



Country	Code	Value
JAPAN	JPY	100
SINGAPORE	S\$D	50
HONG KONG	H\$D	4.4
AUSTRALIA	A\$D	27
NEW ZEALAND	N\$D	34
SWITZERLAND	CHF	27
SWEDEN	SEK	4.1
DENMARK	DKK	6.4
CANADA	C\$D	28
NORWAY	NOK	8.1
FRANCE	EUR	100
GERMANY	EUR	100

3D Repo: New kid on the block

From construction planning to post-build operations, 3D Repo is evolving new tools for BIM-based ways of working

This time last year no one had heard of BIM solutions from 3D Repo, but the company is winning awards and working with some of the biggest names in construction. GeoConnexion spoke to its founder and CEO, Dr Jozef Dobos, to fill in the blanks

GeoConnexion (GEO): You’ve now been operating in the BIM arena for three years, so why the relative silence to date?

Jozef Dobos (JD): Although often described as a start-up, we’ve been working behind the scenes, backed by R&D funding awards, with some of the leading players in construction and infrastructure to develop innovative BIM solutions. We’ve recently been called a tech disruptor, which is probably true! It’s risky being first to market with solutions that challenge the current IT status quo so a lot of that time has been spent proving our offering prior to general release.

And yes, our innovative work has been recognised with a number of awards. In recent months these have included a Premier Award for Digital Innovation from the Chartered Institute of Building, and we were Highly



Dr. Jozef Dobos

Commended at the Institute of Engineering and Technology Innovation Awards.

GEO: You mentioned R & D funding; is there anything new you’re working on?

JD: We’re working on a number of funded projects, including the development of a single, integrated and accessible platform that can visualise and analyse data relating to any aspect of an infrastructure project. This Smart Infrastructure project – called VISUALISE – is part-funded by the UK government innovation agency, and sees 3D Repo working alongside project lead Skanska and partners Building Research Establishment (BRE), UNIT9 and CartoConsult. We’re also one of only three SMEs from across Europe to be selected to work on a major cyber security management project; a European Commission Horizon2020 programme with a research grant of €5 million.

GEO: So, where did 3D Repo come from and what do you do?

JD: We're essentially a spin-out from University College London, where I did an Engineering Doctorate in Virtual Environments, Imaging & Visualisation (Computer Science). In a nutshell, 3D Repo offers a Software-as-a-Service platform for Building Information Modelling (BIM) in the cloud. So, instead of architects, consultants and contractors sharing massive proprietary files in a costly and time consuming manner, they can simply point their web browser to an encrypted database in order to examine each project stage virtually – even on mobile devices. So, we provide a repository for all conceivable types of data; it's best described as an online 'knowledge base'.

GEO: What does BIM mean to 3D Repo and its users?

JD: BIM is a broad term that gets described in different ways, but if I had to pick a definition, this is as good as any: 'a shared knowledge resource for information about a facility, forming a reliable basis for decisions during its life-cycle; defined as existing from earliest conception to demolition.'

The VISUALISE project is a good example of the broad scope of BIM and illustrates how it relates to GIS. Organisations like Skanska are responsible for building, maintaining and managing multiple infrastructure assets on behalf multiple clients. Assets can be distributed over wide geographic areas, and the management of different assets is traditionally within 'closed' systems. While geographical, asset, live monitoring and other data may be available, it's not effectively shared or used to evaluate large scale data patterns. This can mean that trends between different asset types, for example by ownership, location or other shared classification, may not always be identified.

Providing better intelligence and functionality for asset managers, VISUALISE will enable better asset management, reduce the risk of failure and improve lifetime performance. The additional intelligence will also lead to productivity improvements, cost savings and improved business offerings to asset owners.

BIM should also play a vital part in post-build operations. For example, in a recent project for Crossrail, we developed a solution for managing assets 'down the line'. Our mobile app allowed data matrix ID labels and RFID tags to be scanned using a mobile device, to provide real-time access to plant and system diagrams and operation and maintenance manuals. Our mobile platform will also let project managers, maintenance personnel and stakeholders access different 3D views of an asset, allowing them to

select information that is most relevant to them for the purposes of installation, snagging and commissioning, for example.

We've also worked with Canary Wharf to develop a cloud-based BIM solution for contractors to share 3D models via web browsers for the purpose of design coordination. The objective was to replace inefficient email exchange and data federation, where, instead of each party passing around large Autodesk Navisworks and Excel spreadsheet files, we would provide a database-driven live preview of 3D models in a web browser without the need to install any additional software or purchase expensive hardware.

To improve coordination, we employed '3D Pins' that stakeholders could simply drop into the 3D model along with comments through the browser, allowing consultants to reply with comments to resolve any issues. Crucially, we also developed the capability to automatically detect changes between any two revisions of the 3D model; this change detection feature is unique to 3D Repo.

GEO: What makes 3D Repo different from other collaboration tools on the market?

JD: Instead of a conventional file-based approach to storage, we break down files into minuscule data blocks that are uniquely stored in an online knowledge base. So, while other solutions provide online visualisation and common data environments, they're still based on conventional file systems.

This offers great potential for analysis of projects and even cross project analytics. It also means we can easily enrich the information by merging data from various sources. File based systems are just a digitisation of an analogue process of archiving, whereas using an element level database means that information is live, useful and accessible throughout the project lifecycle

To that end, we're embracing not just the democratisation of data, but rather the 'incorporation of information' – giving people access to usable data, when they need it, in order to make informed decisions.

GEO: What are the big issues facing companies operating in the BIM sector, and what do you see as the next big thing?

JD: With cyber-attacks on the increase, data security is naturally a concern. From the outset, 3D Repo has been closely involved in data security, having previously worked alongside organisations such as Digital Catapult, F-Secure and Telecom Italia. That's why we were chosen for the EU Horizon2020 project mentioned earlier, where we will be working with a consortium

of 11 leading IT and communications organisations, including project lead CNR (Italy's National Research Council), Hewlett Packard Italiana and BT.

On the subject of risk, health and safety is always a big issue for industry, especially where hazardous construction sites are concerned. To that end we've used our platform to develop Virtual Reality solutions to simulate on-site working scenarios accessed from the safety of the office. We've done some work with organisations such as Balfour Beatty in this arena, where immersive simulations are being used to give the user different perspectives of a potentially dangerous situation in order to develop an understanding of safe working zones. This type of project is designed to prevent on-site accidents by making highways construction and maintenance projects safer through improved training and awareness.

The relationship between GIS and BIM is important as the transition between each ought to be seamless. While some may say BIM is more rooted in geometry than, say, geography, we would argue it's all about context. Users should be able to identify their project on a map and simply zoom down to street level, via a 3D city model, then enter a building and view the BIM data. It's our aim to make all data accessible with a transparent solution that overcomes issues associated with disconnected technologies, propriety software and different formats.

GEO: So what's next for 3D Repo?

JD: Building on our work with Canary Wharf, we're concentrating on developing our change detection technology and enhancing its clash detection capability. This will allow project partners not only to identify where a change has been made, but also to review the impact of that change on other elements of the project. Internally, we've coined a new phrase that we think will become an industry buzz word and in time develop and mature – 3D Diff – the identification of differences between 3D models which, in turn, will grow into 4D Diff – the identification of differences in 3D models over time. Watch this space ... and time.

Beyond that, the real power of the database is its ability to offer insights into past performance and likely outcomes. To achieve this, we're looking at how we can incorporate machine learning and analysis in order to give users a greater insight into their project performance. This, combined with industry advances such as IOT and new interoperability standards, will create the basis for the next generation of the digital construction process, something which has already been identified by the UK government for BIM level 3 in its Digital Built Britain report.