Bytes and Mortar: the potential for digital to transform the construction and infrastructure sectors

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Centre for Digital Built Britain

Set up in August 2017 by Government at the University of Cambridge to support the digital transformation of the built environment. It does this through:

- building academic capacity
- informing policy
- supporting industry change
Building research capacity

• Centered in Cambridge, delivered by the UK
• Multidisciplinary research community connecting dbB’s social, economic and technological ambitions
• Provides the long-term research agenda needed to deliver the ambitions of the Digital Built Britain programme
• Close links with industry to enable innovative research to become part of professional practice
Informing policy

- Research outputs informing evidence-based policy
- Home Nations Working Group
- Public Sector ISO Transition Working Group
- Digital Framework Task Group
  - Gemini Principles and Roadmap
- International and Prosperity programmes to grow the market for the export of UK skills and services

The Gemini Principles

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Supporting change

- Coordinated vision and roadmap towards a dbB
- Grow an open and global digital construction market
- Industry engagement programme across the supply chain
- Highlighting current and emerging good practice
- Sharing value cases to encourage the adoption of digital approaches
What is a digital built Britain?
• Deploy digital techniques to design better performing buildings, homes and infrastructure
• Use good practice, secure by default, information management to get data right from the start
• Exploit new and emerging digital construction and manufacturing technologies and techniques
• Secure, shared information, enabling clients, design teams, construction teams and the supply chain to work more closely together to improve safety, quality and productivity during construction
Operate

- Use real time information to transform the performance of the built environment and its social and economic infrastructure
- Smart asset management to predict and avoid disruption of services
- Digitising existing assets
• understand how spaces and services can improve citizen quality of life

• feed that information in to the design and build of our economic and social infrastructure and the operation and integration of services they deliver
Technical drivers towards a digital built Britain

Design & Build
- Smart Contracts & Procurements
- Digital Construction
- Digital Retrofit of Existing Assets
- Exploitation of Emerging Technology (AI, Machine Learning)
- Smart Asset Management & Operations
- Digital Twins (Component, Assets, Geospatial)
- Digital Twin Cities

Operate & Integrate

Information Management Framework

Building Information Modelling (BIM)

National Digital Twin

Centre for Digital Built Britain
Technology alone is not enough to deliver change
Construction Innovation Hub

- Product Family Architectures and Standardised Component sets
- Process Engineering Solutions
- Government Department Discovery and Analysis
- Physical Demonstrators

- Engagement and Skills
- Demonstration, Testing and Validation
- Built Environment Performance
- Digital Product Data and Building Regulations

- Digital Transformation across Asset Lifecycle
- Asset Management and Digital Twins
- Contracting and Business Models for the Digitally Enabled Built Environment
- Impact Assessment
- Driving Change and Growth
Data for the public good

Recommendations:

1. **A National Digital Twin** – enabling digital twins to come together to help plan, predict and understand our assets

2. **A Digital Framework** – for effective information management; secure interoperability of data

3. **A Digital Framework Task Group** – to provide coordination of key players
Data for the public good: Challenges

INCREASING POPULATION
ECONOMIC GROWTH
CLIMATE CHANGE
ENVIRONMENTAL STANDARDS
Transport for London has already demonstrated that releasing data to the public can save users time to the economic value of between £15m and £58m per year.
National Digital Twin: Enablers

**Gemini Principles**
Guiding values: the ‘conscience’ of the framework

**Roadmap**
The prioritised plan for delivering the framework

**Information management framework**
Effective information management across the built environment, including secure data sharing
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<td>Digital twins of physical assets are helping organisations to make better-informed decisions, leading to improved outcomes.</td>
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<td>Creating an ecosystem of connected digital twins – a national digital twin – opens the opportunity to release even greater value, using data for the public good.</td>
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<td>This paper sets out proposed principles to guide the national digital twin and the information management framework that will enable it.</td>
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<td><strong>Public good</strong></td>
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<td>Must be used to deliver genuine public benefit in perpetuity</td>
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<td><strong>Value creation</strong></td>
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<td>Must enable value creation and performance improvement</td>
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<td>Must provide determinable insight into the built environment</td>
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<td><strong>Security</strong></td>
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<td>Must enable security and be secure itself</td>
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<td>Must be as open as possible</td>
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<td>Must be built on data of an appropriate quality</td>
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<td>Must have clear ownership, governance and regulation</td>
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<td>Must be able to adapt as technology and society evolve</td>
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Effective information management across the built environment, enabling better decisions, leading to financial savings, improved performance and service, and better outcomes for business and society per whole-life pound.

The right information in the right hands at the right time.
DT Hub

A collaborative web-based community of those who are making serious progress with digital twins

Sam Chorlton
Chair, DT Hub
Steering Group
Project Lead
DAFNI

Target members:
- Asset owners
- Cities
- Universities
Collaborate with CDBB
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www.cdbb.cam.ac.uk/events/2019CDBBWeek