VISUAL DISPLAYS

TEAMS ROOMS, HYBRID MEETING/TEACHING 2022
WEBINAR #10
PROJECTION or dvLED?

23 November 2022

Greg Jeffreys

DISPLAYS, LIGHT & ENVIRONMENTAL EXPERTISE

PRODUCTS, SERVICES, SPECIALIST CONSULTANCY

Presenter – Greg Jeffreys

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- Managing Director of Visual Displays (formerly Paradigm AV)
- Specialist consultant in standards, displays, light & lighting, VC lighting, teaching space & meeting room design
  - Not an AV consultant!
- Current chair, AVIXA Standards Steering Committee
- Lead writer, PISCR image contrast standard – and new ISCR standard
- Task group chair ANSI/AVIXA DISCAS standard – image size, resolution, viewing positions/angles, content size guidance
- Task group working on AVIXA's new UX Design for AV (UXD4AV) standard
- President of InfoComm/AVIXA 2012, board member 2008-13
- Writer and teacher
- 2020 Outstanding Contribution Award – AV Technology Awards
- Proud associate of LTSMG & AV User Group
- Writing book on hybrid teaching and meeting spaces

These views are mine – not Microsoft's!

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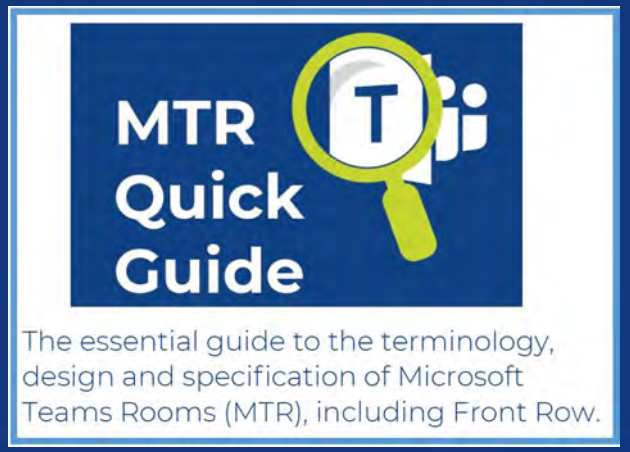
- This presentation is partly based on:
  - Review of current Microsoft materials
  - New White Paper I wrote for Microsoft to discuss and expand on their published MTR- related collateral
    - https://visualdisplaysltd.com/resources/resources/Microsoft-Teams-Rooms-Displays-Projection-and-the-bigger-picture
  - New MTR Quick Guide – design and specification of displays for MTRs & new Signature Meeting Rooms
    - https://visualdisplaysltd.com/resources/tools/mtr-quick-guide



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Step change to large image sizes

DISCAS SETS MINIMUM NOT MAXIMUM DISPLAY SIZES

Microsoft now uses projection

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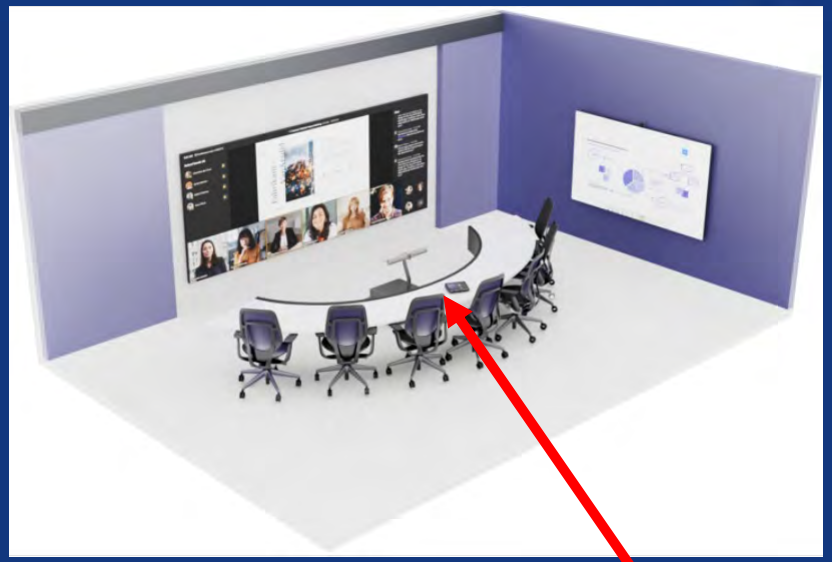
Even in Standard MTRs



Epson EB-PU1006W – EB-PU1008W + X01 UST lens.
With 21:9 EDID

Apply DISCAS to main content window height – not image height

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- DISCAS %ElementHeight (%EH) default = 3%
- 3%EH = 6 : 1
  - (Farthest viewer no more than 6 x image height)
- If content window = 60% of image height
- Then ratio becomes 3.6 : 1
  - (0.6 x 6 = 3.6)

- ✓ **Use AVIXA DISCAS standard**
- ✓ **Use it critically**
- ✓ **Adapt it to your use case – it's not a law!**
- ✓ **Show your workings – get user buy in**

Size

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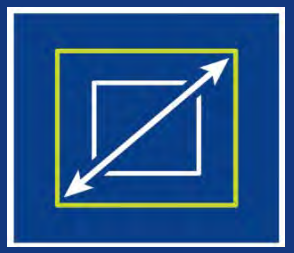

- ALR projection is infinitely scalable.
  - You can have any size or aspect ratio
  - Epson has 21:9 EDID to connect seamlessly with MTS Compute in Front Row configuration
- dvLED size is fixed relationship between pixel pitch and resolution
  - The popular 1.5mm dvLED pixel pitch is therefore the reason that HD displays are around 138" in this class

pixel pitch mm	HD H mm	HD W mm	UHD H mm	UHD W mm
0.9	972	1728	1944	3456
1.2	1296	2304	2592	4608
1.5	1620	2880	3240	5760

- The cost per m2 of projection is often a fraction of the cost of dvLED so you can choose the size your viewers need rather than the size you can afford.
- 1:1 pixel mapping (ie no scaling) is essential

Resolution
HD in 2022 – 4K UHD in 2023?

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- ALR projection can be HD, WUXGA, WQGA or 4K UHD as standard (first 8K available too)
  - So you can futureproof systems
- dvLED displays in the 0.9mm pitch are an exciting development, only currently affordable in high budget projects.
- At a distance, the display resolution is a lower priority, so dvLED is well-suited for digital signage in shopping malls etc.
- Multi-projector systems can provide megapixel displays up to virtually any resolution

‘Brightness’ [luminance – cd/m²]

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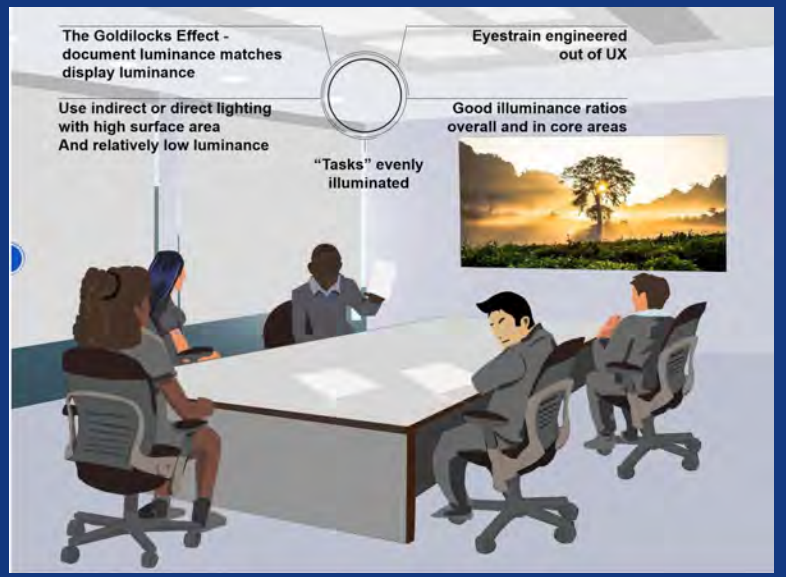
TO CALCULATE TASK LUMINANCE		
Task luminance = *lx* / *pi* x PG		
[lux = lumen / m2]		
Ambient light in lux	400	***You should have 300-500 lux on a meeting room table***
Peak Gain of task (eg paper)	1	
TASK LUMINANCE =	***127***	cd/m² [nit]
Task luminance ratio	2.5	: 1
MAX DESIRED IMAGE LUMINANCE =	***318***	cd/m² [nit]
PISCR contrast ratio required	15	: 1
MAX PERMITTED BLACK LEVEL (relative to the max white level permitted on your image	***21***	cd/m² [nit]
MAX PERMITTED LUX ON SCREEN (ambient light must be at or below this level onscreen to achieve the 15:1 required for PISCR Basic Decision Making category	***67***	lux



- Vital consideration to avoid asthenopia (‘eye strain’)
- Normal meeting and teaching lighting conditions (300-500 lux)
- Maximum image luminance (‘brightness’) needed is around 300cd/m2
- Many dvLEDs offer up to 5,000cd/m²
- 200-300cd/m² is the sweet spot for teaching, Teams Rooms and hybrid workspaces.
- ALR projection can be specified exactly for each location and application.

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Black levels in ALR (ambient light rejecting) projection

QUICK DEMO

Contrast

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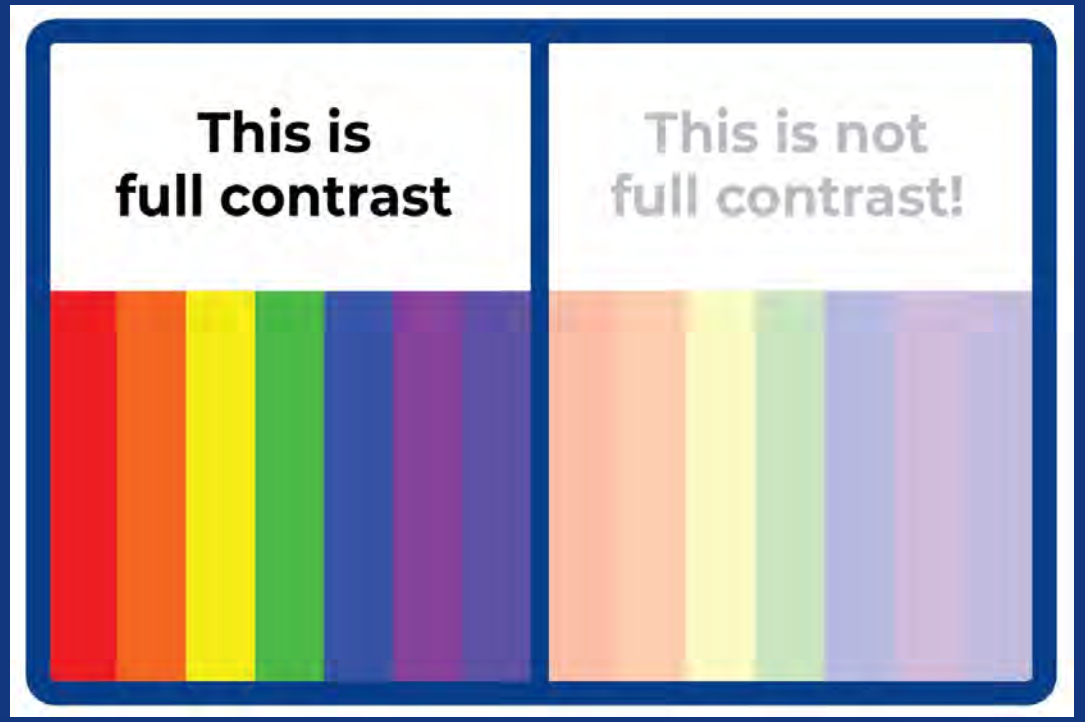
- Use AVIXA ISCR standard – now covers ALL display types
  - MTRs etc = Basic Decision Making = 15:1 minimum CR
- ALR projection works brilliantly in most brightly lit indoor spaces
- dvLED is top of the class for outdoor and extreme light scenarios



Fill factor - how close can viewers be??

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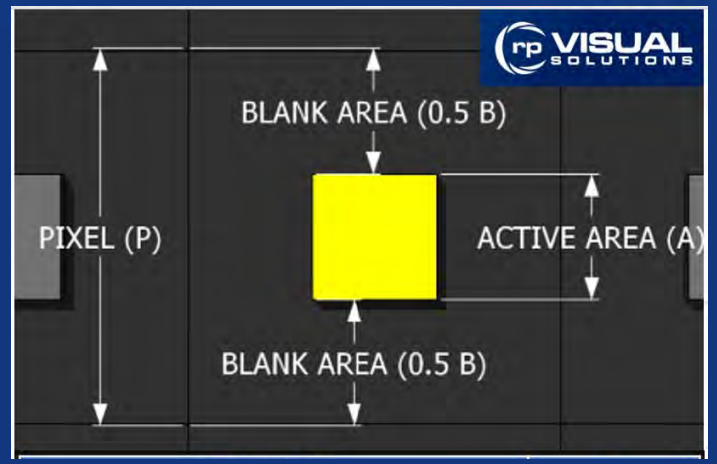
- Each pixel has a FILL FACTOR (F), the % that is active
- Massive impact on closest viewing distance. Nearest Viewer - no closer than where pixels seem to merge
- dvLED screens have low Fill Factor - the active element is a tiny area within the pixel
- dvLED pitch NOT the size of the pixel.
- Projection has a high Fill Factor, meaning you can get viewers close to the image - with comfort.
- Essential with Front Row, where in-person viewer proximity is critical.



TECHNOLOGY	F
D-ILA Projection	0.93
DLP Projection	0.87
LCD Projection	0.70-0.80
High Fill DVLED (SMD)	0.40
Medium Fill DVLED	0.235
Low Fill DVLED	0.15
Micro LED	< or =0.001

Closest viewer – dvLED – example metrics

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- Take pixel pitch in mm
- Multiply x 2
- Express in m
- E.g. 1.5mm pitch is best viewed from 3m as a minimum

pixel pitch (mm)	closest viewer (m)
0.9	1.8
1.2	2.4
1.5	3

Viewing Distances by Technology: based on 110" diagonal image.

Technology	Fill Factor	Pixel Density	Nearest	Ideal
55"	95%	0.63412mm	2.17"	88"
LED	24%	1.267mm	88.35"	259.8"
Projector	87%	1.27mm	11.56"	183"

Weight

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- ALR screens are lightweight per m2 and can be mounted on standard walls and surfaces without needing additional strengthening or pattressing.

Heat

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- dvLED screens emit heat which adds a load to the air conditioning system.
- Projection screens emit no heat at all. Modern laser projectors emit very little heat.

Building Fire Regulation

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- Many large screen installations use ALR projection because building fire regulations restrict use of dvLED in locations near emergency exit and access.

Lifecycle analysis
Environmental considerations

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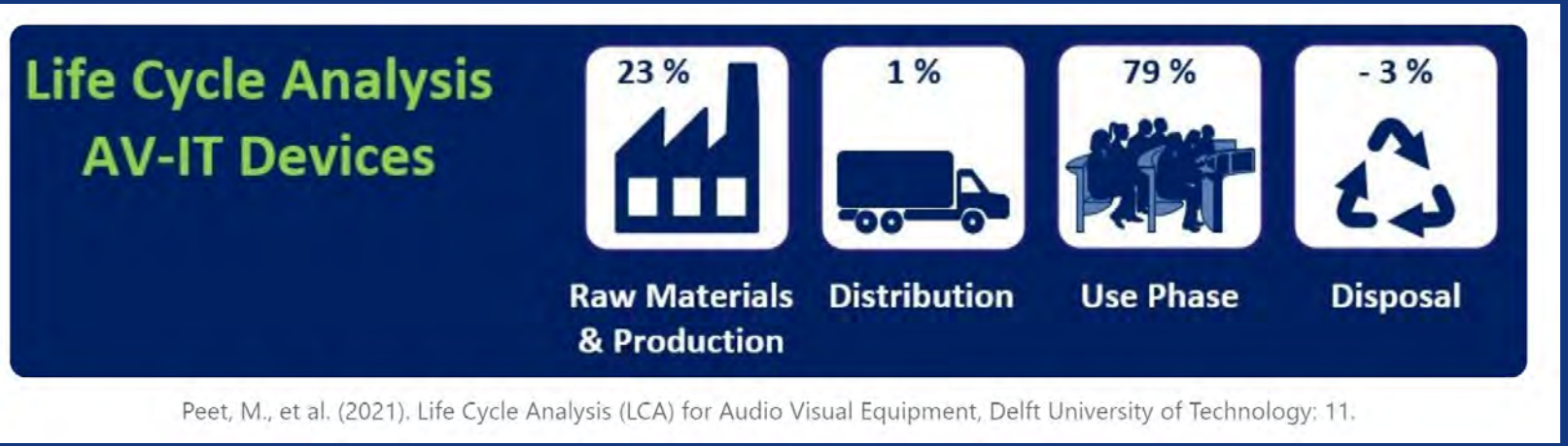

Peet, M., et al. (2021). Life Cycle Analysis (LCA) for Audio Visual Equipment, Delft University of Technology: 11.

- New study underway at Delft University of Technology
- https://www.linkedin.com/pulse/life-cycle-assessment-helps-do-green-av-piet-van-der-zanden/
- …and toxic landfill mass at end of life
- (And follow Piet van der Zanden!)

Total cost of ownership

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Total Cost of Ownership Calculator

Gray cells are calculated for you. You do not need to enter anything into them.

Cost per year	CRT monitor	LCD monitor	LCD monitor savings
Purchase cost	17.59	39.08	-21.50
Cost of power	5.33	2.53	2.81
Cost of space	1,184.38	312.54	871.84
Visual task time	$6,260.83	$5,378.63	$882.21
Total	$7,450.55	$5,693.70	**$1,756.85**

Assumptions		
Product 1 [CRT monitor]		**Unit of measurement**
Purchase price	150	Dollars
Power consumption	100	Watts per hour
Standby power	8	Watts
Width	16	Inches
Depth	18	Inches
Life expectancy	20000	Hours
Product 2 [LCD monitor]		
Purchase price	500	Dollars
Power consumption	47	Watts per hour
Standby power	5	Watts
Width	19	Inches
Depth	4	Inches
Life expectancy	30000	Hours

Indirect costs		
Cost		**Unit of measurement**
Normal annual office hours	2,345	Hours per year
Average employment cost	14.71	Dollars per hour
Time spent using computer	33%	Percentage of working week
Time spent visual searching	15%	Percentage of computer use
Speed increase in visual tasks	25%	Percent by which speed is increased
Reading time	40%	Percentage of computer use
Speed increase in reading	10%	Percent by which speed is increased
Cost of electricity	6.63	Cents per 100 KW per hour
Average office cost	592.19	Dollars per sq. ft per year
% left on with power saving	10%	Percentage of computers
% left on without power saving	5%	Percentage of computers

Microsoft now uses projection

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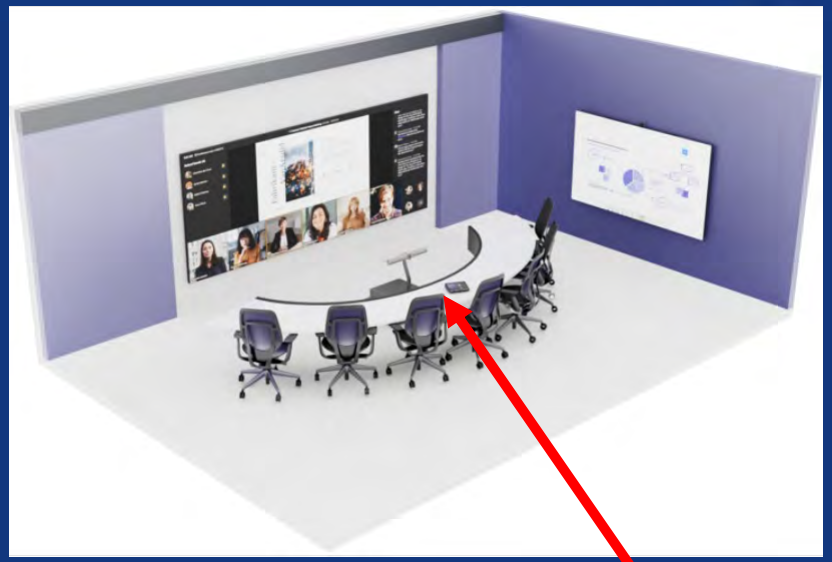
Even in Standard MTRs



Epson EB-PU1006W – EB-PU1008W + X01 UST lens.
With 21:9 EDID

…but it has to be Projection Done Properly!

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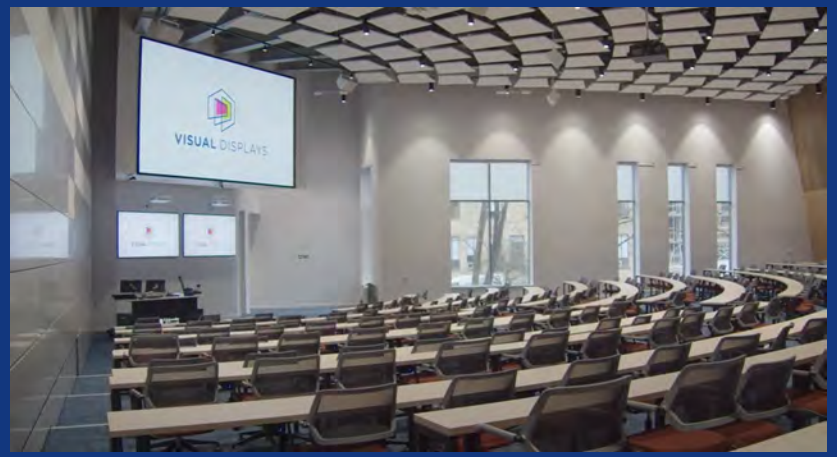
- **Both images are projected, shot with mobile phone – unretouched (no Photoshop!)**
- **Which one do we need for MTRs?**
- **What do we need for MTRs?!**
  - ✓ **AVIXA ISCR standard!**
  - ✓ **Focus on black levels**



https://youtu.be/W-cAxx_n8Gg

MTR Displays – Visual Displays' Quick Guide

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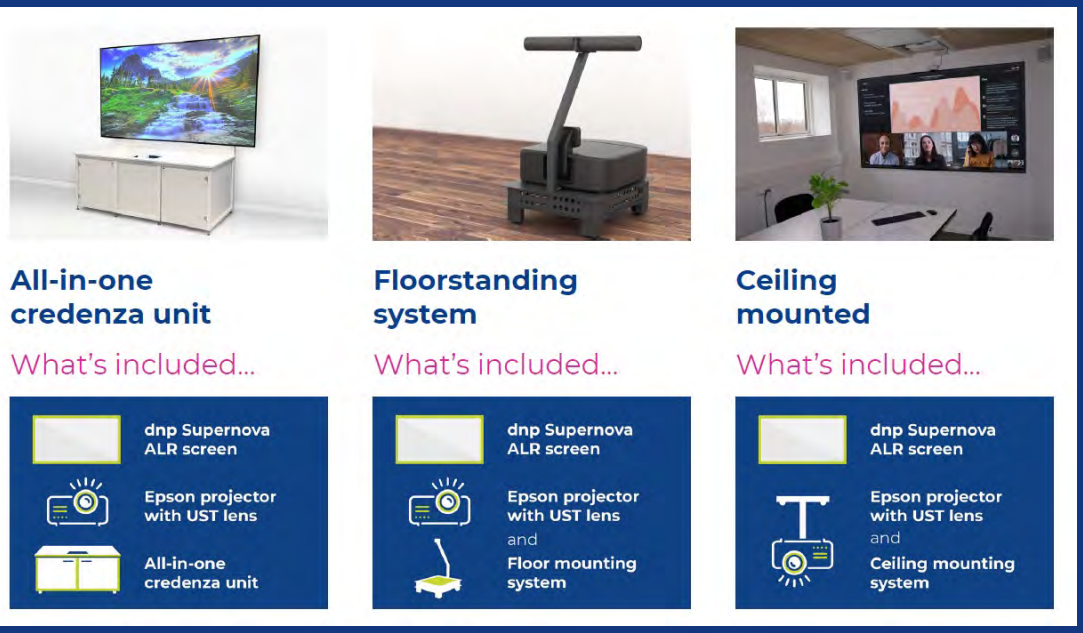
- Comprehensive coverage of specification issues
- Wide range of display choices and sizes
- Based in VDL's Digital Canvas
- Standards-curated bundles of dnp ALR (ambient light rejecting) screens, projectors, mounts/credenzas
- Download here:



Specialist consultancy

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- Greg provides specialist consultancy in tightly-defined packages or on retainer:
  - Space design & configuration
  - Lighting and VC lighting design
  - Displays design
  - AV Standards
  - Environmental standards (including lighting)
- (This is NOT AV consultancy or design – it's complementary services and disciplines)
- Available through AV consultants and major AV integrators, except Government
- Greg holds current UK Government Security Clearance (SC)

GREG JEFFREYS CONSULTING LTD

greg@GJConsult.co.uk

AV User Group

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- https://www.avusergroup.com/

Webinar programme

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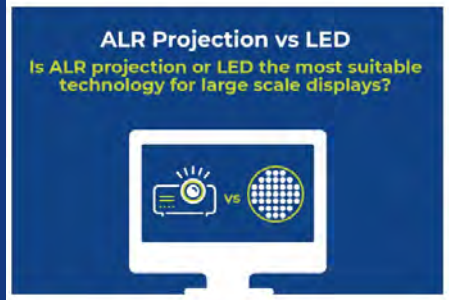
1 November 2022

MTR update - The latest developments in MTR design, Enhanced Meeting Rooms, Front Row display and the new Microsoft Signature Room

Join us on Tuesday 1 November 2022 at 4pm GMT...

Read more...



15 November 2022

ALR Projection vs. LED

Join us on Tuesday 15 November 2022 at 4pm GMT...

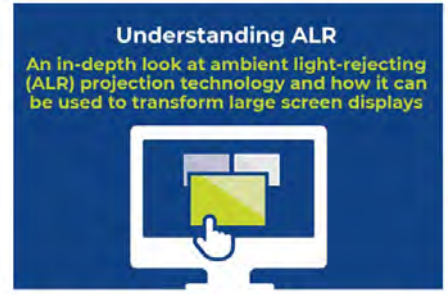
Read more...

29 November 2022

Standards update - The new Avixa Image System Contrast Ratio (ISCR)

Join us on Tuesday 29 November 2022 at 4pm GMT...

Read more...



13 December 2022

Understanding ALR

Join us on Tuesday 13 December 2022 at 4pm GMT...

Read more...

10 January 2023

Aspect ratio update - 16:9, 16:10... or 21:9?

Join us on Tuesday 10 January 2023 at 4pm GMT...

Read more...

We've made the Teams Rooms Webinar Series available to watch again or share with colleagues...

Watch the recordings here

https://visualdisplaysltd.com/resources/resources/webinars

Latest Microsoft materials

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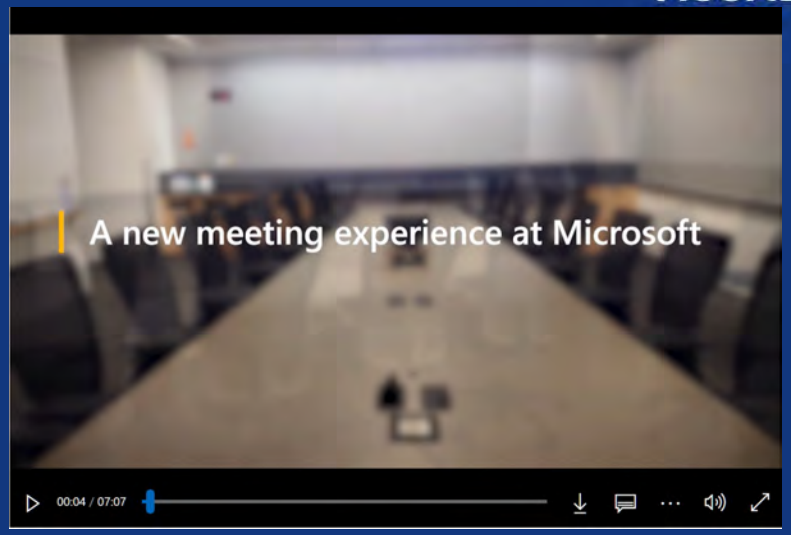
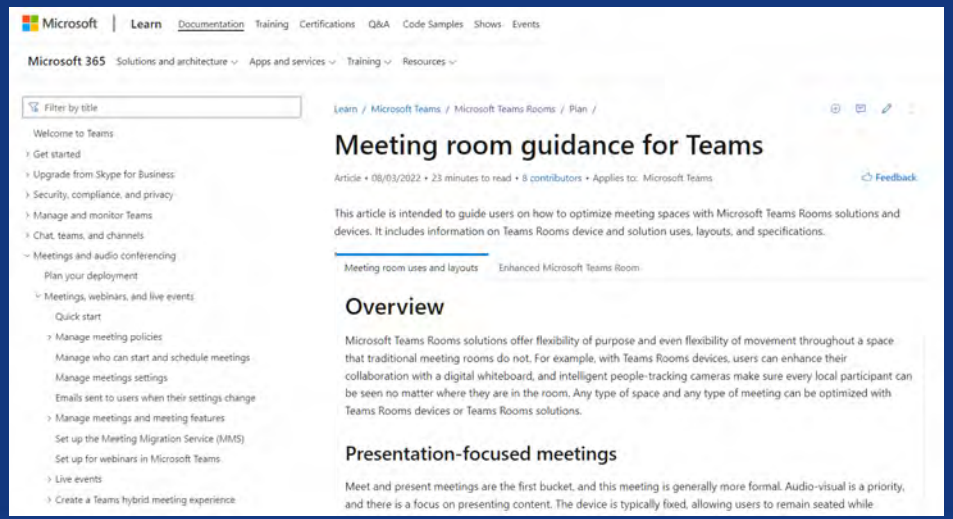
- Updated & extended Hive video
  - https://www.microsoft.com/en-us/videoplayer/embed/RE50xgt?autoplay=false



- New online materials
  - https://learn.microsoft.com/en-us/microsoftteams/teams-meeting-room-guidance?tabs=uses



New AV Magazine feature

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AV MAGAZINE

MICROSOFT TEAMS ROOMS SPECIAL

Opportunity knocks for AV

Microsoft Teams Rooms (MTRs) represent a once-in-a-generation business opportunity for the AV industry. Here, **Greg Jeffreys** explains how...

https://edition.pagesuite-professional.co.uk/html5/reader/production/default.aspx?pubname=&edid=ee4e18d1-75b2-42e9-9670-d60d3620b73d&pnum=41

21:9 – the practical specification call today

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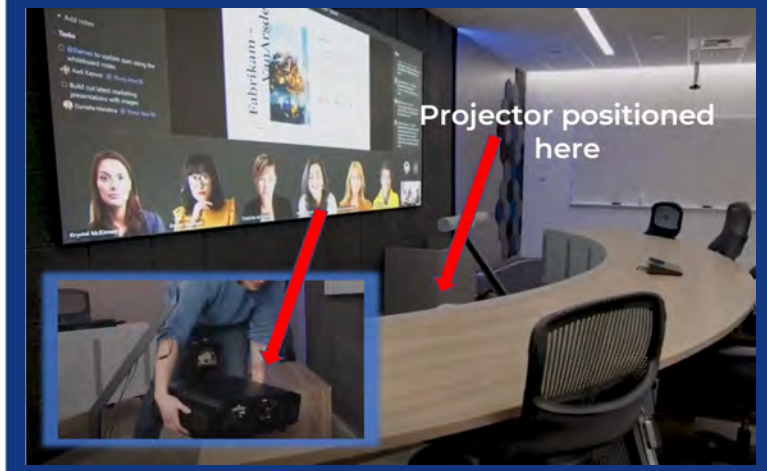
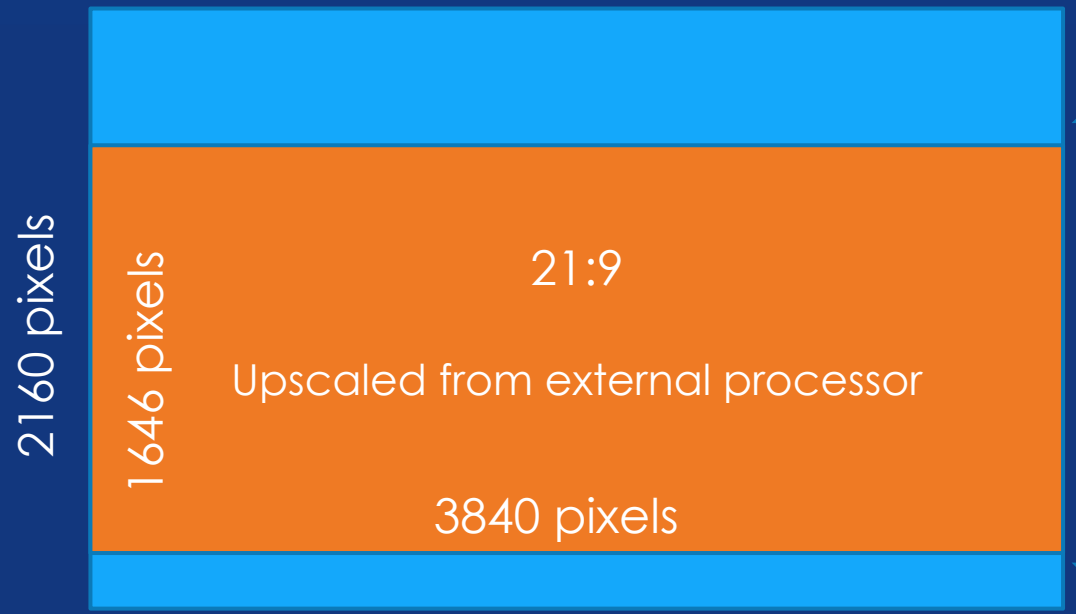


Aspect ratio 16:9 with 1920 x 1080 resolution or

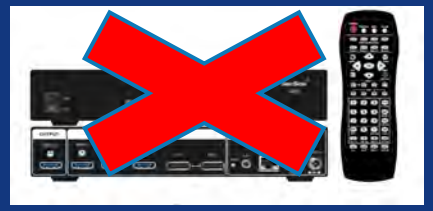
21:9 with 2560x1080 resolution



Using 16:9 at width of 21:9

- **You can have Front Row and all other screen layouts**
- **Front Row strip can be positioned vertically**
- **Background strips to match wall/background**

SOURCE(S)



External processor

Single 4K UHD (pixel shifted) projector

Epson EB-PU range now offers EDID to present 21:9 to MTR PC

Twin displays – not for Front Row!!

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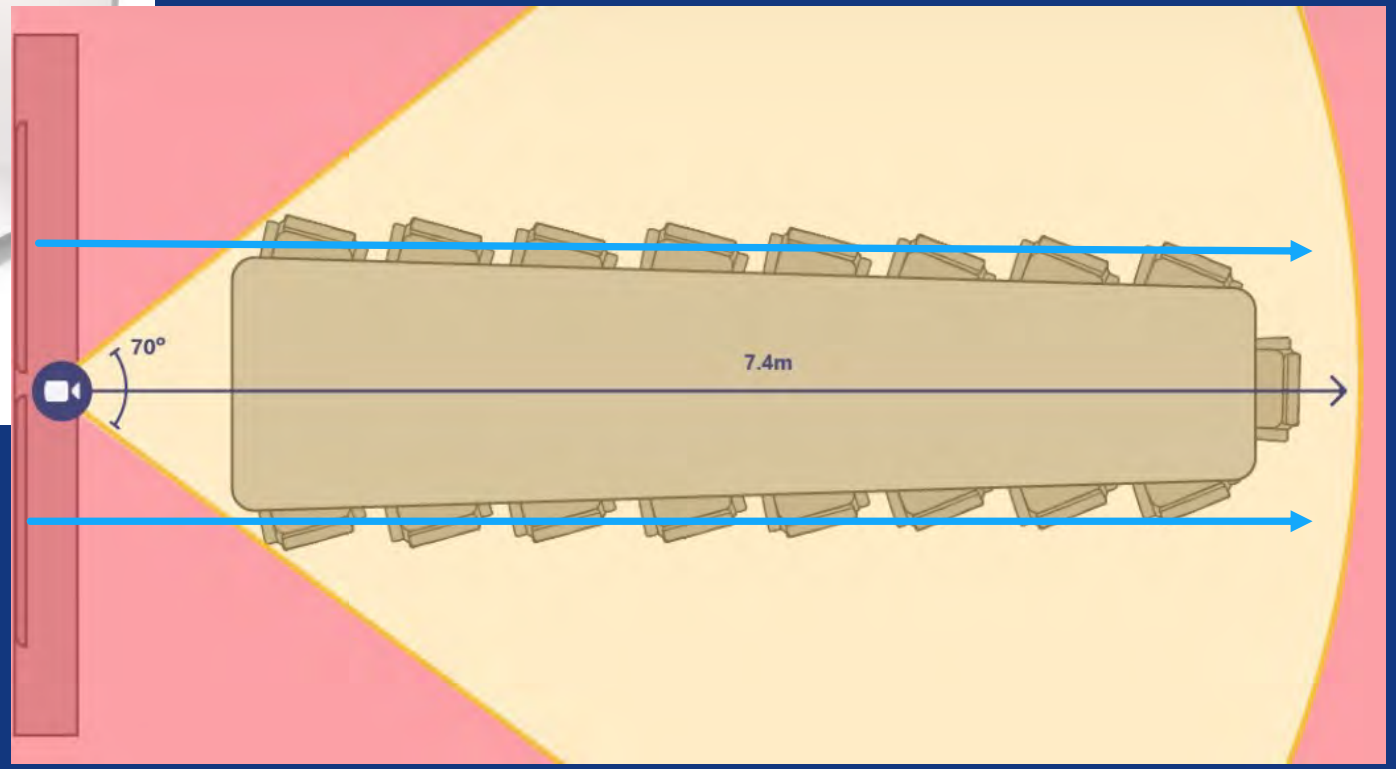
Midsize meeting room



Standards

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Is it a Standard, a Best Practice or just a BOM (Bill of Materials)

The word 'standard' itself starts with two meanings:

1. Relating to a level of quality;
2. Relating to a norm or a model, in this context meaning, for example, a room specification that can be replicated globally. In this second category, this is often reduced to the minimum viable content, a Bill of Materials (BOM).

- In AVIXA we focus on 'performance standards' – describing good outcomes and user experiences in measurable (and repeatable) metrics
- Use related environmental standards too.

Visual Displays Ltd supplies these displays

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Part of the VDL Digital Canvas range

Full packages can include:

1. Lab meter & laser survey of spaces (if needed)
2. Standards-curated system specification for each space
3. 3D CAD design and full installation instructions
4. ALR (ambient light rejecting screen)
5. Projector mount, framework & camera mount
6. You can buy the specified projector from us or locally

- We ship globally

Do you have an evaluation space?

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- Speed of change and development very rapid
- Workflows = work in progress
- Display layouts – how many new versions in 2022/23?!
  - User-created layouts
- Need to see how room self-presents to other rooms
- If you can't have evaluation spaces then you need reference spaces

Let us help you design and build your test spaces.

VDL Digital Canvas – Freestanding, complete, UST projection

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Find out more visit:
www.visualdisplaysltd.com/meeting-board-room-screens/teams-rooms

Curved screen
VDL Digital Canvas

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- Reciprocity – remote & in-person are more equal
- Organic, human-friendly configuration
- UST vs standard lens
  - Impact on camera position
- Wide range of aspect ratios and resolutions
- IP and tools based on our simulation & immersive display modelling tools
- Part of our design consultancy

LTSMG – Learning and Teaching Spaces Management Group

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HE & FE campus technology managers association

LTSMG

https://ltsmg.co.uk/

Our background in immersive brought us here

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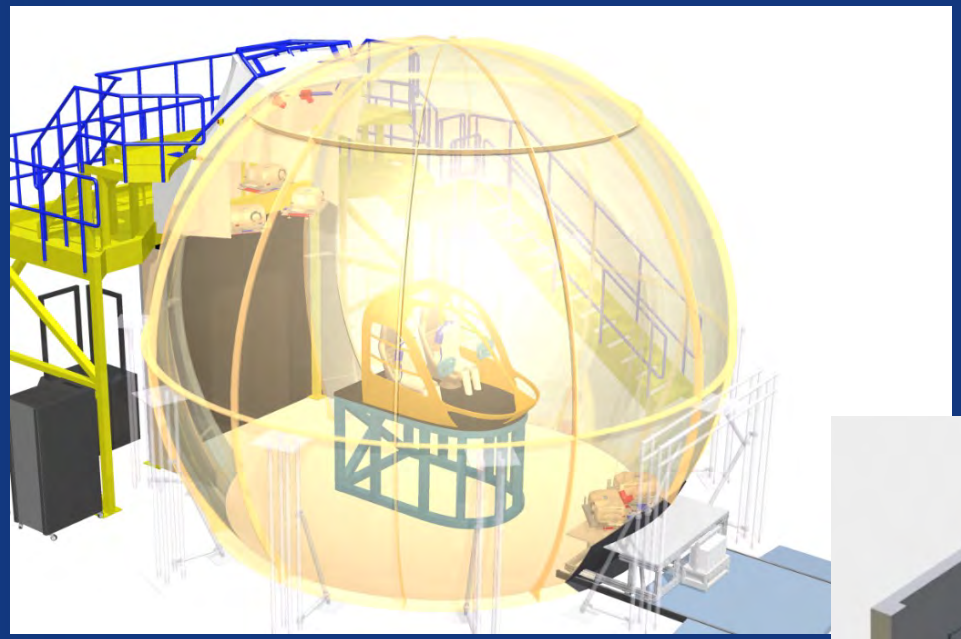

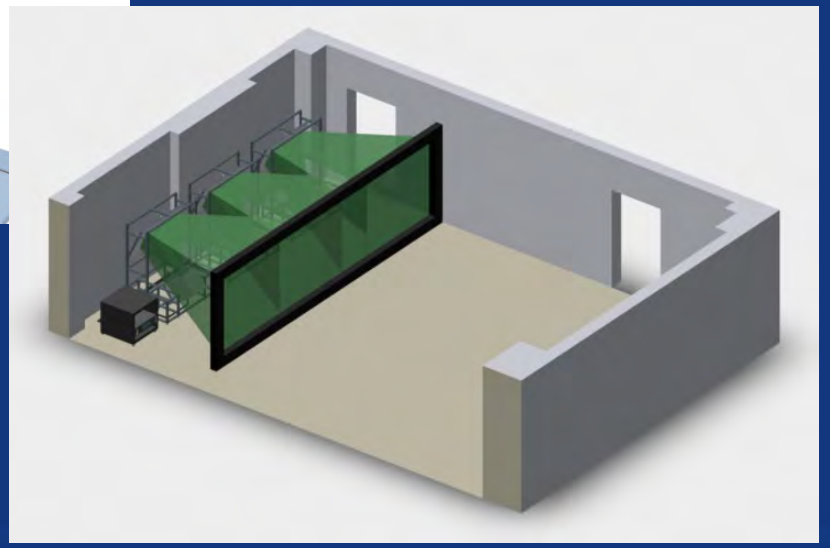

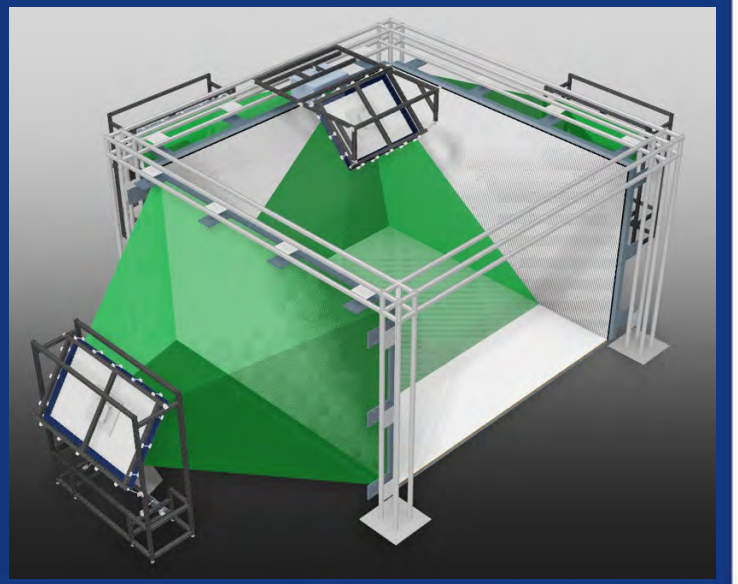

Simulation & immersive displays

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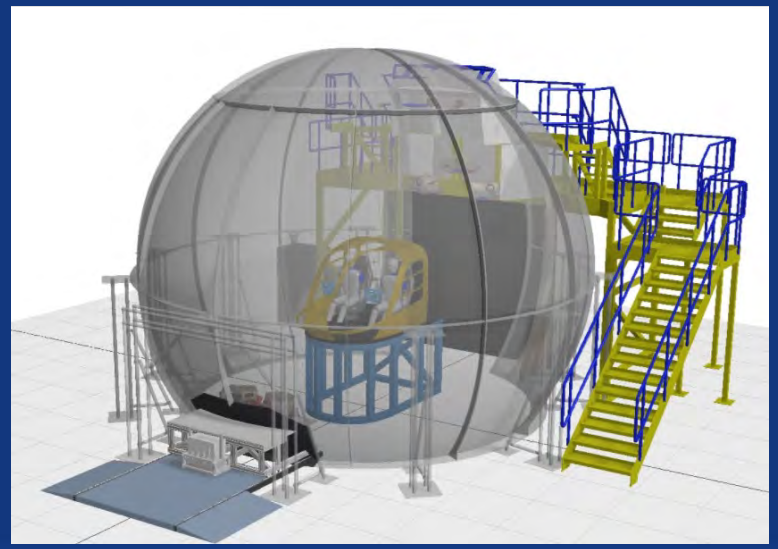
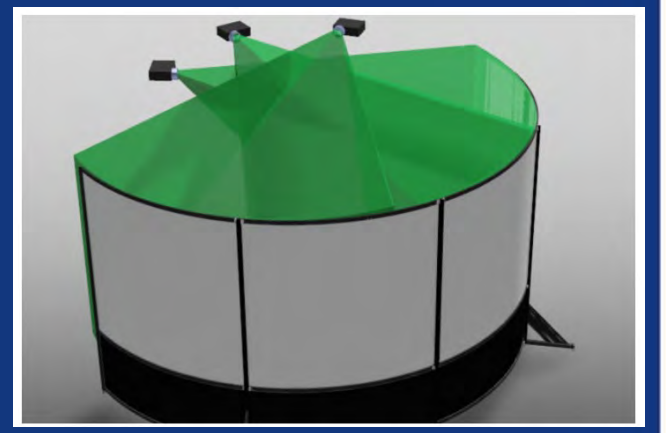
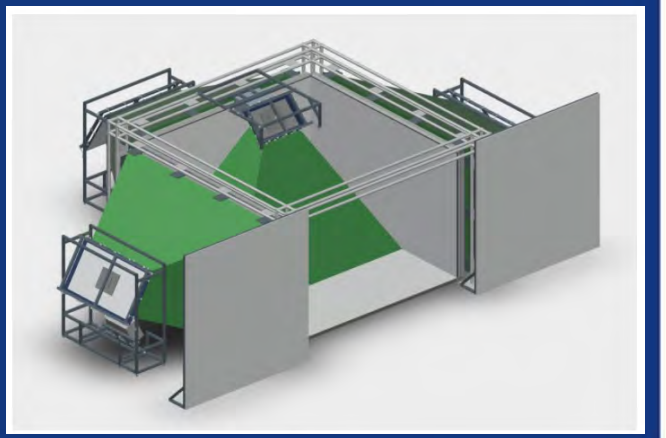
- Breaking the Fourth Wall
- Thinking in ‘cues’







What we can do for you

Use any or all of our services

- Specialist consultancy
  - (not AV consultancy!!)
- Design
- Manufacture
- Solutions & technology
  - VDL Digital Canvas Displays
  - Projection screens of all types
  - Immersive displays
- Proof of concept, product development, system troubleshooting
- Advanced laser tools

- We work actively with all parts of the channel - from end user through to reseller
- All hardware and solutions supplied through reseller/integrator channel

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www.VisualDisplaysLtd.com

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