



# XXVI FIG CONGRESS

6-11 May 2018, İstanbul

## Survey4BIM & BIM4Rail

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ENHANCING THE GEOSPATIAL MATURITY OF SOCIETIES

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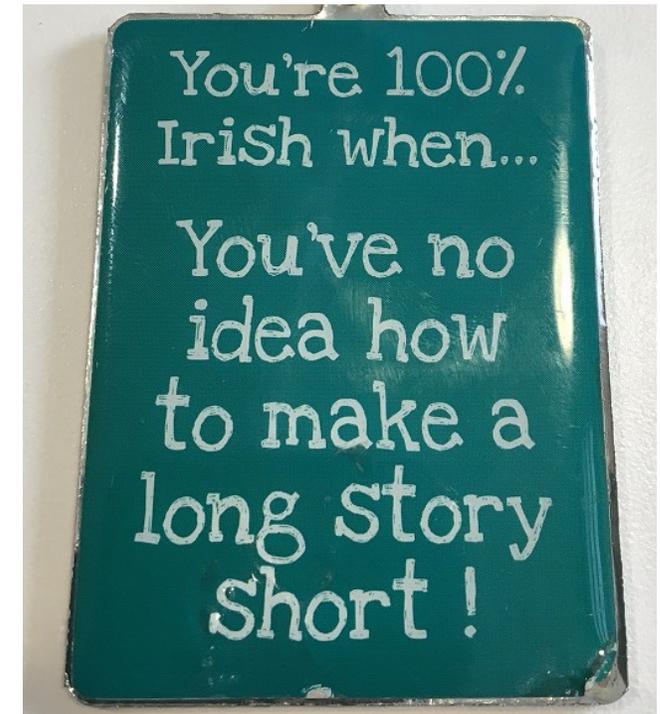




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## Key Messages

- Safety moment and the origin of BIM in the UK
- Geospatial surveying as 7 virtues, or deadly sins
- The BIM “Digital Twin” for “As-Is” and “To-be”
  - are they the same thing or Digital Twins?
- You need to understand BIM challenges outside survey
  - to understand survey challenges in Survey4BIM



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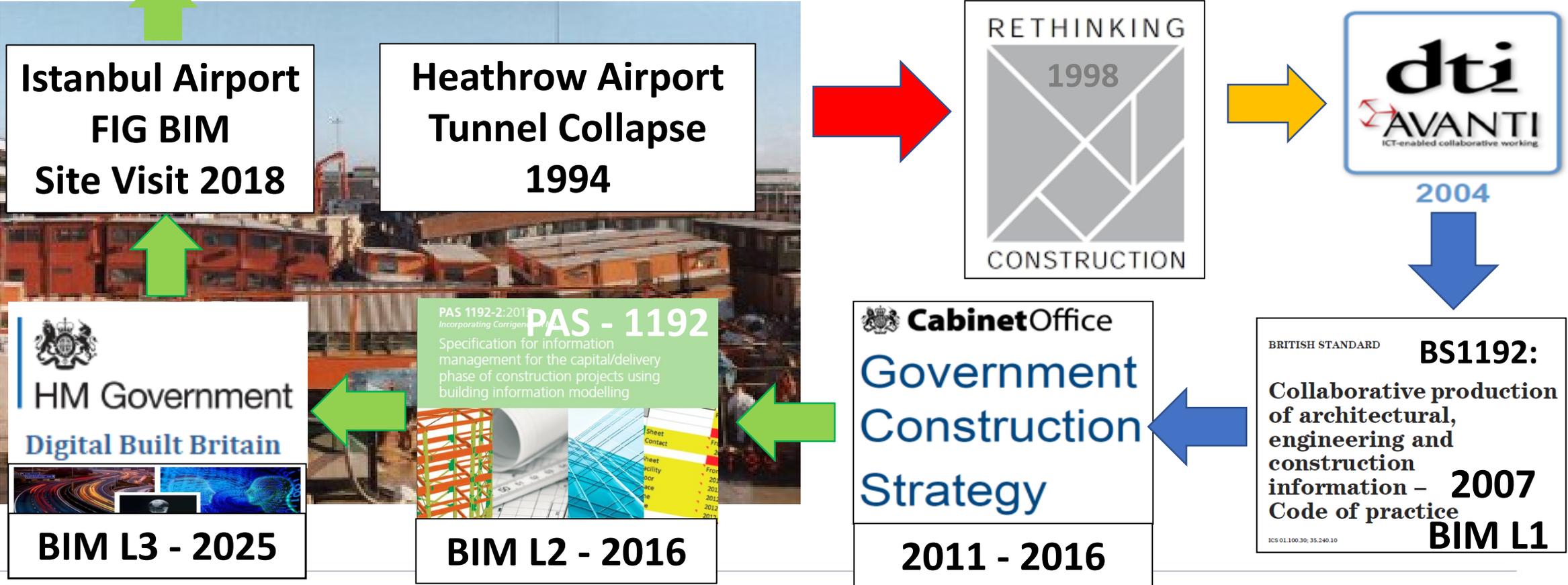
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# Safety moment and the origin of BIM in the UK



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## Geospatial survey as 7 virtues or deadly sins

1. Grids & chainage
2. Accuracy
3. 3D
4. Supplier performance & assurance
5. Safety and site access
6. Awareness and data access
7. Fitness for purpose, update and verification, risks



## The example of Blackfriars Station surveys



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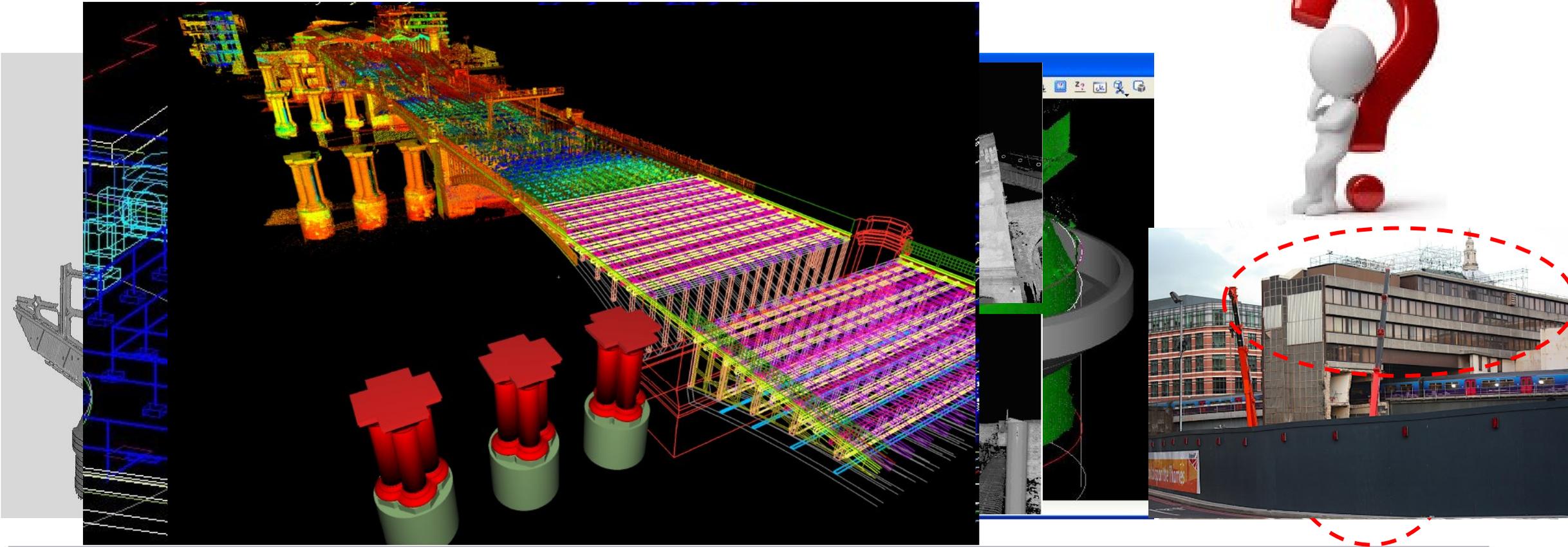


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# Geospatial survey as 7 virtues or deadly sins



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## Geospatial survey as 7 virtues or deadly sins

1. Grids & chainage
2. Accuracy
3. 3D
4. Supplier performance & assurance
5. Safety and site access
6. Awareness and data access
7. **Fitness** for purpose, update and verification, risks

What do  
you think  
now?



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# The BIM Digital Twin (are they the same or twins ?)

As Is

To Be



## Surveying matters

Most people know surveyors from buying their homes, but only 20% of RICS professionals conduct residential surveys. So what does the other 80% do? They measure, value and control costs across land, property, construction and infrastructure.

### Land

With all the demands on natural resources worldwide, land surveyors ensure that we are making best use of the resources around us for the benefit of society.



### £229 Billion

The estimated worth of rural areas which contributes to 17% of England's GVA

### £1.4 Billion

The amount generated by surveyors who are experts in 3D laser modelling

### Infrastructure

Infrastructure surveyors save clients and the taxpayer millions of pounds each year by managing costs and mitigating risks on construction and infrastructure projects.

### £9 Billion

A surveyor was in charge of this budget for the development of the 2012 Olympic games

### £411 Billion

UK infrastructure pipeline

### Property

Property is a company's largest asset and commercial property surveyors ensure that organisations make the most of this asset contributing to the bottom line of their business and the engagement of staff and customers.



### £73 Billion

The combined wealth of 25 of the top 100 richest people who obtained their wealth from property

### £63 Billion

The amount commercial property contributes to the UK's economy

### £17.5 Billion

The value of retail floor space in England and Wales in 2012

### £257 Billion

Contribution by leading investment funds

### £3 Billion

The value of 3,500 NHS properties

### Construction

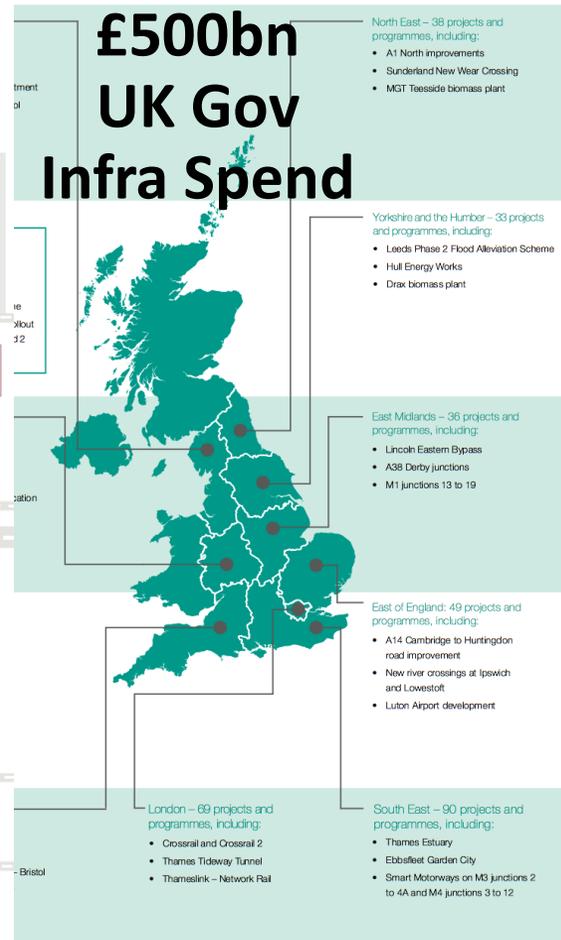
Construction surveyors save clients, businesses and the taxpayer millions of pounds each year through effective procurement and financial control.

### £90 Billion

The amount the construction sector accounts to our economy

### £8 Billion

Investment regenerating Battersea Power Station creating 17,000 jobs



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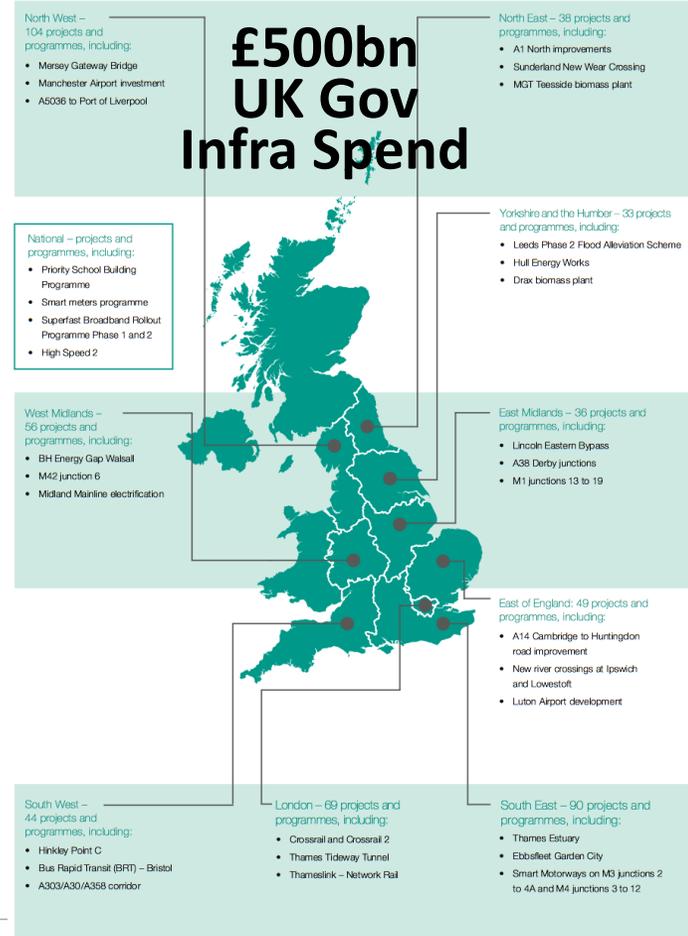
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# The BIM Digital Twin (are they the same or twins ?)



|                             |   |                         |
|-----------------------------|---|-------------------------|
| <b>As Is</b>                | - | <b>To Be</b>            |
| <i>Reality / Built</i>      | - | <i>Concept / Idea</i>   |
| <i>Big Data</i>             | - | <i>Precise Data</i>     |
| <i>Survey</i>               | - | <i>Design</i>           |
| <i>Construct</i>            | - | <i>Virtualise</i>       |
| <i>Sensor Capture</i>       | - | <i>Software Capture</i> |
| <i>Performance</i>          | - | <i>Capability</i>       |
| <i>Analytics/digitising</i> | - | <i>Modelling</i>        |
| <i>Reactive</i>             | - | <i>Proactive</i>        |
| <i>Curved /Dynamic</i>      | - | <i>Flat / Static</i>    |



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# Survey4BIM and BIM4Rail - Role - Structure



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# Survey4BIM and BIM4Rail - activities

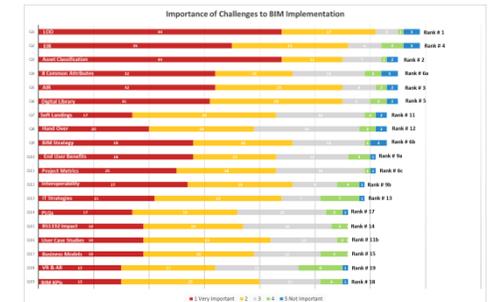
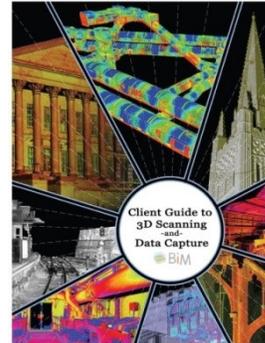


LinkedIn



Survey4BIM  
 Building stronger, together

Survey & the Digital Plan of Works



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# Big5 Challenges – Technical Workgroups

## Survey4BIM

Generalisation

Level of Detail

BIM Level 1

Interoperability

Meta-data

BIM Level 0

Accuracy

BIM Level 2  
Geo Enabled

Reputation

Waste

Risk

Injury

Rework

Delay

COST

CLASH

## BIM4Rail

KPI & Performance  
Proving

Hand Over &  
Hand Back

BIM Level 1

IT Strategies &  
Tools

Level of Definition  
Classification

BIM Level 0

EIR / AIR / OIR

Making BIM L2  
(Benefits) Real

Reputation

Waste

Risk

Injury

Rework

Delay

COST

CLASH

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# Big5 Challenges – Technical Workgroups

## Survey4BIM What's the problem with accuracy ?



BIM

### Accuracy, precision, tolerance: Do we understand the issues in this digital age?

Why is accuracy an issue for BIM?

Bernhard Becker FCInstCES, Director, GEOLEARN and Member, Survey4BIM

SURVEY4BIM has put a challenge down to the industry that geospatial accuracy is not properly defined in building information modelling (BIM) systems. Accuracy is considered one of the fundamental issues in people's use of and confidence in data and information systems. Historically, the geospatial community knows how to determine accuracy, but how can this be translated into a digital environment?

If we can define accuracy properly and communicate it to users, it can add huge value to decision making and risk management. So read on to get to grips with the issues.

#### Survey4BIM

Survey4BIM is a group of like-minded professionals and organisations which are involved in the collection, processing, management and delivery of geospatial services within a BIM context. The group works under the umbrella of the UK BIM Alliance. The group's mission is to provide a forum for survey organisations and industry professionals to collaborate and share their journey putting BIM into practice and to provide guidance documents on survey matters relating to BIM.

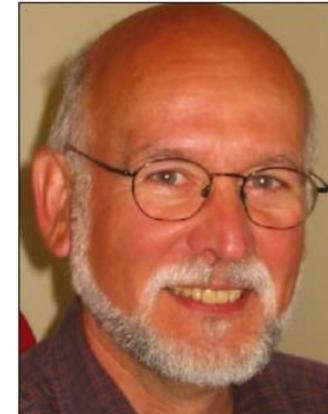
#### Big five challenges

While there is a clear vision outlined in numerous documents as to what BIM level 2 entails and how we have to collaborate to make it work, some important details pertaining to geospatial matters are not readily understood. Those details are technical and need to be embraced not only by survey professionals but also by all users of the system



**Survey4BIM**  
Building stronger, together

<https://survey4bim.wordpress.com/accuracy4survey4bim/>



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# Big5 Challenges – Technical Workgroups

## Survey4BIM What's the problem with accuracy ?

| Relative Error Ellipses |       |       |         | Absolute Error Ellipses |       |       |         |       |       |       |         |
|-------------------------|-------|-------|---------|-------------------------|-------|-------|---------|-------|-------|-------|---------|
|                         | Major | Minor |         |                         | Major | Minor |         |       | Major | Minor |         |
| Line                    | (m)   | (m)   | Angle ° | Point                   | (m)   | (m)   | Angle ° | Point | (m)   | (m)   | Angle ° |
| 1A-1B                   | 0.030 | 0.009 | 172     | 1A                      | 0.022 | 0.002 | 6       | 1B    | 0.022 | 0.004 | 157     |
| 1A-5B                   | 0.025 | 0.024 | 39      | 1A                      | 0.022 | 0.002 | 6       | 5B    | 0.024 | 0.011 | 92      |
| 1B-2A                   | 0.025 | 0.024 | 49      | 1B                      | 0.022 | 0.004 | 157     | 2A    | 0.024 | 0.009 | 66      |
| 2A-2B                   | 0.030 | 0.011 | 86      | 2A                      | 0.024 | 0.009 | 66      | 2B    | 0.024 | 0.010 | 103     |
| 2A-5B                   | 0.032 | 0.016 | 77      | 2A                      | 0.024 | 0.009 | 66      | 5B    | 0.024 | 0.011 | 92      |
| 2B-5A                   | 0.027 | 0.025 | 3       | 2B                      | 0.024 | 0.010 | 103     | 5A    | 0.025 | 0.010 | 13      |

“The degree to which the result of a measurement and/or calculation conforms to a true value.”

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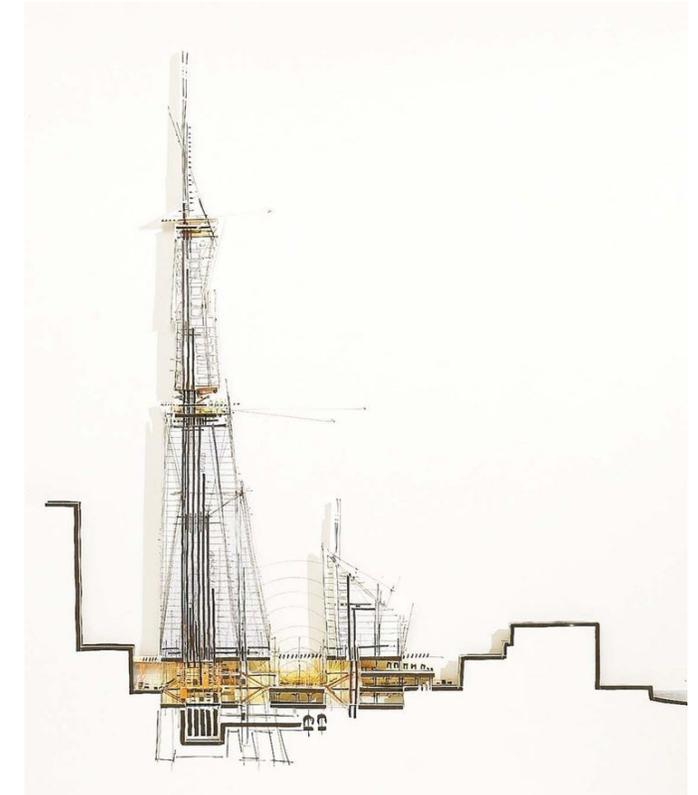


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# Big5 Challenges – Technical Workgroups

## Survey4BIM What's the problem with interoperability ?



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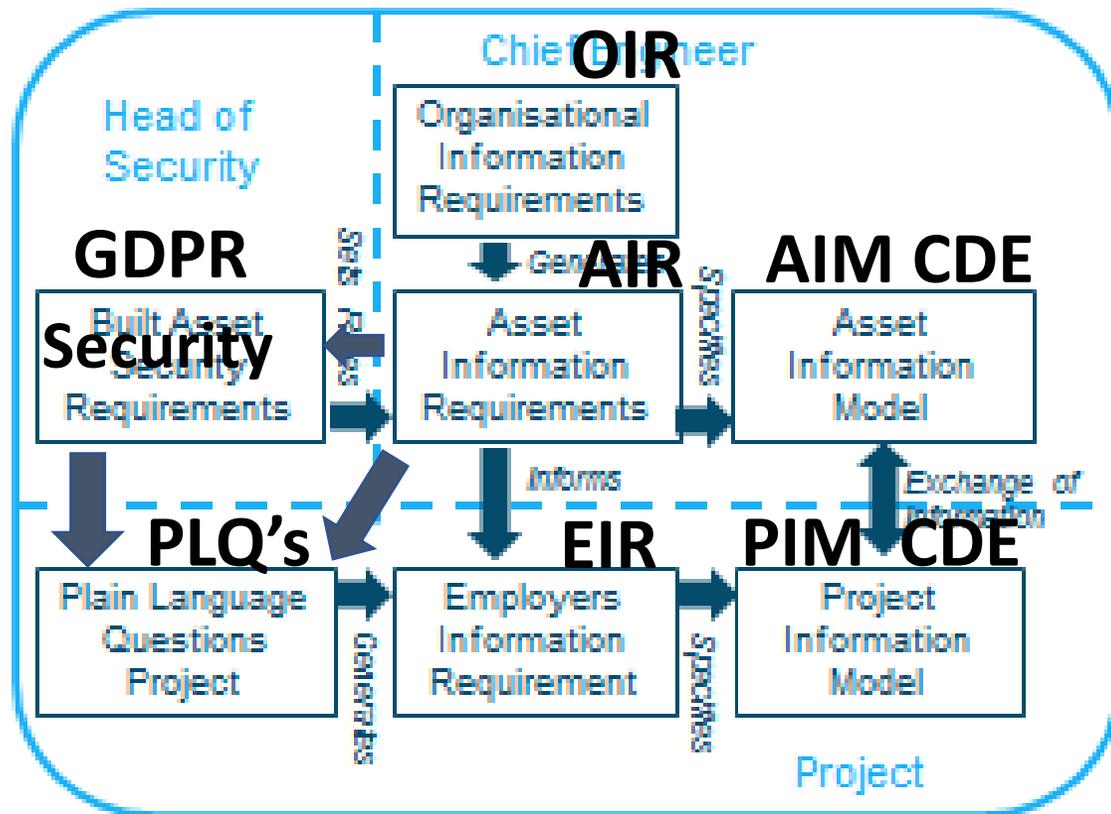
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# Big5 Challenges – Technical Workgroups

## BIM4Rail

What's the problem with EIR / AIR / OIR ?



**Big BIM**  
**(Opex)**  
**Whole**  
**Life**



**Little BIM**  
**(Capex)**



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# Big5 Challenges – Technical Workgroups

**BIM4Rail**

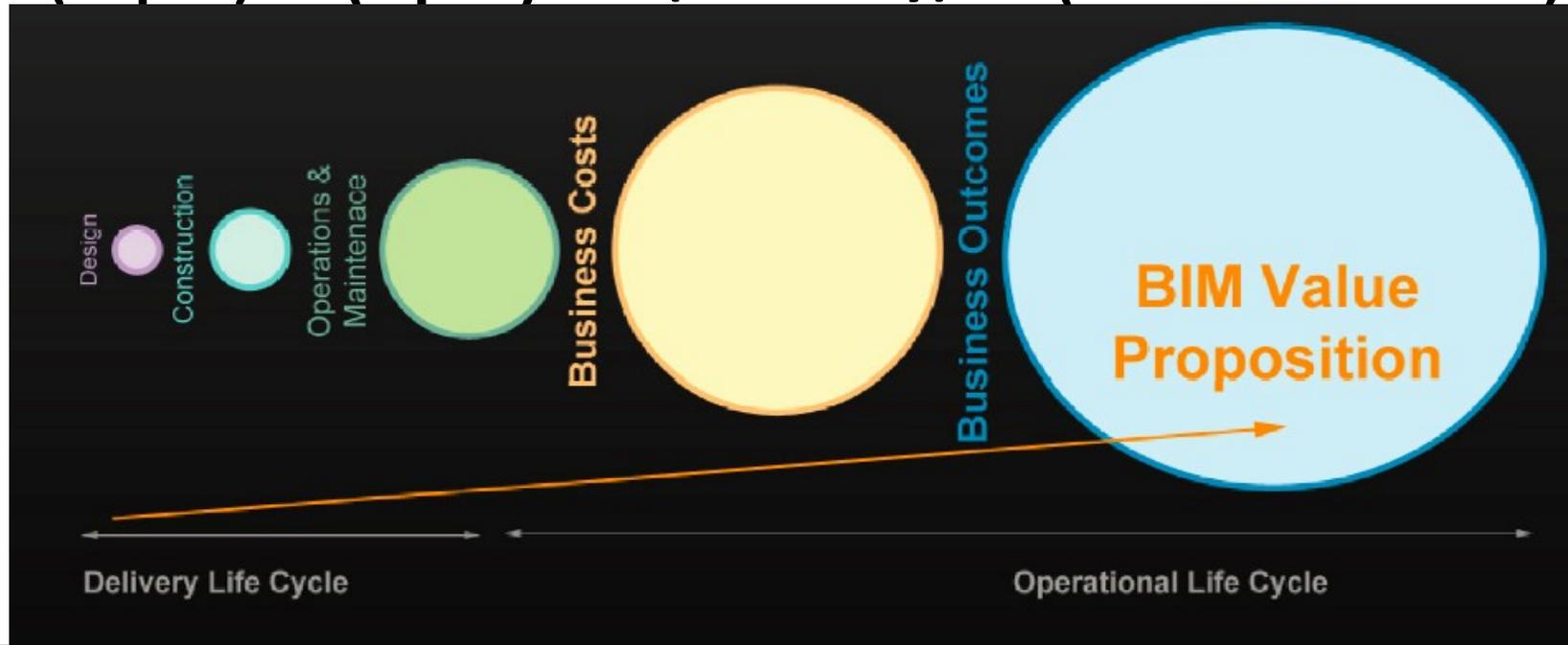
What's the problem with EIR / AIR / OIR ?

**Little BIM  
(Capex)**

**Big BIM  
(Opex)**

**Smart C "BIM"  
(Economy)**

**Social G "BIM"  
(Sustainable - Fair)**



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*You cannot overtake without catching up! Thank you !*

*Know & get  
the basics  
right*

**ACHTUNG**  
Sie verlassen jetzt  
**West-Berlin**

*Break down  
Barriers everywhere  
(People, Process ,  
Technology)*