

Emerging Display Technologies Conference Updates & Trends and thoughts about 3D TV



Bruce Berkoff, Chairman of the LCD TV Association



San Jose CA, Aug 16, 2011

2010's Trilogy of Significant TV Tech Innovations

LED



3D TV

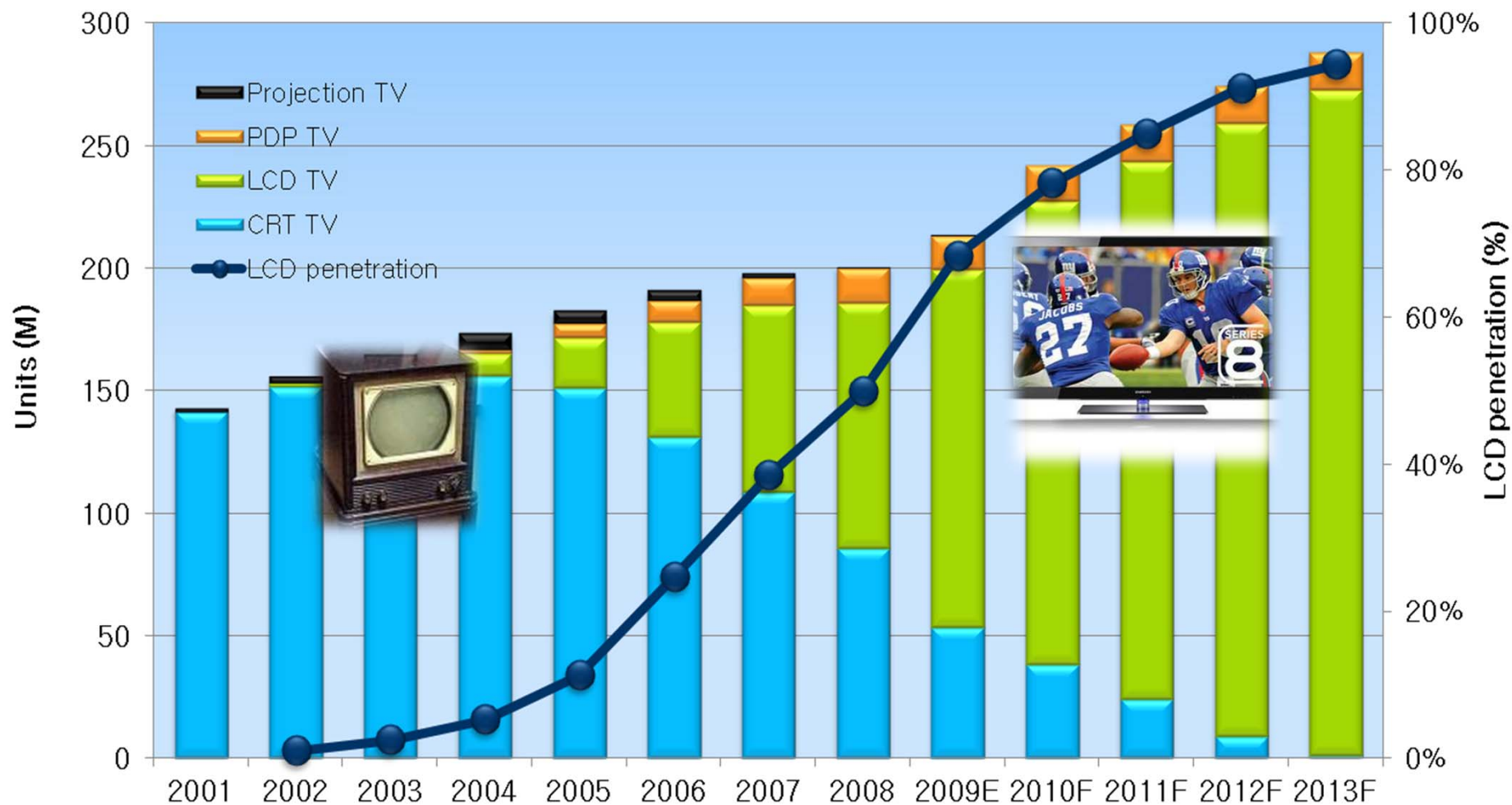


Connected TV



TV Unit Demand by Technology- too LOW by MOST forecasters.....!!! LCD TV is TV Reality will be 400M TVs by 2015! New middle class coming WW!!- bigger AVG sizes too...all products and all regions...

Color TV Market Mix

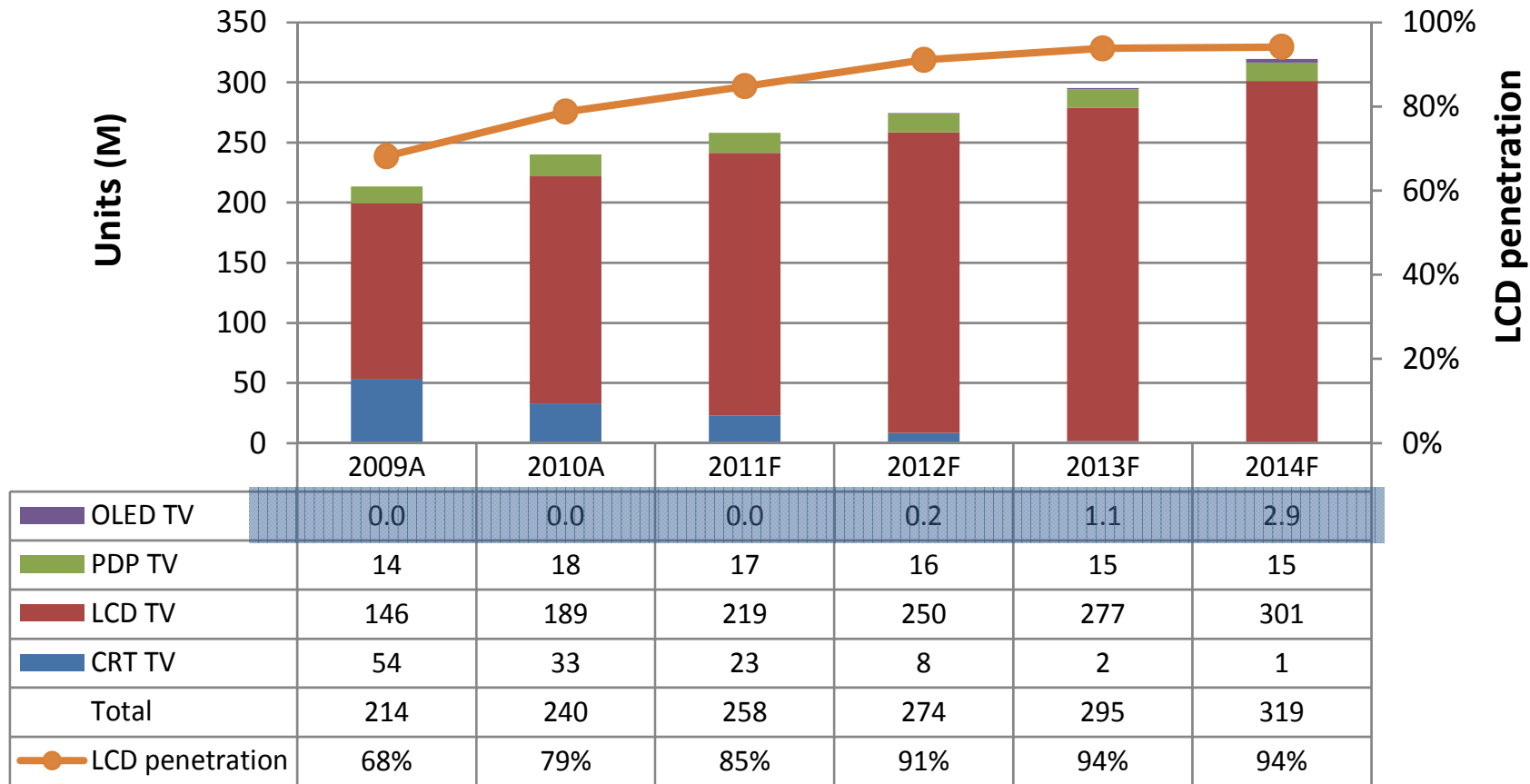


Source: DisplaySearch, ADR, Applied Materials (Feb 2010)

Note: Future demand growth forecast based on past and current LCD growth/size/price trends and an expectation of continued favorable trends for the next several years

Another TV Set Forecast by Technology

Color TV Market Mix

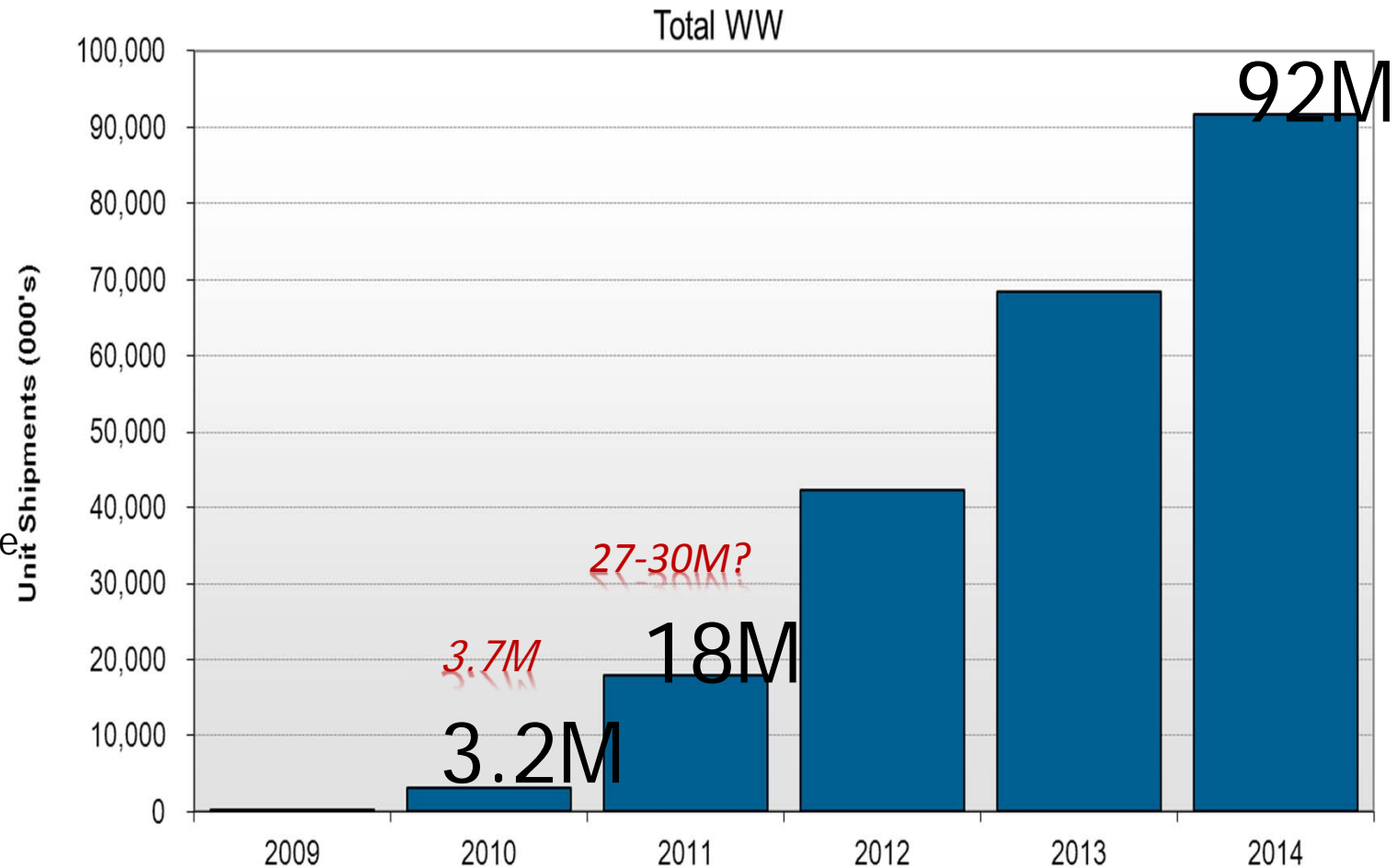


Source: ADT, AKT internal estimates

3D TV Optimism vs. Issues....?

Balancing hype with the realities of an immature ecosystem will be a challenge, ***not to mention a possible format war***

Worldwide 3D TV Forecast



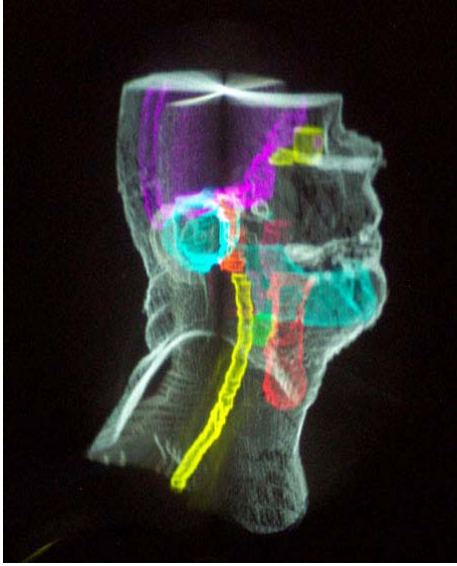
Primary Hurdles

1. CONTENT (conv?)
2. Education
3. Accessory Market
4. Low Quality Experience
5. Price Premium

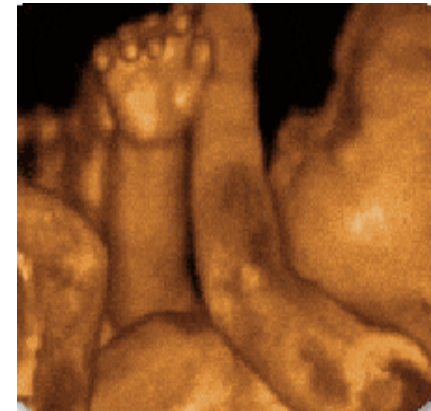
Source: DisplaySearch Quarterly TV Design and Feature Report / DisplaySearch Estima

3D all around us, for a while

a big new trend



Medical Imaging





"Cool 3-D screen."

Direct Array LED in 3D TVs now at ALL PRICES Points..... \$499 and UP...

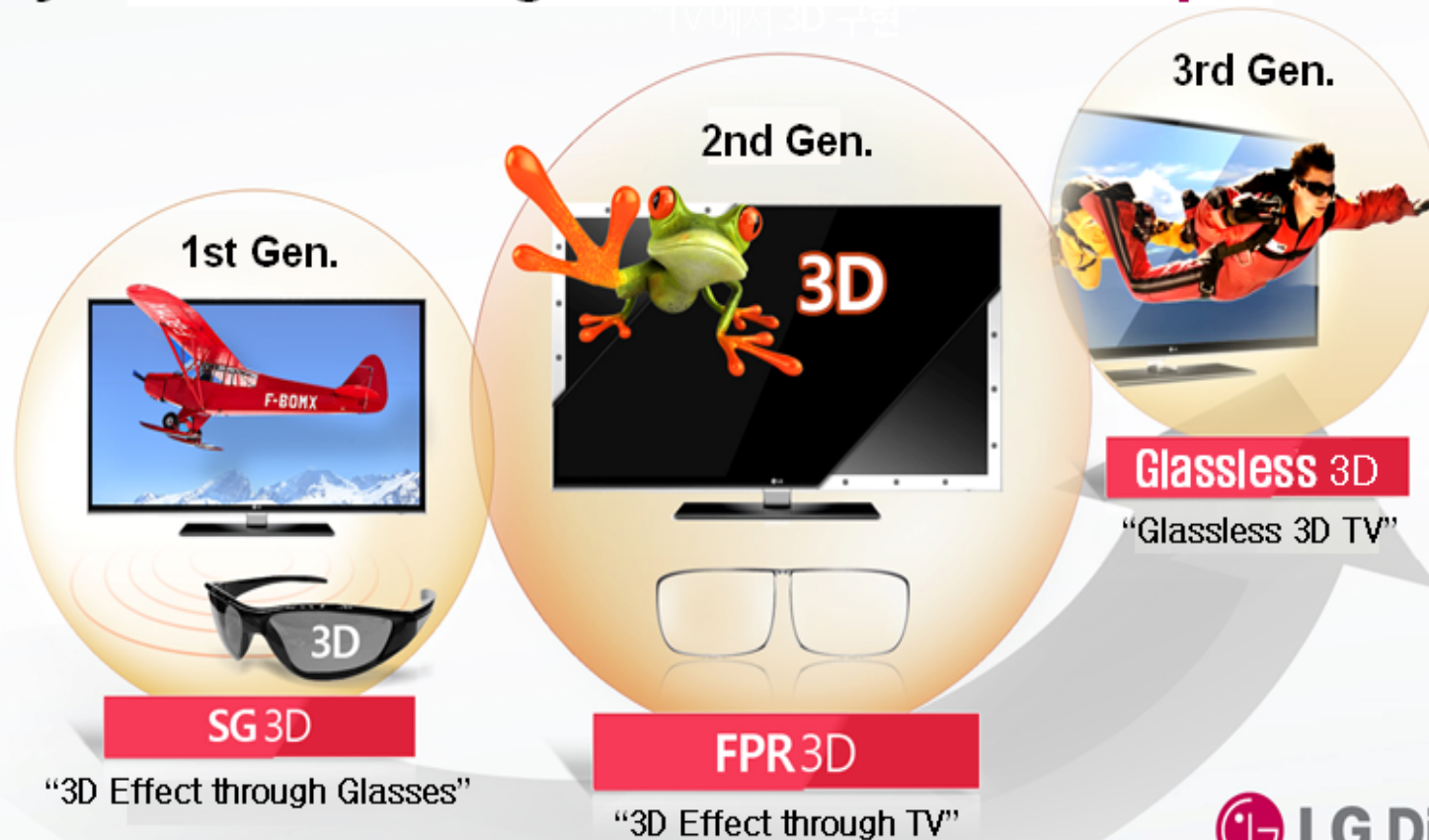


LED Backlighting can help us create outstanding pictures when used as Direct Array lighting with Smart Dimming™.

The next generation 3D technology, from SG to PG to NG?

Advanced Technology

‘Enjoy 3D TV, not 3D glasses, The next step in 3D TV!’



 **LG Display**

Why FPR 3D ? (courtesy of LGD.....)



FPR preference is much higher when experienced 3D comparison

● Survey result by Region: China

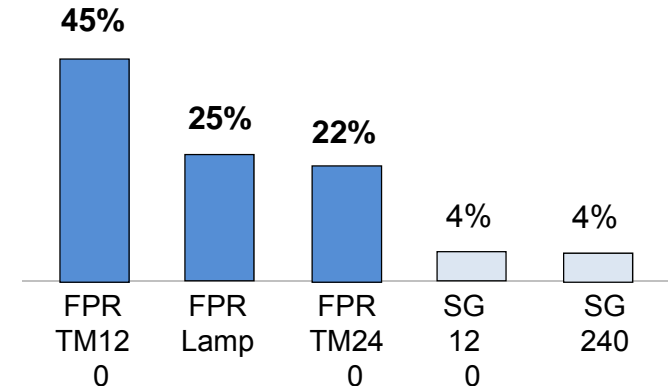
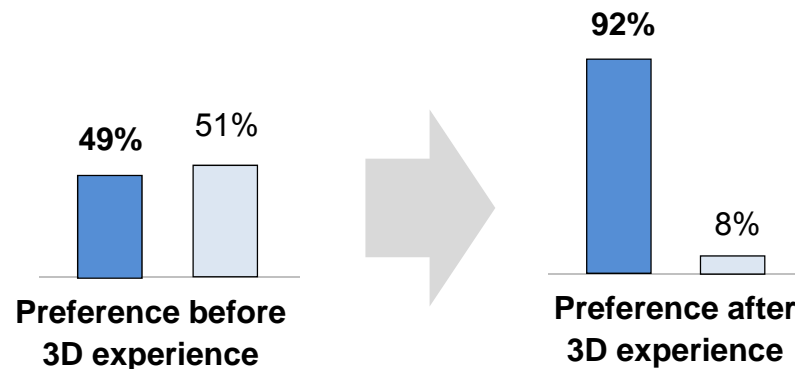


- 'H' company & LGD conducted from Mar. 9th to 13th, 2011 in association
- Gang Survey + FGD conducted in Shanghai, Guangzhou and Liuzhou

*Unit: point / %

 **FPR**  **SG**

- ✓ **By being experienced 3D Comparison, consumers showed absolute FPR preference**



※ The survey result after 3D experience, Marcomm., and checking price of products

No blinking on the screen (Flicker free)

Flicker free

'No Flicker, No Dizziness!'



FPR Flicker Free



SG Flicker Noise X 1,500

 **LG Display**

Clear and bright picture

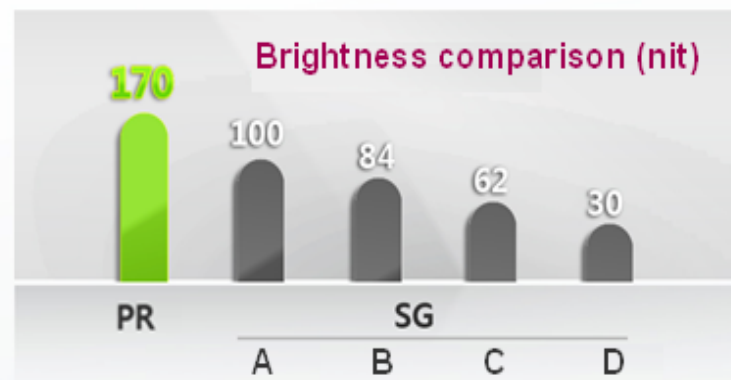
High brightness

‘Bright and Brilliant 3D Picture Quality’

FPR



SG



Comfortable glasses

Comfort glasses

‘Light and Comfortable glasses for the whole family to enjoy’

FPR



SG



VS

Lithium battery



3X heavier
Electronic
glasses



Compatible with
3D theaters



Clip type for
Glasses wearers



Affordable and
Stylish 3D glasses



No head tilting



Full attention
required



No viewing
for long periods

 **LG Display**

No picture overlapping (No Crosstalk)

No crosstalk

‘Clear 3D Picture with No image overlap’

FPR



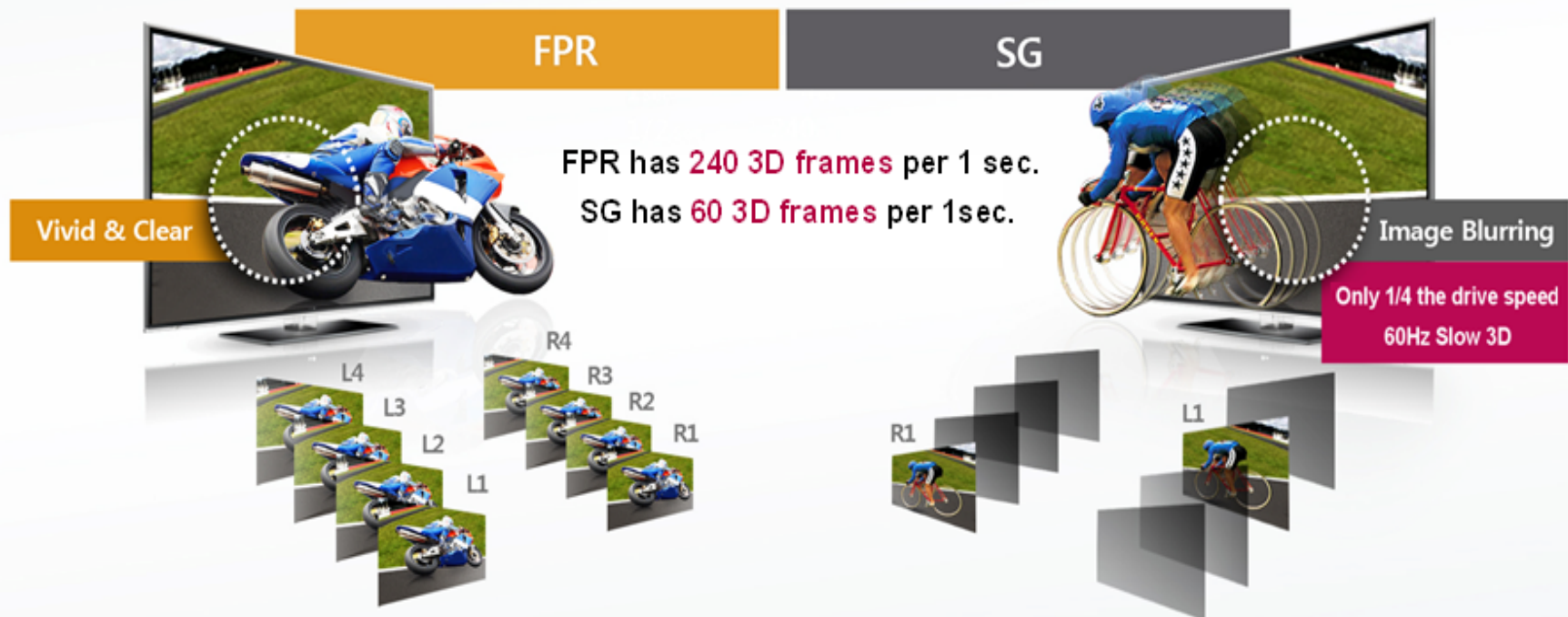
SG



3D 240Hz drive speed, no picture blur

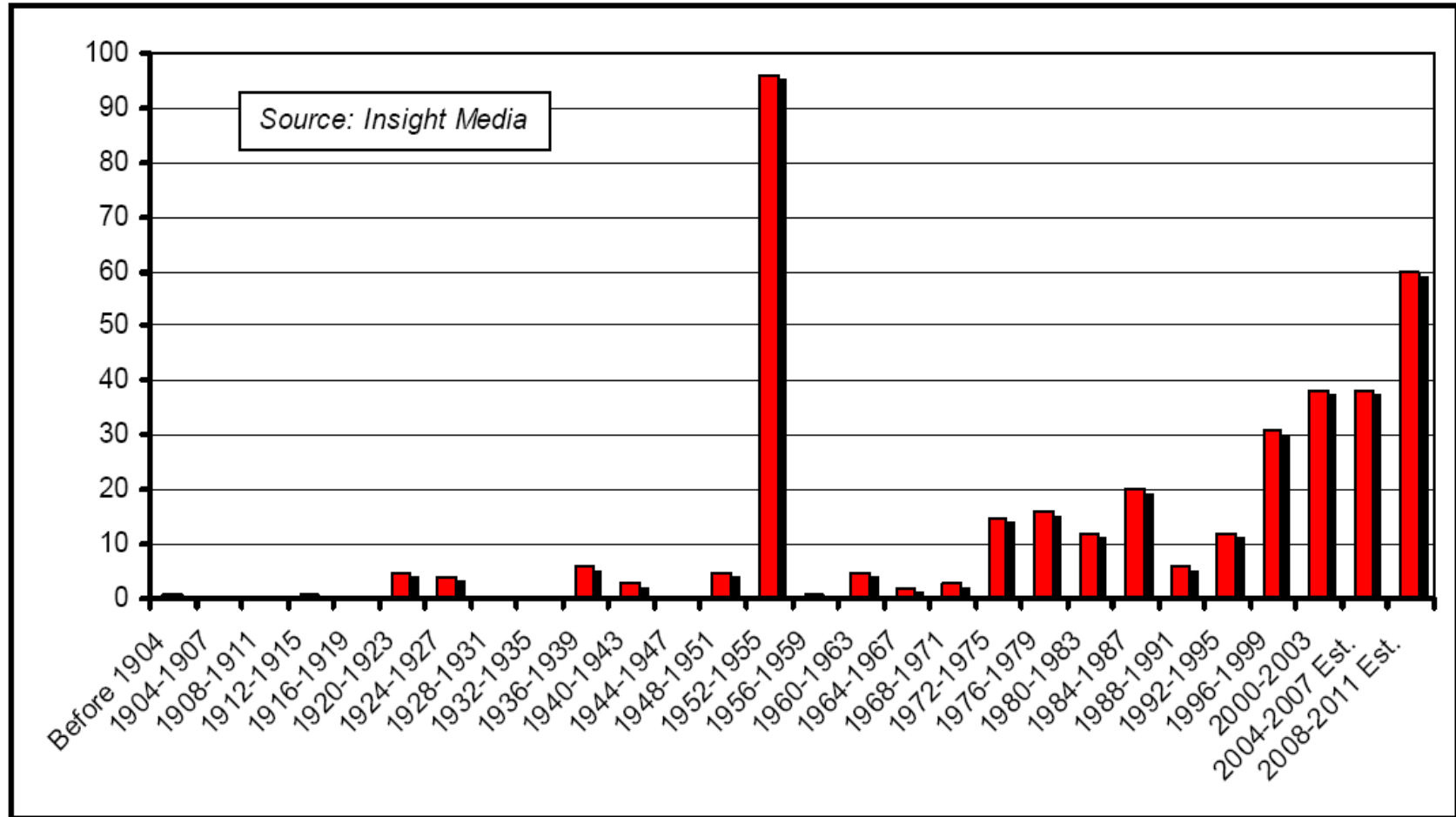
Moving Picture Quality

‘3D in unsurpassed **240Hz High Definition**’



Films exhibited in 3D over past 100 years...

3D another big new trend, especially in commercial theaters...
Besides films, concerts, plays and shows will have HUGE upside....



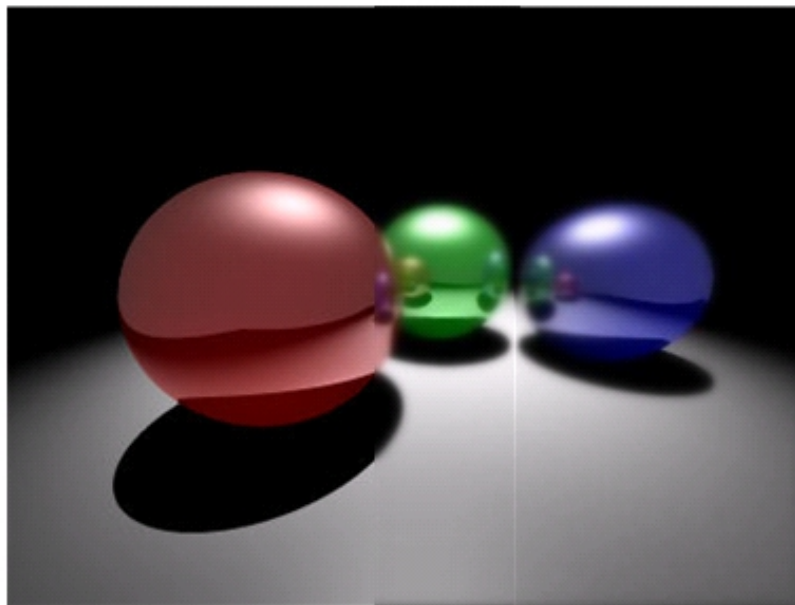
- **314 films (1895-2007)**
- **Many of these releases have been to limited audiences on very few screens**
- **2010 had over 3500 movies released, but only 31 in 3D!!**

Stereoscopic 3D,, 2D to 3D conversion **NEEDED!**



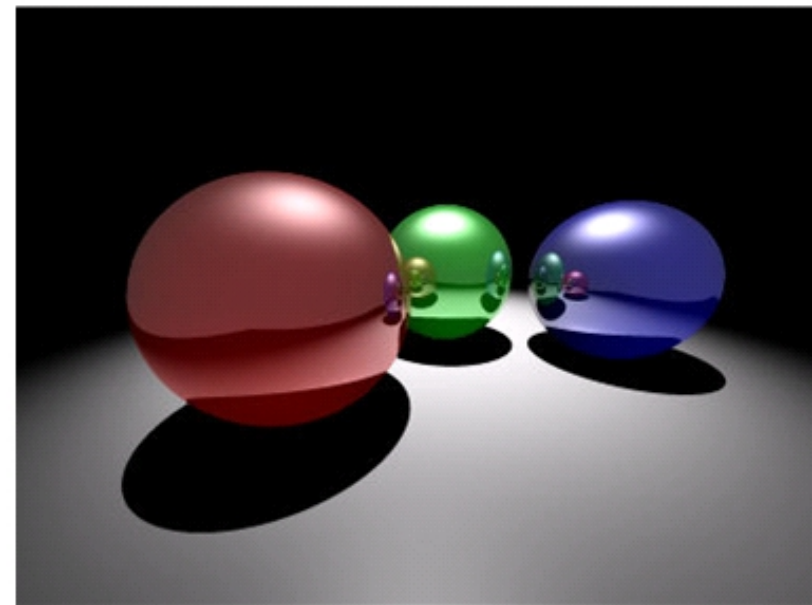
- Strong consumer interest in S--3D
 - 'Avatar' effect
- Strong push by TV brands to sell 3DTVs (or 3D HDTVs)
- Very little S--3D content available for 3DTVs
- Built--in 2D--to--3D conversion is poor, leading to eye--strain and nausea.
 - 3DTVs with good--quality content do not cause these problems.
- BitAnimate has the solution with high--quality Real--Time 2D--to--3D conversion built on a unique IP / Code base.





Current 2d to 3d conv. Technologies

- Poor focus planes
- Blurred planes with depth
- Object depth not consistent or "Realistic"



BITANIMATE Technology

- All image in focus
- True object depth location
- No motion fatigue

Problem

Software sells hardware, but current software is lacking!

(Software sells hardware, and the current SW is lacking!)

- Very Low Quality Conversion exists today, and has for years
 - Other solutions ALL have similar defects.
 - Improper placement of objects in a scene
 - Judder during playback
 - 'Waviness' within the image
 - Poor handling of text and sub)itles
 - Images have a synthetic 3D appearance
 - Conversion algorithm does not properly represent the human visual system
 - Result is poor quality 3D
- Extended viewing of poor--quality 3D leads to eye-fatigue and nausea. This LIMITS 3D TV growth too!



- BitAnimate has solved the problem by creating a “Unique Intelligent Software”.



- Correctly identify *all* objects in the scene (proper placement)
- Correctly identify *where* objects are located
 - Relative to the observer
 - Relative to each other
- Scene analysis based on human visual system
 - Resulting conversion has a *natural* look
 - Natural looking 3D does not result in eye--fatigue or nausea

Smooth video playback

No Judder

Complex images processed without ‘waviness’

Excellent handling of text and subtitles.

3D TV

home vs theater...

New content like concerts and plays
Vs movies and sports..., hmmm...

Better h/w and better s/w.....?



ULTIMATE GOAL:

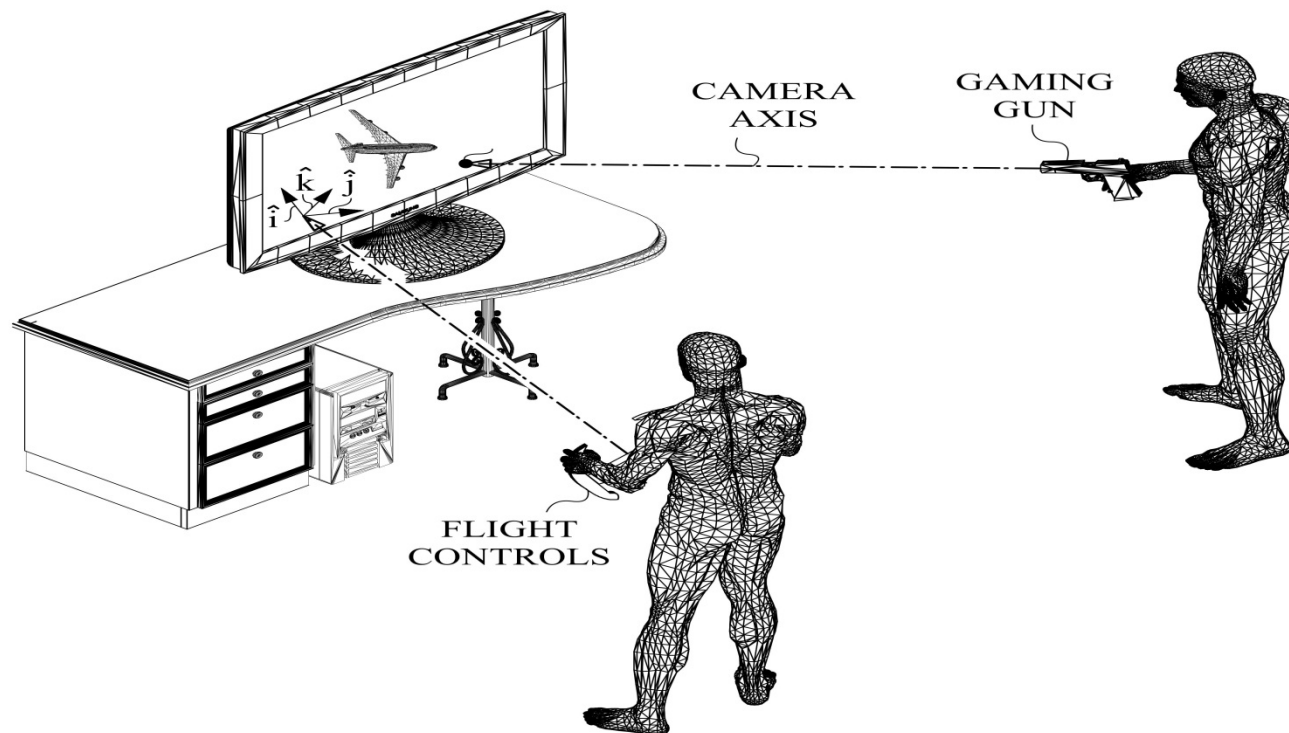
NO Glasses, HIGH Quality 2D and 3D, and High Quality conversion, ALL NEEDED...
Switchable 2D to 3D display could speed home adoption for:

- **Movies:** Hollywood is searching for 3D enticements for new theater draws.... animation is easier to make 3D, glasses common in big theaters, less likely for home use...
- **Games:** Most games are already rendered in 3D.
- **Concerts:** A great way to let everyone have FRONT ROW seats for major concerts, at affordable prices...
- **Shows:** Just like concerts, 3D film could enable great seats and huge access for more fans, and new audiences "off Broadway", throughout the world...
 - THESE last two, also great new categories for COMMERCIAL theaters!!!....

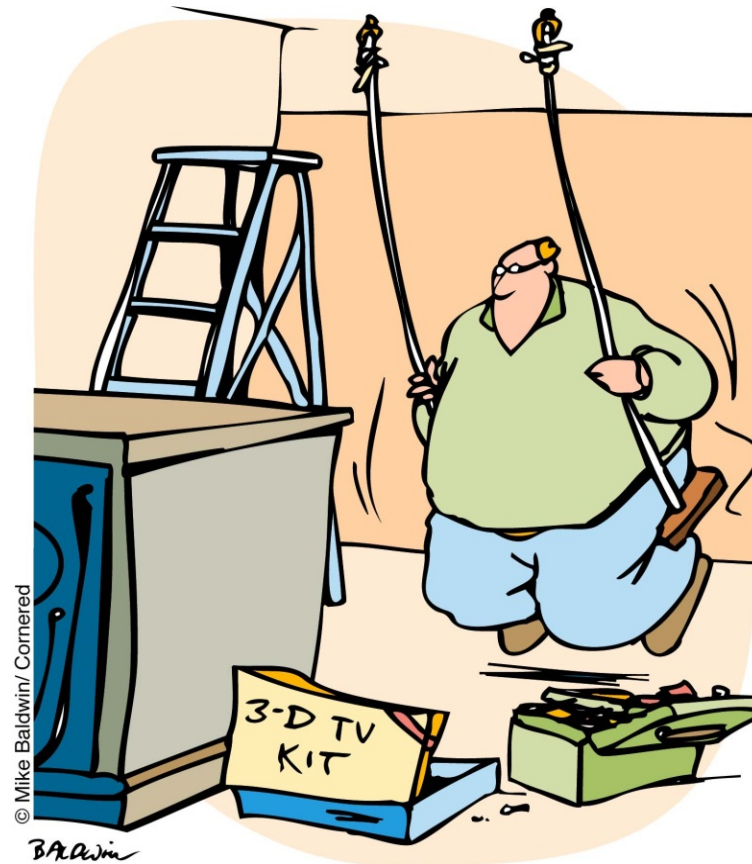
Gaming an important market too, and 3D UI a big issue still in need of solutions, like this one (demo outside, LTA table):

ESPI 3D user interface.....

HAND-HELD CAMERA CONTROLS FOR MULTI-PLAYERS
provide absolute and accurate motion tracking



One way of doing a 3D TV (don't try this at home!)



Unlike LCD's, this has a LOW "WAF"

The World's Largest 3D Display



**North Korea's Mass Games use tens of thousands of people to create motion graphics in three dimensions...
(people power is low Kw-hr!...Green too!)**

“A Great TV in Every Room”



LCDTV
Association



Inform • Promote • Improve • Connect

For more information on the LCD TV Association, membership, or to join, please visit us on the web at
www.LCDTVAssociation.org or email membership@LCDTVAssociation.org

Sustaining Members

