



YELLOW WINDOW

Beyond Reality



Central to the digitalisation of Industry 4.0, production increasingly benefits from ‘digital twinning’. This real-time simulation and assessment of a virtual product leads to an improved development process for the ultimate physical realisation. The benefits to the rail industry are clear, but a lot of the potential remains untapped. Even as parties embrace digitalisation, not all improve their customer centricity or development processes to match.

Rail design expert Yellow Window shares its insights on what an ideal digital pipeline can look like to make the process better, faster and more collaborative.

What Is There to Improve?

Design is a step-by-step process that combines both analytical and creative techniques, with a multitude of

decisions taken throughout. Not all realise the value of this process or appreciate well-designed products as worthwhile investments. Many rail projects that take years to build to last decades in service, could well be born out of creative design trajectories of under three months.

We also experience that qualitative or intuitive attributes of design are hard to evaluate, making



Extended reality: presenting virtual solutions in real environments



Meeting in VR for better understanding and communication

fact-based decisions difficult. Thus, during these ‘three months’, the challenge is to give decision-makers the right information at the right time, with the most suitable visualisation technique, to maximise the success of this rapid initial process.

The rail design industry has long relied on computer-generated images as the only material to precede actual production. To validate end-user experience, present to the customer and test the product in real life, a 1:1 mock-up may be offered but is not always guaranteed.

Mock-ups in public transport have major shortcomings: they require a significant investment, have limited reach (user involvement) and mostly see the light as the design process nears its final stage. This makes them too late for actionable feedback with fundamental 3D changes becoming too expensive to implement.

Without a mock-up however, the preceding development processes offer limited immersion and not enough spatial information to support sound decision-making.

A Faster – But Better Process

As design trajectories become ‘3D’ in ever earlier stages, presenting a virtual or augmented experience can convey spatial and interactive information more effectively. Today, virtual and extended reality (VR & XR) are improving the process of creating, simulating and manufacturing designs. VR can offer convenience and a sense of reality, immersing oneself to fully understand

a space. A designer can immediately ‘feel’ the product or environment and customers can experience how a design would perform in a specific context. Starting with VR, but taking the interactive part further, digital twin technology can run in parallel with the total product development. The potential to create, design and alter products becomes infinite. In a ‘digital twin’, customers can take part in an interactive simulation in various scenarios to experience and interact with the space, all prior to production.

Digital twins provide feedback data and spot areas of concern, just like a mockup, but far sooner in the process, with more flexibility and at a much lower cost.

Unreal Workflow

Interacting with and adapting products in their entirety and context in real-time is a very powerful tool in the hands of a designer. As specialists in the use of participatory techniques in design processes, we also wanted a portion of this experience accessible to stakeholders.

To make the link between our typical 3D CAD workflow and a presentable real-time environment where stakeholders could also interact with the design, we chose the Unreal platform for its programmable potential and stunning realism. To aid our collaboration goals, Yellow Window required the development of interaction and communication features beyond what is available from Unreal.

Meet, Share and Co-design in VR

To benefit the quality of the design, and to provide clear added value to all stakeholders, Yellow Window strives to apply participatory techniques more often and at strategic points in the design process.

To that end, a client-facing platform was developed (with the help of fellow Antwerp digital agency Soulmade). Through this platform 3D designs and presentations can be shared with anyone invited – all in real-time, with the ability to join in a VR headset or directly from a desktop PC.

Beyond allowing designers to gather early feedback on their work, connecting stakeholders with the virtual and augmented reality design offers opportunities to reduce errors and save time.

The digital platform has infinite reach, allows for universal collaboration and improves decision-making. The involvement of a wider group of stakeholders and end-users no longer needs to wait for a mockup at the end of the process. Now, more concepts can be tested with more people – it's more collaborative, immersive and inclusive.

Yellow Window XR Tool: Real-Time Collaboration in 3D

Digital mockups (DMU) enable design teams (operators and OEMs) to:

- Use the platform for collaboration
- Exchange themselves and have virtual meetings in the 3D space
- Meet in VR for co-creation
- Enjoy (remote) access from anywhere in the world
- Have better integration of stakeholders and participatory techniques
- Replace prototyping (test ergonomics, leave comments)
- Take up less time / fewer resources
- Accelerate the design process from concept to engineering
- Have good content management (access, distribution, meetings)

“A realistic, virtual, multiplayer experience, in-person or



Where virtual reality (VR) shines in upfront definition and validation, augmented reality (AR) finds use cases in refurbishments where new interventions can be tested on-board

remote, that facilitates collaboration + co-creation in and around a 1:1 (vehicle) environment.”

YWXR STUDIO is a virtual prototyping tool that allows anyone to experience mobility concepts, streamlining the design process and even replacing the need for a mockup. Based on high-end visualisation software, the resulting image quality is stunning, while its virtual nature enables simulations impossible in a physical mockup.

When connected online, the software allows stakeholders (operators, OEMs or end-users) to see, experience and discuss interiors in real-time, from anywhere in the world. And its programmable nature allows for functionality or interactions to be virtually prototyped, allowing for faster iteration with fewer limits to who can co-design or critique during the process.

For an example of this software in action, watch our [video](#).

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