DESIGN REVIEW EXPERIENCE

The **Design Review Experience** builds on the Theorem Solutions Visualization Experience, further enabling a group of engineers, local or in remote locations, to interactively review a design through the immersive experience of XR technologies, closing the cognitive distance for all involved, and providing a unique collaborative workspace.

Theorem Solutions has invested significantly to understand how **Spatial Computing**, or '**XReality**' (**XR**) technology can be exploited today to bring real business benefits to product development and manufacturing businesses. We have created a suite of task–orientated '**Digital Realities Experiences**' that get the most from the XR toolset, embedded with a suite of targeted tools to deliver the greatest gain.

Design reviews are a critical part of the product development lifecycle. Across the globe, engineers meet regularly, and at key programme milestones to undertake review activities such as:

- Release status and maturity (and identifying / reviewing gaps therein).

- Discussing known issues / anticipated issues.

- Detecting new issues (e.g. geometry clash issues, or manufacturing / service access problems).

- Resolving integration (interface) problems, including methodologies such as zone management / block management.

- Discussing proposed changes.

- Bringing together the necessary business functions to move decision making as far upstream in the development process as possible (avoiding costly changes late in the process).

However, product development has increasingly become an end–to–end digital lifecycle. Advances in computer aided engineering have helped to accelerate development, and reduce the expense of producing physical prototypes to aid review / issue detection, but arguably the downside is an increased gap between engineers and their creations – a disconnect between the digital data and the physical world. Psychologists refer to this gap as '**cognitive distance**'. This is both inefficient and introduces the risk of quality related problems downstream. When it comes to design reviews, it can prove difficult to apply physical context to digital data, and the performance of the event, particularly as it pertains to issue detection and the quality of the associated dialogue between peers, suffers as a result.

Commercial applications of VR, such as CAVES and Powerwalls, both expensive to deploy and operate, have helped larger organisations to close the cognitive gap. To date however, spatial computing, typically deployed in gaming and retail applications, has seen little application in product development. A new generation of low cost, widely available 'consumer' technologies, beginning with wearable VR technologies, has evolved to include **Augmented Reality** (**AR**), and **Mixed Reality** (**MR**) solutions.

Theorem Solutions Digital Realities
## *Closer | Better | Together*

'Theorem Solutions provides enabling technologies for engineering and manufacturing businesses to improve their design, engineering and manufacturing processes, by utilising existing digital assets to collaborate within innovative Virtual, Augmented and Mixed Reality Experiences'. Our goal has been to produce a technology agnostic collaboration platform for businesses of all sizes.

The Design Review Experience can bring distributed experts and practitioners together to review, debate and resolve issues in real-time, improving access, saving time, and avoiding costly travel.
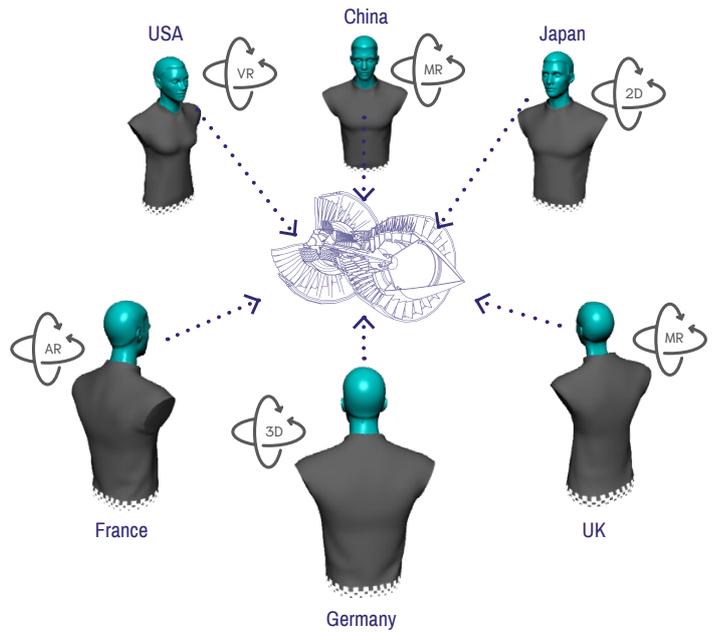

The **Design Review Experience** leverages the Visualization Experience, but further enables group of engineers, local or in remote locations, to interactively review a design through the immersive experience of XR technologies, closing the cognitive distance for all involved, and providing a unique collaborative workspace.
The Visualization Experience provides the essential tools to view, navigate, explode, section, and measure, in addition to interrogating materials and other information (including data pulled from external databases, and essentially maintaining the Bill–of–Materials, part meta–data, and motion replay; functionality that is not ordinarily possible with the gaming graphic engines that underpin XR technologies.
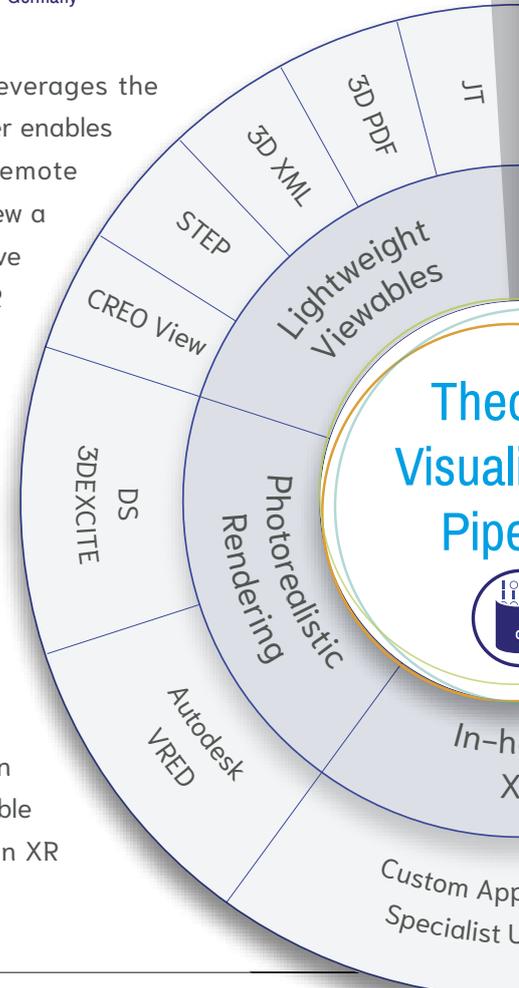
The Theorem Visualization Pipeline is a technology agnostic enhancement that can improve all Visualization approaches. The Digital Realities suite interfaces seamlessly to exploit the advantages of consumer VR technology.
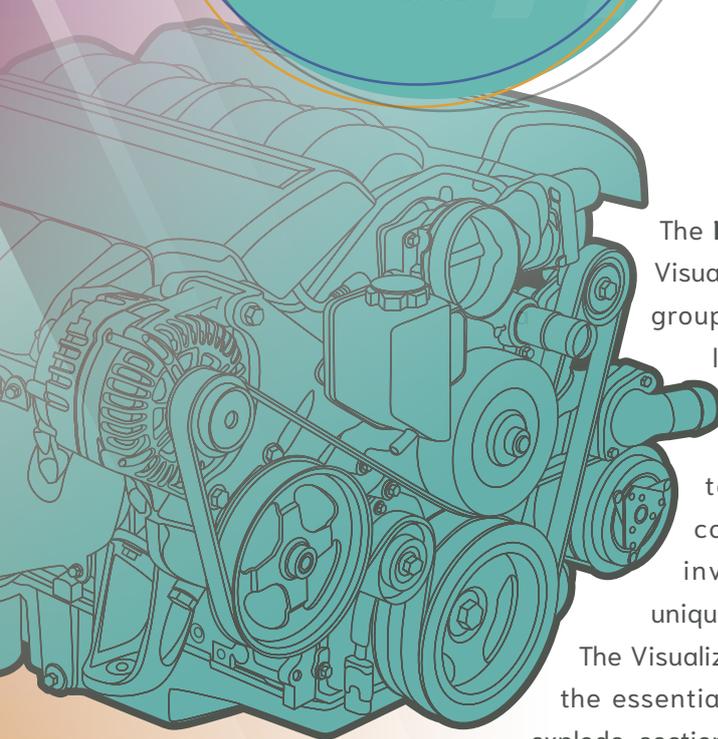
Importantly, the Design Review Experience process can be recorded in part or full, capturing comments and issues for wider cascade and use by other members of the extended team (including full management reports). This built-in capability allows participants to leave text notes, video, images and audio comments. Even the physical location of the participant, when the comment was captured, is recorded and displayed as an avatar when comments are played back at a later date. In this manner, invitees that were not able to attend the event can open saved sessions to see what was discussed, and what actions were agreed. They can then add their own comments for distribution to the extended team.

However, today's products are rarely developed with the luxury of co-located teams. The reality often involves collaboration across international borders. Globally distributed engineering is practically unavoidable, and this will increasingly place a challenge on effective collaboration between engineering teams. Exceeding the capabilities of significantly more expensive commercial VR solutions, the Design Review Experience has been developed with the goal of bringing globally distributed teams closer together. With the built-in collaboration functionality, the spatial context can be applied to the demonstration of a new idea to a colleague, or it can enable complete teams to come together to address a problem that would be tough to explain out-of-context. With AR and MR, teams in the same room will see each other through their devices. However, using any XR technology, distributed team members ca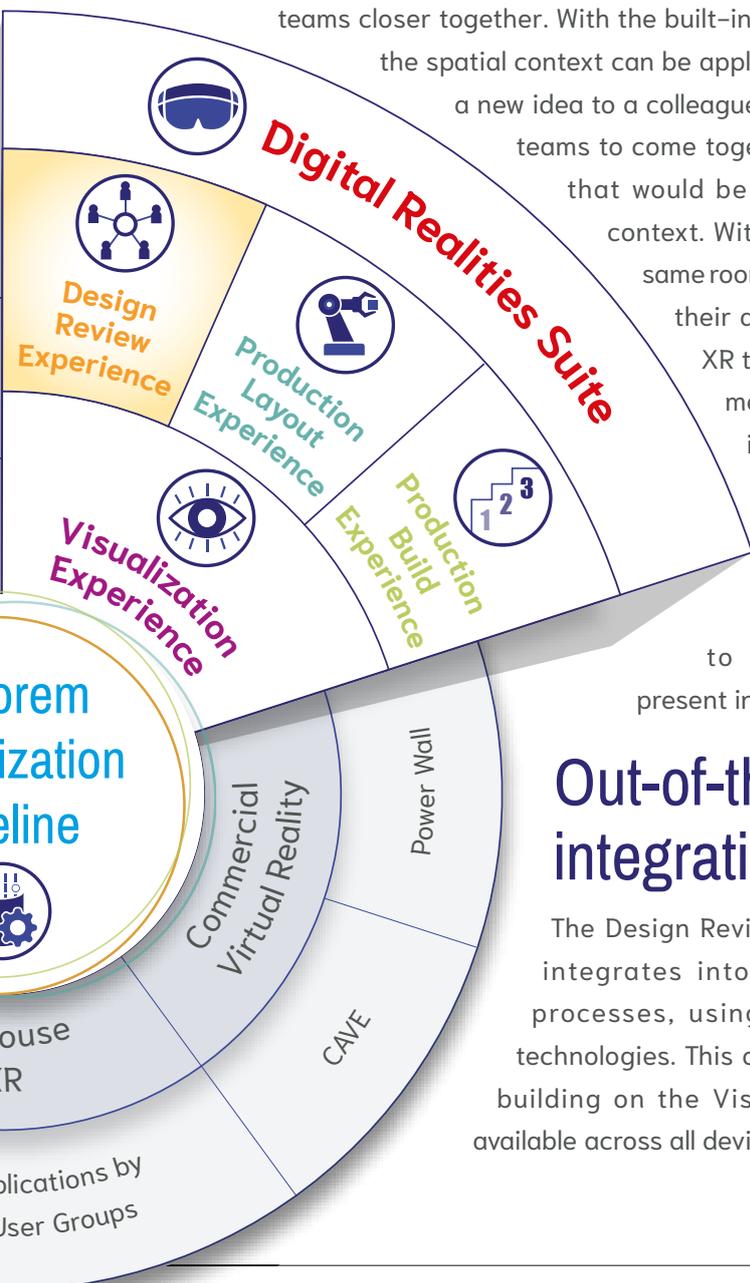n also be 'present' in the room, represented by a virtual avatar that moves as they do, and mimics their gestures – it's as close as currently possible to having them physically present in the room.
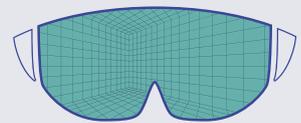
Out-of-the-box integration

The Design Review Experience seamlessly integrates into existing workflows and processes, using proven and robust XR technologies. This out-of-the-box experience, building on the Visualization Experience, is available across all devices.

Digital Realities Suite

Design Review Experience

Production Layout Experience

Production Build Experience

Visualization Experience

Commercial Virtual Reality

Power Wall

CAVE

About Theorem Solutions

Theorem Solutions have been helping engineering and manufacturing users leverage the value of their CAD and PLM assets for over 25 years. We help the world's leading Automotive, Aerospace, Defense, Power Generation, Transportation, and White Goods manufacturers and their end–to–end value chains to optimize the use of their Digital assets. Our solutions enable product development and manufacturing businesses to compress design and manufacturing lifecycles, whilst improving product quality. Our core strength is in the visualization and utilization of data across complex organizations to maximize efficiency.

Theorem Solutions offers a consultative approach to help customers get the most from technology. We advise on optimum use cases, deployment strategy, and custom development as required to maximize the Return on Investment.

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