

# The 6sight Report

THE FUTURE OF IMAGING

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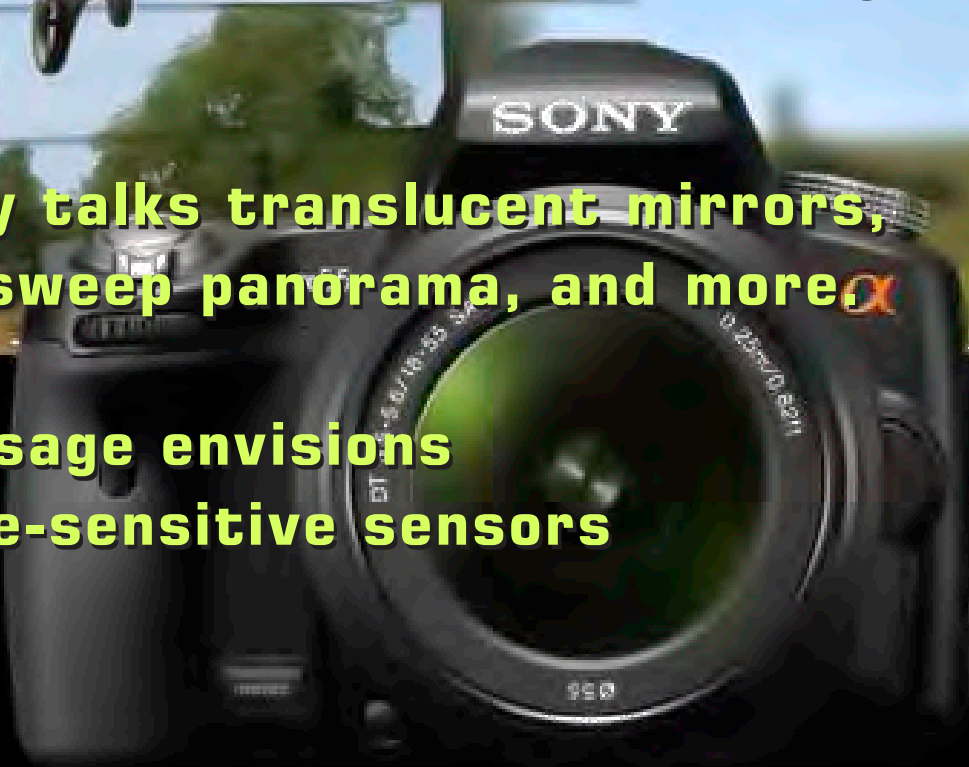
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## Shooting Better, Faster

Computational Photography  
and the FrankenCamera:  
Stanford Professor Marc Levoy

Sony talks translucent mirrors,  
3D sweep panorama, and more  $\alpha$

InVisage envisions  
more-sensitive sensors



# New Imaging Technologies in the spotlight at 6Sight

In its **New Technology Showcases** this year, the **6Sight Future of Imaging Conference** spotlights eleven innovative companies developing the latest in photographic technology.

**CyArk** is a non-profit using LiDAR (Light Detection And Ranging) technology to precisely record and digitally preserve world heritage sites.

**InVisage** has created a new medium for photographic image capture that may supersede silicon.

**Memjet** developed what may be the fastest ink jet printing technology ever invented, and demonstrate a print engine for commercial photo printing.

**Microsoft** will showcase Windows Phone 7, a new operating system redesigned from the bottom up for these phones.

**Gallery Blocks** will present solid wood gallery blocks that can be arranged to create a three-dimensional piece of art.

**Nocturnal Vision** uses spatio-temporal smoothing technology helps video cameras see in the dark.

**Pre-View** promises full-screen interactive panoramic imaging.

**Raviteq** develops applications for the creation, viewing and sharing of mobile multimedia, including photo, video, sound and music.

**Scalado** combines its software and hardware technologies on existing

mobile platforms to accelerate imaging.

**Silicon Hive** will feature high-performance imaging and video processing technology.

**Tracer Imaging** will launch its consumer 3D print service called TracerPix.

Other participating companies at the 6Sight conference include **ABBYY, Adobe Systems, Animoto, Eye-Fi, Lustre Color, metaio, Movidius, Muvee, Northwest Professional Color, Pelican Imaging, Photo Create Pty, Portrait Displays, Roxio, Scalado, Soviet Montage, Tessera, Toshiba, Total Immersion, YDreams, and YOUReality3D.**

The conference will present analysts from

**Brownstein & McCabe Associates, GfK, IDC, InfoTrends, Jon Peddie Research, Lyra, Maveron, NEA, Newforth, NPD, Photo Imaging News, and Soquel Group.**

Also, speaking at the included **AIE Output Summit** are executives from **HP, Kodak, Fujifilm, Memjet, Walgreens, Whitehouse Custom Color, H&H Color, and RPI.**

6Sight is the imaging technology conference for **PMA**, the Worldwide Community of Imaging Associations.

The event is Nov. 15-17, 2010, at the Sainte Claire Hotel in San Jose, Calif.

Visit [6Sight.com](http://6Sight.com) for the latest information about the conference. We look forward to seeing you there.

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# ***Computational Photography and Camera Evolution:*** **“FrankenCamera” points to open platforms** By Paul Worthington

Computational photography uses advanced algorithms and processing to take imaging far beyond the mere replacement of film with digital sensors we’ve seen so far in camera design.

**Marc Levoy**, professor of Computer Science and Electrical Engineering at **Stanford University**, explains why it is an important growing field, and how his FrankenCamera project embodies the ideal of open capture devices that can be customized, expanded, and upgraded.

## **COMPUTATIONAL PHOTOGRAPHY**

What is the state of the art for computational photography? How’s that changed in the last year or so? What important developments lead to where we are today?

Computational photography as a field has been developing for five years or so, and at this point has drawn together threads from computer vision and existing image processing work that has been going on in SIGGraph, the Special Interest Group for Graphics of the ACM. At this point, about 30–40 percent of the papers are about computational photography, whereas five years ago that number was zero. It’s becoming one of the major research emphases at the major graphics conference in the country, and a major part of computer vision conferences as well.

**Is the growth enabled by faster imaging processors in cameras, or as, with a camera phone, people carry little computers with them at all times?**

I think a better way to characterize the whole field is people are interested in what can be done to improve photography. They weren’t thinking very much about platforms.

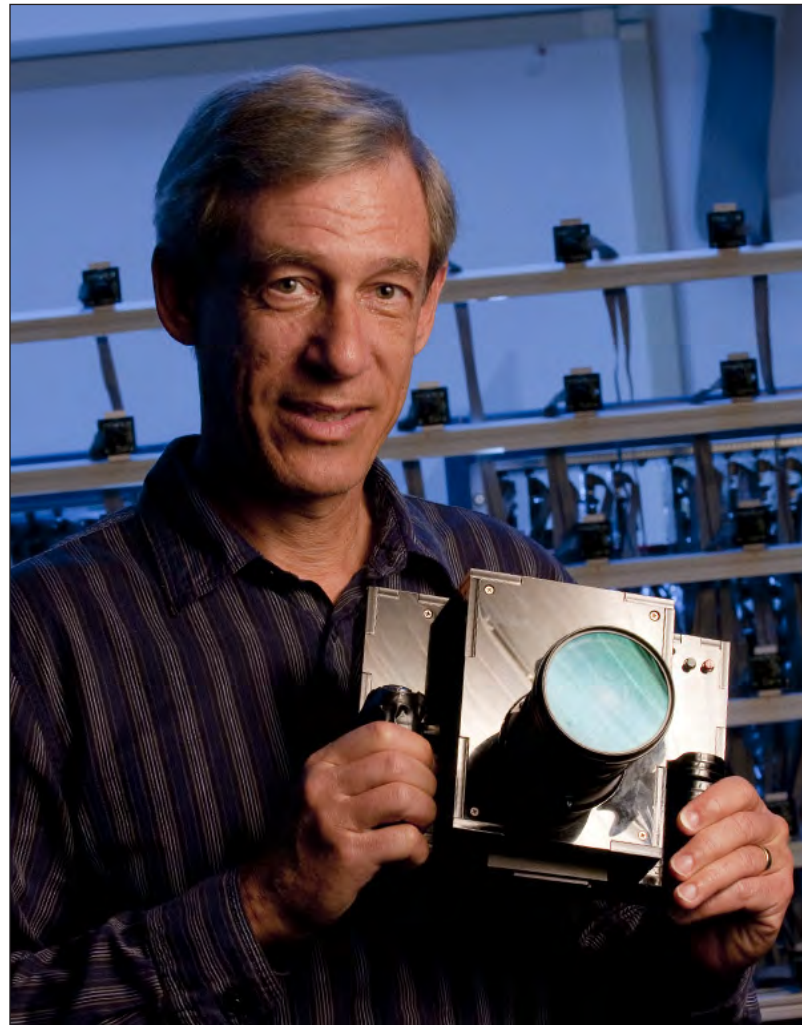
In fact, a lot of the early experiments were done in the laboratory, or they were done with SLRs tethered to laptops.

Initially most of the growth came because increasingly powerful SLRs could take really good pictures.

But as people started to see what happened in the mobile space, and with point-and-shoot cameras, they got even more excited about the field, hoping eventually they could affect those devices. That has driven more researchers into the field.

**Have they affected those devices? If you were to talk to a man on the street who has a pocket camera, can you point out examples to them of how they are experiencing the effects of computational photography now — or is that still in the future?**

No, that has been the frustration in the field, and that’s the



reason why we started this project. In 2005, I led a town-hall meeting at a conference of my colleagues in the research community, asking, “How are we going to affect cameras? We’re not successfully doing it yet.” And five years later, the story has barely changed at all, and it’s becoming embarrassing.

The most mature example of computational photography is arguably high dynamic range imaging — taking a burst of photographs and combining them together to make a single photograph with darker darks and lighter lights. The technology for that has been known since the late 90’s, but it’s just starting to feature in cameras this year.

**Would not that embarrassment be the camera industry’s? The smartest camera out there now is a phone, and what we think of as high-end professional cameras are still as “stupid” in many respects as they’ve ever been.**

Right. It's not to say the SLR makers have not been innovating; they have been, within their domain, which is somewhat hardware-intensive, rather than software-intensive.

They've also been very cautious about affecting the brand quality in any way. The idea of experimental software, or software that might not be 100 percent robust, is anathema to them. That's a reason they've been resistant.

Another reason is they just don't understand or appreciate the idea of an open ecosystem, where people could download plug-ins, as we do now with the app store for the iPhone, for example.

I had a team come in from a major camera maker, and I talked to them about the idea of opening up their platform and perhaps allowing plug-ins to be loaded into it. And they said, "Well, what happens if someone takes a bad picture with one of those plug-ins; they'll bring our camera back into the store for warranty repair!" And that just shows a lack of appreciation of the way the whole computer industry has gone. If an app crashes on my iPhone, I don't blame Apple. I know who wrote the app; I blame the developer. And that lack of appreciation is delaying the acceptance of computational photography, or programmable apps for cameras, among the mainstream camera makers.

**Did you point out to them the most popular camera by many metrics is the iPhone — and people are using apps and they're not complaining to Apple if their pictures don't come out well?**

Yes. But it was an Asian camera manufacturer, and I was talking to their American branch, which was more appreciative of this difference than I think their headquarters would be.

**If you had complete access to the underlying computational hardware in a camera, and the ability to tap into an operating system, what would the existing camera hardware allow you, as an experimenter in this area, to achieve?**

That is a hard question to answer, because it's not publicly known exactly what the hardware is. What is inside a DIGIC chip is proprietary, for example, in the case of Canon. It may be some of what's in there is too specific to the way they currently process photographs, and we would need more generic hardware. But Moore's Law is on our side there: Increasingly generic computational resources will allow you to do good photographic processing. And so

opening it up for more programmability seems like a natural future.

**Then let's talk about what you are able to do with the open cameras that *are* on the market — those open cameras being the phones. Specifically, you're working now with a Nokia N900. You're working with Nokia's research center in Palo Alto, Calif. Did you chose this hardware because of the alliance with Nokia, or because there's something in particular about that phone — like it runs on Linux — that makes it more open than other phones?**

All of the above, actually. It was a contact with particular researchers in Nokia; it was also the fact their Linux phones are a bit more open than some other platforms. It was also the fact the camera module inside their phone was a bit more programmable than some other camera modules, and so could expose, for example, moving the lens back and forth to be able to focus.

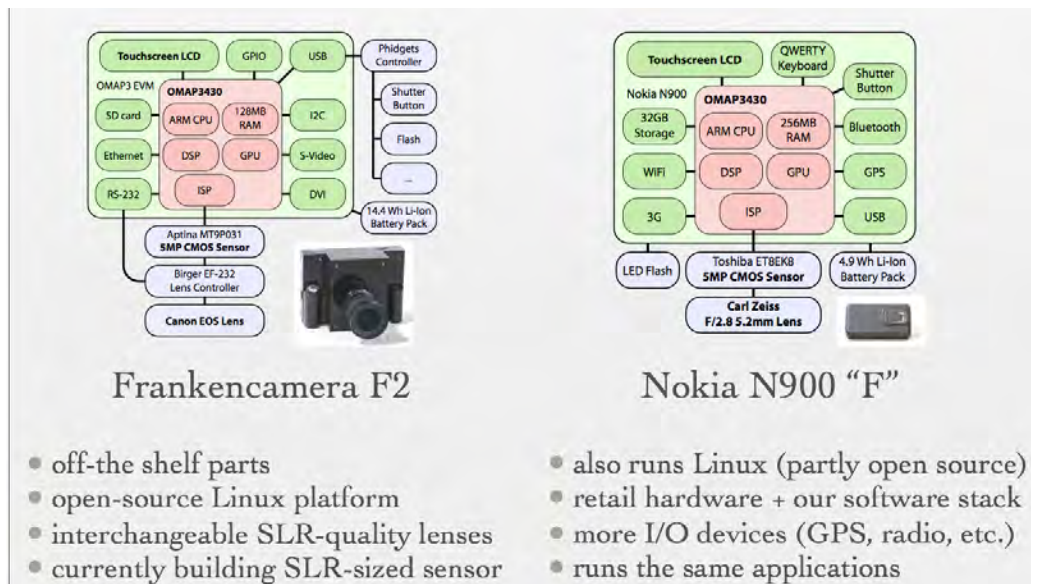
It was also good because it had the Texas Instruments' OMAP system-on-a-chip in there, and TI is a little bit more open than some of the other vendors of the systems on the chip.

So it was a little bit of all of the above that made it a natural platform. All the components in the entire stack were more open than some other choices we could have made.

**How did you address the challenges of computation photography with the FrankenCamera platform?**

Our first step was to try and define an architecture that would allow more flexibility in the camera. Even before we defined an implementation on a particular platform, the key intellectual breakthrough from our point of view was this architecture.

What's unique about the architecture is it lets you change the settings on every single frame, at the maximum possible frame rate the camera can provide — and there's no existing pro-



gram or interface that lets you do that on other cameras. For example, on an SLR, if I want to take a burst of pictures, changing the exposure time on every frame — you can't do that. You can attach a Canon or a Nikon camera over a USB line to a computer, and you can, say, set the exposure to a 60th of a second; take a picture. Then if you immediately say, oh, now, change the exposure to a 30th of a second and take another picture, you'd better wait a second before you issue that second command or the software will freeze, or you will only get one frame where you wanted two. There's no notion of doing a burst with different settings for every frame.

For computational photography, a lot of it is "change setting X, do a burst of frames, and somehow combine the imagery to improve the image along axis Y" — where X could be exposure, ISO, white balance, aperture, something else, and Y could be noise, low-light sensitivity, focus, or extended depth of field. And to do any bursts like that, you have to be able to change the settings very fast, take a burst of pictures, and then when you get the pictures back from the image processing pipeline, know which one was done with which settings.

And so that was the key behind the FrankenCamera architecture.

**What is it you are now offering, with the downloadable version of the FrankenCamera platform? A downloadable application that can make this Nokia camera phone fully accessible, in a way no other capture device has been on the mass market previously?**

I would put the emphasis on the intellectual step of defining a different kind of a pipeline, with requests that have settings to go into a pipeline, and then an API we built around it for controlling a camera — and only then the fact we built two example reference platforms, one of which is the Nokia 900. But they were really simply examples of the architecture and the API, and they could have been differently chosen examples.

**Who do you expect to work with it? Scientists such as yourself, higher-end enthusiasts, or will anybody with a Nokia camera phone eventually try out, in the same way they try out an app on their iPhone?**

The emphasis is not the particular device we've reprogrammed, it's the API, and the notion cameras should be programmable. The Nokia is just an example. And I realize the Nokia 900 is not a very popular smart phone, and so not many people will download it and do anything exciting on the Nokia 900. Some people will, certainly; we're hoping a lot of people do, but we also recognize it's not one of the leading smart phones.

But we're hoping other camera makers look at this API and say, "You know, we could make our camera on our smart phone programmable as well," and that would actually open up a new marketplace of apps for cameras. That's what we really want to see happen.

**So this particular download is more of an embodiment of the idea, one you hope spurs other people to put the idea into practice?**

Exactly. It's a proof of concept, and we're hoping to see it happen across the board in the mobile space — with the idea it would urge the makers of point-and-shoot cameras, and then eventually of the higher-end cameras — SLRs or equivalent — to begin to open up their platforms. That would be the ideal outcome.

**For years everyone has said the camera phone will impact sales for standard standalone cameras, and the camera makers often replied, no, they would always deliver superior photographic quality, or some other aspect would maintain their sales advantage over phones. That has proven to be true all this time.**



Ambient

Flash

Result

**But that gap is narrowing, and now we have phones with a very distinct advantage: Applications the cameras can't provide. I think they're going to have to match that in some way — and you're providing them an avenue to do so.**

Right. Let me give you a specific example of an app that may be somewhat beyond the current scope of what people are talking about in computational photography. Suppose I wrote a little app that replaced the autofocus on the camera. That's not something you can do with an SDK or the Canon hack development kit, or any current user-programmable way of changing a camera.

But the FrankenCamera API allows it, and, in fact, when I handed out Nokia 900s to all the students from my computational photography course, the first assignment was: "Replace the autofocus on this camera. Write your own autofocus algorithm. We're going to grade you on how accurately you can focus on a particular test scene, and how fast, in milliseconds."

Now that's not a challenge a teacher could have ever given a student before, but it's something the students had a whole lot of fun with. So now if you imagine we can replace the autofocus on a camera, what could a third-party developer do? Well, for example, they could develop an app for "soccer-ball focus" that would always recognize and focus on a soccer ball. That's going to be just perfect for soccer moms, and they're going to download the soccer-ball focus app into their camera or mobile platform before they run off to shoot their daughter's game. That's really going to allow them to produce better pictures for that one narrow domain than you could with a much more expensive camera.

That's an example of where an app developed by a third party might force the hand of a maker of a more expensive camera.

**So the current download will go to scientists and experimenters such as yourself and your students — and if the next step you envision takes place, then this technology is used by application developers in the same way they're now developing apps for phone platforms.**

Yes. Anybody can take a retail N900, download our software, and begin writing these apps, but they probably won't find a huge market, just because the Nokia 900 is not a huge market. Nokia's next phone might be, or perhaps Google or other players will begin to make a more programmable interface for the cameras in the Android space, and that's much bigger. And of course iPhone is another example. If they begin to make their cameras more programmable, then the impact of this idea will grow.

**If in five years this idea has developed and is used by the average photographer, what they will be able to do with their cameras they aren't able to do now?**

In the short term, there are standard computational photography algorithms that have not yet been brought to a real platform. High dynamic range (HDR) imaging is the example I

mentioned earlier, and Sony and some other camera makers are almost on top of that one. Panoramic stitching is another example that's beginning to show up in cameras.

But if you look at the computational photography literature, there are lots of other things people have been working on that might be implemented on a commercial platform. "Flash/ No flash" is an example, where you take a picture with flash and one without flash and try to combine the best of both to get the low noise of having the flash, but the better color balance of using the ambient light.

People have worked on a variety of ways for extending the depth of field. There's been work on micro-lens-based refocusable cameras, and we'll certainly see that, but that requires a real change to the hardware, not just the software. But taking a set of photographs focused at different depths and combining them in some way to create an extended depth of field image might be another one.

Removing the blur caused by hand-shake: That's a big research area now. There have been a lot of proposed techniques: One is to do what's called a deconvolution, which removes the blur by just looking at the blurred image.

Others might use the accelerometer and the gyroscope in a mobile device as a guess of how you shook the camera, and use that to remove blur. If the high-level camera manufacturers are not working on this, they'd better start, or else they're going to be blindsided from below. Especially as there's now a six-axis gyroscope/accelerometer combination in the iPhone.

Other approaches are to take a long shot that will be blurry, followed by a short shot that will be noisy but show where the edges and high-frequency information is in the scene, and use those jointly to remove the blur in the longer shot.

So it's a very active area of research, and another example of what you might see within the 3–5 year time frame.

And if it only starts to show up on the low end, those lower-end cameras are going to start to produce pictures that are very good. Not to say it will always be a better picture than a Nikon or a Canon, but it will allow people to take pictures in situations where the high-end cameras couldn't take a picture and people will see added value.

**I think that's going to be a clear differentiation. It doesn't matter if my \$3,000 SLR can**



**get a great picture if I know how to skillfully use it in great lighting situations. I want a camera to deliver the best picture of the situation that's important to me.**

Right. Another very active area of research is video stabilization. People are beginning to come up with very good stabilization algorithms. Some of those are beginning to appear in iMovie and Adobe Premiere and so on. Why not in the camera? Maybe I won't even download my video to my desktop PC; maybe it'll just go right to the cloud or maybe YouTube. I'd like to see what it looks like stabilized, to see whether I got it. I'd also like to see it right then while I'm taking the video, so I can decide whether I need to take it again.

I expect there'll be a whole marketplace of people proposing different stabilization algorithms, and maybe app stores with different kinds of stabilization, and so that's another possible marketplace for computational photography.

**Many of these ideas are practical on existing hardware — the higher-end processors on phones can handle that type of computation. But can they handle it at 30 frames per second? Can a phone ever do video stabilization? Is that possible on current hardware, or is it also five years out?**

I agree with you, that's the next step. It's more challenging than still processing. Of course, current platforms with an electronic viewfinder or LCD do real-time processing to some extent or they couldn't display a viewfinder image. But they don't do it at the full resolution of the captured image. But that will happen, over time. That's Moore's Law, and Moore's Law is definitely in our favor here.

**What obstacles might prevent achieving these goals? The current technology is capable of many of the goals you have in mind — your concept download proves that. Is it getting the various pieces of technology already in the field to work together in a smooth and accessible way? Again, you seem to have proven that's not the obstacle: You're doing it.**

**So are the obstacles either a problem of "Pull" — consumers aren't aware of what these capabilities could deliver, therefore they're not asking for it — or "Push" — where the real obstacle is getting the camera and/or phone companies to wake up to these other possibilities?**

It's a little bit of the last two things. There are a few things, however, that are hard to do in current platforms so far. For example, although we showed how a simple software replacement will allow us to change the exposure, as an example, on every single frame at full resolution, we can't change the resolution at the full frame rate. That breaks some of the very low-level software, firmware, or perhaps even hardware on the platform.

What I'm hoping for is a virtuous cycle, where people like us

turn to the platform and hardware makers and say, "We've got this far with computational photography. If you could just make one more little change, like allow us to change the resolution on every frame, give us a faster path into the GPU, so we can use the graphics processing unit on these mobile devices to do photography processing, it would be so much better." And they'd scratch their head and say, "You know, that's not that hard; I didn't know anyone wanted it." And then they'd make the next chip a little bit more flexible, and then we computational photography researchers go back and implement something better — and that sets up a virtuous cycle.

That virtuous cycle has happened in the graphics card industry for the last 5-10 years, with Nvidia and ATI: there was a lot of flow of students in between universities and those companies.

I'd like to see the same thing happen in a photographic space. It hasn't yet, but it could.

**What other impact might computational photography have on cameras?**

Will the shape of cameras change? We're still at the stage where most of the controls on a high-end camera, the feel, the way you take a picture is just like a film camera. You have to look closely to see it's a digital camera instead of a film camera. With computational photography, imagine that changing. One can begin to imagine different controls on the top of a camera.

The Casio EFX-1 pointed in one direction toward that; it takes a burst of pictures and does a variety of different things on the user interface. Even my little Panasonic GF1 Micro Four Thirds camera has a little switch on the top automatically switching into bracketing mode. In the future, you can imagine that bracketing mode would also meter for high dynamic range photography, so it knows which ones to take by itself; I wouldn't have to set it manually. And then it would combine them together to make a single high dynamic range picture. It's just one button for high dynamic range on the top of the camera.

It's interesting to ask what is the shape of cameras going to be in the future. What are the user interface affordances? Will the optical viewfinder go away because you just really want the flexibility of displaying stuff on top of it? Those are interesting questions.

**Yes, such as "What shape is best suited to human ergonomics?" If you have something in your hand with which you're going to capture a scene: Where is your hand? Which angle are you holding it at?**

Right, and some cameras are beginning to explore that space now. But, it's still within the context of the single image, you press the button, it takes a picture.

As computational photography begins to change that assumption, people will come up with other designs for camera bodies.— **6SR**

# Translucent Mirrors, compact bodies, faster shooting — Sony See surge of Imaging Innovations

By Paul Worthington

2010 has proven to be a good year for the major camera companies, with updated and improved cameras across the board.

Yet while every company has brought something new to the table, Sony this year stands out with at least three distinct advances.

Providing a comprehensive look at these developments is Mark Weir, Sony's senior technology manager.

**Most companies are doing well if they bring one, maybe two exceptional new product ideas to market in any given year. Sony has done triple duty, Mark, with a trio of imaging innovations.**

Well, thanks, Paul. It's been a very exciting year for us. Indeed, I think I've seen more innovation in just the last 100 days than I've seen in the almost 10 years that we've known each other.

It started with our NEX introduction in May, for the NEX-3 and the NEX-5 cameras. Those cameras really broke new ground, not just in terms of their form factor, but rather the kinds of technology they were incorporating to realize the benefits that they offered.

Obviously, mirrorless compact interchangeable lens cameras have been available for more than a year now, but with NEX, we wanted to push the limits of miniaturization; not only in terms of the cabinet size, but also the flange-back distance of the new lens mount we created, the E mount.

Typically an SLR has about 40mm of distance between the lens mount and the imager. Mirrorless cameras have typically been in the vicinity of 25mm. By reaching an 18-mm flange-back distance, we were able to significantly reduce the cabinet size of the camera, and realize the ideal of an actual pocketable camera, with a very large APS-C image sensor.

**What does that flange distance allow for, apart from the more compact case?**

Interestingly enough, a phenomenon is emerging initially in Europe: the 18-mm flange-back distance is encouraging third-party manufacturers to offer the kinds of lens-mount adapters necessary to let legacy lenses, which really had a wonderful life in the days of film photography, to emerge for use with advanced digital cameras like our NEX-3 and NEX-5. The resurrection, if you will, of those lenses is made possible by a large-sensor digital imaging camera that has only an 18-millimeter flange-back distance. The large imager approaches the format of the 35mm film those lenses were initially designed for. Together with the very minimal flange-back distance, it permits the manufacture of the lens-mount adapter, because you have more room than you

would if the flange-back distance was greater, as with the other mirrorless lens-mount systems.

**What else did the NEX cameras bring to market?**

It was the first time we had an interchangeable lens camera that incorporated some of the new high-speed capture and processing techniques that we've introduced in the Cyber-shot line a little bit earlier. I think you labeled those technologies computational imaging, and we quite agree these are the kinds of innovations really allow us to go beyond just imaging that happens to be digital, to true digital imaging, where the camera can take many captures and combine them to create a single resultant image that's superior than any individual capture could be. We're using technology not only to explore new capabilities in low-light photography, but also in panorama photography and high dynamic range (HDR) photography.



Mark Weir, Sony's senior technology manager.

**Like other mirror-less interchangeable lens cameras, NEX also captures HD video. What did it improve on there?**

Although it is true mirrorless cameras have delivered the interchangeable lenses necessary to take advantage of HD capture, until NEX, you really did not see full HD capture together with a full range of lenses with the silent AF and the silent iris control systems necessary to capture video really well. Also, with stereo mics built into the camera, the NEX 3 and 5 were really well-designed from the ground up to capture video the way it ought to be, with continuous AF and really good audio recording.

**Did that small size have any trade-offs?**

We were forced to rethink the human interface. We wanted to



be able to not only realize the very small cabinet size, but also rethink the human interface to allow much more menu-driven controls and much more simplification of controls, with the use of soft keys. And there are also help guide and shooting tips built into the camera to assist those stepping up from a compact point-and-shoot camera into the world of interchangeable lenses, who might not necessarily be familiar with the different interface of a DSLR.

But we also believe that cameras like the NEX 3 and NEX 5 can encourage those customers that are looking for a better camera, looking for the capabilities of an interchangeable lens camera, who don't necessarily go through with the purchase of the DSLR. Those customers will see our NEX 3 and 5, our E-mount cameras, as a very interesting opportunity to really step up in what they use for a camera, but may not necessarily be ready for or interested in the capabilities of a full-sized DSLR.

Frankly, a lot of people who are looking for a better camera may look at a DSLR and think that it's too large, too heavy, perhaps too complicated, and are looking for a more compact pocketable alternative. So NEX 3 and 5 really combine all of those technologies together with that sort of ideal, very compact, with-you-all-the-time camera, that can shoot both stills and video very well.

We also believe NEX very much appeals to existing DSLR users looking for a compact interchangeable lens camera alternative, and our customer research has shown many of the initial customers for NEX 3 and 5 are existing users of DSLRs.

### **Even though the NEX cameras capture video, Sony next offered a video-specific model. Why the NEX VG10?**

I think that really took a lot of people by surprise, because no one had been able to realize a large-sensor interchangeable lens video camera, at least not in the consumer space. In the professional space, we've seen manufacturers at very considerable

cost realize APS-C imagers, or in some cases full-frame imagers, in video capture devices, but never before in a consumer camcorder.

Much of what's happening in the DSLR space, ironically enough, can be tied in to this notion of large-sensor camcorders — And that is that many people are finding that the large sensor and interchangeable lenses of a DSLR together with video capture capability allows them to take the step from just shooting video the way you traditionally would with a camcorder — capturing an event — and move from there to the kind of creative filmmaking that we believe that there are many customers that are aspiring to do.

Creative filmmaking is difficult to do or impossible to do in many cases with a traditional camcorder, because you don't have the benefit of the large image sensor or the benefit of interchangeable lenses.

With the VG10, we have resolved many of the limitations of using a DSLR for that purpose, the first of which, of course, is that DSLRs up until then had not managed to deal with the issue of autofocus. It wasn't really practical to use a DSLR for filmmaking if you had any interest in AF.

Additionally, the ergonomics of a DSLR are poorly suited for video capture; indeed, those that actually used DSLRs for video capture in any serious way end up spending more money on the rigs to convert their ergonomics than the actual cost of the DSLR itself. And most DSLRs I'm aware of have not really offered stereo audio recording capability, so external mics were required as well.

The VG10 addresses all of that. Not only does it offer the very large image sensor, the APS-C HD CMOS image sensor we developed for 2010 and is used in our NEX 3 and 5, and also some of the alpha cameras now; it also provides interchangeable lens capability with the E-mount lens that we developed for the NEX 3 and 5.

It also is uniquely capable of audio recording with a quad-capsule special array microphone.

Finally and probably most significantly: Since it's designed from the ground up as a camcorder, the shooting style that it



affords is really well-suited for video capture without any additional attachments — certainly not the additional attachments required by a DSLR.

So wrapping all that together in a camcorder at the \$2,000 price point is really quite an accomplishment, and I think the acceptance of the VG10 really speaks to the void that it fills in the industry. We imagine other manufacturers will develop inter-

changeable lens camcorders, but certainly the VG10 is the first to do it in the consumer space.

**The third big idea here seems at first glance like a throw-back: Where as many are moving away from mirrors — even Sony with the NEX 3 and 5 — you recently came out with new cameras that have mirrors, albeit nearly transparent ones. The advantage here is less obvious than with the above cameras.**



### SONY'S SEE-THROUGH MIRROR FOCUSES FASTER

The 16-megapixel a55 is \$750 and the 14 megapixel a33 is \$650 — or \$100 more for kits with a 18-55mm lens. The a55 has an APS-sized CMOS sensor, which Sony says is “nearly 20 times larger than a traditional compact camcorders’ 1/2.88 type image sensor, providing more creative control,” such as background defocusing in a shallow depth of field while capturing 1080i video.

For stills, the a55 camera can shoot continuously at up to 10 frames per second, achieving shooting speeds that are the fastest in the industry for an APS-C size sensor-equipped interchangeable lens cameras under \$1,000, Sony claims.

The cameras have a variable angle tilt 3-inch LCD, and its eye-level viewfinder provides 100 percent coverage and 1.1x magnification.

Other features in the new cameras include: Auto HDR, which shoots and combines three frames into a single high dynamic range photo with shadow and highlight detail; Multi frame NR, which shoots and combines six frames into a single photo, enabling smooth low-light imaging at half the noise level; Hand-held Twilight, which shoots and combines six frames into a single photo, suppressing blur to enable clear night-scene imaging without a tripod or flash; and 3D Sweep Panorama, which creates stereoscopic images from multiple frames, enabling panoramic photos to be viewed in 3D on compatible 3D systems.

Through the use of the translucent mirror technology, we can realize a DSLR that can actually do two different things at the same time. Rather than doing things sequentially or in intervals, you can actually record and focus simultaneously. I believe it's the very first camera that can say that.

Obviously, continuous AF is a phrase that's been used since 1985 with DSLRs — but it really isn't continuous. It's AF in the intervals *between* the captures, because when a DSLR lifts its mirror, it loses its ability to focus.

We use the translucent mirror technology not only to allow the camera to continuously focus even while it's recording in still images, but also to realize an unprecedented frame rate, while focusing continuously, of 10 frames per second.

Obviously there is one other camera in the industry, which is many times the price of an A55 that can reach 10 frames of continuous shooting with a moving mirror, but it's only focusing at those moments in between the captures. So we think the A55 really represents quite a milestone achievement in terms of high-speed frame rate still-image capture.

Second, the translucent mirror technology is the world's first capable of capturing video with continuous phase-detection AF, as opposed to the much, much slower contrast-detection AF all video cameras use, up until now. That unique capability to shoot video while focusing continuously with phase-detect AF really sets these cameras apart from pretty much anything else that's ever been made. We're very proud of that.

Third, we're trying with these models to bring a new shooting style to the mainstream DSLR with the electronic eye-level viewfinder. We call it the TrueFinder, because we believe what can be done with an electronic viewfinder for the eye-level finder really extends beyond what an optical viewfinder can do. Obviously the optical viewfinder has advantages in terms of resolution, but in this class, it often feels like you're looking through a small tunnel.

The large-view eye-level finder, together with a very bright image as well as customizable information, is really something we believe the industry will pursue over time because it has unique advantages over what can be done with a legacy-style optical viewfinder. Just to give you an example: It will allow you to hold the camera up to your face and look through an eye-level finder while shooting video. There are no DSLRs that can do that today, except for our A33 and A55. All you have to do is try

to shoot video with an SLR of a fast-moving object or in bright sunshine, for instance, and use the LCD with the camera away from your face, and you understand how difficult that can be.

So obviously there are many advantages to the translucent-mirror technology, and we've already announced we will be further developing key devices to allow for higher and higher performance cameras.

**How transparent is the translucent mirror? You would think there would be some light lost. Light sensitivity is what everybody is after with photography, so how are you not losing a lot of light by having it always go through the mirror?**

Excellent question. We don't release a specification for the light transmissiveness of the mirror, but I will say this: use of pellicle mirrors in the past, the light transmissiveness was always an issue because the reflected light was reflected not for the purpose of AF, but for the purpose of creating a viewfinder image. And that, of course, requires a lot of light, if you're going to get a bright viewfinder image.

What we're doing is just deflecting some of the light for the purpose of the AF sensor, and it requires a lot less light. So some light is deflected, but it's quite minimal compared to other pellicle films in the past.

**As you said, the idea for a camera like this has been around for a while. What development made this possible?**

The translucent mirror technology drew upon Sony's core competencies in thin-film manufacture, which are precision thin films that can be built to very exceedingly small tolerances. That was a necessary requirement to realize the translucent mirror.

For the translucent film, we had to develop the concept much further for the durability and the transmissiveness needed for this purpose.

The primary thing is we deflect the light for the purpose of reaching the AF sensor, as opposed to what previous efforts were built around, creating an optical finder that could avoid mirror blackout. So it's really a different application of the technology for a different purpose.

**What else let Sony bring these products out this year?**

In the background, one of the interesting parts is that all of these product realizations, if you will, really in many ways depend on the key devices that we were able to develop for this year.

The 14- and 15-megapixel APS HD CMOS sensors not only have extraordinary low-noise characteristics, but they also have the kind of capture and throughput rate necessary to not only support full HD video, but also to support this idea of multi-frame capture for a single resultant image. Without that kind of speed in the imager, we could never do what these cameras are doing.

Second is the processor, because the ability to capture that many frames of data and then to assemble them — and not just assemble them but positionally align them at the pixel level — was a major breakthrough from a computational standpoint. We could not have done that before this year.

Also, lens technology: the silent activators that are in many of the lenses that we've developed, particularly for the E mount, requires a lot of miniaturization technology, which was another key element of what we were doing this year.

**I'd also like to touch on the WX5, which exemplifies many of the capabilities you've been talking about, in a pocket-sized, affordable package. It also captures 3D with a single sensor.** [The DSC-WX5 is a 12-megapixel camera with a 5x optical zoom lens and 2.8-inch LCD for \$330; the similar DSC-TX9 has a 4x optical zoom lens and 3.5-inch touchscreen for \$400.]

Yes, excellent point. The 3D capability is made possible by the multi-frame capture, which is also enjoyed by the A33 and A55, and the NEX 3 and 5. And you're quite right; the WX5 is a great example of incorporating all of these multi-capture technology benefits into a compact camera. The WX5 not only has the ability to capture multiple images for low light, but also for HDR, and for sweep panoramas and 3D sweep panorama.

**These cameras demonstrate the importance of personal 3D imagery, which really showcases the importance of having a 3D display.**

We believe personal content is a significant benefit to 3D viewing in the home. There are many people investing in 3D TVs for the home so they can enjoy the 3D content that's becoming available not only in the world of movies, but also in the world of gaming. But a further advantage for that equipment is personal content you can capture of friends and family, and the places that you've been. The photography you enjoy can be further enhanced, and its realism can become much greater, with 3D capture and playback on the 3DTV.

This also yields many other advantages when you're viewing images on a large high-definition television, say as opposed to what you could do with a smaller print — because you're viewing much larger images, and 3D brings them to life in a way that a 2D image could not be enjoyed. — 6SR



# InVisage Improving Imaging — Quantum Dots Deliver More Light

By Paul Worthington

In April this year, InVisage Technologies stepped into the lime-light with the claim its upcoming chips will deliver 2 to 4 times the image quality of current sensors, and enable high pixel count and high performance in tiny form factors.

The light-absorbing material is made of nanometer-sized semiconductor particles. It is applied as a liquid that dries into a micron-thick layer.

Menlo Park, Calif.-based InVisage was founded in 2006, and has more than \$30 million in funding. It says its technology is protected by 21 patents and patents pending. Taiwan Semiconductor Manufacturing Co. has signed on to co-develop the chips.

We'll be hearing more from InVisage at the 6Sight conference Nov. 17. In advance, we spoke with CEO **Jess Lee**.

## How did your company start up?

Our 30-employee team is comprised of a number of veterans of the image-sensor industry, as well as the materials and semiconductor industry. I've been a camera guy for many years. Previous to this I worked for Omnivision, one of the leaders in the sensor market. CTO and founder **Ted Sargent** is a professor from the University of Toronto, and widely published in the field of nanotechnology. Leading our engineering team and chip development is **Mike Brading**, out of Micron (now Aptina). **Igor Ivanov** leads our R-and-D group, which works very closely with our manufacturing partners to transfer our processes from lab to fab.

We are venture-backed; we have a group of successful venture investors, Rockport and InterWest.

## What is your initial goal?

Our goal is to solve one of the biggest problems for the industry. Imaging has evolved quite a bit over the years; cameras are in everything now — embedded in laptops and in cell phones, when they used to be standalone devices.

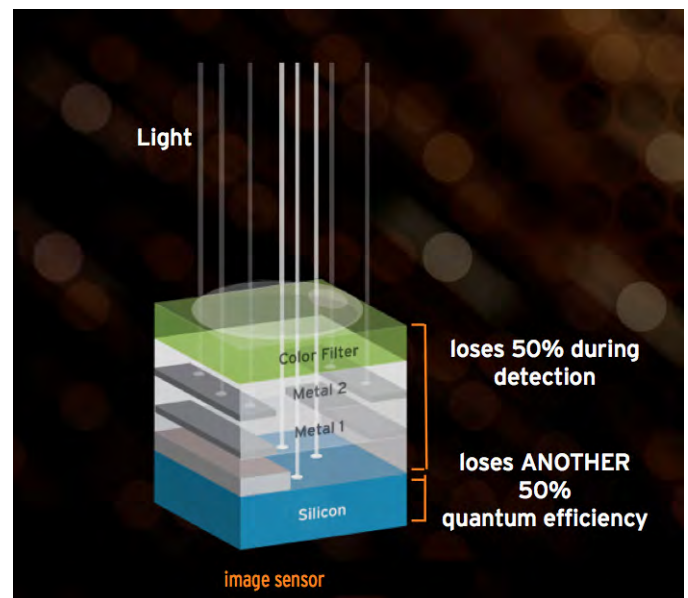
Mobile is the largest market for image sensors; it's very lucrative, and very high-growth. Right now, it's being served by CMOS image sensors.

But how many times have you heard, "I wish my camera phone could take better pictures?" That's because a lot of sensor makers have shrunk the pixels so small it's made them really inefficient.

There are a few pain points here. CMOS is not ideal.

## What are the inherent problems with CMOS?

It has flaws. It's made out of silicon, and silicon was never originally designed to capture light. When you make pixels out of these silicon wafers, you also end up having to design them with things sitting on top of the pixel: metal lines, transistors,



things that sit in the way, in the path of the light. Combine these inefficiencies, the obstructions, and you get what's known as the CMOS flaw. You get more pixels as resolution goes up, but these pixels get smaller and smaller; these problems become more evident. And so you end up having lower quality pictures.

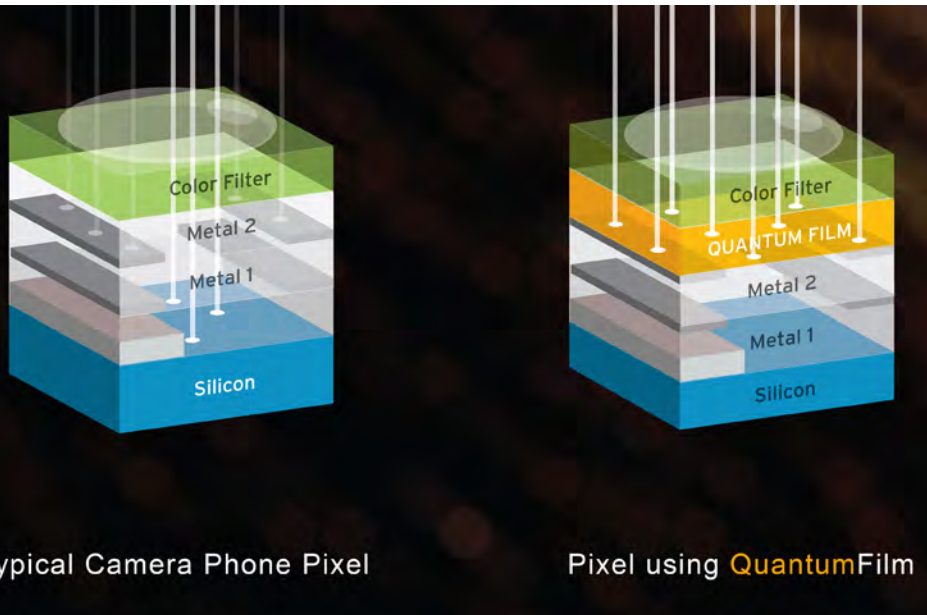
So at InVisage, we set out to change this fundamental compromise CMOS sensors have had to deal with. We do this by starting fresh, removing any sort of assumptions anybody has had about building image sensors, which is now a 30-year-old technology. We said, "Let's actually not use silicon. Let's break that assumption. Let's use something else we've actually designed from scratch to capture light efficiently."

Then we tried to integrate that *with* silicon; so in a way, we threw away silicon, but not completely. We want to keep it as a manufacturing platform, because it's ubiquitous, it's low-cost. So if we combine these two, we could have, effectively, the low-cost platform of CMOS and silicon, but the performance of a new custom material.

After three years of really intense work by our team, we've managed to achieve these goals of completely revamping what an image sensor is, and we've done this by creating quantum film.

## Now, you don't mean "film" like photographic film?

Quantum film is short for quantum-dot film, which is made out of quantum dots. Quantum dots are semiconductor nanocrystals (really small crystals suspended in a film). And by tuning these crystals to be really small, we start to push on a parameter very few other companies have started to exercise. We can tune the inherent semiconductor property of a semiconductor; we can tune its band gap. By tuning its band gap, we can make it much



Typical Camera Phone Pixel

Pixel using QuantumFilm

more efficient for capturing visible light. Which is the name of the game for making image sensors.

#### How is this film combined with silicon?

We put the film onto the top of a wafer using a fairly standard deposition technique, and we end up with a film that covers the entire top of every pixel within that sensor. That gives us a huge advantage from two respects. The first is, because we've covered the entire top of every single pixel within that sensor, every pixel now has a true 100-percent fill factor. Traditional CMOS sensors typically have about a 50-percent fill factor, because of the obstructions, those transistors sitting in the way of the light-capturing silicon.

We've moved our light-capturing material up to the very top, sensitive to all the light hitting it, and we switched it from silicon to the quantum film. That gives us another advantage, because we're much more efficient than silicon. We have higher fill factor, meaning we can see a lot more light, and high quantum efficiency, meaning we convert almost all of the light that hits our film into information.

#### What does this yield as an end result?

At the end we're left with a very important value proposition for our customers. Because we're so efficient in capturing light, we're able to take really stunning pictures and video, even in challenging lighting conditions. And we're able to do that with much smaller form-factor sensors than anybody else. Because we're more efficient, we can make these pixels smaller, we can squeeze in even more resolution into a tiny form factor. Or keep the resolution the same, as some have suggested. The resolution race isn't what it used to be, so maybe we will maintain the same resolution but really improve the quality. We can do that too. And we can do that on a very tiny form factor. This sets us apart from

all of our competitors.

And the final thing is, because we manufacture on conventional CMOS technology, we're cost-efficient. Compared to what some of the very advanced sensors are out there now, from makers such as Sony, we use very cost-efficient silicon. There are very advanced geometries used to make sensors that are not even competitive with our sensor.

#### How does this sensor also work to combat rolling shutter distortion?

Have you ever tried to take a video where things you're moving, and it seems a little bit wobbly, things seem a little bit shaky — but not shaky in the traditional sense, but wobbly, like Jell-O?

That distortion comes from what's known as the rolling shutter effect of traditional CMOS sensors. Traditional CMOS sensors scan from top to bottom for a picture. They don't actually take pictures; they take lines, and they combine them into an image afterward. So scanning from top to bottom is what leads to this distortion. As an object, whether it's a golf club or a car moving across that shot of yours, by the time you scan to the bottom of that image, that object has moved. And that's the distortion you see. Normally you're not taking a picture from a fast-moving car, but you may just be walking, or the subject is moving a little bit. It's hard to see the skew in that sense, but what you do see is something a little bit nauseating; it's this weird Jell-O distortion. That's rolling shutter. We don't like it as consumers; the manufacturers have known about this problem for a long time, yet there's been no solution for it.

Well, we have the solution for that. We added the capability to enable a true electronic shutter. We call this our quantum shutter. We basically snap a full frame of an image, and that gives you the original feel of what film cameras used to do. And this can get rid of the wobble, the distortion. We implement an extra storage element underneath each and every pixel. Effectively, we get a full frame of storage underneath the entire sensor, and that's how we snap the image electronically. This means the ability to take great still pictures and videos without this wobble or distortion.

**One of the primary concerns every photographer has is insufficient light sensitivity. For many years sensors have only been growing in the pixel count — more and more resolution — but as we've often joked, very few consumers five years ago said, "Wow, I wish my camera captured even more dark pixels." They just want, instead, the same number of pixels to be more sensitive, and provide better**

**light capture.**

**You make the comparison to standard image sensors and their layers of circuitry above the actual silicon but how does your comparison change when, instead of looking at standard sensors, you're looking at backside-illuminated (BS) designs?**

Very good question. We do have a lot of respect for the guys that developed backside illumination. They've come a long ways in improving the sensitivity of traditional silicon sensors.

At the end of the day, though, they're still stuck with silicon. Silicon is an inefficient capturer of light. It's got an indirect band gap, and it needs a lot of depth to absorb light efficiently.

So they are not addressing the first flaw of traditional sensors, which is that they're using silicon.

BSI does improve one thing, the fill factor, because they flip the wafer upside down; they're now capturing light in from "the back." But it doesn't fully address it. They can improve their fill factor from roughly 50 percent to about 70 percent, whereas we've actually taken it all the way to a full 100 percent.

The reason they couldn't quite take it to a full 100 percent is the nature of silicon forces them to have to isolate, optically and physically, each pixel. And when you think of optical isolation or physical isolation, basically what they're doing is they're drawing a metal pattern on top of every pixel that covers up part of the pixel, which, as you know, reduces fill factor. They haven't really solved that problem.

All in all I'd say BSI has done a great job of partially addressing the fill-factor problem, and we think of it as a great transition technology to what we have, which is a true solution addressing all the core issues around today's sensors.

**You're aiming at the mobile imaging market; is it a fair long-term goal is to produce a phone-sized chip delivering the sensitivity of a full-frame sensor in a DSLR?**

You know, that is a pretty tall order! To do that you'd need about 20 times the sensitivity of traditional silicon.

So, while we're very proud of what we achieved, I think we're closer to being a 2–4x improvement over traditional technologies, whether it's BSI or FSI.

We are targeting the higher end of the mobile handset space, because that's the fastest-growing category: smart phones. That's where they have the need for high quality, because this is a device you always carry around with you.

So these higher-end handsets are going to fulfill your need of this replacing your traditional point-and-shoot camera.

A digital SLR has a very large sensor and we're going to keep working to get to that kind of replacement in a few years' time.

**A perhaps esoteric question, one I'm unsure of how to ask because I don't know the actual physics — but the week**

**you first announced this, I happened to actually be at MIT talking to imaging physicists. And while they were careful to say they had not studied your technology, some of them did think the claims such as a 100-percent fill factor were just physically impossible.**

**Is this a question of them not knowing what you were doing in terms of new techniques, or are we just talking differences in nomenclature, and apples and oranges?**

That is the first time I've heard of anyone disputing our performance numbers. I'm glad you shared detail with me about 100-percent fill factor. So clearly, we're not breaking any laws of physics. We're not saying we can get 110-percent fill factor, right? All we're doing is a true capture of all the light that hits our sensor.

From their perspective, if you live within the world of silicon, I can see how they view that as extremely difficult, because BSI, for as great as it is, still has not achieved that. Perhaps the context of the discussion wasn't set? If they assumed we were still using silicon, they might have assumed that, jeez, with silicon, that's impossible, and I agree with them. With silicon it is impossible. But if you replace the silicon with an alternative material, and literally place it completely on top — if we cover the entire top of a pixel, by definition we have 100 percent fill factor, and we've actually confirmed this with measurement data.



Jess Lee, CEO of InVisage

**An argument made was that there was very good efficiency in silicon, and there wasn't much realm for improvement there.**

You know, we can cite published data from a number of different sources, and they range from a quantum efficiency for silicon of somewhere between 50 percent all the way up to 60 percent. Some folks might even push a few percentage points higher than 60 percent. That's the best we've seen, and we go by published literature.

So we know we've gotten our quantum efficiencies much higher than that. We do separate out quantum efficiency and fill factor. They're two separate things. You combine them together at

the end of the day to get the ultimate final sensitivity. I would love to sit down with them and share the data we have.

**The down-to-earth question is when am I going to hold your chip in my hands in a functioning camera? You announced this almost a year ago; there's a long time between announcements and coming to market, but when will people be able to buy a camera with one of your chips in it?**

Our plans are to get these into customers' hands in the next few months, and then to work with them to get them into production over the course of roughly 12 months, potentially a little bit more. So our goal is to try to get it to the consumer by the Christmas time frame of next year.

**While you're targeting the mobile phone, is there anything about the chip you're first developing prohibiting it from being used in other capture devices such as pocket camcorders and cameras?**

You're absolutely right in that they can be used in many other sorts of image capture devices and other sorts of consumer devices, or even more industrial applications.

We've taken a very selective approach on what products we're going to go after, just because we have to be focused, as a new venture.

**Your technology works on existing fabrication systems, and therefore you're not expecting any type of cost increase. Are you generally targeting the same price range as CMOS, or might your manufacturing process eventually enable an even cheaper sensor?**

We are using very standard CMOS fabrication, and so our cost should be very competitive. Longer term, we do view ourselves as far more competitive than the technologies that are out there. Look at a traditional CMOS sensor today, compared to a traditional CMOS sensor from 10 years ago. They're very different animals, right? It used to be CMOS image sensors used trailing-edge technologies. Now they're using cutting-edge — bleeding-edge technologies, even. Sony's on a very advanced 65-nanometer process — copper, 12-inch, and backside-illuminated — and that is not cheap.

So, compared to conventional CMOS, we're competitive. Compared to BSI or backside-illuminated sensors, we are extremely competitive.

**Where do you see the sensor market going?**

We see ourselves as a very disruptive technology in the imaging world. We are targeting a subset of the imaging world in the mobile space, but ours is a platform technology. It reaches far within imaging, and into other areas and we will be exploring

those areas, other markets, as we grow as a company.

We get a lot of questions about what else our films can do. Imaging is very important to us; it's very near and dear to us. We also recognize, because our films are so light-sensitive, we see applications in different areas, such as potentially energy and display markets.

**Do you mean energy generation?**

Yes. The original technology from Professor Sargent at the University of Toronto cuts across both fields: imaging and photovoltaics can both make use of our quantum film's sensitive nature. It really captures light very efficiently. Whether you convert that into information, or you convert that into energy, it is versatile for both applications.

Today, as a company we are very focused on imaging, but over the long term, we intend to explore other areas.

**I'm sure your long-term goals include the surveillance and automotive markets, but how does your technology benefit those areas particularly — where sensitivity in challenging light situations is even more important.**

You're absolutely right. For those applications, they are on our road map for the next generation or two down. We are very excited about those markets because we do offer differentiation there and not just in sensitivity as you mentioned.

Typically in those applications, they want to see deeper into the infrared. For security, it's gives them the capability of seeing in the night, and for automotive, to see through fog. Infrared is a key. We have the capability to shift the band gap of our material, which means we can shift its sensitivity to different parts of the spectrum. Today it is sensitive to the visible spectrum. But we have had quite a bit of success in the labs shifting our dot sensitivities out into the . This means we could put on a different film and target that device for security use or automotive use.

It is very flexible, and very unique to us.

**That capability in particular sounds like it'd have great implications for power generation.**

Yes, you're right, because the more sensitive we are across different spectrums, you could potentially combine them together in a stack and capture much more of the sun's spectrum. Yes.

**Isn't more solar energy transmitted in the non-visible spectra than in the ones we perceive?**

I think in the non-visible portion, it's primarily in the infrared, you're right: Just about half of the power of the sun is in the infrared. — **6SR**

## New Cameras For Fall —

# Major camera makers market more models By Paul Worthington

The top camera manufacturers completed their roll out of new still and video models to ring in seasonal sales.

As noted earlier this issue, the big camera news of the season is **Sony's** new Translucent Mirror design that passes light directly to the image sensor while also reflecting it to the AF sensor. The absence of the moving mirror mechanism contributes to making the camera body significantly more compact. We note this new format joins the Micro Four-Thirds systems from **Panasonic** and **Olympus**, cameras that provide the benefits of interchangeable optics without the moving mirror of the single lens reflex design — as well as **Samsung's** interchangeable lens camera... and, not to mention, Sony's own compact ILC design, the NEX cameras that debuted just months ago.

Now the industry awaits the long-time-coming response of SLR leaders **Canon** and **Nikon**: many expect they will also soon debut ILCs, although they might instead maintain their old designs — which clearly have life left in them as evidenced by Nikon's new model covered in the following pages.

### CANON ADDS ARTICULATING LCD TO SLR

The three-inch articulating LCD on its new SLR "is ideal for composing low-angle or overhead shots," Canon says.

The EOS 60D is an 18-megapixel SLR that shoots full resolution still images at 5.3 frames per second.



It also captures Full HD video at 1920 by 1080 resolution with selectable frame rates of 24p, 25p or 30p. The movie mode includes manual controls for exposure as well as manual audio levels in 64 steps. The camera has video clip editing and cropping features.

In-camera RAW image processing features include picture style, white balance, color space, high-ISO noise reduction, peripheral illumination correction, linear distortion correction

and chromatic aberration correction. The in-camera editing tools "will allow photographers in the field to produce optimized images on the spot and generate JPEG files at various resolution and compression settings for immediate sharing," Canon says, without affecting the original RAW data.

Also, Canon follows Olympus and others with new "creative image filters" that alter photos in-camera. These include Soft Focus, Grainy Black and White, Toy Camera, and a tilt-shift Miniature Effect.

The 60D is \$1,100, or \$300 more with an 18-135mm lens. More info is here.

### CANON HEIGHTENS SENSITIVITY IN THREE NEW CAMERAS

Whether shooting a large family photo at a sunset wedding or capturing a historical monument at night, Canon says, photographers will benefit from the new High Sensitivity System that improves low-light shooting in its latest PowerShot. The HS System also helps to accentuate a number of hard-to-get details in decreased lighting, Canon says.

It's the standout feature in the S95, a 10-megapixel camera with a bright f/2.0 lens with a 3.8x optical zoom that starts at 28mm wide. The camera has a 3-inch LCD, and a ring on the front controls manual options and RAW shooting capabilities.

The \$400 camera is also Canon's first model to feature in-camera HDR "to help shooters capture the full magnitude of a scene that consists of very dark tones and bright highlights." With the use of a tripod, one push of the shutter button yields three sequential images with various exposures, the company says, and then combines them into a single optimized image within the camera. As a result, the image showcases a better range of depth and detail found in natural settings.

The S95 also captures 720p HD video, and a "Miniature Effect" movie mode creates the illusion where large objects are shown in miniature proportions, "providing a creative way to play back video," Canon says. The S95 measures 3.9 by 2.3 by 1.2 inches, and weighs 6.8 ounces.

Next up: the SD4500, which Canon says is the slimmest digital camera with a 10x zoom with optical image stabilization — albeit



a zoom that starts at a tight 36mm.

The \$350 camera has a ten megapixel CMOS sensor, and its burst mode captures 8.4 frames per second. It also records 1080p HD video, and features a Super Slow Motion video mode that captures 240 frames per second. The SD4500 has a 3-inch LCD, measures 4 by 2.3 by 0.9 inches, and weighs 6.7 ounces.

And the SX130 is billed as having “extreme telephoto capabilities” with a 12x optical zoom lens (28 - 336mm) with optical image stabilization. The 12 megapixel camera has a 3-inch LCD and captures 720p HD video. The \$250 model measures 4.4 by 2.9 by 1.8 inches and weighs 10.9 ounces.

### CANON POCKET CAM SPORTS 35X ZOOM

Canon says its PowerShot SX30 IS is the world’s first point-and-shoot model to feature a 35x optical zoom lens that starts at a wide 24mm equivalent.

The Zoom Framing Assist button aids in the tracking and capturing of subjects from a great distance away while keeping the lens in focus, the company says. “At extreme telephoto settings, holding a camera unsteady can cause the user to lose track of the subject and make it difficult to find the subject. The Zoom Framing Assist button allows the user to zoom out, find the subject and then zoom back in.”

As you’d expect with such a long zoom, the camera has optical image stabilization as well.

The \$430 camera has a 14 megapixel sensor and 2.7-inch pivoting LCD, and captures 720p HD video.

The PowerShot G12 also captures 720p HD video, and Canon says its HS System “provides clear, exceptional images in low-light settings.”

The \$500 camera has a 10-megapixel sensor, 2.8-inch pivoting LCD, and a 5x optical zoom lens that starts at a 28mm equivalent.

The G12’s High Dynamic Range scene mode takes multiple shots and combines them in-camera into one image helping “to capture the full magnitude of a scene that consists of very dark tones and bright highlights producing greater image details,” Canon says.

### CASIO’S COMPACT CARD CAMERA

Casio says it crams a flat lens barrel and lens ring into “a thin and stylish card-sized body” for its Card EX-S200.

The \$180 model measures .6-inches at its thinnest part. It has a 4x optical zoom lens and 14 megapixel sensor.

### CASIO CAM TRACKS TRAVELERS INDOORS

Casio says it is “taking the geotagging experience to a new level,” with its Exilim EX-H20G, the first camera include “hybrid” GPS functionality, letting it add location data to photos taken indoors.

The GPS receiver is combined with a three-way accelerometer and a three-way direction sensor, all to track your location



motion when indoors, or underground, where a GPS signal does not reach. Photos are saved with the location information, including longitude and latitude, shooting direction, and place names

Casio says the “autonomic positioning works with an internal motion sensor to track the user’s last known satellite-acquired position against map data stored in the camera’s internal memory.”

The camera has information on 10,000 sightseeing photo spots around the globe, Casio adds, and world atlas data including detailed maps of 140 world cities and 12 cities in Japan. When in the vicinity of one of these photo spots, the camera will automatically alert the user, identifying the locations as points-of-interest. These features make it “perfect for traveling... While on-the-go, users can then confirm their present location and utilize the EX H20G’s digital compass to determine the best route to their next destination,” the company says.

The camera has a fourteen megapixel sensor, 3-inch LCD, and a 10x optical zoom lens that starts at a 24mm wide angle. It measures 4.1 by 2.7 by 1.1 inches, and is priced at \$350.

Casio also announced the EX-Z16, which has a 12 megapixel CCD, 3x optical zoom lens, and 2.7-inch LCD. The \$100 compact camera measures 3.9 by 2.3 by 0.9 inches.

### FLIP SMOOTHS VIDEO, OPENS CAMCORDERS TO ACCESSORIES

Casio aims to maintain the “signature Flip Video simplicity” — and so the new MinoHD and UltraHD cameras keep the video resolution to 720p, but up the frame rate to 60fps and add always-on image stabilization, “allowing consumers to capture clear and steady video.”



Also, the larger Ultra is now accessory-friendly. Add-ons work with a new “FlipPort,” and include a wireless lapel mic by Scosche, and “Mikey for Flip,” a \$69 external mic from Blue Microphones.

Other upcoming accessories include a waterproof case and a wide angle lens.

Prices for the UltraHD are \$199 and \$149, for 8GB or 4GB storage; the MinoHD is \$229 and \$179 for the same amounts of Flash.

Flip claims nearly 5 million video cameras sold to date.

### FUJIFILM ENHANCES 3D CAMERA WITH HD VIDEO

Fujifilm updates its 3D camera with HD video, a mini HDMI port for playback on 3D televisions, and enhanced new 3D modes.



Last year Fujifilm introduced what it says was the first complete solution for 3D digital photography — and now its new model makes “3D imaging more accessible to all consumers, enabling them to shoot in 3D HD and making it easy to view their photos and movies on most 3D TV systems.”

The new slimmer W3 measures 21 mm at its thinnest point, and weighs 8.5 ounces with battery and storage card. Fujifilm says its stainless steel construction “ensures that the optical axis is balanced ever so precisely resulting in accurate 3D images.”

The \$500 camera is built around two 10 megapixel CCDs and dual 3x optical zoom lenses (35-105mm). The optics are spaced 75 mm apart to create realistic images “that are similar to how human eyes see them,” the company says. “This technology produces a synchronized image with a natural sense of depth,” and captures 3D photos and video at 720p HD — a distinct improvement over the VGA resolution video of last year’s model. It also captures stereo audio.

The camera automatically adjusts parallax in 3D auto mode for an optimal sense of depth. Manual mode operates the parallax

control lever on the top of the camera to fine-tune the sense of depth and alignment of the images. Both can be used to eliminate “ghosting” and increase or decrease the 3D effect.

Fujifilm says in an “enhanced” 3D mode, advanced users take two shots of the same subject from different positions; the camera merges and save the captured images as a single 3D photo. “Photos of distant subjects like mountains and skyscrapers look amazing in enhanced 3D,” the company says.

As the FinePix W3’s sensors and lenses have individually controlled shutters, the camera can produce more than just 3D photos. The user can choose different zoom ranges and color settings for each image:

- Tele/Wide simultaneous shooting can zoom in on a subject while also taking a wide-angle shot of the same scene.
- Two-Color simultaneous shooting takes photos of the same scene with a different color tonality.
- Dual-Sensitivity simultaneous shooting captures high and standard sensitivity simultaneously, to, for example, take panned shots of a moving subject at the same instant with different degrees of background motion blur.

The 3.5-inch autostereoscopic 3D LCD displays images and movies in 3D needing 3D glasses. The lenticular system uses rows of convex lenses that create a binocular parallax effect to produce a realistic 3D image with less cross-talk and flicker, Fujifilm says. A “High Luminosity” mode display images 1.5 times brighter, and color reproduced 1.8 times deeper, than the previous model, “allowing for clear, distinct and vivid images.”

### FUJIFILM TARGETS COMPACT CAMERA AT SLR USERS

Fujifilm says it set out to create “the perfect compact-sized professional camera... a counterpoint to an SLR.”

The upcoming camera has a twelve megapixel APS-C sized image sensor, and a non-interchangeable fixed focal length lens with a maximum aperture of f/2.

The sensor has approximately 10 times the sensitivity of a conventional compact’s. For its custom CMOS chip, Fujifilm says it optimized the angle-of-incidence in conjunction with the specially developed lens to “maximize light gathering efficiency extending to the perimeter of the sensor for a sharper image with exceptional clarity.”



The FinePix X100 will have ISO sensitivity from 100 to 12,800, and shutter speeds from 30 to 1/4,000 second.

It also pairs a 2.8-inch LCD with a new style of glass viewfinder that with electronic information overlay. The camera measures 5 by 3 by 2.1 inches. It is due for commercial release in early 2011, the company says, but pricing was not announced.

### JVC WATERPROOFS CAMCORDER

The Piccio camcorder from JVC captures 1080p HD video and 5 megapixel still images.

It has a 3-inch touchscreen, image stabilization, HDMI output, slide-out USB connector, and a time-lapse recording function.

The basic GC-FM2 is \$180. The similar WP10 is waterproof to a depth of 10 feet, and costs \$200.

### KODAK CAMCORDER GETS TOUCHY

Kodak's latest pocket-size camcorder adds a 3-inch touchscreen.

The Playtouch camera captures 1080p HD video with digital image stabilization, or 5 megapixel still pictures.

It also features a stereo jack for an external microphone for better audio recording, or headphones for private playback.

In-camera editing will trim video clips, or extract still images.

The \$230 camcorder has a built-in USB arm and HDMI output.

Kodak also announced the M590, a 14 megapixel camera that also captures 720p video. It has a 5x optical zoom, and 2.7-inch LCD.

The \$200 compact camera measures 3.8 by 2.3 by 0.6 inches — making it, Kodak claims, the

world's thinnest 5x optical zoom digital camera — and weighs 4.6 ounces.

### NIKON SLR AUTOFOCUSES VIDEO

Nikon says its new Expeed2 image processor allows for real-time contrast-based autofocus while shooting video, and tracking up to 35 faces.

Nikon claims the D3100 "is the first D-SLR to implement full time AF for D-Movie video shooting and while in Live View mode." The camera captures 1080p video at 24fps in h.264 — a good step up from Nikon's previous SLRs that had only 720p Motion JPEG video.

The 14-megapixel SLR shoots 3 still frames a second. It is priced at a reasonable \$700 with an 18-55mm lens.

The D3100 also features an enhanced Guide Mode "that

makes it easy to unleash creative potential," Nikon says. It's "like having a personal photo tutor at your fingertips... The graphical interface on the camera's LCD guides users by suggesting and/or adjusting camera settings to achieve the desired end result images."

The camera has a 3-inch LCD, measures about 5 by 3.8 x 3 inches, and weighs 17.8 ounces.



### NIKON UPDATES PROJECTING COOLPIX

Nikon's new Coolpix S1100pj camera has a 14-lumen internal projector — 40 percent brighter than the first projector-cam that came out last year — capable of projecting up to 47 inches from more than 7 feet. It also now has a built-in stand.

With its new computer connection feature, the S1100pj can project whatever is on a computer screen.

The Paint function allows users to write and draw on projected images in real time, the company says, while Retouch functions allow users to "add stamps for an entertaining effect or rate their favorite photos for a more convenient search," Nikon says.

The 14 megapixel camera has a 5x zoom lens and a 3-inch touchscreen. It shoots and projects 720p HD video. The \$350 unit measures 4.0 by 2.5 by 0.9 inches and weighs 5.5 ounces.

Nikon also announced the S5100, a 12 megapixel camera that has a 5x optical zoom lens, 2.7-inch LCD, and 720p video capture.

The \$180 compact cam measures 3.8 by 2.2 by 0.9 inches and weighs 4.1 ounces.

### NIKON IMPROVES NIGHT SHOTS

A backside-illuminated CMOS sensor lets the Coolpix S8100 "blend superior high speed and low light performance," Nikon says.

The \$300 12-megapixel camera has a 3-inch LCD and 10x optical zoom lens with 4 Way vibration reduction image stabilization.

It captures 1080p video, shoots five full resolution frames at up to 10 frames per second, and records up to approximately 120 fps in its sports continuous mode.

The Night Portrait mode combines consecutive shots of the background while the subject is taken using the flash, allowing challenging night scenes to be easily captured during handheld shooting and eliminating any subject movement.

The S80's sliding the lens cover turns the camera on and off,



and its 3.5-inch Organic LED touchscreen's Retouch Menu lets users easily adjust images in camera with the touch of a finger.

The \$330 small camera measures 3.9 by 2.5 by 0.7 inches. It has a 5x optical zoom lens, fourteen megapixel CCD, and captures 720p HD video.

The P7000 has "advanced functions and features" similar to those found in its SLRs, Nikon says. The \$500 camera has a 7x (28 200mm equivalent) lens, 10 megapixel CCD, and 3-inch LCD. It captures 720p HD video as well as full resolution bursts at 1.3 frames per second. The P7000 measures 4.5 by 3.0 by 1.8 inches.

### NIKON IMPROVES SLR'S SCENE SENSOR

Nikon says its D7000's scene recognition system analyzes subject information from a database containing more than 30,000 images to optimize focus, exposure and white balance — and reads data from a 2,016-pixel 3D Color Matrix Meter RGB sensor that examines the scene's brightness and color data, then optimizes the camera's performance prior to the actual exposure.

The new SLR has a 16-megapixel sensor, 39-point autofocus, and its ISO can be boosted up to 25,600.

The camera captures 14-bit RAW photos at 6 frames per second, and 1080p video with live autofocus. It can also adjust exposure on the fly while recording video, and has variable frame rates and resolutions. It sells for \$1,200, body only — and that's a weather-sealed magnesium alloy body with a 3-inch LCD.

### OLYMPUS IMPROVES SLR IMAGERY

Olympus' latest E-System SLR, the E-5, features "the highest image quality of any Olympus camera," the company says.

The 12 megapixel camera has a 3-inch LCD that pivots 270 degrees, and in-body mechanical image stabilization compensates for camera movement. It also captures 720p HD video.

The magnesium alloy chassis is completely splash proof and dustproof, Olympus says. The camera is \$1,700, body only.

### PANASONIC TO OFFER PRO-QUALITY CAMCORDER

Panasonic claims its upcoming camcorder's large image sensor "achieves image recording with a shallow depth of field and wider-angle."

Announced earlier this year and now due in December, the AG-AF100 is billed as a professional AVCHD video camera with a Four Thirds MOS image sensor and a Micro Four Thirds lens mount to work with interchangeable lenses. The sensor's imaging area almost the same as that of 35mm film, the company says. The camera has XLR professional audio input.

The camera will start shipping on December 27th at a suggested list price of \$4,995.

Panasonic improves HD video ILC, offers 3D lens

Panasonic says its updated interchangeable lens camera is its

"most professional-level yet, giving users the option to be more creative than ever, from recording video in full HD with cinematic effects to taking 3D photos with our new lens."

The Lumix GH2 supports 1080/24p native mode at 24 Mbps, the highest in the AVCHD format, the company says. The Variable Movie mode records video in variable frame rate — 80, 160, 200 and 300 percent — speeding up or slowing frames for more creative videos.

The camera has a 16-megapixel sensor, and shoots bursts at 5 frames per second in full resolution

The 3-inch rotating /tilting touchscreen provides touch-based auto focus: Point at the subject on the screen and shift focus to make it stand out against the background.

The camera measures 4.9 by 3.5 by 3 inches. Body-only, it's priced at \$900.

Panasonic also debuted three new lenses with the Micro Four Thirds System, including a 3D lens, the H-FT012, which features two optical systems installed within the diameter of the lens mount, the company says, creating stereo images from the left and right lenses that are then processed with a 3D image processing system. "This new compact 3D-capable interchangeable lens is easy to handle and allows instant 3D shooting, without distortion or time lag between left and right images — even when shooting moving objects."

### PENTAX CUSTOMIZES CAMS

Pentax says its Optio RS1000 "may be dressed to match the personality and style of its owner."

The "cosmetically customizable camera" features a removable faceplate to hold interchangeable skins of any personal design. Eleven skins ship with the camera, and customers can also order a free custom vinyl skin, or make one from a photo.

The \$150 camera has a 14 megapixel sensor, three-inch LCD, and 4X optical zoom lens.

It has a lightweight body "about the size of a credit-card," the company says, measuring 3.6 by 2.2 by 0.8 inches.

The Optio RZ10 has a 10x optical zoom lens with sensor-shift stabilization, 14 megapixels CCD, and 2.7-inch LCD for \$220.

### PENTAX UPDATES SLR

The K-5 SLR from Pentax builds on the K-7 camera introduced in June 2009, with a 16 megapixel sensor, faster continuous shooting at seven images per second, and a maximum ISO of 51,200. The camera also features HD video capture and High Dynamic Range function usable in handheld shooting. It's priced at about \$1900 with an 18-55mm lens.



**SAMSUNG SLANTS LENS**

The HMX-T10 camcorder from Samsung has a distinct slant to it — a 20-Degree slanted lens, to be exact, which the company says “makes it easy to handle” and “alleviates “discomfort to the arm or wrist — a common occurrence in standard camcorders currently on the market.”

The Full HD unit has a 5 megapixel back side illuminated CMOS sensor, 10x zoom lens with optical image stabilization, and 2.7-inch touchscreen. The T10 is \$300.



**SAMSUNG RETRACTS USB CABLE**

Samsung Electronics added a retractable USB jack in the body of its latest camera.

“We want consumers to enjoy the entire photographic experience, with the ability to capture, connect, and share pictures instantly and even charge on the move,” the company says. “In this fast-paced world, we understand that our customers need to have these capabilities at their fingertips.”

The twelve megapixel PL90 has a 4x optical zoom lens that starts at 28mm, and a 2.7-inch LCD.

The \$150 ultra compact camera measures 3.9 by 2.2 by 0.7 inches.



**SAMSUNG PUTS CAMERA CONTROLS ON THE LENS**

Samsung Electronics says it is “putting the perfect picture at the fingertips of all photographers through a completely new way of controlling your camera.”

The NX100 is a new mirrorless interchangeable lens camera that is a little smaller than



Samsung's previous NX5 and it has the same 14 megapixel sensor and

NX10 models, though same 14 megapixel sensor and 3-inch display.

What's new are lenses with an “i-Function” button on the lens barrel that changes shutter speed, aperture, exposure compensation, and other settings.

The camera measures 4.7 by 2.8 by 1.4 inches, and also captures 720p HD video.

**SANYO WATERPROOFS XACTI, ZOOMS**

Want to capture HD video underwater? Sanyo's VPC-CA102YL stays dry inside at depths down to ten feet underwater.

The \$350 compact camera has a vertical form factor. It has a 14 megapixel sensor for stills, a pivoting 2.7-inch LCD, and a 5x optical zoom that starts at a narrow 38mm equivalent.

Also: Sanyo's Xacti VPC-PD2BK, has a 3X lens that starts at a 37mm equivalent, and extends to 111mm — but that beats a fixed focal length.

The \$170 Xacti records HD video at 1080p, and also has dual microphones to capture stereo sound.

With a built-in flash, it snaps 10 megapixel still photos, or, in its “high speed sequential shooting mode,” 2-megapixel images continuously as long as the shutter button is held.

The camera has a 2-inch LCD, measures about 2.5 by 4.4 by 0.9 inches, and weighs 3.7 ounces.



# Imaging News and Views

By Paul Worthington

## Cameras

### APPLE ADDS CAMERAS TO IPOD TOUCH

The iPod Touch from Apple adds front and rear cameras, making the popular media player something of an HD video camcorder and pocket-sized video calling device.

The iPod Touch is “packed” with features, Apple says, including a high-resolution Retina display, HD video recording, Apple’s A4 chip, 3-axis gyro... “all combined in the thinnest and lightest iPod touch ever.”

The Retina display has 960 by 640 pixels, four times that as the previous Touch. “The resulting 326 pixels per inch is so dense that the human eye is unable to distinguish individual pixels when iPod touch is held at a normal distance, making text, images and video look sharper, smoother and more realistic,” Apple says.

With the new front-facing camera and mic, iPod Touch users can make FaceTime video calls over WiFi, calling iPod Touch or iPhone 4 users, “and even show others what they are seeing by easily switching to the rear-facing camera,” the company says.

The rear-facing camera on iPod touch “is perfect” for HD video recording, Apple adds. “Users can easily capture HD

video wherever they are and share it via email, MobileMe, and YouTube. With the \$5 iMovie app, users can combine movie clips, add dynamic transitions and themes and include photos and music right on their iPod touch.”

Pricing ranges from \$229 to \$399 depending on built-in storage capacity.

**Not a smart camera:** The iPod Touch is not what many photography enthusiasts were waiting for: the best “smart camera,” a device that combines great imaging features with an expandable operating system for new photography functions.

### DELL DELIVERS STREAK: CAMERA-EQUIPPED TABLET

Dell claims its new Streak tablet “has found a way to fit your whole world in a 5-inch screen.”



The Streak has two cameras: a primary 5 megapixel camera with a dual LED flash, and a VGA resolution front-facing camera likely intended for video conferencing.

The 5-inch display has multi-touch capability and WVGA resolution. The Streak runs the Android operating system, but an older variant, 1.6, not the current 2.2 — and buyers can’t just download the new version. The tablet has Wi-Fi, Bluetooth, and 3G connectivity, and runs on Qualcomm’s Snapdragon 1GHz processor.

The Streak costs \$300 with a new two-year AT&T contract, or \$550 without.

The not-pocket-size computer is faring poorly in many pundits’ comparisons, as it has a smaller screen and higher price than the leading tablet, Apple’s 9-inch iPad (\$500 without a carrier contract). And while the current iPad lacks cameras, the \$199 w/contract iPhone 4 has similar 5MP and VGA cams. The iPod Touch is sold sans data contract.

### 3M COMBINES CAMCORDER WITH PROJECTOR

The Shoot ‘N Share from 3M adds a projector to an HD video camera — “combining a movie theatre with a film production



studio, all in a pocket-sized, portable package,” the company claims.

Well, that’d be a very small movie theater: the projector has only 14 lumens of brightness and 640 by 480 VGA resolution.

The \$299 camera has a 5 megapixel sensor that takes stills and 720p MP4 video.

“With the Shoot ‘n Share, we’ve combined the power to create with the ability to project the video so people can create and instantly share their memories,” the company says.

### CONTOUR HELMET CAM ADDS GPS

“GPS adds an exciting new element to video storytelling,” says camera maker Contour. “It allows you to map your own



adventures and discover new places posted by other users.”

The \$350 ContourGPS 1080p head-gear has an integrated GPS receiver that captures location info every second, the company says, to embed videos with a real-time map view with position, altitude, and speed.



The camera comes with Contour’s Storyteller application which it says “makes it easy to organize videos, configure the camera and post stories online.”

Also, Contour’s online site will be “the world’s first location-based video community, bringing video and mapping together into a rich user experience,” the company says, “the only community where users can watch an epic run down any mountain while tracking progress, speed and elevation on a map.”

Contour calls its “Video Mapping” a “new form of storytelling,” and says “the inclusion of GPS brings a whole new level of context to any video — making location, speed, time, and conditions as important as what you recorded.”

Seattle, Wash.-based Contour was formerly known as VholdR.

**HASSELBLAD HALVES PRICE?**

Hasselblad says its new system is “the perfect digital medium format alternative for 35mm DSLR photographers and for V-customers who are ready to transition to digital.

At \$13k, the H4D-31 is also much less expensive than its 31 megapixel predecessor.

Hasselblad says its True Focus provides focusing accuracy throughout the image

**PELICAN DEVELOPING COMPUTATIONAL CAMERA**

Pelican Imaging reports its received \$10 million Series B funding for its work on a computational camera that “addresses the key pain points associated with conventional camera phones – the height of the camera module, poor image quality and a limited user-experience,” the company says, “targeting a rapidly growing market that currently exceeds \$4 billion.”

Pelican claims its algorithms, together with novel optics and sensors, “fundamentally change conventional camera architecture and addresses the current tradeoffs between thin smartphone design and overall image and video quality.”

The company says its computational camera will enable a significantly thinner camera solution with processing software that does not compromise image quality and enables users to interact with the image before and after capturing the shot.

field – even at close range with shallow depth-of-field. “Hasselblad’s innovative use of yaw rate sensor technology solves the challenge of having to focus and recompose in order to acquire a focus point outside the center area of multi-point AF systems.”

The H4D-31 is available in two configurations: bundled with an 80mm lens, or with a CF-lens adapter.

Also: Hasselblad’s CFV-50 is for its V-System camera customers who want a 50MP sensor. The digital back’s sensor is twice the size of a 35mm frame, the company says. The back is \$15,750.

a half-ounce in weight, and just twenty bucks?

Jalopnik Micro Camera records one hour of standard definition video on MicroSD cards.



**UH OH — TOY SPYCAM SNEAKS STEALTHILY**

Toymaker Jakks Pacific says its \$50 Spy Net Video Watch is a real, working hidden video camera and audio system with onboard memory — with which ‘agents’ can record and save up to 20 minutes of video. Kids can then play their ‘evidence’ on the 1.4 inch LCD.

What’s worse? This: “For missions requiring advanced stealth, the \$25 flexible snake-like camera attachment gets into the most hard to reach places... to see around, below and above objects.” Oh no, we can’t see this one being misused...

**BLUETOOTH HEADSET CONSTANTLY CAPTURES VIDEO**

The Looxcie wearable camcorder looks like — and also works as — a Bluetooth headset for a mobile phone. But this ear-piece is also a camcorder that captures VGA video all the time.

It doesn’t record all that video permanently: it goes into a buffer, and only when the user press a button are the previous 30 seconds stored on the Flash memory, and sent via Bluetooth to an Android phone.

The \$200 camera weighs one ounce.

**VIDEO CAMERA ON A KEYCHAIN**

How small can solid-state recording devices get? And how cheap — enough so that you won’t mind if it’s trashed when the remote control plane it’s mounted on crashes?

Howabout 2 by 1.25 by 0.5 inches,



It can store five hours of VGA-resolution MP4 video on 4GB of internal memory — albeit at a poor 15 frames per second.

### CAR CAM KEEPS EYE OUT FOR PEDESTRIANS

With a smart cam in the window, “drivers can drive reassured with the feeling that an extra eye is constantly at work in the car, giving them another line of defense in an increasingly dangerous road environment,” claims Mobileye Products.

The Mobileye C2-270 camera mounts inside the car’s windshield, and is connected to a display unit placed within the driver’s field of view. If the camera spots a danger in the way, the display will flash bright color-coded icons and sound a warning to alert the driver up to 2.7 seconds before impact — “precious time in which the driver can take immediate action to avert a collision.”

The \$900 system’s processor and algorithms analyze photos to determine shapes and identify pedestrians, cyclists, or motorbikes.

### CAMCORDER WITH REMOVABLE PROJECTOR

A \$550 camcorder costs a bit more than most similar HD models — but this one comes with a removable pico projector.

The HDV-D350S from Ordoro Digital Products captures 1080p video with a 10x optical zoom and a 3-inch touchscreen.

It also projects that video, albeit not at HD resolution: the pico projector’s Texas Instruments DLP chipset yields just 854 by 480 pixels with 15 Lumens brightness.

### LEAF OFFERS 80MP APTUS-II

Leaf Imaging says it is offering the highest resolution, one-shot medium format digital camera back.

The Aptus-II 12 has a full-frame 53.7 by 40.3mm 80 megapixel CCD. The back has a dynamic range of 12 f-stops, and 80-800 ISO sensitivity. It can capture 1.5 frames per second. The price? \$32,000.

### OREGON SCIENTIFIC GETS TOUGH

“Outdoor enthusiasts get extreme,” says Oregon Scientific, whose new high definition video camera “can be strapped to a helmet, handlebars, surfboard, or snowboard, so it can follow athletes places they wouldn’t dare bring a normal camera.”

The \$300 camera is shock resistant, and waterproof to 65 feet.

The ATC9K All-Terrain is a five megapixel camera that captures 1080p resolution video with a fixed focus, fixed focal length lens. It has a 1.5-inch LCD and comes with an infrared remote control.

Also, holding a camera steady is a big challenge, the company says. The ATC9K’s built-in G-sensor measures the force of gravity during acceleration, deceleration



and hang time, allowing users to record and review every detail of their performance. A laser pointer on the camera also helps users line up the camera’s view, “so they never miss a moment of the action.”

## Surveillance and Security

### LOGITECH ALERTS VIDEO SECURITY

Logitech bills its Alert as a complete video security system “that lets you keep an eye on what matters most.”

The camera has a 130-degree wide-angle lens, and captures 720p video when motion triggered.

The software can define up to 16 motion zones to pay attention to critical areas while ignoring others, and so reducing false recordings. The camera stores up

to a week of video (based on the amount of motion-triggered recording in a typical home) on its 2GB MicroSD card.



Connecting it “is as easy as plugging in a toaster” the company says, as its HomePlug AV uses existing electrical wiring and outlets to connect cameras to a network.

The camera is \$300, or \$350 for a weather-proofed version — plus \$80 per year for Logitech’s web and mobile service, which are required if you want to watch live or archived video through a browser on a secure website, or through a smartphone application.

### ARECONT ZOOMS SECURITY

Arecont Vision’s panoramic cameras have electronic zoom windows “that allow a user to view and record the entire panoramic field of view while simultaneously digitally zooming in to multiple regions of interest ... something a standard pan/tilt/zoom camera cannot do,” the company says. “These new cameras are a much more cost effective solution eliminating the requirement for an external housing and consequently resulting in a reduction of between 16–30 percent depending on the configuration.”

The AV8185DN provides a 180-degree panoramic view, using four 2-megapixel sensors which can be switched between day and night manually or automatically.

The AV8365DN provides a 360-degree day/night panoramic view, using four 2-megapixel sensors for a total image of 6400 by 1200 pixels. Both have a two-axis gimbal, providing pan/tilt adjustment as well as 360 degree rotation.

Arecont also announced a line of lower-cost H.264 compact megapixel cameras: half the size and a third of the weight of previous models, at 20–25 percent lower prices. Both have extended motion detection for a higher-granularity grid of 1,024 distinct motion detection zones, the company says, compared to 64 zones supported earlier.



### SWANN SURVEILS OUTBACK

Swann Security is offering a battery-powered self-contained security camera.

The \$150 OutbackCam has a weather-proof case, inside of which is a 2 megapixel camera that stores 640 by 480 video on a 2–32 gigabyte removable SD card.

Recording is triggered either by motion detection, or at pre-scheduled dates and times. With 15 infrared LEDs, the camera's night vision is capable of capturing images up to 32 feet away. The camera runs on 4 AA batteries, and can be mounted to trees, posts or flat surfaces with the included strap.



### WIFI USERS WANT WIFI CAMERAS

A new survey finds sharing images over WiFi may be a key selling point for new cameras, at least for 57.5 percent of those surveyed.

WiFi develop Devicescape and wireless memory card developer Eye-Fi worked with Survey Monkey to find out what 160 respondents from around the world thought about imaging and connectivity. They found:

- More than 58 percent of users sharing their photos online within 24 hours
- 86.4 percent wish they could share new photos and videos within one week.
- 55.9 percent wish they could share them immediately.
- 67 percent thought cameras do not have enough sharing capabilities built in.

### EYE-FI EXTENDS IMAGE ACCESS

Wireless storage card maker Eye-Fi says it will give “full access to all of their photos and videos – anytime, anywhere, from any computer or mobile device.”

“Eye-Fi View,” the new back-end for its WiFi-enabled SD cards, delivers “an even easier way for people to view and share photos from any device, with more control than ever,” the company says.

By logging into their Eye-Fi account from any device, users can view photos, publish them on the web, or share them via email. Recipients – whether Eye-Fi users or not – can download full-resolution images through a link.

Access to content uploaded within the last seven days is always free. Upgrading to Eye-Fi Premium maintains access to an unlimited amount of content for \$5 a month or \$50 a year.

Also, the Eye-Fi Pro X2 card can now automatically upload RAW files onto FTP sites, while backing them up to Eye-Fi View. “Whether a professional photographer or prosumer, users can easily share photos with clients or friends for quicker viewing and downloading,” the company says, “providing additional peace of mind with a full photos and videos back-up solution.”

Founded in 2005, Eye-Fi says its patented and patent-pending technology wirelessly and automatically uploads photos and videos from digital imaging devices, including digital cameras and the iPhone, to online, in-home and retail destinations. The company is headquartered in Mountain View, Calif.

### SURVEILLANCE CAMERAS SEE MULTIPLE ANGLES

Axis Communications says its new fixed dome network cameras support multi-view streaming, allowing up to eight specific view areas to be cropped from the full field-of-view and then streamed simultaneously.

By streaming only the selected areas of interest instead of the full view, the company says, the utilization of network bandwidth and storage is optimized. Each view can be digitally zoomed in, panned and tilted. “With these features, installation and hardware costs can be reduced by simulating several virtual cameras with one multi-megapixel camera.”

The \$1,300 and \$1,500 fixed dome

cameras can deliver three megapixel resolution at 20fps, as well as HDTV 1080p video at 30fps. Also, the “P-Iris” control allows the camera to optimize the iris position for depth of field, lens resolution and incoming light.

### HOMELAND SECURITY TO TEST IRIS SCANNERS

The Homeland Security Department plans to test iris scan technology that captures images of people's eyes as an alternative to fingerprints, *USA Today* reports.

In October at a Border Patrol station in McAllen, Texas, the department will run a two-week test of commercially sold iris scanners. The cameras capture images from 3–4 feet away; one works on people as they walk by.

## Mobile Imaging

### HP UPDATES WEBOS, ADDS 5MP CAMERA TO PALM PRE

The new webOS 2.0 mobile platform will



“transform how people think, feel and connect,” HP claims, with “new features that make it easier to get more things done.”

Among the new capabilities: true multitasking; stacks that logically groups together open apps “so they work the way you do;” and Synergy that connects to multiple web services.

The Exhibition features runs apps when the phone is on a specific charging dock, “turning charge time into useful time” for such functions as a slideshow of Facebook photos.

Apart from that, no new photography functions were announced for webOS.

However, HP updated Palm’s main mobile device: the Pre 2 is the first Palm with a one gigahertz processor, glass display, and a 5-megapixel camera. The smartphone will be available Friday in France, and in the coming months in the United States for an undisclosed price.

HP acquired mobile maker Palm earlier this year.

### WINDOW PHONE 7 DEVICES DEBUT

Multiple manufacturers are now making phones for Microsoft’s new Windows Phone 7 operating system — most of which provide just the minimum 5 megapixel camera the platform requires, and little more in the way of photography functions.

However, it’s worth noting that Microsoft says that, unlike most phones that can take several taps or seconds to access the camera, the Windows 7 models deliver faster access to photography functions: when the phone is turned off, tap and hold the dedicated camera button for three seconds, and the phone bypasses the lock screen and is ready to take a picture. And the proximity sensor limits the camera coming on to only when it can tell there is not a face — or a pocket — up against the phone.

Also, the mobile platform’s tile-centric interface lets users quickly find and flip through photos stored on the phone.

While most of the new W7 phones have a standard 5 megapixel camera for shooting 720p video, HTC’s 7 Mozart has an 8 megapixel camera and Xenon flash. It has scenes modes such as candlelight, landscape, and portrait. The phone has a 3.7 inch touch screen has a 480 by 800 WVGA resolution.

The phones software lets users “enhance photos with one touch,” the company says. “A selection of effects help you create unique photographic masterpieces. Use the auto-enhance preset to adjust color and brightness for the perfect picture.”

HTC’s HD7 has a 4.3-inch touchscreen — the largest for W7 so far — and a built-in kickstand that the company says makes it “ideal for watching the latest movies and other video entertainment or experiencing a large selection of games and applications.” However, the 5 megapixel autofocus camera with dual LED flash is literally the last feature the company mentions.

### MOVIDIUS MAKES MO’ MOBILE 3D

Dublin, Ireland-based Movidius says its Myriad 3D is the first platform optimized for a 3D experience in high definition on mobile devices.

“Mobile phones are where 3D technology will gain real adoption the fastest,” the company says. “3D entertainment may have started in the cinema, but the phone is something people experience every day.”

Using two separate high resolution cameras, the MA1133 is capable of capturing stereo still photos and video images and processing them in real-time into 3D.

The MA1133 semiconductor can preview, capture, and process user generated 3D video and images on a mobile phone; convert 2D video to 3D in real time; and upscale and playback content in HD.

The MA1133 is sampling now.

### NOKIA DEVELOPING 3D PHOTO-REALISTIC MAPS

Nokia’s Navteq mapping division in Finland is producing three-dimensional computer models for a full 3D rendering of locations and environments — one that it says will appear more realistic than Google’s current Street View.

Street View simulates a 3D experience from 2D photos. In Nokia’s system, 3D models are constructed with the radar-like laser system called lidar, over which photographs are projected. The result is a smoothly traversable 3D cityscape, New Scientist reports.

### NOKIA SMARTPHONES FEATURE 8MP CAMERAS

Nokia announced three new smartphones for the European market with 8 megapixel cameras and the Symbian ^ 3 OS.

The E7 has a 4-inch touchscreen, 8 megapixel camera with dual LED flash and 720p video capture, and is priced at about \$640.

The C7 is aimed at social networking, and has a 3.5-inch touchscreen, 8 megapixel camera with dual LED flash and 720p video capture, and is priced at about \$430.



The smaller C6 has a 3.2-inch touchscreen, front-facing camera for video calling, and a rear 8 megapixel camera as well with 720p video capture. It's \$335.

No U.S. launch date was announced for the new Nokia phones.

## PANASONIC TO PROVIDE CAMERA PHONE

Panasonic announced a camera phone with an impressive 13-megapixel resolution.

The phone will debut under the Lumix brand. It has a 3-inch touchscreen, 27 mm fixed focal length lens, and a mobile variation of the image processor Panasonic uses in its cameras.

However, the phone is reportedly built solely for NTT DoCoMo in Japan, and will not likely be sold elsewhere.

## BLACKBERRY LIGHTS TORCH

Research In Motion call its new phone "one of the most significant launches in RIM's history" — but we only look at the imaging aspects of phones here, and there's not much to talk about with the BlackBerry Torch 9800.

The smartphone has a 5 megapixel camera with flash, continuous autofocus, face detection, and geotagging. Video recording is at 640 by 480 resolution, not HD. The 3.2-inch touchscreen has a 480 by 360 resolution. The \$200 phone measures 4.4 x 2.4 x 0.57 inches.

## IPHONE APP READS AND TRANSLATES SIGNS

SnapTranslate is billed as the first app that can read.

The iPhone App photographs foreign language texts and provides the translation "within seconds," says developer PONS, a German dictionary publishing company.

The user selects the section of the photo that is to be translated from the captured text blocks. "That makes the application particularly fast," the company says. The text recognition itself first takes place directly on the device, avoiding costs caused by image transmission. Then only the data to be translated is transmitted. The returned translation can be viewed as text or read aloud by the phone.

The app is \$12–\$25.



## SONY ERICSSON, DELL CAMERA PHONES

"Customers can capture spontaneous moments and memories instantly," says Sony Ericsson of its new Vivaz phone.

The company touts the "superb imaging features:" an 8-megapixel camera, 720p HD video recording, and keys for both video and photo capture "which lock focus on the action as soon as it starts."

The Vivaz is also "pre-loaded" with links to YouTube and Picasa Web Albums, which "make it easy to upload HD videos and high resolution photos for sharing with friends and even the world," the company says. "Shooting and sharing brilliant HD content is what creativity-minded consumers want from their mobile devices right now and we are delivering it with Vivaz." The phone has a 3-inch screen, and costs \$80 with a two-year service agreement from AT&T.

The Aero phone from Dell, meanwhile, has a 5 megapixel camera, flash, dedicated camera key, "and advanced shooting and editing capabilities," the company says.

The phone runs the Android 1.5 operating system, which is more than a year old. It has a 624Mhz processor and a 3.5-inch touchscreen. The Aero costs \$100 with a 2-year AT&T contract, or \$300 without a contract.

## Internet Imaging

### FACEBOOK ENLARGES PHOTOS

"Starting today," Facebook said last week, "we will be rolling out support for print-quality, high-resolution photos. And unlike on many other online services, you don't need any kind of premium or paid account."

How much larger? From a maximum of 720 pixels along the longest edge to 2048 pixels, "for an 8 times increase overall," the company says.

The site's display of photos is improved: "You can now view photos and even whole albums without even having to go to a new page," says Facebook's product manager for photos. "Instead, the photo opens in the center of your screen, and you close it when you're done. There's no need to go back and forth between pages or reload the page. We also rewrote all the code for the viewer from scratch, so paging through photos will be noticeably faster."

Also, the new image uploader can tag multiple photos in the same album.

The company adds that when it origi-

nally got started on its Photos feature, “we only had two people working on it. We didn’t build out a lot of features; we just focused on making sure photos were easy to share and this made Photos a great social experience. But we also wanted to give people on Facebook the best quality photo product on the web.”

### BASEBALL FANS CHOOSE THEIR CAMERA ANGLE

A new TV offering “puts fans in the director’s chair to control how they watch the team compete at Wrigley Field.”

AT&T and WGN-TV launched “Chicago Cubs Multiview,” which lets viewers see four different camera angles of the Chicago Cubs home games at one time. Viewers choose from the main WGN-TV Chicago game broadcast, and six alternate camera angles. “It’s like you’re sitting in the production booth and calling the shots,” the companies say.

Multiview works on AT&T’s “U-verse” Internet Protocol TV system. The app is no extra charge. AT&T first introduced its Multiview app in fall 2009.

### CISCO WANTS YOU AND ME TO TELECONFERENCE

The “Umi” consumer telepresence system from networking hardware leader Cisco connects to an HD television and a broadband internet connection to create a video communications experience “that is so clear, natural and lifelike, that users will see and hear their loved ones,” the company says, “as if they were in the same room.”

The \$600 package includes an HD camera, console, and remote control for what Cisco bills as “an immersive video experience that fits into every home.”

There is also a monthly fee of \$25 for unlimited umi calls, video messaging and video storage. Video calls can also be placed and received on any computer with a webcam and Google video chat.

### DRAG AND DROP PHOTOS BETWEEN WEB SITES

The new Dropico service says it lets users

### PANASONIC TABI NABI — NON-PHONE BASED MOBILE AUGMENTED REALITY

While most mobile augmented reality services are aimed at the camera phone — a display, processor, camera, and connectivity already in the user’s hand — Panasonic is attempting a stand-alone device aimed at tourists in Japan.

The CN-SG500 “Tabi Nabi” (“journey navigation”) is a handheld GPS unit with a 2 megapixel camera and a 5-inch touchscreen. Aim the camera at a landmark, and the screen displays the names of and distances to tourist spots and landmarks, and explains tourist spots.

The approximately \$700 device will be available in Japan next month, targeted at travelers who are 50 and older and enjoy walking around towns.



### AR ADDED TO ANDROID NAVIGATION TOOL

Sounds like augmented reality to us: Navigon says its MobileNavigator for the Android platform is the first to identify points of interest and show them atop a live camera view.

With the “Reality Scanner” feature, users can point the device and instantly identify POIs in or around the location. Utilizing the phone’s built-in camera, positioning, and compass components, the company says, with its database of points of interest, it posts icons directly on the camera’s display on the phone’s screen.

Other features in the \$60 app: Reality View Pro displays photo-realistic 3D views of the actual road, highway or interstate, with signs, exits, and lane guide markers for easy driving decisions; the Red Light Cameras feature provides drivers an advanced visual warning for most red light and speed cameras.

### IPHONE GYROSCOPE

The Spyglass 3 app is billed as a “fun-to-use multi-function augmented reality tool and heads-up display” with compass, GPS, and other information overlaid atop the live feed from the built-in camera, “turning the iPhone into a location-aware viewfinder.”

The \$2 app now works with the gyroscope in the iPhone 4.

Navigating with Spyglass has become easier, adds developer Happymagenta, with enlarged target pointers, constantly displayed distance to the current destination, and audible feedback that beeps upon moving closer to the target.

Located in Minsk, Belarus, Russia, Happymagenta is a privately-held company founded in 2006.



drag and drop photos between social networks and photo sharing services such as Facebook, Flickr, and Picasa, or directly to Gmail, Google Docs, Wordpress, and other web-based editors.

“Have any one of you photo enthusiasts ever wanted to share one of your Flickr photos with your Facebook friends or e-mail it to a friend and found it to be a very long and cumbersome process?” the company asks. “First you had to download the photo from Flickr to your computer, upload it to Facebook or Gmail and then send it, not to mention having to do this for multiple photos. With Dropico this process is simple and fast.”

Herzliya, Israel-based Dropico offers free registration; then “an easy-to-use wizard shows you how to configure all your social networks and photo sharing services including Picasa, Flickr, Facebook, Twitter and more.”

### LIFE.COM OFFERS PERSONALIZED STORIES

Life.com says its Timelines user-generated feature “allows individuals to tell their stories in photos from Life’s archives.”

Users select photos from the collection, place them in the order they choose, write headlines and captions and then publish their timeline on Life.com.

The former famous photo news magazine Life says it has the largest collection of professional and archival photography available online, “providing users with access to a visual cascade of news, celebrities, travel, and classic photography,” with more than 10 million contemporary and archival photographs.

### PHOTOBUCKET BUYS TINYPIC

Leading photo storage site Photobucket purchased imaging service Tinypic — and says it is transitioning Tinypic users outside of the US, Canada, Australia, and the UK to its main site, Photobucket.com.

“Our goal is to take the services you enjoyed with Tinypic, such as sharing photo links with friends, and improve upon that experience with Photobucket,” the

### YOUTUBE ENTERTAINS VIEWERS

54 percent of original web video viewers deem them to be just as, if not more, entertaining than what they view on traditional television.

That’s one of the findings from a study of online video viewership conducted for YouTube from May 18–June 4, 2010 by Next New Networks and Frank N. Magid Associates.

“The findings confirm what many have believed for some time now,” the firms say. “There is incredible content and talent available on the Web and viewers are paying full attention and tuning in regularly.”

The study also found: 60 percent watch Web original video content weekly.

58 percent see Web originals as providing quality entertainment whenever they want.

More than 25 percent find Web original content to be more entertaining than traditional television. Also, viewers are 2.5 times more likely to be fully engaged in online video than their counterparts who watch traditional television programming.

### YOUTUBE TESTS LIVE VIDEO STREAMING

For two days in September, YouTube conducted a limited trial of a new live streaming platform. “This new platform integrates live streaming directly into YouTube channels,” the company says. “All broadcasters need is a webcam or external USB/FireWire camera.”

The test featured four partner content providers: Howcast, Next New Networks, Rocketboom and Young Hollywood. “Based on the results of this initial test, we’ll evaluate rolling out the platform more broadly to our partners worldwide,” YouTube says.

company says.

However the transition did not go smoothly: reports arose that all image links stopped functioning, and new uploads were not permitted.

The next day the sites reported they had “heard from many of our users in regards to these changes,” and “restored linking to your images and enabled uploading. Please rest assured no content was removed from the site.”

### SKYPE SEES FACEBOOK

Online conferencing service Skype latest version for Windows now integrates into Facebook’s news feed and phonebook, to “help bring you and your friends, family and co-workers together like never before,” the company says.

The service includes voice and video calling, instant messaging, screen sharing and file sharing intuitive.

Skype says video calling accounted for approximately 40 percent of all Skype-to-Skype minutes in the first half of this year.

### JUSTIN.TV OFFERS MOBILE STREAMING VIDEO

“When something cool happens, you reach for your phone to record it and then upload,” says web video service provider Justin.tv. “We’ve turned two steps into one. Just start your broadcast and we’ll handle the rest.”

The mobile applications for the iPhone and Android phones “make live broadcasting from your phone the best live video experience in the world” the company claims. With other apps, streamed video “was poor at best, and slideshow-like at worst,” the company says. “It’s no fun to share a live video if it turns out to look more like a bunch of still images.”

Justin.tv’s mobile live video uses “efficient hardware encoding to create high quality video while maximizing battery life. We optimize the video for 3G or WiFi and constantly adjust quality as you move around to keep the video smooth. The results are crystal clear when compared with any other apps available.”

The company says “the mobile space is the biggest opportunity in live video — being tethered to a computer has held a lot of people back.”

**GOOGLE'S PICASA MAKES "FACE MOVIES"**

The latest version of Google's free downloadable photo editing software Picasa adds an intriguing new feature: "Face movies" which creates a video from still photos, aligning the images to the selected face in the photo. "This creates an extremely smooth viewing experience," Google says, "which allows the person in the photos to remain the focus, rather than the transition effects themselves."

Google also added the Picnik online photo editor to Picasa 3.8, and a batch upload function from Picasa to Picasa Web Albums.

**GOOGLE ENHANCES ITS VIDEO CHAT**

Google is offering on its Labs site a preview of higher resolution video and a bigger video chat window in its Gmail video chat.

"The higher resolution video uses a new playback mechanism which enables widescreen VGA and frees up valuable resources on your computer," the company says.

**GOOGLE DEVELOPS WEB FORMAT TO REPLACE JPEG**

Google says during its ongoing initiative to make the web faster, it noticed "a single component of web pages is consistently responsible for the majority of the latency on pages across the web: images."

Images and photos make up about 65 percent of the bytes transmitted per web page today, Google adds. "They can significantly slow down a user's web experience, especially on bandwidth-constrained networks such as a mobile network."

As "most of the common image formats on the web today were established over a decade ago," Google engineers looked for a way to further compress lossy images like JPEG to make them load faster, while still preserving quality and resolution.

The company is now releasing a developer preview of its new image format, WebP, "that promises to significantly reduce the byte size of photos on the web, allowing web sites to load faster than before."

WebP is based on the VP8 codec that Google open-sourced in May 2010, and adapts "a very lightweight container based on RIFF."

Google claims its tests on 1,000,000 images ("mostly JPEGs and some PNGs and GIFs") showed an average 39 percent reduction in file size. "We expect that developers will achieve in practice even better file size reduction with WebP when starting from an uncompressed image," the company concludes.

We note the take of CNET's Stephen Shankland on the new format: "WebP, like JPEG, lets its users trade off image quality for file size. And like JPEG, it's a "lossy" format, meaning it doesn't perfectly reproduce an original image but tries to keep as true to the original as possible when viewed by the human eye. Unlike JPEG, though, it's not built into every camera, Web browser, image-editing program, pharmacy photo-printing kiosk, and mainstream operating system in existence."

**GOOGLE REVAMPS ITS MAPS PHOTO LAYER**

Google updated the design of the photo layer in its Google Maps service "to provide you with a better experience when browsing your favorite places."

The main improvements include: It is easier to see clusters of photos in popular locations; Small thumbnails are now partially transparent, making it easier to see the underlying map.

More information displays when the mouse cursor hovers over a photo, including a larger picture pop-up and the title of each image.

**GOOGLE BUYS QUIKSEE FOR IMPROVED 3D MAP VIEWS**

Israel-based imaging start-up Quiksee announced it has been acquired by Google, reportedly for about \$10 million.

Quiksee provides tools for creating location-based interactive videos. We reported on Quiksee in October last year:

Quiksee says it "easily creates stunning visual experiences of real world places... that's just like being there."

Conventional stitched panoramic images require several hours to produce and potentially weeks of data processing and post-production, Quiksee says — but its own "Tours" take just minutes to film "and can be viewed almost immediately after recording online."

Users shoot video of their environment, and the free downloadable Studio application combines the footage into a navigable tour. It also enhances the images, and smooths and stabilizes the video.

Uploaded projects are viewable in the company's provided Flash player, which has an automatic navigation function for moving through an environment.

**MAKING A GHOST TOWN OF GOOGLE STREET VIEW**

Prototype software automatically washes people right out of a photo in Google Street View.

Google automatically captures photos from moving vehicles — and the shots have random people appearing.

Developed by students at the University of California, San Diego, new software identifies people, removes them, and, like Adobe's content-aware fill in Photoshop, fills the gaps to look like the surroundings. However, the pixels are not interpolated from one frame's similar pixels, but instead are taken from photos taken just before or after the primary image, photos in which the person in question is not at the precise location.

However, as PC World reports, "...on occasion, it renders some bizarre results: dogs with leashes held by invisible masters and ankles without legs appearing in shoes."

# Inside Out: An Insider's view of the Imaging Industry

By Bob McKay

## CAMERAS IN EVERYTHING

All hail the ubiquity of built-in camera modules! We all first noticed the spread of camera modules when they migrated into mobile phones. Now we see handsets with two cameras, one front-facing (typically low-res such as VGA or 1.3 megapixel) for use on video conferencing, and the back (typically 5 megapixel just now, but 8 megapixel is arriving fast and 10-, 12- and 14-megapixel already being shown). The higher-res cameras usually have HD video capability, too, and LED flash is also common.

It has been difficult to identify the module suppliers for each phone. On the full phone front, however, the leading-edge camera phone company now might well be **HTC**, a young Taiwanese company that nabbed two **Sony Ericsson** veterans in July this year to run its strategy and product development. HTC has the EVO 4G and Desire models.

On top of mobile phones, we have **Apple** putting video and still capture into its iPods and iPhones, although not [yet] its iPad, and numerous others offering Android-based tablets with the same two-camera seen in most phones. For example, **Dell** is pushing its Streak tablet-sized phone combo with 5MP and VGA cameras.

So where will camera modules appear next? Apple's next iPad, most likely. That would be important to the capture segment, as **iSuppli** estimates Apple will ship 12.9 million iPads this year, and 36.5 million next. **OmniVision** is rumored now to be the supplier for those v2 iPads. It announced tiny camera modules for use in "notebooks, netbooks, webcams, gaming consoles, portable media players, mobile phones, smart phones TVs and set-top boxes."

There's that ubiquity thing again! To this they could add tablets, digital picture frames, color electronic book readers, computer monitors... there's no end to the potential, si?

## PROJECTORS AND OTHER IMAGING COMPONENTS

The Taiwanese suppliers are as happy as pigs in mud; **Asia Optical** (AO) is shipping 3 million VGA lens modules a month for use in iPhones; **Genius** and **Largan** are supplying the 5 MP modules. AO is shipping another 7 million compact camera modules a month to other customers, and is making **Kodak** cameras in its JV with **Flextronics**. It appears to have grabbed some Kodak biz from **Altek** (but Altek is consoled by having gained orders from Nikon and Samsung).

AO also says it will ship 8 million pico-projector modules a month for use in handsets next year (most using TI's DLP system, I expect. **MarketsandMarkets**, the Texas research company, predicts "the world pico projectors market revenue will reach \$6.08 billion by the end of 2014, with a compound annual growth rate of 120.56 percent from the period 2009-2014. The U.S. market is expected to account for nearly 85 percent of the total market revenue by production and 41.5 percent by consumption. The global pico projectors market is expected grow from 0.22 million units in 2008 to 39.08 million in 2014 at a CAGR of 139.11 percent from 2009 to 2014. Embedded projectors would drive the growth with a CAGR of 203.72 percent." Personally I expect China to make most of these products.

**Kinko** was shipping a million glass lens kits a month to **Canon** for use in digicams and DSLRs and, by Q3 2011, this will increase to 2.4 million kits a month. I have worked for **Premier**, consulted for AO, and purchased from **Skanhex** (and several others); believe me, Taiwanese camera companies are loaded with clever people who used to work for Canon, and many received extensive training in Canon Japan.

Elsewhere in Taiwan, **Ability** shipped 10 million digicams in the first half of this year, and will ship another 13 million in the second.

## LARGE-SCALE SENSORS

At the opposite end of the size spectrum, I am intrigued by the 120 megapixel CMOS sensor **Canon** recently demonstrated. It measures 29.2 by 20.2mm, which is smaller than a 35mm frame (it is in fact APS-H size). That is a funny choice; why did they not just go full-frame? It is so high-res Canon could feed separate signals onto it (eg for 3D capture), each using only part of the surface.

What use is such high resolution? Even back in 1998 many of us discussed whether the pixel-count race would ever end. One reason it might not, it was argued, is it allows for digital zooming. Digital zooming, however, is very inefficient. Even on the Canon 120 megapixel sensor, doing a 4x digital zoom would knock the resolution down to 7.5 megapixels, and 5x would cut it to just 4.8. Don't even think about 10x (1.2 megapixel!)

## NON-MOVING MIRRORS

**Sony's** pellicle-mirror cameras are attracting lots of attention. The lack of a moving mirror not only has engineering, noise and cost advantages, but allows for live viewing of video capture (unlike DSLRs which must lock the mirror up). The one drawback is the pellicle location necessitates longer back focal length lens designs, so pellicle cameras cannot be as "thin" as ILCs.

## STYLE OVER SUBSTANCE?

In closing I draw your attention to a Chinese camera maker called **Aigo**. They co-sponsor the McLaren Formula 1 race team in Europe, as well as Manchester United soccer club in the U.K., (both huge in European sensibilities) but Aigo use a U.S. agent.

But this 18-year-old company plans to open shops on the Champs Elysee and on 5th Avenue, and to be seen as a Louis Vuitton type of camera company. Aigo have exhibited at CES but so far show no sign of taking the U.S. market seriously. Their one digicam on their website is all about its external "skin," not its features or ability.



## Keynotes at 6Sight



**Marc Levoy,**  
Professor of  
computer science  
and electrical  
engineering at  
Stanford University



**Blair MacIntyre,**  
Georgia Institute of  
Technology

# See the Future of Imaging

Explore emerging imaging developments impacting every level of society – businesses, homes, and communities. The 2010 conference looks at:

## Augmented reality

Merging image capture, display, computation, and connectivity on top of our real-time view of the world.

## Smarter camera phones

Not only do they capture great photos, they provide amazing and fun imaging apps.

## Advances in output

Revenue-generating prospects delivered by new output products and services that will transform photographic digital printing.

## 3D cameras, printers, and big-screen TVs

There's new opportunities in 3D technology, infrastructures, and ecosystems.

## Camera evolution

Advancing photographic capture benefits professionals, consumers, and enthusiasts.

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