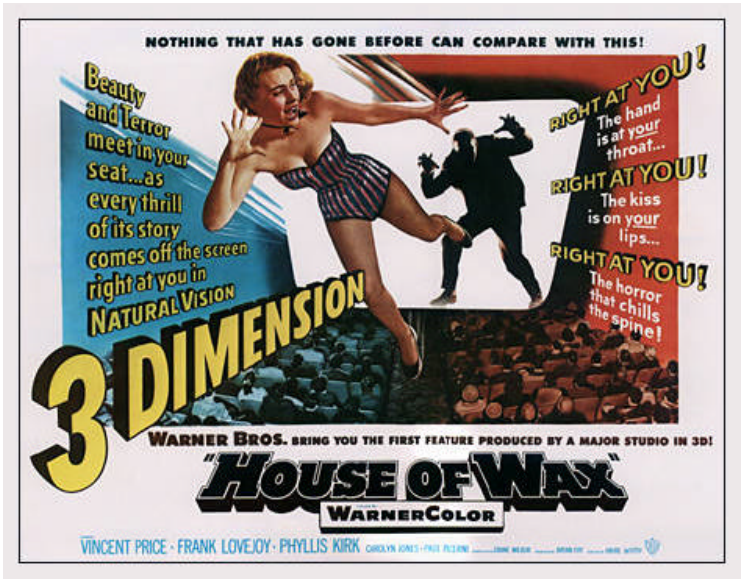

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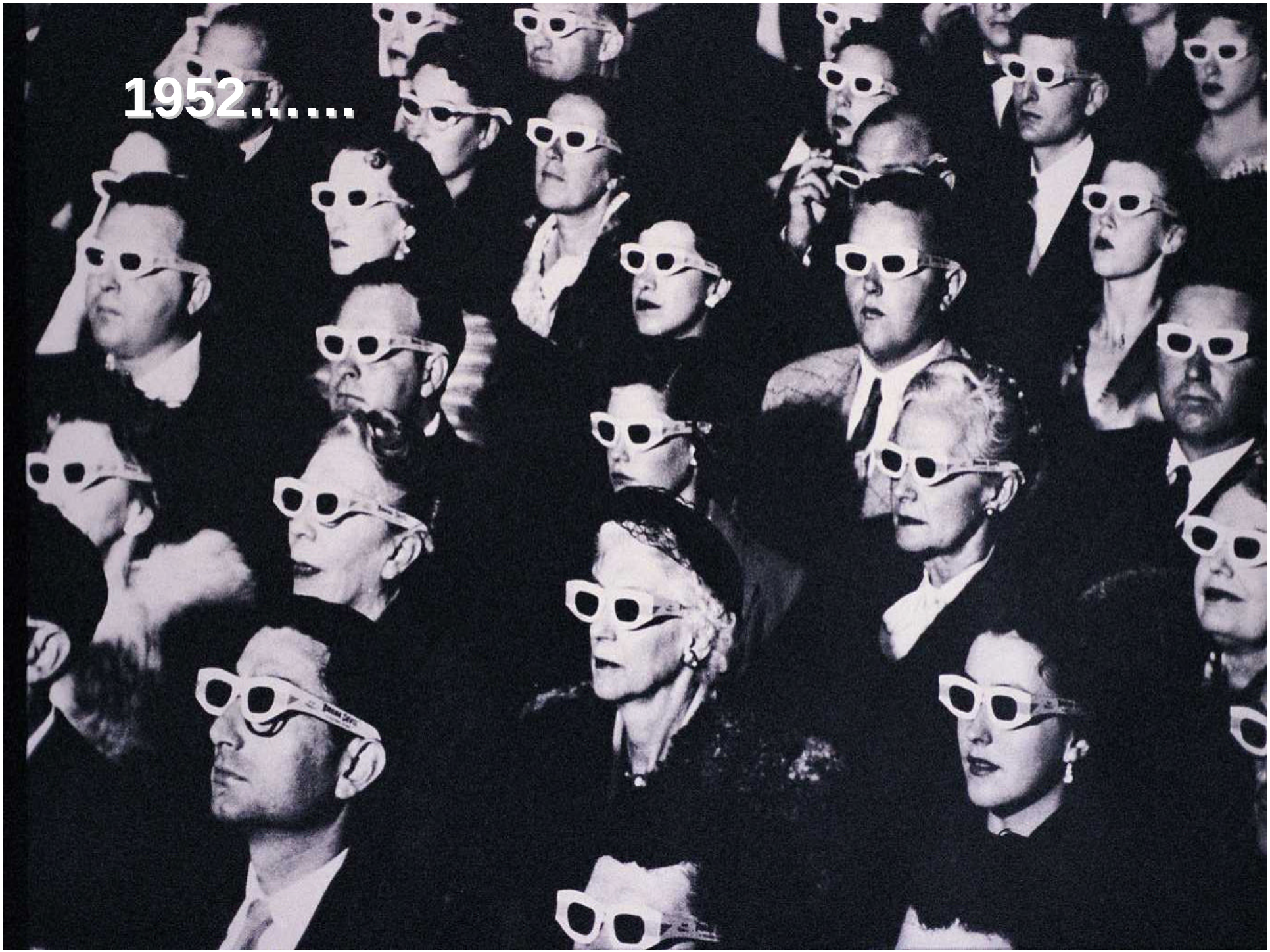
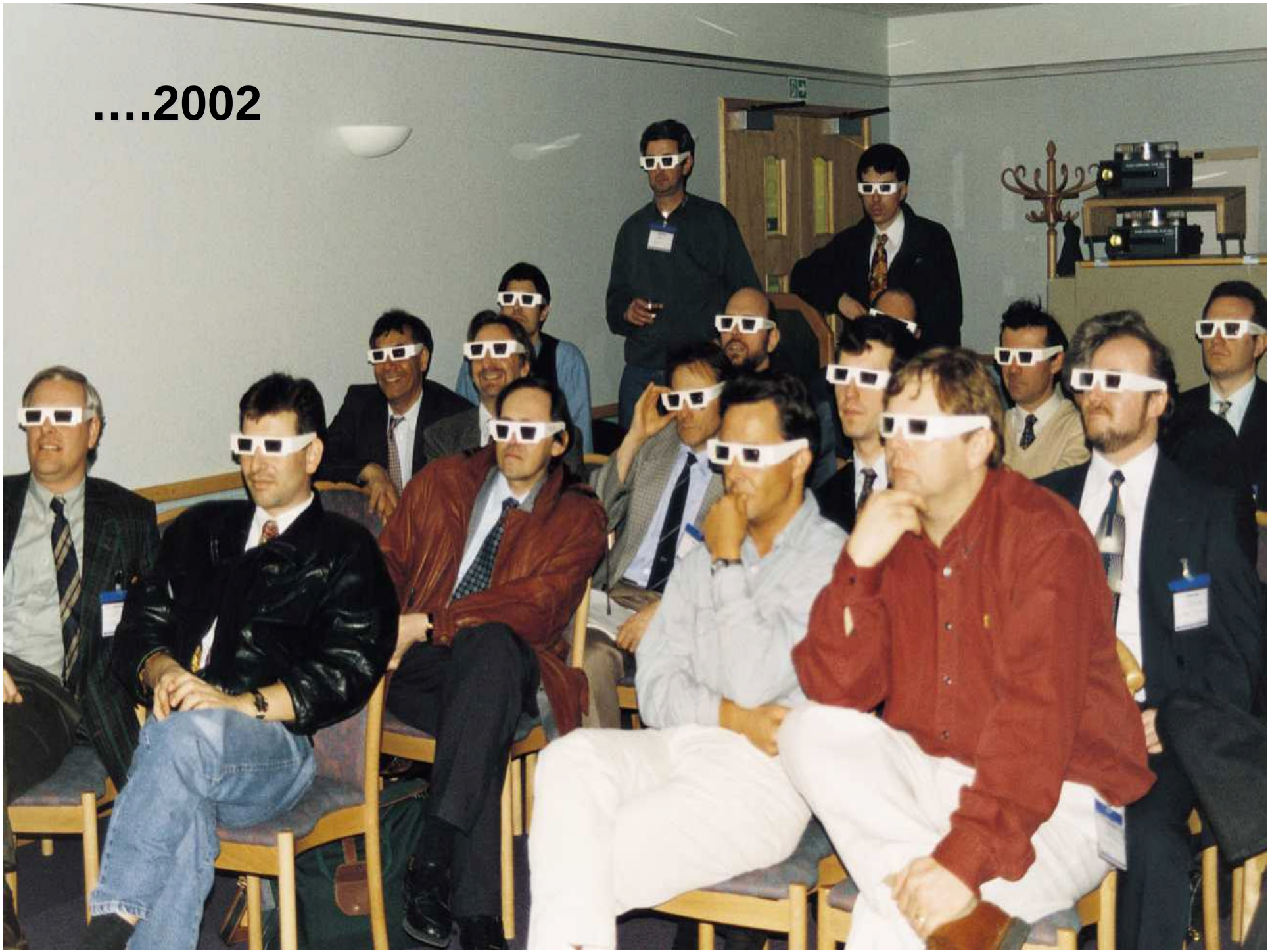
Stereoscopic Television


1952.....


….2002

The basics….

- Left eye and Right eye signals are needed – two picture taken from slightly different viewpoints (*parallax* creating *disparity)*.
- There are many alternative ways of arranging for each eye to get the appropriate image.
- The job can be done by arrangments at one of three locations; at the *display*, at the *viewer*, or by bringing them *together* in the same place (VR).
- Left and right images need to be kept separate all the way from camera to viewer.

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How does it work?

- In normal vision, the brain ‘fuses’ the two images from the eyes (*stereopsis*) to create one ‘image’ (the *cyclopean* image).
- The brain normally works with the eyes in an iterative process of pointing the eyes (*convergence*), focussing them on the object (*accommodation*), and fusing the images.
- *Planar* image stereoscopic imaging will NEVER be perfect because the eye can never focus as it does normally – but it can be good. (volumetric and holographic displays do allow accommodation.)

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..coincident viewer and display
(loosely an ‘eye field of view’ multiplex)

- Head mounted display
- Separate channels for each eye
- Virtual reality system

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..at the display ‘autostereoscopic’ (space multiplex)

- L and R pictures are divided into stripes, and ‘space multiplexed’ on the screen
- Display surface has technical system to direct each eye to appropriate set of slices
- This can be a system of slots (gratings) or lenses (lenticular surface)
- Interesting but there are limits on head movement and resolution available. Multiview/more pixels help.

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..at the viewer

- Glasses needed – of different kinds depending on system.
- Two images need to be time multiplexed or overlaid on the screen.
- Normal TV displays can be used for some systems, and special displays are needed for others
- Different kinds of multiplexing

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…dual polarisation plane displays
(polarisation multiplex)

- CRT or LCD based - two active displays with pictures are combined via half silvered mirror. Viewing via polarised glasses. LCD better because pixel locations are fixed.
- Projection (1) – two projectors fire at the same silvered screen. Polarised glasses
- Projection (2) – double frame rate projector with frame alternating polarisation plane. (« VREX, Stereographics »). Polarised glasses. (time sequential polarised)

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Anaglyph pictures
(colour multiplex)

- Version of left picture overlayed over version of right picture. Red/cyan glasses. Left image in red channel.
- *Greyscale anaglyph* – red version of left greyscale picture combined with green/blue versions of right greyscale picture.
- *Colour anaglyphs* (today) – red component of left picture combined with green and blue components of right picture. Retinal rivalry worse.

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Field sequential system

- **Alternate fields of the interlace frame carry left and right pictures**
- **Shuttered glasses are synchronised to frame sync by tapping into video signal**
- **Large area flicker on 60Hz display is bad and on 50Hz is worse.**
- **Computer displays at 72Hz better but still not great.**
- **Some consider this best available low cost system today.**

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Possible Project Plan for Phase 1

- Send questionnaire to known specialists, to find out which issues are ready for further work, and whether they will contribute. This will enable the work statement to be prepared. October-December 2002.
- Call for contributions and assembly of documents. First set by June 2003.

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Some of the known specialists…

- Andrew Woods (Curtin Univ, Co-chair Stereoscopic Dislays and Applications Conference)
- Michael Starks (3DTV Corp.)
- Vince Power (NuVision Inc.)
- Jeff Wupio (Stereographics Corp.)
- Dave Swift (VREX)
- Anthony Coogan (Stereomedia)
- David Burder (Burdlo)
- Nick Lodge (Consultant)
- Fumio Okano (NHK)
- James Tam (CRC)
- Chris Fehn (HHI)

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