Highlights of Consumer Electronics Show (CES) 2013

Fernando Garcia Calvo
Global Video Unit
Telefonica

Javier Lucendo de Gregorio
Global Video Unit
Telefonica

Fernando Soto de Toro
Global Video Unit
Telefonica

Joaquin Munoz Lopez
PDI
Telefonica Digital

Teo Mayo Muniz
PDI
Telefonica Digital

Jose Maria Miranda
PDI
Telefonica Digital

Oscar Gavilan Ballesteros
PDI
Telefonica Digital

This article is an editorial note submitted to CCR. It has NOT been peer reviewed.
The authors take full responsibility for this article's technical content. Comments can be posted through CCR Online.

ABSTRACT

The Consumer Electronics Show, which is held every year in Las Vegas in early January, continues to be an important fair in the consumer sector, though increasingly the major manufacturers prefer to announce their new products at their own specific events in order to gain greater impact. Only the leading TV brands unveil their artillery of new models for the coming year. Despite this, it continues to break records: there were over 150,000 visitors (from more than 150 countries), the number of new products announced exceeded 20,000 and the fair occupied over 2 million square meters.

Categories and Subject Descriptors

A.m [**General Literature**]: Miscellaneous

Keywords

Consumer Electronics.

1. OVERVIEW

In general terms, the most important trends for the telecoms sector can be summed up as follows:

- Ultra HD (4K) Televisions are the revelation for 2013, but without available content
- 3D is losing its attraction and disappears from the headlines of the CES
- The third generation of SmartTVs focuses on simplifying entertainment for users
- Still cameras become intelligent and loaded with applications (Sony camera Apps and Samsung Galaxy camera)
- HDMI TVs and dongles with Android demonstrate the great economies of scale of Android solutions
- HEVC - High Efficiency Video Coding (H.265) reduces the speed of transmission of videos on H.264 by 50%
- Google TV gains more manufacturers (Hisense)
- Improvement of the TV experience in the home and on the move (TV Everywhere)
- Technology favours healthy life habits
- The battle in processors has just one winner: ARM
- SmartHome becomes popular, with "Smart" household appliances, which communicate with the mobile.
- Innovation in the automotive sector continues at a good pace (electric cars, touch panels, interior connection, etc.)

2. Ultra HD (4K) is the revelation of 2013, but without available content

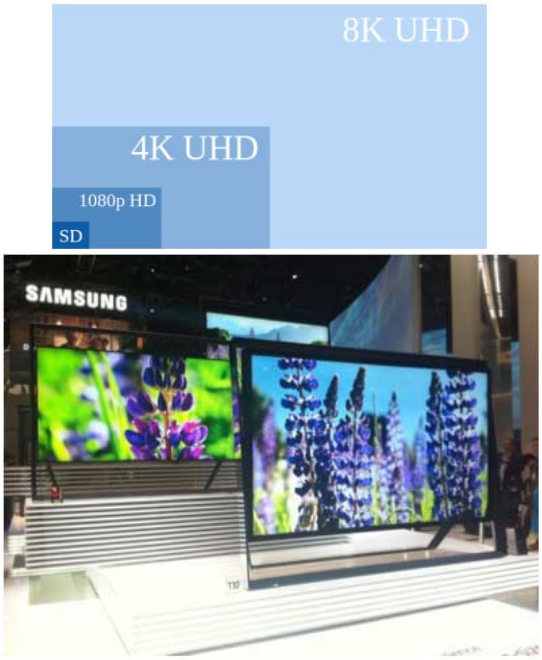

Figure 1. New Samsung Ultra HD TVs

Without exception, all the TV manufacturers turned up at the show with 4K TVs. This new transmission quality, which is sold as the evolution of HD (1920x1080) and which reaches up to 3840 x 2160, means a very significant increase in the size of TVs in order to perceive the difference in quality.

TVs will be manufactured in sizes of up to 84" and in some cases 110", with prices in excess of 20,000 dollars. But, as happened with 3D in its early days 3 years ago, the technology (and the new sales pitches) far outstrips content availability, in both physical medium and linear transmission. Only some current blu-rays offer updates from 1080p to 4K. Blu-ray formats and players compatible with this quality are expected to appear in 2013. New encoding technologies are already appearing (see HEVC, below) to support these formats. In this regard, particularly important is the pilot presented by Samsung in conjunction with Netflix to offer 4K video on demand on the Internet.

Figure 2. Netflix in Ultra HD – Samsung TV

3. 3D is losing its attraction and disappears from the headlines of the CES

The arrival of 4K and the size of TVs, together with the very probable lack of interest in 3D for home consumption, have meant that 3D is not an attraction.

Some stands had large 3D video-walls (LG presented the largest one in the world) or use broadcasting of two separate images in order to be able to have two people playing simultaneously on the same television (Sony).

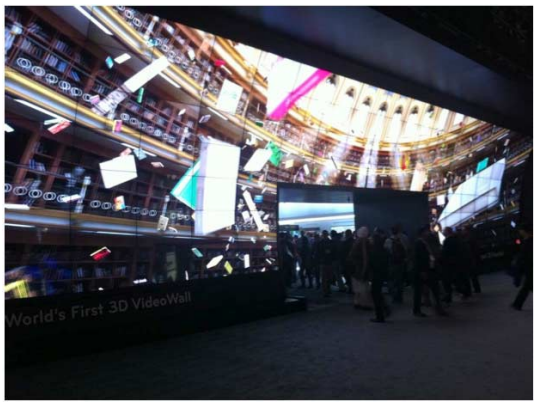

Figure 3. LG Booth – 3D Videowall

Similarly, the OLED technology which Sony championed a few years ago, swiftly followed by others, has never really taken off due to the high manufacturing costs and the costs of the components, without the difference in quality being comparable to the difference in price.

4. The third generation of SmartTVs focuses on simplifying entertainment for the user

Of all the new ranges of SmartTVs presented, the greatest innovations came from Samsung. While other manufacturers have evolved their remote controls in order to make them simpler or to incorporate voice or gesture recognition while maintaining the TV user interface, Samsung has completely redesigned it in a bid to facilitate the discovery of content by the user.

Figure 4. Smart Hub 2011, 2012, and 2013

Once connected, Samsung's TVs incorporate an extended program guide which complements and improves on what is available in open broadcast, including descriptions of the programs, images, other related contents, ratings from the Internet and from other users. When the television set is switched on, instead of seeing the TV on the entire screen, a small window is presented, complemented by images and names of the next programs, broadcasts on other channels and personalized recommendations (the TV incorporates an intelligent algorithm to learn the user's preferences).

Another screen displays images of on-demand contents from the providers of these types of services (which export their catalogues in order to be present in this section) and the TV shows on which services and at what price the content chosen by the user can be seen. Clearly, this represents a disintermediation of the providers of these services, which lose their identities, as they become mere content distributors.

A third screen presents all the applications installed, with a larger space in order to present a greater number. In addition, Samsung is the only manufacturer that has launched a kit to update 2012 TVs to all these new features, which require more powerful hardware in the TV (four-core processor). It is a small black box, which connects to the back of the TVs, sold in 2012 (7000-8000 series). The price will be around 200-300 dollars, but it has not yet been announced. Samsung says it will guarantee these modules for at least 5 years, thus increasing the TV's lifetime without the need to buy a new set.

Figure 5. Samsung expansion kit for TVs

Also worthy of a note is the introduction of wireless HDMI display technology, such as Miracast and WiDi, which make it possible to send videos in HD quality from PCs, smartphones or tablets to the TV.

5. Still cameras become intelligent and loaded with applications

The great success of mobiles with still cameras and the quantity of applications that are developed to improve, edit or control the camera on the mobile have led to the emergence of a new category of low-end still cameras.

Both Sony and Samsung have launched cameras connected by Wi-Fi, which permit the installation of applications (from an applications store). In the case of Samsung, it is the Galaxy Camera with Android O.S., while Sony has the NEX-5R.

Figure 6. Samsung Galaxy camera, and Sony NEX-5R camera.

In time, this new category of cameras aims to replace small multifunctional cameras. However, the key to success will lie in maintaining some difference with regard to the foreseeable evolution and improvement of the cameras on smartphones (better lenses, CCD, etc.)

6. HDMI TVs and dongles with Android demonstrate the great economies of scale of Android solutions

The constant increase in smartphone features, the low power consumption and the constant reduction in price have meant that many manufacturers use hardware architectures based on mobiles for other uses such as smartTVs, small set-top boxes or even dongles that are connected to the TV's HDMI port (they can be fed by an additional USB port or by an HDMI-MHL cable) and, in a very small size, they incorporate Wi-Fi, Bluetooth and microSD connection.

Figure 7. Android HDMI dongle, and Android STB

These small dongles look likely to reach stores on a massive scale this year (they already existed in 2012 but distribution and communication was relatively restricted) and they will make it possible to have Internet access, reproduction of local content, access to Android applications, etc. They will not, however, have access to Google Play (the official Android store) as that will only be available on GoogleTV devices. The prices will be around €50.

There is, however, a high risk of fragmentation in these solutions. Since is so easy to create these devices and upload the Android O.S., similar solutions may reach the market but with variation in versions of Android and with the incorporation of additional components (DRM). It should be noted that there is no certification program for these devices nor minimum requirements from the Android consortium and therefore there is complete freedom in manufacturer. Only GoogleTV devices have that type of control.

7. HEVC – High Efficiency Video Coding (H.265) – reduces the speed of transmission of videos on H.264 by 50%

It was simply a question of time before we saw the evolution of current video compression algorithms. In the same way as Mpeg4 (H.264) radically improved the efficiency of video compression compared to Mpeg2, 9 years ago, the ratification of H.265 is expected at the end of January, which represents a great improvement over H.264, as it supports resolutions of up to 8K.

At a number of stands, we were able to see manufacturers of chipsets showing off new products capable of decoding signals in this format. It is expected that, in order to view the same video quality, a 50% reduction will be obtained in the size or the compression of the file. For example, a 1920x1080p HD signal may require 6 Mbps with H.264 and that would now be reduced to 4 Mbps.

Figure 8. H.264 vs. H.265 comparison

However, it will be at least 2 years before we are able to talk about its application in commercial solutions, because it requires changes to coding and decoding equipment, though the impact on video businesses will be very notable. It will improve the coverage of IPTV services over ADSL networks and signal quality, it will improve satellite capacity, and it will be possible to begin the transmission of UltraHD signals, etc.

8. Google TV gains more manufacturers (Hisense)

As we have reported previously, Google reserves the control of devices compatible with its GoogleTV experience, in contrast to the avalanche of Android devices. After the disaster of the first version of GoogleTV with Logitech, last year Google launched a line of work with several manufacturers (LG, Sony) combining the interface that each manufacturer defines for its device with certain obligatory elements controlled by Google (guide, search engine, YouTube...).

This year, there was no evolution of GoogleTV, but it is worth noting that more devices with GoogleTV have appeared, from manufacturers that are more aggressive on prices, for example HiSense XT780, TCL Movo, Netgear NeoTV Prime and Asus Qube.

Figure 9. Hisense XT870. Asus Qube, Netgear NeoTV Prime

9. Improvement of the TV experience in the home and on the move (TV Everywhere)

The arrival of more powerful hardware solutions at lower prices from the leading chipset manufacturers (Broadcom, Sigma, Marvell, ViXS, NXP) makes it possible to incorporate new scenarios for the enjoyment of television inside and outside the home.

A trend is emerging, which began in the United States and is now reaching Europe, of equipment in the home which permits the distribution of TV to any device inside (or outside) the home, automatically adapting format, quality, resolution and bandwidth for each device. These pieces of equipment are known as "Media Gateways", which may have outputs to TV or not (for equipment that is more hidden) and they may also include a hard disk (for the recording of programs, PVR). These devices are capable of receiving multiple TV channels (some have 8 satellite or cable tuners), transcoding these channels for each connected device and sending them in a protected manner if they are premium channels or content. One example of these is the UPC Horizon in the Netherlands and similar solutions that will be rolled out during this year.

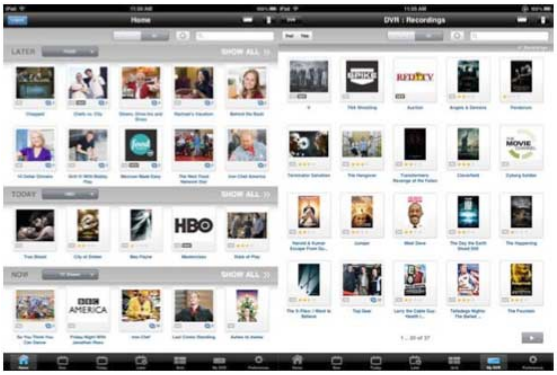

Figure 10. Dish iPad application

Together with this improvement in home experience, manufacturers are also trying to provide more complete experiences outside the home, giving access to all the content, be they channels or recordings, from within the home. To achieve this, the equipment incorporates technologies such as Slingbox (from Dish) that make it possible to send the live channels, protected, to devices outside the home, and also makes it possible to control aspects such as changing channel or recording. The new development this year was the incorporation of this technology, which was previously an additional piece of equipment, in the set-top box itself (e.g. ―Hopper with Slingbox‖ from Dish).

Applications on smartphones or tablets, as well as portals on PCs, make it possible to access all these functions whether at home or not. Pay TV providers such as Verizon are even extending their FiOS services to SmartTVs so that it is possible to access 75 linear channels and video on demand without the need for a set-top box.

10. Technology favors healthy life habits

Fitness and health is one of the fastest-growing segments in the consumer electronics industry. 215 exhibitors were present at the fair in a specific section. The main catalysts are wireless technology and portable devices. Companies such as Masimo[1], in the medical industry, have moved into the consumer segment in order to supply monitoring elements for non-medical uses, such as sports activities. LG is preparing a bracelet with a touch screen, which measures all the daily activity and can send it to the TV in order to compile a register of that activity.

[1] http://www.masimo.com

Figure 11. LG bracelet for wellness

11. The battle in processors has just one winner: ARM

ARM architecture is the most widely used in smartphones (approx. 95%) and tablets. This creates more than sufficient scale to facilitate its expansion into other devices in which it is not so widely used, such as televisions and STBs. In addition, the major investments being made by the silicon manufacturers, such as Qualcomm, are boosting the ecosystem of partners and developers created around this architecture and enormously facilitates access to a large number of applications and available code.

Thus, we can see how there is increasing penetration in televisions and decoders. Even silicon manufacturers, which traditionally have been great supporters of MIPS architectures, such as ST and Broadcom, are starting to implement ARM cores. The remaining bastion is in PCs, but AMD has already announced that from 2014 it will start to produce chips based on ARM. Even Intel is under threat. Evidence of this is the fact that in the last 6 months ARM's share price has risen by 80% while that of Intel is falling.

	A31 Quad-Core	A20 Dual-Core	A10	A12	A10s	A13
CPU	Quad-Core Cortex-A7	Dual-Core Cortex-A7	Single-Core Cortex-A8	Single-Core Cortex-A8	Single-Core Cortex-A8	Single-Core Cortex-A8
GPU	SGX544MP2	Mali400MP2	Mali400	Mali400	Mali400	Mali400
Video Decoder	4K×2K	2160P	2160P	1080P	1080P	1080P
Video Encoder	H.264 1080P@60fps	H.264 1080P@30fps	H.264 1080P@30fps	H.264 1080P@30fps	H.264 1080P@30fps	H.264 1080P@30fps
Package	BGA609 18mmx18mm 0.65mm Pitch	BGA441 19mmx19mm 0.80mm Pitch	BGA441 19mmx19mm 0.80mm Pitch	BGA336 14mmx14mm 0.65mm Pitch	BGA336 14mmx14mm 0.65mm Pitch	eLQFP176 20mmx20mm
Application	Tablet Smartphone Smart TV	Tablet Smart TV	Tablet Smart TV	Smartphone	HDMI Dongle	Tablet E-reader

Figure 12. ARM CPU comparison

12. Smart Home becomes popular, with "Smart" household appliances that communicate with the mobile

In previous years at CES we were able to see self-installable smart home solutions based on z-wave technologies, which have been much more successful in the USA than in Europe.

Figure 13. LG smart appliances

However, this year the major household appliance brands (mainly LG and Samsung) have upped the stakes considerably, with all kinds of appliances, from washing machines to ovens, fridges, robot vacuum cleaners or air conditioning units, which can be controlled from applications on smartphones and include the use of NFC to activate/deactivate simple functions as they include Wi-Fi and NFC connectivity.

13. Innovation in the automotive sector continues at a good pace (electric cars, touch panels, interior connection, etc.)

Figure 14. Tesla concept car with Nvidia

Though CES has never been a "car show", it is true that the integration of technology into cars is increasing exponentially and it has always had its place at CES.

Growth in these types of applications is not only due to the advances in automatic driving (Audi, Lexus), but above all to the integration of 1080p high-resolutions screens, LTE or units on the dashboard that facilitate integration with smartphones and the vehicle's systems. The "Ford developer program" makes such a trend even more clear.

The most important thing we have seen is electric cars that seek differentiation from conventional ones with the introduction of touch screens that replace the traditional speedometers and cluttered dashboards. NVidia presented a model like this together with Tesla.

14. Conclusions

The consumer electronics industry keeps on demonstrating rapid innovation through its Consumer Electronics Show (CES). This document covers what the authors saw as the most prominent trends in CES 2013, a show with an evident focus on providing value to consumers' every day life.