



VISUAL DISPLAYS

Spring/Summer 2021 Webinar Programme

HE & FE display specification & sign-off 8 essential steps and best practices'

DISPLAYS, LIGHT & ENVIRONMENTAL EXPERTISE

PRODUCTS, SERVICES, SPECIALIST CONSULTANCY

Presenter – Greg Jeffreys



- ▶ Managing Director of Visual Displays (formerly Paradigm AV)
- ▶ Specialist consultant in standards, displays, light & lighting, VC lighting, teaching space & meeting room design
- ▶ Current chair, AVIXA Standards Steering Committee
- ▶ Lead writer, PISCR image contrast standard – and new ISCR standard task group
- ▶ Task group chair ANSI/AVIXA DISCAS standard – image size, resolution, viewing positions/angles, content size guidance
- ▶ Task group working on AVIXA's new UX for AV Design standard
- ▶ President of InfoComm/AVIXA 2012, board member 2008-13
- ▶ Consultant on space design and lighting to Google
- ▶ 2020 Outstanding Contribution Award – AV Technology Awards
- ▶ Proud associate of LTSMG

1 – Knowledge is key

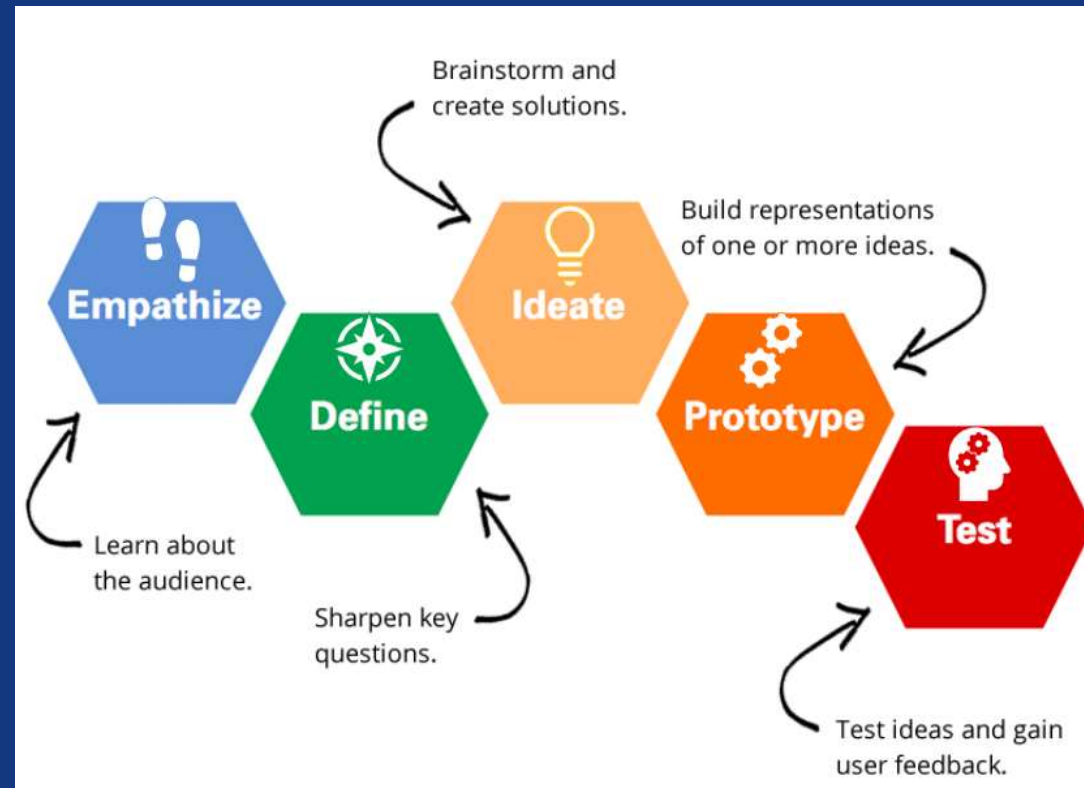
Understand user needs and content



How to create exceptional user experiences?

START WITH THE END IN MIND

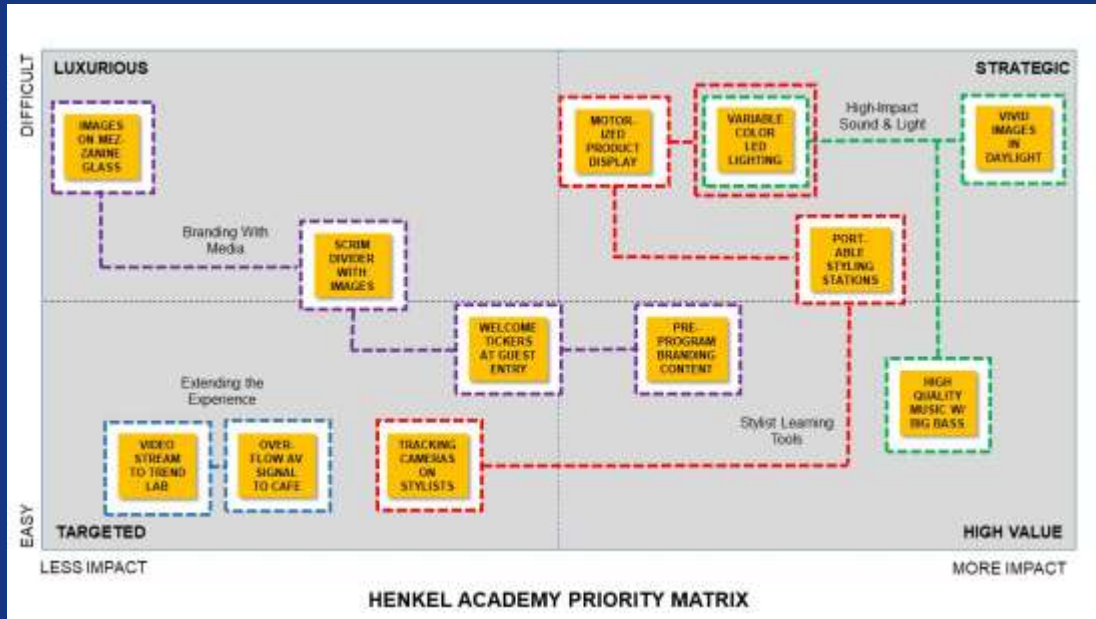
AVIXA's new UX design standard is based on Human-Centred Design



It's all about talking to the users – yes the users, not the stakeholders!

Not a 'waterfall' project flow, but iterative.

UX processes and techniques to establish user needs



Let us help you with our comprehensive services

UX and use case

...knowledge is the key

- ▶ Talk to the users!
- ▶ Don't be afraid of the work 'prototype' here – it's your friend!
- ▶ Start with the end in mind
- ▶ Forget technology until key basic issues are 100% scoped
- ▶ Objective: create measurable performance metrics

Watch out for public review of new *User Experience Design for AV* standard!

Article in AV Magazine here - <https://www.avinteractive.com/features/its-all-about-the-experience-27-08-2020/>

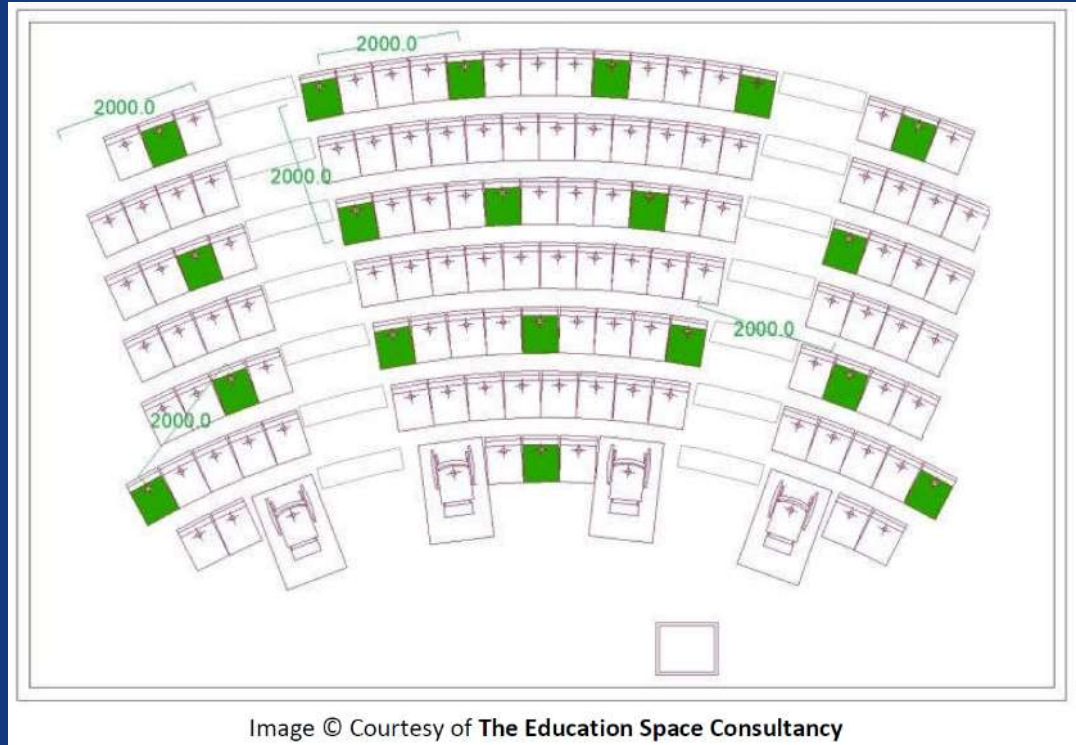
2 – Image size

Is it big enough? ...for social distancing?



And now size REALLY matters

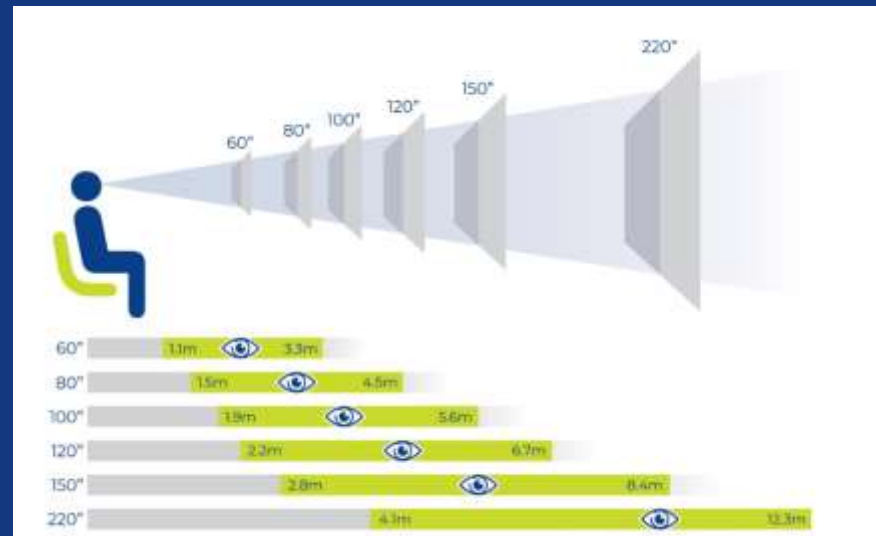
- ▶ Post COVID-19 lock-down, social distancing will have radical impact on space occupancy
- ▶ Imperial College Uni expects <16% possible occupancy
 - ▶ Other estimates start at 9%
- ▶ **People will need to be at – and see from – the back of the room**
 - ▶ They won't want to spend a fortune achieving this...



Use DISCAS!

Take our 1hr webinar (1 CTS Renewal Unit)

- ▶ Use 6:1 rule as baseline metric (relates to 3%ElementHeight in DISCAS)
- ▶ ...but DISCAS is too easy to use not to use it!
- ▶ There are good quick reference guidelines too...



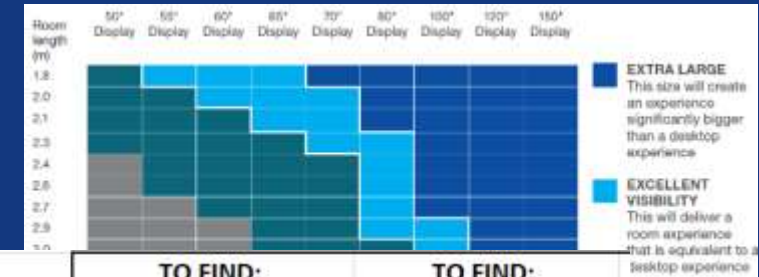
Start with 6 : 1

...because size matters

- ▶ The DISCAS image size standard is globally recognised
- ▶ Content (font size/height) is the 'big new thing'
- ▶ Easy-to-use calculator
- ▶ Recommended starting point = 3%EH
 - ▶ which means...
- ▶ The maximum viewing distance should be no more than 6x the image height
- ▶ Download calculator here - <https://visualdisplaysltd.com/resources/useful-calculator-tools>



VISUAL DISPLAYS



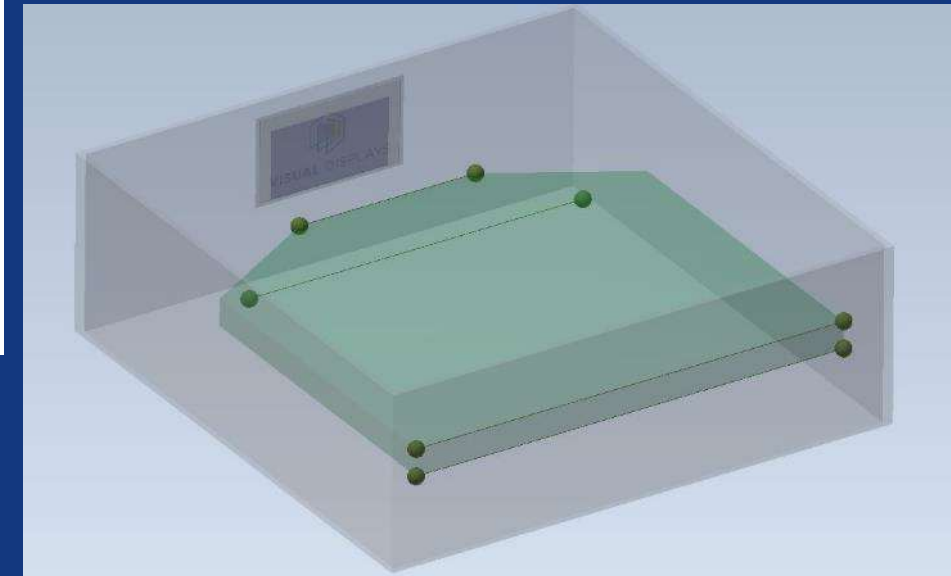
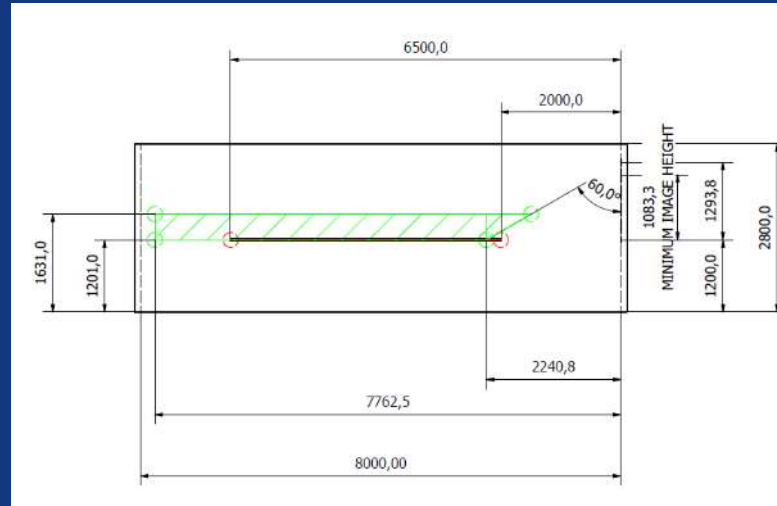
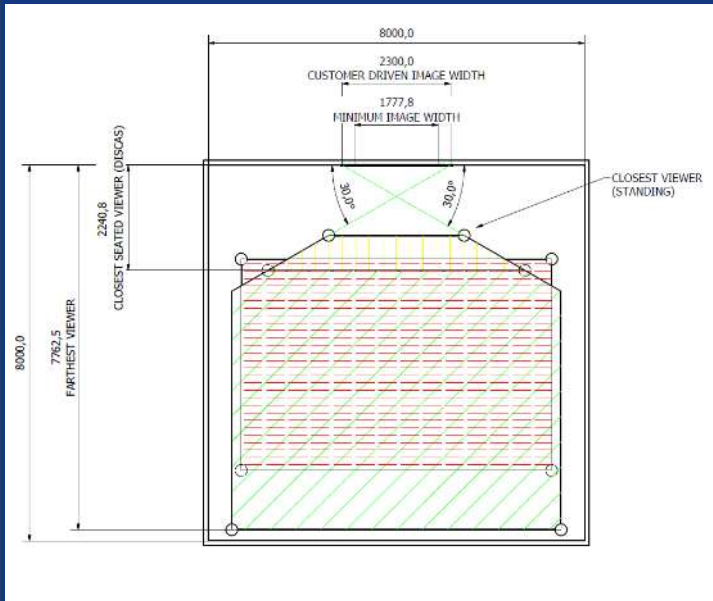
	TO FIND:		
<i>Do not add measurement labels (" , mm)</i>	Farthest Viewer	Minimum Image Height	
Image Height	1000	1000	NOT RECOMMENDED This is a poor experience that does not meet any standards
Distance from floor to bottom of image	1220	1220	
Image Offset	0	0	
Image Width	1780	1780	
Farthest Viewer	6000	6000	
Viewing Ratio	6.00	6.00	
Minimum %Element	3.00%	3.00%	
TO FIND	Farthest	Minimum	
CLOSEST VIEWER	Viewer	Image Height	
Vertical Viewing Factor	1000	1000	
Closest Viewer	1732.0	1732.0	
Viewing Ratio	1.73	1.73	
Nominal Viewing Depth	4268.0	4268.0	
Max. Length of CV Plane	4220	4220	

DISCAS CAD tools

Formulae in parametric 3D CAD (+ renderings)



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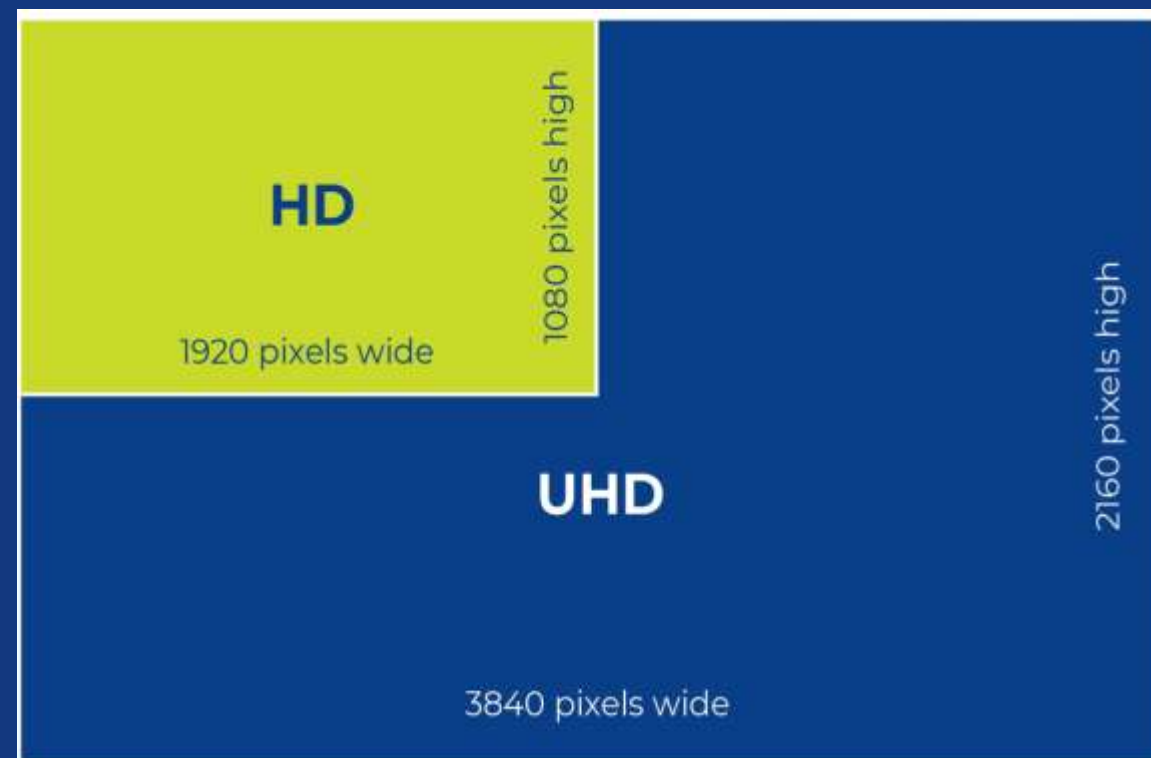
3 – Resolution



4K can be false friend

Useful fact

In practice 4K and UHD are interchangeably used terms. The strict definition is that 4K resolution is 4096 x 2160 and UHD is 3840 x 2160. UHD is exactly 4 times the resolution of HD - twice the width of HD ($1920 \times 2 = 3840$ pixels wide) and twice the height ($1080 \times 2 = 2160$ pixels high). So UHD is usually what's needed in our ProAV world.



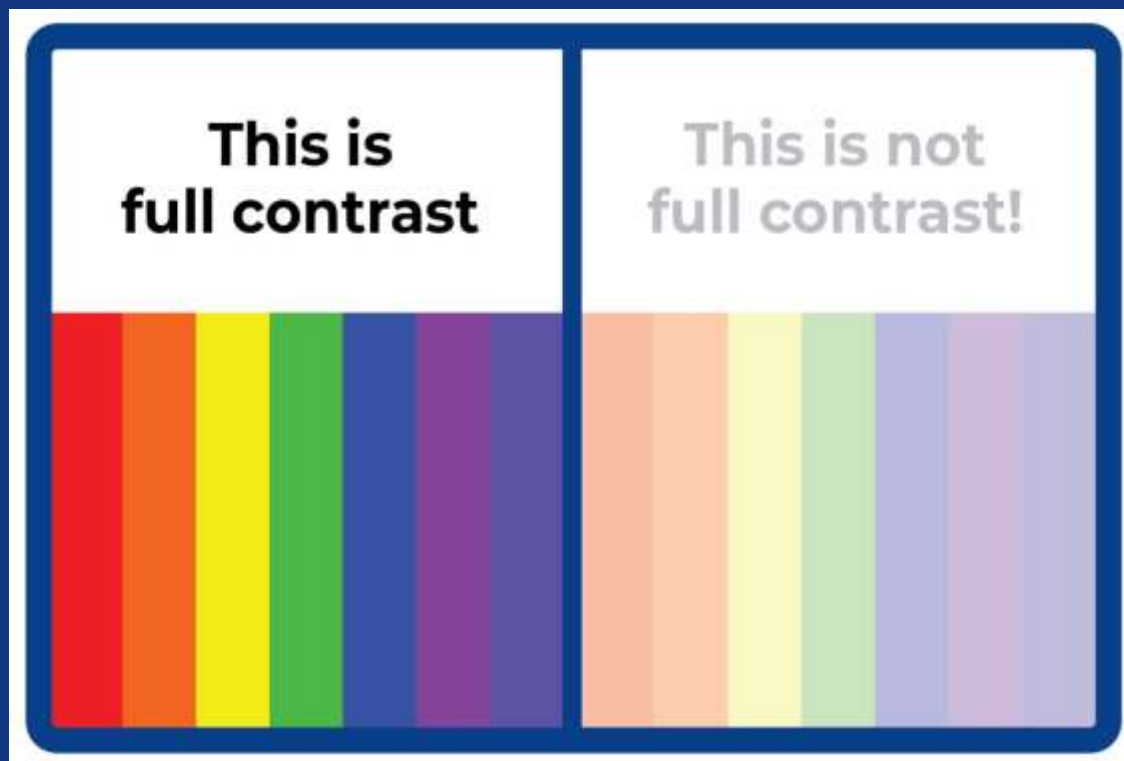
USE DISCAS!

Remember: only needed with ADM (Analytical Decision Making category)

4 – Contrast



Contrast is key to image quality



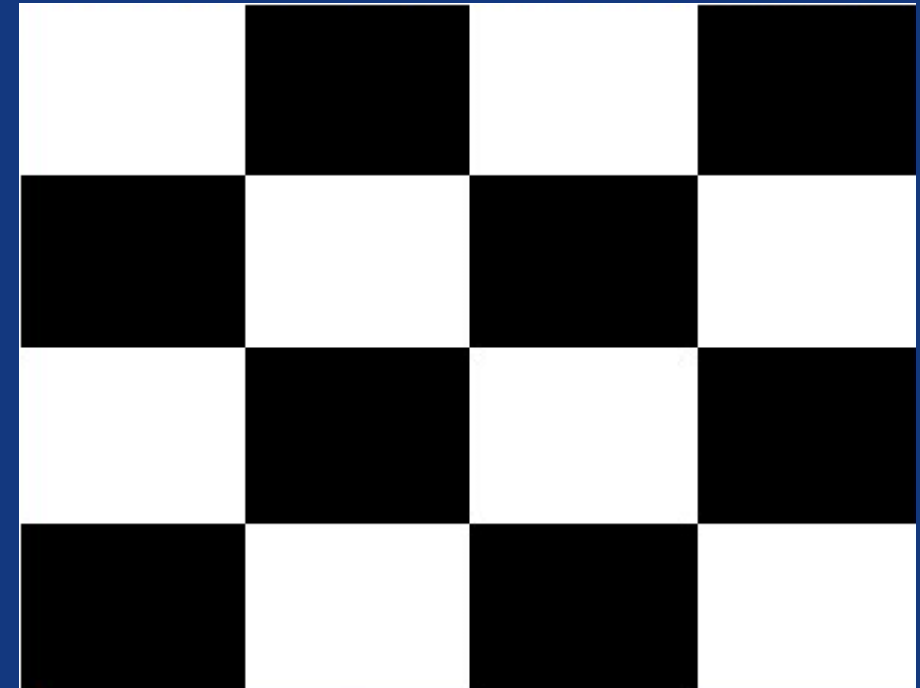
Low contrast even damages perceived resolution.

15:1 contrast ratio PISCR

- ▶ In standard installations 15:1 is almost always impossible to achieve
- ▶ ***Use ALR (ambient light rejecting) projection screens***



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*The white squares' average
luminance (brightness) must be
15 x more than the black
squares.*

**ONSCREEN – NOT FROM
PROJECTOR**

DISCAS / ISCR viewer categories



- ▶ 2 of 4 are applicable:
- ▶ Basic Decision Making (BDM)
 - ▶ Viewers can make decisions and have learning engagement with the content
 - ▶ BDM is the main campus-applicable viewer category
- ▶ Analytical Decision Making (ADM)
 - ▶ Viewers can make decision and have learning engagement with the finest detail of r

Real life contrast is driven 100% by ambient light

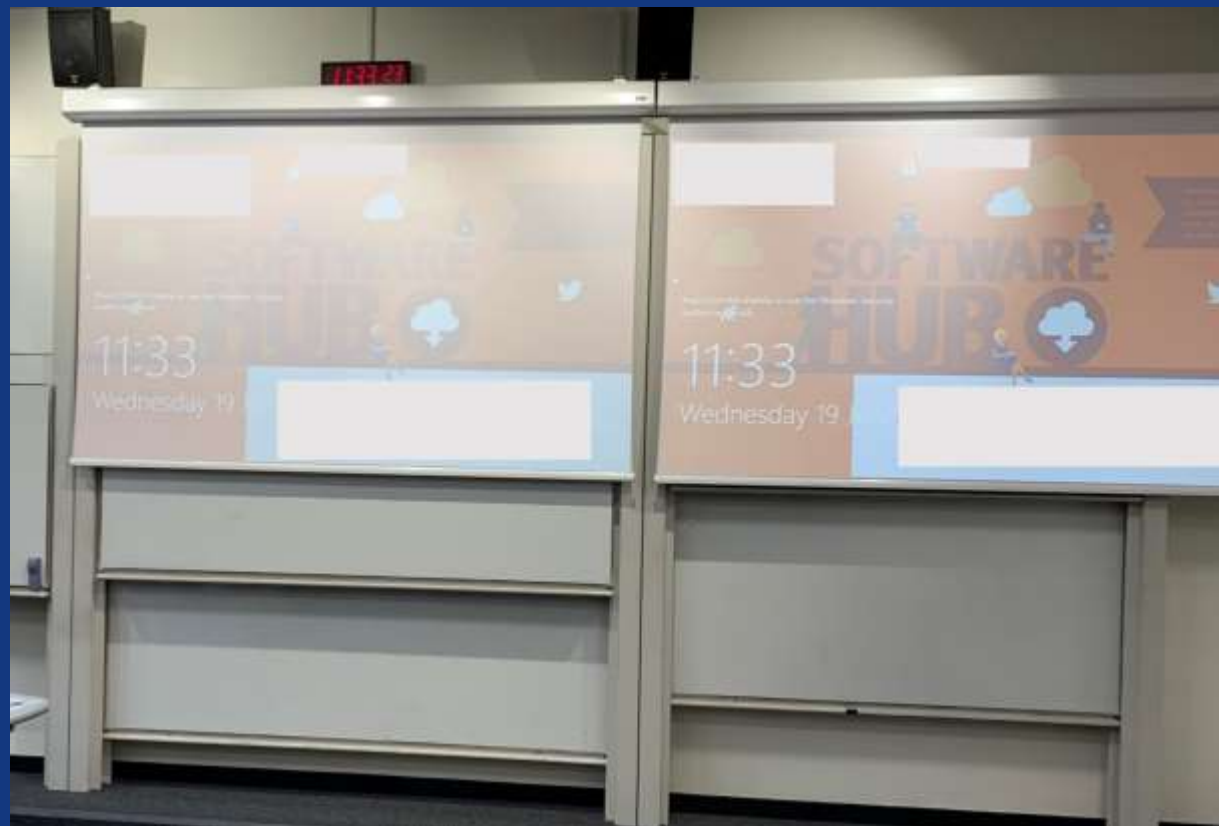
- ▶ Projector contrast can't be perceived until you're in a darkened room
- ▶ Use our calculators
- ▶ If you can't control the light, you need screen technology that can...

PISCR being replaced by ISCR



- ▶ From 'Projected Image System Contrast Ratio' to just plain 'Image System Contrast Ratio'
- ▶ All displays types assessed in a single unifying standard
- ▶ <https://www.avixa.org/standards/image-system-contrast-ratio>
- ▶ Related tools - <https://visualdisplaysltd.com/resources/useful-calculator-tools>

Do you have spaces like this?



By the way – we can help you fix this for free!

Would you like spaces like this?

2021 is *Projection Done Properly* Year!



Glasgow University – new L&T Hub

- ▶ 30 x dnp ALR screen systems 8m wide down to 100"
- ▶ *Image (sign-off photo):*
 - ▶ 1 x 6m wide 4K projection;
 - ▶ 2 x 100" VDL Complete Laser Display

You don't look at the projector – you look at the screen



The split screen technology demonstration



dnp
Supernova
08-85

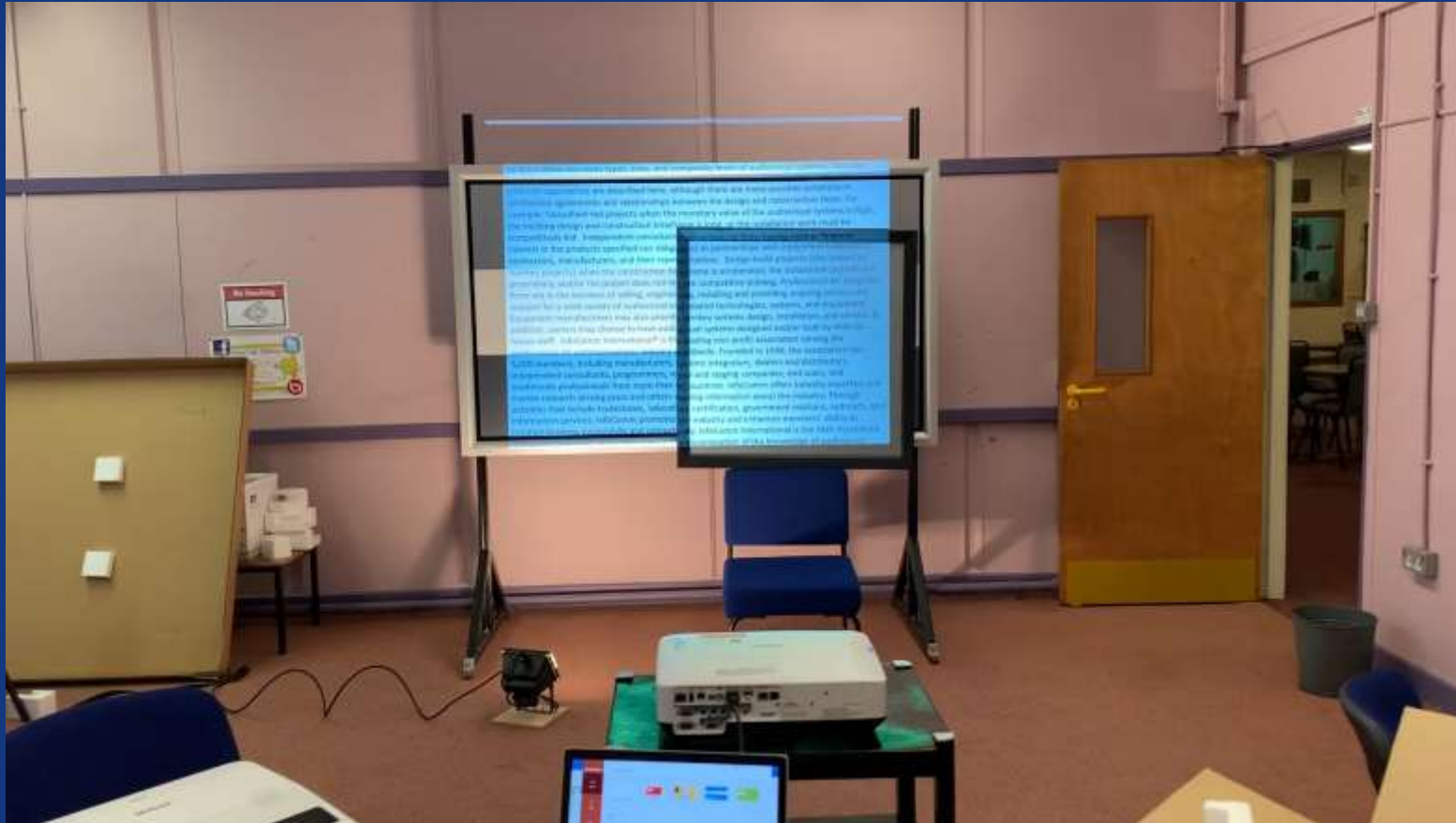
dnp
Supernova
20-25

Standard white
Da-Lite
gain 1

See full Gary
Kayye ISE
video here -

<https://www.dnp-screens.com/en/video/dnp-ambient-light-rejecting-screens-at-ise-2015/>

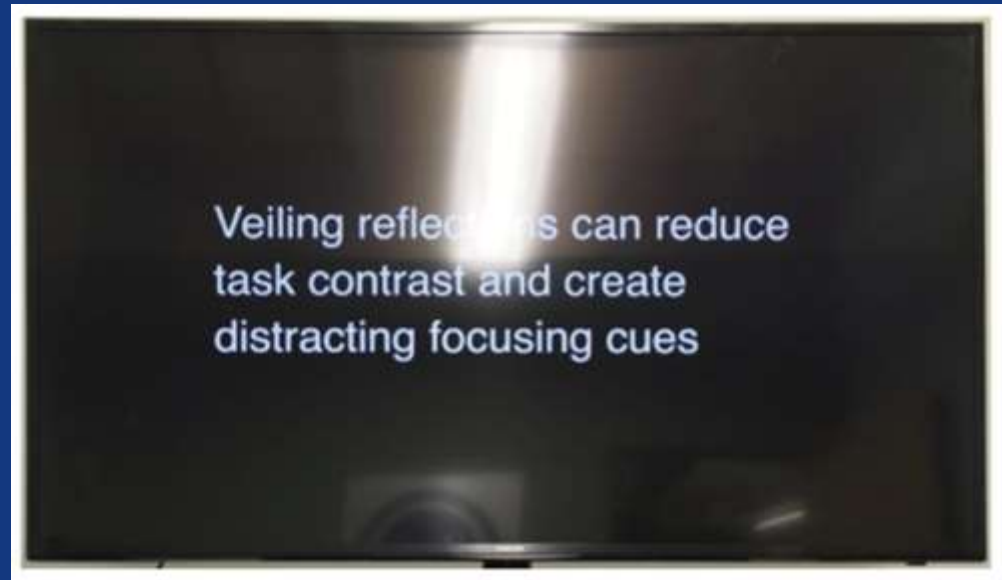
The split screen technology demonstration



Play video here -
<https://www.youtube.com/watch?v=i82O9xYxRxk>

FPD / LFD display contrast also driven by ambient light

- ▶ Ambient light affects LFD (large format displays) too



ALR projection screens are matt and do not suffer from these issues

5 – Image luminance ('brightness')

- ▶ You need the 'Goldilocks Effect' – not too dark and DEFINITELY not too bright (FPD, dvLED etc)



Avoiding asthenopia is the key objective – don't design eyestrain into your spaces

Don't design in asthenopia ...avoiding eye strain

- ▶ Task Luminance Ratio (max 3:1 for key tasks)
- ▶ Keep luminances of everything within prescribed range to avoid eye strain

	Ambient light in lux			
	300	400	500	<i>You should have 300-500 lux on a meeting room table</i>
Peak Gain of task (eg paper)	1	1	1	
<i>TASK LUMINANCE =</i>	<i>96</i>	<i>127</i>	<i>159</i>	cd/m ² [nit]
Task luminance ratio	2.5	2.5	2.5	: 1
<i>MAX DESIRED IMAGE LUMINANCE =</i>	<i>239</i>	<i>318</i>	<i>398</i>	cd/m ² [nit]
ISCR contrast ratio required	15	15	15	: 1
<i>MAX PERMITTED BLACK LEVEL (relative to the max white level permitted on your image)</i>	<i>16</i>	<i>21</i>	<i>27</i>	cd/m ² [nit]
<i>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)</i>	<i>50</i>	<i>67</i>	<i>83</i>	lux

The black level paradox

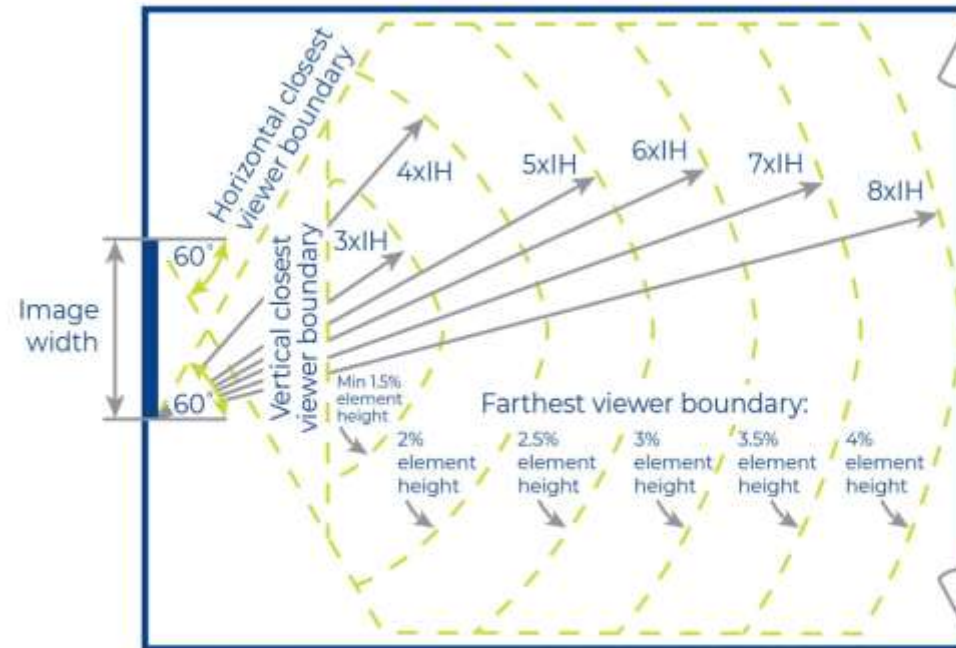
- ▶ Task Luminance Ratio (WELL, SLL, IES etc building codes) must fall within 3:1 ratio
 - ▶ <https://v2.wellcertified.com/v/en/light/feature/6>
- ▶ **Focus on image black levels** to ensure display white levels are not too high
 - ▶ Download essential calculators here - <https://visualdisplaysltd.com/resources/useful-calculator-tools>

6 – Viewing distances & locations

(Back to DISCAS)



Typical DISCAS plan

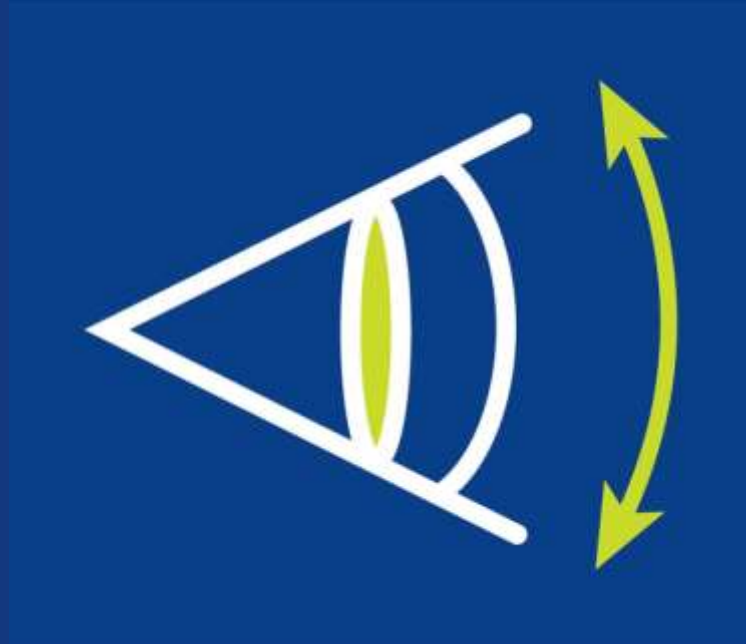


Viewing Parameters for BDM

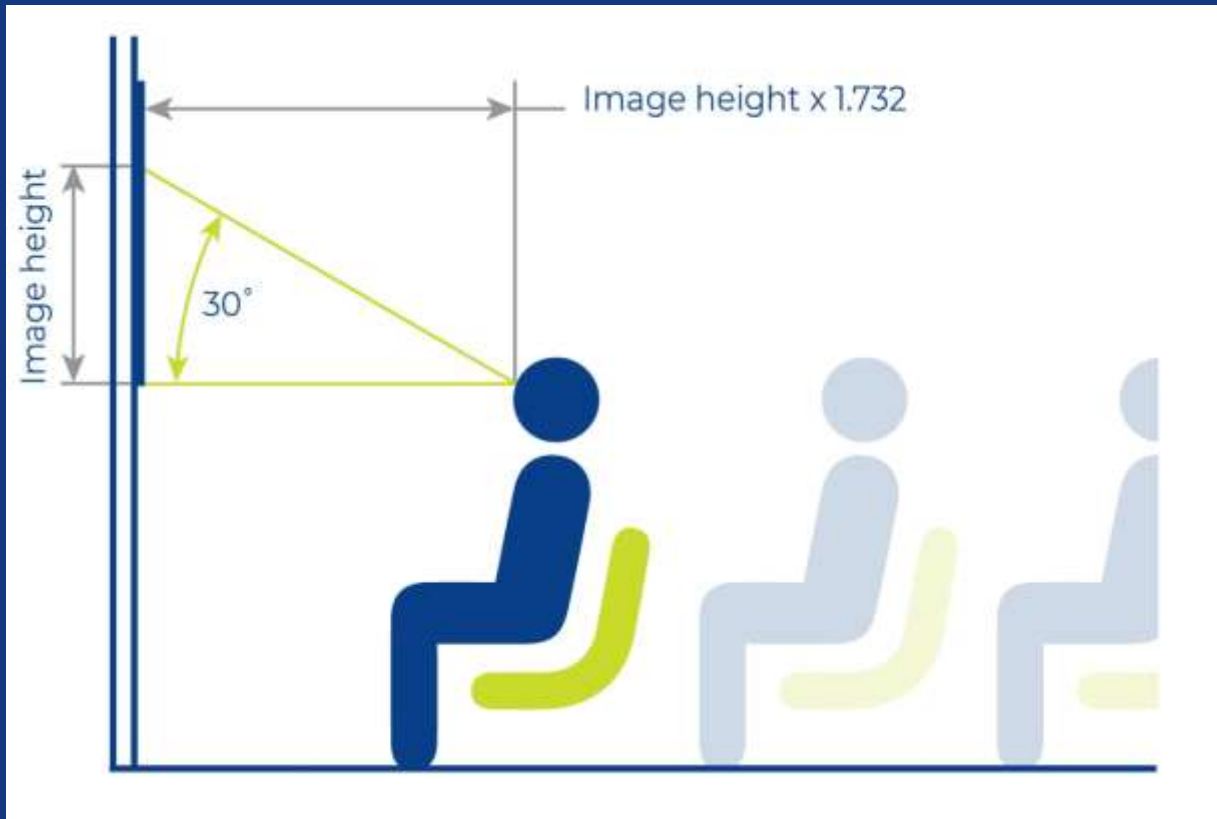
No scale. IH = Image Height. Image Height based on 16:9 (1.78:1) aspect ratio.

7 – Viewing Angles

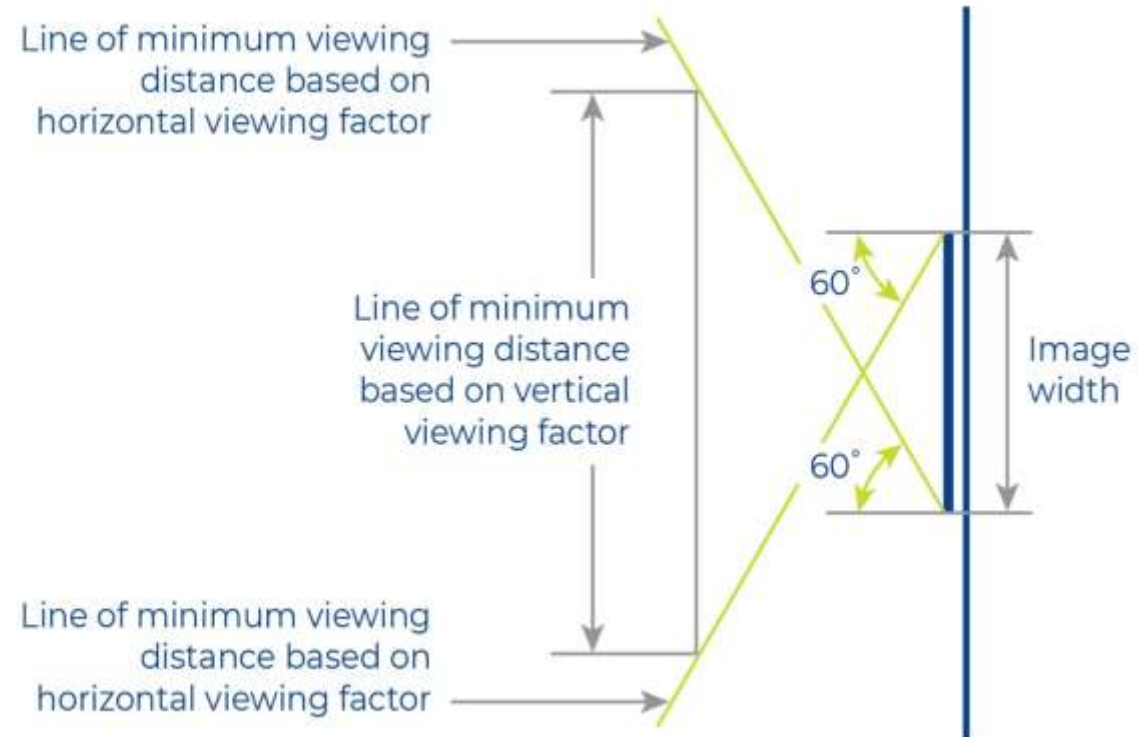
(Staying with DISCAS...)



Vertical viewing angles



Horizontal viewing angles

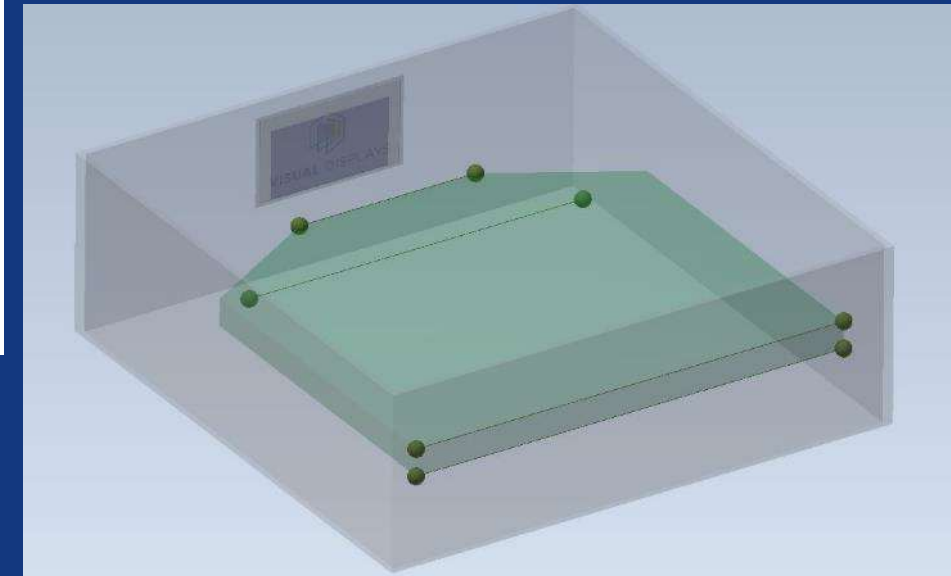
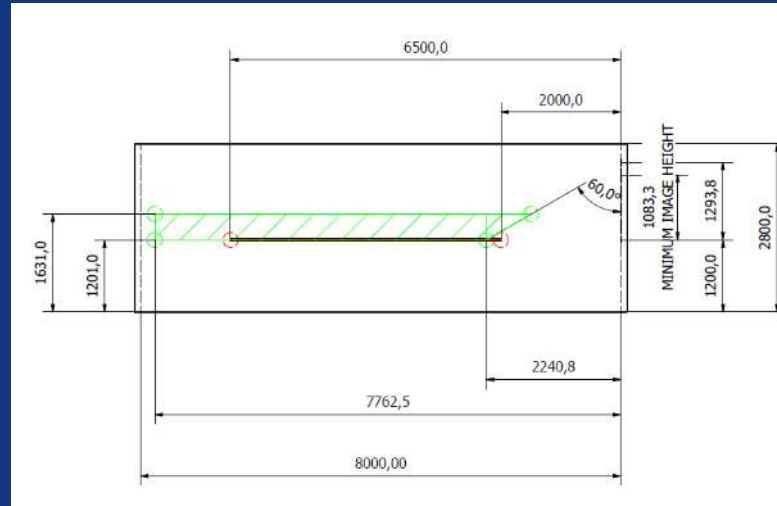
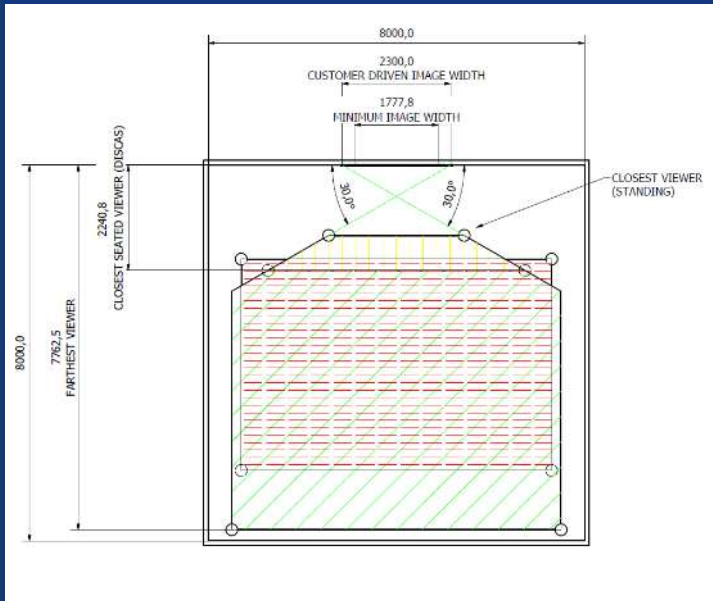


DISCAS CAD tools

Formulae in parametric 3D CAD (+ renderings)

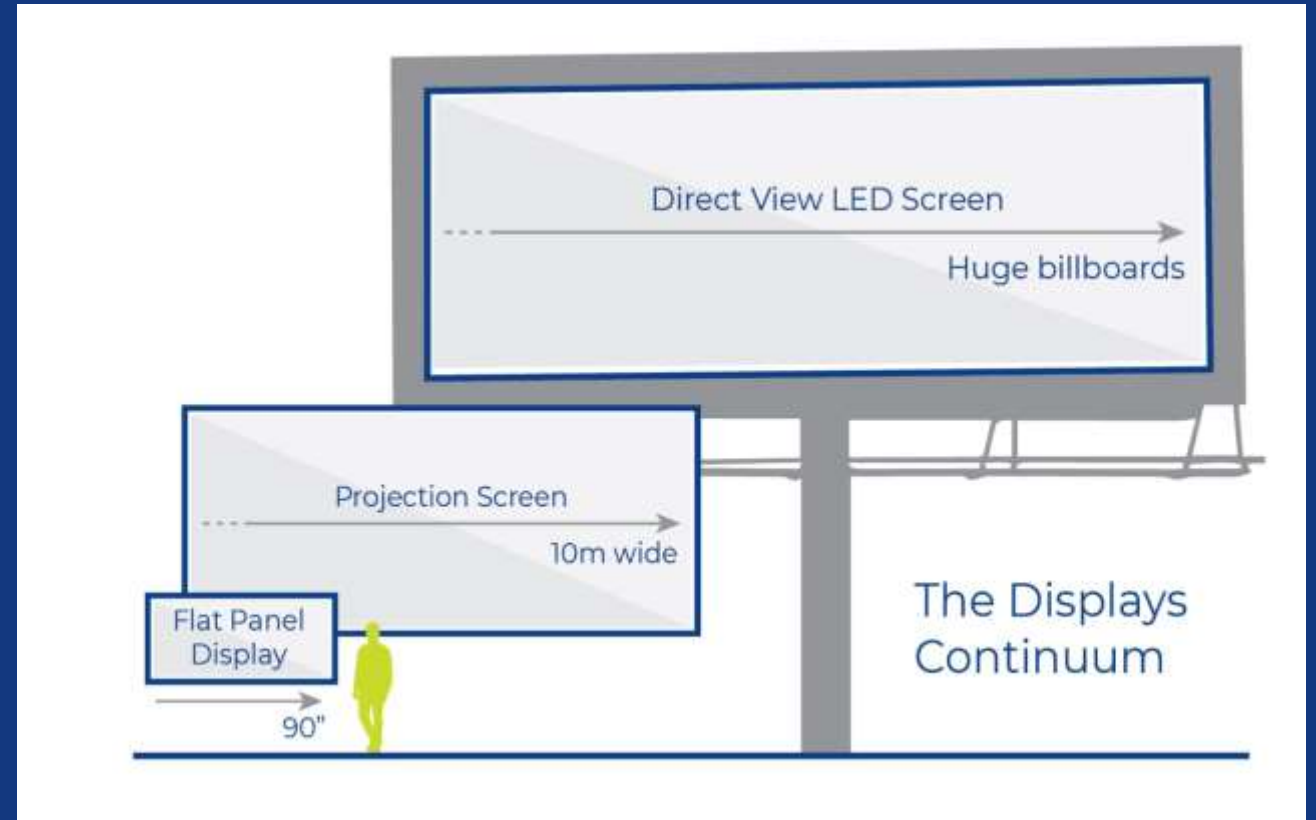


VISUAL DISPLAYS



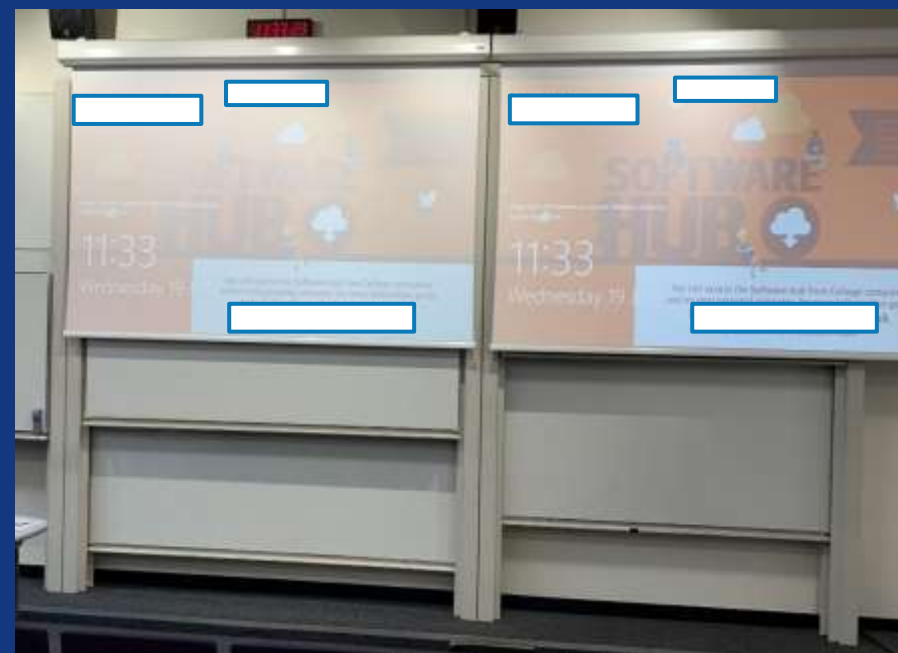
The displays continuum

- ▶ Up to 90" – flat panels (LFD, FPD)
- ▶ Above 90" – ALR projection
- ▶ Variable entry point for dvLED
 - ▶ Best used for signage



2021 is the year for projection

- ▶ Big enough
- ▶ Cheaper than large flat panels
- ▶ A fraction of the cost of dvLED
- ▶ BUT MUST BE DONE PROPERLY FOR SERIOUS CONTENT
- ▶ Done properly, can be better than flat panels or dvLED
- ▶ The washed out reality of most projection is completely avoidable



**VISUAL DISPLAYS**

Features	Comparative LED product	130" CLD XL Display	
	130" Branded LED Display	130" CLD XL Basic Display	130" CLD XL UST Display
Image size	2.88 x 1.62m	2.88 x 1.62m	2.88 x 1.62m
Price	£50,000 - £73,000 + VAT	£16,400 + VAT	£26,200 + VAT
Resolution	1920 x 1080 (HD)	3860 x 2160 (UHD 4K [pixel shift])	3860 x 2160 (UHD 4K [pixel shift])
Pixel pitch	1.5mm	0.75mm	0.75mm
Closet viewing distance	3.7m - 4.6m	2.2m	2.2m
Farthest viewing position	9.7m	9.7m	9.7m
Max brightness (luminance)	600 nit	383 nit	308 nit
Max brightness needed under 300-500 lux downlighting	190 - 320 nit	190 - 320 nit	190 - 320 nit
ANSI ISCR/PISCR Contrast (min required 15:1)	not stated	34	35
Max viewing angle	170 deg	170 deg	170 deg
Weight	105-125kg	17kg (projector) / 29kg (screen)	24kg (projector) / 55kg (screen)
Power	3000 W	416 W	626 W

8 – Sign-off

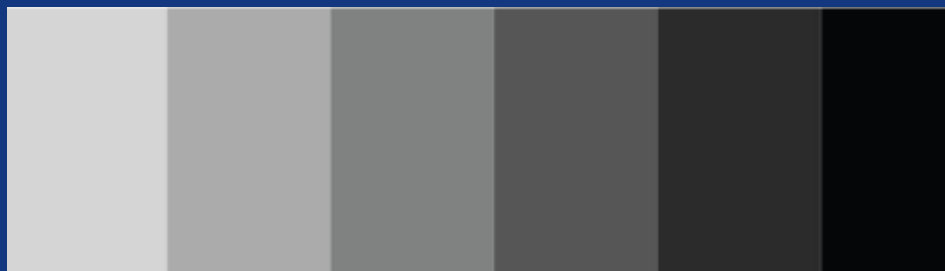
Inspect what you expect !



VISUAL DISPLAYS



Use the grey scale!



The more grey 'chips' you can render and see, the bigger the contrast, the better the image quality. It's that simple.



Attend our system auditing and certification webinar!

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

AVIXA Systems Performance Verification standard

- ▶ **10:2013 *Audiovisual Systems Performance Verification (Under Revision)***
- ▶ This Standard provides a framework and supporting processes for determining elements of an audiovisual system that need to be verified; the timing of that verification within the project delivery cycle; a process for determining verification criteria/metrics; and reporting procedures.
- ▶ <https://www.avixa.org/standards/audiovisual-systems-performance-verification>
- ▶ Handbook - https://store.avixa.org/CPBase_item?id=a13f200000C2iPzAAJ
- ▶ Documentation Standards - https://avixa.azureedge.net/portal/docs/default-source/default-document-library/avprojectdocsample_fullcontents.pdf

WELL Building Standard v2™



- ▶ The WELL standard unlocks your connection to the rest of the built environment and building services
- ▶ Provides constructive and fruitful ways of working with the other stakeholders
- ▶ Route to getting AV connected earlier in the project cycle



<https://v2.wellcertified.com/v/en/overview>



VISUAL DISPLAYS

Trusted campus partners –
*supporting your AV resellers, integrators, consultants to
excellence*

PLEASE ASK YOUR SUPPLY PARTNERS TO WORK WITH US!

Visual Displays Ltd



Specialist manufacture, distribution & services

Working in partnership with & through the channel

▶ Products

- ▶ dnp Supernova ALR (ambient light-rejecting) projection screens
- ▶ Complete Epson laser display bundles – from 100" to any size
- ▶ Comprehensive projection screens, materials
- ▶ Immersive displays
- ▶ Bespoke display & mounting solutions
- ▶ Bespoke interactive displays
- ▶ Daylight control (blinds)

▶ Services

- ▶ Display design and specification
- ▶ Parametric 3D CAD design
- ▶ Expert tender response support and consultant liaison
- ▶ Space redeployment design for social distancing
- ▶ System troubleshooting
- ▶ Room surveys and audits (using meters & reporting to standards)
- ▶ Proof of concept
- ▶ Specialist consultancy

Main distributor for Draper & Euroscreen



- ▶ Only UK distributor with comprehensive technical support
- ▶ Only UK distributor with comprehensive 3D CAD design
- ▶ Extensive demo and evaluation support
- ▶ We help you choose exactly the right screen



- ▶ **PLEASE ASK YOUR FRAMEWORK INTEGRATOR TO BUY THROUGH US!**
 - ▶ **ASK FOR THE SPECIAL SUMMER FIT-OUT DISCOUNTS**

euroscreen®

Complete Laser Displays

Standards-compliant large screen displays



- ▶ Complete bundled packages, Epson projector (with warranty), dnp screen & Epson mount.
 - ▶ 100", 110" & 120" with UST (e.g. EB-700U)
 - ▶ 100" to any size with standard lens laser projectors
 - ▶ Furniture & bespoke options available
- ▶ Option to buy complete displays as single SKUs
- ▶ Fraction of £cost/m² compared with LFD, dvLED etc
- ▶ *Available through all framework integrators*



Specify and buy with single SKUs (order codes)

Each CLD bundle includes

- **Epson laser projector**
(with 5 year warranty)
- **dnp Supernova ALR (ambient light rejecting) screen**
- **Complete mounting solution**

Optional Extras:

- Free installation CAD drawings
- Site survey
- Installation
- 16:10 aspect ratio available
- Furniture
- Bespoke framework
- High-gain screen option (for limited field of view) no additional charge



- ▶ Hassle-free, single-SKU complete solution
- ▶ Multiple screen, projector and mount options to suit any space
- ▶ Large custom-size displays for optimised viewing from everywhere in the room
- ▶ Laser projection and ALR screen technology for flawless image quality at a fraction of the cost of FPD and dvLED
- ▶ Seamless single images - no visible joins (as with videowalls)
- ▶ Completely non-reflective screen - no 'cheap seats' created by distracting reflections from lighting and daylight
- ▶ High resolution HD video and graphics for detailed content viewing – exceeds AVIXA DISCAS resolution requirement
- ▶ Conforms to AVIXA DISCAS image size standard for all room sizes
- ▶ Exceeds AVIXA ISCR image contrast requirement – for all viewers
- ▶ Optimised image brightness, designed for all-day viewing without eye strain (in conformance with the new WELL v2 Building Standard)
- ▶ Lightweight – can mount on any wall, even the largest sizes
- ▶ Reliable & easy to use
- ▶ Maintenance free

Specified by *image* performance



VISUAL DISPLAYS

Bundle code	Complete Laser Bundle Description	Image size (inches diagonal)	Image size (mm width x mm height)	Epson Projector Model (mount included)	Lens type	Projector lumens (max)	Installed Image Resolution (can also be installed as 1920 x 1200)	dnp Supernova ALR Screen Model	Image Brightness (max, cd/m²)	**ISCR Image Contrast
CLD/UST/STW/100/700	Compact Footprint, Fixed Screen	100	2214 x 1245	EB-700U	UST	4000	1920 x 1080 HD	STW	231	29
CLD/UST/STW/110/700	Compact Footprint, Fixed Screen	110	2435 x 1370	EB-700U	UST	4000	1920 x 1080 HD	STW	191	25
CLD/UST/STW/120/700	Compact Footprint, Fixed Screen	120	2651 x 1491	EB-700U	UST	4000	1920 x 1080 HD	STW	161	22
CLD/STL/SNC/100/510	Fixed Screen (semi-rigid)	100	2214 x 1245	EB-L510U	Standard	5000	1920 x 1080 HD	Core	462	39
CLD/STL/SNC/100/070	Fixed Screen (semi-rigid)	100	2214 x 1245	EB-L1070U	Standard	7000	4K enhanced *	Core	647	47
CLD/STL/SNC/110/510	Fixed Screen (semi-rigid)	110	2435 x 1370	EB-L510U	Standard	5000	1920 x 1080 HD	Core	382	34
CLD/STL/SNC/110/070	Fixed Screen (semi-rigid)	110	2435 x 1370	EB-L1070U	Standard	7000	4K enhanced *	Core	542	42
CLD/STL/SNC/120/510	Fixed Screen (semi-rigid)	120	2657 x 1494	EB-L510U	Standard	5000	1920 x 1080 HD	Core	290	31
CLD/STL/SNC/120/070	Fixed Screen (semi-rigid)	120	2657 x 1494	EB-L1070U	Standard	7000	4K enhanced *	Core	406	39
CLD/STL/SNO/100/510	Fixed Screen (with bezel)	100	2214 x 1245	EB-L510U	Standard	5000	1920 x 1080 HD	One	462	39
CLD/STL/SNO/100/070	Fixed Screen (with bezel)	100	2214 x 1245	EB-L1070U	Standard	7000	4K enhanced *	One	647	47
CLD/STL/SNO/110/510	Fixed Screen (with bezel)	110	2435 x 1370	EB-L510U	Standard	5000	1920 x 1080 HD	One	382	34
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CLD/STL/SNB/100/510	Fixed Screen (borderless image)	100	2214 x 1245	EB-L510U	Standard	5000	1920 x 1080 HD	Blade	462	39
CLD/STL/SNB/100/070	Fixed Screen (borderless image)	100	2214 x 1245	EB-L1070U	Standard	7000	4K enhanced *	Blade	647	47
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CLD/STL/SNF/100/510	Electric Drop-Down Screen	100	2214 x 1245	EB-L510U	Standard	5000	1920 x 1080 HD	Flex Classic	462	39
CLD/STL/SNF/100/070	Electric Drop-Down Screen	100	2214 x 1245	EB-L1070U	Standard	7000	4K enhanced *	Flex Classic	647	47
CLD/STL/SNF/120/510	Electric Drop-Down Screen	120	2612 x 1469	EB-L510U	Standard	5000	1920 x 1080 HD	Flex Classic	332	31
CLD/STL/SNF/120/070	Electric Drop-Down Screen	120	2612 x 1469	EB-L1070U	Standard	7000	4K enhanced *	Flex Classic	467	39

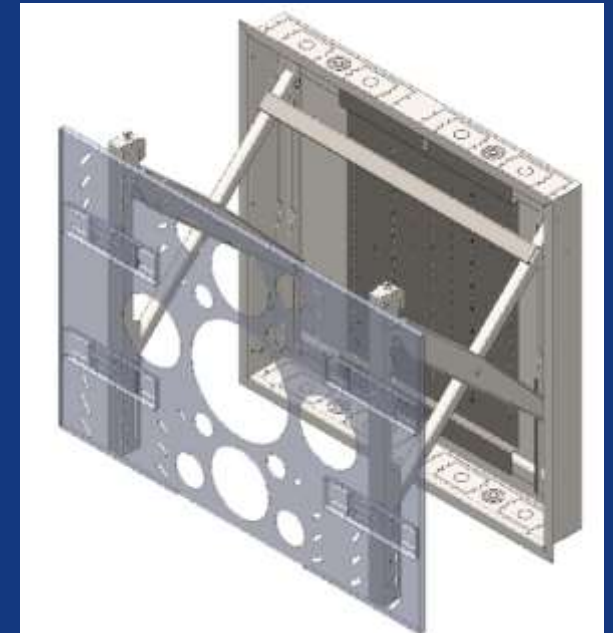
What size should my screen be? [Click here](#) for our 3-Step Guide to Display Success



* 4K pixel resolution, pixel shift technology.
 **Notional, at 150 lux downlight on-screen.
 (Min for BDM category = 15 : 1)

WALLMATE

- ▶ Total in wall solution
- ▶ Flexible mounting
- ▶ Displays from 55" through 100"+
- ▶ Order as kits
- ▶ With box = all at once one SKU
- ▶ Box separate / first



<https://visualdisplaysltd.com/solutions/technology/wallmate>

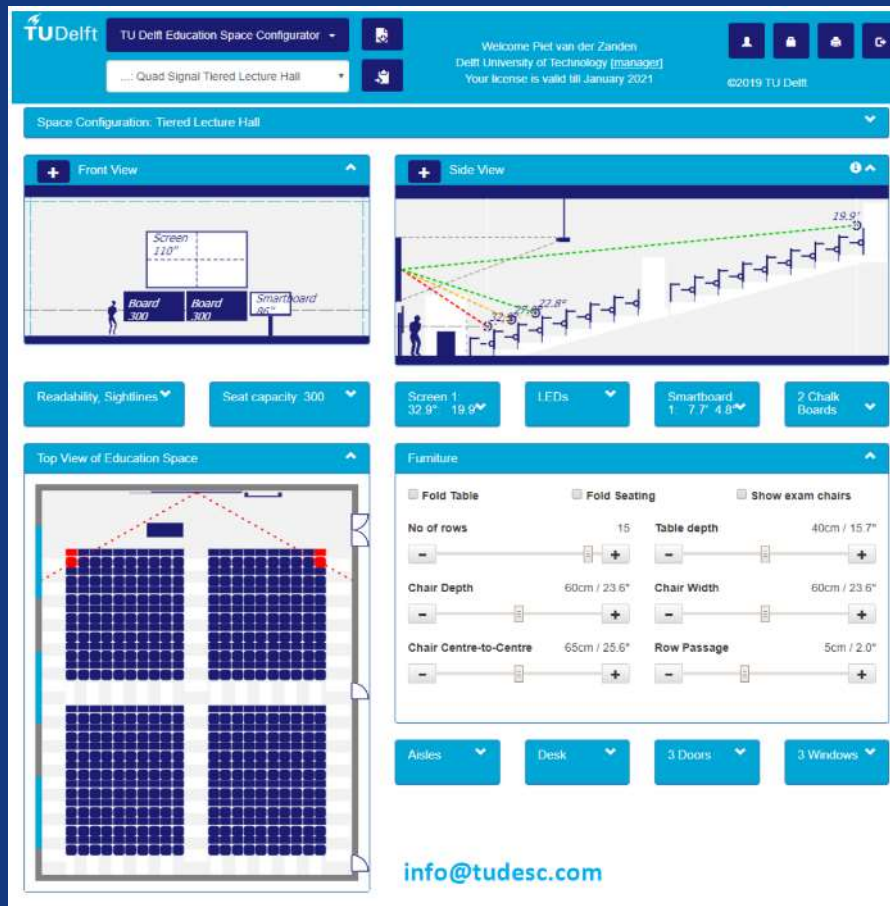
dvLED

- ▶ Indoor and Outdoor systems
- ▶ Huge range of resolutions
- ▶ Many brightness options
- ▶ Mounting and framing
- ▶ Full design and mechanical engineering service



TUDesc space configuration and management

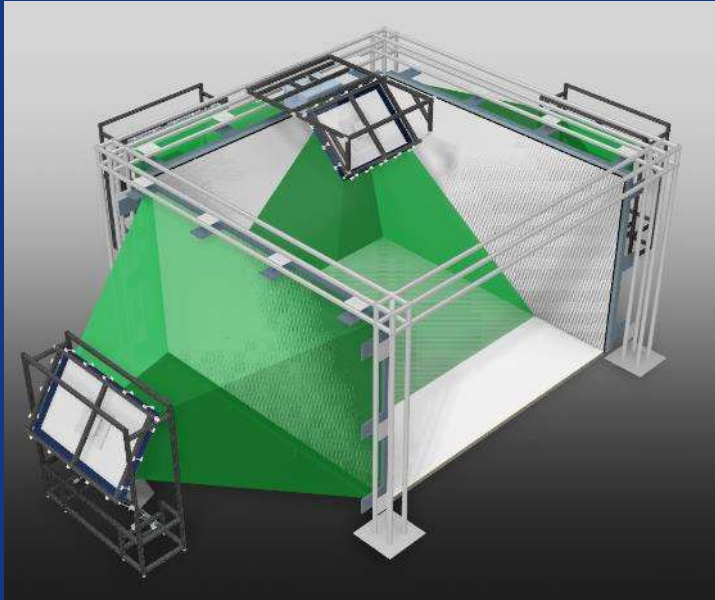
- ▶ Configure every element of teaching space
- ▶ Manage your estate with data and dashboards
- ▶ Social distancing for seating & traffic included
- ▶ **SPECIAL SUMMER OFFERS**



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CAVES



MULTI-PROJECTION



CURVED SCREENS



LARGE SCREEN
INTERACTIVE

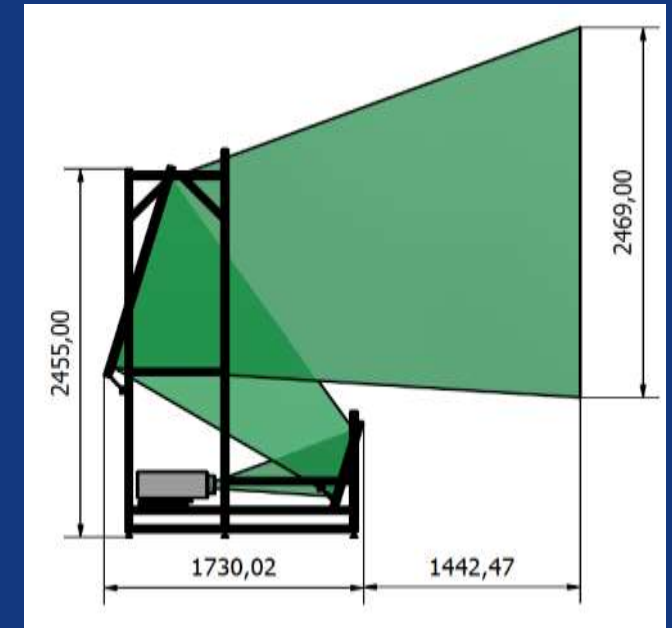
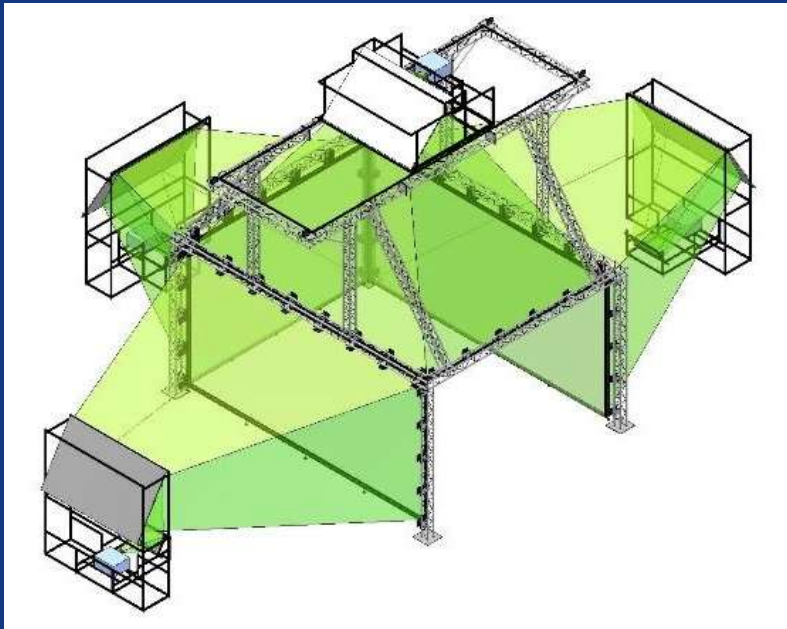


IMMERSIVE, SIMULATION, AR,
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- ▶ We turn your opportunities into success stories



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