Gli obiettivi del BIM per le Stazioni Appaltanti

The objectives of BIM for contracting and procurement

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EU BIM Task Group: Representatives from 21 EU Member States

The public sector: driver for innovation

As large public procurers they are:

- Non-competitive
- Transparent
- Non-discriminating

By investing public money, they

- Underlie certain rules and regulations
- Lead and influence the market through procurement
- Have the power to create fertile environment
Risks to the EU market of not collaborating

- Adding cost burden
- Slowing economic growth
- Confusing the market
- Closing markets
EU BIM Task Group

• Deliver greater value for public money

• Increased openness, fairness, competitiveness and productivity

• Stimulating innovation and growth in the construction and digital economies through better alignment
Value proposition of BIM

• **Economic**: increase productivity, potential for growth, enhance position of European industry on international markets (construction, IT), ...

• **Environmental**: less waste, lean supply chain, lower energy demands, lighter carbon footprint, ...

• **Social**: facilities aligned with societal needs, job creation including for the “otherwise unemployable”, ...
Common EU BIM Performance Level

Responsabilità
Competenze
Capacità
Incentivi

Aspetti legali e contrattuali
Appalti
Requisiti specifici in materia di dati
Piano di consegna

Scambio di dati
Lavoro collaborativo e coordinamento
Gestione delle informazioni
Ingegneria dei sistema

Sicurezza
Informazioni tecniche
Convalida
Uso
### Common EU BIM Performance Level

<table>
<thead>
<tr>
<th>Settore della definizione</th>
<th>Descrizione ad alto livello delle caratteristiche</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Politiche</strong></td>
<td>Le questioni di natura commerciale, giuridica e contrattuale sono concordate e documentate in un formato adeguato e diventano parte degli accordi contrattuali tra le parti interessate.</td>
</tr>
<tr>
<td></td>
<td>La procedura di gara comprende una valutazione adeguata della capacità, delle risorse e dell'intenzione del fornitore di rispettare i requisiti BIM.</td>
</tr>
<tr>
<td></td>
<td>I requisiti in materia di informazioni associati a un intervento sono specificati ed espressi in termini di fasi della commessa o del procedimento, che il committen te del progetto o la catena di approvvigionamento intendono utilizzare. Adottando requisiti specifici in materia di informazioni si dovrebbe rispettare il principio fondamentale che prevede si evitare una generazione e un trattamento eccessivi di dati.</td>
</tr>
<tr>
<td></td>
<td>I dettagli in merito alle modalità per il rispetto dei requisiti in materia di informazioni e di fornitura delle informazioni richieste sono concordati e documentati in un formato appropriato.</td>
</tr>
</tbody>
</table>

| **Aspetti tecnici**       | I requisiti in materia di informazioni specificano i dati da fornire in formati non proprieta ri, non legati a un particolare fornitore. |
|                           | Un approccio orientato agli oggetti costituisce il principio fondamentale per la specificazione, modellazione e organizzazione dei dati. |

| **Processo**              | I processi di pianificazione e fornitura delle informazioni richiedono l'adozione di principi del lavoro collaborativo e basati su oggetti connotatore. |
|                           | È necessario un ambiente di condivisione dei dati (ACDat, in inglese, **Common Data Environment - CDE** come mezzo per disporre di un ambiente sicuro e collaborativo per la condivisione delle attività. |
|                           | Sono necessari dei metodi e strumenti di ingegneria per comprendere in maniera olistica tutte le esigenze e i requisiti di tutte le parti interessate in maniera esaustiva, comprendendo tutte le visioni architettoniche (operative, funzionali, organiche) per tutti gli stati dei beni immobiliari o infrastrutturali lungo il loro ciclo di vita, nonché per strutturare in maniera adeguata tutte le informazioni. |

| **Persone**               | La competenza per la gestione dei dati e delle informazioni è conferita in base alla complessità dell'intervento. |
Common EU BIM Performance Level in “BIM language”

EIR: Employer’s Information Requirements
Specify your data needs for good decision making and managing your risks

BEP: BIM Execution Plan
Agree with your supply chain how this project (and the data requirements will be delivered)

CDE: Common Data Environment
The data management processes, conventions and technology

LOD: Level of Development
Quality criteria to define the model content like the scale in 2D drawings

BIM Model: Usually a 3D Model, surface or volumetric, that contains objects

BIM Protocol: Contractual document
## Relevant Standards

### STRATEGIC

**AIMED AT THE PROCESS OF DEVELOPING A CLEAR AND EFFECTIVE OVERALL SMART CITY STRATEGY**

- **PD8100**
  - [Image](#)
  - Smart Cities Overview

- **PD8101**
  - [Image](#)
  - Smart City Planning Guidelines

### PROCESS

**PROCURING AND MANAGING SMART CITY PROJECTS**

- **ISO37100**
  - [Image](#)
  - Vocabulary

- **ISO37106**
  - [Image](#)
  - Strategy

- **ISO30182**
  - [Image](#)
  - Smart city concept model

- **PAS185**
  - [Image](#)
  - Security

### TECHNICAL

**IMPLEMENTING SMART CITY PROJECTS**

- **ISO19650:1**
  - [Image](#)
  - Concepts and principles

- **ISO19650:2**
  - [Image](#)
  - Delivery phase of the assets

- **ISO19650:3**
  - [Image](#)
  - Operational phase of the assets

- **ISO19650:5**
  - [Image](#)
  - Security minded
Does BIM cost or save money?

Higher investments for more clarity and better decisions are often avoided in early phases when risks for the project are high and the value of the project is still low.

Digital technologies and standardized processes can be used to:
- Make approval processes faster and more transparent
- Manage risks
- Improve decision making by providing relevant information

What does this look like?
- Process reliability - Common Data Environment
- Simulation, automation, linked data
- Visualization
- Information deriving from models
- Accelerated commissioning
- Improved documentation
- Prefabrication
- Modular design
- IoT, LEAN, etc.

Patrick McLeamy, 2004
The Built Environment contributes significantly to economic output.

Sources: ONS, gov.uk, Gazprom, Facilities Management Journal, Arcadis


### Strategic Outline Business Case for the delivery of Digital Built Britain Programme Level 3

*Digital enabled transformation of the full lifecycle of the built environment to increase productivity, improving economic and social outcomes.*

Data Feedback Loops

Flow of information

- £808bn
- £89bn
- £122bn
- £597bn

...to enable even greater economic output

Technology enables the information feed-forward and feedback loops...
Linear construction process

Strategic Planning Brief Design and Build Maintain Operate Service Socio-economic

HOA / HOAI / VOB / ….
The Systems Engineering “V-Process”
The Challenge

- Ability to find key information
- Models, maps, drawings and data all in different places
- No common open standards
- Information is often poor or of unknown quality
- Unknown security measures
- Need to use complex unfamiliar systems to access information
- Lack of integration limits good understanding
- Information doesn’t often get to those who need it
How do you want them to be?
For example..
... cheap?
... fit for purpose?
... available quickly?
... based on open standards?
... small file size?
... semantic?

Use games technology!
More efficiency in data capturing

Quiz time:
Data capturing of all public areas, including outdoor areas, station concourses, all platforms and pedestrian tunnels, at a city center station with around 60,000 passengers per day and 14 long-distance tracks.

How long do you think it took? How much did it cost?

3 man-hours
100 EUR
Quiz time:
Which one is real?
What is the file size of one of these buildings in the model?
What is the file size of a 3D city model with more than 1200 buildings?

Answers:
~ 80 kb
~250 MB
What do you think was the processing time to produce this model of Milan Central Station?

~ 1 week
Low-cost and automated 3D production

3D Production:
- In-house developed ToolChain for semi-automated data processing and modelling
- Data synchronizing and –standardization
- Calculations based on terrestrial photogrammetry
- Detection-software (pattern recognition)
- Use of structured libraries
Low-cost and automated 3D production

Step 1: creating the 3D geometry based on the principles of descriptive geometry

Step 2: Vector, material and object recognition and instancing

Library structure

<table>
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<tbody>
<tr>
<td>Global</td>
<td>Objects that are globally the same (i.e. concrete, a car etc.)</td>
</tr>
<tr>
<td>UK</td>
<td>Objects that are specific to countries (i.e. traffic lights, road signs etc.)</td>
</tr>
<tr>
<td>DE</td>
<td></td>
</tr>
<tr>
<td>CH</td>
<td>Objects that are unique (i.e. a house etc.)</td>
</tr>
</tbody>
</table>
Efficient 3D production using learning algorithms
Object-based by default

A vast object library is at the heart of our technology, containing digital representations of real world objects. Started 15 years ago, it now contains a vast amount of street furniture, building components, rail equipment, technical objects, materials and textures from all over the world. The library enables the semantics in our digital twins.
The is no better place to store information than a 3D model.
Data Integration

Project Information Models (PIMs)

Asset Information Models (AIMs)

GeoConnect+

Internal Data
- Geospatial data
- Supplier data
- Flood data
- FM data
- Occupancy data
- Traffic data
- Sensor data
- Boundaries
- BMS data
- Crime
- Environmental

External Data
- OS Maps
- Flood data
- Demographic
- Sensor data
- Traffic data
- Boundaries
- BMS data
- Crime
- Environmental

www.loclab-consulting.com | BIM e gestione del processo edilizio | 3 Dec 2019
A 3D model is the most intuitive place for finding information!

GeoConnect+ provides web-based integration of asset data, BIM and IFC viewers, digital twins and real-time sensor data.
Vielen Dank für Ihre Aufmerksamkeit.

Bei Rückfragen stehen wir Ihnen gerne zur Verfügung:
info@loclab-consulting.de