

BIM

A focus on reality

A practical introduction
to BIM and how you can
get involved



Connecting output with outcome

Paul Fletcher discusses the real reason why we should do BIM well

“At BIMSphere, we are committed to innovation in BIM, through integrating technologies and education to enable the highest return on investment from your BIM journey”

For more than forty years information technologies have allowed the geometry of the built environment to be modelled in computers, allowing designers to better realise aesthetic forms and arrangements. In parallel, the other analogue processes necessary to bring a building from design concept to built reality have been accommodated in digital form; from word-processing, spreadsheets and email to an ever growing array of construction specific applications.

As computing power has increased, digital building models have become ever more complex allowing improvements in coordination, specification, cost and construction logistics. More recently, data is being embedded and extracted from these models and simulation is adapting from visual fly-through to construction simulation and energy use predictions. We are undoubtedly building better, with greater accuracy, greater precision in less time and at lower capital cost. But are we building better buildings? This is the real prize, the real opportunity.

The key measure of what makes a better building when in use, the resultant outcome of the building being built.

Ever improving technologies that allow building physics, the integration of the building fabric and services that are in use to be modelled and, more importantly, simulated are facilitating this adaptation in purpose. The growing awareness of the profound importance of buildings in their usage, and how this can be understood through data modelling and simulation, will inevitably inform the process of building creation and indeed the refurbishment and remodelling of existing buildings.

Empowering a rejuvenated and repurposed industry to deliver systematically integrated solutions by enabling environments that are energy optimised, resource efficient and minimise waste will probably, most significantly, enhance end-user wellbeing and productivity.

Social media and big data have already transformed much of our daily lives, and now these evolutionary technologies are poised to transform our understanding of the built environment further still.



Paul Fletcher
February 2013

Paul is an Architect, catalysing a cooperative collaborative Built Environment culture that sustainably serves society. Paul is a co-founding director of Through Architecture, Chartered Architect and accredited RIBA Client Adviser.

Contents

Discover BIM	4
To BIM or not to BIM?	5
Our five steps to BIM success	6
Understanding the BIM consequence	7
It's all about the ROI	8
The power of good data	9
BIM data flow	10
Interoperable Data	11
Luckins™ and BIMSphere	12
Products and services	13
Education and training	14
Biographies	15

Discover BIM

BIM is a subject widely talked about but little understood. Here we look at the basics of BIM and the fundamental parts that are required to make a complete BIM model useful to the entire project team – whatever that project may be.

Building Information Modelling (BIM) is simply a collection of data about a project. Originally a term coined for buildings, BIM applies to many forms of project, from infrastructure to petro-chemical and everything in between.

Using BIM is for many a cultural change as much as a technological change. Amtech's BIMSphere team is able to provide tools and solutions to help your business grow into becoming a successful BIM rich organisation.

In March 2011, the UK Government mandated that all of their projects procured after 2016 must be BIM level 2 compliant. Indeed, it is their intention to be on the way to level 3 by this time. BIM Level 2 is a set of co-ordinated information, both geometric and data centric, produced in a collaborative way and delivered in an electronic format.

The deliverables required for BIM Level 2 are (a) a data rich BIM model and (b) a COBie (Construction to Operations Building Information Exchange) output from said model. COBie is a simple, lowest common denominator data structure, most commonly generated as a spreadsheet. The data contained in a COBie file is a collection of information about the project although its real intended use is in the operation of buildings.

BIM/CAD authoring such as those from Autodesk®, Bentley, Tekla, Graphisoft etc. are able to create models that can clearly display a virtual building which is immensely useful. However, the missing link in the BIM world to date has been a lack of somewhere to link all the vast amounts of data available at different stages through the project lifecycle and make it available to anyone involved in its construction or operation.

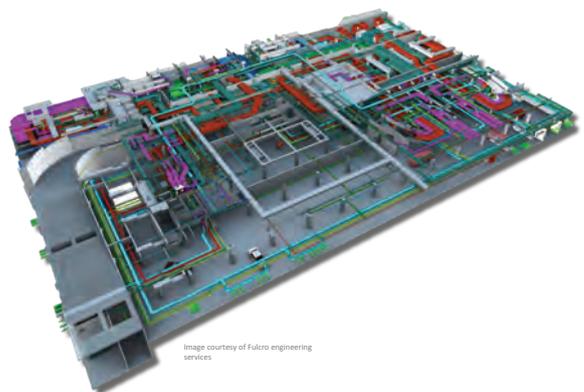
Artra™ changes all this. It is an enterprise solution for asset and plant lifecycle management, as well as construction and facilities management.

At its core, is a SQL database management system with a 3D graphical front end. This has been designed to be easily integrated with other database applications as well as IFC and COBie standards.

Artra™ provides the means to collate an entire project bundle of information & documentation into a single, manageable resource that can be handed over or transferred between project stakeholders throughout the design, construction, fit-out and FM stages of a project.

It provides the functionality to search, link, tag and report on information stored in 3D models or BIMs, as well as the ability to add new construction and maintenance data captured on site. There is much debate about the file sizes for models in REVIT® or COBie files. However, that's because too much data has been added in the wrong place. For instance, a 600Mb model can be viewed in Navisworks in a 41Mb file without any loss of intelligence. This can easily be taken on site to enable further data capture.

The BIM Sphere team can help you through every aspect of your BIM journey. Starting with expert advice and consultancy services to help develop your BIM strategy, through to evaluating your current processes and advising on technology choice. We can even help you manage your first BIM project to ensure a successful outcome.



To BIM or not to BIM?

When it comes to BIM, the term ‘emperor’s new clothes’ would be a good description of what people are stating as reality. The truth is that BIM is absolutely the right thing for the industry.

It seems that anyone who is anyone is the king or queen of BIM and that they’ve been “doing” BIM forever. It’s not hard to see why many in the construction industry feel they can’t compete with seemingly the whole world doing super-projects in BIM. The reality, however, is often quite different and in fact, many of these ‘BIM’ projects are little more than 3D CAD with clash detection. BIM wash is a widely accepted term for this mis-representation of the facts and it exists at the highest levels within the industry.

BIM requires two key components, collaborative working and interoperable software. BIM is aimed at efficient program delivery and preventing the huge unnecessary waste that occurs on most construction projects. It will improve margins for contractors and save costs for clients. Instead of each discipline working within ‘silos’ in an adversarial and very contractual environment, the aspiration for BIM is to bring everyone together, clients, architects, engineers and contractors and have them work together collaboratively to provide efficient design through effective communication, at all levels. This is common sense but it will require significant cultural and technological change, which is coming.

Interoperability brings many sets of data together that can be shared amongst the design and construction teams.

The data starts off in a very simple, generic form and is then developed and enhanced as a project progresses towards completion. Finally, it can be handed over to the owner as a comprehensive and accurate ‘living’ operating and maintenance reference set, only now it is fully interactive and digital – which is extremely useful. This project biography can then serve to inform the next project, a true “Cradle to Cradle” data journey.

The truth about BIM right now is that it’s not the finished article but if you can find a way of bringing BIM into your working practice, in any way that is better than those in your peer group, you’re already halfway to success. It’s definitely not too late. Indeed if you jump on the wagon now you will get ahead of many of your competitors.

Take the time to learn about BIM and what it means for your discipline. Look at how you currently work and how this may have to evolve to accommodate this new world of BIM, which is here to stay. Then plan to embrace it one step at a time. Try to cut through the BIM wash and understand how first defining and then implementing your BIM strategy, will produce a significant advantage for your business.



Our five steps to BIM success



1 Act now!

- Get a better understanding of BIM and how it will benefit your business and help you:
 - Win business
 - Reduce waste, therefore save costs
 - Help complete projects on time
 - Improve your profits

2 Plan

- Define a company strategy
- Cultural change – starts with simple high level education
- What are the barriers to change?
- Expand the education and define the first 'BIM Goals'
- Evaluate the competence of existing BIM products
- Ask your software vendors what their interoperable BIM strategy is

3 Review

- Are they currently fit for purpose?
- Will they achieve your BIM goals?
- Re-align to technology / BIM plan as necessary

4 Define

- Set benchmarks against previous projects
- Define what success is
- Agree your business objectives for the first project
- Define what a successful BIM project is

5 Get started!

- Start on a small project
- Choose one that is relatively straightforward
- Remember this is a learning curve
- Agree limited, well defined measures of success
- Review successes and apply to your next project

Understanding the BIM consequence



It's all about the ROI

A look at the real cost of BIM

To many, there is a strong perception that investing in BIM seems like an extravagant and costly investment. The reality is that it could make you much more profitable and help you win business.

First of all, let's look at that word "expensive". In the 1980s and 1990s 2D CAD replaced drawing boards in offices around the world and formed a revolution in the way that we worked.

You may well remember that back then a fairly basic PC would have cost you around £2000. A CAD workstation with added software plus a highly paid user with all the extra training that was required, then coupled with the implementation and learning curve, generated substantial costs. Back then most people did not know how to use a PC at all!

Nowadays, PCs get cheaper by the day, everyone can use them and we all have the necessary furniture and additional equipment needed to set up a BIM workstation. In fact setting up a basic BIM user with everything that he/she needs is just over half of what it cost in the '80s.

Also, compared to CAD, the return on investment has been proven to be remarkably more than break even. In the McGraw Hill SmartMarket report (2010) 46% of BIM users recorded a ROI of better than break even, and 20% reported ROI of over 100%, and that was three years ago and based on the extremely limited tools available at that time.

With the revolutionary tools such as ArtrA™ now available, which make the right asset information available to everyone, on or off site, whenever they need it, these ROI statistics are already a thing of the past.

The efficiencies already being made by removing misinformation and waste on site are showing overall project cost savings of around 15%-20% of the total project cost. If a sub-contractor can save 1%-3% of their total project value, (and some already have) this might easily double their profits. The cost of a few BIM workstations quickly pails into insignificance.

If you don't embrace BIM you will get left behind. It's not just government mandating BIM and if you can't demonstrate your BIM credentials you soon won't be able to bid on many projects. But embracing it will give you a competitive advantage and save you money!

If you need help on where to start, just contact the BIM Sphere team.



The power of good data

BIM is only as good as the data it uses

Until very recently, even BIM well done was limited by the breaks in data flow that occur due to the way data is exchanged between members of the construction team and the building operators.

Each time a different BIM tool is used, or each time the project progressed to the next stage, data is lost or discarded and this severely limited the effective use of the BIM model throughout the entire process.

Now designers, engineers and contractors can add manufacturer specific data into the earliest of design stages. Software can now link to a comprehensive manufacturer's data set in the cloud simply by adding a unique ID into their software or model. This not only provides access to a wealth of data, it also reduces the file size of the model since it only need carry the code rather than masses of embedded data.

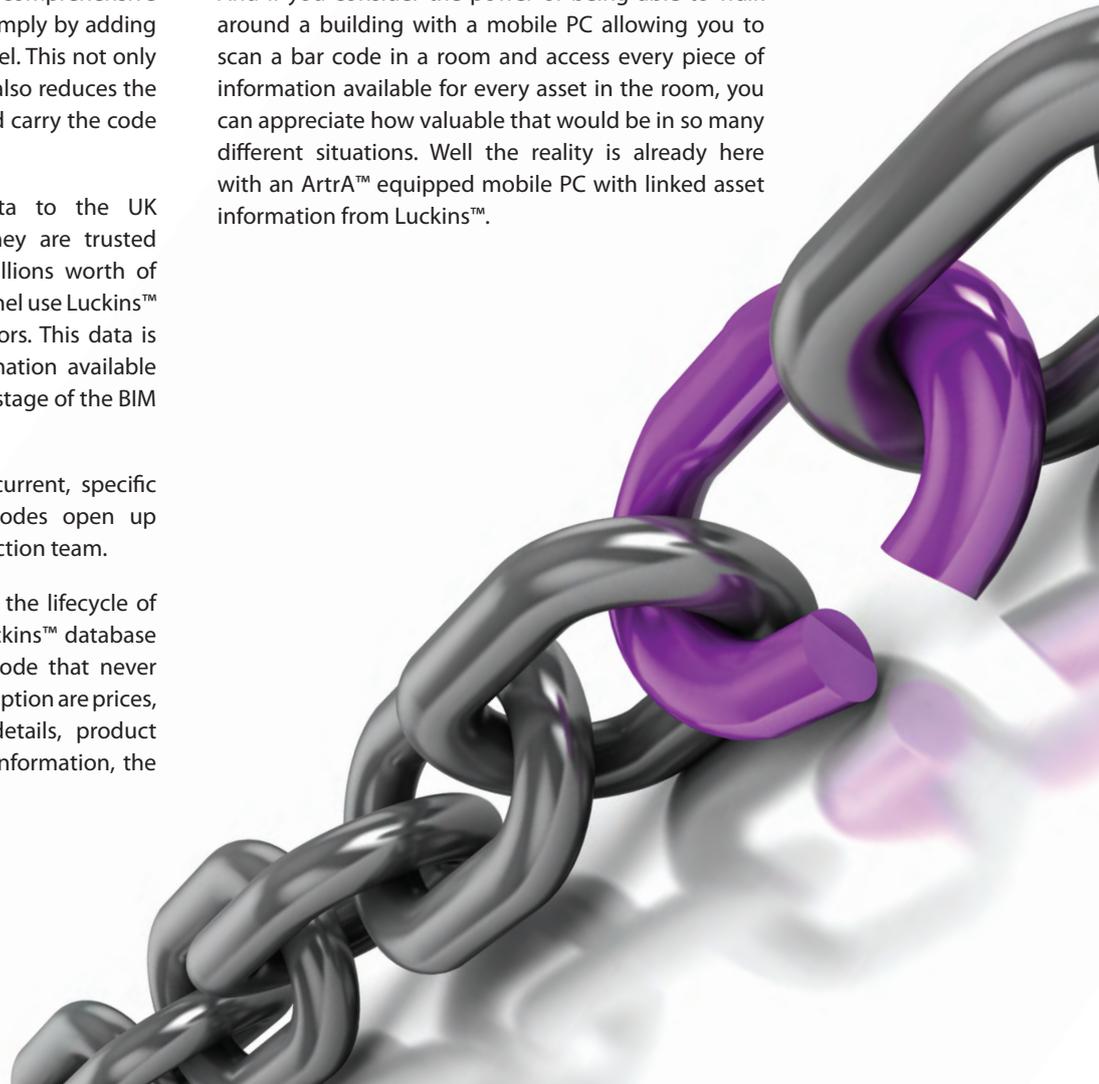
Luckins™ have been providing data to the UK construction industry since 1966. They are trusted to supply pricing information for £billions worth of projects. Much of the distribution channel use Luckins™ data as well as thousands of contractors. This data is being enhanced to provide all information available for a product and filtered to suit every stage of the BIM lifecycle.

With its database of over 1 million current, specific manufacturer's products, Luckins™ codes open up huge possibilities to the entire construction team.

These possibilities extend throughout the lifecycle of the building. Every product in the Luckins™ database is uniquely identified by a 13 digit code that never changes. Attached to the product description are prices, labour rates, spare parts, supplier details, product images, technical data, maintenance information, the list goes on.

All of this (asset) information is kept up to date and available through the cloud. It can also be pushed to specific applications on a daily or weekly basis. The information can be linked to many types of systems including ERP for estimate, procurement, service and final account.

And if you consider the power of being able to walk around a building with a mobile PC allowing you to scan a bar code in a room and access every piece of information available for every asset in the room, you can appreciate how valuable that would be in so many different situations. Well the reality is already here with an ArtrA™ equipped mobile PC with linked asset information from Luckins™.



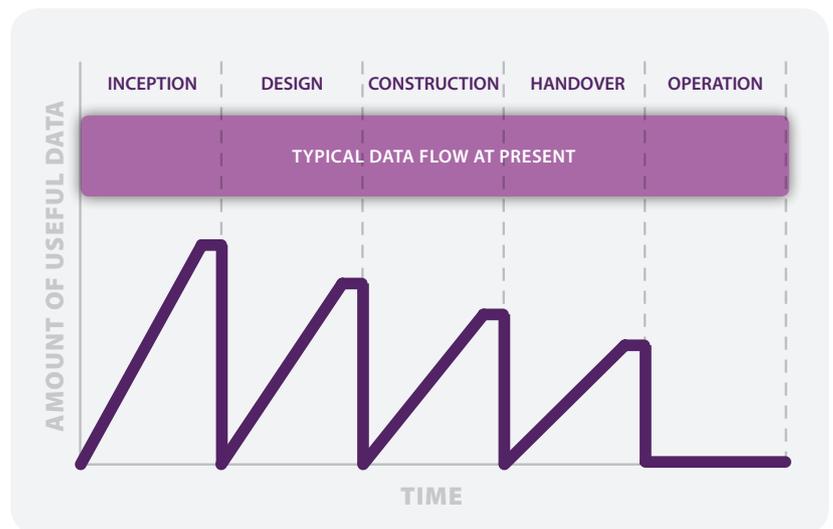
BIM data flow

Without meaningful asset information, you will never have a true BIM

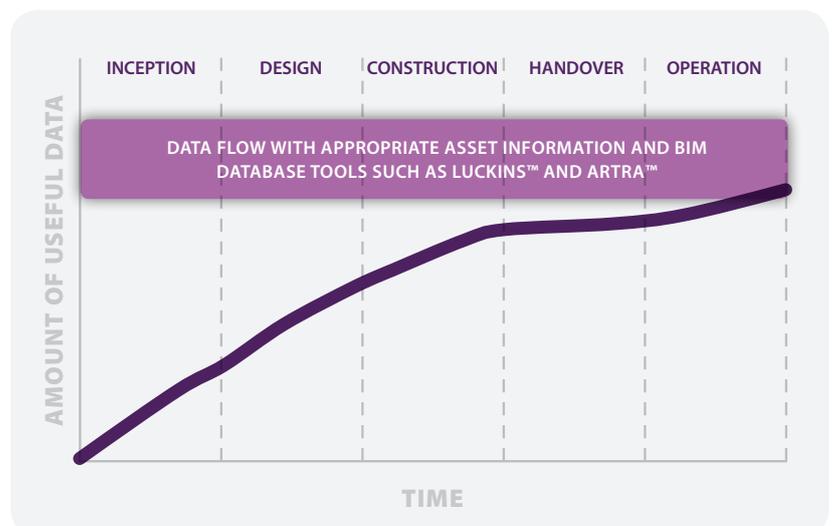
The 'I' in BIM stands for information. Getting the right level of information into the model at the right time is one challenge. The next is to make it available without loss of integrity or quality throughout the project lifecycle, so that it is available to everyone who needs it, when they need it.

Current BIM model data flow. Information is frequently lost because of poor interoperability and data standards. At each stage, varying degrees of re-work are required to provide the information required for the next stage.

Currently there is very little operational or lifecycle data available to building operators.



Data is developed and enhanced at each stage of the building's life. It can be made available at the appropriate level for each stage, thus avoiding 'information overload'. It builds toward handover and changes from construction information to operational asset data. Now FMs have the information they need to maintain and operate the building.



Interoperable data

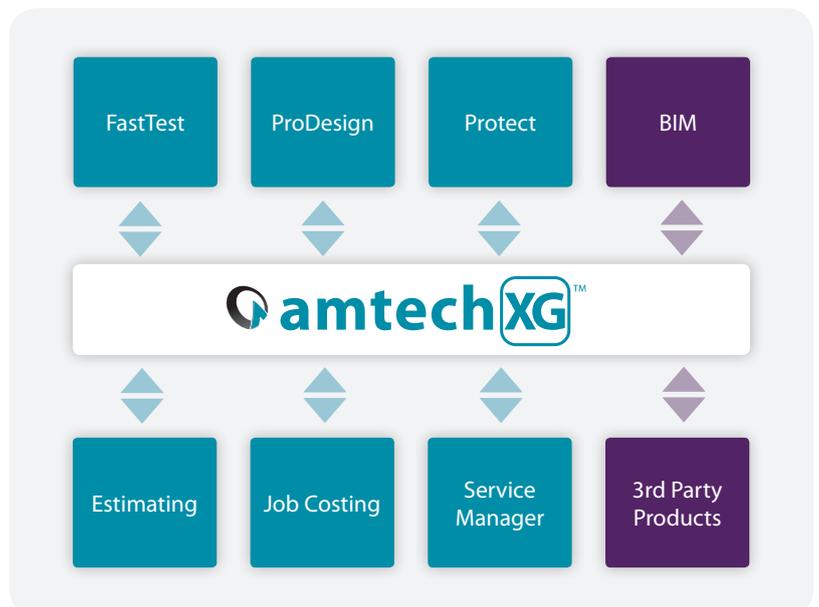
Getting tools to work together

Amtech Group have committed to making all of its software completely interoperable, COBie and Ifc compliant and open to link to any 3rd party product via web services. The key to this is its central project database.

All Amtech XG software will be connected to a central database enabling design calculations, estimating, certification and project management tools to work from the same data.

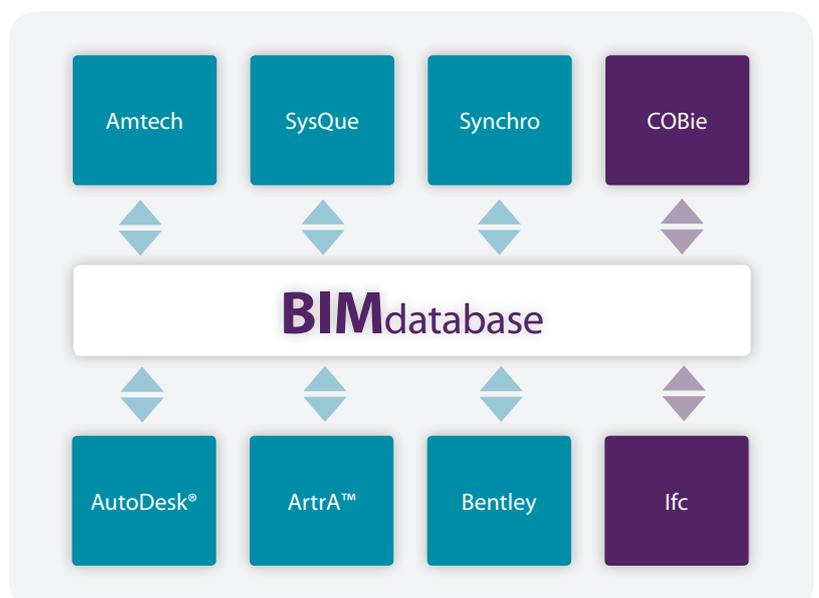
The data can be exchanged with external BIM authoring and analysis tools and a BIM database such as ArtrA™.

All software has access to accurate product and pricing data available from the Luckins™ Cloud Asset database system



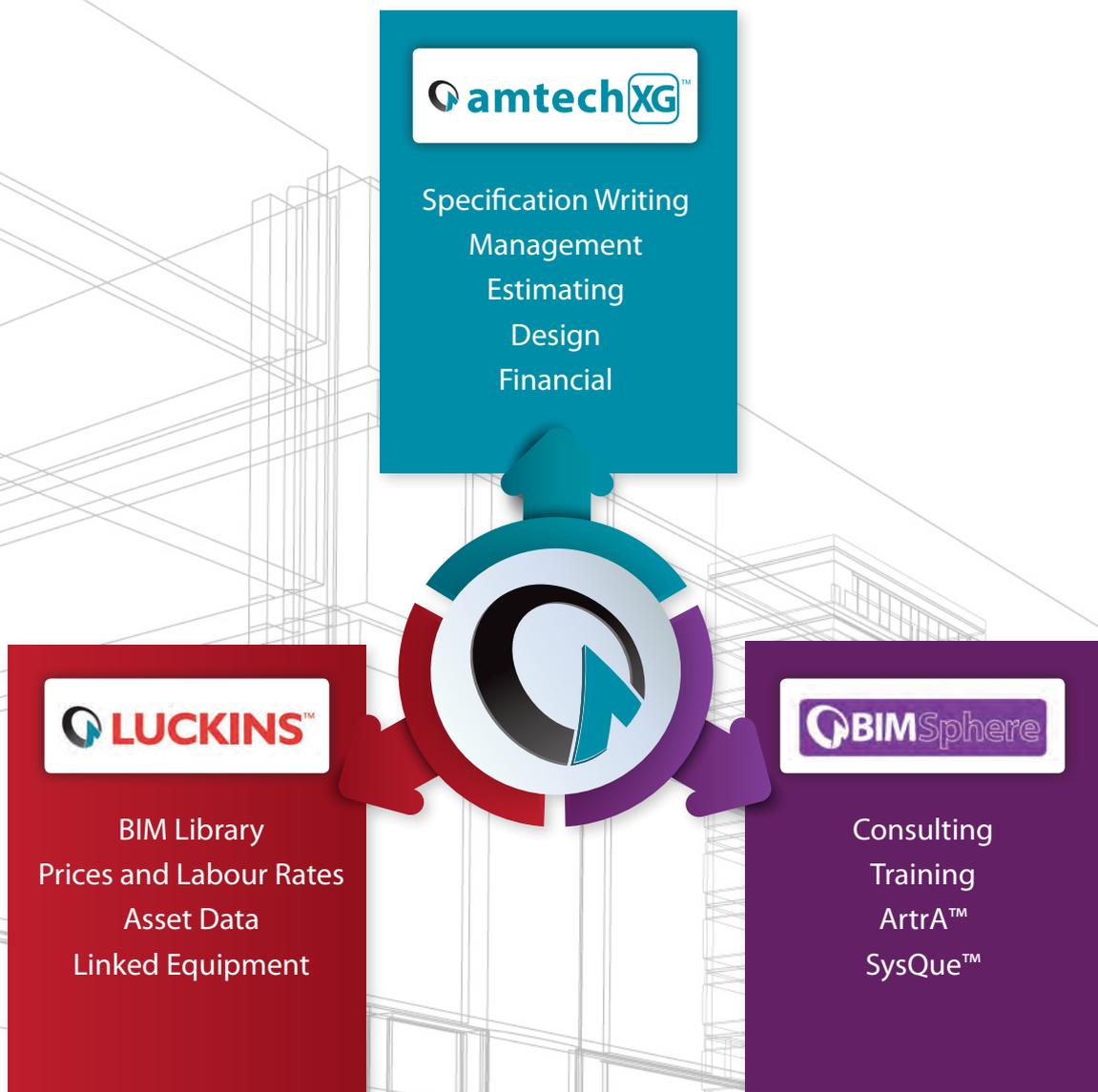
This open data, database approach allows links to other BIM tools to be possible. An example of this is a bi-directional link between Amtech Prodesign™ electrical calculations and Revit®, making the electrical design process more efficient, error free, continuous, and compliant with UK Regulations. Making all of the data on a project centrally based enables COBie to be generated on a whole project basis.

ArtrA™ is a unique asset lifecycle database that brings together information from many different software tools. It can be taken in the field (Field BIM) for fit out and snagging. Other information such as FFE can be added to the model to be handed over to the operations team. It can be used on any type of project both large and small.



amtechTM

Amtech Group solutions are set into three distinct but completely interoperable areas, each delivering efficient, task driven tools and services to help drive your business to success in BIM.



Building efficiency through software



Software for the Building Services Industry

Amtech XG™ is a set of interoperable tools designed to make the Building Services design and management process as efficient as possible.

Integrated software including: specification writing, design, estimating, job costing tools, maintenance scheduling, testing and certification.

With links between all this and your BIM model, Amtech XG™ provides the complete BIM solution for Building Services.



Asset Data for the Built Environment

Comprehensive asset database with 2 million items including obsolete
400,000 rich data items
BIM object library
Spares data
Links to ERP and other systems



Solutions and services for the entire construction process

Expert, 'real world' practical consultancy
Real world BIM application training for Revit® users
BIM readiness assessment
IFC and COBie tools
Powerful BIM software tools
Help all the way

Education and training

Where do I start?

Education and training are often overlooked or considered as optional extras. But this is a false economy and a lack of knowledge or, worse, mis-information will prove expensive. Training is essential to make the most of the BIM opportunity.

BIM is a global phenomenon and the UK has a particular focus with the Government mandating its use from 2016. In fact, the reality is that they are expecting to have their first level 3 project underway by this time. Many non public companies are following suit in requesting that projects are completed using 'BIM'.

This is a fantastic opportunity to get ahead of your competition by embracing the principles of BIM, but you have to be prepared. We already have experience of people bidding for contracts requiring level 3 BIM, yet this hasn't even been fully defined yet! So beware, it is not a case of bluffing your way through or you will come unstuck very quickly.

Our BIM Sphere team can provide a variety of support starting with the very first steps to BIM. If you need to understand what it means for you we can deliver a half day BIM quick start session aimed at senior decision makers and management. We can provide advice on how to develop your BIM strategy and can work with you to develop that strategy. We can also help you implement it, right through to your first BIM project and beyond. We can also offer practical, 'real world' Revit® training that goes beyond the 'standard functionality' courses. Our courses apply its application to help you meet your BIM deliverables.

Whatever your needs, our BIM Sphere team can help you every step of the way with a real world, practical approach that will help your achieve real results.



Amtech have been supplying software tools to the construction industry for over 25 years. We understand how the industry works and we understand its issues and challenges.

We have amongst our team many talented people with engineering and contracting backgrounds and a number of chartered engineers. Our BIM Sphere team is no different. We have put together an experienced team who really understand BIM and are widely recognised as having significant expertise in this hugely important growth area for anyone involved in the design, management or operation of buildings and assets whether a nuclear power station, undersea pipeline, hospital, office building or car park. If you need practical, 'real world' assistance in gaining an understanding of how BIM affects you, developing an implementation plan or tackling your first project we can help.



Gary Ross

Director of BIM Solutions

Gary Ross has been in the construction industry all of his life. Trained as an engineer he was one of the first to use CAD in its early days and went on to become CAD manager/engineer at many consultants and contractors. More recently Gary moved to Autodesk® where he was the technical interface between Autodesk® and its clients for Revit® MEP and AutoCAD MEP covering Europe, Middle East, Africa and India. BIM became a huge force in the industry and Gary became a BIM expert from the inception of BIM itself. Having become a specialist in BIM implementation and training Gary now strives to promote good information flow between all parties on construction projects to produce the nirvana of a complete BIM Model.

As Director of BIM Solutions at Amtech, Gary now also sits on Central UK Government bodies such as the FM Soft Landings group, is Chair of the BSRIA BIM network and Chair of the West Midlands BIM hub for the CIC and Government.



Peter Moyes

BIM Director – Industrial Solutions

Peter worked for 15 years as a senior piping designer in the petrochemical industry, progressing from the drawing board to the first 2D AutoCAD system and then on to Intergraph's 3D CAD. His experience has taken him to sites around the globe working on both onshore and offshore projects in Brunei, Oman, UAE, China, Indonesia, and UK North Sea.

His unique knowledge of many 3D CAD systems together with hands-on site experience has been an invaluable asset in the development of ArtrA™. ArtrA™ is a powerful 3D Plant Asset Lifecycle Management system particularly for Corrosion Monitoring in the Process and Power sector. In recent years the ArtrA™ system has been used in some of the largest and most prestigious construction projects as a unique BIM server system.

As Director of Industrial Solutions at Amtech, Peter will be focusing on Petrochemical, Power and Industrial applications of BIM and Asset Lifecycle Management.



Alexandra Grounds

BIM Director – Applied BIM Technologies

Alex has become an industry leader on how Building Information Modelling (BIM) interacts within the infrastructure market, geospatial engineering, MEP markets and the heritage sectors within the AEC industry. She presents at international conferences on these subjects, including SPAR Europe in 2011 and 2012. She has also had a number of papers published on the subject of BIM. She presented on BIM at GEO12 in March 2012 and ISPRS 2011.

Alex is a member of the ICE/ICES industry GP panel due to her work in the BIM arena, for all things related to BIM and the AEC industry. She is a certified professional in Revit® 2012 and is part of Autodesk's® Customer Council beta testing team. As part of the UK Government BIM adoption drive Alex has been involved with the UK BIM task group in relation to laser scanning.

As BIM Director, Applied BIM technologies at Amtech, Alex will be helping clients with the modelling of existing buildings and structures and linking them to the BIM.

BIM

The time is NOW

BIM is nothing short of a revolution for the Construction Industry. It is a global phenomenon but nowhere does it have more focus than in the UK right now.



“Government as a client can derive significant improvements in cost, value and carbon performance through the use of open sharable asset information”

“It will be mandatory for the use of BIM on all Government projects by 2016”

BIM Working Party Strategy Paper – March 2011

If you want to get started on BIM and need some help contact the BIM Sphere team:

Bank House
171 Midsummer Boulevard
Milton Keynes
MK9 1EB
UK

T: +44 (0) 1908 608833
E: enquiries@bimsphere.co.uk