

# 3DNA

A central image of Thor, the Norse god of lightning, holding his hammer Mjolnir aloft. He is wearing his iconic black and red armor and cape. The background is a dramatic, blue-toned scene with lightning bolts striking down. Several faces of other characters from the Thor franchise are superimposed on the background, including Odin, Jane Foster, and Loki.

The Newsletter of the International 3D  
& Advanced Imaging Society

November 2013



INTERNATIONAL  
3D & ADVANCED  
IMAGING  
SOCIETY

## HIGHLIGHTS

- What Gravity's Box Office Triumph Means
- INTERVIEW: Onsite Media's Simon Craddock
- China Box Office Surges 35 Percent
- 3D Holiday Box Office Projections

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## Welcome Letter

Dear Friends,

### 3D

In our last issue of this newsletter, we wrote of the excitement for a new 3D movie being released called 'Gravity.' The months of speculation and good buzz from the London production community working on this movie had been coming for almost a year. And then it hit.

Gravity has been a box office phenomenon worldwide with an average of 80% of all tickets sold in 3D. It has been a triumph at the creative level, the marketing level, the PR level, and (most importantly) at the exhibition box office. By working together, these critical legs have supported what has become nothing short of a spectacular worldwide success.

The movie has become a case study for how to do it right. 'Gravity' was created and promoted as a 3D "must see." Exhibitors scheduled 3D showings at every opportunity, and consumers responded accordingly.

Now the biggest October release of all time, grossing more than \$400 Million Dollars worldwide (and counting), and driven by moviegoers age 30+, the hit has generated "new laws of gravity."

### 4K

At the upcoming Consumer Electronics Show in January, CE players from around the world will walk the aisles of the Las Vegas Convention Center and will be greeted by a spectacular array of autostereoscopic and ultra-high definition / 4K technologies. In response to these "advanced imaging" evolutions, you'll notice in this month's newsletter a new section, entitled "UHDNA."

Combined with our 3DNA Updates, UHDNA will be a regular companion to this newsletter to prepare you for the constantly changing environment in which we work.

These newsletters together are designed to make certain that you have the very best information possible to advance your own career and the companies that you work with.

Enjoy your 3DNA and the new UHDNA.

Warm regards,



Jim Chabin  
President  
International 3D & Advanced Imaging Society

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## What Gravity's Box Office Triumph Means for the Future of 3-D Film

By Jennifer M. Wood  
Oct. 22, 2013, 6:30 A.M.

It happens every two years. After months of debating the financial viability of 3-D in the movie marketplace, a film comes along that silences the naysayers who describe the technology as nothing more than a money-grubbing gimmick. In 2009 it was James Cameron's *Avatar*. With 2011 came Martin Scorsese's *Hugo*. And earlier this month, Alfonso Cuarón's *Gravity* became the most recent reminder of the genuine storytelling power that stereoscopic filmmaking holds.



Dr. Ryan Stone (Sandra Bullock)

“One of the things that is great about *Gravity* is that Alfonso embraced 3-D as a full-fledged storytelling tool,” says Namit Malhotra, founder and CEO of Prime Focus World, the company that converted *Gravity*'s 2-D elements into 3-D and also lent a technical hand to both *Avatar* and the 3D re-release of *The Wizard of Oz*. “Not only did [Cuarón] want to ensure that the 3-D was an integrated and value-added aspect to his film, he decided at the beginning to make it so. This approach allowed 3-D to be a supporting element and enabler of the outstanding story. And what's great is [that] audiences are validating that decision.”

In its opening weekend, 80 percent of all *Gravity* ticket-buyers chose to see the film in 3-D (compare that to 71 percent of *Avatar*'s opening audience). The following weekend, that number rose to 82 percent and remained steady through the third weekend. “I think that an increasing number of people no longer feel that it's worth paying a premium to see a film in 3-D, unless there's something really unique and interesting about the 3-D

presentation,” says Bruce Nash, founder and president of Nash Information Services, LLC and publisher of movie analysis site *The Numbers*. *Gravity*, with all its eye-popping visuals, is the rare kind of movie that demands to be seen as it was intended: in the theater, on as large a screen as possible, tub of popcorn and 3-D glasses firmly in place.

The fact that we're even still talking about Cuarón's cinematic journey into space weeks after its initial release is a testament to its originality. After setting a new October box office record with its \$55 million take in its opening weekend, the sci-fi drama continued its winning streak into week two, when it generated another \$44.3 million in receipts (an audience drop of just 21 percent). And it became the highest-grossing October film release ever this weekend, where it easily crushed any purported competition from newcomers like *Carrie* or *The Fifth Estate*.”

Few people are more excited about the attention being paid to Cuarón's film than Jon Landau, producer of *Avatar* and COO at Lightstorm Entertainment, who told *WIRED* that *Gravity* “seamlessly integrated 3-D into some of the most outstanding visual effects ever created. The combination of story, performance and 3-D visuals made for one of the most memorable experiences in the theater that I can remember in a long time.” It's strong praise, particularly from the previous poster boy for the rebirth of 3-D cinema. When *Avatar* hit theaters in 2009, it was heralded by some as the movie that would change the face of 3-D film, but in the four years since, audiences have largely been subjected to the same 3-D cycle of kiddie CGI, in-your-face concert films, nature documentaries, cheesy horror movies, superhero flicks and studio tentpoles that would be unsatisfying in any dimension (can you say John Carter?). Rather than changing the face of cinema, 3-D technology has too

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often been used to charge us more for an experience that feels superficially enhanced, something that hasn't been lost on audiences asked to pony up more money for 3-D movie tickets.

"Movie audiences — now more than ever — are savvy," says John Fragomeni, president of Mirada, a production company he runs alongside Guillermo del Toro and a veteran visual effects supervisor who counts *Pacific Rim* among his credits. "If 3-D is used in a gimmicky way, it often triggers a negative viewer and critical response, because they know when it's enhancing the story and when it's not. 3-D works best when the technique is used like any other filmmaking tool — be it CG, SFX, lighting, etc. — that's applied in service to the story. In the case of films like *Gravity*, *Pacific Rim* and *Life of Pi*, the 3-D helps immerse the moviegoing audience into a fuller experience, which can be more intimate and emotional."

But when so few films fit that bill, coupled with the growing number of moviegoers who are making their preference for 2-D widely known, why do studios keep churning out 3-D movies at all? The answer is simple: overseas markets.

In a *Forbes* article about "the necessary evil of 3-D," film critic Scott Mendelson argues that "in today's marketplace, where a big-budget film's financial fate is often decided by overseas dollars, it's almost fiscal self-injury not to make the call. For anywhere from \$10 million to \$20 million extra, you can add around 15 to 20 percent to your opening weekend grosses (think around 40 percent of tickets sold via 3-D and prices around 33 percent higher per 3-D ticket) and around 15 percent to your total domestic box office, with an unquantifiable upshot for foreign grosses. For numbers like that, why wouldn't you convert your purely commercial popcorn genre film to 3-D?"

The real problem, according to IMDb managing editor Keith Simanton, is not with the technology, but with the content to which the technology is most frequently attached. "3-D can either be the hood ornament on an Edsel, like *Wrath of the Titans*, or the star emblem on a Mercedes-Benz hit like *The Avengers*," says Simanton. "The perception of depth does not lead the perception of good taste astray." (Though he does include higher ticket prices and uncomfortable glasses as

two of the "many direct and negative associations people have with 3-D.")

Despite its continued description as "game-changer," at the end of the day can *Gravity* — or any other movie that successfully utilizes 3-D as a tool for immersive storytelling for that matter — truly change the course of which films studios deem worth of being given the 3-D treatment? Will *Gravity*'s success inspire a rash of pictures that look at 3-D as a meaningful way to enhance the storytelling, and not just the studio's bottom line?

Nash, for one, isn't expecting the market to be flooded with films as similarly well-suited to 3-D technology anytime soon. But he does see *Gravity* as a positive step forward for innovative filmmaking in general. "I don't expect it to have a huge impact on 3-D movies over the next year or two, although I'm hopeful we might see a resurgence in films that depict space more realistically. I think Cuarón will be very influential in the long term though. I'm sure there are many young filmmakers who will be inspired by *Gravity*."

Simanton, too, sees *Gravity*'s true impact as a good news/bad news proposition. "The film's success has given [3-D] new life and new positive figures to point to," he says. "But, and this is inevitable, right around the corner will be some mega-bomb that will tout the format and 3-D will once more be pilloried as a gimmick. Until *Avatar 2* comes out."

<http://www.wired.com/underwire/2013/10/gravity-future-3d-movies/>



## THE 3D INTERVIEW: Onsight Media's Simon Craddock

Based in London, ONSIGHT is a leading production facilities company, specialising in services to the film and television industries. With 2 decades of experience, they provide high-end camera and equipment rental as well as post production solutions in major formats such as 2D, HD, 3D and 4K. Renowned for groundbreaking 3D, the team has worked on a number of award-winning and critically acclaimed productions for Sky and the BBC, including Kingdom of Plants 3D with David Attenborough, Micro Monsters 3D, Mr Stink and Little Crackers.

*3DNA: ONSIGHT has been at the forefront of some of the best 3D being produced anywhere. What was your first 3D project? What was your most recent 3D project?*

SIMON: We were involved in the world's first live 3D sports broadcast for the Rugby Union Calcutta Cup in 2008. More recently, ONSIGHT's first major 3D project was Flying Monsters 3D with David Attenborough, which became the first 3D programme to be awarded a BAFTA. It incorporated live action and CGI to recreate the prehistoric world, requiring extensive planning that we oversaw from the shoot through to post and delivery. Since then, we have continued to develop our stereoscopic services to meet our clients' requirements. We just completed Sir David Attenborough's latest series for Sky, Micro Monsters 3D, unveiling the world of insects with macro photography. It's really something and involved a 5K workflow. This series also marks ONSIGHT's fifth 3D project with Atlantic Productions and Sky, behind Colossus Productions. Our team is also in production on a number of stereoscopic jobs, such as Pandas 3D for Oxford Scientific Films/Sky, Hidden Kingdoms for the BBC NHU and a new feature film for 2014.

*3DNA: There is probably not a more credible person in the world using 3D as a tool than*



Sir David Attenborough has generated #1 ratings for Sky TV with his documentary series. The latest in the series, with Attenborough as host (pictured above), is Micro Monsters 3D.

*David Attenborough. How does his involvement enrich your 3D storytelling?*

SIMON: Sir David Attenborough has a remarkable ability to tell a story and engage audiences. With the immersive quality of 3D, his presence is only made stronger. His 60-year broadcasting career proves he has the experience and fortitude to try new things editorially and in terms of technology. 3D has come on leaps and bounds since we first started working with Attenborough and we are proud to have collaborated with him, Atlantic Productions and Sky. His voice is internationally renowned and he is a national treasure in the UK.

*3DNA: What topics lend themselves best to 3D?*

SIMON: I believe a variety of topics do when they fit the script. Action movies will continue to lend themselves to 3D and be made in this genre, but more and more scripted drama is being combined with 3D. Quality 3D gives viewers a different impression of the story; a more lifelike one when the roundness of the 3D image makes the drama more realistic. Because of this, you could say the viewer might experience a stronger connection with the content. We know natural history and wildlife is also very effective for entertainment and educational purposes by immersing the viewer further into a world often out of reach.

*3DNA: For someone who has been producing 2D for some time, what is the most important thing to understand about creating 3D content?*

SIMON: There are many components to understand about 3D filmmaking and that's where we come in, guiding the production team through the technology challenges from shoot to post. Really, from the onset, planning is essential across all areas; the correct equipment needs to be specified and supported by an experienced 3D team. 3D is there to complement a story and enhance the storytelling; it will not make a bad script into a good one.

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*3DNA: London has been at the forefront of 3D since its re-emergence in 2009. What is the 3D community like in London/U.K.?*

SIMON: It is a small, but growing 3D community. It's a community servicing productions across Europe as well as Hollywood studios. Importantly, some of the best 3D talent in the world is based in the UK. The ONSIGHT team and I feel we are in a privileged position, offering expert 3D solutions and collaborating with a global leader in 3D, like Sky.

*3DNA: There seem to be many points of view about how much depth content should really have. Some feel that the current 3D movies coming from Hollywood may be a little too flat. Do you feel bold about the use of depth in 3D content? So you hesitate to push the envelope the bit? How do you determine what's best?*

SIMON: As a facilities provider, we work within the confines of our clients' specifications to create the desired look. The issue of depth may be debateable, but it has to be accurate technically and it should be used to enhance the story in the right places. Now that audiences are becoming more familiar with 3D, growing depth budgets are a natural consequence.

*3DNA: What do we, as a global community, need to stay focused on right now? What should we as a group be relentlessly promoting?*

SIMON: Ultimately, delivering quality 3D, in order to demonstrate what can really be achieved with this format. Sky will only accept quality 3D and it's to their credit that standards are kept high on their channel. Bad 3D is the enemy - viewers need to have a positive experience. Like building a good 2D storyboard, integrating 3D into the project from the very beginning is crucial.

*3DNA: The BBC has announced that their "experimentation" in 3D will take a backseat for a while. Virgin seems to be as aggressive as ever in providing 3D, as is BSkyB. Where do you think things stand as we move into a*

*future of ultra hi-def technology? How do you feel about autostereo?*

SIMON: ONSIGHT has worked with the BBC and Sky on many of their 3D ventures. We must remember that the BBC is a public service broadcaster, and as such, cannot be seen to spend too much money on any technology that is not mainstream, especially with a licence fee freeze. With 3D, they have merely hit the "pause button". Both Sky and Virgin can take a longer-term view, with 3D adding to their subscribers experience. 3D in the home is here to stay. Once the BBC decides that it is mainstream enough, they will have to continue in a more serious way. 4K technologies will further promote 3D. ONSIGHT has been shooting and posting 3D for a number of years already. Autostereo screens are getting better and better - look out world!

*3DNA: Of the content that you have not created, what productions have you admired?*

SIMON: More recently, Life of Pi instantly comes to mind. The film showed a great balance of drama and action. The 3D was fitting and seemed to be very much part of the visual design by Ang Lee. It's a perfect example of where the roundness of 3D works fantastically well in a drama setting.

*3DNA: What has been your favourite 3D movie to date?*

SIMON: I want to choose 3! Avatar; simply because it was a huge landmark for 3D. Life of Pi; as it combined a great storyline with jaw-dropping 3D, this is when real magic can be created! Gravity; as it has made many of the 3D naysayers turn in their tracks and see the value of the format.

*3DNA: What excites you most about 4K? What does it do that lowed-def production just doesn't accomplish as well?*

SIMON: Every time we make these technology leaps the viewer's experience improves. ONSIGHT has been working in 4K for a number of years and has built the infrastructure to achieve a 4K-delivery pipeline.

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## Imax's Greg Foster on 'Gravity's' Appeal, China and 'Hunger Games: Catching Fire' (Q&A)

A co-founder of the 3D Society, Greg Foster and IMAX have been at the forefront of 3D innovation since its modern re-introduction into theaters. The Hollywood Reporter recently interviewed Foster.



Typically, Foster can be found meeting with filmmakers in his Santa Monica office or crisscrossing the globe, tending to 650 commercial Imax theaters in 56 countries, including 350 sites in North America (not including 125 museum and other institutional locations). The married father of three grown sons remains a fierce family man and won't receive email via his smartphone. He recently sat down with THR to discuss what Hollywood can do better and why Imax is on such a roll.

The large-format czar talks about the next international push and why Warner Bros. is the St. Louis Cardinals of entertainment.

At a time when movie going in the U.S. is down year-over-year, Imax Corp. is on fire. The large-format exhibitor, once relegated to museums, is responsible for more than 15 percent of Gravity's gross, with moviegoers shelling out \$20 or more a head in big cities. The Toronto-based, 550-employee company has seen its revenue balloon from \$102.7 million in 2008 to \$284.3 million in 2012 thanks in large part to Hollywood tentpoles, while its stock has rocketed from \$3.35 a share in early November 2008 to around \$30 today. Imax's global creative czar is **Greg Foster**, 51, whom Imax Corp. CEO Rich Gelfond promoted earlier this year to CEO of Imax Entertainment in recognition of Foster's leadership in building the company's commercial slate and establishing relationships with studios. Foster, who spent 15 years at MGM before joining Imax in 2001, also oversees the documentaries financed and produced by Imax. The distributor will release a total of 40 films this year. Tentpoles can see an enormous boost from their Imax runs; it's not uncommon to add \$70 million or more to their bottom line.

*THR: Fanboys traditionally have been a big market for Imax, but Gravity is luring an older crowd. Why?*

GREG: Gravity is a seminal movie for us. There's a whole crop of moviegoers -- I call them the "get-around-to people" -- who never see a movie in a theater but who are coming to Gravity. There's definitely a connection because of all the Imax space documentaries we grew up seeing in museums. Also, Gravity is a single-themed narrative, but it talks about some deep ideas that people are responding to. It gives me faith that people are interested in exploring what life is all about versus just wanting to see things blow up.

*THR: What can Hollywood learn from Gravity?*

GREG: When there's so much blowing up, people become numb. When I'm at an investor conference and there's six or seven meetings a day, I always find myself thinking after the third or fourth meeting, "Did I just say the same thing?" That happens with movies sometimes, where you'll be in the middle of a film and you ask yourself, "Didn't I just see that?" They start to all feel the same. Gravity is not more of the same.

*THR: What is the secret to Imax's success?*



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GREG: Filmmakers are at the core of what differentiates Imax from everyone else, and we work with them for months. We don't finance their films and we don't approve the scripts, but we are a partner in the process. We do every James Cameron movie, every Chris Nolan movie, every Zack Snyder movie and Peter Jackson's Hobbit films. Chris uses Imax cameras for most of his films, including [his next film] Interstellar. He was designing Interstellar with Imax in mind before one frame was shot. If Chris wants to shoot a line of taxicabs, we will sign up in advance.

*THR: With every studio releasing some movies in Imax, how do you prevent films from cannibalizing one another?*

GREG: It's putting our long-term relationships first. There are going to be times when a studio [wants] something extended into theaters beyond what was agreed to, and there are times when the same studio will have a movie open, and the movie doesn't turn out to be what everyone hoped it would be.

*THR: How much does Imax's future growth depend on international?*

GREG: About 60 percent of our business comes from overseas, including 20 percent from China. Of the 300 theaters we operate overseas, 125 are in China. We just made a deal to build 125 theaters with Chinese exhibitor Wanda. Rich Gelfond had a strong vision about China and is responsible for our business there. In China this year so far, Imax carried four of the five top-grossing movies: Iron Man 3, Pacific Rim and two Chinese movies, Young Detective Dee and Journey to the West: Conquering the Demons.

*THR: What's next after China?*

GREG: Southeast Asia is booming, and we want to be a part of that boom. We recently struck a deal to build more than 20 new theaters in Indonesia, further boosting our presence there. Our South Korean presence is also growing, and Gravity recently scored

the highest opening average theater gross of any movie in Imax's history, or \$107,900. That's insane.

*THR: Do you release local-language films in other countries?*

GREG: We program about 25 Hollywood titles globally and carry another five or seven Hollywood titles internationally that we can't play domestically because of scheduling conflicts. We have another five or seven titles that are local-language movies, such as Stalingrad, Imax's first 3D co-production in Russia. The movie [which opened in mid-October] has already earned more than \$40 million in Russia, smashing records.

*THR: Imax once operated only museum and institutional theaters. Where does that business stand today?*

GREG: It's fantastic. We finance and produce the documentaries for roughly 125 theaters in museums, science centers and aquariums. These films are turtles, not rabbits. If you look at the box-office chart, you'll see that [2002's] Space Station 3D is still in the top 60. It's grossed more than \$123 million. These films are hip. Tom Cruise narrated Space Station, Leonardo DiCaprio narrated Hubble. Johnny Depp and Kate Winslet narrated Deep Sea 3D. Cate Blanchett narrates our upcoming Journey to the South Pacific.

# 3DNA

## China Box Office Surges 35 Percent to \$2.7 Billion in First Nine Months of 2013

In just a year, China has now become the 2nd largest movie market in the world, behind North America. The Society's China Chapter will host its annual 3DU Seminar and Society Awards November 25th in Beijing. China consumers are avid 3D movie fans and construction of new screens which are 3D capable continues at a break-neck speed.

China's box-office take was \$2.7 billion (16.43 billion yuan) in the first nine months of 2013, a muscular 35 percent hike over the same three quarters last year, with domestic movies racking up a powerful display in the time period.

The figure of \$2.7 billion is close to last year's total for the whole year, when the industry took \$2.8 billion, according to data from the State Administration of Radio, Film and Television, carried on the official Xinhua News Agency.

The data underline why China has become so important for Hollywood, and why U.S. film execs are actively wooing the market. While the figures give a lift to domestic movies, they paint a less rosy picture for foreign films in the world's second-largest market.

Broken down, the figures show that domestic movies took \$1.57 billion (9.56 billion yuan) in the period, up 94 percent on the previous year, while box office from overseas movies fell 5.2 percent to \$1.13 billion (6.86 billion yuan). Half of the top 10 titles were domestic movies, the SARFT results show.

The highest-grossing movie this year so far is Stephen Chow's interpretation of Journey to the West, which pulled in \$200 million, followed by Iron Man 3, actress-turned-director Vicki Zhao's directorial debut So Young and Pacific Rim.

In another light, signs of an expanding market share for Chinese movies could be viewed as good news for Hollywood, as it eases Chinese government fears that foreign content will overwhelm domestic movies if import controls are relaxed further.

There are still around 10 new screens coming online every day in China, and the demand for content continues to grow.



<http://www.hollywoodreporter.com/news/china-box-office-surges-35-650572>

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## 3DS Tops Charts For Fifth Month Running

Nintendo 3DS Number One Selling Videogame For Second Month In A Row



Nintendo's 3DS handheld gaming system topped NPD sales charts for the fifth month running, beating out both home and handheld systems.

The 3DS undoubtedly benefitted in October, thanks to the enormous success of Pokemon X and Y which sold 4 million units in its first two days at retail.

While many have been critical of the Wii U, the 3DS should serve as a lesson in humility.

Many analysts and critics were dubious about the system when it launched, and it was months before Nintendo saw any momentum. Now the 3DS regularly tops sales charts.

<http://www.forbes.com/sites/erikkain/2013/10/21/wii-u-sales-up-200-following-price-cut-3ds-tops-charts-for-fifth-month-running/>

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## TABLOID EXCLUSIVE! 3D Saves Man's Life!

3D is now becoming a part of the global culture. Not long ago, a national tabloid proclaimed that a woman watching a 3D adult movie had become impregnated. Last month, another story (which seemed more plausible) made the news. As publications seek to include 3D in their human interest stories, your 3DNA editors think it's a sign that 3D is truly becoming a part of the story of our times.

Today's smartphones are more than just a piece of electronic equipment, they often are an all-in-one tool for business, entertainment and so much more. In rare occasions, they can even prove to be lifesavers.

Today a news report arrived by way of CNN about a gas station clerk in Orange County, Florida who survived an attempted robbery thanks to his HTC Evo 3D. According to the report, the suspect fired off one bullet while leaving the crime scene after the clerk unsuccessfully attempted to unlock the store's safe at the command of the would-be thief.

After the suspect took off, emergency services arrived and the clerk complained of chest pain - unaware that the stray bullet had actually hit him in the chest!

Lucky, the only damage received by the clerk seems to be some bruising from the impact of the bullet hitting the phone in his shirt pocket. As you can see in the pic-



ture above, the phone wasn't so lucky and was completely destroyed due to the bullet's impact.

This is far from the first time we've heard of a phone saving someone's life, with reports of flip-phones doing a similar deed going back years. What's most interesting though is that this is the second known report involving an HTC handset - with the first being an incident in 2011 where a Droid Incredible resting a shirt pocket saved a valet's life.

Morale of the story: keep your 3D phone after all. Your editors will keep our eyes posted for the "3D cures cancer" story which is undoubtedly next.

<http://www.androidauthority.com/htc-evo-3d-bullet-312088/>

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## 3DU: DreamWorks Animation “3D, 4K & U”



More than 100 Society members and friends gathered this month for an afternoon's discussion about 3D, 4K, and the entertainment industry's employment picture.



“There is a momentum building for Ultra-High Definition. The standards are incomplete, and we have dozens of areas to work out. But there is an unmistakable commitment to this new technology.” – Pete Lude



Lenny Lipton compared the quality of 3D movies from the 1950's to present. “We need to move beyond the action hero genre to grow the 3D marketplace. In the '50's the studio commitment to 3D was broader than it is today.”



Asked if Directors are getting bolder on using 3D in their movies as a result of recent successes like ‘Life of Pi’ or ‘Gravity,’ StereoD’s Aaron Parry said, “We work with the top directors in our field, and each one is very different. They all bring their own inspired 3D focus and they express that inspiration in their own unique way.”



Sharon Berlin of StereoD and Bill Simon of Korn Ferry International shared their insights about where the job market would be growing in the year ahead. “The vast majority of people who find jobs will do so through a friend of a friend,” said Simon. You may well be placed in a position by a firm like Korn Ferry, but the process of finding a new career opportunity is a little like kissing 100 frogs.” Berlin added, “I am struck by the number of resumes I receive with no contact information on them. It is a simple thing, but if we don't have an easy way to get a hold of you, we can't hire you. Keep the resume short, simple, and to the point, and don't get discouraged if you don't hear from us. Just keep at it. We are looking for great talent.”



Dolby's Roland Vlaicu updated attendees on autostereo's advancements to date. “We think autostereo is an inevitable step in media's future, and the systems are getting better and better.”



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## 3D Holiday Box Office Preview

Before this summer's movie season began, we invited several of the Society's best forecasters to suggest what they thought the summer box office would turn out to be. They were pretty close. We've asked them again to estimate what they think the 3D movies during this holiday season will produce. Below are their projections.

Release Date	Movie	Studio	ACTUAL	3DNA Forecast
Friday, Nov. 1, 2013	Free Birds	Relativity Media	\$32.7 Million	\$100 Million
Wednesday, Nov. 8, 2013	Thor: The Dark World	Marvel / Disney	\$337 Million	\$500 Million
Friday, Nov. 27, 2013	Frozen	Walt Disney Pictures	TBD	\$450 Million
Friday, Dec. 13, 2013	The Hobbit: Desolation of Smaug	MGM / New Line	TBD	\$1.1 Billion
Friday, Dec. 20, 2013	Walking With Dinosaurs	Animalogic, BBC	TBD	\$75 Million
Wednesday, Dec. 25, 2013	47 Ronin	Universal Pictures	TBD	\$180 Million
<b>Worldwide Gross Total</b>				<b>\$2.305 Billion</b>

## GLOBAL SPOTLIGHT: "INSIDE THE MIND OF LEONARDO: 3D"

At this year's 3D Creative Conference in London, Society members were riveted to a 3D documentary on the life of Leonardo Da Vinci.

The Creative Genius and his world is brought to life by acclaimed BAFTA winning actor Peter Capaldi (Doctor Who, In the Loop) in a unique 3D documentary hybrid based on the artist's private journals. The film re-creates the mindscape and ideas of mankind's greatest polymath. Capaldi narrates passages from the journals, capturing the power of Da Vinci's artistic imagination. Following a biographical narrative, the feature traces the artist's thwarted ambitions, anger and sexual desire.

<https://aenetworks.box.com/s/2i4sb8hy8w2j2ztbv2ja>



**Director:** JULIAN JONES

**Producer:** Julian Hobbs, Peter Lovering

**Cinematographer:** Duane Mclunie

**Running Time:** 80 min.

**Language:** English

# 3DNA

## ShowEast: Laser Projectors Take Center Stage

New developments to address complaints that theater screens are too dark will be unveiled at the theater owners confab.



*Getty Images*

Addressing complaints that theater screens, especially when showing a 3D movie, are too dark, the digital cinema industry has been exploring laser-illuminated projection technology. And some of these new developments will be highlighted at theater owners confab ShowEast, which starts Monday at the Westin Diplomat & Spa in Hollywood, Fla.

Proponents say laser light can also offer lower operating costs, reduced power consumption compared to the xenon lamps currently in use, and increased system lifespans. However, others believe the cost of this technology could be a barrier to entry along with regulatory issues since the FDA monitors the use of lasers.

To address these issues, projector maker NEC plans to demonstrate a new laser-light source projector aggressively priced at \$38,000 and targeted to exhibitors with small screens up to 36 ft. Scheduled to become available in March, the new NC1100L 2K projector is being developed to offer brightness of 14-ft-L (using a 1.8 gain screen) with 10,000 lumens of light -- a low enough number that the projector won't require FDA approval.

Jim Reisteter, general manager of digital cinema at NEC Display Solutions, believes this can be an attractive option with its "aggressive" price and a projected "20,000 hours of expected light source usage." In particular, he is looking toward Latin America, where many screens still need to convert to digital, as well as the U.S. as key markets for the technology.

For larger screens, NEC is working through a partnership with Laser Light Engines to develop an option for large screens (70 feet or higher), that will involve retrofitting any NEC Series 2 projector. At this point, that option would need FDA approval; the technology will be demonstrated in Los Angeles during the week of Nov. 11.

On Wednesday at ShowEast, Christie and Dolby are teaming up for a demonstration featuring Christie's prototype 4K laser projector, fronted by a RealD XL Cinema System and accompanied by Christie Vive Audio speakers and amplifiers configured for Dolby Atmos.

Last summer Christie announced that it received a US FDA approval of a variance allowing the sale of these laser projectors for use in a cinema. The first is scheduled to be installed in Seattle's Cinerama Theatre in early 2014.

Barco has already developed a prototype laser projector, but the company believes the economics don't work at this stage.

Similarly Sony is developing a laser projector, though its execs have stated that the company believes the market is still several years away.

*E-mail: Carolyn.Giardina@THR.com*

<http://www.hollywoodreporter.com/behind-screen/showeast-laser-projectors-take-center-649314>

# 3DNA



## How HP Could Reinvent 3D Printing...and Itself

Although 3D printing is a world apart from stereoscopic 3D, we are regularly asked by members about 3D printing and its future. The Consumer Electronics Show, along with its autostereoscopic and UHD flat screens will also spotlight the emerging 3D printing marketplace. So, to keep our readers up to speed, we include this recent article about HP's potential plans.

### The Opportunity

3D Printing is the next Internet. Just like the web revolutionized entertainment, shopping and communication, 3D printing will power a local and personal industrial revolution. It will eliminate the distance between idea and product, unleashing the creativity of geniuses and imbeciles alike. Some will make amazing physical objects that improve our lives. Others will build a clone Kardashian army to rule Los Angeles. And like the Internet, 3D printing will create entire new categories of jobs that are impossible to explain to your parents.

3D printers are evolving fast. It's just a matter of time before our breakfast, drugs, and dinner tables come out of one. Need a new house? Get dirty looks from Frank Gehry as you download and print your own Guggenheim. Don't want to look like sausage at the royal wedding? Print a new shirt that actually fits. Dog eat your Legos? No need for a messy extraction; print replacements. Trouble finding the perfect gift? 3D printers can make jewelry, crafts, or a new liver for that college buddy who had one thousand too many.

CHART: Here is my brief collection of industries with 3D applications, the commercial readiness of the technology, and who the likely users would be. (Red arrows indicate uses across customer segments.)



Don't expect to print a homespun iPhone 6 just yet. 3D printers are just starting to mix materials and create complex gadgets. They also can't do large volumes. For that, you still need Foxconn. Things will change as new capital fuels innovation and lowers prices. Machines by Pandabot will cost around \$800 and Makerbot sells a \$2200 model. Piper Jaffray projects 3D Printing to be a \$1.5B market in 2012. Wohlers Associates predicts it will be \$6.5B by 2019. But don't try to deposit analyst predictions at Chase. Mayan apocalypse permitting, a lot will change before then. An aggressive entry by a cash-rich market-maker is one of them. That company could be HP.

### Why HP?

Are you sick of all your MacBook-toting friends lusting after your HP laptop? Do the beeps from your HP Deskjet put your lover in the mood? OK, you get the idea - HP isn't the sexiest consumer brand these days. Their PC's are a low margin stepchild often offered for adoption. Printers are also a low growth business that can't stop printing money. Those inks cost more per ounce than caviar. Krug champagne filtered through Queen Elizabeth's hat would cost less. That kind of cash is a tough habit to give up. But physical consumer products isn't where HP sees itself. Enterprise hardware, software and services seem to be its true loves, but polyamory has a price. It turns HP into a spork - a clunky multitasker that mangles every menu item at KFC.

The good news is the recent combination of the printing and PC businesses positions that business unit for a clean break and a possible entry into 3D printing. Here are some reasons this makes sense:

### External

Endless possibilities: 3D printing is the first physical technology that can also go viral - by combining design, crowdsourcing, social sharing, web services, and physical products.

The physical world is still where all the action is. For all its amazing growth and innovation, a whopping 90% of all transactions still happen in the real world. As every other competitor goes mobile or digital, contrarian opportunities to double down on the physical world open up.

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**Green:** 3D printing is a green technology. As fuel costs rise, printer “cartridges” would weigh less, consume less space, and be cheaper to ship than finished goods. By increasing the volume and efficiency of these printers, HP can put a legitimate green wind in its sails.

**Political goldmine:** Republicans and Democrats talk about US manufacturing and small business job creation. 3D printing is like a gift from bipartisan gods. It will allow small businesses and individuals to make and sell things they previously had to learn Cantonese to do. Plus, this is a golden opportunity to make the printers themselves domestically – before they make themselves. A great American industrial story in waiting. In fact, GE is already pursuing that in commercial markets. HP could dominate the small business and consumer segments.

## Internal

**Consistent model:** HP’s lucrative razors and blades model for ink makes sense for anything that needs refills, except beer. There’s plenty of opportunity to innovate around the composition, procurement, distribution, and application of all the “inks” required for 3D printing. Control of the materials supplies alone is worth its weight in magenta cartridges, just ask China.

In fact, it’s a win for the entire value chain. HP can use its existing distribution network to reach many of these small business customers – through Staples, Best Buy and others.

**Deeper customer relationship:** Early generations of 3D printers will be a boon to the very large and lucrative small business segment. From printing custom clothes to toys and auto parts, HP can establish a deeper, ongoing relationship with a group of customers they already serve. Except this time, their product won’t just print invoices, but make an actual product sold by those businesses. It’s a major step up. That lack of focus could kill the company, no matter how many strategy consultants scrawl “synergy” on HP’s whiteboards.

**Deep R&D pockets:** No major player with the size or recognition of HP has entered the space yet. The company spends \$3.2B a year on R&D. By redirecting a fraction of it, HP can also single-handedly move the market through brand recognition, marketing, and distribution. The resulting scale will drive down costs of printers and materials.

**New Customers, new services.** This gives HP a way to attract new commercial customers. 3D printing juggernaut Stratasys is already valued at \$1.3B and its stock has tripled in the last year. By entering this space, HP can sell other software and services to their new commercial printing customers.

## Food for thought

Turning the world into your inkwell is no easy feat. It’s like the old adage about how to make a sculpture – you have to cut away whatever doesn’t look like it. If the company wants to try, here are a few thoughts for HP’s next cocktail party:

**Focus:** Any good 3D printer is likely to find uses never imagined by the manufacturer. So, flexibility is key. That means letting the best technology decide which verticals to pursue. The first generation of printers will likely suit hobbyists and small businesses, not raging masses of Black Friday zombies.

**Innovate the business, not just the product.** There’s no shortage of promising technologies, but many of the most interesting innovations in 3D printing will be in creating new business models, communities, apps, and distribution methods. Consider Ponoko. Like FedEx Kinkos, Ponoko allows customers to print their designs through networked printers anywhere in the world. No more waiting for lead-encrusted Chinese “Barbeez”.

**Acquire:** I’ve seen firsthand how a large company can crush the soul of whatever it acquires. HP can reduce some of that risk by focusing on technologies that fit their existing customer base and distribution channels. Buying a larger player, like Stratasys would be an uneasy fit without a strong vision for linking it to other HP services.

**Experiment:** With plenty of cash, HP doesn’t have to bet the farm on any one technology. It can afford to experiment.

**Materials.** The procurement and differentiation of 3D “inks” will determine if HP can be as profitable in 3D as it is in 2D. After choosing the best printing technology, HP should have its scientists evaluate which materials have the most potential for developing new IP...as long as my Barbie’s model cars don’t cost \$2,700 to print.

These are exciting times for those of us who still enjoy the 3-dimensional world. I personally won’t be satisfied until we can print at the molecular or subatomic level. After all, why should we need anything but neutrons, protons and electrons to build our dream home...or spouse? Until then, HP can play a big role in shaping our physical world, but probably not in its current state.

<http://www.forbes.com/sites/stevefaktor/2012/10/15/how-hp-could-reinvent-3d-printing-and-itself/>



# 3DNA

## The Next 3D Frontier? - 3D Printers

When the Consumer Electronics Association wanted to feature a discussion on 3D Printing at their October Futures Forum in Los Angeles, they turned to the Society. We turned to senior strategist for Hitachi, and 3D printing expert, Eric Schoss. We asked Eric to introduce our readers to the topic, and following are his introductory insights



Eric Schuss, Director of Industries,  
Hitachi Solutions

In a small retail store in Pasadena, California, a device no bigger than a PC quietly whirs and beeps like R2D2. Like the movie icon, this robot is smart, elegantly designed, and functional. But this robot, named Bukito, does what R2 could not. Bukito, as one of the new generation of 3D printers now available, can fabricate just about anything.

As part of the 3D industry, you've probably already been asked by friends, family, or colleagues about the hype surrounding 3D printers. Are they just for the business owner? What can these printers make? Do I need one?

3D printing is different from traditional 3D machining techniques in that solid objects of virtually any shape are made from a digital model, i.e. a CAD file, instead of removing material by cutting or drilling. 3D printing uses an additive process by which successive layers of material are laid down or printed to create objects. Right now, toys, jewelry, figurines, and even bones and organs are being printed on 3D printers.

This particular 3D technology has been used in business and industry for nearly 30 years, but it is now making a move into the private sector. In fact, in 2012, the market for 3D printers and services was \$2.2 billion worldwide, and in 2013, it is estimated to be \$2.7 billion.

The entertainment industry, already embracing 3D visuals, is an obvious growth market for 3D objects. Now, there are several new companies generating innovative, 3D printing concepts, giving the entertainment market an exciting new way to reach the consumer. For more information on this impressive technology and the 3D market, go to [www.3dprintingindustry.com](http://www.3dprintingindustry.com).

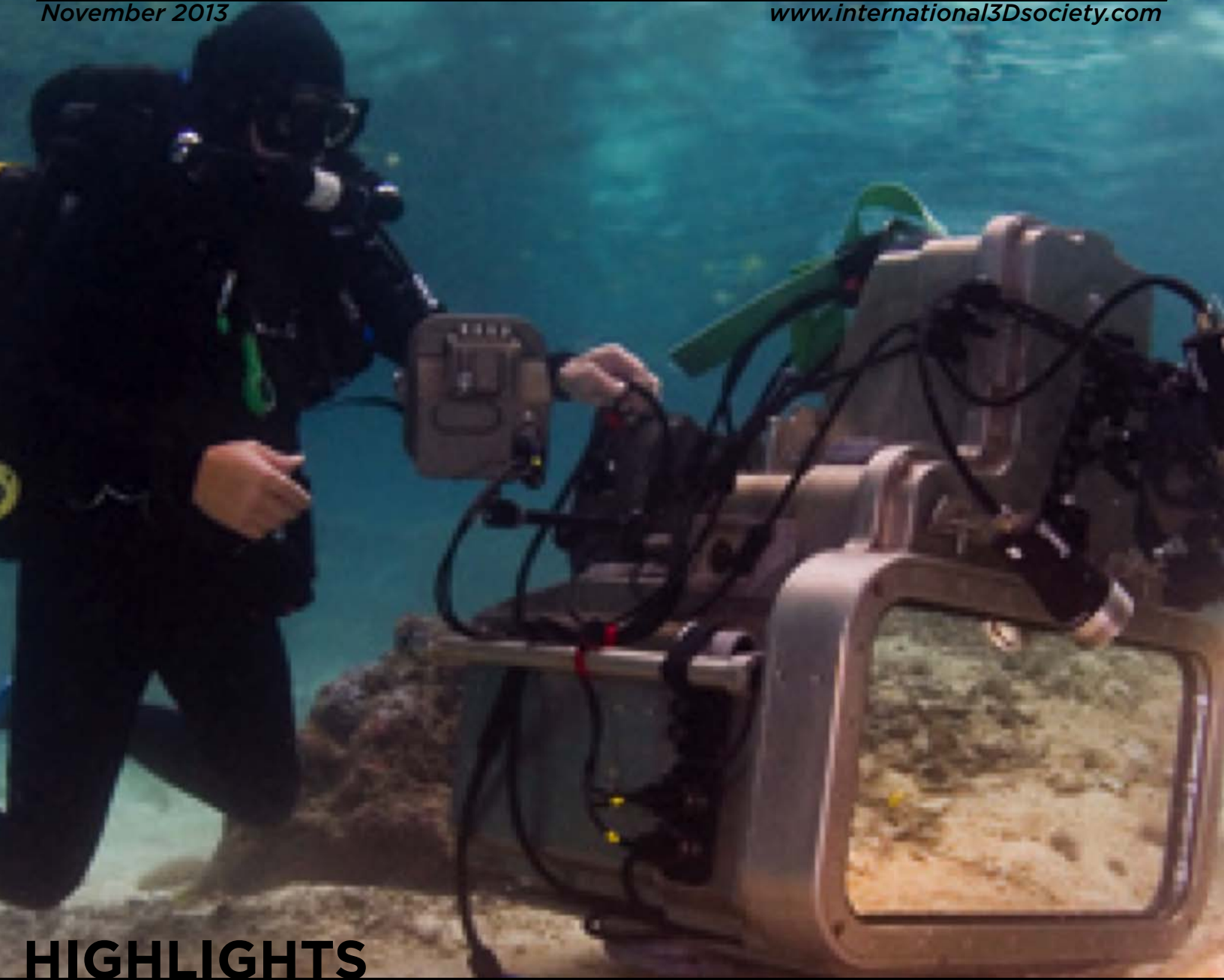


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November 2013

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## HIGHLIGHTS

- IMAX Movies to ship with Samsung 4K TV's
- Netflix tests 4K Streaming
- INTERVIEW: Pete Lude on UHD
- Panasonic's ToughPad 4K 20" Tablet



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## UHDNA: The 4K Interview

UHD will be a term we'll all be seeing heavily in 2014. It was the centerpiece of the recent IFA and IBC CE shows in Europe last month. It'll be front row and center at CES in Las Vegas in January. To set the stage for this new conversation, we called on the Society's resident expert on the subject to bring you to the context from which to view this new technology



*UHDNA: Pete -- you have been at the forefront of many digital transitions, and now we are embarking on Ultra high definition. With retinal quality screens on handheld and desktop devices? What does UHD offer consumers as it rolls out over the next decade?*

PETE: You're right - digital technology has driven a continuous string of transitions as bandwidth, data storage and processing power have increased each year. UHD is simply the latest natural evolution of motion imaging. Since the invention of television, technologists have been continually working on enhancing image quality. But the recent advancements in both digital image processing and materials science have made ultra-high definition displays possible.

When discussing UHD, the benefits are often described in terms of the increase in spatial resolution - four times the pixels when compared to current high-definition 1080p, resulting in sharper, more immersive images. While this is true, the benefits go far beyond just resolution. The emerging UHD TV standards call for an increase in frame rate to improve motion reproduction, expanded color gamut for more lifelike

hues, and expanded dynamic range, sometimes referred to as contrast ratio. Collectively, these image enhancements open the possibility of a more immersive, engaging and lifelike viewing experience.

*UHDNA: What does UHD offer for 3D?*

PETE: In the near term, the extra pixels in an UHDTV display are being repurposed to provide a greatly improved stereoscopic 3D display. In some cases, the UHD panels are fitted with a pattern retarder for passive polarized glasses, providing full 1080p resolution per eye. Until now, 3DTVs with polarized glasses used an HD panel with a pattern retarder to assign half of pixels to the left eye, and half to the right. That results in a 1,920 x 540 pixel structure per eye - a compromise from full 1,920 x 1,080 of "full" HD. But with a UHD panel, there are plenty of pixels to assign 1,920 x 1,080 full HD resolution to each eye. Passive glasses displays can now match the HD resolution previously available only from shuttered glasses 3DTV.

Even more enticing, UHDTV panels enable a big step forward toward glasses-free 3D. To achieve high-quality stereoscopic images without glasses, display pixels are directed to viewer zones through the use of parallax barriers or lenticular filters. But there is a big trade off: multiple viewer zones result in lower resolution per zone. With a 3,840 x 2,160 ultra-high def display, we have many more pixels to reproduce a 3D image into multiple zones. Most auto-stereo displays using UHD panels are able to achieve picture quality near 720p. And future "8K" displays, with 7,680 x 4,320

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pixels, will provide even better images for glasses-free 3D.

In the longer term, I look forward to seeing stunning 3D images in full UHD resolution per eye. But combining this increased spatial resolution with 3D (not to mention high frame rate, expanded color gamut and increased bit depth!) is still a few years away.

*UHDNA: Korea, Japan and China have announced aggressive plans for UHD. Does their commitment -- and the size of the China market -- mean the rest of the world will be increasingly brought into the UHD game to have access to those markets?*

PETE: Well, it certainly will drive the widespread availability of UHD consumer products. We've already seen a remarkable price drop in UHDTV displays - largely driven by Chinese and Taiwanese manufacturers. Just a year ago, 85-inch UHD panels were coming to market from top manufactures like Sony and Samsung for \$25,000 - \$30,000 - or about \$300 per diagonal inch. Today, according to display expert Pete Putman, prices are closer to \$80/inch, with some

Taiwanese and Chinese manufacturers (Westinghouse, Hisense, and TCL) floating aggressive prices on UHDTVs down to \$30 per diagonal inch. That's as low as \$1,500 for a 50-inch set. With these aggressive prices, DisplaySearch forecasts unit shipments increasing from fewer than 1 million sets this year to about 11 million sets shipping in 2016. A new report from Dataxis predicts a worldwide installed base of over 66 million UHDTV homes by end-2018, with Asia Pacific region accounting for over 40% of the global 4K TV households.

On the content side, the situation is less clear. It's obvious that consumers won't enjoy the full benefits of a new UHD television without true UHD content. But the appetite for producing and releasing movies and television programs in 4K or UHD is still developing. Further, the ecosystem for delivering high-quality UHD programming to the home - whether by broadcast station, cable, satellite, Blu-Ray disc or over-the-top internet delivery - is in the earliest stages. The shortage of content and limited distribution options could slow things down.

*UHDNA: You have seen more UHD demos than most of our readers. What have you seen in any of those presentations? Any interesting features that consumers over the next decade will find cool to have in their home?*

PETE: The fine image details in a properly produced 4K movie can be jaw-dropping. To me, the most impressive have been 6K digital scans from 70mm film masters. You can see the unmatched imagery of 4K in recent films such as Samsara and Mystic India, and library restorations including Sound of Music and Lawrence of Arabia. These are images that simply are not possible in HD. Carefully produced sports coverage can be equally engaging, as recent tests at the Olympic Games and several soccer and rugby matches have demonstrated. But while UHD and 4K images can be breathtaking, some demos have been less dramatic.

In order to achieve the full impact, content must be carefully produced and finished to preserve fine detail. Extremely high quality lens optics must be used. Often, Super 35 film and many so-called "4K" digital cameras don't contain enough spatial resolution to make a dramatic difference. Images must be viewed from closer to



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the screen then most people are used to, and even things like ambient room lighting will make a difference.

Besides the increased resolution, high dynamic range pictures also have an amazingly pronounced impact. When watching 12 or 16 bit images on a high-contrast display - one with good black level performance -- even a casual viewer will be startled by the more life-like quality. In the real world, spectral highlights -- for example sunlight reflecting directly off rippling water -- appear far brighter than the rest of the scene. But in today's HD video, those spectral reflections are clipped, appearing no brighter than the surrounding white objects or the sky. If these spectral reflections can be captured in high dynamic range imagery, the highlights jump out at you, creating a far more immersive and lifelike viewing experience.

*UHDNA: We saw a CE demo of a news-cast live-shot from a helicopter and the camera zoomed in further and further and the picture never lost clarity. It seemed to us that any TV news director would see that and want it. The camera never blurred or lost picture quality even from a helicopter. Where else would it make a difference?*

PETE: That's a great example where we're already seeing the impact of UHD imaging - even in today's 1080p HD programs. Since a UHD image contains four times the resolution as HD, it can be cropped and re-framed to focus on the object of interest - all without sacrificing picture quality. In addition to news, there's been a wide adoption of "overscanned" 4K cameras used in HDTV sports coverage. Fox sports has

used a Sony F65 4K camera to capture instant replay. CBS Sports used a similar system for the 2013 SuperBowl broadcast, called "Heyeper Zoom", using a For-A FT-One 4K camera and Evertz servers capture video at 300-500 frames per second. In both cases, the 4K capture enables zoom-in and pan during replay, greatly enhancing the game coverage. Producers of scripted dramas are also seeing the benefit of 4K capture for HD release. The oversampling during principal photography adds much



more flexibility during the post production process. Of course, UHDTV cameras are already being tested in non-broadcast applications as well, such as medical imaging and security surveillance cameras. You can expect to see more deployments in all of these applications.

*UHDNA: There seems to be a school of thought that the consumer won't notice the difference. What's your take?*

PETE: It should be no surprise that UHDTV won't be for everyone. First, 4K content is not necessarily a fit for all programming. News programs, web videos and even some talk shows will not leverage the benefits as much as drama or sports. Secondly, the benefits of UHDTV will be diminished if content producers use low-end cameras and lenses, or if distributors over-compress the image. Thirdly, the trend toward mobile viewing is well established. In many cases, I think we'll find that the

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convenience and mobility of a small screen trumps the immersive quality of a giant-screen UHDTV experience - at least for some content.

Finally, we must keep in mind that human visual acuity will limit the viewing distance at which the difference between HDTV and UDTV can be appreciated. For an “average” viewer with 20/20 eyesight, that limit is a distance equal to roughly one-and-a-half screen heights. That means that if you’re viewing your TV from five feet away (closer than a typical living room set-up) then you’ll still need an 85-inch diagonal UHDTV screen to fully enjoy the high resolution benefits. Sitting further back, your eyes probably won’t be able to see much of a difference between an HD and UHD set.

But this is a key point: Much of the benefit of UHDTV is the much wider horizontal field of view it provides. The high image resolution means you can sit much closer to the screen without being distracted by visible pixels. By sitting close to the screen, the image fills a broader horizontal field of view, filling much of your peripheral vision and thereby drawing you into the story. This is the same property that made Cinerama and CinemaScope dramatically different than previous cinema experiences, and one of the key differentiators that continues to draw audiences into IMAX theaters. According to the ITU-R, the optimal horizon viewing angle for UHDTV is 58°, nearly double the 32° horizontal viewing angle for 1080p HD.

*UHDNA: Where are we on industry standards work for UHD? When will we likely have the standards process completed?*

PETE: Standards are off to a good start, but much work remains. SMPTE published the first standard for UHDTV (ST-2036) back in 2007. In August of last year, the ITU-R officially approved the UHDTV standard as ITU-R Recommendation BT.2020. This September, the HDMI Forum announced the release of Version 2.0 of the HDMI Specification with support of UHDTV up to 60 frames/second, but only at 4:2:0 8-bit - a step in the right direction, but inadequate to achieve the full benefit of UHDTV. For a big-picture view, SMPTE released the “Initial Report of the UHDTV Ecosystem Study Group” in September. This report documents the full chain of required standards needed for end-to-end support of UHDTV to the home. The report is available at no cost at [www.smpete.org](http://www.smpete.org).

Despite this helpful progress, as of today, there are no standards for distributing UHDTV programs to the home by broadcast, cable or physical media. For terrestrial broadcast, ATSC 3.0 is in the works. The Blu-Ray Disc Association is working on next-generation discs for home video. But in the meantime, digital distribution services including Netflix, Sony Video Unlimited and Odemax are launching UHDTV content distribution to the home in proprietary formats.

*UHDNA: What do content creators need to think about to make sure their content is “future proofed”? Is the pipeline defined yet or are we still in early stages?*



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PETE: Content providers are probably the furthest along in tapping the benefits of UHD and 4K. According to the web site ShotOnWhat.com, over 300 features have already been captured in 4K. Several television programs have also experimented with the format: the Netflix hit House of Cards, CBS drama Made in Jersey, The Mentalist, FX's drama Justified, Saturday Night Live and Jimmy Kimmel Live! Many more are being planned. Sony has started to remaster Breaking Bad, originally shot on film, in order to grow its 4K library.

Within the next year, I think you'll see increasing use of 4K cameras in shooting scripted series, primarily for two reasons. First, oversampling during photography allows much more flexibility in post - the ability to reframe, crop or zoom during editorial, without degrading the HD image. Secondly the high-resolution files preserve long-tail value for the future syndication market. Many studios and post facilities, including Sony Colorworks, Warner Bros, Deluxe and Technicolor have invested heavily in a 4K pipeline, and it's likely that 4K finishing will cost very little over today's 2K or HD pipeline.

Already, there's much discussion about "beyond 4K", and I expect to see more content producers archiving RAW files from the production to afford maximum flexibility for using the programs in years to come.

*UHDNA: Cable labs and others indicate that set top boxes will be changed out to handle the increased data required for UHD over the next 7-10 years. More than 50 CE companies have announced UHD product plans. And there are discussions that 8K is in the pipeline right*

*behind 4K... So it sounds like 4K UHD is inevitable. Do you agree?*

PETE: I agree that the adoption of UHD is inevitable, but am not as convinced about 8K (7,680 x 4,320 image format) to the home. One of the key enabling technologies for UHD is the High Efficiency Video Coding standard - dubbed HEVC - a successor to MPEG 4/AVC. This new compression format enables transmission of UHDTV images in a reduced bandwidth, which is critical for practical adoption. Chip manufacturers including Broadcom, STMicroelectronics Samsung, and ViXS Systems have all developed their own HEVC chips for UHD decoding -- but these devices are still in early versions. These chips will mature over the next three to five years, and become commonplace in most consumer devices. Of course, the industry still awaits standards for transmission (such as ATSC 3.0 and DVB) and physical media (e.g. UHD Blu-Ray) to close the loop.

On the other hand, the move to 8K (7,680 x 4,320) is 16 times the resolution of today's HD, and I believe will be of limited benefit. Few programs and living room set-ups will allow a viewer to tell the difference between 4K UHDTV and the proposed 8K standard. Instead, I think there is much room to adopt higher frame rates, increased dynamic range to reveal deep shadow detail and spectral highlights, broader color gamut to reveal cyan and deep red colors never before seen on TV and new immersive sound systems, perhaps using object-based audio. One thing is certain: you will continue to see remarkable improvements in home entertainment, and will probably need to continue to buy a new TV every few years to keep up!

*UHDNA: ...If everyone needs a new TV every few years, and content creators need*

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*to keep up with the evolution, it sounds like many of our members will stay fully employed in the future...*

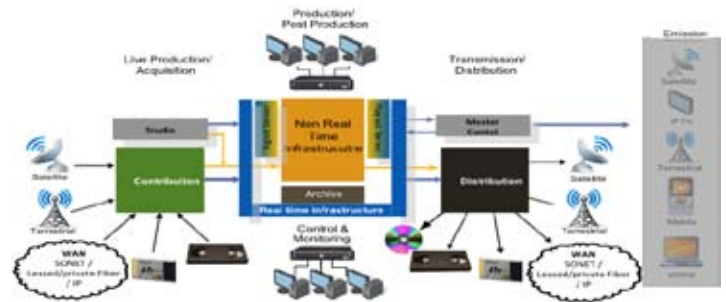
You are now consulting companies about how to transition to this new technology. What's the best advice you can give a company or professional about what they need to do to stay in top of all this?

PETE: In short: plan for change. It's a mistake to get too fixated on today's specific image formats. There are many variables, and the only thing we can be sure of is that they will continue to evolve. Programmers should plan on capturing material in the highest resolution affordable. Broadcasters should plan infrastructure upgrades to maximize flexibility and capacity. New image formats mean more network bandwidth and storage requirements, so take every opportunity to remove obstacles that would limit future expansion.

Finally, I'd encourage all stakeholders to spend at least a little time tracking standards progress. While the long term approach needs to embrace flexibility, certain standards will affect near-term adoption of advanced image formats. For example, it's promising that we now have ITU-R and SMPTE standards for basic image parameters, but a debate is brewing as to whether UHDTV should be limited to 8-bit video or increased to 10 or 12 bit. Spoiler alert: we absolutely need at least 10-bit to achieve the desired image improvements, even though it's somewhat more difficult to implement. Those that care about the artistic integrity of content should study this - and other related issues - and speak up.

UHD Ecosystem:

Pete Ludé is a prominent media engineering executive, most recently serving as head of Sony's professional products R&D laboratory in Silicon Valley. He is a consultant and frequent speaker on topics of motion imaging, the future of broadcast, human visual perception, 3D and laser illuminated projectors.



Pete is past president of SMPTE - the Society of Motion Picture and Television Engineers, and a SMPTE Fellow. He can be contacted through his blog [digidrive1.blogspot.com](http://digidrive1.blogspot.com) or [about.me/pete.lude](http://about.me/pete.lude).



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## Netflix posts 4K test video to streaming service as it prepares for planned 2014 launch.

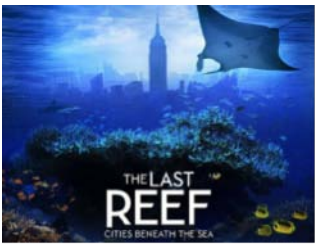


Ask anyone what the largest issue facing 4K video is, and you'll likely be told that it's distribution; bringing the massive files — with four times the resolution of a 1080p video — to viewers' homes is an incredible challenge. Nevertheless, Netflix believes it will be able to stream Ultra HD 4K videos to customers by next year, and it's already testing the feature, according to Gigaom. In fact, you can watch Netflix's test footage now, as a number of 4K "movies" have hit the service for internal checks on 4K performance. It's worth noting that the movies are all made up of test footage, and 4K quality isn't an option yet for subscribers.

Netflix hasn't kept its interest in streaming 4K video directly to subscribers' homes a secret. CPO Neil Hunt told *The Verge* this spring that "we expect to be delivering 4K within a year or two with at least some movies and then over time become an important source of 4K," and CEO Reed Hastings said on a recent earnings call that "we want to be one of the big suppliers of 4K next year." The company also teamed up with Samsung to demonstrate live 4K streaming at CES this past January. While it's unclear if Netflix will be able to meet its goal of a 2014 launch, it looks like there will be some good content once it does arrive: the company's very own *House of Cards* will be among some of the first video on the site offered in 4K.

## Nothing to play on 4K TVs? Samsung ships IMAX movies with purchase

Devin Coldewey, NBC News, Nov. 4



Anyone who buys a UHD or 4K TV set right now faces that very first-world problem of finding content that's high-definition enough to show off the display.

Samsung is lending a helping hand to buyers of its new 4K TV by shipping out full-size hard drives filled with UHD content.

It may seem a lavish gift, but these are quite fancy TVs, starting at \$3500 — and that's after some fairly recent price cuts. It makes sense that Samsung would want to roll out the red carpet for these deep-pocketed customers.

Samsung isn't sending some thumb drive loaded with trailers or promotional shorts. It's a full-on 500 gigabyte affair, though only about 100 of those gigs are filled.

It comes with two full IMAX movies: "The Last Reef" and "The Grand Canyon Adventure," which form the bulk of the 100 GB of content on the drive, and a few shorter clips. By rough calculation, that makes each ~40-minute documentary quite a bit larger than a 100-minute feature film on Blu-ray. And that's as it should be: 4K resolution contains four times the pixels as 1080p, though that doesn't necessarily mean the files will be four times bigger.

Anyone who owns a Samsung UHD TV or buys one before the end of December is eligible to get the drive, which plugs into the USB port on the TV's separate One Connect breakout box. After you watch the movies, you should be able to put the drive to other uses — another nice perk.



One of Samsung's latest 4K TVs.

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## Panasonic ToughPad 4K tablet launched at GITEX

Panasonic has been consistently delivering technological and user improvements to help transform the way mobile workers perform in the workplace. In line with this, and alongside the global announcements, Panasonic has unveiled the Toughpad 4K UT-MB5, the world's first 20 inch tablet with a 4K resolution display for the Middle East and Africa markets, at GITEX 2013.

The Toughpad 4K - UT-MB5 is the flagship product in Panasonic's groundbreaking new Ultra-HighDefinition Toughpad range. Offering a new digital viewing experience called 4K which is more than four times better than HD at 3840 x 2560 pixels, the Toughpad 4K UT-MB5 is a business rugged, portable tablet that breaks new ground in digital viewing with 4K resolution, collaborative working with touchscreen capabilities and a unique Panasonic Electronic Touch Pen for pin-point accuracy and annotation.

The portable tablet comes with a unique new Panasonic Electronic Touch Pen\* that is super intuitive and provides paper-like feel for sketching, annotation or handwriting. The pen uses infrared signals to distinctly read every single pixel on the screen and communicates it with the tablet via bluetooth, making it stand apart from commonly found capacitive digitizers. It is so accurate because it is able to recognize every individual pixel on the tablet screen, can recognize & record the pen, tilt and can interpret 2048 levels of pressure, ensuring drawing or handwriting is reflected perfectly to the smallest detail.

With its 15:10 aspect ratio, the Toughpad 4K UT-MB5 is the lightest and thinnest portable 20 inch screen tablet, weighing in at 2.35kg and just 12.5mm thick. Powered by an Intel® Core™ i5 vPro™ CPU, up to 8GB RAM and NVIDIA® GeForce® graphics, the UT-MB5 is able to display very high resolution videos smoothly and without buffering.

"At Panasonic we are committed to engineer products and technologies that enrich lives and contribute to society. The world's first Toughpad 4K is another example of Panasonic delivering on its promise. This product will open new doors for our customers by delivering an immersive viewing experience. With this device, the region has literally moved into an era of the next dimension in visual developments of 4K resolution technology," commented Mr. Masao Motoki, Managing Director, Panasonic Marketing, Middle East and Africa.



The Toughpad 4K UT-MB5 comes pre-installed with Windows 8.1 Pro making the device future proof, allowing enterprises to use all their existing applications and office products and enabling IT departments to migrate with ease. Combined with accessories

such as the Panasonic desktop cradle and carry solution, the device can also be used as both a desktop PC and tablet, reducing the need for designers and engineers to use multiple devices.

The Toughpad 4K UT-MB5 also offers all the necessary interfaces to make it a practical device in the business environment, including USB 3.0, SD card slot, headphone jack and optional smart card reader. The cradle also offers Ethernet and HDMI connectivity.

With a 1280 x 720 pixel built-in front camera, combined with the 20 inch screen, video conferencing becomes a simple and enjoyable experience. With 256 GB SSD and SD card slot, the device has plenty of space to store applications and data.

Furthermore, the Toughpad 4K UT-MB5 is business rugged meaning it can withstand drops of up to 76cm (bottom side, while operating).

Panasonic's success in Toughpad is due to factors such as their durable and rugged performance, ergonomic design, superior inside and outside screen viewing technology and tailored docking and peripheral solutions to meet the varied needs of the most demanding mobile workers.

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## Blackmagic Intros UltraStudio 4K With Thunderbolt 2

Blackmagic Intros UltraStudio 4K With Thunderbolt 2

*Also has 3D editing and lighting applications.*



Blackmagic Design is now shipping a new model of UltraStudio 4K.

The UltraStudio 4K is a rack mount capture and playback device based on Intel's Thunderbolt 2 technology. It features a machined aluminum front panel with an integrated color LCD as well as fast to use video and audio input buttons. The rear panel includes video and audio connection such as 6G-SDI, HDMI 4K, analog component/s-video/composite, as well as balanced analog and AES/EBU digital audio.

Now with the 20 Gb/s speed of Thunderbolt 2, UltraStudio 4K has even more bandwidth to work with higher quality video and frame rates. Now users are able to capture and playback Ultra HD 4K YUV video at 60 frames per second and Ultra HD 4K RGB video at 30 frames per second via the 6G-SDI video connections. The Thunderbolt loop thru allows connection of up to six devices, so users can connect fast disk arrays for massive amounts of video storage with a single Thunderbolt connection to their computer.

UltraStudio 4K handles most television formats, featuring 6G-SDI connections that switch between SD, HD, Ultra HD and 4K. UltraStudio 4K is also intended for 3D workflow as it features both interleaved/side by side and dual stream capture and playback.

Users will be able to take advantage of the Desktop Video 10 release. The new driver architecture is a major software update designed from the ground up to be optimized for high speed computers and the new emerging ultra HD television formats that require massive data speeds. DaVinci Resolve 10 customers will benefit from the simultaneous capture and playback support that enables them to capture direct from cameras on set and grade the live video with multiple nodes of color correction for live onset monitoring.

Its SDI inputs include full SDI re-clocking for capture from poor quality SDI sources. It features HDMI in and out, supports SD and HD formats up to 1080p60, frame packing 3D and 4K. It also has component analog in and out, and the component analog switches to s-video and composite. It features two channel balanced analog audio in and out, as well as additional RCA HiFi audio in and two channel AES/EBU unbalanced audio in and out.

XLR connectors timecode in and out, and it includes genlock/tri-sync input. It features Sony compatible RS-422 deck control. UltraStudio 4K supports uncompressed 8/10 bit and compressed video capture and playback.

UltraStudio 4K supports Final Cut Pro X, Avid Media Composer 7 Adobe Premiere Pro CC6, Adobe Photoshop CC6, Adobe After Effects CC6, DaVinci Resolve and more. It also includes a free SDK, as well as hardware SD and HD keying and hardware up down and cross conversion on playback. It features capture/playback of side by side, line by line, top and bottom and dual stream 3D via SDI.

See more at: <http://www.tvtechnology.com/equipment/0082/blackmagic-intros-ultrastudio-k-with-thunderbolt---/222172#sthash.XEG7YjEK.dpuf>

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## Custom CPUs and 4K Ultra HD resolution displays are what Samsung is planning

Bendable and foldable screens are not the only thing Samsung is preparing for the near future. Higher resolution displays, as well as own, custom processors, are also planned by the South Korean manufacturer, as the information has been unveiled at the same, ongoing, Samsung Analyst Day in Korea.

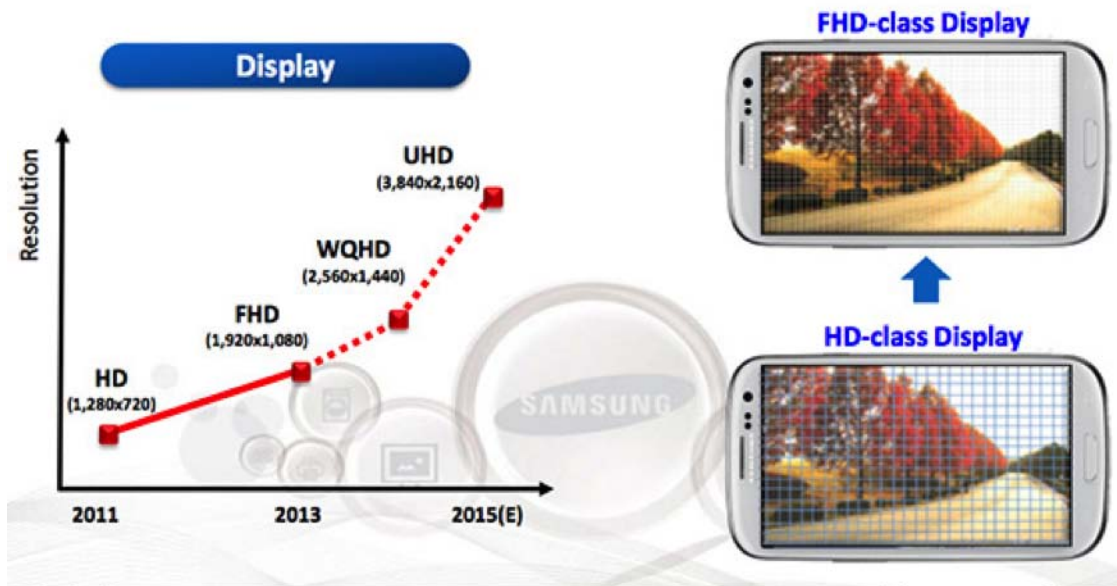
Just like Apple's own processors for the iPhone 5, 5S, and recent-generation iPads, Samsung is planning on utilizing its own 64-bit custom processor cores in the future; it will be ARM-based and will be tailored to

the company's needs. However, Qualcomm is still in the game for the near future, as far as products in its line-up are concerned.

If you think that Full HD is overkill, think again! 4K Ultra HD resolution screens with 3840 x 2160 pixels are coming in 2015. Of course, not before WQHD screens of 2560 x 1440 resolution, but still, on five-six-inch displays, we're talking about insane PPI ratings.

<http://pocketnow.com/2013/11/06/custom-cpus-and-4k-ultra-hd-resolution-displays>

- **Higher resolution**



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