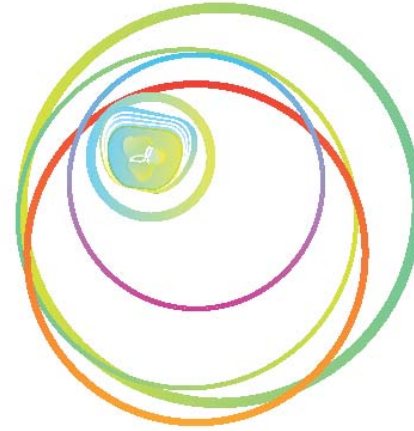
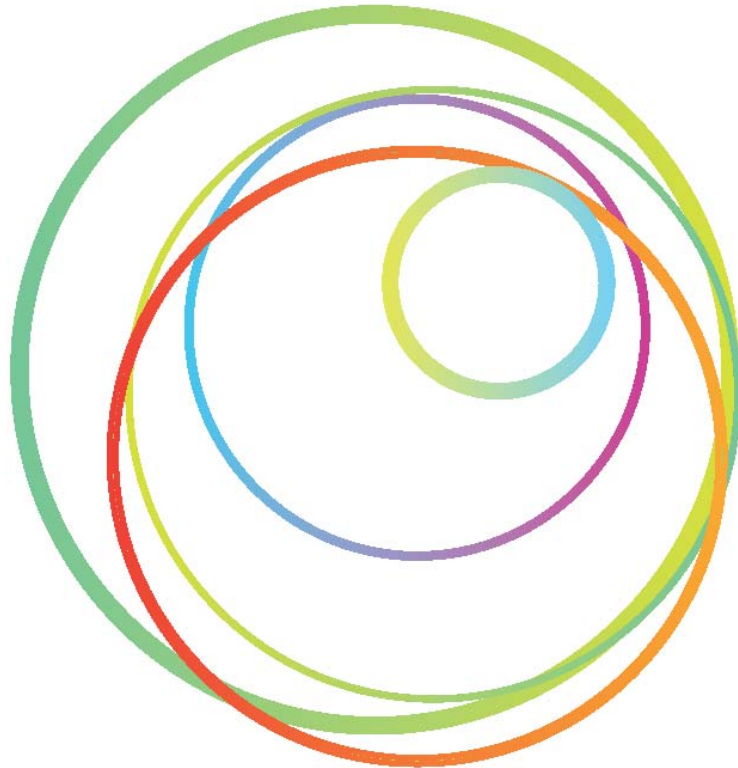


3D

"Will You Stick Your Neck Out for 3D?"



Claude Stoffel

ISOG Meeting

Tunis 3rd November 2010

Agenda

- Company overview
- ATEME practical experience in S3D
- Today best practices for S3D TV contribution and distribution
- The future of S3D TV according to ATEME

Overview

- **Leader in MPEG-4 AVC/ H.264** based video encoding and transcoding solutions for cable and satellite broadcasters, telecom operators and content owners
- Headquartered near **Paris** with offices in the **USA** and **China**; employs 85, VC backed privately held company
- **Committed to the development of Video Broadcast Industry**

- **Wide range of customer deployments across all geographies**



- **Strong partnership network**



ATEME practical experience with S3D

- Distribution

- ATEME transcoders are used in the distribution of « Frame compatible » S3D VOD content in the US and in particular by Direct TV and In Demand (a joint venture of Comcast , time Warner and Cox)

- Contribution

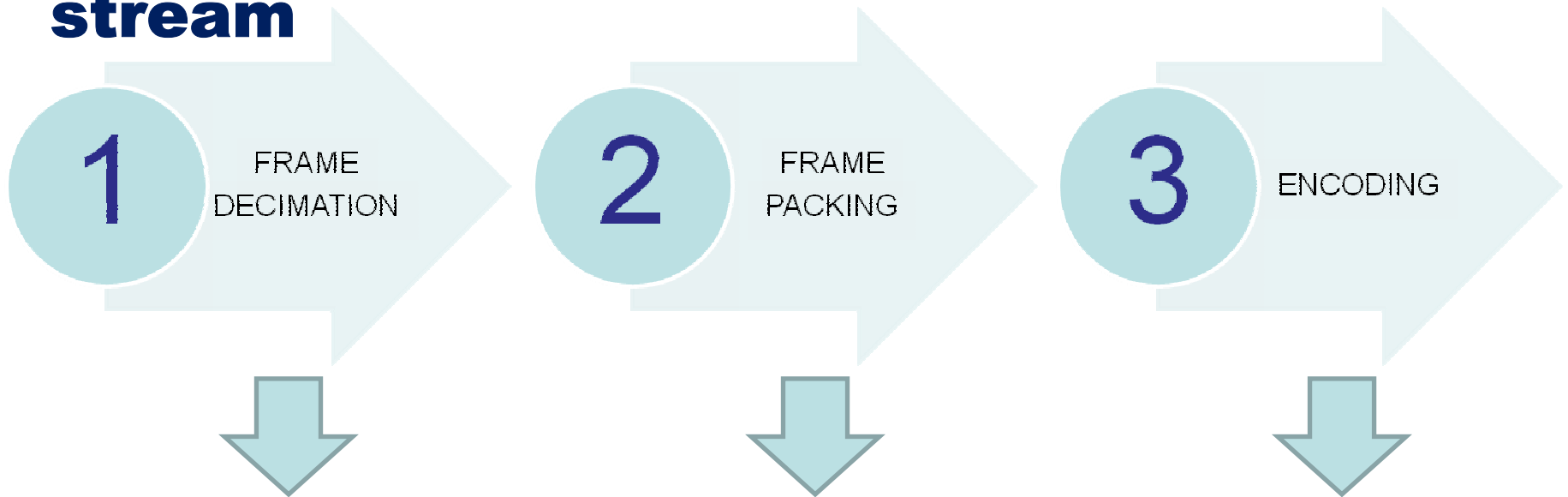
- ATEME contribution encoders have been used for point to point “full resolution” transmission of a few S3D events , in particular by Globecast
- This is made possible by a unique synchronization technique for the left and right views.

Phased approach to S3D TV delivery

- **Phase 1 / Frame compatible**

- Left and Right views are packed into a single frame
- The resulting stream is compatible with existing HD Set-top-boxes, subject to a firmware upgrade (and the customer buying a 3D TV set)
- Bandwidth requirements are marginally increased to cope with the reduced efficiency of MPEG Codecs on composite frames (15% to 30% more bandwidth)
- S3D service is a must have for premium tv package of pay tv operators.
- They are other initiatives from free to air channels via IPTV

Steps to create a Frame compatible stream



Resolution loss

How to best preserve quality?

Not a new challenge

Frame coherence loss

- How to maintain
- Interoperability
- with the rest of the chain
- including compression ?

• Quality loss

- How are codecs affected by decimation
- + frame packing ?

Packing Arrangements

- Side-by-Side:



•Side-by-Side with Horizontal

- Top-and-Bottom:



•Top-and-Bottom with Vertical Resize

- Line Alternating:



Best practices for S3D TV distribution and contribution

- Distribution

- ATEME has researched frame compatible decimation and packing option with the view at determining the most qualitative options.
- These options need to take into account the fact that the frame compatible stream will be compressed for distribution.
- Results are available as a white paper

- Contribution

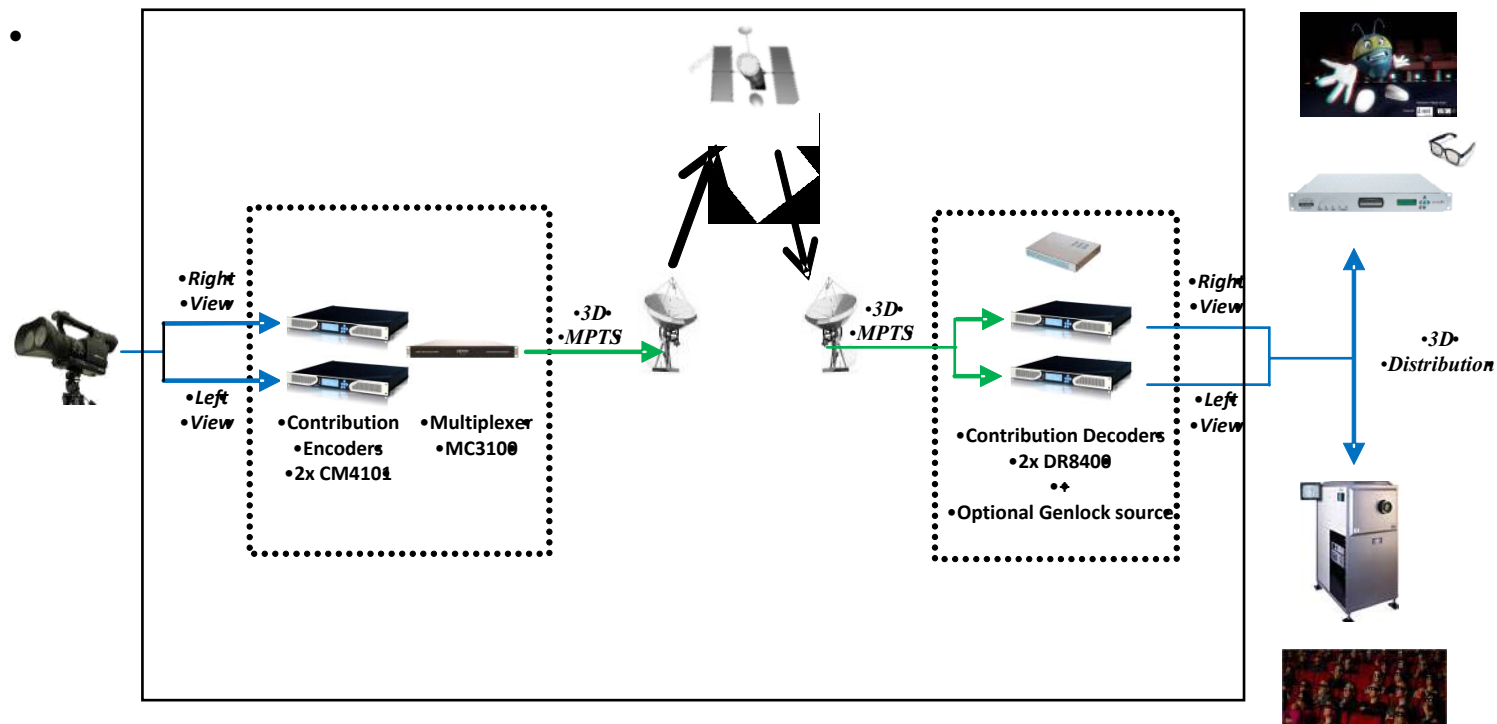
- Because the various S3D channels launched in 2010 do not adopt the same decimation and packing mode, ATEME recommend that contribution links keep as long as possible the full resolution for each view.

Best practice in S3D TV Contribution

- Measurement show that full HD 3D provides the best quality above 20Mbps:
 - ⇒ At Contribution rates, transmitting 2 full HD views is the preferred solution, quality-wise.
- But there is currently no encoder/decoder able to process 2 full-HD views
 - ⇒ This solution must be implemented with 2 synchronized encoding/decoding chains
 - ⇒ Even a single frame de-synchronization is very disturbing for the viewer

Best practice in S3D TV Contribution

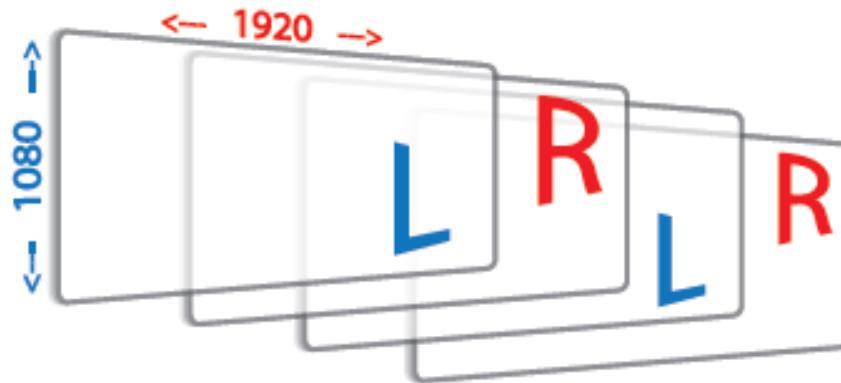
ATEME has provided fully synchronized solutions since last February



The future of S3D TV

Phase 2 / Service compatible, aiming full resolution per view

- Send Left and Right across the network and the STB/TV renders
- 1080i or 1080p50/60
- Will require a new set-top-box



The future of S3D TV

- **Market condition**

- New set-top box able to decode 2 full resolution views – from 2011
- Consumer interest in 3D in the living room to justify the upgrade

- **ATEME point of view**

- Phase 2 will be initiated by some pay tv operators early 2012
- It will rely on content specially designed for 3D viewing, a separate production from the 2D version.
- For free to air broadcast of service compatible 3D, we do not expect anything major to happen for at least another 3 years – if it ever happens; there is too much gap today between 2D and 3D production for them to merge anytime soon.
- On the video compression side; the various standards which are considered such as MVC or Dolby 3D are all based on MPEG-4

Conclusion

- During the last FIFA WC broadcasters have benefit of the solution deployed for the distribution to cinema
- We recommend to use full resolution solution from 20Mbit for two synchronized feed.
- Mpeg4 is the compression solution adopted by all frame compatible and 2D/3D compatible format
- Documentation available as white paper and 3D poster

www.ateme.com

