Dancing with an octopus

Being a one-man A/V crew is possible and rewarding if you're more than a little handy across skill sets. ANDREW LEVINE explains how he does it.

I came to audio 10 years ago from the video arena because I was (in hindsight, I can say, predictably) unhappy with the sound of the built-in microphone on my consumer mini-DV camera. In the following years I regularly produced some video footage along with the audio, albeit only once or twice a year and I did buy Apple's Final Cut Pro Studio and studied and used FCP and DVD Studio Pro to edit and finalise the material I gathered on these occasions. This went on for about seven years until in 2010 I documented the International Jewish Music Festival (IJMF) in Amsterdam with the assistance of two colleagues for the image aspect and was not satisfied with the results, which I was in charge of editing. Despite my prior instructions the wide angle was too closely cropped, occasionally even leaving out one of the musicians, the footage from the tripod mounted camera was to a large part unusable as the framing changed unpredictably when the camera was moved after remaining on the objective for too few seconds. I did manage to salvage the material in the editing thanks to quite a few nice handheld shots but it was frustrating work, to say the least.

I decided that I might as well cover the visual aspect myself for those occasions where musicians required video in addition to my audio, especially since the use of DSLRs for videography. In 2011 I purchased first one, then a second camera (Canon EOS 550D) with a selection of fast prime lenses (Canon 24-2.8, 35-2.0, 50-1.4 and 100-2.0); a photography tripod (Vanguard Alta Pro 63 AT) with fluid head (Manfrotto 701HDV); later a follow focus (Jag35 D|Focus as part of the D|Runner rig); and camera mount 7-inch display (Lilliput 665 GL) to be able to judge focus correctly.

The number of gigs where video was requested increased steadily and when in 2012 a recording with the chamber choir Tonikum required three angles I added a third DSLR to my store. I had acquired more lenses than I had camera bodies: a Voigtländer 20mm 3.5 for wider shots (20mm on an 1.6x crop APS-C camera is equivalent to 32mm on a full-frame sensor); a 70-210mm 2.8-4.0 Vivitar Series 1 zoom; and a few more vintage lenses adapted to the EOS mount by a British camera specialist and 'lens doctor' Eddie Houston.

For this job I also purchased a stabilisation system. After first trying out a Glieecam XR-1000 I decided on a Titan by L'Aigle. Its one-point gimbal is not quite as fluid as the Glidecam's three-axis roller bearing design but it is comfortable to handle and folds nicely for easy packing without needing to disassemble the unit. I still need a lot more practice with static and dynamic balancing as well as live handling to keep the horizon steady, but it is a great way of getting some fluid movement shots.

As the amount of video-centric work increased my backlog of unfinished work rose exponentially. The camera's footage is natively compressed to H.264 and needs to be transcoded to Apple ProRes 422 and synchronised with the separately captured audio to make multicam editing with Apple Final Cut Pro 7 possible. Since the maximum continuous recording time of cameras for still photography is limited to 30 minutes (to minimise import taxes) and the FAT16 formatting of SD cards allows for a maximum file size of 4Gb, resulting in 12 minutes at EOS native compression, you have to synchronise several clips for every camera capture.

Lucky for me there is an alternative firmware that lets DSLR videographers overcome some of the limitations of Canon's built-in offering — at their own risk! Magic Lantern (http://magiclantern.fm/), which got started when Canon's 5D Mk2 shook up the film making community, is steadily improved and expanded and now runs on several EOS models. Not only does it feature an auto restart to resume filming after the inevitable break every 30 minutes/4Gb, but it also allows for precise control of white balance (in Kelvin), ISO and frame rate with more than the usual options, implements zebra patterns to easily detect over- and underexposure and provides, among many other tools, histogram, image magnification and focus assist.

I needed to optimise my workflow to better handle the workload and to be able to offer my clients reasonable pricing without having to work for too little money. The solution, to reduce the complexity of the postproduction stage, was to employ live video editing. I purchased a Blackmagic Design ATEM Television Studio that can handle up to six camera inputs. Of course, you need an extra screen — I chose the relatively lightweight and transportable LG Flatron E2251VR-BN — to monitor the signals and make editing decisions but the time saved far outweighed the 'cost' of lugging around more equipment.

One thing to keep in mind when using a video mixer with a separate audio input is the image processing related audio delay of between one and three frames, equivalent to between 800 and 2400 samples at 48kHz. I delay the audio with the help of the inbuilt DSP processing primitives of Metric Halo's MIO audio interfaces. This way I can also apply a low cut filter, limiter and dither to the audio sum.

There were two issues left: flexible connectivity of the cameras in use and reliable, preferably standalone high-end video capture of the live montage.

The interconnect standard for consumer video gear is HDMI, and the requisite cables can be no more than

5m long. This had work for smaller gigs in the past but when the IJMF 2012 came along it was clear I'd need to be able to place the cameras farther apart. I needed to convert the HDMI signals to SDI as the standard of professional interconnects in the video world and then I'd be able to place the cameras 20, 30 or more meters apart without a problem. Lucky for me Blackmagic Design announced an affordable battery powered convertor that does the job. Shortly afterwards Atomos released another unit that is not built as solidly but is way smaller and can be piggy-backed with an external battery while in turn supplying power itself, so you have even more choices now.

My workflow now used one laptop to record the multichannel audio over FireWire as well as the H.264 encoded output of the TV Studio via USB. I felt that this was a bit too much complexity on the recording side and rather wished for a standalone solution, which is what led me to purchase an Atomos Ninja-2 HD recorder. It hooks up to my TV Studio and the AES-EBU output of my audio interfaces, runs on battery power with a redundant source, records onto 2.5-inch SSDs but also on less expensive spinning platter HDDs and offers a host of features: one button recording and playback, live monitoring and image inspection functions (zebra, focus peaking, b/w, etc.)

Sadly the Ninja-2 only records stereo audio (the Samurai with SDI connectivity handles 8 tracks) at 16-bit depth and 48kHz sample rate, which is why I need to apply dither to the AES feed, but according to Atomos the bit depth might be increased in the future.

On the occasion of my Ninja-2 purchase I also invested in a new tripod and fluid head. In the prior years I had always rented a Sachtler system with the cameras and the smoothness of the professional head combined with variable levels of horizontal and vertical drag being a joy to work with. The cost of such a full fledged system was prohibitive until the introduction of the Sachtler ACE featuring a solid tripod base with either ground or mid level spreader and fluid damped head with three levels of drag all in a nice bag. While it is bulkier and heavier than my Vanguard-Manfrotto solution I have since taken it with me whenever possible.

What other issues need to be addressed? I like the Canon EOS cameras because they deal well with low light situations, which is a must. The bodies are relatively inexpensive, there are also many nice lenses, either with original EOS mount or adapted, I am comfortable with their handling and am a fan of the Magic Lantern firmware. On the flipside the images are not as sharp as with other digital cameras e.g. Panasonic GH2. I believe this is at least partially due to the in-camera image processing, scaling the effective image size of 1620 x 911 pixels by about 119% to 1920 x 1080 and converting the frame rate from (NTSC) 59.94i to (PAL) 25p. It's another good reason to grab the chip's output more or less directly and do the crop, scale and fps conversion after the capture.

I often have to do one or two small corrections, cropping the beginning and end, substituting some extra footage of the audience, or some detail of the performance space for an inadvertent camera move or awkward image and adding leading and trailing text. After that is done I usually render a QuickTime movie with references to the original sources and feed that to MPEG Streamclip for the scaling and frame rate conversion. The resultant file is then processed by Apple Compressor for use on a DVD requiring mpeg-2 or by Elgato Turbo-H.264 for an encoding that preserves the HD resolution at 1080p or 720p, the latter being optimal for especially low light/high noise footage.

I am still on the lookout for a hardware solution that will accomplish the scaling and possibly even the conforming to 25p in real-time right before the video is recorded by the Ninja-2, but it seems this task is not trivial. As far as I know the unit that comes closest is the Teranex 2D processor — the company that developed the unit as part of a joint project with Lockheed Martin in the early 1980s and marketed the predecessor at a multiple of its current price was recently purchased by Blackmagic Design — that features great looking conversions from nearly any input to any output format plus an excellent denoising algorithm, but I deferred its purchase as it currently cannot scale HD input material. Let's see what the next firmware upgrade beings. I was wary about the always-on fan when I demoed the box since I don't want to have a humming unit close by my side and possibly too close to my microphones.

The last acquisition in 2012 was a new follow focus. I managed OK with Jag35's DⅠFocus but when I had the chance to get a rebate on an Edelkrone Focus-1 I took it, and it already has made a world of a difference. The unit is CNC-manufactured from aluminium, grips very well and handles exceptionally smoothly. It is also the only follow focus that features a disk facing not sideways but towards the camera operator, so you have a visual confirmation of what you are dialing in and you don't have to use a pen to mark it but simply press and turn the disk. It's one of those innovations that feels so natural you can't understand why nobody had thought of it before.

The first acquisition in 2013 has been a new monitor. The Lilliput was OK, but I experienced a pink-tinted picture from its HDMI output on occasion — possibly related to the sequence of turning on the camera and the monitor, but I haven't narrowed the issue down conclusively yet — and that can make you feel insecure when you primarily deal with live events. Furthermore there are higher quality displays out there and the emerging OLED technology promises greatly enhanced image quality and colour rendition especially in the dark areas.

I chose the 8-bit capable SmallHD AC7 OLED display — the build quality is great, it offers an on-screen menu with many options, cropping the black frame to make the most of the available 1280 x 800 pixels and offering several types of focus assist, false colours, etc. Reassuringly 'what you see is what you've got'. After all this screen determines how I view the close-ups during the event I am recording, and I will also use it in the future when setting up all static camera angles and to compare the images obtained from the use of different lenses.

As with many things, there is room for improvement, but I stand by my statement that if you like to watch musicians as well as listen to them, and feel at home in the visual and the auditory worlds, being a one-person A/V crew is possible and is rewarding, even if you need to dance at two weddings simultaneously and often appear to emulate an octopus. Except for the ongoing issue of getting the gear to and from a location it certainly has been worth my time and effort. And yes, I do make the time and have the peace of mind to set up no-compromise high quality audio (for stereo and surround) to parallel my visual work. This is the world I come from, and this is also what clearly differentiates me from guys using their eyes only. I listen and I watch, while I listen.

FOOTNOTE

This is an extended version of script originally presented in a workshop at the VDT International Convention 2012 in Cologne.