

Results of competition: Digitising the construction sector - Collaborative R&D

Total available funding for this competition was £6m from Innovate UK.

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
4 Projects Ltd (lead) Shepherd Engineering Services Limited University of Northumbria VINCI Construction UK Limited	"Tier2Tier": A collaboration interface between construction main contractors and their supply chain specialist sub-contractors	£777,620	£444,590
Project description - provided by applicants			
<p>It has been recognised that the benefits of BIM will not be realised without the collaboration of the main contractor's supply chain: Tier 2 and beyond. There are significant barriers to this and it is unlikely that the CDE for Level 2 BIM is achievable without overcoming them.</p> <p>In response, Tier2Tier is a SaaS-based solution that will provide the Tier 2 specialist with an independent, controlled, bi-directional, cloud-based micro collaboration portal, allowing the 2-way transfer of validated information from tender through to final account. The envisaged service supports the goals of BSI B/555 Roadmap by facilitating controlled inputs, tender exchange, contract administration, automated payment transactions, change management, and COBie data transfer; all whilst minimising user expense.</p> <p>This collaborative project addresses the obstacles to participation of the wider project supply chain in the CDEs required for project teams to attain Level 2 BIM Maturity. This will be achieved by the re-examination of the business-to-business processes of tendering, invoicing, change management and payment, as well as using new "Big Data" and Social-graph approaches to manage multiple BIM projects.</p>			

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Balfour Beatty Group Limited (lead) University of West England Bristol	Integrated Mobile-BIM System for Optimised Construction Process: A Big Data Analytics for Simulation, Visualization and Real-time Updates of On-site Activities	£1,994,381	£1,138,732
Project description - provided by applicants			
<p>Cost and time overruns are rife in construction. It is the most critical factor causing stakeholders' dissatisfaction (CI, 2011). To better meet project deliverables, BIM is being currently used. However, contractors do not have a virtual simulation platform that can be used to simulate & benchmark their construction delivery processes, along with different construction techniques, materials, plant & equipment and personnel that can lead to optimum BIM delivery model. This is addition to excessive paperwork, artisanal approach, low levels of collaboration, high levels of repetition of effort, waste and errors. Existing BIM tool (i.e. ArchiCAD, Revit etc.) are not doing enough to tackle these operational inefficiencies.</p> <p>The overall aim of this project is to develop an integrated Mobile-BIM system that comprises of (i) Optimised BIM Simulation tool, and (ii) 3 Mobile Applications (Apps) that will be produced using Big Data Analytics and integrated together using Cloud Computing Technologies. Apart from helping to digitise the construction delivery process & eliminating operational inefficiencies, this project will enable attainment of UK Government's 2016 target for Level 2 BIM.</p>			

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Balfour Beatty plc (lead) 3D Repo Ltd Association of Interior Specialists Ltd AIS FPDC	3D Repo Bid4Free	£436,764	£244,061
Project description - provided by applicants			
<p>3D Repo (http://3drepo.org) is a multi-award winning open source version control system for the engineering and construction industry. Together with Balfour Beatty, the largest construction company in the UK, and the Association of Interior Specialists AISFPDC, a membership organisation that represents the majority of the interior fit out and finishes industry in the UK, the consortium aims to develop and test the 3D Repo Bid4Free cloud-based platform for Building Information Modelling (BIM) in the UK and abroad.</p> <p>In the construction industry, on average 2 to 3 man-weeks per subcontractor are spent on costing during each tender. For micro contractors working on single discipline tenders, this is a man-day, which is proportionally a very significant cost for them, too. However, such high multi-party expenses are recouped by only those companies that win the contracts. The aim is to pilot a process change in order to digitise the costing of work and submission of tenders for contracts and subcontracts with a reference to 3D data directly in web browsers.</p>			

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Keynetix Limited (lead) British Geological Survey	BIM for the Subsurface	£770,280	£543,639
Project description - provided by applicants			
<p>Unforeseen ground conditions are one of the major causes of project delay contributing to ~1/3 of construction programme over-runs. This can be attributed to constrained approaches to investigation, limited availability of high quality geotechnical data & subsequent interpretation. The project aims to address these issues by applying the BIM process directly to ground investigation & subsurface infrastructure design.</p> <p>The partners Keynetix, BGS and Atkins seek to significantly advance Keynetix's established HoleBASE SI & 3D geological modelling extension within Civils3D, & deliver the first geotechnical BIM solution through the development of a cloud based repository that will allow the storing, sharing & re-use of subsurface data & interpretations throughout the supply chain.</p> <p>Through the integration with BGS' national databases, the solution "Geotechnical BIM Suite" will allow for historical data to be digitally accessed, providing improved accessibility to BGS maps & geotechnical data & implement BGS methodologies & standards for 3D geological modelling. The approach is highly innovative & will significantly reduce future ground investigation risks & costs.</p>			

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Laing O'Rourke PLC (lead) Tony Gee & Partners LLP University of Cambridge	Digitally Enabling the Design for Manufacture, Assembly and Maintenance of Bridges	£1,199,983	£782,458
Project description - provided by applicants			
<p>A project to develop an integrated digital delivery process for bridges and bridge parts. It will address the whole lifecycle of bridges from identification and rationalisation of needs to manufacture, assembly, operation, maintenance and decommissioning. The output will be an interoperable set of digital tools, data schema and virtual prototyping processes that lead to the automated manufacture of a set of standardised, validated parts and sub-assemblies at a controlled price, configured virtually and in reality that are capable of meeting the requirements of the most common bridge types.</p> <p>The project aims to create a demand for offsite manufactured bridge parts and assemblies and allow digitally driven advanced manufacturing processes to be applied to bridge delivery.</p> <p>The team include Laing O'Rourke(LOR), Tony Gee and Partners, and University of Cambridge.</p>			

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MIRA Limited (lead) Cable Detection Limited JCB Service Limited	Intelligent Autonomous Digital Construction Machines	£1,665,598	£832,799
Project description - provided by applicants			
<p>The purpose of this collaborative project between JCB, MIRA and Leica Geosystems is to research future construction techniques involving a combination of automation, information technology and machine guidance. With expertise in their representative fields, the partners will look to enhance the efficiency of construction by optimising the generation, use and sharing of work-site data throughout the construction process. The novel technologies to be explored will realise measurable reductions in lead-times, fuel consumption and carbon impact whilst improving quality, work accuracy and improving job site safety.</p>			

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RIBA Enterprises Limited (lead) Bsi Standards Limited Construction Products Association	Persistent Digital Identifiers for Construction Products	£1,203,826	£591,913
Project description - provided by applicants			
<p>The project brings together the unique expertise and capabilities of RIBA Enterprises (RIBAE), BSI and the Construction Products Association (CPA) to address a critical infrastructural requirement for digitising the construction sector; the need for a common, identification system for all construction products. The system will utilise and build on the success of a scheme that is well-established in other sectors, enables interoperability of existing identifier schemes and reliability of long-term access to product information.</p> <p>The project will research and define the required product information, pilot and validate the approach. This will enable new business models for the project partners and the wider construction industry, facilitate data exchange and e-commerce and support the adoption of BIM. The project offers potential for expansion both to other aspects of construction information and into international markets.</p>			

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Skanska Technology Limited (lead) Armstrong Integrated Limited Building Research Establishment Limited Leaderflush Shapland Limited Multiple Access Communications Limited	Digital tag and track	£998,862	£509,299
Project description - provided by applicants			
<p>Tag & track provides the controls needed for effective implementation of industrialised construction activities, leading to certainty of outcome & reduced costs. There are a number of tag/track approaches (RFID/Bluetooth enabled, QR, Barcodes) that can be used to collect real-time data on the status/location of a component during the construction and life of a facility.</p> <p>To date the use of tag/track in construction has been restricted by cost of hardware & limited supply chain integration. However, its use in combination with 4D-BIM will allow progress on projects to be monitored against plan, enabling efficiency improvements (eg addressing scheduling issues that would otherwise cause delays) with 10% reductions in programme time targeted.</p> <p>The project will develop a solution for real-time tracking of component status during manufacture which can utilise different tag/track approaches. It will also develop a 'schema' to capture data from multiple supply chains in a standard format for integration into 4D BIM models. Outputs will be piloted in supply chains for real projects. Implementation will accelerate uptake of BIM throughout supply chains, contributing to an estimated 20% efficiency improvement.</p>			

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StickyWorld Limited (lead) Axis design Architects Limited Facit UK Limited HTA Design LLP National Custom and Self Build Association CIC Oprillo Limited Slider Technologies Ltd (trading as Slider Studio)	Digitising Custom Build (DCB)	£509,313	£329,997
Project description - provided by applicants			
<p>In the wake of the Chancellor's latest budget announcement of a new £150m fund to support the custom and self-build sectors, Stickyworld Ltd has assembled a consortium to innovate with digital communications and design coordination tools tailored to meet the needs of the different stages of custom build developments.</p> <p>The Digitising Custom Build (DCB) project combines BIM in desktop and the cloud with interactive stakeholder communications portals and will demonstrate improved end user journeys for the customer. The system will be designed, developed and tested to provide a means to coordinate, communicate and control quality on site and culminating in a smoother handover process supported by helpful online interactive home user guides.</p> <p>The consortium comprises two web application developers, architects and BIM specialists, custom home builders working at small and volume scale, and supported by the National Custom and Self Build Association. Together they will collaborate over 18 months to develop and test the project technologies and workflows in three live contexts for projects at different stages.</p>			

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Welplan Limited (lead) University of Northumbria	DECC-MR- Digital Engineering for Customised Compliance in Maintenance Regimes	£284,168	£166,492
Project description - provided by applicants			
<p>Digital Engineering for Customised Compliance in Maintenance Regimes: This project will deliver an innovative new application for the industry standard maintenance specification SFG20 web service, building on SFG20's existing capability to model and customise legally compliant client/sector specific, fit-for-purpose, cost-effective maintenance regimes to inform tendering and subsequent contract in management and audit. 'SFG20 for BIM' will provide a 2-way interface between individual native building models and SFG20.</p> <p>Data transfer from construction to Operation & Maintenance (O&M) phases will permit automatic generation of customised maintenance solutions from BIM models. Conversely, O&M data will inform whole-life design decisions, with collaboration between construction and facilities management teams benefitting stakeholders throughout the building cycle.</p> <p>This innovative proposal supports government and industry-led initiatives, e.g. 'Soft Landings', PAS 1192, COBie UK, and Digital Plan of Work (DPoW). The work is being delivered in partnership, drawing on experts from B&ES/Welplan, Northumbria University, Faithful+Gould, BAM FM and Bilfinger.</p>			