



Zero Density

The World's Most Photorealistic Virtual Studio and AR/XR Products

dock10



CASE STUDY

Zero Density & dock10



Creators of Visual Excellence:

dock10, the Award-Winning Facility behind some of the biggest shows on British televisions.

If you live in the UK, you've probably watched dozens of hours of television delivered by dock10. The full-service facility is home to popular **primetime entertainment and sports shows**. It's also the site of ten television studios including the UK's **biggest multicamera set**—a massive 12,540 square-foot space with the capacity for an audience of 1,000.

But that's not all dock10 is known for. In 2017, the team first crossed paths with Zero Density at IBC, where they saw how **Unreal Engine** could be used as a 3D renderer for real-time broadcast graphics. Before long, dock10 had become a **European pioneer of virtual studio technology, creating a whole production team that was fully dedicated to the medium.**



Today, that pioneering work has paid off. Each of dock10's ten studios is now capable of delivering **virtual or augmented content** with a thanks to a centralised technology solution and a **modular cyclorama system**. This gives the clients the option to film on both a traditional, virtual set or a hybrid of both; so talent can be captured everywhere from the real world to a 360-degree universe.

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Zero Density were the only people at IBC demonstrating an Unreal Engine-based solution. I could see that was the big game changer. And it probably took the rest of the industry two or three years to catch up to what Zero Density was doing, I still think that's apparent today.

—Richard Wormwell, Head of Production Innovation at dock10.

A 24-Hour Cyclorama

For their modular cyclorama, the dock10 team uses a **bespoke system using a combination of green drapes, 45° wedges and painted floorboards**. Because all the dock10 studio Cyc-tracks run at the same height, the curtain can quickly be installed in any studio depending on clients demand. It's the perfect solution, except for one thing: Unlike a full infinity curve cyclorama, a drapes, wedges and floor boards involve variations in material and tones of green. That means **obtaining a clean key can be a challenge**.

That's where Zero Density's Reality Keyer comes in. With support for 3D masks, Reality Keyer uses clean plate technology which is taking an image of the empty cyclorama to identify green variations **Reality Keyer** takes into account where each tone of green is located and can key up to **2 million shades of green**. That means that even with color variations on the green screen whether from shadows, transparent objects or different materials, **the final key is always clean and accurate for every frame**.





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The control and the flexibility that Reality Keyer offers is far better than anything else we saw on the market.

—Richard Wormwell, *Head of Production Innovation* at dock10.

Capturing 4K in Real-Time

Alongside the Reality ecosystem, dock10 also deploys Mo-Sys StarTracker camera tracking systems across the facility. Each unit feeding into one of 15 Zero Density Engines for real-time compositing. This allows the dock10 team to **blend physical and virtual elements seamlessly.**

RealityHub then ties everything together, enabling dock10 to manage **real-time data integration on a single web-based platform.** That means live stats can be used to drive everything from gameshow results charts to football scores during the broadcast so they are always up to date. RealityHub also gives the dock10 team the ability to use **third-party code from clients to integrate into their pipeline.** Whether the client needs to take over lighting through DMX or change the Q&A of a gameshow through their own software, feeding it into RealityHub is no problem.

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We started out with 5 channels to deliver against our sports commitments; we've now have 15 channels and are looking to expand further. Without Zero Density and the flexibility that virtual studio production offers, I don't know whether we would be where we are at this point.

—Richard Wormwell, *Head of Production Innovation* at dock10.





Forging a New Creative Future

Today, dock10 has gone from being **one of the first studios in the UK to offer virtual sets** for anyone brave enough to try something new, to filming thousands of live and pre-recorded hours of virtual studio shows every year.

So far, the technology has enabled the team to do much more than just create photoreal 3D backdrops. By using a **Flycam** effect, for example, anyone filming on a smaller budget can expand their space by seamlessly **switching from a real camera to a virtual one inside the 3D world**, making wider shots possible. While pulling the camera out, the dock10 team dynamically **masks other cameras, so they do not show on the screen**.

Clients using virtual sets can also take advantage of **3D animated characters** with the ability to interact with on screen talent while being broadcast live. To do this, the dock10 team uses a full-body **Xsens motion-capture suit and facial-capture software** to track anything from a smile to a raised hand. All movements are **tracked in real time and connected into the Reality ecosystem** so that any 3D characters designed by the team can appear with in virtual or real sets.

As dock10 **looks to the future**, virtual studios play a key part in their mission to attracting a global clientele by creating extraordinary content for any audience.