

# Showreel

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Sony's F23 is one of the most widely anticipated cameras of the moment. Available shortly after NAB, this top-of-the range addition to Sony's camera range is not just a replacement for the F950; both its styling (on-board HDCAM SR recorder that can be top or back mounted) and its spec (full 1080p24 4:4:4 recording) telegraph that this camera is firmly targeted at the major motion picture market.

Although the production model wouldn't be arriving in the country until shortly before NAB in mid-April, a few weeks earlier a single preproduction model was discreetly flown into Los Angeles under cover of night and delivered to BandPro in Burbank. From there it was handed to Fred Meyers, perhaps best known as HD camera supervisor on *Star Wars II: Attack of the Clones* and *Star Wars III: Revenge of the Sith*. His mission was to test the camera alongside other digital cinema cameras, as well as film, to help the producers of a forthcoming motion picture determine which camera they should use for acquisition.

I caught up with Fred shortly afterwards. "The test was presented to me like this," he said. "The production company had a project and they were keen to find a look that could leverage some of the characteristics of digital capture. These included low noise, saturated colors and increased depth of field. The film is going to have an intentionally layered look, created by live action in the foreground and layers of photorealistic CG in the background, using a look that goes back to old animation and rostrum techniques. Therefore, there was a specific look in mind, so testing digital

cameras was suggested. We also put film material through the same process, as both a control, so that the results of the test could be judged in context, and also to test the quality of the digital cameras, because staying with film hadn't been ruled out.

"Early on, we'd discussed which digital cameras to test. They wanted to check out 4K cameras, they wanted to check out 2K and HD cameras; they wanted to check out cameras that used 35mm-equivalent large sensors, and they wanted to check out 2/3in HD sensors. They also wanted to check out high-speed cameras, and both datacentric and videocentric systems. I fielded this big list and I said, 'well, here's what I know about these cameras and here's what doing a test with them would entail – and what completing a fairly big budget, effects-heavy, high expectation project would entail'.

"As it turned out, a couple of the cameras just fell out because they were considered similar to others – or at least there was an assumption that they would offer similar performance. So there were a few cameras that we tested only at the kind of chart/techie level, and then on the main test day, the digital cameras that were available were the Sony F23 and the Arri D-20, alongside a couple of film stocks.

"Prior to that there was also a Viper involved, but some of the rejection decisions had to do with how much time and resources the directors and studio were able to put into the test. Decisions were made that were non-technical in terms of throwing a few cameras away on the actual day. I've always been keen on looking at all the potential cameras, but at the same time, I know some trade-offs have to

made in terms of good quality versus resources expended. For example, the 4K path with the Dalsa Origin and the transition the company is now making to the next generation was certainly of interest, but it ended up bowing out. There were PL-mount possibilities too, such as the Panavision Genesis, but for this project they were looking for increased depth of field. You can see the depth of field you are going to get with 35mm film, and you can see what you are going to get with a D-20, so we didn't necessarily have to see a Genesis as well to test that characteristic. Clearly, not all large format cameras are the same, and not all 2/3in chip cameras are the same, but some decisions were made on a kind of expediency.

"They wanted a wide depth of field and this is something the smaller 2/3in sensors offer. There's an interesting thought process whereby, aesthetically, the narrower depth of field offered by large format cameras has been considered the Holy Grail for digital cameras, with the wider depth of field offered by 2/3in chip cameras being considered a flaw. However, for some people, the opposite is true. You can easily run into a situation where it's actually a disadvantage in post to have reduced depth of field, particularly when you are creating heavily layered composites. With the techniques now available, you can throw things out of focus very accurately in post, or create a look that wouldn't be possible if you started with limited depth of field. It's a different spin and certainly one that I find intriguing. You can see new thinking and new techniques evolving out of digital cinematography, and wider depth of field is where the

Sony F23 with SR mag top-mounted, film camera style.

future lies.

"With the two digital cameras and the film cameras we tested frame rates and over/undercranking, plus post and VFX wanted to explore the response characteristics of the cameras, as this would be very helpful for the look they would get in post. For both the charting and actual scenes we were shooting, we used some hero Zeiss lenses on all the cameras – Master Primes for the PL-mounts and DigiPrimes for the 2/3in cameras.

"There was a fork in methodology that presented itself. Some of the vendors are looking at very filmcentric pipelines that use log encoding, which is currently used in film post. While that is a well established workflow, it isn't necessarily the best for digital source material. As many post houses are now realizing, it's good to remove the encoding that's used in-camera. Whether you are talking about a log response curve or a log curve that's built into a film scan, that's some form of encoding, in the same way that gamma encoding, which is common with video systems, is used to get the sensor response down to a manageable amount of data. So what I suggested they do is look at what is capable now with some of these cameras using gamma encoding, because it has an advantage in some areas of the workflow in that it doesn't require very sophisticated viewing tools. It's more of what you

see is what you get. With either log or gamma encoding, if you have the information about how that encoding took place you can de-encode it, linearize it (put it into floating point color space) very easily. So the guys in post were all over that. Everything up to the point where it would have gone to a film-out was going to be happening in high dynamic range imagery. So this meant we could talk to Arri or Sony and we could get curve data from the camera so that all the evaluations would be done in linear scene intensity space, which is a great – it's floating point, greater than 16-bit, and it really shows you exactly what the sensor captured. Sony and Arri were very up-front with what the actual responses were from the cameras, so it allowed us right there on the set to get the information out of the camera as we were shooting and take it out to linear intensity space so that we could test the quality of the extractions from

the green screen, or we could test the ability to color correct or blow up the image. What that

**Sony F23 camera with back-mounted SR mag, camcorder style.**

meant was that we were able to put a curve in the cameras that showed what gamma encoding and/or log encoding was able to do, and then

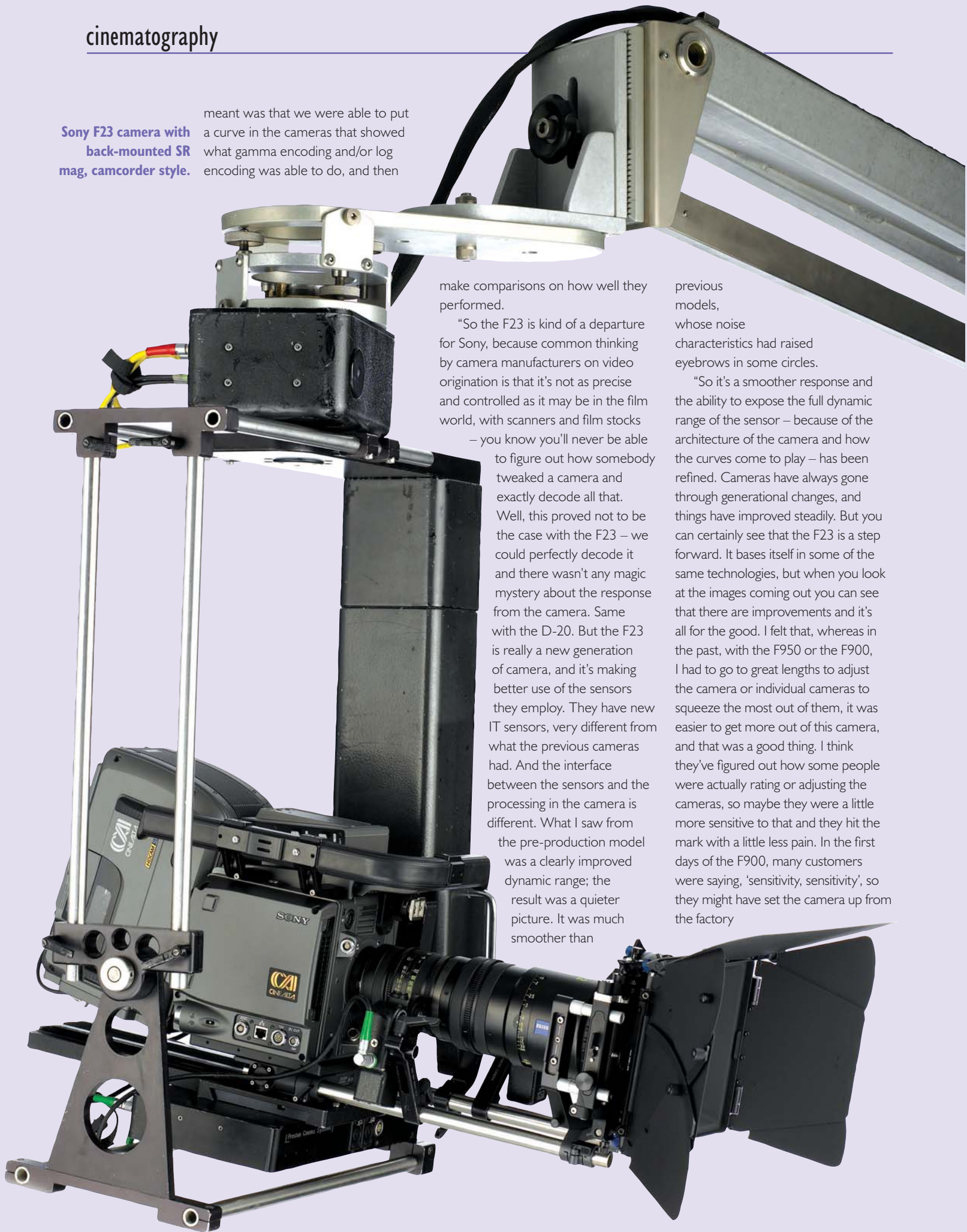
make comparisons on how well they performed.

“So the F23 is kind of a departure for Sony, because common thinking by camera manufacturers on video origination is that it's not as precise and controlled as it may be in the film world, with scanners and film stocks

– you know you'll never be able to figure out how somebody tweaked a camera and exactly decode all that. Well, this proved not to be the case with the F23 – we could perfectly decode it and there wasn't any magic mystery about the response from the camera. Same with the D-20. But the F23 is really a new generation of camera, and it's making better use of the sensors they employ. They have new IT sensors, very different from what the previous cameras had. And the interface between the sensors and the processing in the camera is different. What I saw from the pre-production model was a clearly improved dynamic range; the result was a quieter picture. It was much smoother than

previous models, whose noise characteristics had raised eyebrows in some circles.

“So it's a smoother response and the ability to expose the full dynamic range of the sensor – because of the architecture of the camera and how the curves come to play – has been refined. Cameras have always gone through generational changes, and things have improved steadily. But you can certainly see that the F23 is a step forward. It bases itself in some of the same technologies, but when you look at the images coming out you can see that there are improvements and it's all for the good. I felt that, whereas in the past, with the F950 or the F900, I had to go to great lengths to adjust the camera or individual cameras to squeeze the most out of them, it was easier to get more out of this camera, and that was a good thing. I think they've figured out how some people were actually rating or adjusting the cameras, so maybe they were a little more sensitive to that and they hit the mark with a little less pain. In the first days of the F900, many customers were saying, 'sensitivity, sensitivity', so they might have set the camera up from the factory



with sensitivity, which might have been at the expense of the dynamic range.

"Typical of Sony, they've got a preproduction model that is working very well. I think it was good for them to see what we were able to do with the pre-production model. For some aspects of shooting, the production wanted a camcorder, but the bulk of the material was studio work, where there's no real advantage to having the camcorder. The fact that the F23 could operate either as a camcorder or by remote recording in an engineering tent was something the production immediately gravitated towards.

### Data and SR

"I suggested to the production that they make their own independent decision and look at what the ramifications are of a datacentric workflow, as opposed to or in conjunction with a tape-based workflow. I'm fully aware of what compressed and uncompressed is, but at the same time I'm also aware of what actually ends up on the screen. As it turns out, if you're shooting a lot of process screen, the compression used by SR is not really being stretched at all, and you'd be pretty hard pressed to see any difference between an uncompressed foreground element and a compressed one recorded on SR. That said, there are many things that are expedited by having a file-based workflow on set. So there may be other factors that drive the decision on how they complete the project. So we did make some evaluations on test material of compressed versus uncompressed, but the result was that there was nothing lost at all when going with SR. And, of course, the F23 can record to tape or disk, or both.

"We shot both inside and out, actors, animals and children. We docked and undocked it, and I think it should satisfy many people in that it looks more like a film camera than a video camera. You can mount the SR unit on top, like a film camera, or on the back like a video camera. It certainly gets cluttered up like a film camera, with all the peripherals, whether it's focus rangefinding, auxiliary monitors, jib arms, cranes. We got to see pretty quickly how the widgets and accessory

adaptation come to play. I have a sense that people are going to look at it and say, 'this as a motion picture camera'.

"I feel Sony listened to what the film camera guys were asking for and swung quite a way, if not all the way, in that direction. The F23 is clearly going towards film styling, with multiple ways to mount the magazine and handles and buttons on appropriate sides of the camera for operators and assistants, unlike the F950.

"There are enough tracks for audio production, although I would anticipate this project not having the recorder on the camera for most of its application. But there is a big advantage for editorial to sync the sound. I highly recommend recording the sound with the image, whether it's to the on-board recorder or remote recorded to a studio deck or disk systems. In the rigs I put together we had audio everywhere. It's digital audio and the format is capable of 12 channels of 24-bit audio, so there's no reason not to use it.

"Comparing the two digital cameras, the D-20 had the reduced depth of field of the 35mm camera, and this was immediately apparent. But the D-20 has a single-chip Bayer pattern sensor, whereas the F23 has a three-chip CCD prism system. What was apparent was that the new prism and alignment of the three chips in the F23 was improved from what we've seen before. Whereas the Sony didn't come top in all resolution measurements, taken in all, the F23 did edge out the D-20, and that was apparent right there on the set.

"In terms of other qualitative tests – resolution and dynamic range chart tests, for instance – these have to be viewed in terms of the gamma encoding they wanted to use (in other words 'optimized', not textbook gamma encoding, not REC709, but a modified gamma curve that captures the entire range of the sensor). Given how that was implemented in the D-20 versus the F23, the Sony did a better job, where the dynamic range was noticeably better. The chip design also meant that the sensitivity of the F23 was noticeably greater than the D-20, so to get an apple to apple

comparison you have to throw quite a bit more light to get the equivalent output from the D-20.

The ability to control and get the response out of the camera, and by control I mean what you can access remotely by setting the camera up and by loading curves into it and getting it to do what you want it to do, there was a fair amount of work to do with the F900 and F950. Working with these cameras for Lucasfilm involved either using custom control software and/or custom curves for the camera. That required a fair amount of work outside of Sony, but control also involved internal readjustment of setting in the camera, such as gain structures. I'm not saying that some users might not want to add some of that customization to the F23, but it seemed like it was already much closer to the best it is capable of. The F900 and F950 are good performers, but you have to spend a lot of time with them to get the best out of them. With the F23, it's going to be a good performer without you having to do quite as much.

"What I enjoyed about the test was that before we even got to the stage where we shot with the talent and directors, it was great to get Arri, Sony and others together, with nobody trying to hide anything from each other. They were also a bit more open to trying to do best practise with their cameras. Most manufacturers have recommendations on how their cameras should be used. You get people in certain camps – you know, 'you should be using a certain Filmstream mode' or this or that. But the people who turned up to the tests didn't feel compelled to stick with the company line on how they should be set up. They were more flexible. So that made it a really enjoyable test."

So what was the final result of the tests? Well, even though the camera was a preproduction model, and despite no official announcement being made, it looks like the production company is going to go with the F23 over film and its digital rivals. So the camera has its first big budget feature even before it's been released. And that has to make the developers happy.



**Steve Parker is editor of Showreel magazine and co-founder of Showreel Publishing. He has been a journalist and photographer since 1987, specializing in photography, video, broadcast and film. He has written several books on photography and video and has been technical consultant on TV series Shoot the Video and I Camcorder for the UK's Channel 4.**