

# Innovation Insights

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**bsi.**

## Immersive Technology

Embracing technology  
today to meet the  
challenges of tomorrow



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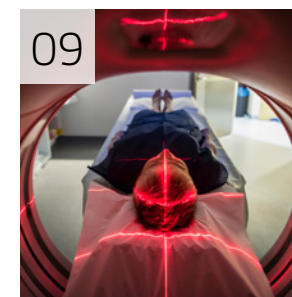
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# Sustainable Resilience through Immersive Technology

By Howard Kerr, Chief Executive



2020 brought unprecedented global business challenges and many companies are actively adapting their business model to meet changing client demands. BSI was not immune

from the negative business effects of COVID-19. With the concern of BSI employee and client safety, coupled with travel restrictions and limited ability to access client sites, most of the services we provide were challenged.

To ensure continuity of service for our clients, BSI immediately transitioned from an onsite to a remote service delivery model with operations shifting entirely to immersive audit, certification and consultancy delivery in less than a week. Turning the business risk presented by COVID-19 into an opportunity and our ability to transition the delivery model of a global organization

**“With Immersive Solutions, BSI has helped clients maintain certification in a challenging regulatory environment.”**

didn't happen by luck. This rapid transition was enabled as a result of 18 months of testing, failing fast, ideation and our commitment to the UN Sustainable Development Goals.

Our global experts worked together with our Innovation Team to test multiple hardware and software technology. Working through technology failure, the team identified the best solutions that delivered the same level of quality. Ultimately, this testing led to the development of four different levels of Immersive Technology, allowing BSI to support clients in most environments – whether on an offshore platform, in a highly urban office environment or at a factory.

Regardless of the business environment, we're committed to sustainably advancing the assurance and compliance industry while enhancing trust and resiliency for our clients. We are turning to emerging technology today to help address the challenges of tomorrow. For example, our Immersive Solutions include an augmented reality auditing platform that pairs with smartglasses, smartphones, and other smart wearables. This technology enables BSI



to deliver remotely, enhanced by the benefits of technology. To date, our global team of experts have supported our clients through more than 70,000 audits, product certifications and consulting days using our Immersive Technology.

The biggest impact of Immersive Technology, however, can be seen through the client stories. With Immersive Solutions, BSI has helped clients maintain certification in a challenging regulatory environment. From certifying manufacturers of personal protective equipment (PPE) to ensuring supply chains remain moving, Immersive Solutions has played a key role in organizational resilience for both ourselves and our clients.

Remote delivery has been rapidly adopted with the same level of quality as our onsite audits. Clients have found that immersive audits maintain the same rigour and excellence, and

result in an equal amount of onsite observations and client satisfaction rates. We've also seen a positive global and societal impact, saving substantial carbon emissions with every remote assessment. This currently equates to an overall figure of 3,776.06 tonnes of CO<sub>2</sub>e. Our work on this front has even been recognized by the Reuters Responsible Business Awards as a finalist for the Sustainability Innovation category.

Now, more than a year into our immersive auditing programme, BSI is actively testing technology that pairs with Immersive Solutions to further our digital roadmap.

We're committed to shaping the compliance industry through innovation, trust and resilience. We look forward to working with our global clients and colleagues on this journey.

# Introducing Immersive Technology

By Dan Purtell, Group Innovation Director

Technology is changing the way BSI conducts business, allowing us to support clients in new ways.



At the heart of our digital strategy is Immersive Technology Solutions, our remote audit, assessment and consultancy platforms incorporating augmented reality and spatial technology.

Immersive Solutions brings emerging technology to the hands of our clients, enhancing the reach and efficiency of our expert audit and assessment teams and helping to inspire trust with their customers.

Powered by our Augmented Reality (AR) tool, Immersive Solutions allow us to help clients maintain their certification, keep supply chains moving, and reduce carbon emissions, helping to promote a safer, more sustainable and resilient world.

Developing the solution took two years of R&D and testing with clients globally. The result: four different levels of technology, utilizing the hardware and software to suit almost any environment – whether the client site is in an urban office location or out on a low-bandwidth rig.

In many situations, multiple levels of technology are incorporated to suit the client environment and their business goals. For a supply chain assessment, for example, the client may choose to use Level 3 for a live-site walkthrough and Level 4 for live-spatial analytics. Throughout all levels, one thing is consistent – BSI expertise is complemented and enhanced by the latest technology.

## BSI's four levels of Immersive Technology



### Level 1: Live-web streaming

BSI brings virtual connection via video conferencing, leveraging client laptops and computers, with their chosen application. This can be ideal for assessments with heavy document reviews and conference room discussions and can be mobilized immediately.



### Level 2: Smartphones

BSI connects through the client's smartphone technology to perform site assessments and uses BSI's Augmented Reality (AR) tool. This allows telestration, and image capture features, so both the client and the BSI expert capture a detailed view of the site. This is a popular approach for assessments that require site tours to capture data.



### Level 3: Smartglasses

BSI incorporates smartglasses into the assessment, which also connects to BSI's Augmented Reality (AR) tool for an interactive hands-free data capture experience. Perfect for heavy manufacturing environments, loud sites such as construction, or high-risk sensitive locations that have intrinsic safety needs. The smartglasses technology is particularly effective in environments where smartphones are prohibited.



### Level 4: Aerial and LiDAR technology

BSI's spatial technology uses aerial imagery and lidar scanning to create aerial orthomosaic maps and 3d models. Clients can gain a digital record of site interiors and exteriors, capturing a visual record of any issues identified during the assessment.



# Immersive Technology in Assurance

By Pietro Foschi, Group Director of Assurance Services

As our world becomes increasingly complex, innovation will help organizations remain resilient and maintain the trust of their clients, employees and shareholders.



Here at BSI, we're no different. We're aware that technology will help address the challenges organizations face now and in the future. Nowhere is this

more evident than with the use of BSI's Immersive Technology Solutions. When travel restrictions began affecting the world, BSI rapidly shifted its mode of delivery, accelerating our global digital transformation. Our Assurance business helped drive the adoption of this technology, delivering over 70,000 remote audit days from January to September 2020. This virtual delivery was possible due to work already conducted on the feasibility of

remote auditing in assurance. Incorporating the best in class technology with the best in class expertise, our clients welcomed this digital assurance approach. Shifting over from predominantly onsite assessments to mostly remote assessments was no small task. In 2019, BSI delivered only 2% of audits remotely – a drastic difference between the remote work delivered in 2020. Switching to remote assessments almost overnight required agility and the dedication of both our clients and our audit teams. Traditional methods were rapidly adapted to ensure minimal risk or delay to certifications and ultimately enabled continuation of assurance services.

With the delivery of remote audits, we've maintained the rigour and excellence of BSI services; clients are expressing satisfaction with this remote approach. For most schemes, the number of non-conformities raised is the same whether it's remote or onsite. This is thanks to the robustness of our immersive audit approach and the skills and expertise of our auditors.

BSI's adoption of cutting edge technology has been integral in our ability to service our clients during this time. Having a range of different technologies at our disposal has meant that we've been able to support both the highly urbanized client as well as those in more remote locations. This has meant our clients have the option to deploy the most relevant Immersive Technology to meet both our and their needs.

In both the United States and the United Kingdom, our aerospace teams have been using Level 3 smartglasses to conduct remote assessments. Prior to this year, the International Aerospace Quality Group (IAQG) only allowed the use of Information and Communication Technology (ICT) to conduct audits for up to 30% of an assessment. Following the impact of COVID-19, the IAQG allowed up to 100% of an assessment to be delivered using technology instead of the traditional physical presence. While

**Through Immersive Technology deployment both our clients and audit teams have seen:**

- A proven and tested process and platform, based on 18 months' experience with the aerospace sector
- Continuity and resilience - staying on schedule to maintain certification
- A reduced carbon footprint thanks to reduced travel for our team and our clients
- A flexible approach – by aligning technology that works best for all involved
- Access to our global network of experts from a distance
- Enhanced connection – our operational and senior leadership team can connect to relevant parts of the audits, and bring an additional perspective on the challenges at hand
- Engagement with other key members of the client teams no matter where they are based
- An immersive audit experience with the same trusted expertise

the aerospace teams initially only used Level 1 and 2 technology, Level 3 was soon deployed to allow the auditor to be virtually onsite with the clients in all areas.

As Tim Belstone, Quality Manager at H+S Aviation Limited, one of the global leads in aerospace manufacturing said: "One of the reasons we like to use BSI is the proactive nature of the audits. Via the use of the RealWear Glasses we were able to perform a virtual assessment that was as close to a physical audit as possible in the current situation and as such able to add value to our business. RealWear Glasses appeared to me to be a simple and effective solution to enable you to perform your role and so ensure we meet the standard. For H+S Aviation this was an excellent innovative method to ensure the audit could be completed safely for both the auditor and auditee, allowing the audit to meet the requirements of the standard."

Our auditors have also found value in this technology, helping to enhance their work further. Jon Richardson, EMEA Aerospace Operations Manager, described his experience as, "Having different software and hardware options available to support immersive audits is a game changer for our clients and auditors alike. Using technology such as the BSI Augmented Reality software coupled with the RealWear Glasses gives us greater flexibility in the delivery of system assessments without negatively impacting on the value and depth of the assessment."

Datwyler Pharma Packaging is another great example of the need to provide consistency and continuity at such a critical time. Jagannath Dudhal, Head of Quality Management at



Datwyler Pharma Packaging India stated his positive reflections: "I would like to thank BSI for conducting the ISO 9001:2015 and ISO 15378:2017 remote audit in June 2020. It was very good experience to have this first remote audit for our India site. We are very happy with the way you conducted the audit.

Key highlights are:

- Remote opening meeting with participation of our Europe and India colleagues
- Virtual plant tour through an immersive smartphone experience
- Document sharing through Microsoft Teams
- Live streaming for quality check testing and in the warehouse."

As the world looks ahead to its next normal, BSI is reflecting on the value gained through the application of Immersive Technology Solutions.

Even as travel restrictions ease, our assurance business has the ambition of continuing to deliver a significant portion of our services in a hybrid mode, smartly blending immersive audits with face-to-face interactions to deliver effective audits for our clients. This will take into consideration the type of client, their system requirements, organizational performance and risk indicators. The anticipation is to move towards a predictive, forward-looking experience; one that will not only identify what is and isn't compliant but could alert to potential areas of concerns before problems arise – for a more resilient approach.

With these technologies, BSI's expertise and global experience we can progress even further, helping our clients to truly improve their performance, inspire trust and ultimately contributing to a safer, sustainable and more resilient world.



# Immersive Technology in Consulting

By Thorsten Querfurt, Group Director of Consulting Services

As the first BSI business stream to test and adopt Immersive Technology Solutions, Consulting has been committed to innovation from the beginning.



Early in the programme's research and development (R&D), BSI Consulting realized the value that Immersive Technology could offer its clients and joined the innovation team in its R&D efforts. The programme has grown substantially since those early days, and following the initial deployment, BSI Consulting has embraced Immersive Technology across our vast client base. This includes use at railroad sites and offshore platforms, pushing the technology in a number of new directions.

One key advantage of Immersive Technology Solutions is the visibility clients gain through its deployment. Often, clients will express interest in having BSI support with internal audit or internal processes, but still wish to



## “Our main Consulting offering with Immersive Technology Solutions allows our experts to support clients even on the days when we are offsite”

maintain clear oversight and visibility of all internal work conducted. Using Immersive Technology, our clients now have visibility of the entire piece of work we are performing. This is especially valuable for clients with lean internal teams that have a limited capacity to travel and provide reviews. With Immersive Technology Solutions, clients can maintain the control and visibility typically only found in work performed by the client.

Our main consulting offering with Immersive Technology Solutions allows our experts to support clients even on the days when we are offsite. We are also able to expand our clients' reach and expertise. From air permitting assessments to hazard identifications, Immersive Technology Solutions allows our experts to deliver onsite work with minimal delay and no travel restrictions.

This is evident through our work with an oil and gas client. Earlier this year, travel restrictions complicated a typical oil rig industrial hygiene assessment. In order to visit, our assessor would have to quarantine two full weeks prior to going onto the rig. This process wasn't feasible for the client or us, so our industrial hygiene team got to work on identifying potential solutions.

Quickly, our industrial hygiene team decided on an immersive assessment as the solution, using our Level 3 intrinsically safe RealWear Glasses. This technology solution made it possible

for onsite client staff to walk around hands free, avoiding any additional hazards that could come from limited line of sight – protecting the workforce during the assessment and beyond. This form of assessment delivery prevented the need for offshore training and the cost of helicopter transfers while allowing for increased speed of service and safety risk management.

With Immersive Technology Solutions, we can offer clients multiple new services, too. The first of which is immersive assessment as a service. BSI can help clients facilitate their own remote assessments using our multiple levels of technology. Clients receive dedicated technology support, hardware to use for their internal audits, and software connected directly to BSI experts. This solution allows clients to leverage technology on their own without the research, development, and logistics needed to launch an internal audit programme from the ground-up.

Between delivering expertise remotely and offering our clients new tools, our immersive portfolio helps clients at any stage. Whether the client is looking for disaster relief, sustainability support or safety assessments, our tools can advance the safety and resilience portfolios of our clients. Regardless of which service is selected, these technologies will help our clients achieve their goals, and reach greater organizational resilience.



# Immersive Technology in Medical Devices

By Manuela Gazzard, Group Director of Regulatory Services

In early February 2020, the world tilted dramatically for everyone with the emergence of COVID-19. As the human consequences played out terribly, initially in China, it became clear that BSI needed to react quickly to support its clients and their patients globally.



BSI is at the front line of ensuring clients can continue to place safe and effective medical devices on the global market. Acting as a notified body for Europe, as an Auditing Organization for MDSAP (Medical Device Single Audit Program) and Certification Body for three different Accreditation Bodies for ISO 13485; BSI sits at a major nexus of regulatory approvals. Given the surging demand for medical devices to support the effort to save lives, never has there been a time when a fast and effective remote audit methodology was needed more.

Let's take a step back in time to January 2020. At this time, BSI Medical Devices conducted approximately 1% of its audits remotely. Even prior to COVID-19, BSI has recognized the changing technological, sociological and environmental drivers for remote audits. Our experts were at this time engaging and testing Level 3 smartglass remote auditing technology but could not yet implement it as many regulatory schemes mandated onsite audits. Fast forward to present day; under contingency conditions introduced during the global pandemic, we're now conducting 90% of our Medical Device audits remotely, in what our clients and auditors tell us was an almost seamless transition.

Achieving this was no mean feat. In February there was very limited regulatory guidance governing this activity. BSI wrote detailed procedures and trained 250 auditors, whilst at the same time rolling out and boosting

its IT support services for remote conferencing platforms, such as Microsoft Teams. As the regulators rolled out their own guidance, BSI adapted and updated to align with the many different versions being published.

The huge advantage of these technologies was that they were instantly scalable. The majority of clients had access to some form of technology regardless of their location or the need for special equipment.

This ability to instantly react and deliver a robust audit service was acutely highlighted when BSI participated in the UK Government's Rapidly Manufactured Ventilator Scheme (RMVS) initiative. Many new and existing businesses were able to be audited and thus produce ventilators for COVID-19 patients, saving many lives in the process. Clients and auditors alike reported high levels of satisfaction and achievement of audit objectives. It came as a huge relief to many clients and healthcare providers that certification could be maintained and access by patients to critically needed medical devices was not disrupted.

BSI is conducting extensive statistical analysis of the audits delivered pre- and post-COVID-19 related lockdowns. Results show no difference in the quantity of non-conformities raised or in the number of appeals logged. This would support the direction that remote audits still pose a relevant, robust challenge to the client's quality management systems. BSI's early approach was to shift higher risk process assessments to a subsequent audit, enabling both auditors and clients to gain familiarity with the new technique. Following the delivery of such audits, further analysis will be conducted regarding the nature of the non-conformities raised for additional insight.

## “BSI is conducting extensive statistical analysis of the audits delivered pre- and post-COVID-19 related lockdowns”

Moving forward, BSI will make extensive use of our Augmented Reality application using both Level 2 smartphone and Level 3 smartglass technology. Using a uniform technology that is purpose built for remote auditing will address many of the issues currently being experienced. Superior levels of image stability, directional microphones, the ability to zoom in, head-up displays and hands-free voice control will all make for a smoother, predictable and safe audit experience for all stakeholders.

With a good level of communication possible between the auditee and auditor and sophisticated imagery, it is much more possible to 'drive' the audit, requesting to look inside boxes, doing a 360° of the room, directing the camera holder to a specific area of concern and zooming in. This should go a significant way to addressing regulator concerns. However, it's only possible to audit what you have been shown. If you have never been to a site, how do you know that all the areas are on display?

BSI's approach will be one of risk mitigation. The intention for higher risk audits where there is a level of unknowns will be to conduct some of the audit onsite and then leverage that knowledge to conduct the rest of the audit remotely. This more



robust approach increases patient safety, whilst minimizing exposure of clients and auditors, potentially speeding up product to market and controlling costs with long term sustainability.

Another key area that should support regulator adoption of this technology is the fact that audits could be more frequent if no onsite activity or travel is required. Regulators could participate in more frequent oversight both of their assessment bodies and of manufacturers, potentially even using the technology themselves.

Imagine the future of patient safety if an authorized audit system could enable un-announced sampling of live product

quality check measurements, or if Artificial Intelligence (AI) systems highlighted a previously undetectable change in the setup of a production line that prevented the shipping of incorrect product.

Ultimately, we are in the business of ensuring that only safe and effective medical devices reach patients. We should not forget that leveraging this kind of technology does not mean forgetting about people, but working with them where they can best add value. We should let the technology drive predictive compliance towards a culture of problem prevention and allow the people to focus on product improvement, sustainability and supporting global health needs.

# BSI's Digital Roadmap



By Harold Pradal,  
Group Commercial  
Director

Today's unique challenges mean that organizations are facing the 'next normal' by integrating more technology into their existing practices and businesses, supporting the future workplace. This direction of travel is positive both for our clients and the planet, as it provides greater resilience combined with a decrease of global carbon emissions. That's why we at BSI are embracing it.



Technology is changing how global business is conducted, allowing for greater agility, improved transparency, increased resilience and long-term sustainability. BSI is at the forefront of this global transformation in the compliance industry.

Digital transformation requires organizations to think differently and boldly. Here at BSI, our digital transformation is ongoing, enhancing our existing solutions and expertise in all areas of our business. Our Immersive Solutions have helped clients maintain organizational resilience and compliance during these challenging times and in the face of new regulations.

Immersive technologies will fundamentally enhance the services and the expertise that BSI can offer clients. Our global Innovation Team is researching the power of game-changing technologies such as Artificial Intelligence (AI), Optical Character Recognition (OCR), Robotics Process Automation (RPA), and Image Recognition.

By adopting these cutting-edge technologies, BSI is bringing new solutions to a largely traditional sector, driving the future of predictive compliance.

**Predictive compliance will help organizations identify potential risks or threats before they occur using live data analytics.**



All these innovations will enable our clients to have a data-driven understanding of risk, helping to identify problems before they happen. This new form of compliance helps align to other emerging technologies like Internet of Things (IoT), Smart Factories and Industry 4.0.

Another important addition to our Immersive Technology portfolio is BSI's spatial solutions. With this technology, clients will be able to request a full digital rendering of their facilities. This digital

**“Our global Innovation Team is actively researching and developing new emerging technology to integrate into Immersive Solutions”**

model will provide both an aerial view of the client site and a detailed 360° record of their site interior. This disruptive technology will enable clients to track changes to a site over time providing digital evidence of gap and remediation closure.

BSI is committed to developing transformational tools that will help our clients become more sustainable and resilient today and in the future.

# Inspiring trust for a more resilient world

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BSI and Consultancy. Due to BSI's role as a designated EU Notified Body and accredited certification body, no BSI group company may provide any form of consultancy that could be in breach of the Medical Devices Regulation or accreditation rules. No BSI group company may provide consultancy services to medical device manufacturers, commercial competitors or suppliers to the manufacturers. Consultancy clients are unable to take certification services from BSI within three years of the completion of the consultancy.