

KOMODO

AR WITHIN THE MANUFACTURING INDUSTRY

How companies within the manufacturing industry adopt Augmented Reality to improve production processes and overall efficiency.

— WHITE PAPER
AUGMENTED REALITY



WHAT'S IN THIS WHITEPAPER

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Estimated reading time: 20 mins

01 — ABOUT US

WHY LISTEN TO US?

In specialised sectors, we redefine digital success through innovation and understanding.

Since 2003, KOMODO has been at the forefront of digital transformation in the North East. As a creative product studio, we've helped guide businesses in traditional sectors like manufacturing to embrace the power of digital. Across our team we have experts in design and development who use any and all techniques to achieve commercial success – there are no tools or approaches we haven't explored.

But what we use in your project depends entirely on you. You don't want to be the same as everyone else – your business is unique, so slapping a product together using the same features as your competitors is never a good idea. Instead, we bring our expertise to your table and help you understand who your customers are, what their needs look like, and how digital technologies can solve them.



KOMODO digital studio.

01 — ABOUT US

We suggest creative ideas alongside a structure-led approach, so you benefit from big ideas, intelligent time investment and detailed problem-solving. To do this, we follow a time-honed process – and if AR isn't right for your users, we'll tell you straight.

01

UNDERSTAND

We get to know you and your business, then go deeper to identify your users and their behaviour – what their needs are and how your business may serve them.

02

DEFINE

We take the knowledge from understanding and define your project scope, so you'll know exactly what we propose creating and how long it will take.

03

IDEATE

Our team comes up with the features and functionality required to take your product to the next level.

04

CREATE

We work in Agile sprints to get your product ready for customers as soon as possible.

05

REFLECT

Once live, a product roadmap continues to evolve – learning from data and iterating based on user feedback and requirements.

02 — INTRODUCTION

AN INTRODUCTION TO AR IN MANUFACTURING

This whitepaper outlines how companies in the manufacturing industry are adopting AR to improve their production processes and overall efficiency.

When we first created this whitepaper, AR was an emerging technology with a range of benefits and challenges. In 2022 it's still a growing field, perfect for driving innovation and experimentation. AR is perhaps best recognised in consumer tech through camera apps like Snapchat – seeing an AR model in the viewfinder as though it were really there.

Despite slow consumer uptake, AR has made a big impact in commercial sectors. Overlaying graphics on the real world through devices like the Microsoft HoloLens lets users follow complex, step-by-step instructions in real time – negating lengthy training and the memorisation of procedures. Boeing and others were early adopters, and the design phase benefits too, with Alstom and Ford collaborating in 3D before building physical prototypes.

\$1.5tn

the value PwC predicts VR and AR could add to the global economy by 2030 – while early adopters report training that's 30–40% more efficient at a tenth of the cost.

02 — INTRODUCTION

How AR Drives Results in Manufacturing

Implementing AR may seem like a far-flung idea, but the tangible benefits are hard to ignore. In an industry where innovation leapfrogs a business to success, AR facilitates:

Efficient Training

AR gives more freedom and flexibility when training new employees – you can ‘see through their eyes’ and guide them through tasks. Boeing uses wearables to help technicians wire aircraft by displaying the full wiring map in an AR representation.

Workflow Improvement

Through better training and tools that remove distraction, AR improves overall workflow. Some manufacturers use AR-ready glasses to keep workers focused at their assembly stations, giving crucial information without going elsewhere.

Collaborative Product Design

AR lets teams collaborate more readily on product design. End customers can use it too – seeing a representation of a product and selecting options before purchase.

AR Adoption & User Experience

The main factor in adoption is the UX of the products and how quickly users can pick up an AR device. Concerns around bulky hardware and technical glitches remain barriers to widespread adoption – especially when they affect the bottom line.



A HoloLens engineer on a service call.

03 — APPLICATION

SERVICING & MAINTENANCE

AR is increasingly finding its stride with companies looking to implement it. Where maintenance relies on field workers and manuals, AR delivers greater efficiency and on-the-ground insight – triaging requests ahead of a call and enabling hands-free, remote guidance on site.

Thyssenkrupp

When Thyssenkrupp began using Microsoft's HoloLens in servicing, they reduced the average service-call length by 4x. Dropping the laptop kept technicians' hands free; before a site visit they could view a 3D model of the elevator and zoom into individual components, with training and on-hand technical info. Skype integration allowed live calls to experts for a second opinion. Since 2016 this success has led to lasting support – in 2018 they used 'HoloLinc' to help homeowners visualise stairlifts, and as of 2022 continue rolling out 24,000 headsets.

Mitsubishi Electric

Mitsubishi Electric developed similar maintenance support with AR glasses that use a 3D model generated by scanning objects with a wearable camera, providing check procedures for the scanned object; workers enter results by voice and are prompted to re-enter ambiguous data. In 2022 their Polish branch took it further with TeamViewer via HoloLens, digitising shop-floor support so technicians can guide workers through fixes from anywhere – hands-free.



An augmented UI featuring instructions and solutions.

04 — ASSEMBLY

COMPLEX ASSEMBLY & TRAINING

AR has been eagerly adopted into varying production processes. Assembly is always precise and complicated – a jet engine, phone or vehicle involves assembling hundreds or thousands of components, each new product needing a new set of instructions.

Boeing

Boeing has implemented AR wearables into manufacturing for some years. Since 2018 it has used AR to give technicians interactive 3D wiring diagrams – with over 130 miles of wiring per aircraft, any support was welcome. Traditionally technicians relied on manual drawings; with Google Glass and Upskill Skylight they could instead see a 3D model overlaid on the aircraft showing installation points and in-depth wiring renderings.

Technicians can also bring in remote help, granting ‘see what I see’ access via Google Glass’s camera and voice input. In a 2015 study, AR participants were 30% faster and 90% more accurate on their first tries. In 2018 the Google Glass and Upskill Skylight process delivered a 90% improvement in first-time quality and a 30% reduction in time per job – and Boeing reported it cut error rates to zero.

04 — ASSEMBLY

Volvo

When we first wrote this whitepaper, Volvo took its first steps in AR with Microsoft HoloLens on the assembly line, letting workers view assembly instructions digitally rather than consulting physical or PDF manuals – keeping them focused without leaving the workstation. Since then it has experimented widely, and in 2021 invested through its Volvo Cars Tech Fund in start-up Spectralics, which makes a thin optical film for windshields, aiming for an AR-ready car windshield.

Japan Airlines

Japan Airlines built this software into their training programme, with a scalable 3D model of a jet engine and other components that trainees can study element by element – scaling the engine to life-size 1:1 to see in detail how it works. JAL has also used AR to promote flights between London and Tokyo, with a large AR-ready display placing the audience among graphics symbolic of Japan, such as falling cherry-blossom leaves.



AR-guided step-by-step solution.

DESIGN & COLLABORATION

From a product-design perspective, AR helps manufacturers streamline their workflow — generating 3D models that can be adjusted swiftly, refining designs earlier without compromising time, and increasing conversion by offering investors a hands-on look during early development.

Thyssenkrupp

The German elevator company adopted the HoloLens to design bespoke stairlifts — a challenge given the uniqueness of staircases. The HoloLens captures digital measurements of a customer's staircase and stores them in Microsoft Cloud, instantly accessible to plants so production can begin immediately. Head of Product Lifecycle Management Simon Feismann claims it made the process up to 4× faster, and the team also used it to show customers designs and configurations — far quicker than brochures.

BAE Systems

As far back as 2014, BAE Systems has used AR to overhaul warship design, building multiple 'visualisation suites' that generate full-scale 3D ship prototypes so engineers can view and test the design before construction — dealing with issues early and cutting remedial cost. The 3D view is projected on a giant screen, or seen via gaze-tracking 3D glasses; all suites are networked for collaboration. The system helped develop the Type 26 Frigate, with HMS Glasgow due in 2025/26.

Alstom

Alstom, a French transport provider, used AR/VR to streamline design and promote its services. VR specialists Immersion built an immersion room where engineers and observers view 3D models; the system tracks the user for a realistic 1:1 perspective, so ergonomics can be tested under realistic conditions before construction, then technical and operational aspects reviewed – with real-time collaboration across other immersion rooms.

Caterpillar Inc.

Caterpillar, with Scope AR, launched CAT LIVESHARE in 2017 – an AR-based live-support platform. With complex machinery in hard-to-reach locations, an on-site technician and a remote expert collaborate live using AR, enabling real-time support, training or maintenance. In 2020 Scope AR announced a license with Caterpillar, showing AR is here to stay.

Ford

Ford was among the first to use AR, as far back as 2000, and it's now integral to their process. Their FIVE Lab immersion room lets engineers design and build a complete 3D car – engine block to upholstery – as an early prototyping step before physical or clay models. It translates CAD into a rendered 3D model detailed to the millimetre; the user can sit inside and experience the car, with the VR headset mapping their movement. Ford also uses POINTR remote field-service tech for hands-free help.

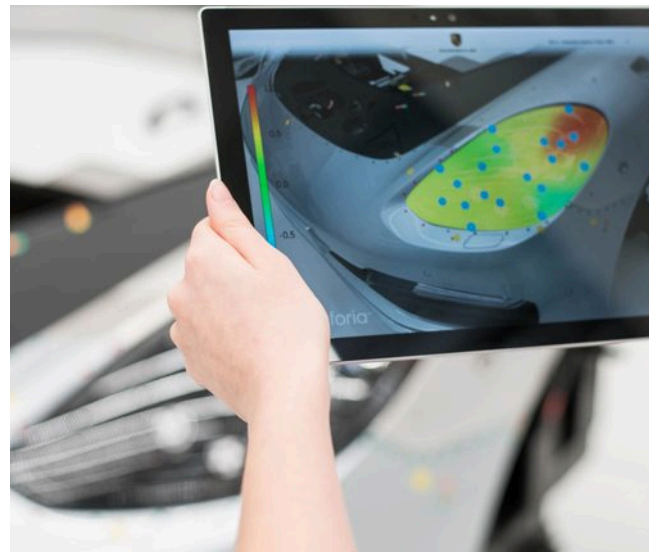
06 — REFINEMENT

QUALITY ASSURANCE

Manufacturers constantly seek to improve their products; quality is the bedrock that helps them stand out. AR alleviates the pressure, offering a superior way to maximise quality while reducing the time needed.

Porsche began adopting AR for quality assurance in 2016 at its Leipzig plant. With some of the tightest QA testing in the automotive industry, AR reinforces and intensifies their checks, enhancing how they decide which vehicles pass before reaching customers.

The system uses laser-perfect scans of the model in a cloud database to compare against real-time images: technicians use tablets to capture the final assembled car, and the software overlays the model scan, flagging any deviation over 0.1mm – pinpointing errors even a trained observer might miss. Originally trialled in 2017, the program (now ‘Tech Live Look’) is available across 189 locations worldwide.



Porsche AR quality check.

06 — REFINEMENT

Airbus

Standardising QA

Airbus launched MiRA (Mixed Reality Application) under Testia in 2011 to standardise QA across its global production network. Like Porsche, it combines real-time images with digital mock-ups on a Windows tablet with a camera, superimposing an 'As Designed' mock-up over an 'As Built' product as a comparison.

Reporting & Rollout

Once inspection is complete, management automatically receives a report generated by the operator, detailing any distorted components to replace or repair. After its success, Testia gained approval to sell MiRA as 'Smart Mixed Reality' outside Airbus to other industries facing the same issues.

3 days

to inspect 60,000–80,000 brackets on an A380 fuselage with AR – instead of three weeks. As of 2015, MiRA was installed on around 100 tablets and used by 1,000+ engineers.

IN CLOSING

A TEAM WHO CAN BRING EFFECTIVE AR TO MANUFACTURING & INDUSTRIAL CORPORATIONS

Our expertise in design and development means we can bring AR to your industry – but only if it's justified. We analyse your customer and employee requirements to build a product map from real needs, not assumptions, and make sure AR drives value before we ever write code. Whatever stage your project is at – a brand-new idea or a failing app to refine – we're the team to help.

GET IN TOUCH

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