



## Bristol Data Dome: a new dimension in big data visualization



Housed in the At-Bristol Planetarium, the 98-seat Bristol Data Dome, is the UK's only stereo 3D hemispherical screen with 4K resolution. It is connected via the 30Gb/s fibre network to a high-performance computer housed at the University of Bristol which enables computing power to be utilised for visualising complex experiments, creating virtual reality environments and providing individual audience members with their own unique viewpoint.

Taking full advantage of these capabilities, power systems company Rolls-Royce has partnered with Bristol Is Open to utilise the Dome to demonstrate the features and capabilities of its latest aero jet engine, the Trent XWB, claimed to have the lowest emissions of any aero jet engine currently in production. The choice of Bristol as a showcase venue for the technology was particularly relevant as the city was European Green Capital in 2015. However, the functionality of the Dome was the main attraction for Rolls-Royce, which recently established Bristol as a new development centre for advanced fan system technology for the company's future aero-engines. Rolls-Royce has signed a three-year agreement to use the testbed facilities offered by Bristol Is Open, and is planning further events at the Dome in the coming 12 months.

Paul Stein, Chief Scientific Officer, Rolls-Royce, said, *"Visualising and creating value from a wealth of data is really important to us, and this partnership provides us with a great opportunity to tap into the Bristol and Bath area's rapidly growing innovative digital media capabilities. It's also a great opportunity to engage and inspire young people with immersive sound and vision experiences of our products and show them how exciting engineering can be."*



*Presentations can be made in a standard flat format using the HD conference projector with an HDMI connection; however the high-quality 3D projection system raises data visualisation to a whole new level.*

*Image courtesy of Rolls Royce*

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Rolls Royce's presentation was developed from its STEM (Science, Technology, Engineering and Mathematics) project, an international educational initiative aimed at building interest in those topics among young people. Originally produced in a linear 'flat' format, the Trent XWB presentation was developed into a 3D multi-media presentation specifically for exhibiting at the Dome, using Unity software – commonly used in the gaming industry.

Phil Winfield, Chief Executive, At-Bristol, said “Increasingly vast amounts of data are being generated in many fields, from healthcare to engineering, network performance to the environment and now the challenge is to analyse and interpret that data. At-Bristol's Data Dome is a unique canvas for data visualisation.”

Paul Wilson, Managing Director of Bristol Is Open agreed “Visualising data in a shared environment like the Bristol Data Dome enables people to identify new patterns, and jointly examine new ways of seeing the world, the city, and products and services.”

### Dome facts

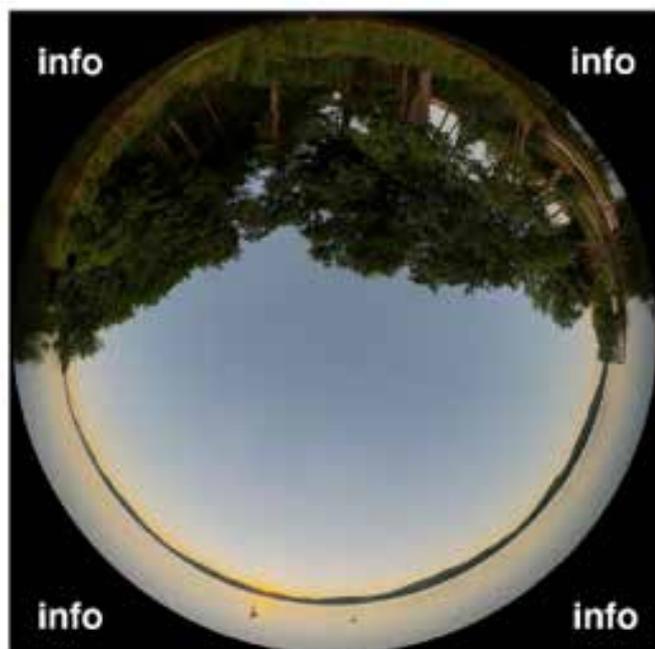
- One of the UK's highest resolution cinema environments.
- A screen that completely surrounds the audience in a full hemisphere.
- A shared space for virtual reality experiences.
- An entirely interactive environment
- A flexible space for R&D
- A unique space for the visual representation of data

### Technical specifications

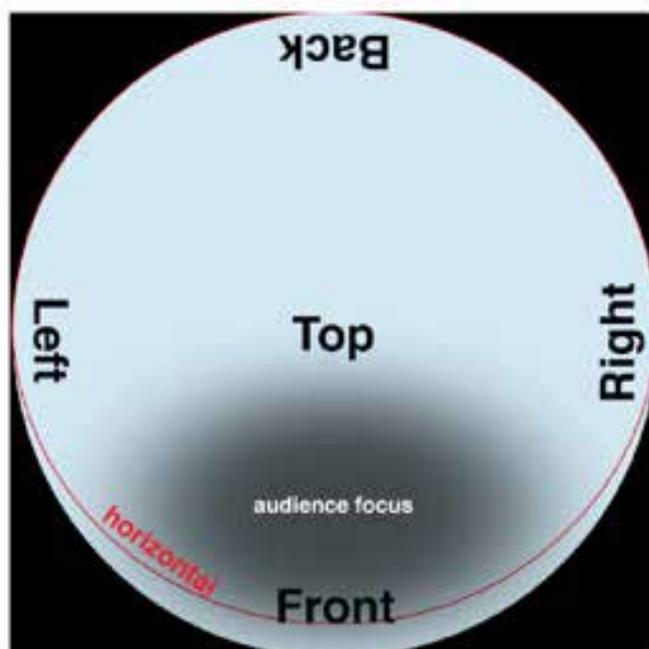
- 2x4k hemispherical screen at 120 Hz: A total of 2.1 billion pixels a second
- XPAND Active 3D system for a crisp stereo experience
- 7.1 surround sound audio
- 2x Christie boxer projectors at 30,000 lumens each
- 98 forward facing seats
- Chromacove cove lighting system
- Wing I/O video playback system
- Workflows for Unity and Unreal engines
- 2x 4k60 video capture via display port
- USB and Ethernet available from the dome for interactive control
- 3 presenter microphone channels with a choice of wireless handheld or over ear mics
- HD conference projector with HDMI connection for traditional presentation



Much effort has gone into making sure the Dome is a flexible as possible, making it relatively simple to adapt any type of content that plays back on a flat screen to full dome playback. It is possible to play correctly formatted linear media such as animation or films, or alternatively use a 3D engine like Unity or Unreal to create highly interactive experiences. The only requirement is that whatever content is produced, it must conform to the domemaster format.



*Domemaster image*



*Domemaster orientation*

The domemaster format specifies a circular image which fits perfectly inside a square frame. The bottom of the image is the front of the dome and the area where the audience's attention is focused. Resolution of the image is described by the resolution of the bounding frame. For example a circle inside a 4096 x 4096 frame is a 4k domemaster, even though only the pixels inside the circle will actually appear when projected. As only the circle is projected the corners of the frame are often used for information like timecode, copyright information or logos.

## Access

The Dome can be booked by people with a Bristol Is Open account at a rate of £1,000 per hour, which includes full technical support. If required, presentations can be reformatted by a number of Bristol-based companies specialising in appropriate file conversions.