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Entertainment
Technology Center

Overview of the USC Entertainment Technology Center and 3D Entertainment

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Entertainment Technology Center

- Established in 1993 by George Lucas in USC School for Cinematic Arts
- Mission:

To understand what next-generation consumers want in digital entertainment and to bring companies together to ensure they get it.

Los Angeles Times

Consumer Electronics Show: USC group helps shape future of entertainment

January 7, 2011 | 4:57 pm

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Entertainment executives who can't attend the Consumer Electronics Show can get a virtual eyeful of the technology that is shaping the industry courtesy of an innovative online project undertaken by the University of Southern California.

USC's Entertainment Technology Center for the last three years has sent a team of multimedia reporters to Las Vegas to highlight products of interest to companies such as Disney, Sony and 20th Century Fox. The goal is to deliver in-depth, real-time product analysis to executives' desktops before the rest of the herd gets on board.

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Impact

BY DEREK LOOSVELT

For years, digital cameras and post-production equipment have been changing the way films are budgeted, shot, and edited. But no matter how films are made today, theatergoers still watch them on 35 millimeter celluloid prints. Even when a film is shot on high-definition video, the distributor has to copy the master onto celluloid before sending it to a theater. Film projectors and the process of printing and shipping prints—a financial line item costing distributors $1 billion annually—have been more or less the same for nearly a century.

But this is all about to change. In the past few months, US distributors have begun to replace physical thirty-five millimeter prints with digital bit streams, which can be beamed to studios by satellite and then shown using digital projectors, devices expected to spell the end of bulky canisters and reels of film. Also gone will be pops and jiggles on the screen as well as dirt and scratches that celluloid collects after several runs. Most important, the advent of digital projection means distribution costs will plummet, bringing down budgets, which will free up billions of dollars each year to produce additional content and significantly reduce the price of placing big- and low-budget films in theaters. According to *Screen Digest*, if all of the approximately 100,000 screens in the world were digital, distributors could save over $2 billion a year.

Given the huge cost savings, it might be surprising to learn that digital projection technology has been available for many years. But what stalled the transition was finding an answer to an economic question: Who'll pay for it?

Nearly all of the financial advantages of moving to digital projection go straight into distributors' pockets, with little if any

THINKING OUTSIDE THE CAN

benefit going to theaters. Understandably, theaters figured ticket sales wouldn't increase much if films were shown digitally rather than on celluloid. Studios, meanwhile, didn't want to foot the bill for installing servers and projectors, which cost up to $100,000, nor did they want the responsibility of upgrading and maintaining the new equipment. Theaters, in turn, were weary of getting hammered with replacement costs caused by inevitable innovations that would make equipment obsolete.

To address these and other issues related to the digital transition, Digital Cinema Initiatives (DCI), a consortium of seven Hollywood studios along with theater owners and tech manufacturers, was created in 2002.

DCI's first order of business, before discussing any economic details, was addressing picture quality. According to Charles S. Swartz, executive director and CEO of the Entertainment Technology Center, a research unit at USC within the School of Cinema Television where DCI conducted its research, "No one wanted to step back. Sure, prints get scratched and dirty and break, but when they look good, they really look good. The image in digital had to equal or excel what film, at its best, can create. All the testing we did was subject to that underlying promise." Thanks to Texas Instruments technology, specifically TI's 2K chip, comprised of 2,048 horizontal mirrors and 1,080 vertical rows or lines, Swartz and DCI were able to meet their

aesthetic goals.

In addition to the 2K technology, which most digital projectors use today, Swartz notes, "Now we also have the possibility of 4K projectors, with a lot of promise to reach even higher resolution, which might be good in certain situations, but resolution alone isn't the only factor that makes a satisfactory image. Contrast and color saturation are equally important."

This past July, three years after its inception, DCI unveiled version 1.0 of its uniform specifications for digital projection, outlining standards for debated issues such as file resolutions, compression formats, and security requirements. The specs also ensured that replacements costs and upgrades would be mostly

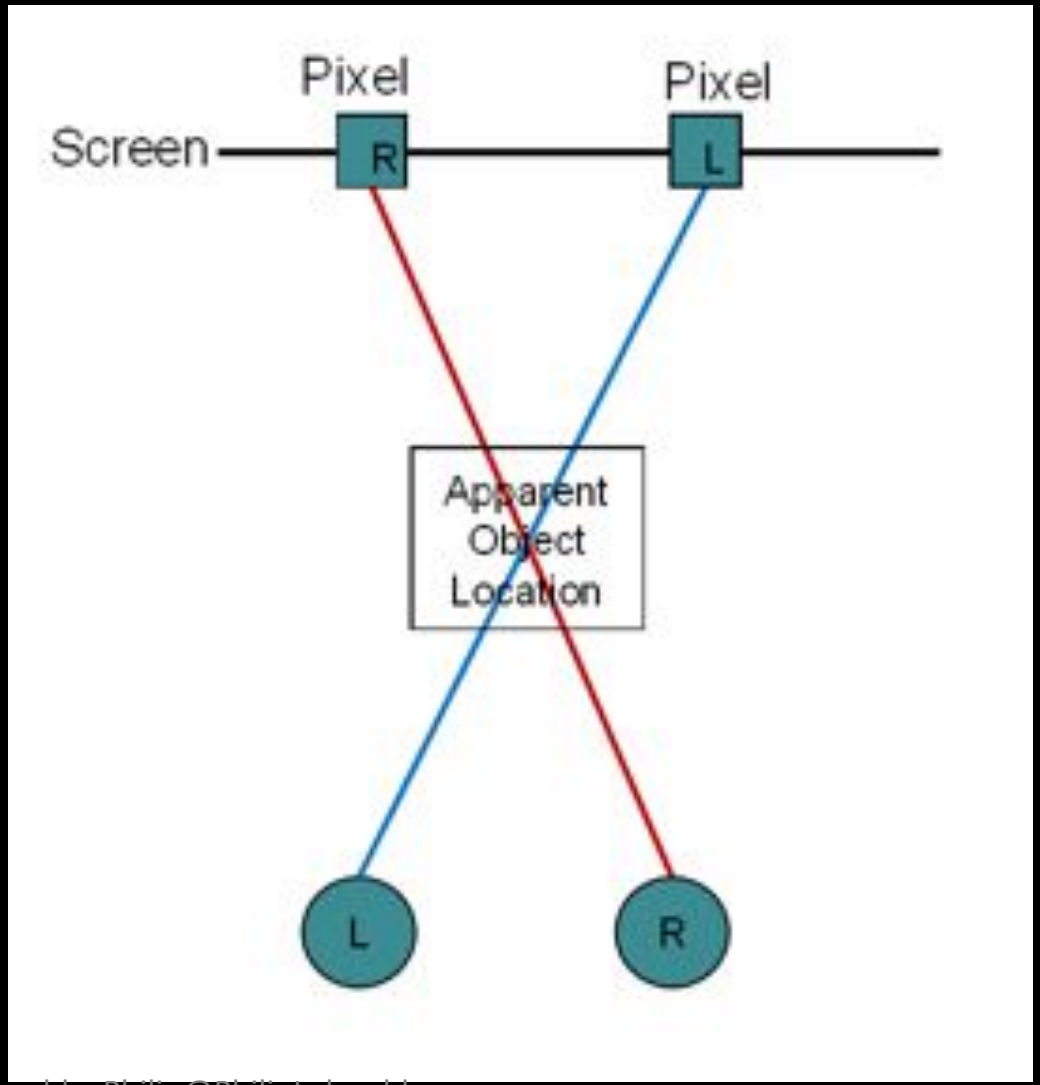
With the creation of the Digital Cinema Lab, the motion picture industry was able to accelerate the advancement of digital cinema projection worldwide.

The Entertainment Technology Center @ USC

www.etcenter.org

The Consumer 3D Experience

Basic Concept

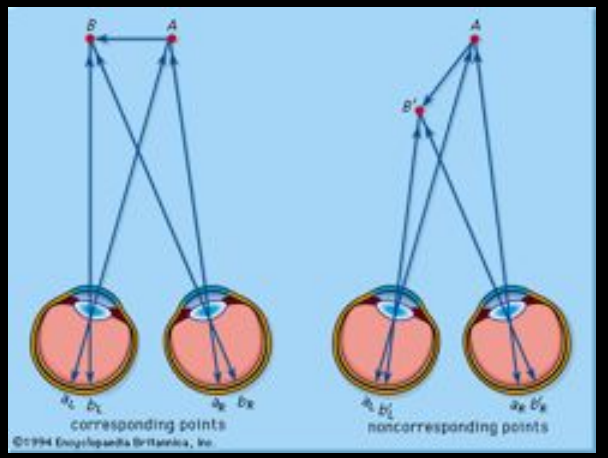


How We Experience Depth in the Real World

Monocular

Motion

Binocular



Balance, sound, and other sensory input

How We Experience Depth in Stereoscopic 3D

Monocular

Motion

Binocular

"Visual-vestibular conflict"

Balance and other sensory input

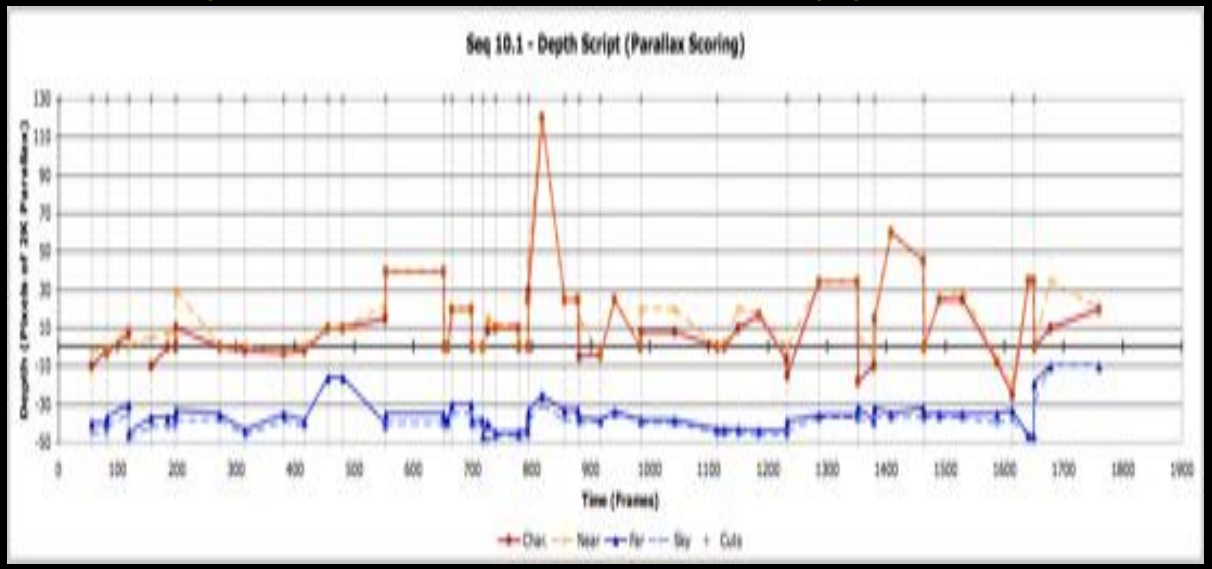
3D Content Creation

"Our people need to think in a different geometry."
Chuck Pagano, ESPN Sports

Art of S3D

Some new 3D tools and techniques will emerge

Entrepreneurial Creative Opportunities



depth script

3D Previsualization

3D Content Creation (3 methods)

1. Computer Generated Images (CGI)
2. 2D-to-3D conversion
3. Live Action (2 image)
   - Prerecorded
   - Real time

Art of S3D

Sports and live action
driving the learning curve

Camera development

Cutting among cameras

Stats, flying logos, and closed caption

Games (the other CGI 3D)

- Adjustable S3D

- Average gamer is 37 years old
- 42% are now women
- 55% play games on their phone or handheld

Source: Entertainment Software Assn. 6/11

- $25.1B spent on game content, hardware, and accessories in 2010 in the U.S.
- Call of Duty: Black Ops- $650M in 5 days ($1B in 9 mo.)

Source: Entertainment Software Assn. 7/5/11

Consumers don’t buy technology, they buy the experiences that technology delivers

Consumer Market

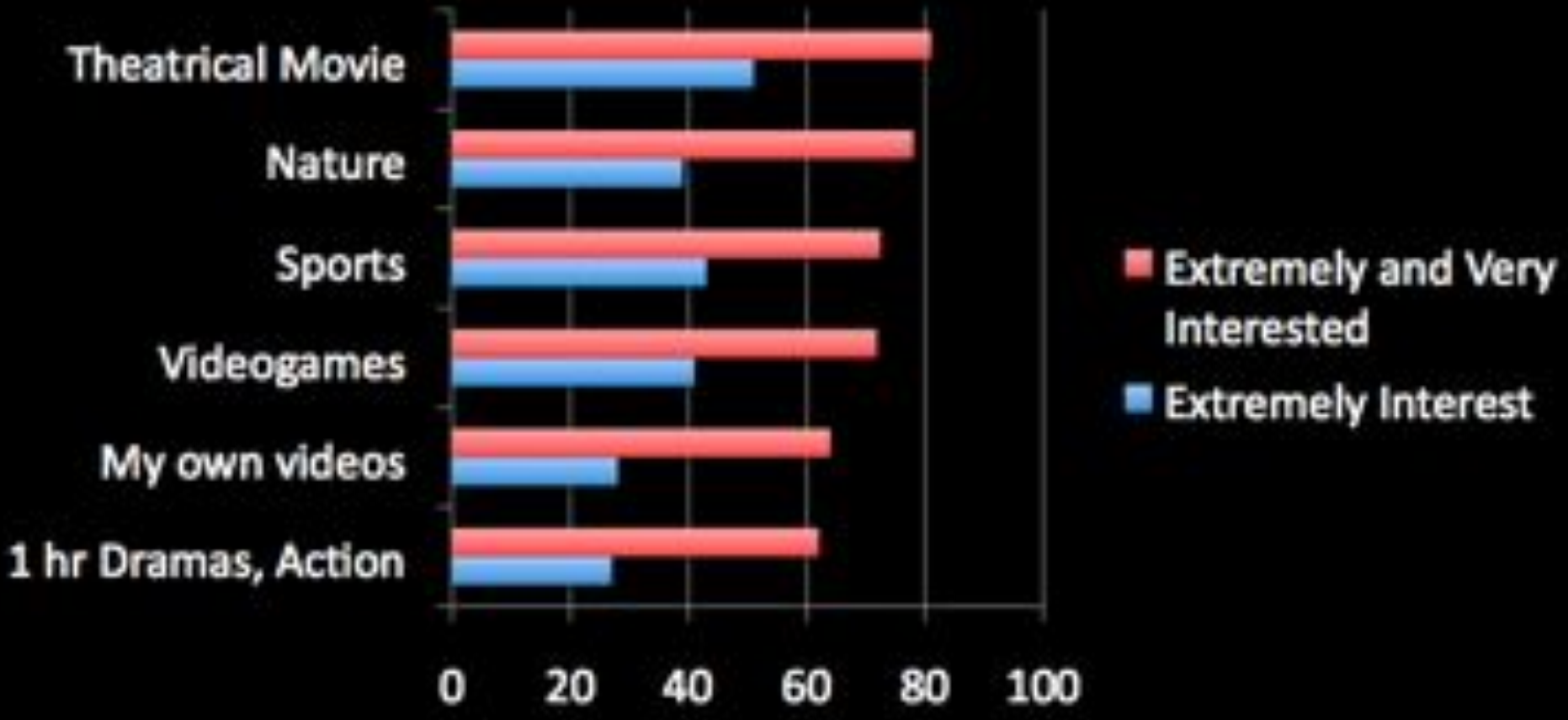
3 Legs of the Stool

Movies

Sports/
Live Events

Games

Consumer 3DTV content preferences



Source: Arturo Jordan, Sony Electronics, 3D University, 6/18/11

The Emerging Language of 3D

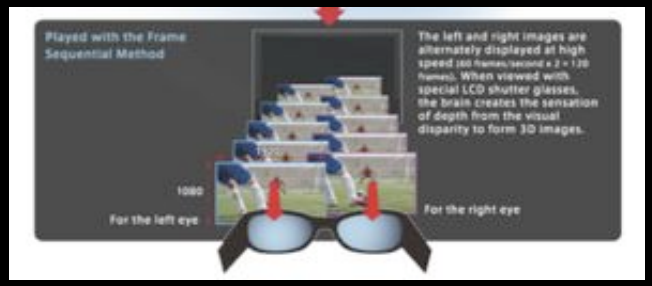
End Game:

To transition 3D
from a special effect
to a key resource in the storyteller's tool kit

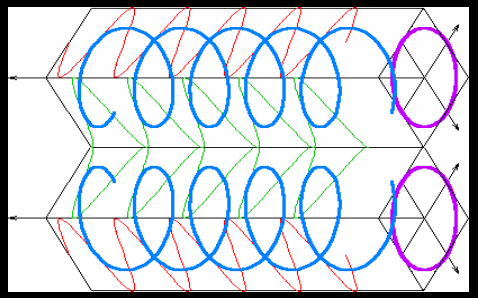
The Consumer 3D Experience

Tour

3D viewing technologies for the consumer market



Active Shutter



Counterclockwise spin

Clockwise spin

Passive Polarized

Anaglyph

Autostereoscopic

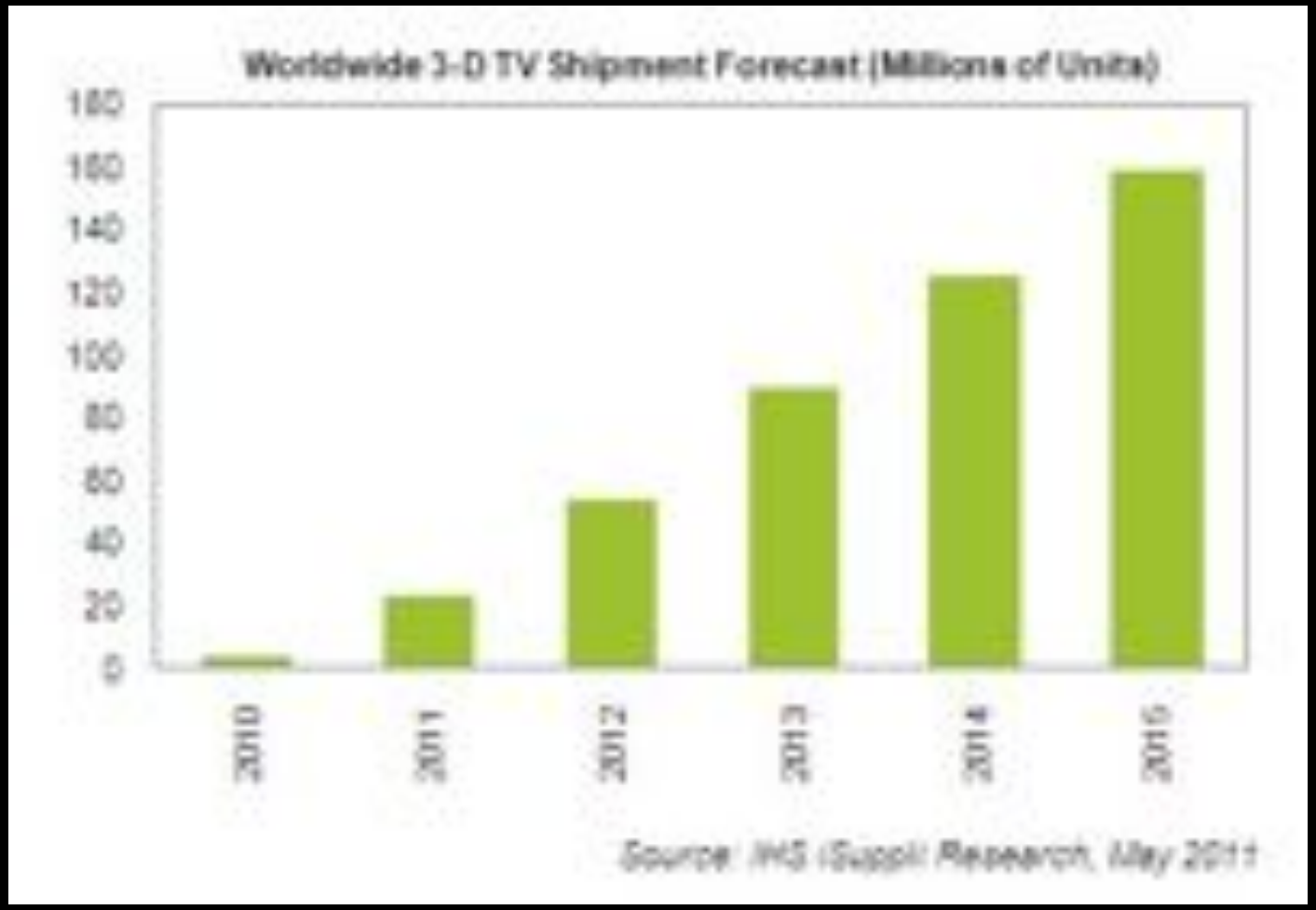
Head Mounted Display

The Hype Cycle

Source: Gartner Group

Worldwide 3D TV Forecast

Millions of Units / year



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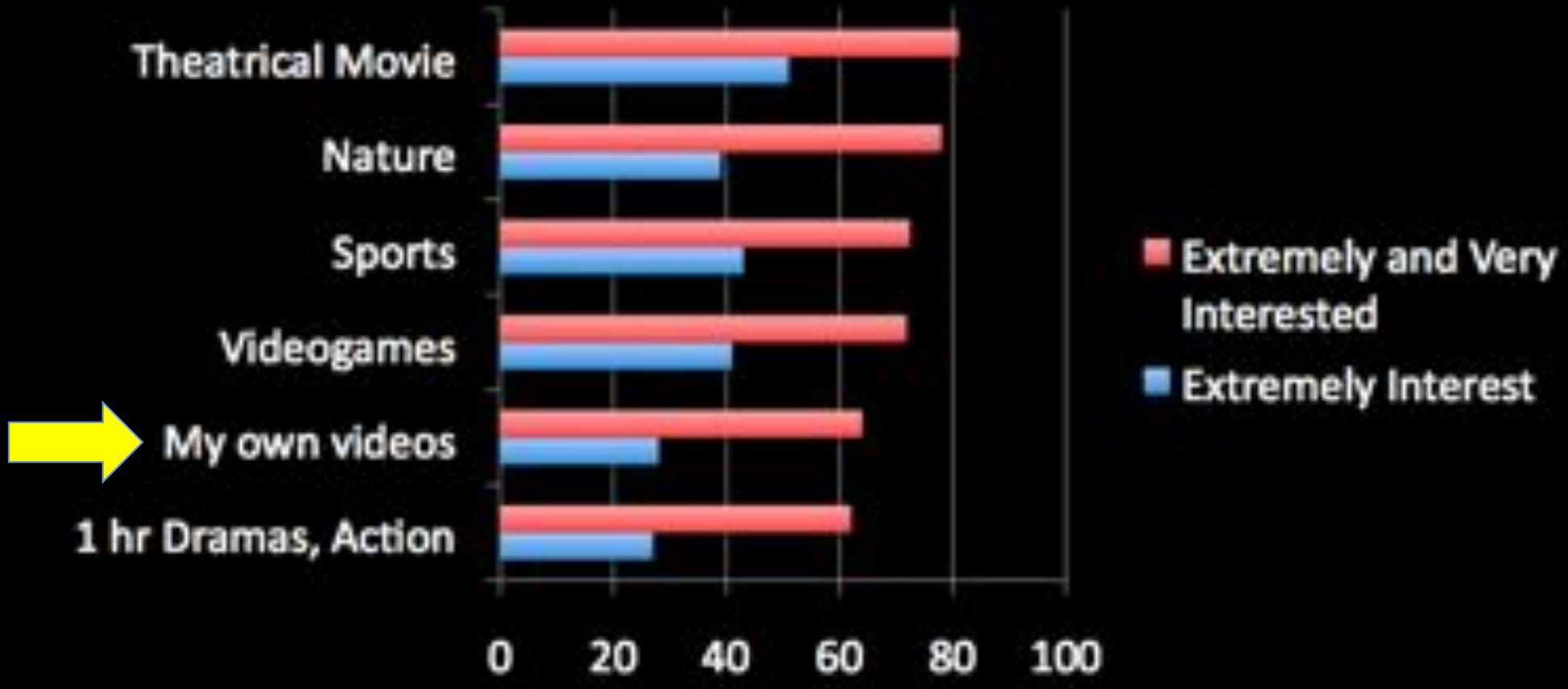
3D on Personal Devices

Consumer 3DTV content preferences



Source: Arturo Jordan, Sony Electronics, 3D University, 6/18/11

Trends in Mobile 3D devices

Three key applications:
- creation and sharing of user-generated 3D content
- playback of 3D content
- 3D gaming

(Source, ABI Research, 4/20/11)

Autostereo 3D Phones

LG Optimus 3D
Dual 5 Megapixel cameras

HTC EVO 3D
Dual 5 Megapixel cameras

Sharp Aquos SH-12C
Dual 8 Megapixel cameras

Consumer 3D Cameras

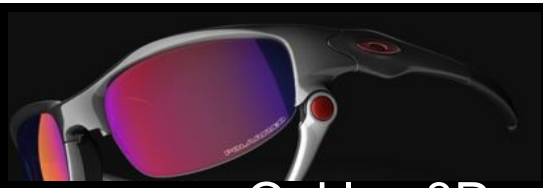
DXG
$69.99

Created with kids in mind

Comes with 3 viewers
- prints on any photo printer

Apps / devices specific to 3D content

Picoscan
3D scanner



Oakley 3D

Professional

iPhone App:
Cine3D
Stereographer

CRC Depth
Estimation from
3D video

Consumer

$70 3D
Shot Cam

3dtvpubfinder.com/

3D mapping
laser backpack

Laser Light Engines Raises $13 Million; Pacts With IMAX

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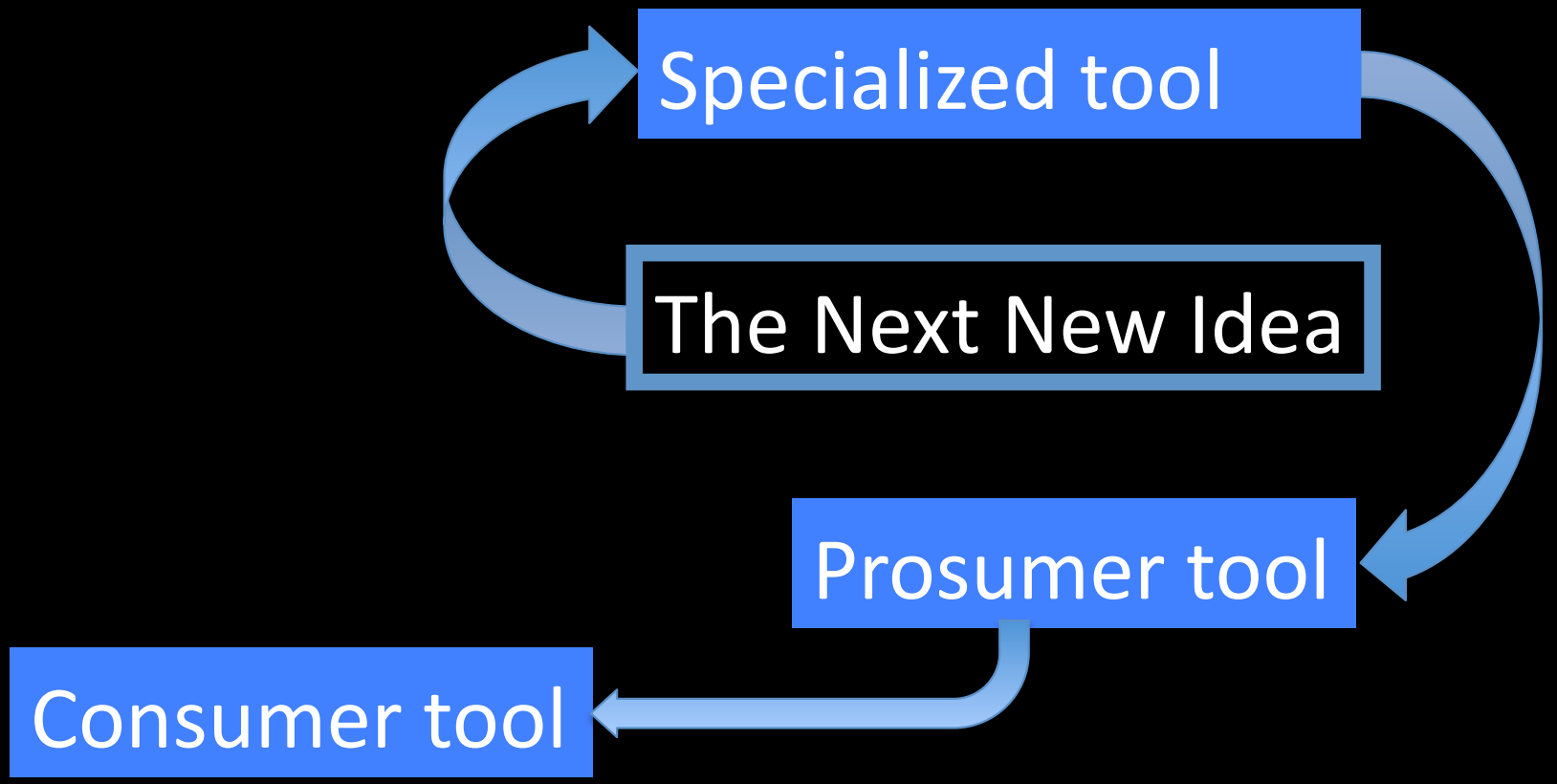
Business Opportunity – the product lifecycle



Other S3D Markets

- Simulations
- Augmented reality
- Telepresence

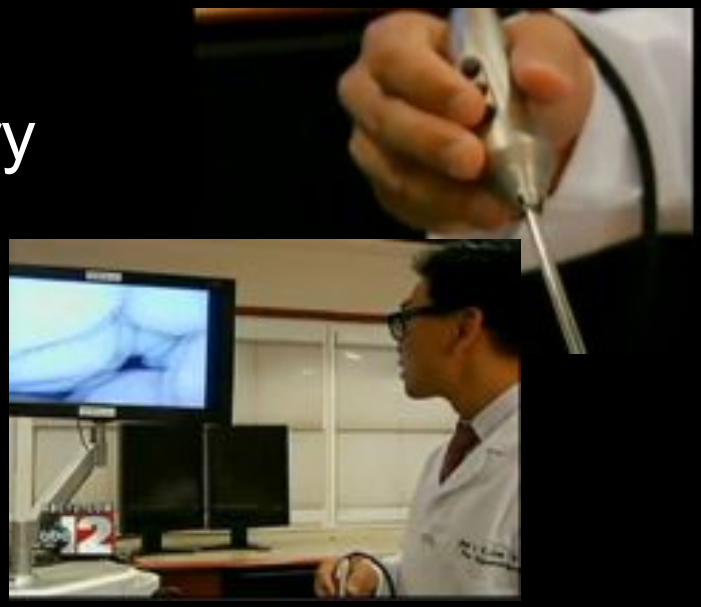
Military

Univ. of Washington military data indicates that 3D safety training reduces injuries by up to 38 percent.

Medicine

3D prostate surgery
Cleveland Clinic Florida (12/17/10)

3D laparoscopic surgery
UC San Diego (1/31/11)
University of Surrey, UK (1/31/11)



3D glaucoma and refractive cataract surgery
www.truevisionsys.com (11/17/10)

3D endoscopic brain surgery
University of Pennsylvania (3/26/11)

Education and 3D

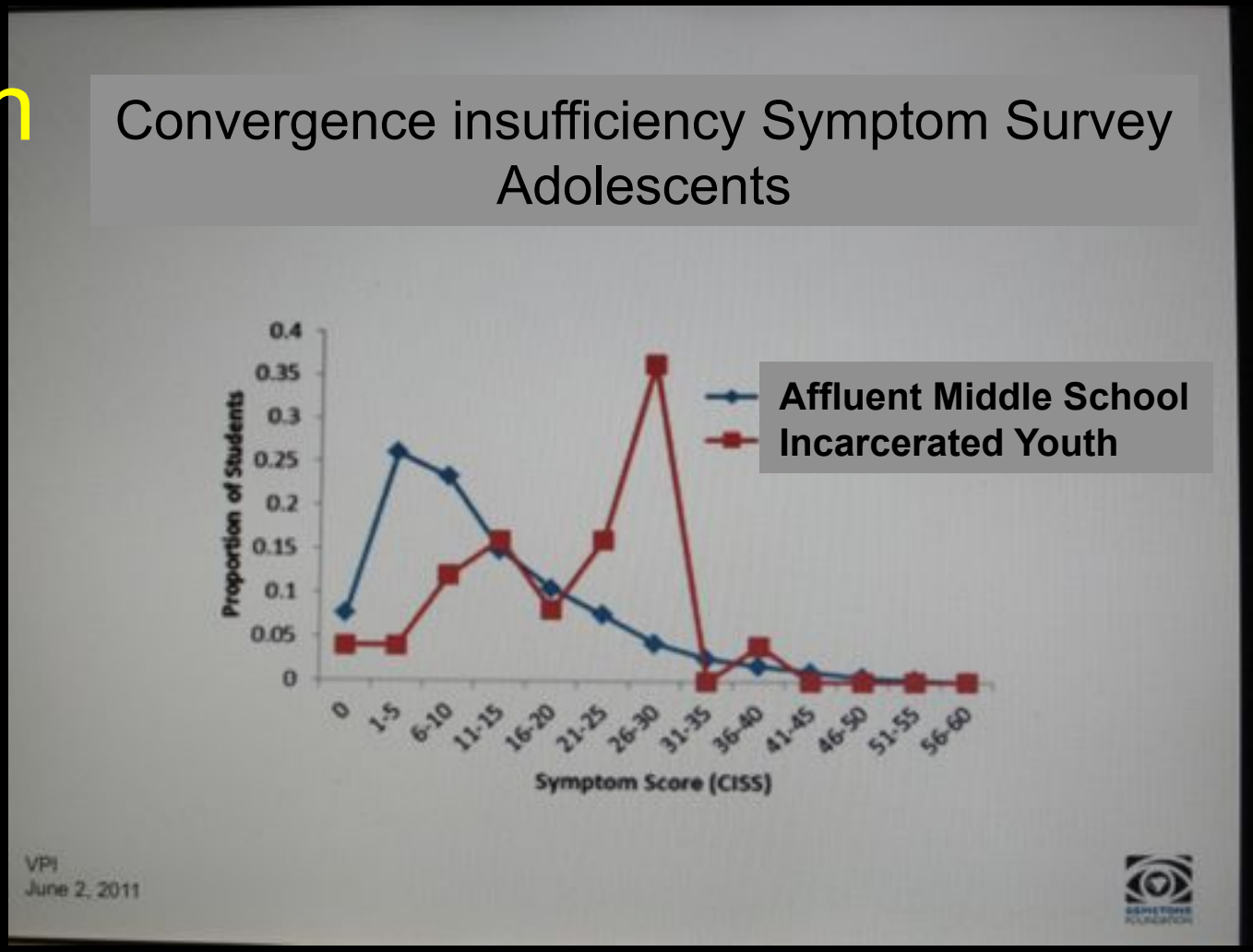
Greater retention

Greater understanding of spatial relationships

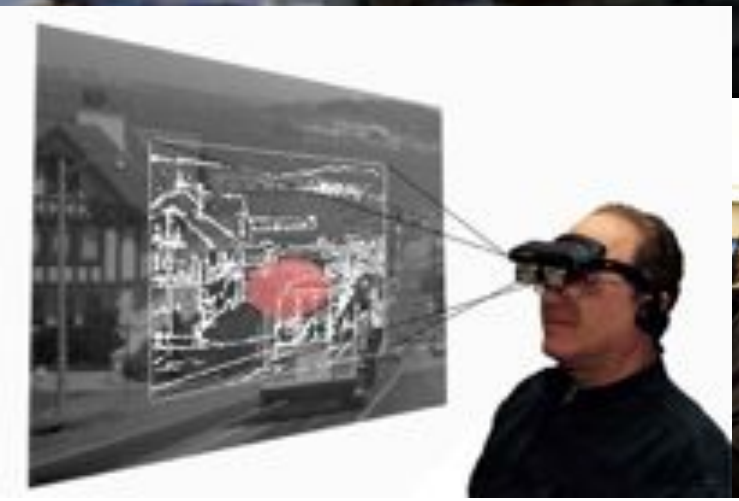
3D and Children

Work of
Maureen Powers,
Gemstone Foundation

Los Angeles schools
and youth facilities



3D
A potent component of the immersive technology mix



Consumers don’t buy technology, they buy the experiences that technology delivers

Conclusions

3D will be in TVs, PCs, game consoles, etc., as well as movie theatres

Conclusions

We will see how consumers use it as markets emerge

Conclusions

Entrepreneurial opportunities in the professional and consumer markets for…

Hardware
Software
Services
Support
Training/Ed.
Tools
Marketing
PR
…

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Thank You

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