



Sky Italia - Esperienza 3D

SMPTE – 25 Maggio 2011

Massimo Bertolotti

Head of Platform Engineering & Innovation

Summary of how we see depth

- Focus.
- Perspective.
- Colour intensity and contrast.
- Relative movement.
- Convergence.
- Binocular vision.

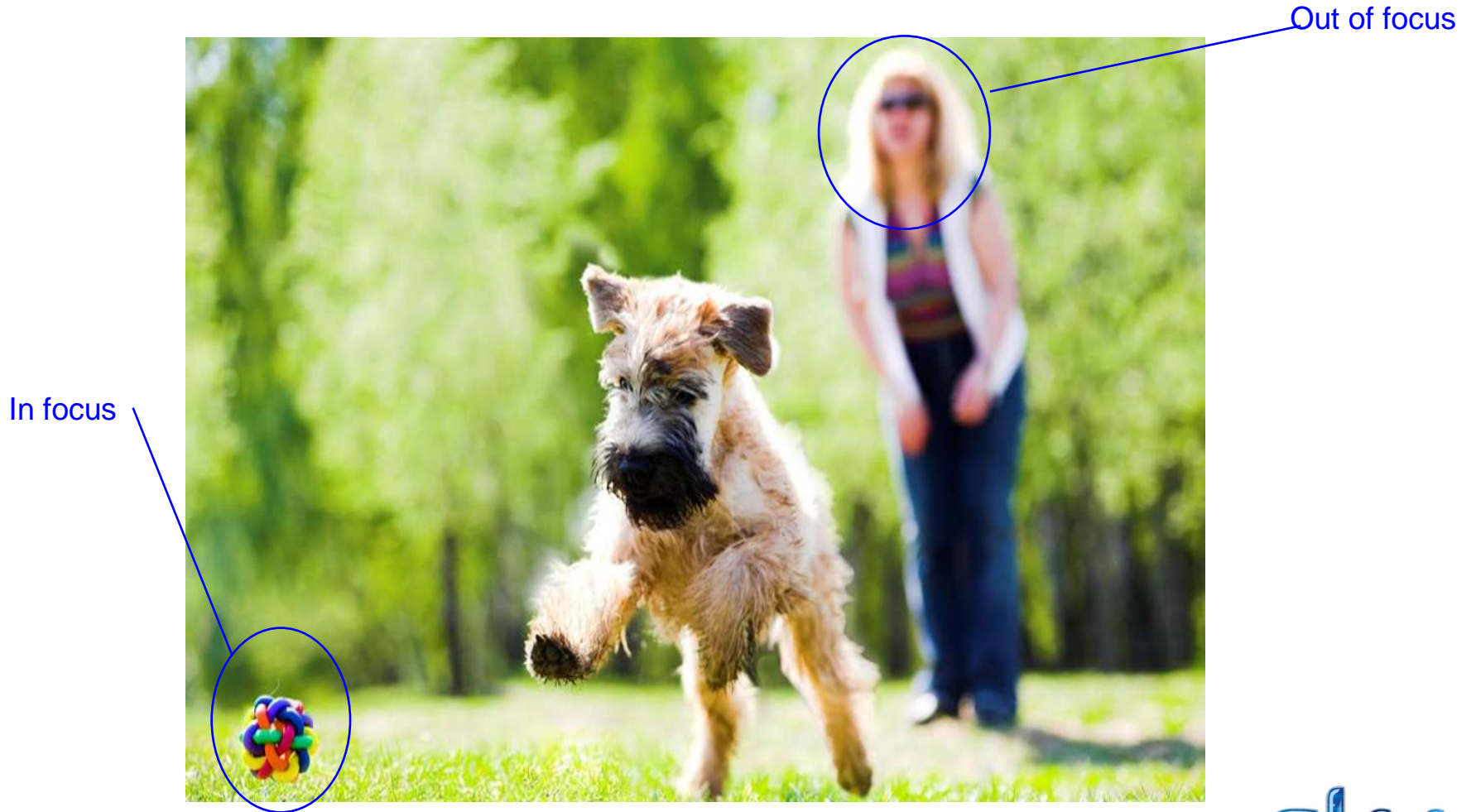
Possible with a 2D image.
Used for many years in paintings and drawings.

Used by television and film to show relative distance

Not possible with present conventional 2D television or film.
Need something new!



Seeing depth with focus



Seeing depth with perspective



The brain understands that things get smaller as they move away.

• Vanishing point



Seeing depth with colour intensity and contrast



Close objects are more colourful

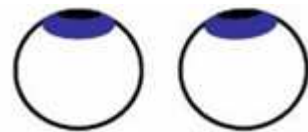
Faded colour

Intense colour



Seeing depth with convergence

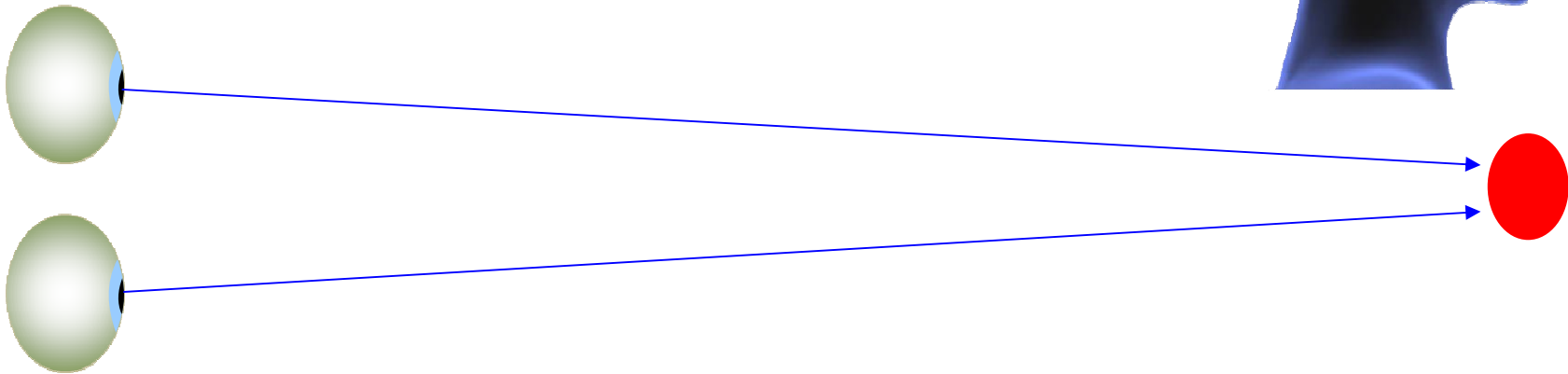
Eyes angle inwards to focus on close objects.
The brain interprets this as a close object.



FAR

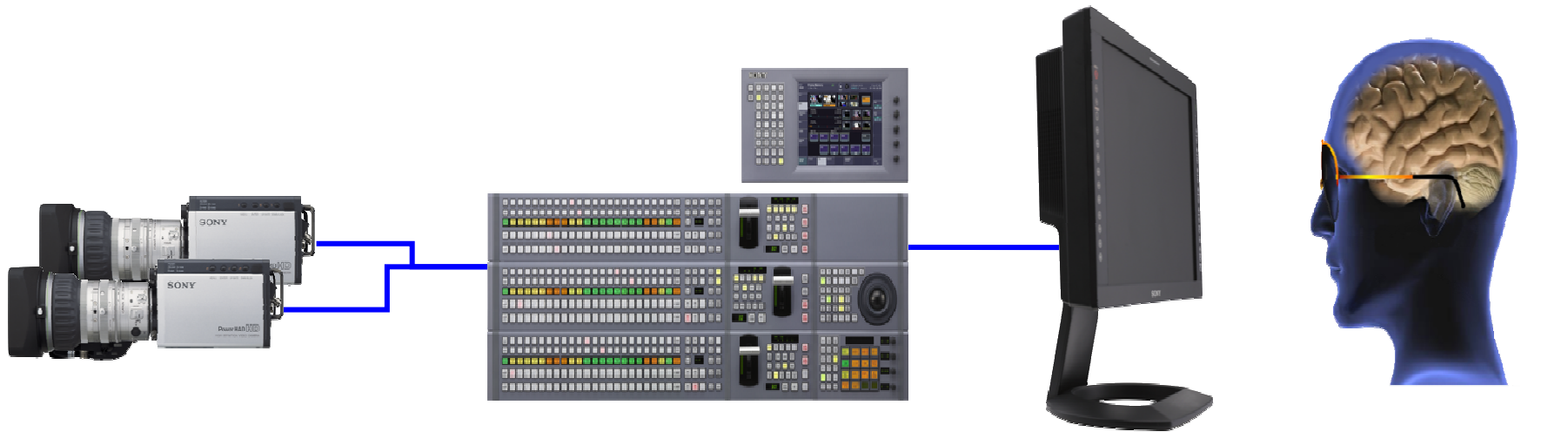


NEAR



How 3D video and film works

- Two cameras are used.
- Postproduction performed on parallel signals.
- The viewer wears glasses.
- The brain sees this as a 3D image.



Seeing depth with Binocular difference

- The brain calculates depth from the differences in the two images.
- Often called binocular vision.

Left eye



Right eye



Difference



The new age of "3D"

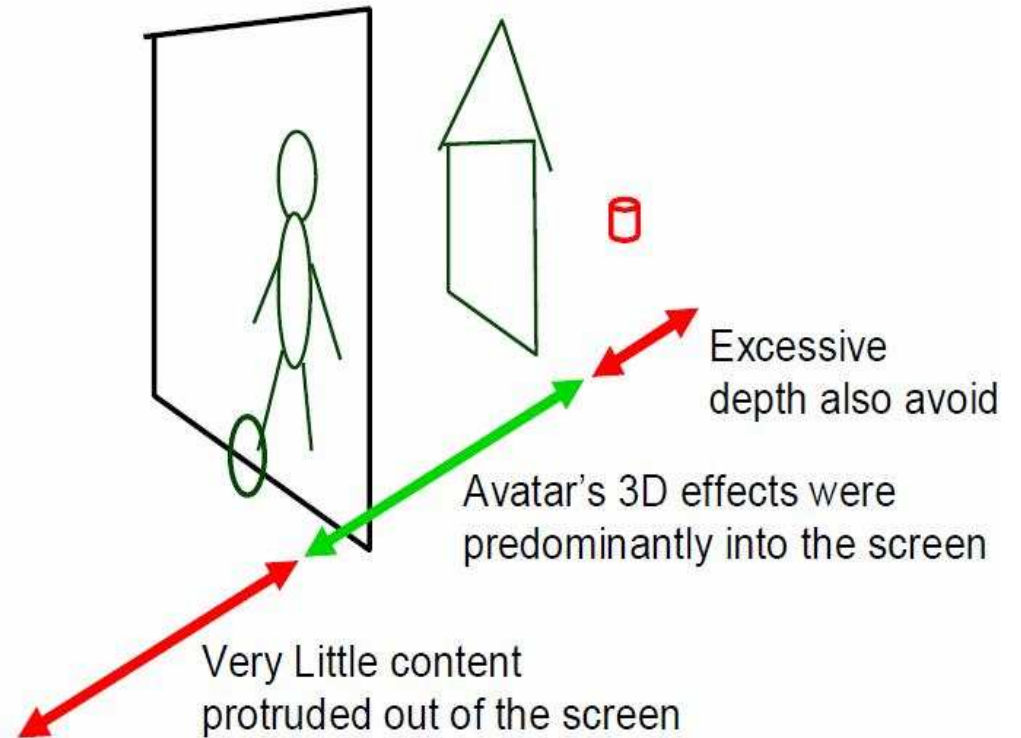
In 2002, a Giant Film Director, James Cameron visited Atsugi Tec.



Avatar set the “standard” for good 3D



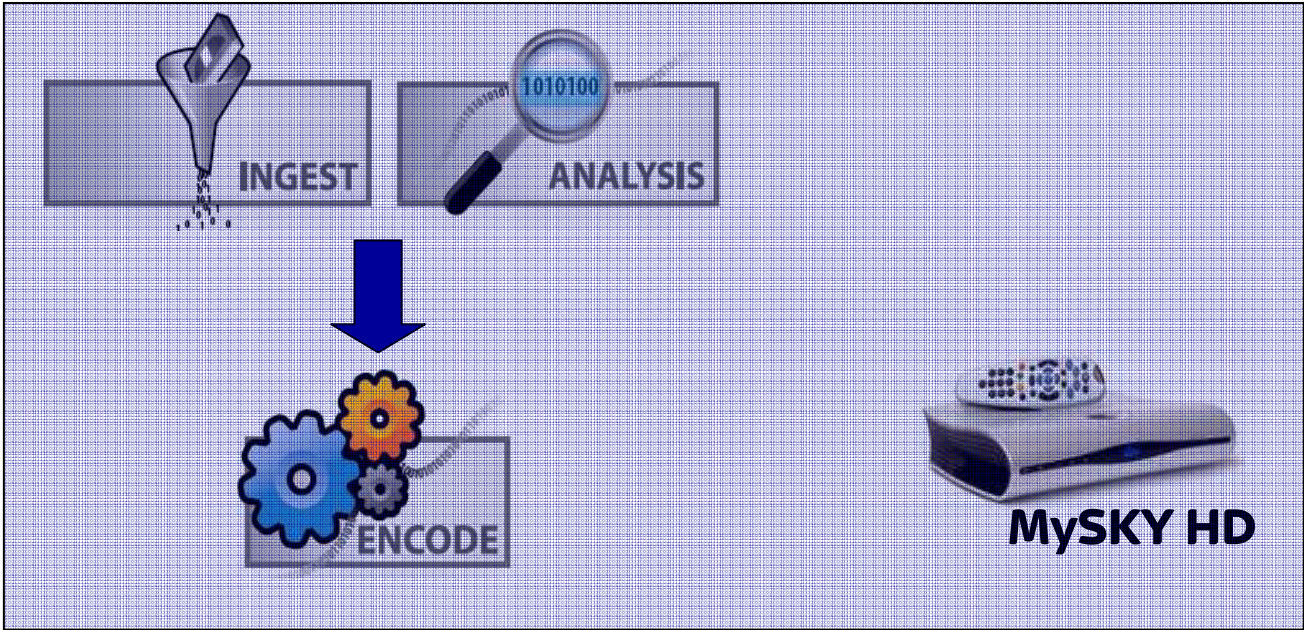
Avatar's 3D effects were predominantly into the screen



Possible implementation



In according to field test made the main element of the chain can be maintained as today, for Film/Series/Cartoon... New shooting and post production is required for live event.



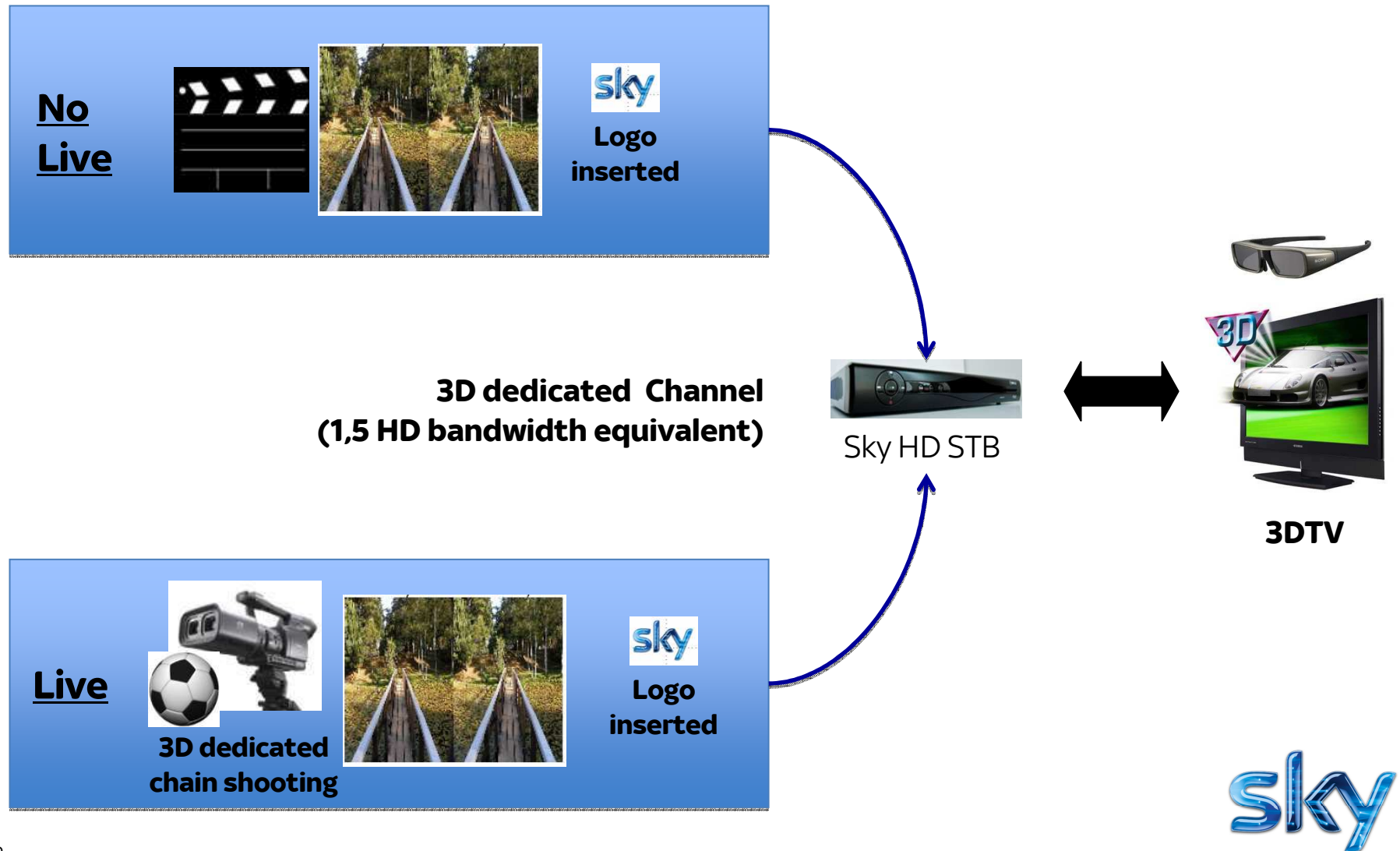
Current environments



HD-3DTV

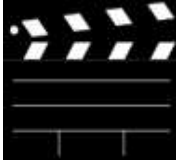


Possible implementation



Possible implementation issues

Off
Line



General

- How to monitor the signal ?
- How to insert the Logo ?
- How to manage subtitles ?
- How to manage the programming for 2D/3D transition?



....On top for live content

Live



**3D dedicated
chain shooting**

- How many cameras should be used?
- How should it be produced?
- What type of transitions work best?
- How to manage shot cuts?
- What to enhance the depth and the aspect of a clip?
- How should the talent interact with the cameras?
- A significant understanding of the physiological and psycho-optical characteristics of the eye and brain in order to deliver strain free 3D is required



SKY Italia - the first Italian 3D Broadcaster

Sunday 19th April 2009
First 3D Live transmission

- Montepaschi Siena VS
Eldo Caserta
- Only for internal test
- Production: DBW
- Direction Angelo Carosi
- Bandwith: Eutelsat



Stereoscopic Broadcast 3D – The first needs/doubts

- Acquisition – Cameras and Stereo Rigs;
- Production Flexibility – File based storage and Editing;
- Transmission;
- Screen;
- Avoiding 2D > 3D conversion;
- Learning the new techniques;



3D highlights

- Practice, Practice, Practice
Aim for perfection
- Guidelines and Rules
Set them in place and adhere to them
Understand the new language of Stereo vision
- Convert with care
Avoid 2D > 3D conversion wherever possible
- Give the viewer an experience to remember



Ryder Cup – the first live 3D Event

Sky with more than 50% of customers base in HD, and ready to receive the 3DTV launched the first 3D live event for all sport subscribers.



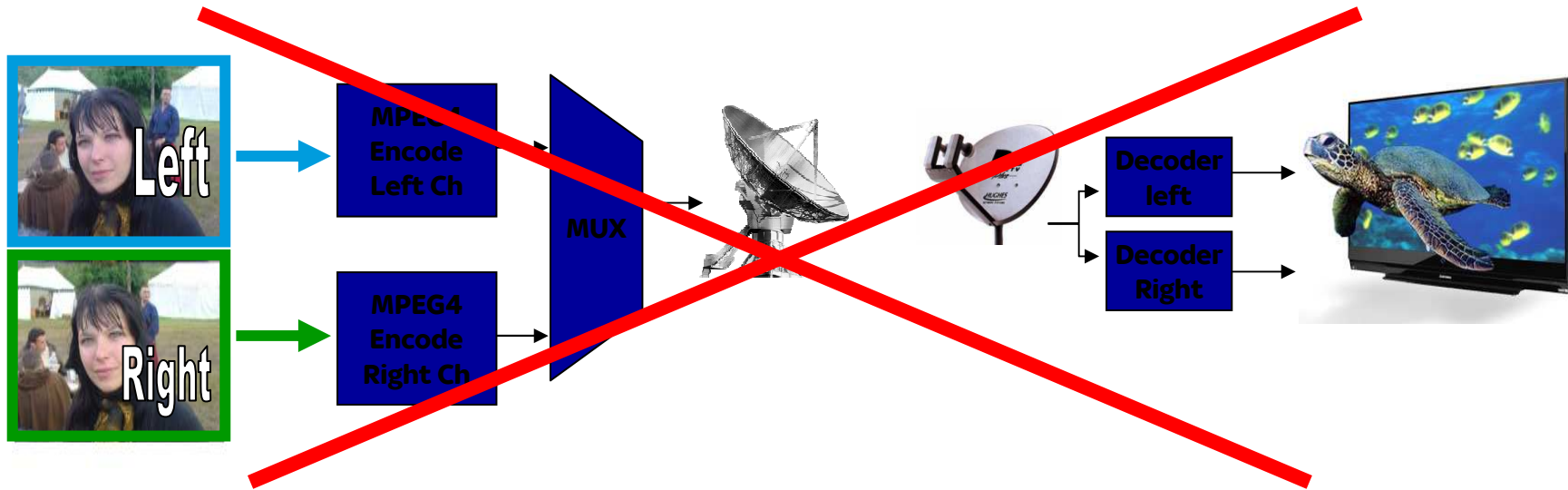
**Ryder Cup Oct
'2010**

Oct, 3rd first 3d Live
events

22 - 3D Cameras

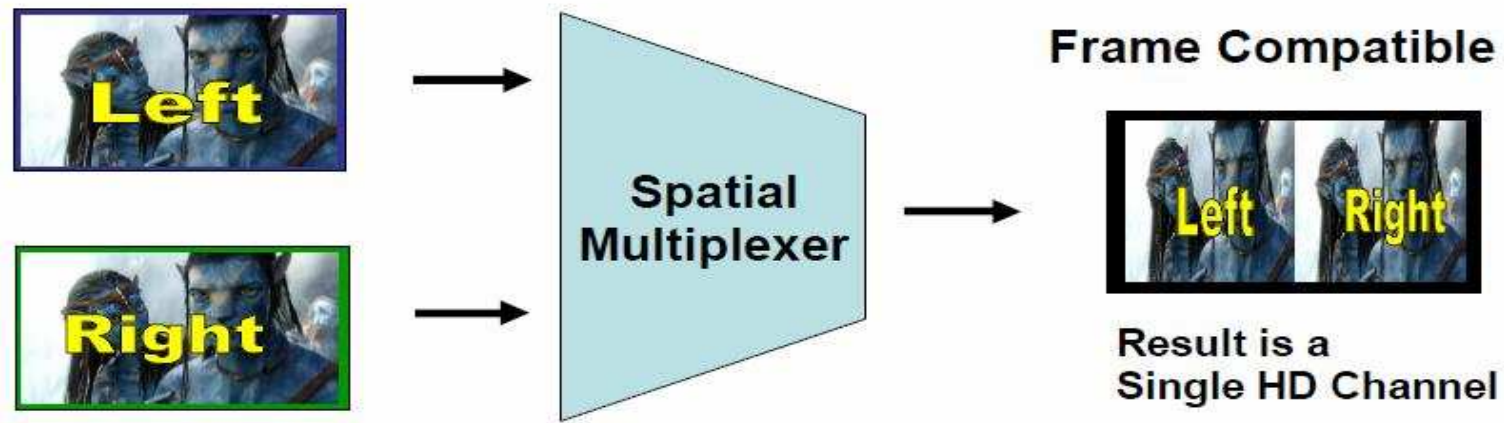


How Broadcast 3DTV : Delivery to the Home



- Each channel is encoded separately
- Maintains spatial resolution
- Takes 2X the amount of bandwidth
- Requires **two** Set-top boxes or a Dual Channel Set-top box
- This scheme is not likely to be used

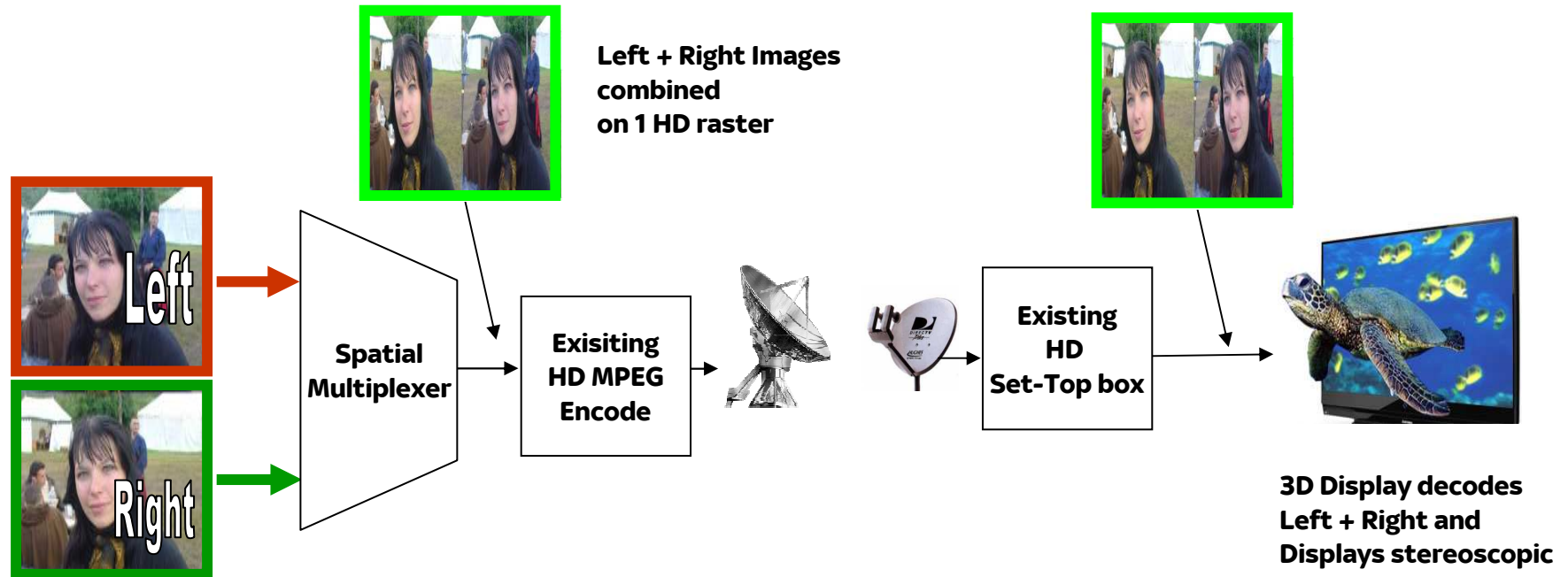
From 2 images to “side by side”



- Left Image and right image are combined into a Spatial Multiplexing
- Loose half Horizontal resolution on both images
- Same HD Infrastructure



Delivery to the Home: Spatial Multiplexing



- Left and Right are Combined spatially and delivered as a single signal
- Sacrifices resolution but saves on bandwidth
- Enables the use of existing MPEG encoding and more importantly the existing HD Set Top at home
- Drawback is that non 3D equipped homes see a side by side image

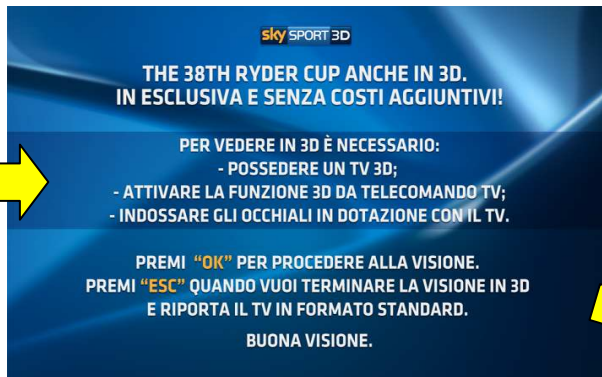


3DTV - Access to channel (Ryder Cup)

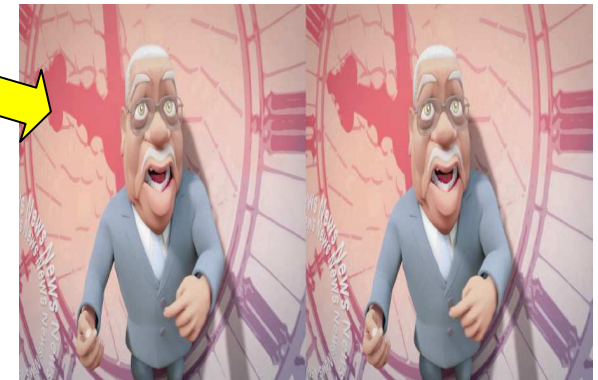
202 - SKY Sport 2 HD



● To accesses to 3D world



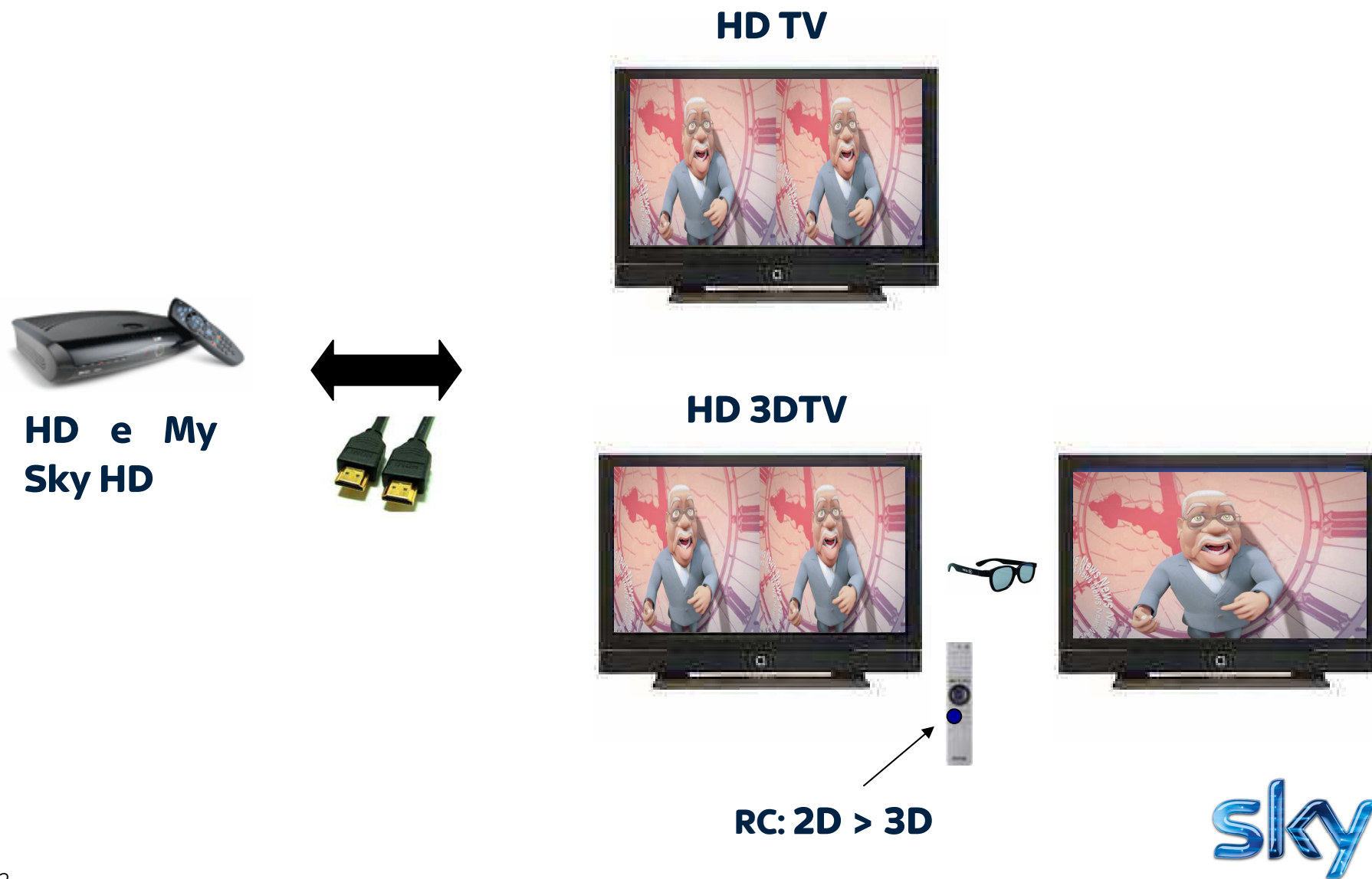
OK to access to 3D Events



206 - SKY Sport 3D



3DTV - Ryder Cup: Customers side



SKY Italia - 3D Event



**From Nov '2010 a few events
(sports and movies)**





Sky 3D - One Year on, what's been happening ?

- Screens are evolving
 - Sky broadcasts Frame Compatible SbS (Linear)
 - System adopted by all CE manufactures
 - Sky is agnostic to active / passive
- Gaming devices and handhelds appearing
- 3D Content production is increasing
- 3D capable Screen sales are ahead of expectations
- Content is still scarce – commitment to create is needed





Massimo Bertolotti, Laureato in Ingegneria delle Telecomunicazioni presso il Politecnico di Milano, Master Presso la Business School Sole24Ore, è Head on Platform Engineering and Innovation presso Sky Italia e Commissario presso l'Ordine degli Ingegneri della provincia di Milano.