NAB 2015: “Crave More”

Mark Schubin, SchubinCafe.com, (who has visited every booth at every NAB show since 1973)
NAB 2015: “Crave More” Respect
NAB 2015: “Crave More” Respect

- Fairness
NAB 2015:
“Crave More”
Respect

- Fairness
- pay-to-be-nominated awards
NAB 2015: “Crave More” Respect

- Fairness
- Women
NAB 2015: “Crave More”

Fairness

Women

return of topless models at the Atomos booth

Respect
NAB 2015: “Crave More”
Respect

- Fairness
- Women
- Intelligence
NAB 2015: “Crave More” Respect

- Fairness
- Women
- Intelligence
  - non-lies
Live
Sounding
Weather 24/7
UnattendedWeather.com
NAB 2015: “Crave More”
Respect

- Fairness
- Women
- Intelligence
  - non-lies
  - lies
Zero Latency,
High Definition Wireless Links
for Camera Professionals
Ramesh Raskar, MIT, trillion-fps camera showing a pulse of light passing through a filled Coke bottle, slowed by 10,000,000,000:1. 2012 TED talk - http://bit.ly/mitfast (two Japanese universities now at 4.4 trillion fps)
NOTHING has zero latency

some “zero” latency at NAB 2015:
NOTHING has zero latency

some “zero” latency at NAB 2015:

“about 90 milliseconds”
alignment technology used to mount the chips to a newly developed prism. This new optical system supports the wide color gamut of ITU-R BT.2020\textsuperscript{\textdagger}, enabling more precise color reproduction in live broadcasts.
alignment technology used to mount the chips to a newly developed prism. This new optical system supports the wide color gamut of ITU-R BT.2020*1, enabling more precise color reproduction in live broadcasts.

*1 ITU-R BT.2020 is the specification of video format defined by ITU-R. The camera does not cover it in full.

I’ve substituted the word “camera for the actual model number listed.
NAB 2015: “Crave More” Respect

- Fairness
- Women
- Intelligence
  - non-lies
  - lies
  - one-side only
IP: ‘Swonderful

- commodity components

$24.99
free shipping
IP: ‘Swonderful?

- commodity components
  - unless your facility is not all IP

Extron VN-Matrix 325 replacement power supply: $250
IP: ‘Swonderful

- commodity components
- no central router needed

Cisco diagram
IP: ‘Swonderful?

- commodity components
- no central router needed
- differences of opinion

Evertz EXE-VSR
46 Tbps router
IP: ‘Swonderful

- commodity components
- no central router needed
- helps “remote the remote”
Remote Production Truck

All Mobile Video Titan
Truck on a Chip

same size
Personnel

On-Site
- A2s
- utilities
- maintenance
- stage managers

Is This Trip Really Necessary?
- graphics
- recording & playback
- director/AD/TD
- audio mixer
- camera operators
IP: ‘Swonderful

- commodity components
- no central router needed
- helps “remote the remote”
IP: ‘Swonderful?

- commodity components
- no central router needed
- helps “remote the remote”

### Internet protocol suite

- **Application layer**
  - BGP, DHCP, DNS, FTP, HTTP, IMAP, LDAP, MGCP, NNTP, NTP, POP, ONC/RPC, RTP, RTSP, RIP, SIP, SMTP, SNMP, SSH, Telnet, TLS/SSL, XMPP
  - *more*

- **Transport layer**
  - TCP, UDP, DCCP, SCTP, RSVP
  - *more*

- **Internet layer**
  - IP (IPv4, IPv6), ICMP, ICMPv6, ECN, IGMP, IPsec
  - *more*

- **Link layer**
  - ARP, NDP, OSPF, Tunnels (L2TP), PPP, MAC (Ethernet, DSL, ISDN, FDDI)
  - *more*
NAB 2015: “Crave More”
Respect

- Fairness
- Women
- Intelligence
  - non-lies
  - lies
  - one-side
  - superlatives
Announces World's First Hand-held 8K UHDTV Camera System

Trimmed headline of an NAB report
(appeared in many media outlets)
Announces World's First Hand-held 8K UHDTV Camera System

NAB 2013 DEBUT

Astro 8K UHDTV Handheld shown at NAB in 2013
Countryman continued to show, uncredited, scenes from the 2010 “Live From Lincoln Center” South Pacific
NAB 2015: “Crave More”
Respect

- Fairness
- Women
- Intelligence
  - non-lies
  - lies
  - one-side
  - superlatives
  - instant change
SDR (Standard Dynamic Range)

HDR (High Dynamic Range)
36-inch Rear Projection System
D-ILA 1920 x 1080

HDR at JVC
GV Xensium
CMOS sensor
10,000,000:1
contrast ratio
>23 stops
shown at NAB 2008
NAB 2015: “Crave More” Respect

- Fairness
- Women
- Intelligence
  - non-lies
  - lies
  - one-side
  - superlatives
  - instant change
  - nonsense
Real 4K Filter for film
A Breakthrough in optical HD glass
Ultra HD

- higher dynamic range (HDR)
- wider color gamut (WCG)
- higher frame rate (HFR)
- more immersive sound (IS)
- higher resolution: originally 4x HD, now “8K,” “4K”
in 2010 it was S3D
Y4K?

Two main reasons:

- Better pictures
- Ability to zoom in by a factor of 2:1 for HD
Astro 55-inch ("world’s smallest") 8K display

- up close: amazing!
- at home viewing distance: HD-ish
4K 293” (12’-high) Hibino LED display
Viewing Tests: 56” Screen

Average of 6 sequences, with 95% confidence limits

Average of 5 sequences, 3H viewing distance (with 95% Confidence Intervals shown)

- HD
- 4K

4K=8xHD (720p or 1080i) pre- & post-compression

EBU @ HPA 2013

EBU @ IBC 2013

2x/grade

0-0.2x/grade

Vertical scales normalized

pre- & post-compression data rate increase of ~16x per grade

Mark Schubin, SMPTE DC, 2015 May 20
“sharpness” is based on area under MTF curve

RCA: area$^2$

Zeiss: area
The System Expander enables the use of large viewfinders and full studio lenses, converting the portable camera into a full facility studio/field camera.

from the press release for an 8K camera introduced at NAB 2015
Common HD Field Camera/Lens

- Dichroic prism with three identical-resolution sensors
- B4 (BTA S-1005-A) mount
- Optical filtering
- Long-range zoom lens
1080-Line 2/3” HD Camera’s Sensor

three of these sensors
each with at least 1920 x 1080 photosites
(not 2 x 2)
<table>
<thead>
<tr>
<th>Option 1: Big Prism</th>
</tr>
</thead>
</table>

- Special lens adaptor needed for 3-chip

Lockheed Martin 4K prototype 2000

*SMPEJ* March 2001
Option 2: Single-Chip w/Color Filter

- Perfect optical low-pass impossible
- Upconversion necessary
- If chip is 3840 or even 4096 across, not delivering 4K due to color filtering (higher-res chips available)

Bayer pattern drawn by Colin M. L. Burnett attribution required
UPREZZING NOT SPOKEN HERE.

-JIM JANNARD, 2006
upscaling, upconversion, de-Bayering, de-mosaicking, etc.
Lens Considerations

- PL-mount, primes primarily
- Large format tends to mean narrower depth of field (all else being equal)
- Adaptors from 2/3-inch format lens to S35 sensor lose ~2.6 stops (if perfect)
  - Also lens MTF is HD
Option 2A: 1-Sensor, Built-In Adaptor

- Panasonic AK-UC3000
  - 1”-format
  - 16/11 optic reduction
  - built-in allows use of lens correction

to scale
Option 3: Shrink Pixels

- Ikegami SHK-810 & Sony HDC-4300
- 3 CMOS = true 4K
  - no upconversion
- 2/3-inch sensors
  - sensitivity/noise
    - light has noise
Option 4: Diagonal Offset

- Hitachi SK-UHD4000
- 4 HD sensors
  - (two green w/½-pixel diagonal offset)
  - extra prism element splits light
  - Bayer-like processing
Option 5: HD+Upconversion

- Grass Valley LDX 86
- optics match sensors
So, with B4 “4K” Cameras...

- Canon field prototype
- Fujinon
  - UA22x8
  - UA80x9
also more transmission, less reflection, shifted peak performance, etc.
Full-Frame 35
43.3 Ø

VistaVision
45.3 mm Ø

Dragon 8K
46.3 mm Ø
HBC-3600
13.5-570mm (42倍)
F2.8（開放）
2014/9/16 18:10 暗れ

目視イメージ
Shenzhen Imaginevision

World-class autofocus algorithm with high-power zoom lens
20 Times 2.3 Million high-definition af zoom camera module
Fraunhofer Lightfield

- Previously shown:
  - Re-focus in post
  - Re-frame in post
  - Re-iris in post/HDR
- NAB 2015:
  - Re-light in post
Depth-Based Grading

courtesy of Fraunhofer IIS and Stuttgart Media University HDM
Re-Lighting in Post

courtesy of Fraunhofer IIS and Stuttgart Media University HDM
競技会場

(i) f(x, y, z)

被写体のみを切り出し伝送

(ii)

被写体以外を伝送

(iii)

音響空間情報を伝送

超高臨場感メディア同期技術
Advanced MMT

イマーシブテレプレゼンス技術 Kirari!

Size: 10m x 5m x 5m
Projector: 4K x 4
Speaker: 5.1ch
Light: 5

伝送先会場
Jan Frölich in front of Christie 3P projected content at HPA Tech Retreat
courtesy Charles Sappington, Morningstar Productions

Christie Laser Projection
- high output
- no scintillation
- HDR
- almost full BT.2020
experiences made with IBM
Not at NAB: BABO Next-Stage Citizen Journalism

1. An event occurs
2. Editor sets tasks and fees using BABO software
3. The app uses geolocation to find the nearest users and sends them the task
4. Editor chooses the best video and buys it
5. The best video is aired

http://babo.com/
Where Did the Newscast Come From?

Mark Schubin
SchubinCafe.com
Simple Answer: 19th-Century French SciFi

English translations available since 2004
35th Anniversary of 24-Hour News Cycle?
169th Anniversary of 24-Hour News Cycle!

- *Le Grand Pan*, a continuous, subscription newspaper in *The World As It Shall Be* (1846)
- followed closely the invention of continuous-roll wood-pulp newsprint (1844)
1882 The Twentieth Century, chapter 3:

“Ferbana, 11 pm: His Majesty the King of Senegambia was assassinated minutes ago. Dynamite bombs and electric torpedos were launched into the palace....”
TV News

- same book
- HD (even AR)
- injured correspondents become the story
- libel complaints settled by duels
Bloommobile of 1882

- handheld camera
- one-person crew
- *PRESS* markings to indicate noncombatant status
- but long cords needed
Source of the Idea: 1881

The Graphic, September 24, 1881

stereo listening at the 1st International Electricity Congress in Paris
1st Newscast: February 15, 1893
1st News Telecast: May 10, 1928

newscaster
Kolin Hager
posing later
with mics
from various
dates
BUT

there were much older live, remote visual sportscasts
Hall of Fame Induction Speech 1976

“I was born in September and my mother had to see the World Series... at the old opera house in Redlands, California. And in those days they didn’t have babysitters; they had clothes baskets. So they put old Lem in a clothes basket and they went to see the World Series. I was probably about six weeks old.”

Cleveland pitcher
Bob Lemon
1920-2000
BASEBALL AT THE OPERA HOUSE.
A Complete and Convenient Arrangement to Take the Game in Detail.

Augusta, Ga., notes:— We have a blackboard in the Opera House and a diamond on it, with holes punched for each base, with flags showing how each base runner gets his base, with the batting order of each nine. The whole game is sent by telegraph, showing how each player plays. They charge ten cents for each day. We have gotten the games played by our nine in Atlanta, Chattanooga, Memphis and Nashville and will get Columbus and Macon......When Esterday made his home run and won the game on Monday it was like bedlam let loose for ten minutes.
Improvements

1888 - pins

1889 - motion

1891 - electricity
Pathé newsreel of 1919 World Series
Androids

1894

1895
making very complimentary remarks about Sam Crowder's little men. One charming young girl was heard to say: "Aren't they just the dearest, cutest little fellows you ever saw, and so polite! why they bow as sweetly as 'real live men' when they are applauded," and another: "I declare, I though 'little' Jake Wells looked positively handsome when he knocked that home run."

The Times (Richmond)
May 7, 1895

Arizona Daily Star
October 1, 1931
(Tucson)
Coleman Life-Like Scoreboard
400 projectors, 5 operators
Washington, D.C., 1926
Questions?