



VISUAL DISPLAYS

Summer 2020 Webinar Programme

Standards Master Class for AV Consultants

DISPLAYS, LIGHT & ENVIRONMENTAL EXPERTISE
PRODUCTS, SERVICES, SPECIALIST CONSULTANCY

Presenter – Greg Jeffreys



- ▶ Managing Director, Visual Displays (formerly Paradigm AV)
- ▶ Specialisms include standards, displays, light & lighting, VC lighting, teaching space & meeting room design
- ▶ *Not an AV Consultant!*
- ▶ Chair, AVIXA Standards Steering Committee
- ▶ Task group member, AVIXA's new UX for AV Design standard
- ▶ Task group chair ANSI/AVIXA DISCAS standard – image size, resolution, viewing positions/angles, content size guidance
- ▶ Lead writer, PISCR image contrast standard – and new ISCR standard task group
- ▶ President of InfoComm/AVIXA 2012, board member 2008-13
- ▶ Former visiting lecturer, UMIST – post-grad MSc *Sustainable Electronic Building Design* (Prof Geoff Levermore)
- ▶ Proud associate of AV User Group!
- ▶ 2020 Outstanding Contribution Award – AV Technology Awards



VISUAL DISPLAYS

Poll questions

PLEASE KEEP QUESTIONS COMING DURING THE WEBINAR!

Today's objectives



- ▶ Management summary of relevant standards
 - ▶ Summary of existing and in-development AVIXA and ANSI/AVIXA standards
 - ▶ New UX standard and its use on campus
 - ▶ Summary of relevant environmental standards
 - ▶ Review of new WELL Building Standard V2
 - ▶ Radical new standard which can act as hub for all other relevant standards
 - ▶ Addresses wellbeing
 - ▶ Application for system sign-off, auditing & certification
- ▶ Post COVID implications and applications
- ▶ Provide follow up materials and resources
- ▶ Q&A

Background

- ▶ AVIXA Standards out of Best Practice group
- ▶ Appointed as ANSI SDO (Standards Development Organisation) 2008
- ▶ Good reaction to first published standards but limited adoption
- ▶ PERFORMANCE standards – NOT system specifications
 - ▶ ‘Start with the end in mind’
- ▶ ‘Standard’ has two meanings
- ▶ Easy to adopt
- ▶ ‘The Haiku Principle’. Just a handful of essential benchmarks and guidelines effectively needed from each.
- ▶ Adaptable – make them work for you, not the other way round!
- ▶ Calculators – tools – guides

Current AVIXA standards



- ▶ *A102.01:2017 Audio Coverage Uniformity in Listener Areas (Under Revision)*
- ▶ *4:2012 Audiovisual Systems Energy Management (Revised publication expected 2Q 2020)*
- ▶ *10:2013 Audiovisual Systems Performance Verification (Under Revision)*
- ▶ *J-STD 710 – 2015 (CTA/AVIXA/CEDIA) Audio, Video, and Control Architectural Drawing Symbols*
- ▶ *F501.01:2015 Cable Labeling for Audiovisual Systems (Under Revision)*
- ▶ *V202.01:2016 Display Image Size for 2D Content in Audiovisual Systems*
- ▶ *RP-38-15:2018 (IES/AVIXA), Lighting Performance for Small-to-Medium-Sized Videoconferencing Rooms**
- ▶ *3M-2011 Projected Image System Contrast Ratio (Revision V201.01 Image System Contrast Ratio – see below)*
- ▶ *F502.01:2018 Rack Building for Audiovisual Systems*
- ▶ *F502.02:2020 Rack Design for Audiovisual Systems (New Release!)*
- ▶ *RP-C303.01:2018 Recommended Practices for Security in Networked Audiovisual Systems*
- ▶ *2M-2010 Standard Guide for Audiovisual Systems Design and Coordination Processes (Under Revision)*
- ▶ *TR-111.01 Unified Automation for Buildings*

Systems Design and Coordination



- ▶ **2M-2010 Standard Guide for Audiovisual Systems Design and Coordination Processes (Under Revision)**
- ▶ This Standard provides a framework for the methods, procedures, tasks, and deliverables typically recommended or applied by industry professionals in the design and implementation of audiovisual communication systems. The framework enables clients and other design and construction team members to assess whether responsible parties are providing expected services. The revision will define minimum documentation requirements for audiovisual systems design.
- ▶ <https://www.avixa.org/standards/Standard-guide-for-audiovisual-systems-design-and-coordination-processes>
- ▶ Handbook - https://store.avixa.org/CPBase_item?id=a13f200000C2iPzAAJ
- ▶ Documentation sample - https://avixa.azureedge.net/portal/docs/default-source/default-document-library/avprojectdocsample_fullcontents.pdf

Systems Performance Verification



- ▶ **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

Audio #1 – Audio Coverage Uniformity



- ▶ **A102.01:2017 Audio Coverage Uniformity in Listener Areas (Under Revision)**
- ▶ This Standard defines measurement requirements and parameters for characterizing a sound system's coverage in listener areas. It provides performance classifications to describe the uniformity of coverage of a sound system's early arriving sound with the goal of achieving consistent sound pressure levels throughout defined listener areas.
- ▶ <https://www.avixa.org/standards/audio-coverage-uniformity-in-listener-area>
- ▶ WEBINAR - <https://www.avixa.org/insight/webinars/Details/what-you-need-to-know-about-the-revised-audio-coverage-in-listener-areas-standard/>
- ▶ UPDATED VERSION DUE IN PUBLIC REVIEW THIS SUMMER

Audio #2 - Spectral balance in development

- ▶ A103.01 Sound System Spectral Balance
- ▶ This Standard defines a measurement and verification process for sound system reproduction of spectral balance, also known as uniform frequency response, accomplished by documenting the frequency response from the sound system across a specified bandwidth within a low- to high-frequency range within the listening area.

Audio #3 Sound System Dynamic Range in development



- ▶ A104.01 Sound System Dynamic Range
- ▶ This Standard provides a procedure to measure and classify the dynamic range, or signal-to-noise ratio, of early arriving sound from a sound system across a listener area.

Energy

- ▶ **4:2012 Audiovisual Systems Energy Management (Revised publication expected 2Q 2020)**
- ▶ This Standard defines processes and requirements for ongoing power-consumption management of audiovisual systems. The revision uses a tiered conformance approach. Audiovisual systems conforming to this Standard will meet the defined requirements for automation, measurement, and analysis will vary based on each tier.
- ▶ <https://www.avixa.org/standards/energy-management-for-audiovisual-systems>
- ▶ ROI worksheet available from above link
- ▶ Energy Management Plan available from above link
- ▶

CAD symbols

- ▶ **J-STD 710 – 2015 (CTA/AVIXA/CEDIA) Audio, Video, and Control Architectural Drawing Symbols**
- ▶ This Standard defines architectural floor plan and reflected ceiling plan symbols for audio, video, and control systems, with associated technologies such as environmental control and communication networks. It also includes descriptions and guidelines for the use of these symbols.
- ▶ <https://www.avixa.org/standards/audio-video-and-control-architectural-drawing-symbols>
- ▶ Symbol files - https://store.avixa.org/CPBase_item?id=a13f200000C2iQdAAJ

Cable Labelling

- ▶ **F501.01:2015 *Cable Labeling for Audiovisual Systems (Under Revision)***
- ▶ This Standard defines requirements for audiovisual system cable labeling for a variety of venues. It provides requirements to easily identify all power and signal paths in a completed audiovisual system to aid in operation, support, maintenance, and troubleshooting.
- ▶ <https://www.avixa.org/standards/cable-labeling-for-audiovisual-systems>

DISCAS

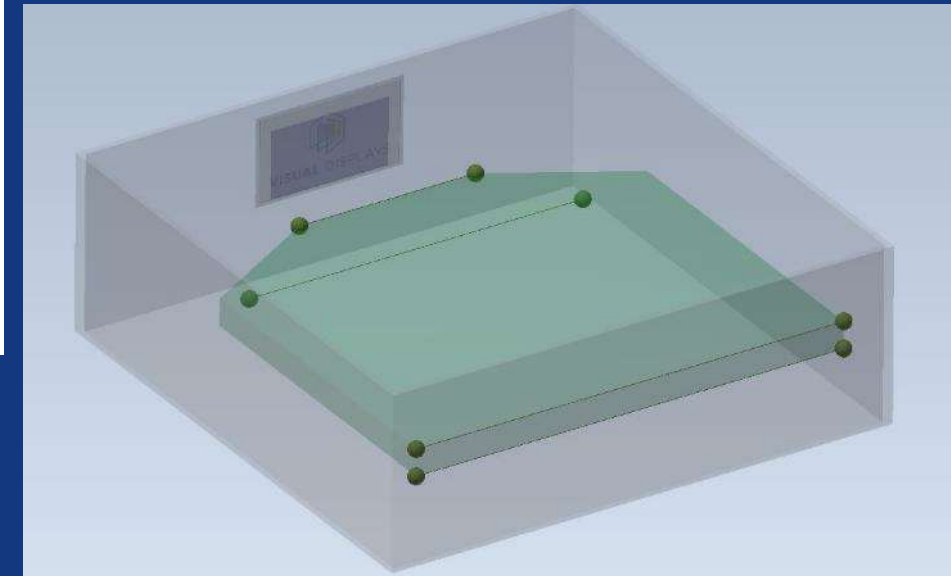
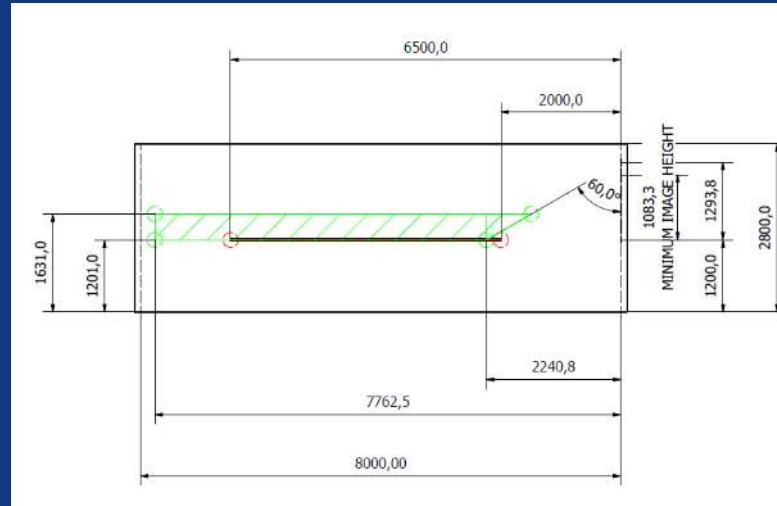
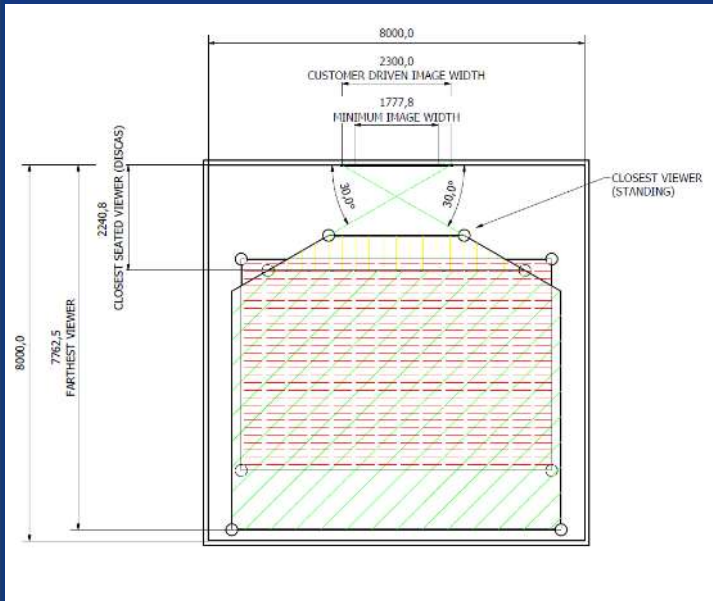
- ▶ **V202.01:2016 Display Image Size for 2D Content in Audiovisual Systems**
- ▶ This Standard determines required display image size and relative viewing positions based on user need. It can be used to design a new space or to assess/modify an existing space, from either drawings or the space itself. It applies to permanently installed and temporary systems. The Standard does not apply to the performance or efficiency of any component. A [free online calculator](#) is available for ease of conformance (one-time registration).
- ▶ <https://www.avixa.org/standards/display-image-size-for-2d-content-in-audiovisual-system>
- ▶ Online calculator - <https://www.avixa.org/standards/discas-calculators>
- ▶ Offline calculator - <https://visualdisplaysltd.com/resources/useful-calculator-tools>
- ▶ Delft Uni DISCAS tool - <http://homepage.tudelft.nl/9c41c/Readability/ReadabilityTool4EducationSpaces.htm>

DISCAS CAD tools

Formulae in parametric 3D CAD (+ renderings)



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VC lighting

- ▶ **RP-38-15:2018 (IES/AVIXA), *Lighting Performance for Small-to-Medium-Sized Videoconferencing Rooms****
- ▶ This Standard provides parameters and performance criteria for lighting small-to-medium sized single-axis videoconferencing spaces (maximum of 25 participants), defined as one set of video displays and cameras oriented toward a group of seated participants, providing technical and practical requirements to assist practitioners who configure and specify lighting systems specific to videoconferencing projects.
- ▶ <https://www.avixa.org/standards/recommended-practice-for-lighting-performance-for-small-to-medium-sized-videoconferencing-rooms>

PISCR

- ▶ **3M-2011 Projected Image System Contrast Ratio (Revision V201.01 Image System Contrast Ratio – see below)**
- ▶ This Standard defines projected image system contrast ratio and its measurement. Four contrast ratios based on four categories of content-viewing requirements are defined. Practical metrics to measure and validate the defined contrast ratios are provided.
- ▶ <https://www.avixa.org/standards/image-system-contrast-ratio>
- ▶ Related tools - <https://visualdisplaysltd.com/resources/useful-calculator-tools>

15:1 contrast

Make it happen!

- ▶ Example 120" image
- ▶ Normal lighting scenario
- ▶ 15:1 image contrast impossible with standard screen
 - ▶ Easy with dnp ALR(ambient light rejecting) material!
 - ▶ 3 x better is typical with dnp – up to 7 x better
- ▶ Try it yourself - <http://pdf.dnp.dk/html/>

Change to US unit ▶

Copy information from scenario 1 to 2 ▶

Image brightness needed based on best estimates:		
Ambient brightness level in the room	ALR	?
Ambient brightness level on the screen surface	ALS	?
Screen reflectance factor	SRF	?
Contrast level needed in final image	ICR	?
Projector checkerboard contrast	C	?
Ambient light reflected back to the audience	R	
Image brightness needed based on best estimates	B	
Maximum brightness allowed to be "eye-gonomical"	Bmax	

Scenario 1		Scenario 2	
500	LUX	500	LUX
150	LUX	150	LUX
25.0	%	5.0	%
15.0	:1	15.0	:1
120	:1	120	:1
37.5	NIT	7.5	NIT
600.0	NIT	120.0	NIT
477.5	NIT	477.5	NIT

Projector brightness needed for the actual screen size:	
Image height	Set size ▼
Image width	
Image area	
Peak gain	?
Gain efficiency for horizontal viewing position	?
Gain efficiency for vertical viewing position	?
Effective gain in viewing position	
Effective (net) projector brightness needed	PBN

Scenario 1		Scenario 2	
1,493	mm	1,493	mm
2,657	mm	2,657	mm
3.97	m2	3.97	m2
1.00		1.00	
94	%	73	%
94	%	69	%
0.88		0.50	
8,462	lum	2,969	lum

Dimensioning the projector(s):	
Loss for start-up adjustment of colours	?
Number of projectors	
Blending zone	?
Lamp efficiency	?
Brightness need adjusted for start-up adjustment of colours	
Brightness need adjusted for loss for edgeblending	
Brightness need adjusted for loss due to lamp decay	
Specified (gross) projector brightness needed	PBG

Scenario 1		Scenario 2	
15	%	15	%
1		1	
100	%	100	%
90	%	90	%
9,956	lum	3,493	lum
9,956	lum	3,493	lum
11,062	lum	3,881	lum
11,062	lum	3,881	lum



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Image luminance ('brightness')

- ▶ You need the 'Goldilocks Effect' – not too dark and DEFINITELY not too bright (FPD, dvLED etc)
- ▶ Observe Task Luminance Ratio
- ▶ Use our calculators
- ▶ Monthly display specification webinars



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

ISCR – in public review

- ▶ V201.01 Image System Contrast Ratio (In Public Review as of December 2019)
- ▶ This Standard defines contrast ratios based on user viewing requirements. It is designed to facilitate informed decision making for any display, projector, and screen selection, relative to location and purpose. It applies to permanently installed systems and live events; front and rear projection, and direct view displays.

Rack building & design

- ▶ **F502.01:2018 Rack Building for Audiovisual Systems**
- ▶ *This Standard defines requirements for building audiovisual equipment racks which are defined as assembly of rack(s), mounting of audiovisual equipment and accessories, cable management, and finishing.*
- ▶ <https://www.avixa.org/standards/rack-building-for-audiovisual-systems>
- ▶ **F502.02:2020 Rack Design for Audiovisual Systems (New Release!)**
- ▶ This Standard defines minimum requirements for the audiovisual rack planning and design process including required process inputs and outputs. Key performance criteria validate the impact to internal and external integration with the facility requirements.
- ▶ <https://www.avixa.org/insight/articles/Details/a-behind-the-scenes-look-at-avixa-s-new-rack-design-standard/>
- ▶ <https://www.avixa.org/standards/rack-design-for-av-systems>

Network security

- ▶ **RP-C303.01:2018 *Recommended Practices for Security in Networked Audiovisual Systems***
- ▶ This Recommended Practice provides guidance and current best practices for securing networked audiovisual systems including how to recognize risks and develop a risk mitigation management plan to address those risks.
- ▶ <https://www.avixa.org/standards/recommended-practices-for-security-in-networked-audiovisual-systems>

Unified Automation for Buildings



- ▶ **TR-111.01 *Unified Automation for Buildings***
- ▶ This Technical Report provides a detailed overview of the building automation environment and identifies the need for a unified set of standards to integrate multiple building systems, including but not limited to traditional Building Automation Systems (BAS), into cohesive and functional systems and/or sub-systems for increased benefits.
- ▶ <https://www.avixa.org/standards/unified-automation-for-buildings>

Standards in development



- ▶ V201.01 Image System Contrast Ratio (In Public Review as of December 2019)
- ▶ A103.01 Sound System Spectral Balance
- ▶ A104.01 Sound System Dynamic Range
- ▶ UX701.01 User Experience Design for Audiovisual Systems

User Experience Design for AV Systems



- ▶ UX701.01 User Experience Design for Audiovisual Systems
- ▶ This Standard defines processes that optimize user experience for audiovisual-equipped spaces. Processes include user engagement, design, testing, deployment, and continuous refinement.



VISUAL DISPLAYS

Any questions about AVIXA
standards?

WELL Building Standard v2™



IWBI delivers the cutting-edge WELL Building Standard™, the leading global rating system and the first to be focused exclusively on the ways that buildings, and everything in them, can improve our comfort, drive better choices, and generally enhance, not compromise, our health and wellness.

- ▶ This standard captures every aspect of building and user wellbeing and management
- ▶ Provides 'hooks' into AV standards
- ▶ Powerful tool to work with senior management and other stakeholders
- ▶ Helps 'silo conflict' such as lighting damaging display performance – and learning outcomes
- ▶ <https://v2.wellcertified.com/v/en/overview>



AQAV – AV9000



- ▶ Focus on good processes
- ▶ Obviating the snagging list
- ▶ Good reception from AV User Group
- ▶ US-based
- ▶ Current work on adapting to UK building codes and related standards



- ▶ Possible system for helping your framework integrators

AQAV – Observational & meter testing modes

- ▶ Practical approach:
 - ▶ Structured observational certification (your teams)
 - ▶ Measurement/formal sign-off (e.g. pre-handover requirement for integrators or 3rd party certification?)





VISUAL DISPLAYS

Specialist manufacture, distribution, services.
Supporting HE framework integrators to excel.

DISPLAYS, LIGHT, ENVIRONMENTAL & STANDARDS EXPERTISE

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 sub-consultancy to AV consultants

Ambient light rejecting screens

...best known for dnp Supernova



dnp
Supernova
08-85

dnp
Supernova
20-25

Standard white
Da-Lite
gain 1

See full Gary
Kaye ISE
video here -

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

<https://www.dnp-screens.com/>

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*



Projects



TV STUDIOS



RETAIL & SIGNAGE



INTERACTIVE
DISPLAYS,
FLOORS –
ANYTHING!



PEPPER'S GHOST

We specialise in challenging projection projects



UNUSUAL SHAPES &
SIZES



CONTROL
ROOMS



LARGE SCREEN
INTERACTIVE

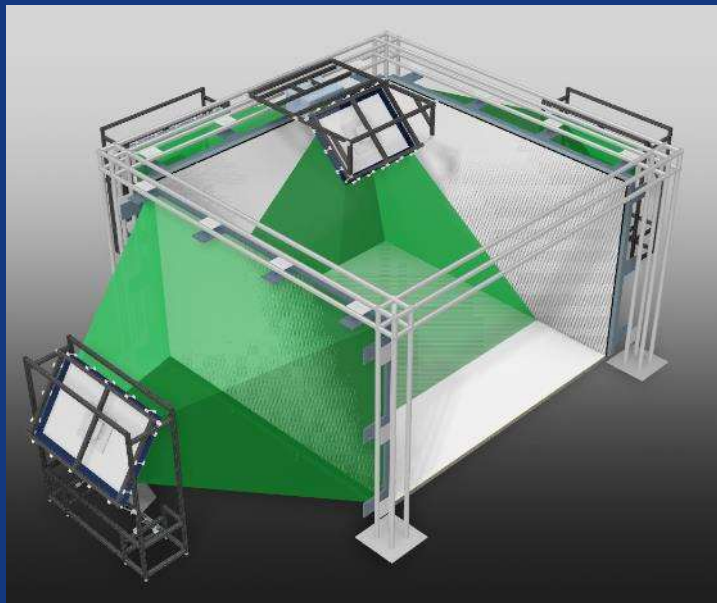


SHOPPING
MALLS

Immersive displays



VISUAL DISPLAYS



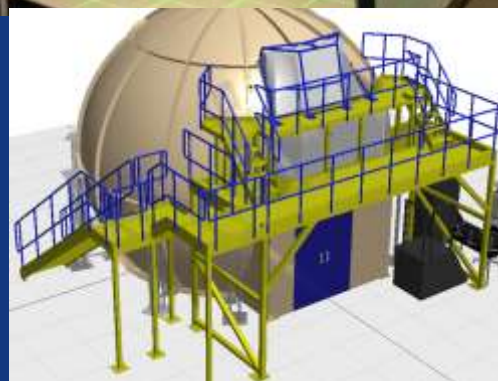
CAVES



CURVED SCREENS



CURVED
EAR



LARGE SCREEN
INTERACTIVE



IMMERSIVE, SIMULATION, AR,
VR, CR etc

Mirror systems



VISUAL DISPLAYS



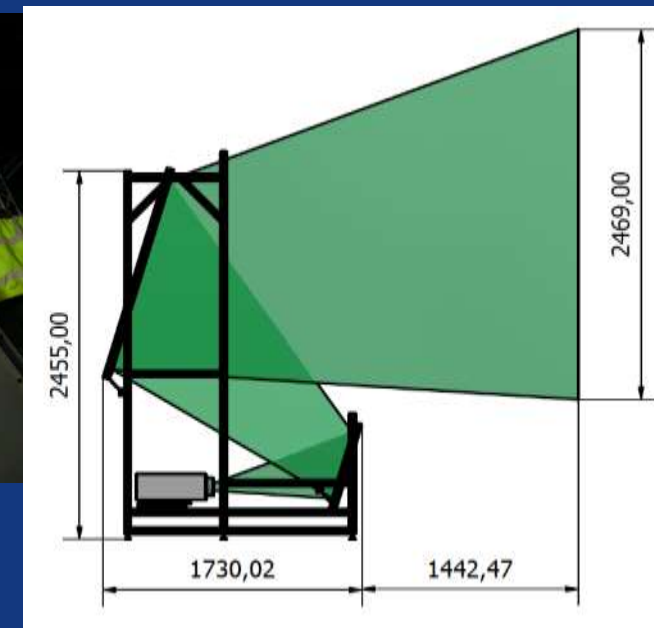
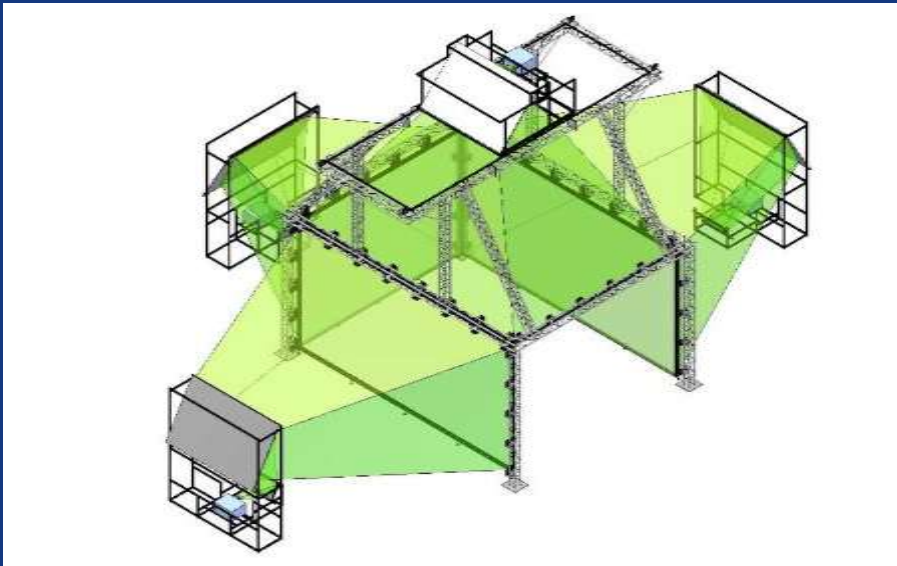
MIRROR RIGS,
FLOOR PROJECTION



MULTI-PROJECTION

World-leading 3D CAD design and bespoke manufacture

- ▶ Full support for consultants
 - ▶ Full design & CAD
 - ▶ Unique system specification ref for tenders



Social distancing space configurator

Complete space configuration and management

TU Delft TU Delft Education Space Configurator

Welcome Piet van der Zanden
Delft University of Technology (manager)
Your license is valid till January 2021

©2019 TU Delft

Space Configuration: Tiered Lecture Hall

Front View

Screen 110"
Board 300
Board 300
Smartboard 60"

Readability, Sightlines
Seat capacity: 300

Side View

Screen 1: 32.9" / 19.8"
LEDs
Smartboard 1: 7.7" / 4.8"
2 Chalk Boards

Top View of Education Space

Furniture

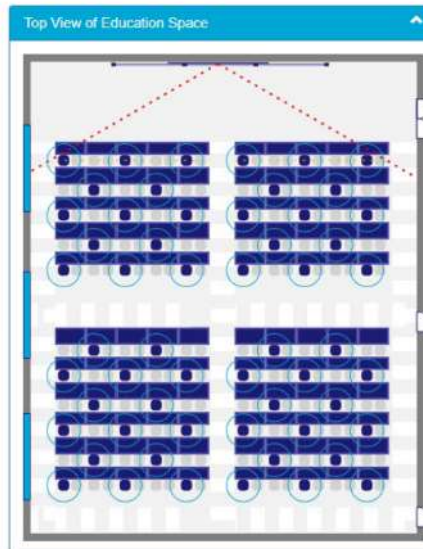
☐ Fold Table ☐ Fold Seating ☐ Show exam chairs

No of rows: 15
Table depth: 40cm / 15.7"
Chair Depth: 60cm / 23.6"
Chair Width: 60cm / 23.6"
Chair Centre-to-Centre: 65cm / 25.6"
Row Passage: 5cm / 2.0"

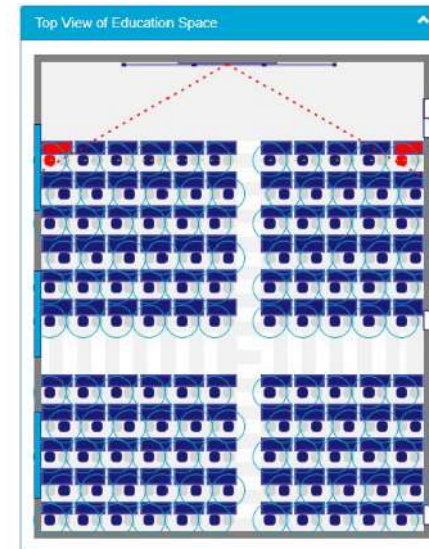
Aisles
Desk
3 Doors
3 Windows

info@tudesc.com

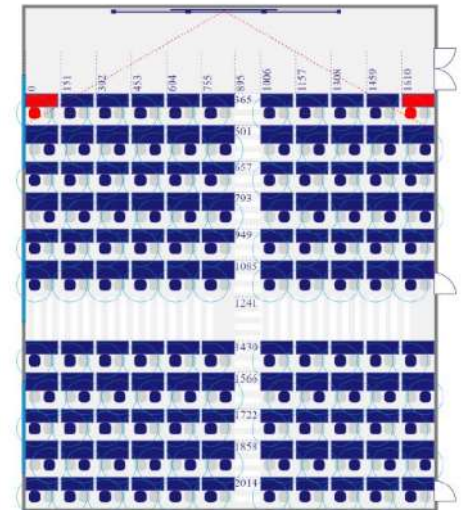
Social Distance with normally generated Seat Capacity (56)



Social Distance with optimized Seat Capacity (121)



Printed detailed Floorplan for facility instructions



Q & A



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