Market Intelligence

3D Handsets Grab Attention of UK Consumers

According to data from Experian Hitwise exclusively provided to TechRadar, the HTC Evo 3D and LG Optimus 3D have emerged as two of the top three 3D search terms in the UK over the past three months. What the company found surprising was the high level of interest in 3D mobile handsets — higher than interest in 3D games (#6), specific 3D movie titles (*Piranha 3D* at #7) and Sky 3D. The top search term was 3DTV.

The Evo 3D and Optimus 3D each turned up twice in the top 20 3D-related UK search terms across all search engines in the 12 weeks ending August 20. The handsets took a total of 4.3% of all 3D searches by UK Internet users over the 12-week period. (Experian Hitwise estimates there were around 6.6B searches over these engines during the period, which is how they calculated the 4.3%.)

Part of the high interest was attributed to the recent availability of these two products, but the company was still surprised by the result.

James Murray, marketing research analyst for Experian Hitwise, commented, "The 3D market is rapidly diversifying and whereas last year the focus was very much on 3D films and 3DTVs, this year new 3D products like mobiles are grabbing the attentions of UK consumers. Our search data suggests that TVs are still the primary 3D product that people want to purchase, accounting for 10% of all 3D searches online, but as more 3D mobile handsets come onto the market this could be the new dominant 3D platform." –*Chris Chinnock*

In-Stat: 148M 3D Mobile Devices by 2015

Market research firm In-Stat suggests that the adoption of 3D mobile devices is about to take off — big time. The firm acknowledges that issues with technology and especially content needed to be solved, but the rapidly expanding size of the mobile device market means that even modest penetration levels will lead to very big sales numbers. The company did not reveal their expectation for the Total Available Market (TAM) for mobiles devices, nor their penetration rate, so it is hard to judge whether their forecast is reasonable or not.

Mobile devices are likely to include mobile handsets, tablets, netbooks, laptops and game consoles. It is unclear if they also considered portable media players, portable TVs, cameras, camcorders and other products.

Insight Media has developed a database of 3D products that are currently available for purchase in the U.S. This database confirms the very small number of mobile products that consumers can actually buy in the U.S. This database (which is now available for purchase), shows the following number of products consumer in the U.S. can buy today.

- Consumer Digital Video Camcorders: 15
- Consumer Digital Still Cameras (depending on 3D definition): 32

- Laptops (depending upon 3D definition): 27
- Portable Game Consoles: 1
- Mobile Handsets: 2

"Despite the advances in the technology, adoption of 3D in mobile devices is still likely to be relatively slow due to limitations in content, the potential of eye strain and headaches from viewing 3D content by some, and the additional cost for 3D content and devices," said Jim McGregor, chief technology strategist. "Although 3D has been around for decades, the current technology is new and advanced. And, as with any new technology, adoption will increase as the ecosystem matures, costs come down, and the ability to capture 3D is combined with innovative mobile applications, which is likely to be in the 2013 to 2015 timeframe."

Recent research findings include:
- Nearly 30% of all handheld game consoles will be 3D by 2015.
- 3D mobile devices will increase demand for image sensors by 130%.
- In 2012, notebook PCs will be the first 3D-enabled mobile device to reach 1M units
- By 2014, 18% of all tablets will be 3D.

–Chris Chinnock

3DTV Owners Seem Committed to Watching 3D Content

According to research from Strategy Analytics, two-thirds of 3DTV owners across Europe and the U.S. watch 3D content at least once per week. And 41% say they watch 3D content at least once per day or every several days.

David Mercer, Principal Analyst and the report author noted that, "A significant minority of 3DTV owners now watch some TV in 3D on a daily basis, and this should be seen as an encouraging sign for content producers and the television industry in general."

While this sounds like a very high adoption rate, details of the survey need to be examined carefully before jumping to conclusions.

Strategy Analytics conducted the online survey in July 2011. The sample consisted of 2,000 individuals in the U.S. and 2,801 in Europe (France, Germany, Italy and UK) ages 15–74 years. The sample of 3DTV owners was 238.

How were these individuals selected? Was it a random selection, or were they filtered for those who bought a TV recent? The 3DTV owners represent about 5% of the survey participants, which is a higher level of penetration than 3DTV sales in the general population, so the survey may be overestimating this contribution.

Of course, how the questions were asked, how they were phrased and any incentives can clearly influence results. Assessing the validity of surveys like this is tricky and takes detailed analysis.

Interestingly, "Nearly half of 3DTV owners are making use of the TV's in-built 2D-to-3D conversion feature," the firm said. This suggests that native 3D content remains rare, but

viewers are willing to use the conversion feature for now. But this appears to have a consequence. Most people also complained that watching too many shows in 3D made them feel sick. "So it seems that 3DTV is likely to remain an occasional activity for most viewers until the technology matures," the report's author concluded.

The survey also found that 3DTV owners typically own two pairs of 3D glasses, although a small minority (13%) claims not to own any 3D glasses. The research provides some evidence that the cost of buying additional pairs of glasses is seen as a barrier to 3D viewing: 53% of 3DTV viewers agree that they would buy more 3D glasses for family and friends if prices were lower.

Jia Wu, who was part if the survey team, noted that, "The glasses issue is very real," before also adding, "Naturally, enough people would rather not have to wear them, but a majority of 3DTV viewers are prepared to put up with the inconvenience when the experience and entertainment value justify it."

While the high rate of 3D content viewing grabs the headlines, the report has uncovered other issues that temper these rosy results, like the reliance on conversion to the ill feeling this creates and the cost of glasses and desire to watch 3D without any glasses. *–Chris Chinnock*

Are TV Buyer Perceptions Out of Line With Reality?

According to Strategic Analytics, you should be prepared to pay more than a 50% premium to get a 3DTV compared to an HDTV. Their data suggests that consumers on average earmark $1,224 for a 3DTV and only $785 for an HDTV. In Europe, there is an expectation to pay a premium ranging up to 54%, while the U.S. figure is 56%.

The research firm did not reveal how they conducted this survey nor what consumers expect that they receive in a 3DTV and an HDTV, if it includes glasses, or even if they are comparing the same screen size!

Since 3D functionality is being added to a broader range of TVs and not always packaged as part of a premium TV, these consumer perceptions seem a bit out of step with reality. However, it does point to the need for retailers and manufacturers to reverse such consumer perceptions.

This price premium impression means buying intentions for 3DTV are low, according to Strategy Analytics. They claim that in Germany, only 9% of buyers will look at purchasing a 3DTV, while that figure is 6.9% in the UK.

These results fly in the face of recent sales results from Dixons, which shows a surge of interest and buying of 3DTVs in the UK (see related story).

Meanwhile, DisplaySearch has also conducted a survey of consumers worldwide on their TV-buying intentions and found similar results (for 2010 anyway). According to DisplaySearch's "Global TV Replacement Study," while sales of new TVs set a record in 2010 with 24.4% growth, new technologies did not appear to be the reason driving TV replacements.

Less than 1% of those Germans interviewed for the study indicated 3D was a reason to buy a new set, and just over 1% said the desire to own an Internet-TV played an important role. In

Indonesia, 6% of buyers said 3D was a main reason for their purchase, while 5% of urban Chinese buyers cited the Internet as a major motivator.

"Some of the findings from this study show that advanced features are not strong drivers of new TV purchases compared to fundamentals like trading up in size or getting a flat-panel TV," said Paul Gray, director of European TV Research at DisplaySearch.

These varied results and results in the real world point to need to look beyond the headlines of these surveys to better understand the methodology, timing and interpretation of results. – *Chris Chinnock*

3DTV by the Numbers

Below is our summary of 3DTV sales info we collected for the month.

3DTV Panel Shipments at 5.2M Units in Q2

LCD panel makers report that in Q2'11, they collectively shipped 5.2M 3D-capable panels, according to a new DisplaySearch report. Almost all panels (4.9M) were slated for TV with the rest aimed at laptops and monitors. Remember, these are panel shipments, not final product shipments.

However, we are unclear how panel makers classify 3D-capable panels. Do any panels that offer 120Hz or higher get classified as 3D-capable? If so, these panels could clearly be used in non-3D-capable TVs. But even 60Hz panels can be used for passive solutions. Until the definition of 3D-capable is clear, we would be cautious in interpreting these results.

The Q2'11 results represent 188% growth over Q1'11 results and pushes 3D LCD panel penetration from 4.5% to 9.3%. Panel makers are targeting 53% growth in 3D-capable LCD shipments for Q3'11.

"The LCD TV panel industry has been in oversupply for more than a year, and panel makers are motivated to develop new features like LED and 3D to increase value," noted David Hsieh, vice president, Greater China Market, DisplaySearch. Although there are still doubts about whether the market is ready for 3D, 3D penetration is increasing due to falling prices and the ability to produce panels.

In addition to TV, 3D monitor panel shipments are growing rapidly, from less than 80K units in Q1'11 to more than 250K in Q2'11, thanks to adoption in gaming and other special application monitors, said DisplaySearch. The mainstream 3D technology currently used in desktop monitors is shutter glass, but

Size	Q1'11	Q2'11	Q3'11
32"	0.6%	2.8%	3.8%
37"	7.1%	15.7%	20.8%
40"	5.7%	11.5%	13.8%
42"	6.5%	15.4%	22.5%
46"	26.6%	34.3%	39.5%
47"	20.0%	38.5%	52.8%
52"	24.9%	44.4%	54.5%
55"	32.2%	46.1%	59.7%
60"	28.6%	22.6%	36.7%
Total	12.7%	21.7%	28.2%

3D Penetration in LCD TV Panels (40-inch and larger)

Source: DisplaySearch Quarterly Large-Area TFT LCD Shipment Report-Advanced LED + 3D

pattern retarder and switched cell (active retarder) solutions are emerging rapidly too. Panel makers expect to double shipments in Q3'11.

Volumes of 3D panels for notebook PCs are still relatively small, with less than 100K units shipped in Q2'11. However, panel makers are promoting shutter glass, pattern retarder, and autostereoscopic solutions to the gamer and entertainment-focused notebook users. Shipments are expected to grow by 126% in Q3'11.

For LCD TVs, larger panel sizes are seeing faster penetration of 3D, as the benefits are clearer. In 40-inch and larger LCD TV panel shipments, 3D penetration increased from 12.7% in Q1'11 to 21.7% in Q2'11. TV panel makers are aiming to reach 28.2% in Q3'11.

In terms of 3D LCD TV technologies, shutter glass is still dominating the market, with 61% in Q2. However, pattern retarder panels are growing rapidly, with 271% Q/Q growth rate in Q2, compared to 74% Q/Q growth of shutter-glass-type panels. According to panel makers' production plans, pattern retarder panel shipments will reach those of shutter glass panels in Q3'11.

Ofcom surveys U.K. Households for 2010

According to a recent report from UK telecom Ofcom, for every 3DTV set sold in the UK in 2010, there were nearly 10 times as many sales of Internet-enabled TVs — and 100 times as many HDTVs. In total, Brits bought close to 10M devices during the year (practically all of them HD-ready), of which nearly 1M were connected TVs and only 125K offered 3D capability.

The report also showed that:

- Almost half (46%) of all households already incorporate at least one digital video recorder (DVR).
- Time-shifted viewing accounted for 14% of all viewer hours.
- Over a fifth (22%) of game console owners are using these devices to watch video content. This includes 11% who claimed to have downloaded or streamed content from the Web and 19% who accessed content from the BBC iPlayer catch-up TV service.
- Live TV programming is increasingly being accessed via gaming consoles, especially by younger generations of players — 7% of those aged 16–24 versus 4% of all console owners.

Meanwhile, total revenue generated by UK television broadcasters in 2010 reached £11.7B, an increase of 5.7% over last year. According to Ofcom, such growth was driven by a combined recovery in advertising revenue (up 11.2%) and a 5.3% jump in subscription income.

China to Absorb Nearly 3.3M Smart TVs in 2011

According to a *DigiTimes* article, sales of Smart TVs in the China market are on the rise, with 2011 sales volume estimated at 3.29M units, according to industry sources.

There were 124 models of Smart TVs available in the China market in June 2011 and 89,000 units were sold, accounting for 7.5% of the sales of all LCD TVs for the month, according to

China-based All View Consulting (AVC). Sales of Smart TVs in the China market are expected to keep increasing at a CAGR of 50% in 2012–2014, the sources pointed out.

With 16.92M LCD TVs sold in the China market in the first half of 2011, the sales volume in 2011 is projected at 36.65M units of which 51% (18.7M) will be LED backlit models and 14% (5.1M) will be 3D models, according to AVC.

U.K. 3DTV Sales Jump

Dixons Retail Group this week revealed that sales of 3DTV displays in its network of stores have increased dramatically over the last quarter. The British consumer electronics retailer, who owns Currys and PC World, said that 3D-capable HDTV sets accounted for 20% of all televisions sold between April and June this year. Dixons also stated that like-for-like 3DTV sales are up 500% from 12 months ago.

The retailer attributed this to lower prices (prices as low as £499), greater availability of 3D content, and the fact that 3D capability is increasingly found on a wider range of flat-screen TVs (even entry-level and midrange ones). Currently, 40% of the company's stock of televisions are 3D-capable sets.

Passive 3DTVs, such as the LG LW650T and the Toshiba VL863 series, were singled out for praise by the retail group, who said that these models sold particularly well, contributing heavily to the jump in overall 3DTV sales.

John Mitchell, Dixons Retail's category manager, noted that there has been heightened interest in 3D display technology in both the company's online ecommerce Websites and brick-and-mortar shops over the past three months. *–Chris Chinnock*

Education Industry

North Carolina's 3D Jedi Knight

In the previous column, we introduced a taxonomy showing six leading approaches to 3D educational content development. However, very little space was dedicated to the "constructivist" sixth column of our 3D taxonomy — **student content creation**. The creation of 3D resources by armies of talented students promises to be a true disruptive innovation in the field of 3D content development.
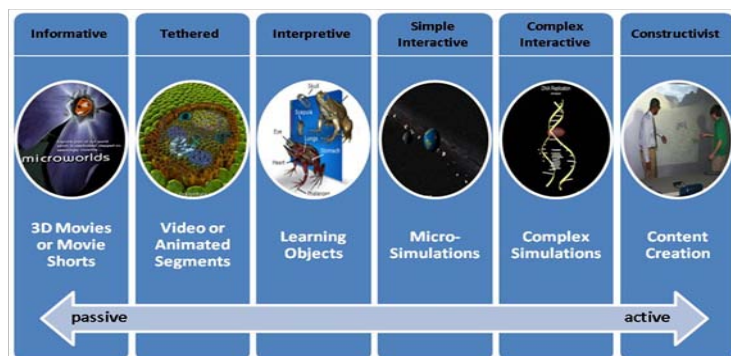
The 3D Content Taxonomy

Interestingly, one of the most vibrant projects focusing on 3D stereoscopic content creation by students is evolving out of rural North Carolina's Richmond County Schools. In 2009, IT Director Jeffries Epps and seven high schools students developed a project to teach students to create 3D models of objects that

teachers could use to introduce new concepts during instruction.

"With only 10 hours of instruction, the students were working with a geometry teacher creating objects and animations that explained the concepts of transitions and rotations," Epps stated. Fast forward two years later and Epps has set his sights much higher, forming the Globally Ready Engineering and Technology (G.R.E.A.T.) 3D Academy. His solution is effectively simple: Take on any students who have the interest and aptitude for learning 3D; connect those students with both a relevant context for learning and supportive classroom teachers; and then leverage that interest to enable students to reach higher levels of performance in science and math.

IT Director and 3D Jedi, Jeff Epps

"You bring us any students who have the willingness to learn how to design 3D content, regardless of their academic challenges, and we can help get them to new levels of math and science," he stated. "We can turn them into engineers and designers."

Ben Dibble, student at Richmond Early College High

One student, Ben Dibble, serves as a clear instance of Epps remarkable vision. Ben, currently a student at Richmond Early College High, describes his motivation in wanting to make 3D artifacts "to help teachers make students understand concepts better — and I found when I did make things for the teachers, I understood the concept better when I finished also."

The strength of Epps' new approach revolves around solid educational research and thinking: that relevance, context and authenticity in learning really do matter. Imagine a middle school math student who still struggles with fractions. Working closely with her math teacher, Epps anticipates crafting a tailored design-build project that fortifies the student's own math skills, while at the same time provides the teacher with a 3D visualization tool that can help instruct other struggling students. In designing this project, according to Epps, our young middle schooler "will soon acquire a better-than-average understanding of fractions that will get her past this unfortunate hurdle in math skills."

3D design experiences can also leverage improved student performance in critically important science skills. Creating a visual model of mitosis or the structure of the human cell, for example, can contribute directly to mastery of learning by students who struggle to understand abstract concepts that they ordinarily cannot "see." Asking students to create design-build 3D

Jeff Epps and Grady Lorenzo, a senior at Richmond Senior High, preview Lorenzo's 3D simulation of a space rover to be adapted to teach the human circulatory system.

projects that require precise measurement, metric conversion, and tool calibration skills will go a long way toward cementing some of the most critical prerequisite skills in understanding science.

3D design projects also provide a powerful seedbed for improving other building blocks of science achievement, such as tentative explanation, putting raw data into graphical form, or even technical writing. Epps explained: "We see this as a great opportunity for students to use this 3D skill set to give them a better [and relevant] understanding of math and science concepts." He added, "And what better concepts are there to visualize than the very concepts that they're weakest in? If they can design it, they're going to have to understand it. It's a win-win: The student has now mastered a specific weakness in math or science, and the teacher now has a tool that she can use with other students."

He cited middle school student Ben Dibble as an example of this scenario, as Dibble produced some of the very sophisticated 3D models such as "pyramids, burial chambers, and a simulation of the launch and orbit of the Sputnik satellite."

Happily, Epps' 3D dream is an opportunity open to all children. He observed, "I felt there were a lot of students that were getting overlooked in terms of talent. There are students that may not be academically talented, but are experienced with technology," he said. "I thought about launching a program that's inclusive and not exclusive of students. We are reaching out to females, children of color, and special needs students. One of our top graduates was accepted to the Art Institute in Raleigh, North Carolina. He has Asperger's Syndrome, and yet he was the best 3D modeler in our district."

Epps believes that "anybody can learn higher levels of math and science if they just want to. That's why this technology needs be accessible to all."

His plans also involve reaching students as early as third grade: "We're planning to partner up with our testing coordinator in our district to find out where most of our third graders miss the mark on the state standardized test. Then we'll ask our secondary students to design 3D simulations that will help visualize and clarify difficult concepts for those students."

Of course, Epps has not made it this far without the solid commitment and leadership demonstrated by community-based thought leaders and innovators. "The BRAC Regional Task Force, which is a base realignment and closure group (an organization closing bases across the country, consolidating troops, and relocating them to new areas) led the initial effort by funding our previous program, placing 3D labs in eleven high schools," Epps noted. "BRAC aims to further shape the educational landscape of the 21st Century" by expanding and adding more equipment, totaling 31 systems in 11 counties.

Epps' project is not without significant challenges, however. "We're looking for more business leaders as partners," he indicated. "We need assistance from the engineering community to help expose students to the engineering experience — we need internship opportunities for our students once they become comfortable using 3D design software." He is not only seeking physically close internships, but also remote internships. "I need people that can video conference with our students, look at their content, and challenge our interns to improve their work."

He is also looking for laptops to put in the hands of students. "When those kids get laptops in their hands, they take them home; while they're at home, they're doing more. We find that

they actually do extra work without complaining." Epps is also hoping to find more modern 3D content development software

It is becoming clear that not all 3D content development will emerge solely from creative production houses. Student-created content will soon become a disruptive force in the content development market. For that reason, I've always advised 3D content development companies to develop a simple authoring tool for student use. Then, I suggest they begin to strategically tap into this growing developer community well before it begins to tap into their revenues. That's when disruption happens. *–Len Scrogan*

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2D-to-3D Conversion

LG Intros 3D Game Conversion Engine for Smartphones

At IFA 2011 in Berlin, LG Electronics (LG) took the wraps off of the world's first OpenGL-based 2D-to-3D game conversion engine available on a smartphone platform. A result of LG's efforts to expand the quantity of 3D content and widen consumer adoption of 3D devices as gaming platforms, the 3D Game Converter is expected to open more doors to 3D gaming content. This is indeed a much-needed capability.

The 3D Game Converter will be included in the first Maintenance Release (MR) of the LG Optimus 3D smartphone starting this October, the exact rollout date determined by each mobile carrier.

Calling the new platform "… a major breakthrough for this industry," Dr. Jong-seok Park, president and CEO of LG Electronics Mobile Communications Company, also declared, "Mobile gaming is a huge trend on the cusp of massive growth, and LG is determined to be the de facto leader in this space."

Once the 3D Game Converter is installed, users can enjoy 3D on previously purchased 2D games (OpenGL-based and landscape mode only) simply by activating the 3D Game Converter. When a user opens a 2D mobile game through the 3D Game Converter, the program automatically scans the game to see if it is listed among the 2D mobile games optimized for 3D conversion. If the game has been optimized, it will be converted into 3D using default visual settings. Unlisted OpenGL-based 2D games can still be converted to 3D by adjusting the settings manually. Optimized settings for approximately 50 2D games will be available by October, with 50 more to be added by year's end.

Users can also easily switch back and forth between 2D and 3D game play.

This process is very similar to the way PC-based games are converted with drivers from companies like DDD, nVidia and iZ3D, which capture the OpenGL calls and render a second view in real time.

The press release had gamers and mobile industry watchers buzzing over the implications and potential harm from "auto-magic" algorithms that decides which parts of a game to add depth to — in perhaps an ad hoc manner.

For example, according to HotHardware, the main problem with LG's approach is that it has been tried before. "We've seen so-called 'live 2D-to-3D conversion' technology in Toshiba's 3DTVs and various other electronics and, well, to be honest, it's absolutely terrible and hardly ever works," according to Device.com's Ray Wong, who isn't even waiting around to see the results.

He said in his piece on the announcement: "If you want great 3D, don't expect to rely on 2D content converted to 3D, unless the developers specifically programmed it with the extra D. Based on experience, 3D conversions only serve to damage 3D's reputation and leave a sour taste with consumers. Let's not be fooled people."

Wong went on to say, "It's even more telling that the engineers behind these live 2D-to-3D converters are reluctant to tell us exactly how the software magic works and how it decides which parts get depth and which parts don't. It's almost like the software just randomly decides which part to convert."

Not so said Dr. Henry Nho, LG's 3D Technology Evangelist. He thinks this advancement is far from being a gimmick. "LG's 3D Game Converter automatically recognizes the depth information based on the location of each object and separates the 2D graphic images for each eye. Using the existing depth information, the 3D Game Converter generates two different images — one for the foreground and one for the background. It then uses a thin film parallax barrier on the display to show the left image to the left eye and the right image to the right eye, creating an illusion of visual depth."

LG has filed several patent licenses in major countries, such as the U.K., Germany and the U.S., for technologies embedded in the 2D-to-3D game conversion feature. Can such drivers actually be patented give the history of the above companies?

The 3D Game Converter is expected to benefit both game developers and smartphone users alike. Small and medium-sized game companies will be able to offer 3D versions of their existing 2D games without major investments in human resources, cost or time. Meanwhile, smartphone users will reap the benefits of being able to convert their 2D games into 3D anytime, anywhere free of charge.

All skepticism aside, with so much at stake, and LG putting its reputation on the line, we have to think that the 2D-to-3D conversion software should perform respectably well. No software of this type will outperform games developed for 3D from the ground up, but if the experience can offer marginal improvements over the 2D experience (and not make the user ill in the process), we think LG has a shot at breaking out from the Android pack as 3D begins to come into its own, both with professionally produced content and home-make images using the

dual HD cameras. But truly the jury is still out for this device, so stay tuned. *–Steve Sechrist and Chris Chinnock*

KanexPro to Unveil 2D-to-3D Converter

At the upcoming CEDIA Expo 2011 (to be held in Indianapolis September 8–10), [KanexPro](#) (Brea, CA) will show CubeUp, a real-time 2D-to-3D converter with a built-in scaler.

The CubeUp will take content from 2D video sources and instantaneously convert it into 3D for viewing on 3D-enabled TVs and 3D-based DLP projectors and monitors.

In conversations and e-mail exchanges with Kashyap Khetia, manager of Product Marketing, Insight Media learned that the device includes one HDMI input and one HDMI output for connection to a 3DTV. It will work with source material from PCs, Blu-ray players, set-top boxes and cable boxes. KanexPro said 3D viewing parameters can be fully adjusted at the touch of a button.

Features in the device include manual depth adjustment button, support for 2.75Gbps data rates, full HD 1080p/60Hz resolution, HDCP and EDID compliance, 12-bit color depth, 5VDC external power supply, real-time hardware conversion from 2D-to-3D, built-in scaler for provisioning 2D formats, automatic video enhancement, 2D and 3D bypass mode, HDTV or projector 3D conversion mode, image sharpening — spatial adaptive (gradient based), adaptive edge enhancement and bad-light correction. It has support for pass-through, up-scale, 3D side-by-side, 3D top-by-bottom, 3D frame-packing and 3D page-flip formats.

The product is scheduled to ship starting in September at a suggested retail price of $299.

A second product with 3D capability has also been just released. It is a HDMI Extender based on HDBaseT technology called the "The Long-Runner 5PL." It includes all the five main elements of a typical A/V install: audio, video, power, control, and the distance needed for versatility and swift installation. A product data sheet can be found [here](#).

Among the many features and capabilities of the new product, the following are included: the ability to route high-resolution HDMI signals with full HD 1080p from the source up to 330 feet to a HD display and full 3D (all formats) and resolutions up to 4K x 2K with multi-channel audio, IR and RS-232 extension over a single low-cost CAT6 cable.

The Long-Runner 5PL is now on sale for $799. *–Arthur Berman*

KanexPro, Kashyap Khetia, 888-644-4149 x117, kashyap@kanexpro.com

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Triaxes Vision Seeks to Standardize Multi-view Formats

In our courses about autostereoscopic 3D content creation under Insight Media University, we talk about three basic approaches to packaging and delivering multi-view images to AS-3D digital signage displays. These include:

- Models and Scenes — uses a game engine and instructions on how to render the multi-view images
- Interleaved (or n-view) — samples parts of the multi-view images and packs them into a single video frame
- 2D+ depth — a 2D image of a scene plus the depth map, which is processed at the display to create the multi-view images

Almost every AS-3D developer has a preferred approach and many offer proprietary solutions. Interleaved solutions can be compressed, but care must be taken as the images consist of multiple views assembled as a series of columns at an angle. With 2D+Depth, the 2D image can be compress with standard encoding tools, but the depth map cannot.

Now, a company called Triaxes Vision (Tomsk, Russia) is proposing a new format that it hopes will become a new standard for consumer broadcast and digital signage distribution. According to Dmitry Bimatov, senior software developer at Triaxes, "Our aim is to make a universal format compatible for 2D HD, with glasses and autostereo displays so that a broadcaster can transmit just the one channel and the picture will be decoded according to the display consumer's have."

While there is no name for the new format, it consists of a stereo pair plus the depth maps for each image. Such an approach can solve compatibility and image quality issues perhaps, but there will clearly be a penalty in terms of bandwidth. The company has talked to the BBC and BSkyB about the format, and will showcase it at the upcoming IBC event. We may have more in next month's edition too.

One of the problems the new format is meant to address is the recreation of objects in additional views that were occluded in the original view or views. These occluded areas are hard to recreate, as there is no information in a 2D image. If a stereo pair of the scene is available, there is a lot more information. What Triaxis proposes is to simply create depth maps of each stereo pair and use this information to much more accurately recreate occluded zones.

It already has some experience in doing this. On its Website, it describes its 3D video server and media player. The server accepts stereoscopic images in a dual file or side-by-side format and then generates the two depth maps. The images and depth maps are then encoded in MPEG-2 or MPEG-4/AVC formats. These streams can be packetized for transmission over the Internet using TCP/IP or over a broadcast network such as DVB-T.

This data is received by the media player, where it is decoded and used to create the multi-view images the particular display wants. In general, the output display can be a 2D display or a glasses-based stereoscopic displays as multiple formats are supported, allowing different types of display on a digital signage network, for example. With this information, users can adjust the depth of the background and foreground objects independently to optimize the 3D effect.

If all this sounds vaguely familiar that because it seems to be partially based on technology developed by Philips and licensed and improved by Dimenco. In fact, Triaxes is a partner and distributor of Dimenco displays in Russia.

Triaxis Vision (part of the Elecard Group) is actually a 10-year-old company that has been doing 3D and AS-3D production all that time. Currently, it offers several software packages:

- Triaxes DepthGate, which is a stereo to multi-view conversion product offered to enterprises on a software-as-a-service business model.

- Triaxes NetJet captures two video streams, synchronizes them, converts the stereo-video into a glasses-free 3D format, and broadcasts output via IP or DVB-ASI in real time.

- Triaxes SpiceBox converts 2D video into 3D format by generating a depth map for each frame. The system automatically detects scene changes, analyzes the source video's scenes, and performs auto adjustment and depth information analysis for each scene.

Customers can also leverage these software tools to buy conversion services from the company directly. *–Chris Chinnock*

Triaxes Vision, +7 (3822) 70-14-29, info@triaxes.tv

Leawo 2D-to-3D Conversion Software Launched

Leawo Software Co., Ltd. (Shenzhen, China) has added 2D-to-3D conversion capability to the company's Video Converter V4.1.0.0 software product.

The Leawo Video Converter can work with a wide variety of media file formats, including downloaded movies and homemade videos in formats like AVI, MP4, MPEG, MKV, MPG, VOB and WMV.

The 2D videos can reportedly be converted to 3D videos with the use of only a few simple steps and without any technical knowledge.

The output 3D video is compatible with some 3DTVs and other 3D display devices.

Various 3D setting modes (red/cyan, blue/yellow, interleaved, side by side) are provided. Capability to adjust the 3D depth effect is also included. The output 3D video can also be cropped, trimmed and watermarked to achieve the best effect. Other functions are also included, such as video and audio parameter setting, previewing, and screenshot capturing.

Users can download this video converter for free for evaluation here.

The software can be purchased for $29.95 here. The price includes lifetime upgrades as they become available. *–Arthur Berman*

Leawo Software Co., Ltd., Steven Zhang, +86-755-26553081, sales@leawo.com

DDD Doing Well With Conversion Technology

DDD Group (Santa Monica, CA) is a publicly traded company that has been developing 2D-to-3D conversion software since 1993. Its first license agreement was to Sharp back in 2003. Since then, its technology and financial position has improved quite a bit. Recently, it told investors that sales for the first half of 2011were strong, and it now expects H1'11 sales to reach $2.3M.

Sales for 1H'11 were up 138% compared to the same period in 2010, and up 121% over 2H'10 sales. Gross margins are expected to reach 96%.

So where is DDD seeing success? Primarily, income is coming from its TriDef Software, which is sold as a standalone product or as a digital version for incorporation into OEM customer platforms. These latter customers provide a royalty payment to DDD.

So far, DDD has been successful licensing its software to the likes of Intel, Samsung, LG Electronics, CMI and two others. Samsung has been a strong customer, incorporating the technology into select TVs, Blu-ray players and monitors. Based on royalty reports, the number of units of TriDef software shipped by licensees in the TV and PC markets jumped 268% over the first half of 2010. Additional products will ship in the 2H'11.

DDD is also working with CBS to convert content for use on a rumored 3D channel. This service, which is offered for about $10K per minute of converted material, features the use of the company's automatic conversion technology and the use of a trained stereographer to optimize the conversion. (See related story on ADS' new conversion solution for 3D network operators.)

In addition, in July, DDD announced it had signed a two-year license agreement with a leading mobile phone manufacturer to bundle DDD's TriDef 3D conversion software products with the manufacturer's latest "glasses-free" 3D smartphones.

DDD did not name the manufacturer of the smartphone, but dropped a bunch of hints, like:

- The 3D smartphone will shortly be available from mobile carriers and retailers in Asia, Europe and the United States.
- It is based on an OMAP processor demo they showed at the Mobile World Conference in Barcelona last March.
- The smartphone uses the Android O/S.
- It has a four-inch autostereoscopic screen.

Based upon these hints, we suspect the phone is the LG Optimus 3D (or Thrill 4G in the U.S.). DDD will receive quarterly royalties from the manufacturer based on the volume of 3D smartphones manufactured. Production of handsets, including the TriDef software, began in H1'11. The agreement also includes a $120K development and license fee.

DDD also said that it has managed to expand its patent portfolio, adding further patents in the U.S., Japan, China and the Philippines for its 2D-to-3D conversion and 3D encoding

technologies. This brings the total number of currently issued patents to 53 across 24 countries. *–Chris Chinnock*

DDD, Chris Yewdall, 310-566-3340, cyewdall@ddd.com

ADS Offers 2D-to-3D Conversion to TV Networks

Advanced Digital Services (Los Angeles, CA) has developed a 2D-to-3D conversion service that is aimed at networks that have a need to fill air time with 3D programming. The service, which will be marketed to studios, production companies and content owners with a catalog of legacy content, is a hybrid solution that features some automatic conversion along with manual intervention as needed. The idea is to provide a conversion capability that offers the quality needed for broadcasters but at a fraction of the conversion cost of a Hollywood class movie effort.

ADS is an established postproduction house that offers media kit creation, high-definition conversions and editing. The company has 86 employees, but it recently trained three stereographers to fix problems with automatic conversion and offer this new service.

ADS can convert 2D content to 3D for about $3K–$5K per minute and can complete a one-hour TV show (42 minutes of video) within four to 10 days. By comparison, high-end Hollywood postproduction houses charge $50K–$100K per minute. That's because they convert manually on a frame-by-frame basis using rotoscoping techniques to isolate each object and assign a depth. This can take months for a film conversion and is not a cost-effective solution for 3D network operators.

For certain effects, ADS does use 2D-to-3D automated conversion equipment from vendors, including JVC, Sony and Teranex. But CEO Tom Engdahl stressed that the automated conversion technology is just one tool in ADS' toolbox, not the central mechanism. He said the 3D material ADS produces has been validated by studios as meeting their quality standards, but no studio customers were disclosed.

The conversion service is suitable owners of episodic television content, documentaries, animated features, music videos, sporting events, commercial advertisements and infomercials. The resulting converted 3D video footage is optimized for cable and broadcast television, Blu-ray packaged medias and pay-per-view, the company said. In addition, ADS' processes include 3D support for mobile devices and for services such as Netflix, iTunes and Hulu.

Engdahl said science fiction, space programming, and content with open spaces, ranches, aerial shots, car races, CGI and animation work particularly well in 3D, but some shows like *The Office* are not as effective due to the shaky handheld cameras and limited depth. *–Chris Chinnock*