OpiaVision Pty.Ltd.

For this issue's Company Biography I decided to talk to OpiaVision, a Sydney based innovative company that designs and manufactures a special kind of digital video recorders. Readers that have read last year's Test Drive, where we tested 19 DVRs, will remember a "brave new concept" summary referring to OpiaVision's product, called Waveserve.

OpiaVision is a Sydney based company, run by three directors: Clive Swatton, David Douglas and Wolf Zandberg.

Clive has an Electronics engineering degree and is responsible for the hardware designs.

David has a degree in Computer sciences and he is the software designer in OpiaVision.

Wolf has a degree in Marketing and Management and he is

responsible for strategies that led to the successful marketing of Waveserve into industries including transport, banking, and leisure.

The basic product of OpiaVision is the Waveserve, a Linux based wavelet digital video recorder, enclosed in a small box, not larger than two bricks put on top of each other. OpiaVision's concept is that the Waveserve doesn't need to be installed in a location close to the operators, with a composite or SVGA video output, but rather is accessible from anywhere using a LAN, PSTN or GSM connection.

Vlado: How did OpiaVision start, and what does the name Opia stand for?

Clive: We established OpiaVision in March 1999…

David: …But we formulated the idea of OpiaVision in November 1998.

Wolf: The name "Opia" comes from latin, and it means "eye". So, "OpiaVision" means "eye-vision," which is what we wanted to concentrate on with our products.

I remember, when you launched the "CCTV focus" magazine in 1999, we already had our first Waveserve working.

Vlado: Is OpiaVision made up of only the three of you, or are there more co-owners?

Wolf: The three of us are OpiaVision. We own the company, so it is 100% Australian owned. We are the engineers and designers of all products. Of course, we subcontract PCB manufacturing, components population and assembling of the Waveserve

Wolf: Interestingly enough,

when we first met you Vlado, you labeled our products and company as a "brave new concept", which I think put us into a different perspective to all the other manufacturers at the time. We could see that what all the others were doing, was merely copying each others systems and ideas, that is - chucking a card into a PC, and then charging a premium. And, whilst these systems might have had many features because they had the grunt of a PC behind them, they didn't quite have the reliability that we wanted to include in a system.

Vlado: You of course, have

worked in security before, so you would know the need for reliability in a recorder.

Wolf: Well yes, it is very important. And now that we are looking at it in retrospect, we see that it was the right choice to make, and it was the right decision. It was brave because it took time for others to see the same. But now we see companies like Sony and Sanyo beginning to turn to what we are doing, as they are now building dedicated systems that are not purely PC based, but are dedicated to do a specific task, like the VCR was, and like security products should be dedicated to certain tasks.

Vlado: So why have you cho-

sen Linux over the other operating systems?

Clive: Well, we'd already run Windows 95, and NT in a previous product, that we were associated with, and we frankly found that it was just too unreliable for a 'secure' system. In fact it was totally unreliable. I actually had to resort to designing and building a hardware 'watchdog' so that if the application ever stopped, then it would perform a fairly brutal and effective reset.

Vlado: Yes, I've noticed fairly recently that many specifications now include a hardware watchdog as a must, or require a scandisk and defrag to be performed at every boot.

Wolf: Well Linux has a substantially different filing system which removes the need for "defrag", as it is very effective and organized in comparison to Windows.

Clive: Also, Linux and Unix have a fairly extensive history, so it has the advantage of over 25 years of professional experience and upgrading by technical users behind it.

Another advantage with Linux is that it was developed in the low-speed age, and has very effective remote-access technology. Linux was able to run multiple sessions at the time of 300 baud modems, and in the time since, it has developed in this area substantially.

David: Linux is also good at multitasking, using true multitasking, whereas Windows, especially earlier versions, did not. Things such as a capture task, a housekeeping type task, and such can run much more harmoniously in a Linux system.

Wolf: Probably the best fea
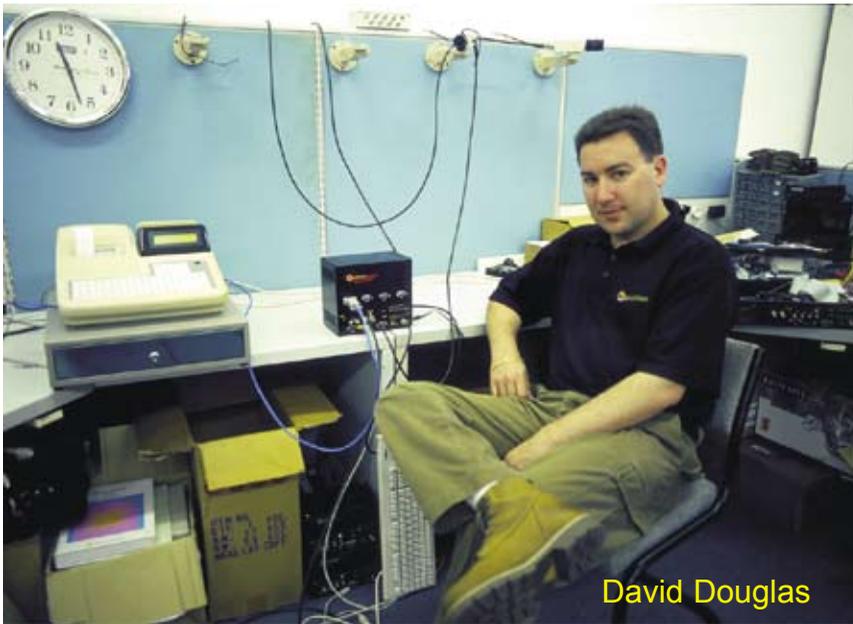
David Douglas

ture of Linux, as far as I'm concerned, is the ability to be able to remotely access every part of the operating system, unlike Windows, while still retaining the security required for the system. In that aspect, Linux has got everybody beat. This is especially important, because we are a security product, and we have to remain aware of that, while maintaining a good level of support for our customers. We don't want to have to send out technicians every time we have an update, or every time a customer wants a change made to part of the software - it can be simply downloaded. We find that we can perform these tasks quite well, whereas as most of our competition, being Windows based, has a lot of trouble doing this.

David: Another advantage of Linux is that you have access to the complete source of the operating system, meaning that utilities and such can be easily built around that. The system isn't a black-box, where you don't understand what each segment really does; rather you have full understanding of the source, and

can add and remove areas of it as is necessary.

Vlado: As far as I understand it, your operating system is embedded in an EPROM, Flash RAM. It has a very fast download, and the downtime is very low, in case power is stopped.

Wolf: Correct. The best feature of this is that being on a Flash RAM, our OS is loaded into the RAM, at startup. Therefore, when the system is rebooted, if there is a problem and the system is corrupted, a brand new operating system is loaded, one that isn't corrupted.

Clive: With disk-based systems, there is a much greater chance of corrupting a physical

area of the disk. Flash RAM is actually protected against operations - a number of layers of security have to be crossed before any information can actually be written to the Flash RAM. If any problems do occur, a 'watchdog' reset will be performed, and a new copy of the operating system is loaded. At this point, the system can still be run, and diagnostics can be retrieved.

Wolf: The only thing inside the system which has any moving parts is the hard-drive, which makes it the most susceptible thing in the entire system to corruption. Now, by not storing the operating system on the hard-drive, you remove the chance of the system failing if corruption occurs, which is the main risk factor. If this does occur, the system is still operational - you may not be able to access or store images directly, but they can be accessed by other means, which is the most important thing.

Vlado: I can see you have put quite a bit of thinking into the concept itself, and that only confirms my first impression in our last November issue about the Waveserve as a "brave new concept." Let's have a look at your history now - even though it's short I think it is very interesting. I would like to know, and I am sure the readers too, where

have you been and where are you going? We'll start at your first concept, when you designed a digital recorder in which was contained in a small box, which was accessed through a network connection.

Wolf: Our first concept was and will stay like that - TCP/IP based, meaning it can be accessed by network, by mobile phones…

Clive: …Anything with a serial link or a network connection can

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Wolf Zandberg

dial into it.

Vlado: Is this a finished product - are you still developing around that, or are you developing new concepts and technologies?

Wolf: Both. We've actually taken that product and we've found that it's very well suited to a niche market - POS (Point Of Sale) systems. We have now further developed the Waveserve into CashView, a system that is not a high cost product, and can take all of a cash-register's transaction data and store it with an image. Using another 'brave new concept', we've managed to - with the help of David and everyone else - overlay images not

as bitmaps with the POS information, but keep them totally separate and store the transaction data underneath the image.

David: The concept is really that we're coming out with a data-logger, so that we can store both serial data and video data, and cross-link them.

Wolf: The best thing about it is that it gives us the ability to search for data. You can simply look for note sales, or refunds or a specific amount of money. This doesn't necessarily have to be used for POS systems; it can be for any data - from barcodes to collection of data from anywhere.

Vlado: At the moment you have obviously used the system for a cash register, but it can be used even in industrial type machines. That's a very powerful tool, because I know a lot of people are asking for it.

David: For instance we can log the weight of a weighing machine, at a garbage tip when a truck comes in and leaves, so you can keep a record of when certain levels were met…

Clive: …You can verify trans-

action data with other data.

Vlado: How easy is it to interface to various "intelligent devices"? Will you develop interfaces for the majority of products and their uses?

Clive: We have the capability for our own hardware and software design.

Vlado: I would also assume that people interested in reading this will have to account for a fee that you would have to charge for developing and producing that interface.

Wolf: Right now, we have interfaces for all major POS systems, such as Sanyo, Sony, Sharp, Uniwell, Casio and others. We already have those interfaces in place.

Vlado: So all you do basically is put the system in place, put a camera in the box and then interface them?

Wolf: Yes. The software has a table of all the cash registers already interfaced, and the end-user can just select which register they have.

Vlado: You can obviously offer them as much storage as the hard-drive has inside the system, correct?

Wolf: Correct. We're also embarking on a new development which is network storage, in which each unit will be able to give you 1.6 TeraBytes of space.

Vlado: So instead of having all the hardware in the unit, you put a box somewhere and the data is stored across the network.

Wolf: …That's also cascadable so you can make multiples of the data.

David: With the current hard-drive technology, we can store approximately 30 days worth of data on the system, with continuous 24 hour per day recording,

with one image per camera per second for 4 cameras.

Vlado: And if you have a POS system can all four cameras be used for that purpose?

Clive: Yes, you can use it in a multitude of ways - one situation we have at the moment has 16 cameras, 4 of which are used for cash registers, and the other 12 of which are used for general security purposes. So, you can utilize the system in a mix-and-match scenario, expand it to whatever size is required, and it can take care of your full video security needs.

David: You can also have additional communications ports put on the unit, so that if you need one camera per cash register you can do that, instead of the typical 4-6 camera system.

Wolf: A new system that we should be releasing within the next few weeks or so, which is just going now into prototype testing…

Clive: Let's be conservative with that, I don't want to preempt too much…

Wolf: In a few weeks, we will have a new system which will have 10 "Comm" ports on it, allowing you to monitor 6 or 8 registers, with room left for modem communications and so forth. It's going to be a much more powerful system.

Clive: Obviously there is going to be a price-premium, so we have a new generation of the current system coming out, which uses a more powerful processor, and which should allow for faster switching because we're actually using a new video digitizing chip, which is significantly faster than the one we are currently using. We will then be able to run a 4-6 camera system with a much faster frame-rate.

Vlado: Can I ask you about systems you have done, you reference sites?

Clive: There are some customers that we can't name, but some of the others are the Greater Building Society for instance, the insurance company GIO, and many others.

Wolf: We also have people like Waterways, who we did a project for during the Olympics, with network storage used for the security of the super-yachts near Anzac Bridge. We also did the Sydney to Hobart yacht race, installing cameras on "Bumblebee", "Terrafirma", and "Wild Thing".

David: We installed 4 cameras on each of the 3 yachts, as well as CDMA telephones connected through Telstra MobileNet, and for the duration of the race we were downloading live images from the yachts and posting them on the internet. We updated each feed approximately once every 3 minutes, because of the rate at which the CDMA phones could transfer the data, and we only lost communication to the yachts when they went through Bass Strait. We had a lot of good feedback about the system. Initially, the Sydney to Hobart organizers weren't sure exactly

how well the system would work, and so we were very much buried on their website, but when they saw how well things were moving along, and how good a response we were getting, we moved from the bottom-right, two screens down, to the top left, so it could be seen as soon as someone logged onto the site. The feeds also went from the third most hit area of the website to the most hit.

Wolf: We had a total of 32 million hits within the course of 10 days.

Vlado: Wow, that's quite a lot. So, this other thing you mentioned, the project for Waterways, was this similar to your work in the Sydney to Hobart?

Clive: No, that was purely security monitoring during the Sydney Olympics. Many people were mooring their super-yachts at the facility, so they were obviously very concerned about the security of the area. Obviously, the product has been very well field proven, with things such as the Sydney to Hobart, but before that, the system was used on trams, in cars, in taxis overseas, and other such things, so we knew the system was reliable before we committed to

bigger projects like the Sydney to Hobart. By using the small laptop 2.5" drives, we knew that the system could withstand the g-forces due to the fact that it had no moving parts.

Wolf: Our new prototype system has the capability of playing full-sized DVD commercials…

Clive: …It has MPEG encode/ decode capability, and uses a dual video processor, which is quite distinct from the first version of the system. We're basically making a complete system ourselves, designing the entire main-board with, as we said earlier, up to 10 communication ports, as well as dual Ethernet, and other features. The Comm ports can be reassigned as desired. The system obviously has Wavelet compression, MPEG 4 compression, as well as the option for a secondary video processor, and each video processor can be assigned to whatever compression is wanted.

Wolf: Both chips can be used in unison with different compression.

Vlado: Coincidently, in the issue with your Company Biography we will have an article about MPEG-4. Can you tell us why MPEG 4? Where would

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you use it?

Wolf: The significance of MPEG-4 is its ability to transmit live images over low bandwidth. Because of the flexible compression ratios, or scalable compression, we can send live images instead of still images over mobile phones, or to a PDA.

MPEG-4 gives you voice and data. Our new system has also got dual stereo channels.

Clive: Ultimately, with the new video processor on the MK 2 version of the system, we could incorporate any new standard that comes in future. It can also act as a full duplex processor, so you can be encoding and decoding data simultaneously.

Vlado: We know when you started, we know the development process of your company, is there any key point in time when you decided to go in one direction instead of another?

Clive: Well, the company was formed when we all got together in a group and decided that this was the way to go.

Vlado: So, as you said earlier, this was sometime in November of 1998, and you actually created the company in March of 1999…

Clive: …Yes, and we've really been charging along ever since. We've had the concept for the MK 2 for quite a while now - it's been longer in development than we originally envisaged, but we still think that it's a definite breakthrough. We believe it's quite a flexible approach to the problem, which is our prime reason for developing it, as we wanted to be able to cater to various consumer needs from more or less a single platform. That's really where we're heading - we have a variety of other ideas we'd like to explore, but we're basically limited by resources at

the moment.

Vlado: In this case, is it fair to say that all ideas and designs are done by yourselves? Obviously you would subcontract manufacturers and the like, but the actual designs are all done by you?

Clive: Yes, all the hardware and software design is done in-house…

David: …It's all 100% controlled by us, and it's all OpiaVision hardware and software.

Clive: With the current MK 1 "Waveserve", the actual single board computer is a product that we buy in, as well as the memory, but that's all going to change with the next version of the product, which will be a completely unique design.

Something I left out regarding the system, which does differentiate it from other products on the market is its power consumption. The system can run off a 12 volt battery, which is important for mobile applications. It is a much more efficient system - it could be tucked away in other areas, run off solar power, which, typically, most (if not all) of our competition aren't able to do.

Wolf: Yes I would say the best thing about our system is that it can be put away anywhere. Being a security system, the first thing someone is going to do when they break in - is say "There's a nice big computer, I'm going to swipe this.", and there goes your security system.

David: Most security systems are accessed through the box itself, they have to be accessible, and so people can switch them off if they want to do so. However, our system is accessed through a remote source, and there is no actual user-manipulation of the box itself, meaning that the vast majority of our units are installed in ceiling cavities and the like.

ing these areas, and the staff themselves don't know where the units are.

Vlado: In that respect, you don't have any problems with temperatures or such things in the areas you store the units?

Clive: Typically not, the section that generates the most heat is the hard-drive, and we're generally running around 20-30 watts of power with 2 hard-drives.

If you have a completely enclosed cavity, obviously you have to be aware of the heat, and generally should have some sort of flow of air. But we don't usually have problems with the heat - we can run in ambient temperatures of somewhere around 45-50°C with no problems.

Vlado: From my experience, the biggest problem that digital recorders may have is really temperature and dust, and in Australia high temperatures can easily cause problems in this area.

Wolf: Well with our system, those problems are largely avoided - heat isn't an issue because of low power consumption, and we don't use fans, so there isn't dust being sucked into the system.

David: That's why our devices have been designed as they have - on the bottom you have the single board computer, then on top of that there is the capture card, on top of that is the power card, and right on the top is the drives. We organized it so that all of the heat production is on the top - the power card is right near the top, with the drives on top of it. Due to the fact that hot air rises (even in Australia…) (he laughs - editor's remark), with enough ventilation the hot air escapes quickly and doesn't

heat up the entire system.

Clive: If you have a heat problem, you can simply reduce the power consumption even more by using 2.5" drives, which run off 5 volts, at the cost of drive capacity obviously.

Vlado: Have there been any key points in your development that you consider particularly interesting?

Clive: It's been an evolution really. We've added features as we went along, made the system more and more reliable…

David: …Our biggest advan-

The various products of OpiaVision

tage really is that we implement functionality that people really want, so if someone comes to us and needs a particular function, we can respond to their request, rather than having a static box that is completely unchangeable. For example, they could come to us and say "I have this cash register" and it wouldn't be a problem, we could develop an appropriate interface for it. The customer is ultimately getting what they want.

Vlado: Is it a trade secret to reveal how many units you have sold to date?

Wolf: Well, quite a few, obviously enough to stay in business.

Vlado: A politician's response. You said you don't deal much overseas, but you had some-

thing set up in the UK. Obviously you're not focusing completely on that.

Wolf: We haven't concentrated on that and we haven't poured a lot of money into advertising and setting up overseas channels and whatnot, we've basically concentrated on development and getting the product set up. We do have a marketing plan to pursue overseas markets, but we'd really like to do that with the MK 2, which isn't completed yet.

Vlado: So if people reading the magazine overseas are interested in your products and development, you would be more than happy to discuss their requirements?

Wolf: Absolutely, and we'd be more than happy to point out distributors overseas to them.

Vlado: So that's the present stage, what can you see for the future - you mentioned something about new designs?

Clive: We expect to have large volumes by first quarter next year, and we estimate a market of at least 4-5 thousand units per annum.

Clive: The MK 2 will do a lot of things; it will be a multifunction box. There is a lot of attention being paid to power efficiency, and low power operation. It has an in-built UPS (Uninterrupted Power Supply), and on-board 'watchdog' micro, which should satisfy people with "quirky" demands. We have capability for several analogue and digital channels, a variety of features which we can add for specific needs of consumers. We could easily manufacture many thousands of units under the new design.

Vlado: Will the physical size of the MK 1 box match the size of the MK 2 box?

David: No, the MK 2 typical format will be a 19" rack mount, 19" wide, a little less than 2RU high, and about 140 mm deep, marginally bigger than the original unit. That size will hold 2 hard-drives, so a 4 drive system will obviously be larger.

Wolf: The system will have the capability for holding 8 internal hard-drives, with up to 4 IDEs, with extra IDE ports being able to be added with revisions. We'll have Firewire, USB and SCSI drive support. The key thing behind the new product is that with multiple IDE ports we'll be able to communicate with more than one device at a time. Each system will have dual network.

Clive: The basis of this is that if you have network storage and a network, they can operate separately, so as not to clog the system.

David: Not only is it a separate network just for storage, its integrity is much higher because you don't have to go through a hub, you can simply have a short crossover cable, eliminating the chance of failure.

Wolf: Plus the systems are networkable, so you could have hundreds of thousands of them networked together, making an extremely large system.

Vlado: Where, in general, do you think security and CCTV is going?

Wolf: I think you will find it very hard to differentiate security and IT - the two have been merged, and will become more and more a single entity.

Clive: CCTV is going to become very much a consumer item, and not so specialised, much like IT networking is now - 5 years ago, you would always bring in a consultant when setting up a network, now you simply plug into the card, it's much simpler. The same thing is going to happen with security.

Vlado: Yes, I agree. The only thing is that people are going to have to gain a greater understanding of the basic concepts - you are all experts in CCTV technology, but the average person wouldn't be able to understand as easily.

David: That's where having it all computer based comes into play - the software will become more intelligent, and more user friendly, to the point where you wont be asking questions like "What frame-rate do you want to store?" because no-one will know what a frame-rate is. The questions will become much more humanized, and you will be given options which will mould to the parameters of the technology. The viewing software will need to become much more easy to use, and much more robust, so that if you change a parameter it checks everything and confirms that with you in natural English language, rather than CCTV jargon.

Wolf: We've always been kind of rebels in the CCTV industry, and we moved away from the standards a long time ago, because we thought there must have been easier and more reliable ways of doing things. Why constantly copy systems that you want to change in the first place?

David: I'd rather be the one that gets copied than the one copying.

Vlado: I understand that you are happy with the Linux operating system but will you be developing something for Windows in the future?

Wolf: Well that's the beauty of Linux - because our system is a server, it doesn't really matter who connects to it, under any operating system.

David: We have Windows based software that connects through TCP/IP to the system.

Wolf: We have support for all Windows versions - 95, 98, ME, NT, 2000, and XP will work fine when it is released as well.

Vlado: Anything else you would like to touch on?

Clive: I think what will be interesting further down the track will be the advances with sensors and cameras - we will be going for higher and higher resolutions. We'll be moving away from the TV standards and utilising 1024 x 768 and even high definition imaging, moving towards the digital standards.

Wolf: That's why we already have a Firewire connection, devices will plug straight in.

Vlado: Well, gentlemen, on behalf of our readers and myself, I would like to thank you for your time, and good luck in your future projects. []