BIM

Building Information Modelling

Digital Construction

REAL INNOVATION
HAPPENS IF YOU'RE
WILLING TO BE BRAVE.

MERCURY

2021

TABLE OF CO

ONTENTS

1

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Our Facilities & People

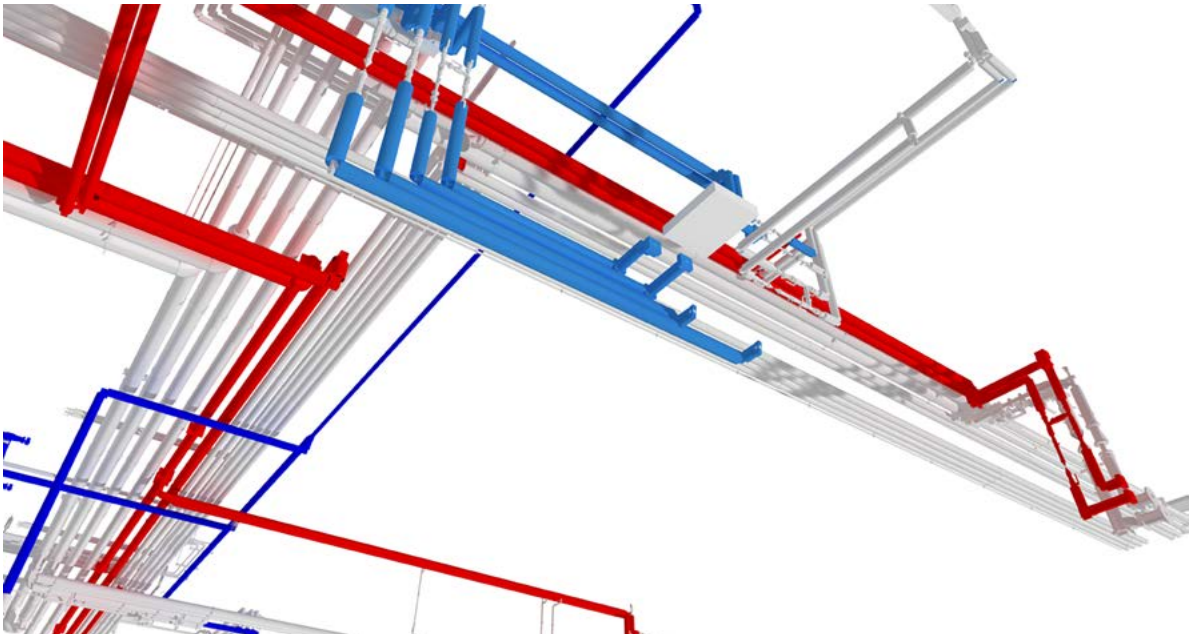
Accreditation

Building Sectors

OUR FACILITIES & PEOPLE

Over the last five years, Mercury has standardised and invested in the improvement of its BIM capabilities, facilities and equipment, including the creation of its **Digital Core in Maynooth, Co. Kildare**. Located close to a number of large multinational clients, and a short distance from Ireland's major transport hubs, the Digital Core is a central part of the BIM Department.

With projects based in 16 countries and many team members **working remotely from all over the world**, Mercury offers standardised software and hardware solutions to meet their teams and client needs. Teams located in the "Digital Core" can avail of the purpose-built on-site Virtual Reality (VR) Lab, as can a number of teams with dedicated VR Rooms on site. Mercury consciously ensures that we have the best tools available to enable fast turnaround times at the highest possible quality.



Mercury's Digital Core in Maynooth contains two BIM Modelling floors, with state of the art meeting rooms, a VR Lab and a large rest and recuperation area. Mercury also has BIM offices in Glasgow and Poland; with smaller satellite offices on client projects and staff working remotely all over Europe, all connected through our high-specification communication and collaboration systems.

We believe that real innovation happens if you're willing to be brave. Mercury is led by a multidisciplinary team of individuals from diverse backgrounds. Our leadership team is passionate about creating innovation and change. **Beyond50** is Mercury's five-year strategy, aimed at bringing clear direction to the company as we reach our 50th year in business. We are now entering the next stage of our development with a platform that our business and people are aligned to. Beyond50 supports Mercury's purpose to deliver leading edge construction solutions to our clients and build relationships that thrive.

To achieve incredible things you must invest in your people. We have a proud track record of retaining staff long-term and developing them from apprentice and graduate level all the way to becoming senior management. We value the **depth of experience** and specialist knowledge of all our employees.

Mercury is heavily invested in BIM. With **220+** dedicated personnel, we have one of the largest BIM team's in Europe. However, you need more than a great BIM team to be a leader in Digital Construction. To best serve clients, a robust training strategy and plan is required along with the best facilities and equipment. Our BIM team is highly skilled in both 2D and 3D modelling.

With a primary focus on Revit, Navisworks, Solibri, iConstruct and CAD based products, our team is organisationally built around a standard pyramid structure with a Group BIM Manager and a number of dedicated Business Unit BIM Managers. These Business Unit managers have multiple team leads in place with downstream teams of senior modellers, modellers, BIM engineers and surveyors. Mercury also has a team of systems personnel to build projects from the ground up using Autodesk BIM 360, Glue, Team etc.

A significant portion of the team are qualified design engineers, holding a Level 8 degree and many also hold master's degrees in engineering disciplines or postgraduate BIM qualifications. Mercury also recruits experienced tradespeople into BIM roles, bringing core hands-on construction knowledge to our multidisciplinary team. This is achieved through an internal 'Trades to BIM' conversion programme, where through various incentives we attract electrical and mechanical tradespeople to BIM, where they undergo a two-year on the job training programme to become BIM professionals.

220+
dedicated personnel

ACCREDITATION

Mercury recognises the ever-growing importance BIM to the global construction industry. We utilise the most innovative and cutting-edge digital technologies. This enables more efficient design and construction to support the organisational growth of our clients.

We are certified to the highest possible standards, having received the **BSI Kitemark for BIM Level 2 accreditation** (PAS 1192-2:2013 & BS 1192:2007+A2:2016) in 2018.

As BIM standards evolve – Mercury is planning to be ISO19650 accredited during 2021 in line with this evolution.

BUILDING SECTORS

A | Enterprise Data Centres

B | Hyperscale Data Centres

C | Advanced Technology

D | Life Sciences Pharmaceuti

s &
ical

E | Fire Protection

F | Building Services

G | Technical Support Services

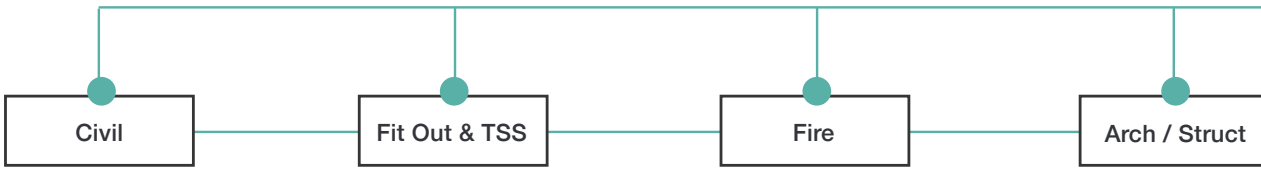
H | Facilities Management

2

BIM INT

TRO

BIM Intro



BIM INTRO

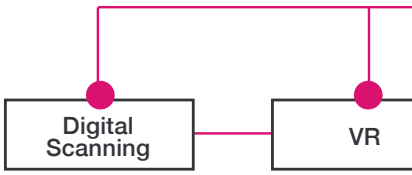
Digital Construction succeeds when it is embedded into all aspects of design and construction. Mercury constantly strive to push the possibilities and improvements of BIM, with the aim to deliver real innovation.

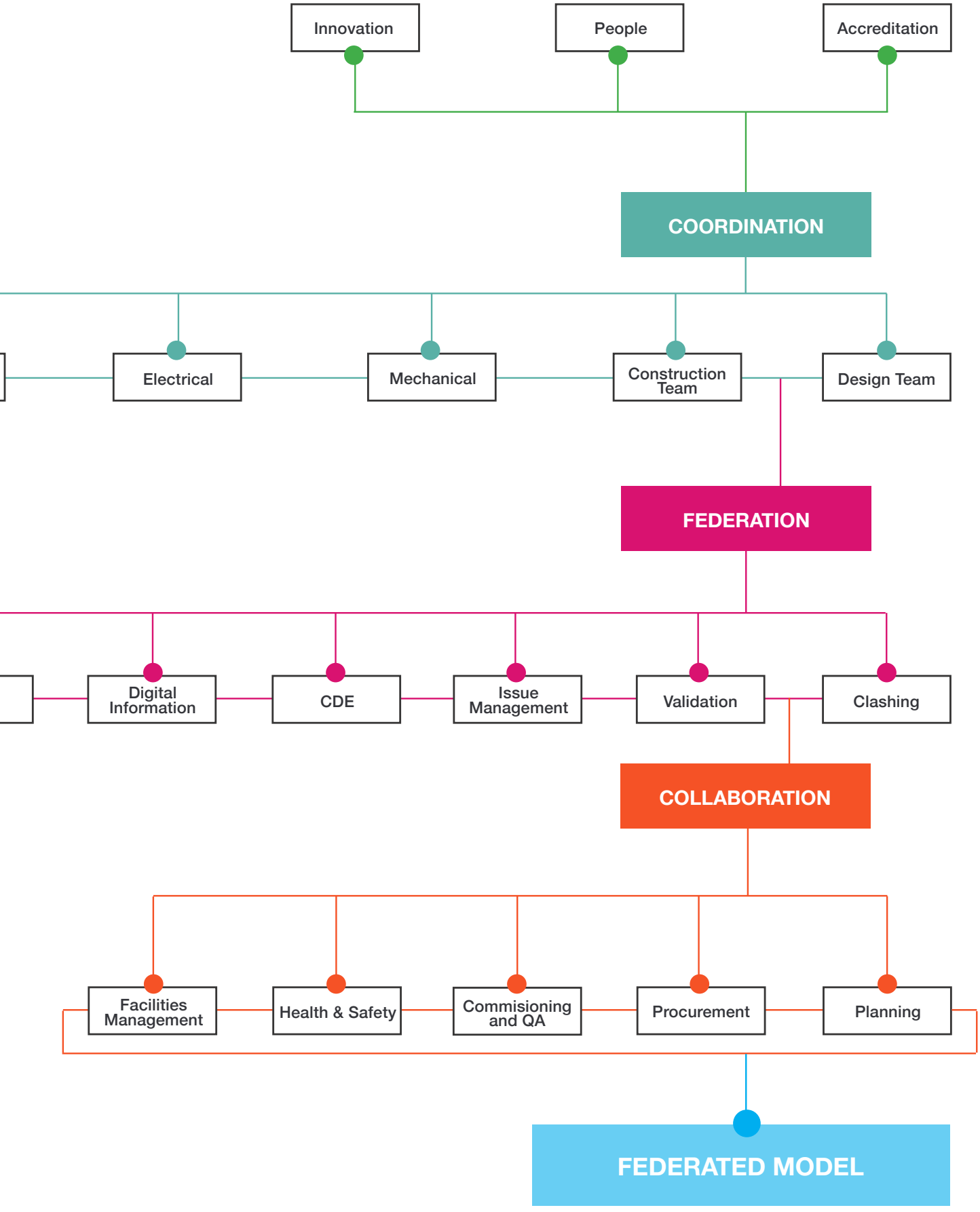
Utilising the right people, with the necessary processes and structures, along with the ever evolving technologies – creates the perfect environments for turning Virtual Construction into real success.

Throughout the **Coordination stage** it is important that all design and construction teams embrace the opportunities available through BIM for the client.

It is essential that the various processes, applications and technologies are planned, communicated and managed for the Digital and 3D information **Federation** through the project lifecycle.

Information shared between all departments of the team allow for **Collaboration** to take place, providing opportunity for huge benefits for the project, from schedule to safety, construction logistics to operations management.




Innovation
People
Accreditation
COORDINATION
Electrical
Mechanical
Construction Team
Design Team
FEDERATION
Digital Information
CDE
Issue Management
Validation
Clashing
COLLABORATION
Facilities Management
Health & Safety
Commisioning and QA
Procurement
Planning
FEDERATED MODEL

3

COORDI

NATION

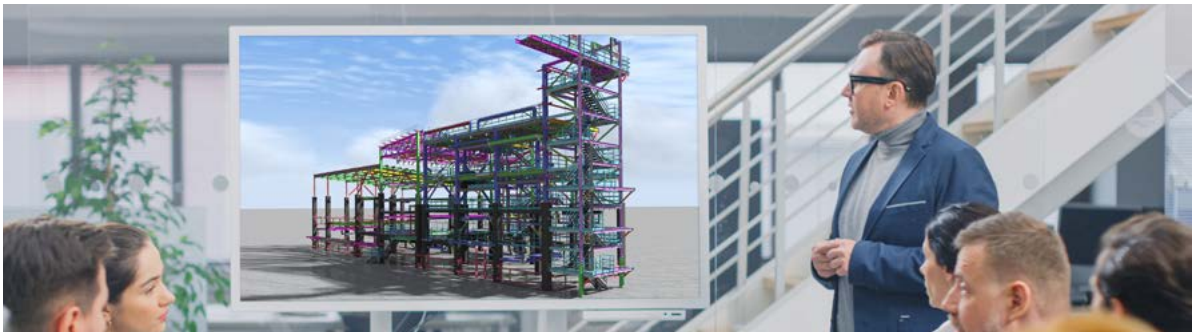
- Design Team
- Construction Team
- Mechanical
- Electrical
- Fire Protection
- Fitout & Technical Support Services
- Civil
- Structural & Architectural
- Offsite Assembly (OSA)

COORDINATION

DESIGN TEAM

Whether delivering projects as a prime contractor, or working as a specialist services contractor, it is essential that good collaboration and communication is achieved between all stakeholders and the design team. This ensures that the delivered final product meets all the requirements expected by the client. The effective work of the entire team is what drives successful projects. BIM provides the perfect **Digital Construction Platform** for all parties to create, share and manage their own information in a collaborative environment.

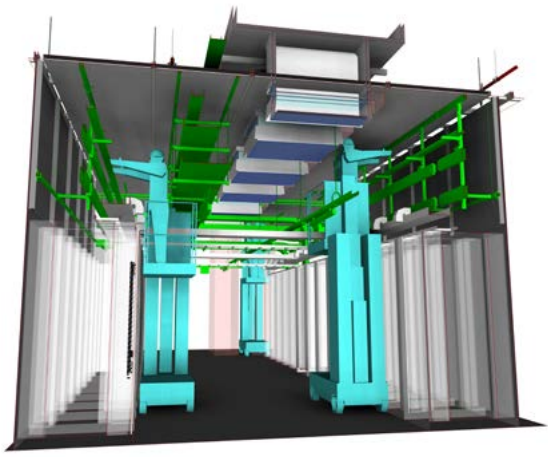
The **3D BIM** model provides a platform for design to create a complete building with the entire team participation. Utilising accurate geometry, design calculations and data we can deliver a complete design solution that meets all the requirements for the client.



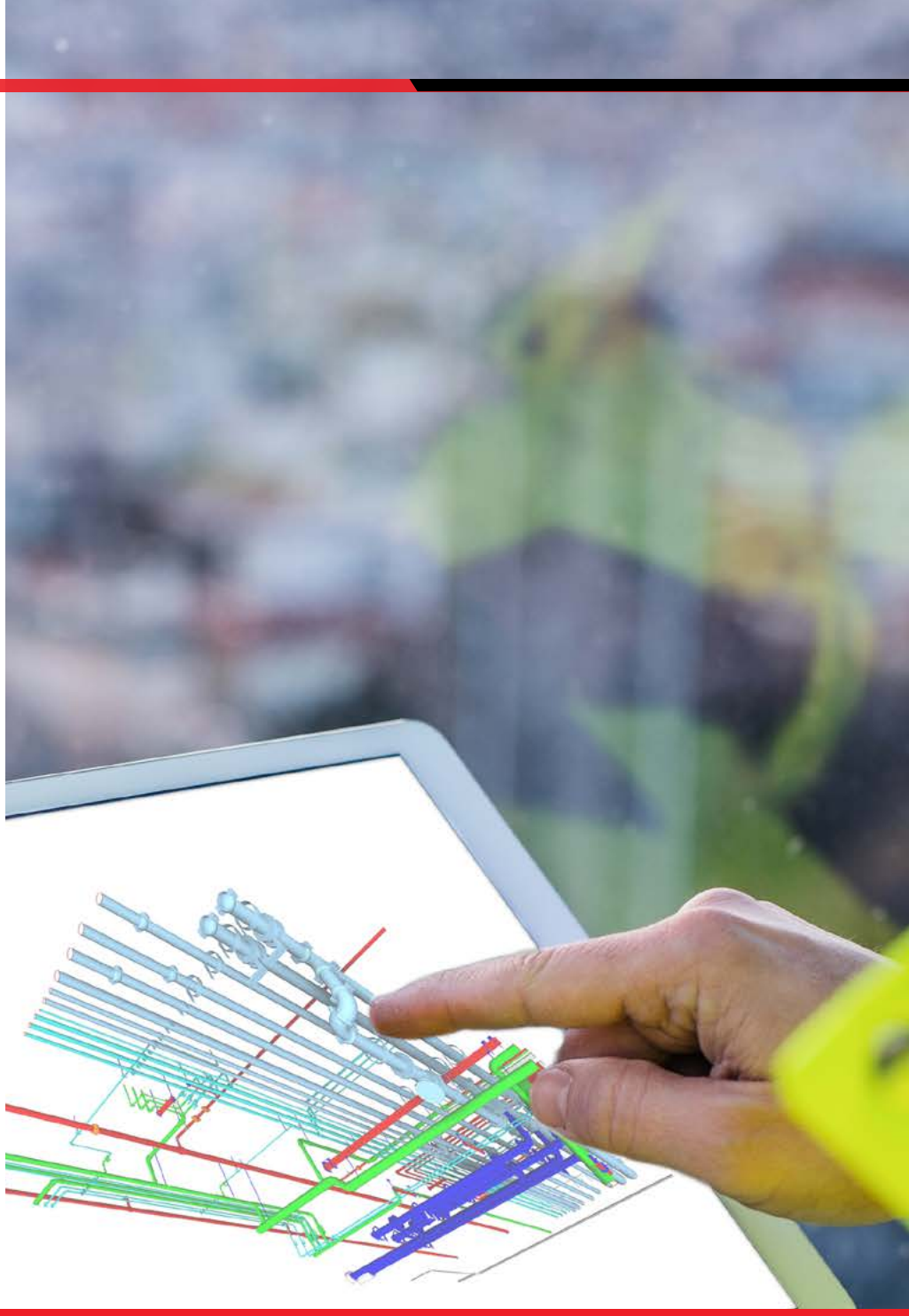
CONSTRUCTION TEAM

Detailed coordination processes allow Mercury to succeed in a "**Right First Time**" approach. Experienced Site and Engineering Teams work hand in hand with the BIM Team to ensure not only coordinated but constructible design models.

Mercury has placed BIM at the core of the construction process because it is driving our core values. Using the 3D model throughout the construction stage of the project supports our "**Work Safe, Home Safe**" value along with our promise to always deliver. BIM also allows our construction teams to introduce methods of work that focus on delivering projects on time while reducing risk to both safety and quality.



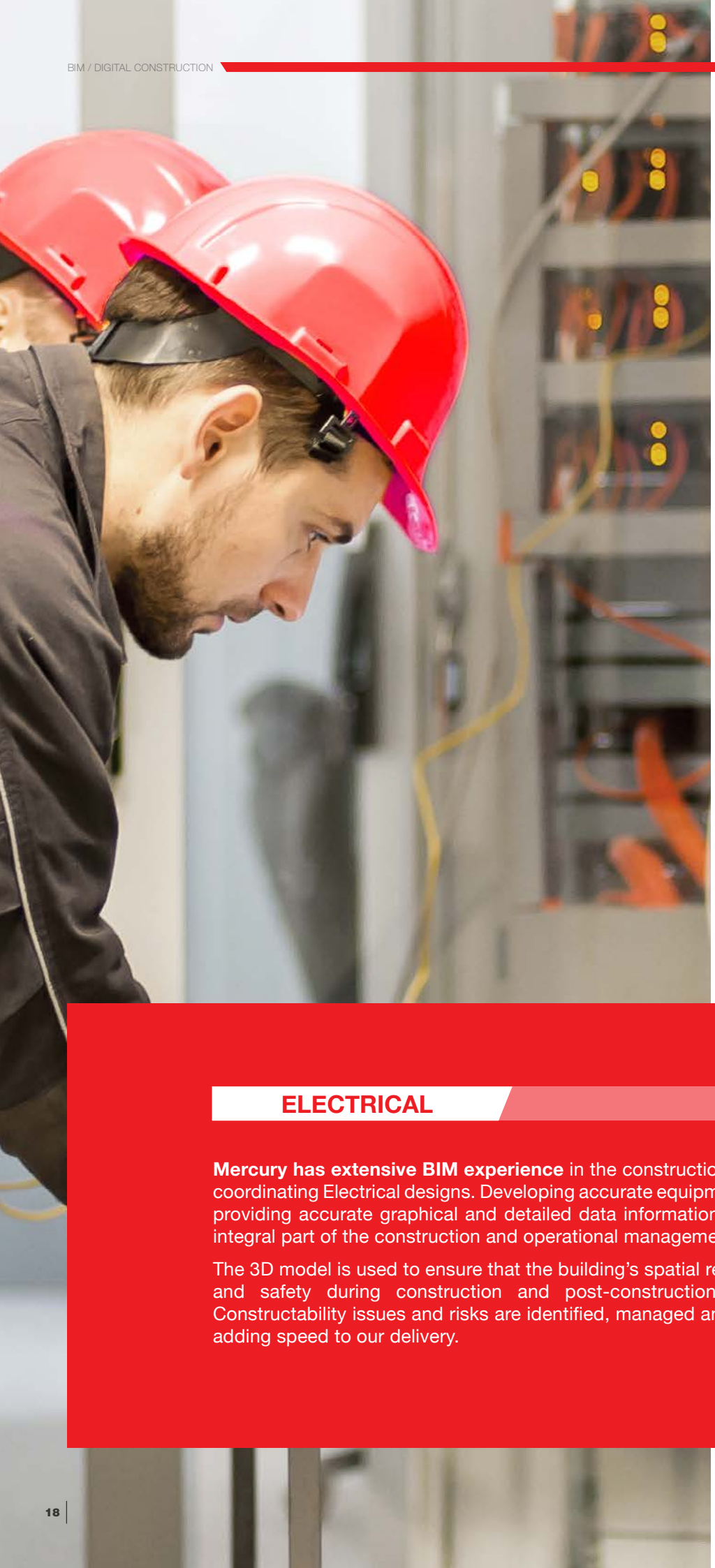
complete
reviews with clients



MECHANICAL

Excellent construction knowledge and communication between the BIM and on-site teams ensure that the delivered **coordinated models meet design requirements** for all stakeholders. Accurate modelling of equipment allows complete reviews with clients to ensure designs, access and maintenance. Precise modelling allows offsite fabrication of piping spools, ensuring Mercury's waste free environment.

Designs are thoroughly developed through the Engineering and BIM modularisation Ensuring duct and pipework coordination allows pre-fabrication and modulisation to be incorporated in the construction stage, which is an essential part of the Mercury philosophy.



Mercury is a world leader in digital construction

ELECTRICAL

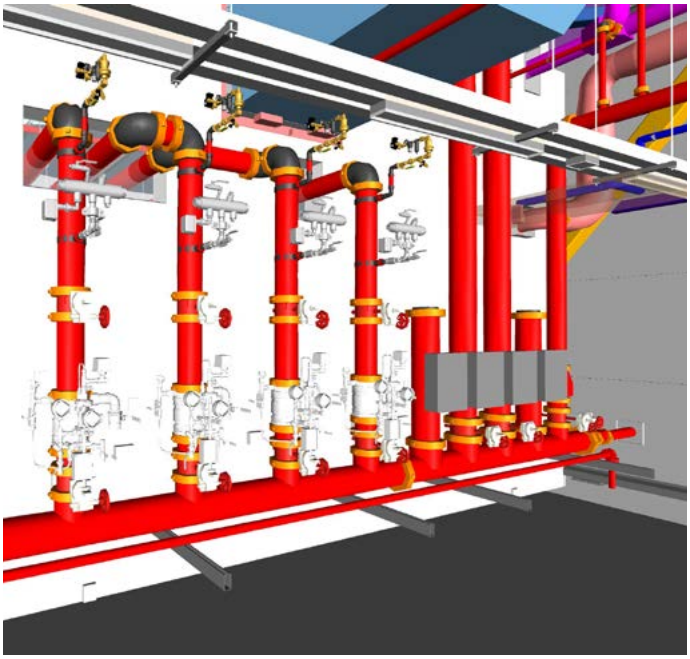
Mercury has extensive BIM experience in the construction industry in developing and coordinating Electrical designs. Developing accurate equipment and fittings components, providing accurate graphical and detailed data information, allows the model to be an integral part of the construction and operational management of the building.

The 3D model is used to ensure that the building's spatial requirements for maintenance and safety during construction and post-construction operations are provided. Constructability issues and risks are identified, managed and rectified at an early stage, adding speed to our delivery.

FIRE PROTECTION

Using our propriety software **AutoSPRINK** with excellent communication between the BIM and site teams ensures that the delivered sprinkler model meets the design requirements for all stakeholders. As the AutoSPRINK Model is live, this allows alterations or changes, due to coordination conflicts, to be instantly reviewed and recalculated to ensure the client's design specification is maintained, identifying and resolving potential clashes with other stakeholders, constructability and safety issues, all before going to the project construction stage.

Accurate modelling allows offsite full system fabrication of piping, creating an accurate bill of quantities for cost minimisation, while minimising Mercury's waste environment. Designs are thoroughly developed through AutoSPRINK and are fully compatible with **Revit, Navisworks** and **AutoCAD.**



FITOUT & TSS

A fully **coordinated Fitout design** and model is completed where required, making full use of the pre-fabrication abilities within Mercury to benefit the construction stage, coordinating all construction details, and coordinating between architecture and structural designs and allowing for all finishes, fittings and equipment to be positioned and approved, avoiding any delays and rework on site.

TSS incorporates the former Mercury Technologies & Mercury Fire Alarm departments yet retains the key staff and Industry leading brands that have delivered large scale projects for the last twenty years. The **TSS team is highly experienced** with an excellent knowledge of fast track projects. Our client focused approach has ensured long term success and repeat business.

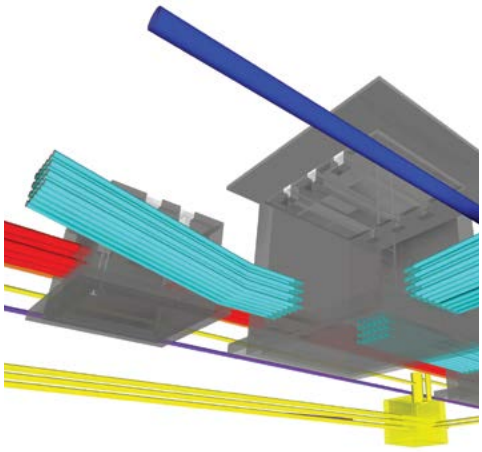
Specialisations:

- Structured cabling installations
- Data Centre upgrades & fit outs
- Fire alarm & gas detection systems

CIVIL

Detailed and accurate 3D models for the Civil elements of the construction are **essential to successful project completion**. The interconnection of existing and proposed services are a critical and complex part of the construction sequence. Using the 3D model, Mercury can ensure that the complete project can be delivered within the existing environment and demonstrate how it can be delivered in a multi-phased delivery plan.

The delivery by Mercury's BIM Team of an accurate Public Health, Data, MV & LV infrastructure and underground structural elements in a coordinated Model is essential for the success of the project and all future projects of phases.



STRUCTURAL & ARCHITECTURAL

Working closely with design consultants throughout the design and construction stages in BIM provides **the perfect platform to ensure highly positive project outcomes**. This provides an excellent platform and method to discuss and agree solutions to the various design issues prior to commencing on-site. Agreeing construction detail, finishing details and aesthetics provide the ability to deliver a project on time, cost and at the high quality expected from the client.

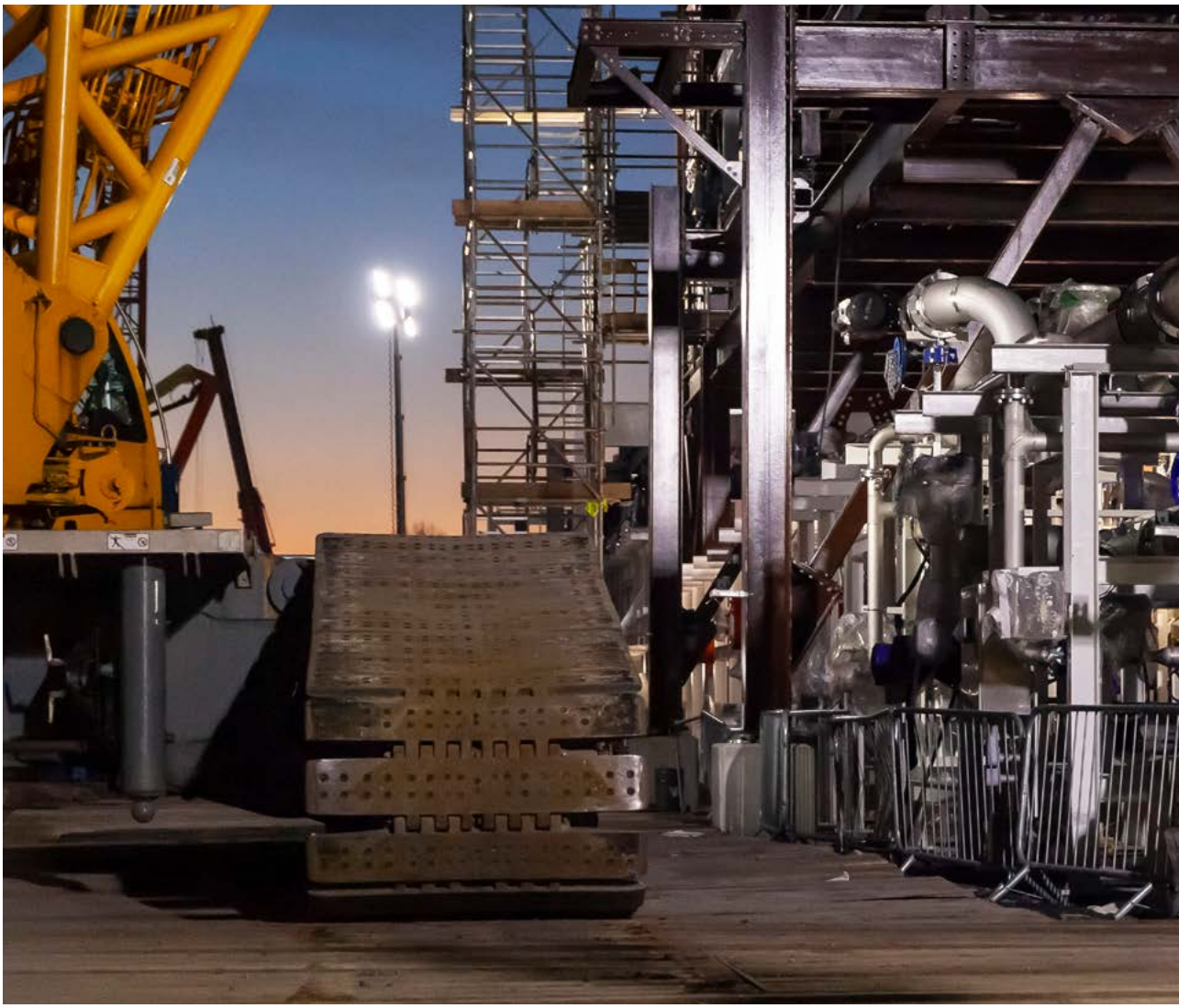
The 3D model also provides the client an ideal opportunity to realise the final product and ensure satisfaction with the delivered outcome.

OFFSITE ASSEMBLY (OSA)

The Offsite Manufacturing (OSM) market is redefining our industry and we're leading the way. Our expansive OSM strategy and capabilities will ensure our success continues to accelerate as we step into the future.

Mercury has an extensive offsite manufacturing (OSM) operation and supply chain spanning the island of Ireland, as well as strategic locations in the UK, Europe and beyond. Our Offsite Assembly (OSA) Hub in Co. Kildare is easily linked to Dublin Port. This enables us to send fully assembled, highly detailed and complex OSA modules internationally for key clients in the Data Centre, micro processing, life sciences and pharmaceutical sectors.

As a prime contractor with whole lifecycle scope delivering design, build, commission and operation, we're constantly evaluating **innovative ways to improve our delivery**. Offsite manufacturing combined with leveraging the use of digital toolsets such as BIM in all dimensions and Virtual & Mixed Reality (VR & MR) has a positive impact on all major pillars of construction: Safety, Risk,



Cost Certainty, Programme Management, Quality, Sustainability & Waste Reduction, Georesilience and most importantly Our People.

Our holistic approach to OSA starts with design and ends with operations on site through progressive development of digital workpacks and Lean principles. Our digital process is not bound by land boarders. As part of our process to reduce waste and any potential delays on site we send **virtual models of OSA** to site for examination and virtual placement on site through mixed reality prior to any physical elements arriving on site.

Our range of OSA delivery is extensive and growing from fully modularised Mechanical & Electrical plantrooms and switch rooms, to fully coordinated MEP risers and sectional horizontal services distribution. In our Advanced Technology, Life Sciences and Pharmaceutical sectors, we deliver multiple skid arrangements, fully completed chilled water pipework systems, to high-purity cleanroom grade systems. Our offsite manufacturing capabilities can comprise anywhere from 5% to 45% of contract value, depending on the project, and we expect this will increase further as time goes on.

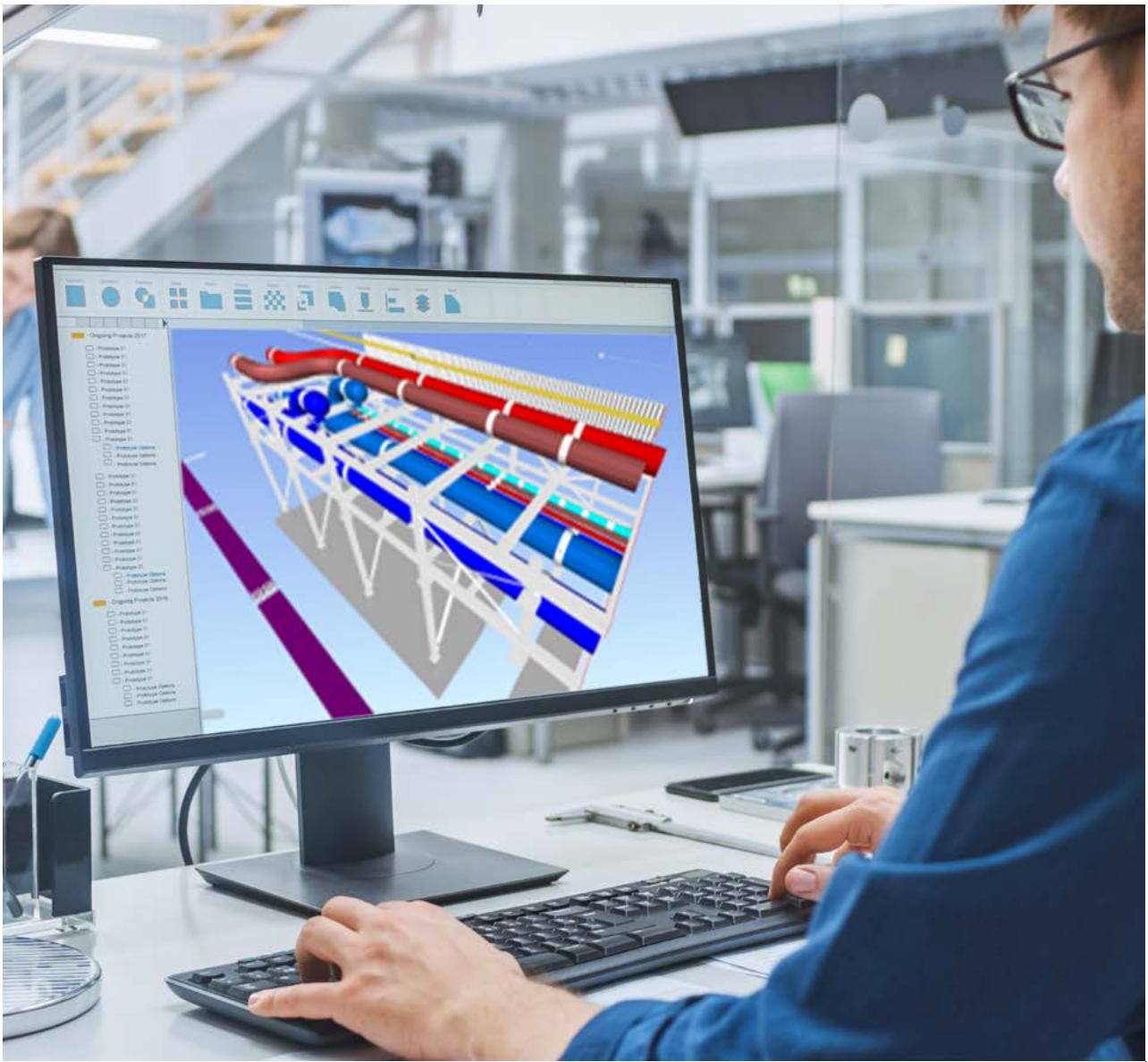

Adriaghem

Our investment in technology, people and processes coupled with our digital transformation strategy have made OSM & OSA more desirable and achievable than ever before. It has given us the ability to ensure every module is completed to the exact specification required and delivered to site 'just-in-time'. We have refined these processes and fully digitalised them to the extent that we can confidently move them to any country in the world.

As part of Beyond50, we will **continue pushing our OSM & OSA strategy and capabilities through constant R&D**, looking at the latest developments in digital technology. We continue to evaluate the trade-offs between offsite and onsite manufacturing and are currently exploring new and exciting opportunities to further increase our level of offsite activity where we can prove that it will benefit the project and our clients.

We are also currently testing technologies that utilise 4D modelling and Augmented Reality (AR) to reduce non-value-add activities, facilitating greater insights into the visualisation of the complete module manufacturing process, considering safety, material selection, equipment, workflow, and people.

Our multidisciplinary Offsite Manufacturing team, with representatives from our support functions and all business units, meet up twice a month to share knowledge, collaborate and further develop our OSM strategic roadmap, collaboration and early engagement is key to our collective success.



4

FEDERA

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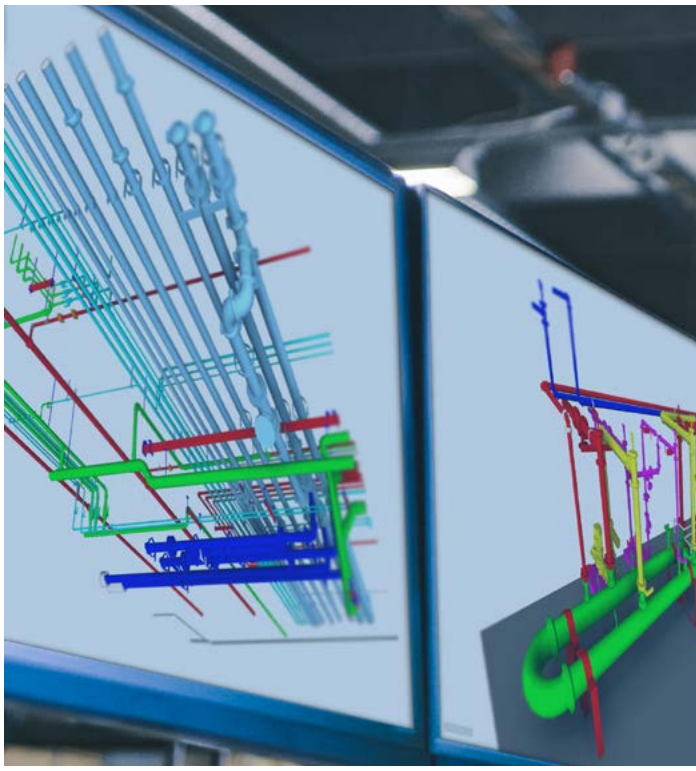
- Clashing
- Validation
- Issue Management
- CDE
- VR & AR
- Digital Scanning

FEDERATION

CLASHING

A key benefit of BIM is the ability to compile all 3D models within a project into a master or federated model in order to spot clashes in the project. A clash may occur when two components are occupying the same space, when a component enters a clearance or buffer zone, or even when scheduling conflicts arise. The ability to find and resolve these clashes at the design stage of a project is critical to avoid project delays and costly reworks.

The latest BIM modelling software and BIM integration tools allow Mercury's designers and modellers to check for clashes within their own models, and when their models are added to the federated model. Hosting these models on a cloud-based platform allows for **real time clash detection** between all disciplines to ensure that clashes are spotted, and resolved, early in the project.



VALIDATION

Various processes and technical procedures are administered to validate all aspects of the delivered digital information, ensuring the requirements of the clients are delivered throughout all stages of the project life cycle. Standard operating procedures and templates have been developed within our BIM Level 2 framework creating an environment where correct information is embedded within the project and the ethos of our people.

Ensuring the model meets the required **Level of Detail** (LOD) and the required **Level of Information** (LOI) is a critical factor for every project. Rigorous developed and tested processes and experienced people ensure that every object within the digital built environment meets client demands. From utilising modelling schedules and BIM interoperability tools to ensure information and COBie parameters are provided within the 3D model, to correct naming conventions of documents, 3D components and deliverables. All individual elements combined, provide a virtual digital building that can be beneficial well after the construction stage is complete.

ISSUE MANAGEMENT

The use of digital construction technologies to achieve better information management is fundamental to the processes embedded in the Mercury BIM department.

From the management of model quality issues through our robust QA/QC process, to the client satisfaction procedures designed to ensure we always deliver, we have tools and systems in place to allow us **consistently deliver consistently high quality information to our construction teams**. With the implementation of our bespoke BIM Portal application we can easily identify, analyse and evaluate any quality issues that arise during modelling. Utilising this application we can monitor and review all modelling activities and implement corrective actions where required, enabling us to achieve high levels of productivity and excellent standards of output. Combining this bespoke solution with our experienced, dedicated staff and other construction technologies such as digital reality capture, we can address any issue that arises from detail start through to construction complete.

we always **deliver**

CDE

The Common Data Environment (CDE) is a single source of information that is used to collect, manage and disseminate information relating to a whole construction project. Teams within Mercury use a number of different CDE structures depending on the level and environment required. Team CDEs, cross departmental CDEs and cloud-based solutions are all used in order to satisfy project requirements.

The contents of a CDE are not limited to just assets created in a 'BIM environment' and will include documentation, graphical and non-graphical data for the whole project team. Creating this single source of information facilitates collaboration between all disciplines and project teams. This in turn helps to avoid information duplication and mistakes.

The use of a CDE in a project serves as a single source of 'truth' and can provide the following advantages:

1. Shared information should result in coordinated data which should reduce both time and cost on a project.
2. Project team members can use the data in the CDE to generate documentation they need confident that they are using the latest assets.
3. The use of a centralised model results in inherent spatial co-ordination.
4. Adhering to information sharing processes all product information produced is 'right first time'.

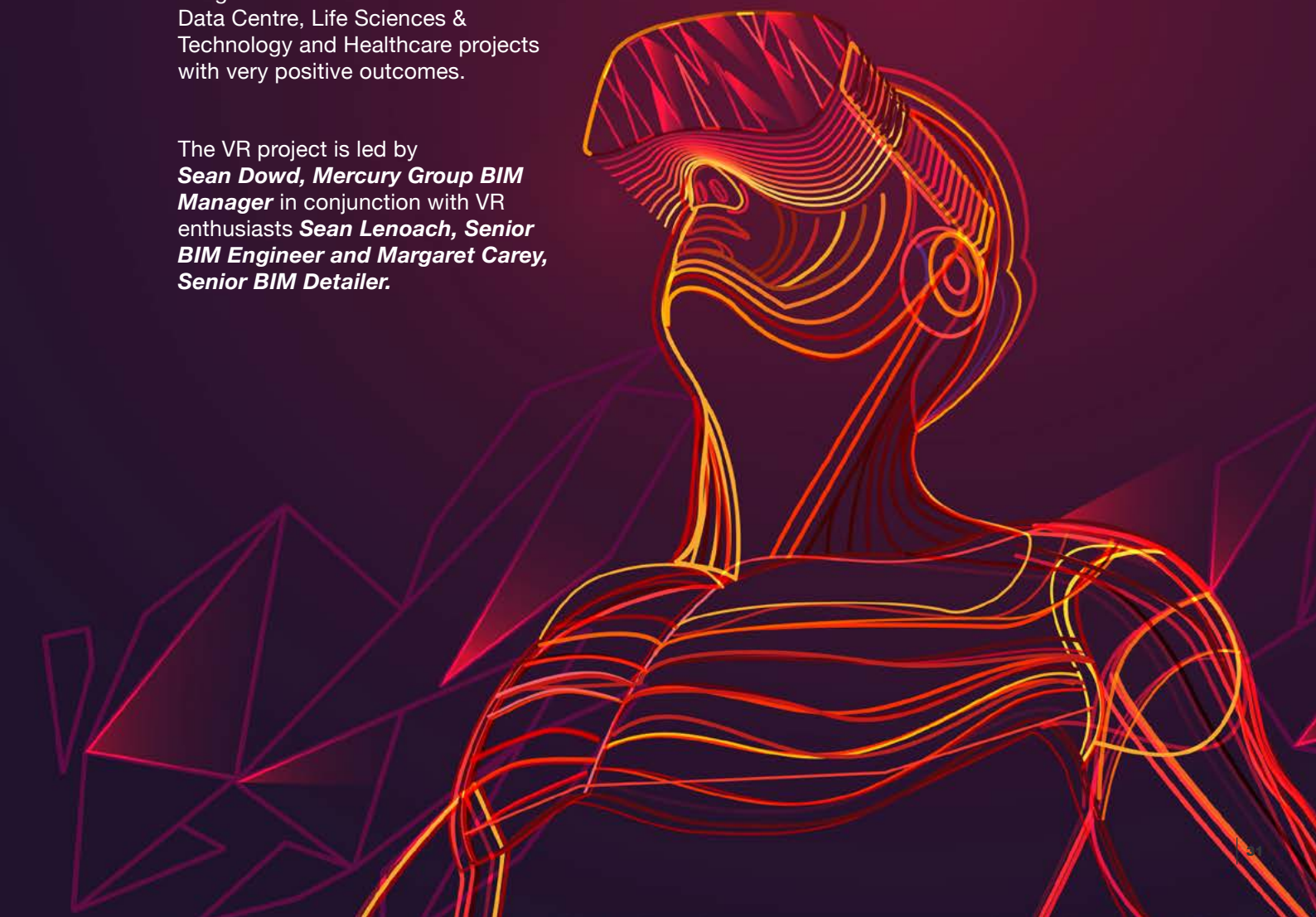
VR & AR

Mercury has been working with VR for some time and in 2019 opened a Virtual Reality Lab at our dedicated BIM centre, Mercury Digital Core in Maynooth. Mercury's in-house BIM team have the capability to generate bespoke VR models for any project utilising BIM. The VR models not only create a **unique immersive experience for our clients**, allowing them to see how Mercury plans to deliver their vision and make it happen, but also have major benefits with respect to design development & review, construction management, QEHS, facilities management and training.

Mercury promises to always deliver. Using VR in collaboration with BIM and traditional construction documentation allows our clients and project team to engage in more thorough design review and construction planning processes. This in turn creates a positive impact on the project for all stakeholders involved. Mercury not only has a purpose built **VR Lab** but also a mobile VR unit that can be taken to any site or client meeting, along with a number of dedicated VR Rooms at various project sites.

Mercury is also invested in utilising Augmented Reality (AR) and Mixed Reality (MR) technology for on-site applications. To date Mercury have integrated VR and MR into numerous Data Centre, Life Sciences & Technology and Healthcare projects with very positive outcomes.

The VR project is led by ***Sean Dowd, Mercury Group BIM Manager*** in conjunction with VR enthusiasts ***Sean Lenoach, Senior BIM Engineer and Margaret Carey, Senior BIM Detailer.***



DIGITAL SCANNING

The use of surveying data is an integral component of Mercury's BIM process. We have cultivated our own **in-house expertise** to capture and manage this information. We have developed systems and procedures to inform the management of our survey work and utilise a combination of proprietary, opensource and bespoke software applications to make use of this data. The use of 3D laser scanning and imaging technologies to capture as-is conditions prior to modelling provides an accurate representation of the field conditions through which to route our services. This allows us to actively avoid clashing due to construction misalignment during the modelling process.

Owing to the nature of our work, this approach holds for both new build as well as retrofit projects. The survey equipment and software used allows us to conduct deviation analysis very quickly between the model and what our crews have installed. This informs the redlining process and allows us to be more efficient.

3D laser scanning

and imaging technologies

5

COLLBO

RATION

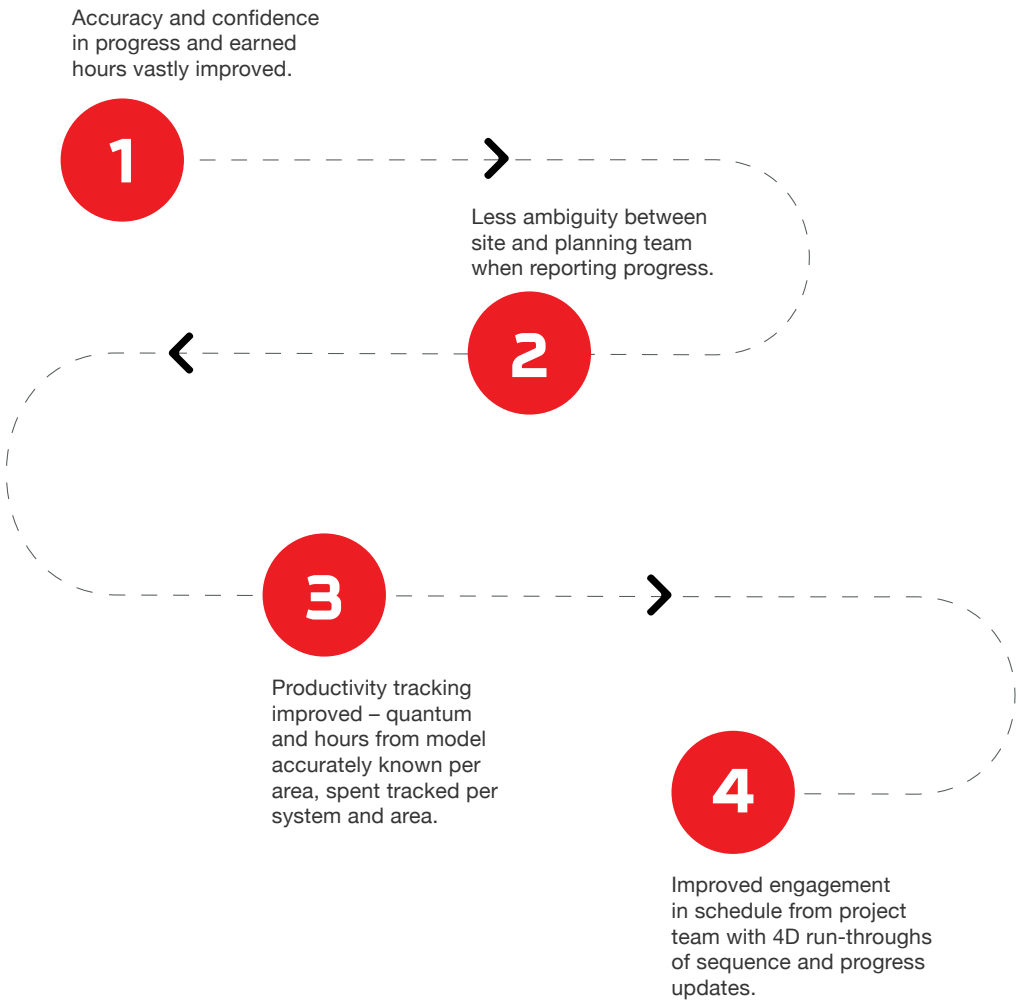
- Planning
- Procurement
- Commisioning & QA
- Health & Safety
- Facilities Management

COLLABORATION

PLANNING

The BIM Model is used in several ways to work with the planning team, by linking time data to the 3D components. Detailed schedules can be fed into the model to display both proposed and actual **construction sequences** and displayed through a **detailed visual 4D animation**. This provides clear information to the Client and relevant parties. The 3D Model also provides the ability to investigate and compare various designs and research their impact on the schedule is all an integral part of the design process.

There are numerous benefits to incorporating the Schedule Information into the Model.



PROCUREMENT

Building accurate 3D Design and Construction models allows **Mercury's dedicated procurement team** access to the most accurate and current information on all the building components. Access to this information provides known quantities of items per building area. Linking this information then to the schedule provides to opportunity to supply "**what and when**" data for just on-time deliveries.

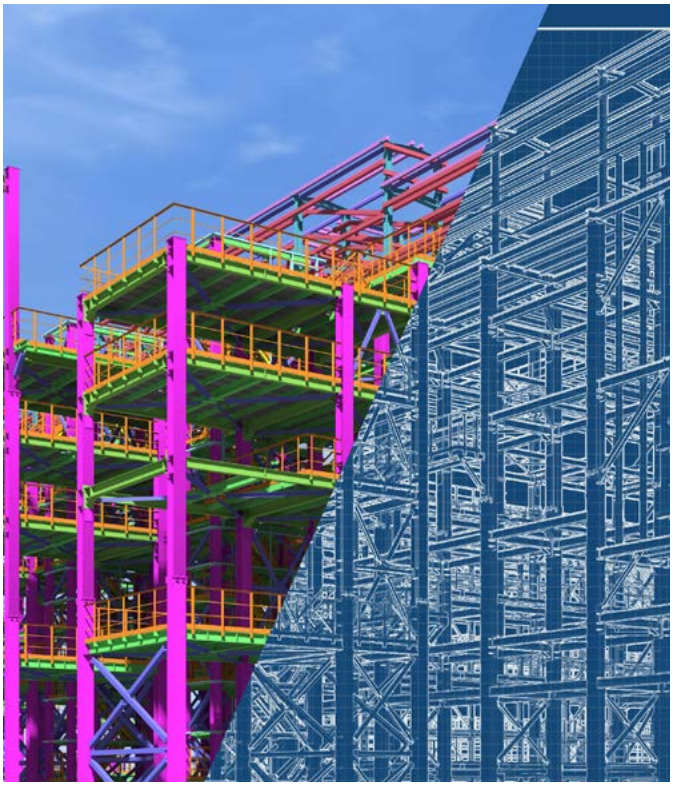
The 3D information allows faster and more precise take-offs and known quantities per area providing more accurate cost plans. This also provides a platform for design change review and comparison to the original designs, providing the opportunity to accurately change costs in real time.

Quantum and budgeted hours are updated as the model detail progresses. An exact quantum of install is known and can be displayed through Synchro. This enables us to track the install through the model and compare the predicated quantities to the actual costs.

COMMISIONING & QA

Quality in construction performance and client care underpin our reputation as a leading contractor delivering complex projects throughout Europe. Key to our success is our constant investment in our people, supply chain and in the latest innovations in BIM technology. Mercury is certified to ***ISO 9001:2015*** – the highest internationally recognised standard in quality management. We don't only satisfy quality system requirements to deliver the best possible service to our clients – **we continually aspire to exceed** them.

Mercury has the ability to carry out highly detailed quality site walks, both virtually through our collaboration and conferencing software, Microsoft Teams and in person across over 16+ countries in which we operate. **Our Design, Quality & Innovation team** constantly looks at new innovative approaches to deliver for our clients, while ensuring the safety of all involved.



HEALTH & SAFETY

One of Mercury's core principles is "**Work safe, Home safe**", putting everyone's Health & Safety at the centre of all work. We are using the digital world to monitor, improve and mitigate risks throughout all stages of the project. The 3D model can be used throughout the design process to eliminate potential areas of risk of injury during the construction stage or any time during the entire buildings lifecycle. The Virtual Construction environment provides an excellent platform to also highlight any risks to the construction team that cannot be eliminated. Ensuring clear plans can be put in place for work to be completed in a controlled and safe manner.

We operate in **16+ countries**

FACILITIES MANAGEMENT

As a result of Mercury's digital project delivery processes, our clients have the opportunity to build a **6D BIM model** - the Asset Information Model (AIM). Within this model, information is included for facilities management teams to operate and maintain the building after construction is complete.

Mercury's Facilities Management team works with our clients to develop an Employers Information Requirement (EIR) document that details the information required during the operational phase of the building. This information is then progressively collated in parallel with design and construction from **LOD100-500.**

The key benefits of this 6D model are:

1. It provides a single location where all operational information is stored, eliminating the requirement to have a traditional folder structure or hard copy O&M manual.

2. Facilities technicians have the entire historical suite of documentation available to them on their mobile device while carrying out maintenance tasks on the assets.

3. Technicians carry out inspections on equipment and upload reports directly to the model from their mobile device in real time.

4. The 6D model provides an effective project management and coordination tool for future building upgrade and maintenance works.

6

INNOVAT

TION

Innovation

INNOVATION

Mercury recognises the strategic importance of Building Information Modelling (BIM) to the global construction industry. We utilise **the most innovative and cutting-edge digital technologies**. This enables more efficient design and construction to support the organisational growth of our clients. Pushing industry boundaries by doing incredible things in areas such as digitalisation, offsite manufacturing and safety.

It's our bold promise that Mercury will always deliver. As an early adopter of building information modelling, Mercury consistently stays ahead of the curve with the modelling, information management and engineering techniques that we have employed to provide the best possible end product to our clients, both internal and external, across multiple sectors.

VIRTUAL PCS IN THE CLOUD

Working in the Cloud environment has allowed Mercury to develop the ability to utilise virtual CPUs and GPUs. Providing the flexibility to adapt and configure specifications to align with project requirements. These virtual machines are being used for shorter term projects where it is not economically viable to purchase new equipment. This collaboration between Mercury's BIM and IT departments allows us to provide best results for the client.

Further development has also taken place for remote access working to enable the ability to utilise the high-spec hardware in the BIM Digital Core Office from the home. The Mercury team have built an IT system where the power of the existing office hardware can be tapped into and utilised to maximise the work outputs from external locations, allowing Mercury to be even more productive in the Work from Home environment.

PRE-MODELLING POINT CLOUD USING AI

Several clients have requested Mercury to scan their Data Centres in 2020 - but some of these do not have an existing BIM model. From the scans produced by Mercury's surveyors, modellers then need to build out an entirely new model. We are currently investigating the use of scanning, photogrammetry and Artificial Intelligence to build the model straight from the scans and photogrammetry.

Exploring and investing in the HoloLens and similar new technologies in VR, AR & MR is opening up a whole new world of possibilities.

Working with all department enables Mercury to lever the maximum benefits from BIM. Integration of databases with SAP has enabled the output of modelled data for procurement and logistics purposes, reinforcing our "Just in Time" principles. A continued drive in 4D, 5D and 6D will continue to increase these possibilities.

Expansion of Mercury's bespoke BIM software has been a key enabler of working from home. In 2020, The software has now been expanded to give greater flexibility, inputs and outputs. Output is now available to Power BI and covers multiple metrics.

ENVIRONMENTAL ISSUES

are a major concern for Mercury, and implementing new ways to to make construction more sustainable is essential to the company. For this reason we have begun a new programme utilising the EC3 platform, looking to find ways to improve the Construction Carbon Footprint.

Waste reduction is also a critical part of environmental protection. The Mercury ways of working are continually being driven by Lean Principles. This ability of our teams of adapt and evolve has now resulted in the creation of completely Paperless Construction Sites.

HEALTH & SAFETY IN THE WORKPLACE

is one on the most fundamental core value for Mercury. Mercury continue to look and find new ways and technologies to help improve safety and minimise risk. BIM provides a excellent opportunity to mitigate risk and where not possible put procedures and plans in place to maximise safety.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