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Feature

Shot in DV!

By Neil Sadwelkar

DV as a technology or a technological 'event' is probably passing through that unique phase in time, where it's too old to be news but too new to be history!

[Thunderous applause which is what **Neil Armstrong** received in Mumbai, when he used this phrase to describe man's - or his - landing on the moon]

The DV revolution came with the **Sony VX-1000** - probably the first prosumer DV camera ever. It came along in Oct Nov 1995 and I remember seeing a demo and getting a quote for this in early 1996 [Rs. 3 lakhs then]. Later that year, a friend shot a pilot episode of a talk show with the VX-1000. We, who used *Betacam* and *U-matic* sometimes, were astounded by the sheer quality of this format then.



Today there is a generous number of DV cameras made by many companies worldwide. DV decks with a variety of features, and interfaces with *Beta* and even *DigiBeta* are easily available. The three main DV flavours of DV - DV or *miniDV*, *DVCAM* and *DVCPRO* - are neatly tabulated with some main characteristics of the big three.

	DV	DVCAM	DVCPRO
Made by	About 60 manufacturers including Sony, Panasonic, JVC, Canon, Sharp.	Sony, Ikegami	Panasonic, Philips, Ikegami, Hitachi.
Tape Type	ME [Metal Evaporate]	ME [Metal Evaporate]	MP [Metal Particle]
Track Pitch	10 microns [SP] / 6.7 microns [LP]	15 microns	18 microns
Track Width	10 microns [SP] / 6.7 microns [LP]	15 microns	18 microns
Tape Speed [SP mode]	18.81 mm/sec	28.215 mm/sec	33.82 mm/sec
Cassette Sizes [timings are SP/LP]	miniDV: 80/120 min Big DV : 3.0/4.6 hrs	Small: 40 min. Large: 184 min.	Small: 63 min. Large: 123 min./184 min.
Compression	5:1 DVC-format DCT Intra-frame 25 Mbps video data rate	5:1 DVC-format DCT Intra-frame 25 Mbps video data rate	5:1 DVC-format DCT Intra-frame 25 Mbps video data rate
Resolution & Sampling	720x480, 4:1:1 [NTSC] 720x576, 4:2:0 [PAL]	720x480, 4:1:1 [NTSC] 720x576, 4:2:0 [PAL]	720x480, 4:1:1 [NTSC] 720x576, 4:1:1 [PAL]
Audio	2 ch @ 48 kHz, 16 bits	2 ch @ 48 kHz, 16 bits	2 ch @ 48 kHz, 16 bits Locked + one analog

		12 bits	audio cue track
Analog Component I/O	JVC BR-DV600, playback only in DVCAM or DVCPRO VTRs with component outputs	DSR-40 and higher-numbered VTRs	AJ-D850/780/750; 650/640; & 450/440 VTRs

Apart from these big 3 DV flavours, there is also the *Digital8*. A Sony format that uses *Hi8* sized tapes but records a digital signal on them identical to DV. But since D8 camcorders are of the low-end consumer variety, it's not regarded as equivalent to DV as a medium.

Then there is *DVCPRO50*, promoted by *Panasonic*. This uses cassettes similar to *DVCPRO* cassettes. It has 4:2:2 sampling and lower compression of 3.3:1 [compared to DV's 5:1]. Some new *DVCPRO50* machines sport a FireWire interface and one can capture the full 3.3:1 signal into an NLE like *Final Cut Pro*. But sadly enough, no *DVCPRO50* camcorder has a FireWire port. Only the decks have. And the decks can't shoot. So to use *DVCPRO50*, you have to buy a deck and a camcorder. But thanks to its relatively lower cost, some consider it to be a middle-class *DigiBeta*.

And there is *Digital-S* or *D-9* as it's known now. This format uses a VHS-like cassette and some models can play back SVHS tapes. This format is pushed by JVC only and hasn't really caught on in India in a big way. It also has 4:2:2 sampling and 3.3:1 compression. The KBC look-alike from ZEE, '*Sawal Dus Croe Ka*', was supposed to have been shot in this format.

So basically we're left with DV, DVCAM and DVCPRO. And although almost everyone in the media industry has used one or the other, there are some basic misconceptions about DV. Ranging from complete scorn and contempt from the 'uncompressed' and '4:2:2' crowd, to unabashed adoration from parallel [this is the technological equivalent of *avant-garde*] film-makers.

Let's bust some of these myths.

Myth 1: DV is not broadcast quality

With Digital TV, MPEG-2 for broadcast, and news channels needing to get news-worthy content up fast, previously held concepts of "DigiBeta or Beta or nothing" for broadcast are wearing thin. These days, if you attend any press event or press conference, there would be at least a dozen TV news crew, taking aim and shooting with *PD-100*, *PD-150*, *XL-1*, or *DVC7* camcorders - all shooting on miniDV or DVCAM. In fact, a news crew holding a Beta or *DigiBeta* camcorder actually draws stares.



So instead of broadcast-quality or not, we should be terming media as *broadcast-able* or *broadcast-worthy* or not. And DV may or may not be broadcast quality for those wearing a vectro-scope round their necks, but broadcast-able it definitely is!

All that matters is content. Have a shot of an airliner slamming into a skyscraper? Yes? But it's on DV? Ok, now show me a channel that'll refuse to air it because it's not '*broadcast-quality*' material! On the other hand, shoot a dull inconsequential social event with no celebs, on *DigiBeta* and show me a channel that'll take it.

Myth 2: DV is better than Betacam

As an analog medium with analog component ins and outs, component processing and storage, and the other bells and whistles, Betacam is superior as a storage medium than DV. Because of its

uncompressed nature, it holds up better to post-production processing.

But DV is a close second. And if used carefully in post with due care to route all signals digitally, it holds up to post processing every bit as well.

Myth 3: DV is not good for keying

Not really. It's true that DV's sampling [4:1:1 for NTSC and 4:2:0 for PAL] does make it more difficult for editors to pull a good matte from it as compared to Beta or DigiBeta - but a majority of our chroma shoots have this sloppy look about them, which leaves most of the hard work to the post! Keying is as much a production process as is a post-production one.

If you take the normal or even a bit extra precautions about lighting, shadows etc, you can key DV stuff pretty well. The default keyers in both Apple *Final Cut Pro* and Avid *XpressDV* are decent. But if you want some *dhaasu* [or *wicked*] keying, take a look at Ultimatte's *Advantedge* or DFT's *zMatte*. You can get used to them. DV's lower chroma sampling has been blamed for poor keying in DV. But with advanced processing techniques used in *Advantedge* and *zMatte* and with lots of settings to tweak, one can pull very clean [and broadcast-quality] keys from DV footage.

As an aside, the venerable Panasonic *MX-50* vision mixer used to process internally at 4:1:1 - the same as DV.



Keying with Ultimatte

Myth 4: DVCAM is better than DV

DVCAM and miniDV have exactly the same signal as on tape except that the tracks are wider in DVCAM, making it more robust for repeated playback. With NLEs, this is almost a non-issue as we seldom run a tape more than once. DVCAM has user settable time-code which DV doesn't. This doesn't help the image, maybe just the work-flow. And most DVCAM camcorders produce 'locked' audio, which makes it easier for the NLE to maintain video-audio sync.

Also, the camera part of some DVCAM camcorders is noticeably superior. For one, they are all 3 CCD machines. They all have component processing of the CCD-captured image until recording to tape. They offer better white-balance, focus and exposure control than most consumer camcorders, which in its own way, contributes to better images. Exceptions to this would be the Canon *XL-1* or *XL-1S* and Panasonic *DVX-100* - both miniDV camcorders.

So DVCAM as a medium may not be much better than miniDV, but many DVCAM cameras are. Some say *zameen aasman*, but I'd be a bit more conservative. Not even *unnis bees*, but slightly more.

Myth 4: MiniDV on DVCAM tapes is better than miniDV on miniDV tapes

miniDV is identical whether you shoot it on a miniDV tape or a DVCAM tape. Similarly, if you place a miniDV tape inside a DVCAM camcorder, it will shoot every bit as well as DVCAM. The only difference is in duration. A miniDV 60 min tape will run for 40 mins in a DVCAM camcorder set to DVCAM mode. Conversely a 60 min DVCAM tape will run 90 mins in a miniDV camcorder. And of course, a miniDV 60 min tape will run 60 mins in a DV camcorder.

Myth 5: DVCPRO is better than DVCAM

The internal signal in DVCPRO, DVCAM and miniDV is all the same. But DVCPRO and DV cassettes are physically different, so they are mutually incompatible. However, most DVCPRO camcorders are high-end machines, some with 3-CCD imagers. Hence it would be hard to find a bad image from a DVCPRO camcorder. miniDV camcorders on the other hand can easily produce really bad images especially with low end camcorders and lower end cameramen!

DV: What's the big deal?

What makes DV so revolutionary is not just the size or quality of the little camcorders, but the integration of this technology into non-linear editing. Underneath DV is a new technology called *FireWire* or *iLink* [IEEE-1394 port in pure technical terms]. This little connector is built into most camcorders.

Before DV and FireWire happened, to edit video, one had to equip one's computer with an analog capture card. Then connect to a video source like a camcorder or VCR and capture video to disk. The card compressed the video big-time, before storing it on the hard disk. This made the quality anything from just about tolerable to abysmal. I'm talking about 'normal' computers and 'normal' hard disks. High-end systems like Avid and Media 100 managed good quality because they used capture cards with high quality compression that cost many millions, besides SCSI hard disks with SCSI controllers. And you had to be a geek to keep all this running. So before DV, video film-making tools were unaffordable.



Before DV, all these went into your computer before you could make it edit-worthy

FireWire on the other hand is available on all new Apple computers, some PCs and can be easily fitted into most PCs. Digital video and audio from the *FireWire* connector of DV camcorders has a data rate of 3.6 MB per sec. Meaning, you can store this on 'normal' IDE disks. You don't need costly and complicated SCSI hard disks and their controllers.



In these DV camcorders, picture is compressed at about 1:5 and recorded to tape digitally. The quality is amazing and comes close to Betacam, or high-end broadcast video. Each GB gives you 5 mins of DV quality video [and audio], i.e., you pop in one 120 GB hard disk [costing about Rs. 6000] and you can store 9 hrs of DV on your disk.

And when you connect a DV camcorder to an NLE and capture video and audio, you are copying digitally [like how it happens in file transfers between computers or hard disks], so there is no generation loss like in analog transfers. And the same *FireWire* cable carries

With DV you just plug in your camcorder to your computer

audio, timecode and tape control signals as well. So the software knows where each part of your video is stored on tape.

You can capture to tape, edit, add effects and then dump to tape with no loss of quality. And even if you delete all the video and audio off your hard disk, you can recapture or batch capture all the stuff back automatically.

So I'd say the big deal about DV is that it allows you shoot on a tiny digital camcorder with amazing video quality and then to edit films with the same amazing video quality, on an ordinary desktop computer with a huge range of NLEs to choose from!

DV made video film-making tools affordable to anyone who can afford a small car or sometimes even a good bike. And with the quality and ease of use that DV offers, even if you select one between the two, you'll be happy. And you don't need a license to 'drive' DV. And you can drink and 'drive' [DV]! And you can never kill anyone [with DV]! Er... well... I'm not so sure about this one!

About Neil Sadwelkar



Neil Sadwelkar has little formal training, so he just about makes a living in the film & TV industry in India. His profession is a higher form of meditation through which one can deny hunger and sleep - it's called editing. In his spare time thinks hard and writes stuff like this piece above. And in whatever time is left over, he does his own accounts and chases clients for money. As you must have noticed by now, he is also shamelessly besotted with Macintosh machines and considers them as God-sent gifts to man kind!

He builds and tinkers with computers, so some people get conned into believing that he knows a lot about computers and editing software, so they even pay him as a consultant. Really! If you love what he's written you can drop him a line at neil@misenscene.net and tell him he's the greatest. He even has a web site dedicated to Final Cut Pro where you can take in more of his writings.

If you're a budding editor you can make him feel good by asking for advice. But if you're looking for work, don't bother because he doesn't have contacts. And if you really hate his writings, write to him and give him some work, so he has no time to write stuff like this. But don't make him chase you for money; else he'll go back to writing.