulting in image capture that makes for better movies. The size of the K1was dictated largely by the necessity to accommodate two cine' cameras for 3D filming and it has proved particularly well suited for that mission, but the requirement for wide angle shooting for video special effects work resulted in the development of the K1 HAMMERHEAD a 24K three camera array, and the 'K1 HYDRA'; that synchronizes six RED Dragon 6K cinema cameras, allowing the construction of images that span an unprecedented 160 degrees field of view. Almost twenty K1's have been sold and with their ability to support the big, heavy lens-camera combinations of the latest generation of digital movie photography, their primary use is in the production of blockbuster movies, so Shotover already controls a substantial share of that particular market.

One of Hurndell's main tasks after the acquisition by Helinet was to work on the Shotover F1, a smaller, lighter and more affordable system than the K1, but mimicking the larger system's full 6-axis gimbal design. The prototype of the resulting product was unveiled in 2014 and the F1 comes close to the K1's capability but is less expensive, utilizes a single pole mount, is easier to ship and has less effect on the helicopter in flight. Like the K1, the F1 boasts a high degree of flexibility with regard to the varied models and brands of cameras and lenses that it accommodates, making the system more accessible and suitable for users such as ENG, advertising and wildlife filmmakers and promoters of major sports events. Since the launch of the F1, over seventy

units have been sold and the constant evolution of camera and lens design has increased the range of supported combinations from around fifty, to over two hundred and, while not able to carry the largest combinations that the K1 can, the unit is still capable of a large proportion of movie work.

The flexibility of Shotover's systems is one of the keys to their success. "That's where we've managed to stay on top of that rapidly changing market," explained Hurndell. "Our whole mantra is giving the director of photography the camera and lens that they choose because they're very specific about the look and feel of their desired end product. The same thing often applies to news producers who may want to use a particular low-light or high-speed camera." The F1, fully loaded with a cinema camera and lens weighs between fifty and sixty kilograms, whereas a fully loaded K1 will be ninety kilo's plus, so the advantage of the cheaper F1 is obvious to those who don't require the capability to carry the largest, heaviest cinema camera-lens combinations. He stated that a major component of the flexibility of Shotover systems is the ease with which users can change combinations and described the methodology. "Due to the K1's size, it is quite a simplistic fitment solution that uses a common dovetail mount and is super-easy to swap over. For the smaller F1, however,

> "
>
> Shotover's range of products includes an aerial photography drone system and several camera gimbal systems but the first major, readily recognizable design was the Shotover Camera Systems K1, which incorporates design evolution and fine-tuning garnered from the experience and expertise brought to the table by users and the investor group.


Heliops
Glacier
Southern Lakes Helicopters
Glacier Southern Lakes
OPERATED BY HELICOPTERS QUEENSTOWN LTD
EXIT
SHOT OVER


DANGER

we've developed a very clever, innovative rail system for which we can easily and very quickly make adapters to fit virtually any combination you supply, provided it can fit within the F1 housing." When a system is bought, it comes off-the-shelf with a massive range of mounting options, covering almost all commonly used combinations. If a new camera comes out and cannot be readily fitted in an available adapter, Shotover designs and builds new brackets to fit, supplies them to the customer and includes them in the standard kit thereafter. Kits also come complete with power supplies and all cabling required to run it on the helicopter. A packaged-up K1 weighs around 250kg (550lbs) and an F1 around half that, but both systems can be dismantled into small sub-assemblies, loaded into soft cases and shipped as excess baggage, a real bonus when the user needs to travel to different locations around the world.

Unlike previous gyro stabilized platforms, Shotover designs and builds systems that are non-spherical and highly distinctive. "I looked at every other system out there and there all just big balls," remarked Hurndell. "There's a lot of dead space in those designs and that just kills us if we want to minimize size, weight and drag." The easily recognizable dark carbon fiber and anodized aluminum finish with colorful orange accents stands out from anything else available and Hurndell himself carries out the CAD shaped carbon fiber design and tooling for Shotover's products. "It's all good that it works; that's the whole goal after all. But it also needs to look aesthetically cutting edge


Glacier
Southern Lakes Helicopters
IWE
SHOT OVER

and people really do love the SHOTOVER look," he remarked. "When one of our gimbals is mounted on a helicopter, there's no mistaking that it's one of our systems. With any other system, you can't really tell what it is because they all look the same. We don't design the same stuff as everyone else. It looks different, it works different and it's customer driven." That whole approach comes naturally to Hurndell, who comes from a product-development background. The distinctive 'Shotover look' is also exhibited in the futuristic U1, an aerial photography drone that was developed when Purwin decided he wanted the most advanced drone in the world. It mounts the company's smallest stabilized gimbal, the 3-axis G1, and became an immediate success on its launch. The weather resistant, professional grade UAV's 73lb gross weight permits a payload of 41lbs, with redundant flight control and battery systems, retractable landing gear and a customized downlink with two HD video feeds and, while the G1 was developed to fit on the U1, it is readily detachable and able to be fitted to a wide variety of platforms, making it a particularly versatile photography tool for vehicles, cable-cams, boats and the like.

The company's latest production model – and huge news in the broadcast industry - is their new M1 and in much the same way that the F1 carried the benefits of the K1 into a smaller, less expensive package, the M1 offers a 6-axis gyro stabilized gimbal platform designed to meet the needs of 2K, 4K and 8K live broadcast but features an open platform design, allowing for future resolution


Glacier Southern Lakes
HELICOPTERS QUEENSTOWN LTD
IWE

growth at a size, weight and affordability point that make it accessible to a vastly greater market. Focused directly at the ultra-HD 4K broadcast market, at just 41.6lbs without payload the M1 is small and light enough to be equipped on the smaller light helicopters, and while the size restraints limit the flexibility in camera-lens combinations somewhat, the combinations in common use by target users mean that their needs should not be adversely affected by that. Of course, as advances in camera and lens design continue, a wider range of payload options will inevitably become feasible. "This is the future of broadcast from our point of view," commented Hurndell. "4K Ultra-HD lenses are coming out all the time now and the Sony P43 is one of the main broadcast cameras at the moment. That fits the M1 and while there are a whole lot of heritage systems out there doing this work at the moment, this is intended to supersede all of those as they become obsolete." Hurndell advised that the M1 had been in the works for a while, but the slower than expected adoption of 4K broadcasting had caused him to hold off on finalizing the project. The recent increase in provision of fiber-optic broadband services and greater production of 4K media, however, had made it timely to complete and launch the M1. A greater level of secrecy than usual for Shotover products surrounded the model's development, and its launch in late March came as a surprise to competitors and most users within the broadcasting and production industries, but Helicopters Inc. has already become the launch customer and ordered the M1 for use on its fleet of news gathering helicopters in the USA.

In a departure from the K1 and F1 designs, which were designed to be as roomy as possible, the M1 design was focused

specifically on being as small as possible, but taking advantage of all the lessons learned in developing those other systems. The main arm on the M1 gimbal is made from solid billet aluminum, machined on a four and five axis mill in Christchurch and the housing itself looks a little more traditional, in that its small size necessitates slightly more of the usual spherical shape, although it retains a forward-looking snout in profile to enable the fitment of longer high-resolution lenses. Finished in Shotover's standard color palette of black, grey and anodized orange, though, the M1 is still clearly a Shotover system and it looks slick, streamlined and elegant. "Smaller sizing brings inevitable compromise," conceded Hurndell. "And although everything has been shrunk around the camera and lens size to make it ultra compact, we made sure we consulted at length with potential users to find out what they were prepared to sacrifice. The end result is that we have much less frontal area and therefore greater ground clearance than the traditional gimbals." According to Hurndell, while the low-volume more bespoke K1 retails for not much under half a million $US and the F1 comes in around $100,000 less, an M1 kit is expected to be around another $100,000 cheaper. That compares extremely favorably with pricing of competing older, less capable and somewhat outdated systems and there is a ready global market for several hundred M1s as the broadcast industry adopts general ultra-HD, expanding with new equipment and replacing obsolete units.

Developing new technology and products to a marketable stage is a costly exercise and not without risk, so it is fortunate that after Alan Purwin's death, his widow Kathryn continued with Helinet and is that company's CEO and a director of Shotover, with Hurndell being the other director. Hurndell described Kathryn Purwin – who is a qualified commercial pilot with both fixed-wing and rotary licenses - as equally passionate, supportive and knowledgeable about Shotover's work as her late husband, so gaining approval for new projects is no problem provided they have sufficient potential and merit. It is clear when discussing trends with Hurndell that Shotover is never going to be a company to rest on its laurels. New technologies and advances in existing tech are constantly monitored with a view to incorporating advances into existing and new product lines. Already, Shotover have experimented with remote control of their systems, enabling operators to remain on the ground while the helicopter or other photography resource is filming elsewhere. Particularly in the case of helicopters, this is a major benefit, reducing payload to permit higher fuel loads and endurance, plus removing the operator from perceived flight risk and increasing their potential productivity. Because most of the operating system is common to all Shotover platforms, it also means that new technologies such as remote control will be available across the product range as they are developed.

Success in business goes well beyond providing great products though, and Hurndell credits Shotover's continuing growth and success to the support and backup that the company provides to all users of their systems. "There are a lot of phone calls in the early hours of the morning, because the time-zones aren't usually particularly friendly to New Zealand when Hollywood is working." He explained that many of the evolutionary improvements come from constant communication with users; finding out just what they would have on their 'wish list' of what the equipment could do for them and their directors, then using whatever new hardware and software technologies become available to include as many of those desired abilities as possible. "Every two months, we put together a huge list of both our own envisaged improvements and our customers' requests and then go into a 'war room' type session to determine which features will go into our next R&D cycles. Any mechanical changes

> "
> The flexibility of Shotover's systems is one of the keys to their success. "That's where we've managed to stay on top of that rapidly changing market," explained Hurndell. "Our whole mantra is giving the director of photography the camera and lens that they choose because they're very specific about the look and feel of their desired end product. The same thing often applies to news producers who may want to use a particular low-light or high-speed camera."

are developed to fit into the existing structure because we want to make sure our existing customers can get upgraded to the latest specification, as we don't want to penalize the early adopters. On our K1s, for example, every single system has been upgraded – at no cost to the user - to the latest spec' so they are all the same and no-one is disadvantaged by buying an early production unit."

The potential market for Shotover's product lines is enlarging and Hurndell advised that the majority of F1 sales have been to customers who had previously owned a gimbal system. Further developments are also undoubtedly in the works and anyone in the broadcasting or film industry would be shortsighted indeed if they did not keep a weather eye on whatever Shotover Camera Systems comes out with. Hurndell succinctly summed up how he sees the company and its aims. "Constant innovation is part of our brand and our key goal is for the whole industry to be of the opinion that if they want to shoot stabilized footage, they'll use one of our products," he stated. "That's our vision and this is the catch-phrase for the M1: 'Look down, look forward, but never look back.' Looking down is what our products do, looking forward is us always keeping an eye on the future and anticipating trends, and never looking back because that's where obsolete technology resides." ■