

GeoBIM benchmark Workshop



2nd December 2019

Introduction on GeoBIM

3D city models

Building Information Models

Workshop &

Discussion: ideas towards integration

 GeoBIM benchmark workshop Programme 	
Kattenburgerstraat 5, Building 027W, 1018 JA Amsterdam Room: 'Beijing/Shanghai'	
2 nd December 2019	3 rd December 2019
h.9.30-10.00 Welcome and Introduction on GeoBIM <i>[Francesca Noardo]</i> Part 1: 3D City models h.10.00-11.00 3D City models overview: <i>[Balázs Duker & Tom Commandeur]</i> - introduction and 3D city models overview - effective use cases - data and related standards (CityGML, CityJSON...) h.11.00-11.15 Coffee Break h.11.15-11.45 GeoBIM benchmark results: The support for CityGML within GIS (and other) tools (Task 3) <i>[Stefos Vitalis]</i> 11.45-12.00 Q&A / Discussion h.12.00-13.00 Lunch Part 2: Building Information Models (BIM) h.13.00-14.00 Building Information Models overview: <i>[Lorenzo Polia & Helga Tauscher]</i> - introduction and BIM overview - effective use cases - data and related standards (Industry Foundation Classes) h.14.00-14.30 GeoBIM benchmark results: The support for IFC within BIM (and other) software (Task 1) <i>[Thomas Krijnen]</i> 14.30-14.45 Q&A / Discussion h.14.45-15.00 Coffee Break h.15.00-15.15 The world is not all CityGML and IFC: other GeoBIM standards (Landinfo, gbXML, INGPURE...) <i>[Anna Labetski]</i> h.15.15-15.45 Workshop - Replicating the results for Task 1 h.15.45-16.30 Workshop - Replicating the results for Task 3 <i>[Led by Jordi van Liempt]</i> h.16.30-17.30 Conclusions: ideas towards integration <i>[Led by Claire Ellul]</i>	h.9.00-9.10 Welcome to the second day <i>[Francesca Noardo]</i> h.9.10-9.20 The EuroSDR GeoBIM project <i>[Janien Stoter]</i> Part 3: GeoBIM use cases h.9.20-10.15 GeoBIM for building permission issuing <i>[Hasim Tezerdi & Francesca Noardo]</i> h.10.15-10.45 GeoBIM for microclimate simulations <i>[Panagiotis Arapakis & Natasja van Heerden]</i> h.10.45-11.00 Coffee Break h.11.00-11.30 GeoBIM for asset management <i>[Nicola Moretti & Claire Ellul]</i> h.11.30-11.45 Stop copying your files: versioning for 3D city models <i>[Stefos Vitalis]</i> h.11.45-12.00 Q&A / Discussion h.12.00-13.00 Lunch h.13.00-13.50 Geo-referencing BIM and IFC data: GeoBIM benchmark Task 2 <i>[Lars Harrie & Claire Ellul]</i> h.13.50-14.15 Task 2: tools for georeferencing BIM h.14.15-14.30 Coffee Break h.14.30-15.00 Options for conversion: IFC to CityGML and CityGML to IFC (Task 4) <i>[Nebras Salheb]</i> h.15.00-15.45 Task 4: tools for IFC to CityGML or IFC to CityGML h.15.45-16.00 Conclusions, Visions & Next plans.
 <div>  https://3d.bk.tudelft.nl/projects/geomim-benchmark/events.html  </div>	
    	

GeoBIM use cases

Georeferencing BIM

GeoBIM Conversion procedures

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GeoBIM use cases

Georeferencing BIM

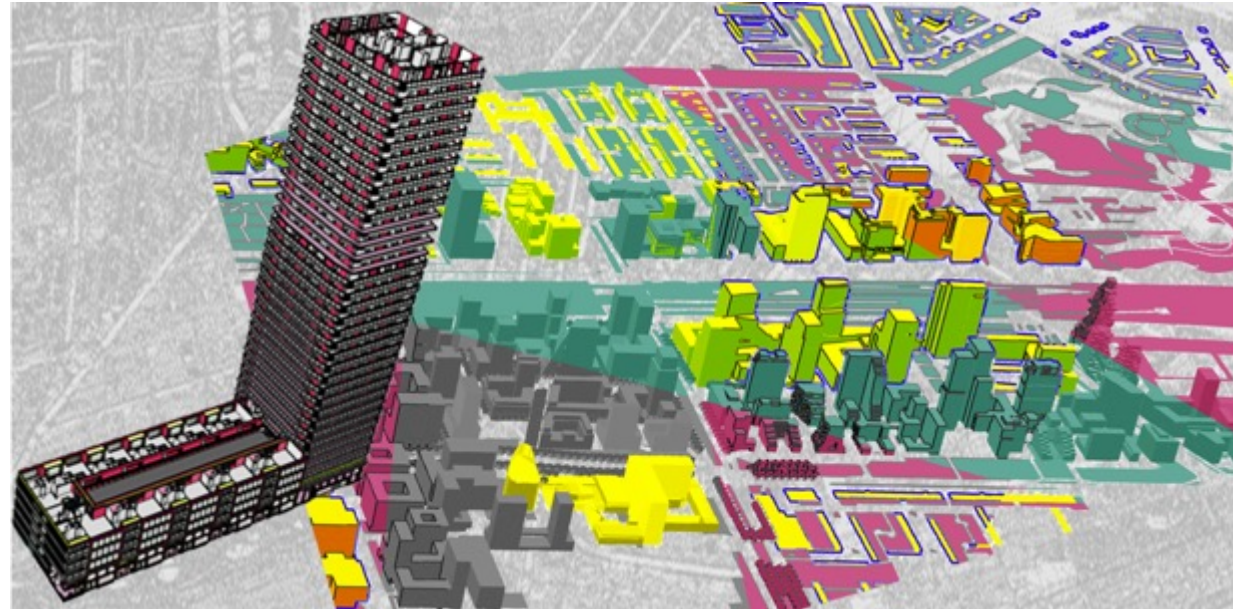
GeoBIM Conversion procedures



Other Challenges:

- Lack of understanding of GeoBIM and how and why it can be useful
- Lack of GIS/BIM skills and especially combined skills across both
 - Cost of implementation (changes to workflows, new staff skills)...
- How to make Geo- & BIM worlds talk to each other?
 - What standards?
 - What are the most important stakeholders to be involved?
 - What are the three factors that could significantly push forward the GeoBIM integration?

Take notes during the day to further feed the discussion in the end!



Integration of two very powerful 3D information systems,

(mainly) 3D city models & BIM

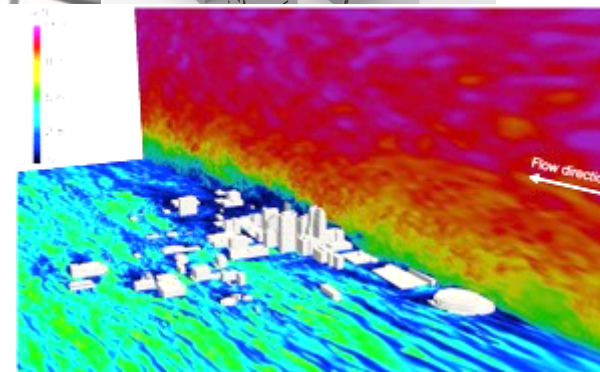
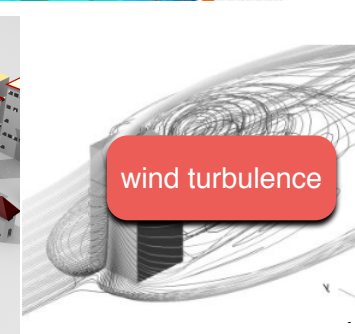
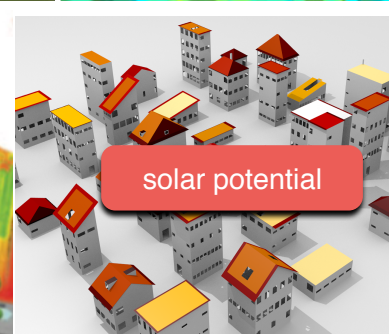
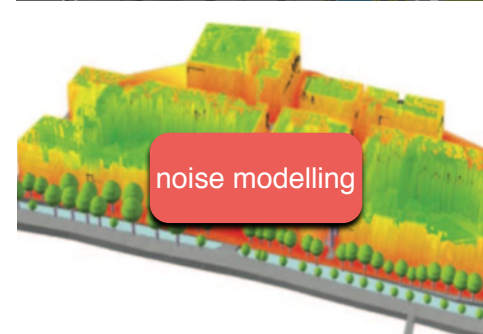
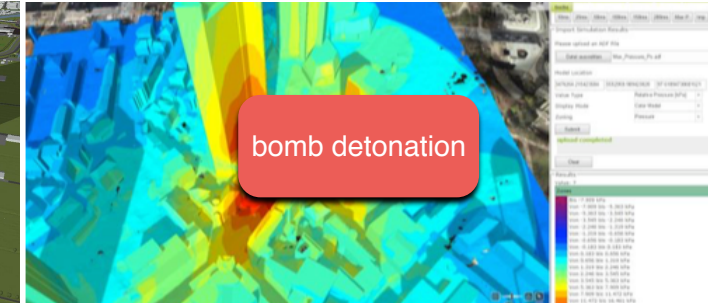
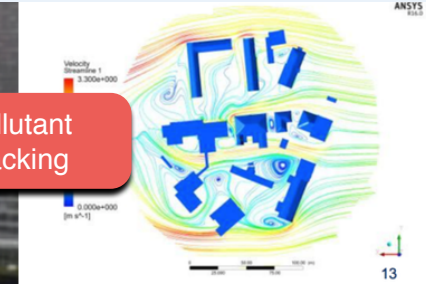
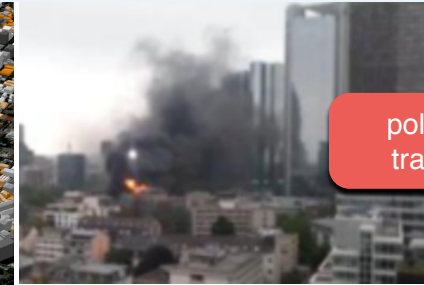
in order to suitably support built environment applications
(representation, understanding, analysis, simulation, planning).

3D city models use cases

GeoBIM



3D geoinformation:
3D city models



Navigation

Flood simulations

Multivariate analysis

3D cadastre

3D archive

Multitemporal analysis

Risk assessment...

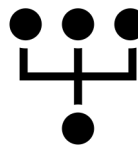
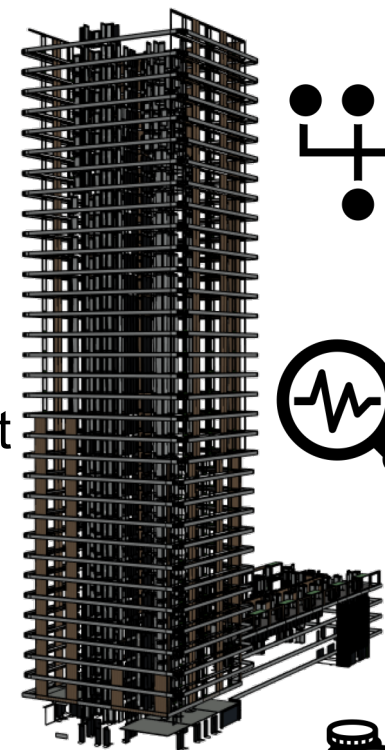
GeoBIM



Building
Information
Models



- **design** options assessment;
- **quantities** and **cost** estimation;
- construction simulation;
- **energy** modelling;
- **project management support** (efficient collaboration, multi-disciplinary project team);
- **facilities and asset management**;
- better design and construction **coordination**;
- **reduced construction costs** (less delays on-site, rework...)
- **reduced operational costs** (seamless information delivery for facilities management at handover).



3D city models miss something

GeoBIM



3D geoinformation:
3D city models

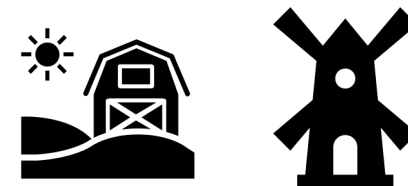


Rotterdam

Difficult **to update** (new building, building changes...)



Missing **detailed building information** (materials, energy related information...)

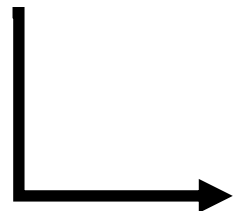


Difficulties in modelling large numbers of **high level of detail** buildings

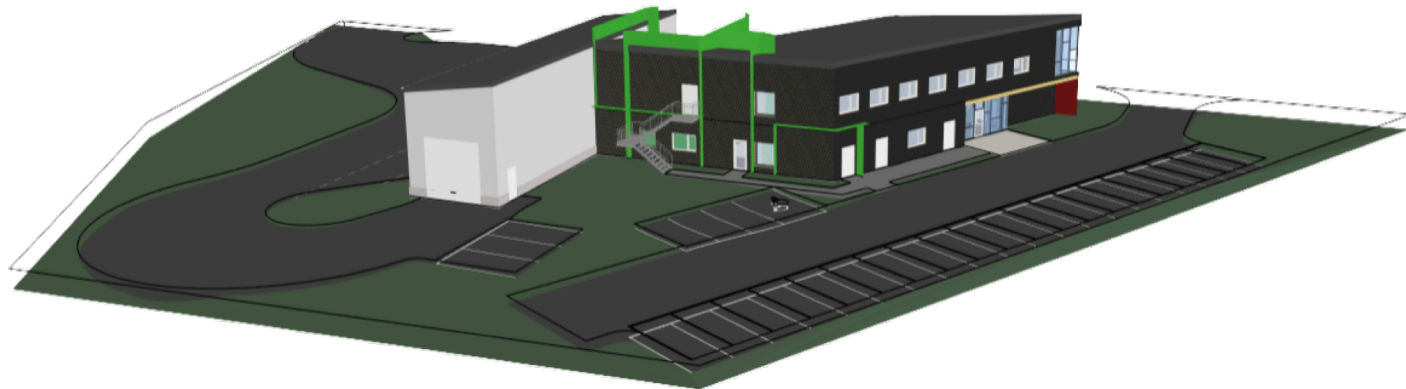


Building Information Models miss something

GeoBIM



Building
Information
Models



No context (transport networks, environmental features, urban values, infrastructure connections...)



Somewhere in the world (only generic location information, with very low accuracy...)



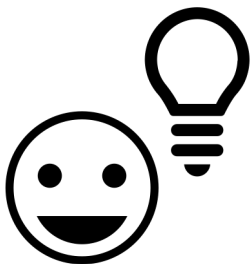
Discrepancy between the **precision** of what is modelled in the BIM and the context where it is supposed to be built (possible need to fix them on site, during construction)



Great advantages from integration

GeoBIM = integration of geoinformation with BIMs

3D
geoinformation:
**3D city
models**
+
**Building
Information
Models**



GEO world point of view

- High **level of detail** 3D cadaster
- No tasks duplication** (3D data collection)
- Efficient databases **updates** without additional costs
- Effective **data exchange** with **professionals** (architects, engineers, environmental scientists, etc.)
- Stronger information for **lifecycle asset management & city analysis**

Context for design reference

Improved **test of building properties**: designed building into its context

Test of the **impact of the building** on the city or landscape.

Multiscale vision (from construction elements to whole territories)



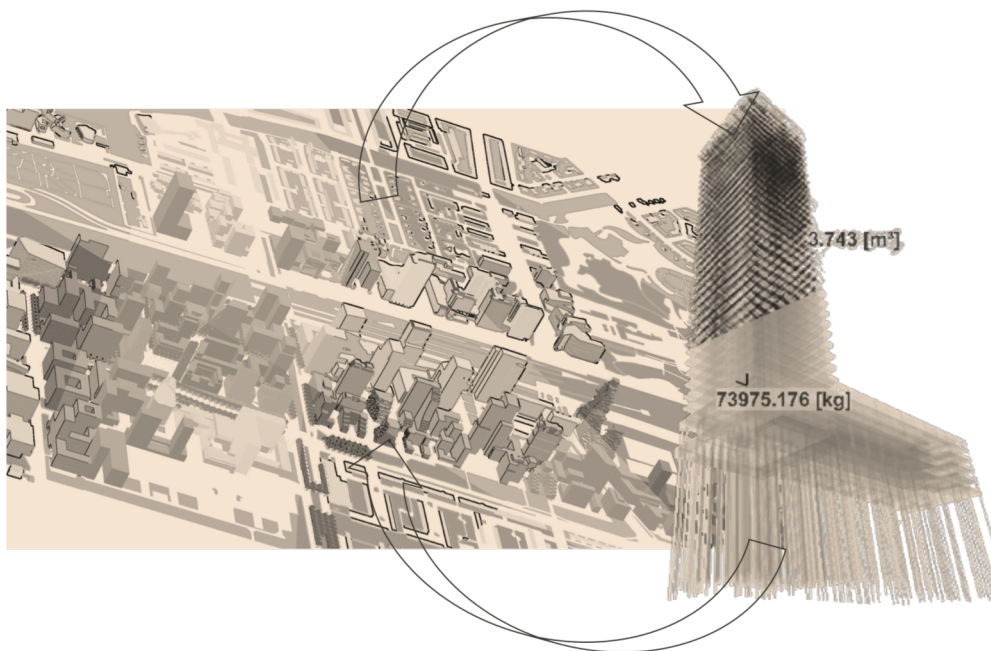
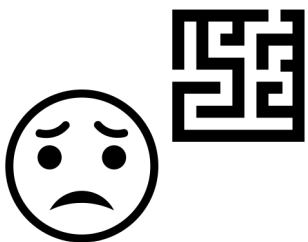
BIM world point of view

...But it's not a trivial issue

GeoBIM = integration of geoinformation with BIMs

3D
geoinformation:
**3D city
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+
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Information
Models**

1. Integration of **data** (common characteristics, they fit together)
2. Data **interoperability**
3. Reliable **conversion procedures**
4. Integration of **procedures** (BIM and GIS tools)

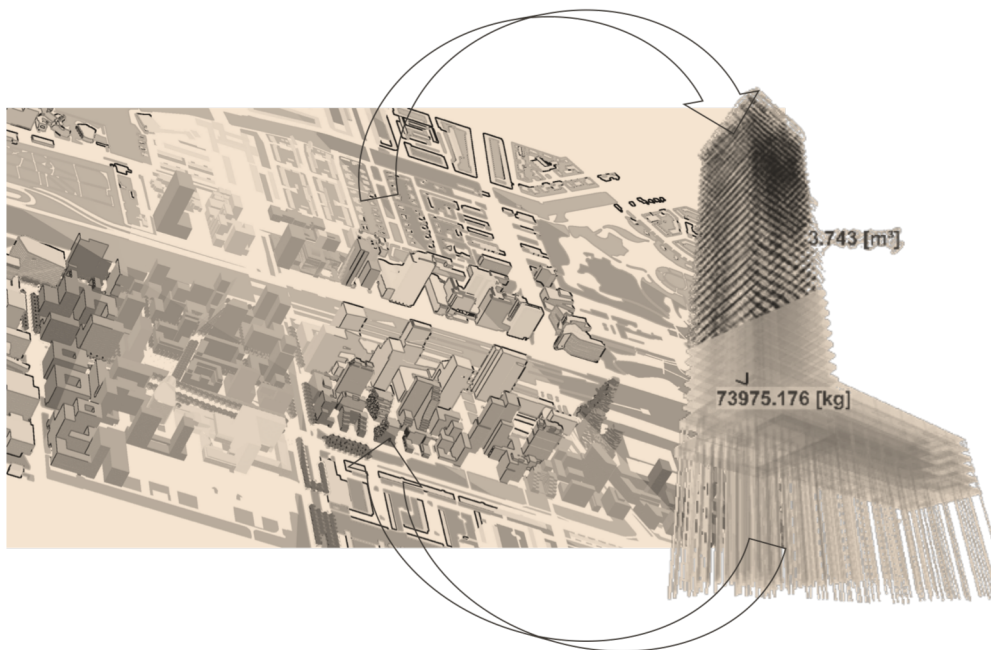
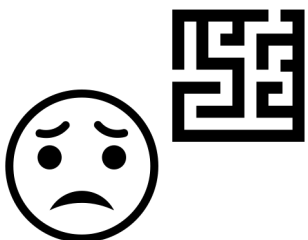
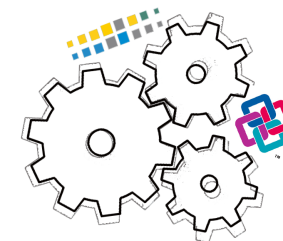


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Aim:

Investigation of the available **technical solutions to support** the open standards IFC (by buildingSMART) and CityGML (by OGC).

Open standards, therefore, exist




However...

- Are they suitably supported in tools?
- Are current users able to exploit their power?
- Are the standardized data actually interoperable?



How can I effectively use standardized data?

Image by [Lukas Bieri](#) from [Pixabay](#)



External **voluntary participants** can perform one or more tasks with the tools they are familiar with, and **deliver their results** in the provided **on-line results template**.



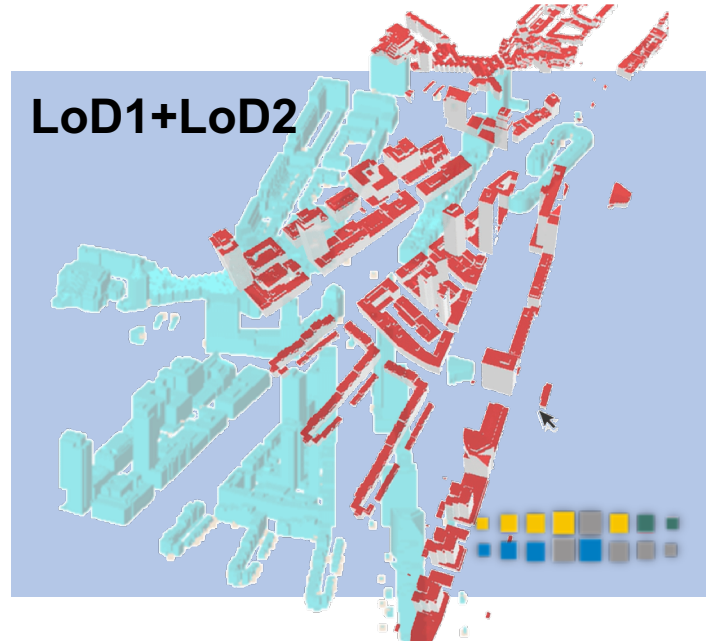
<https://3d.bk.tudelft.nl/projects/geo-bim-benchmark/>

The ISPRS-EuroSDR GeoBIM benchmark: provided data

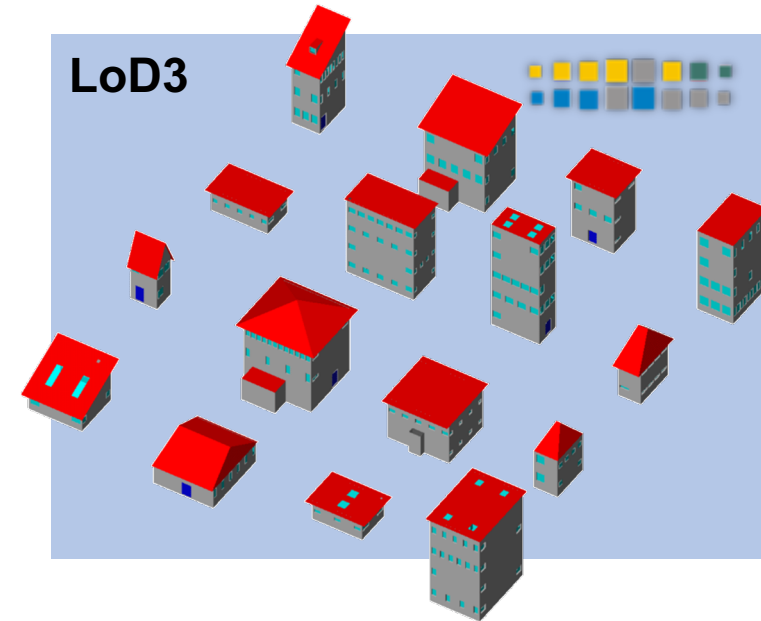
Whole city, heavy file



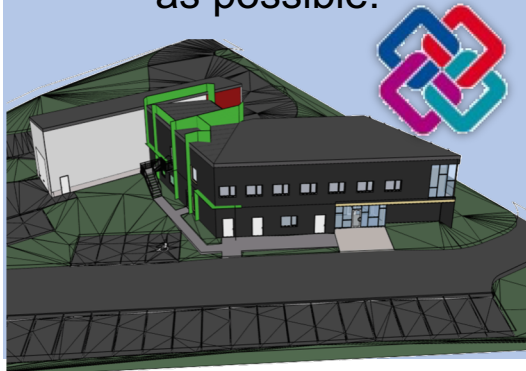
LoD1+LoD2



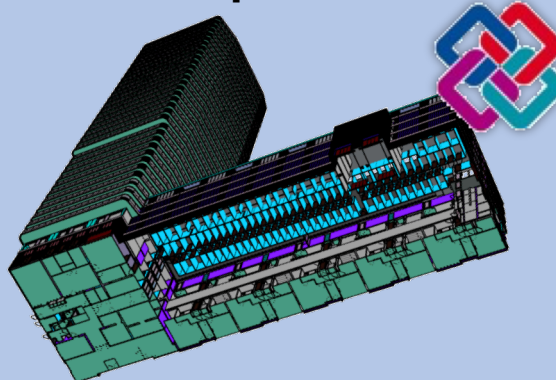
LoD3



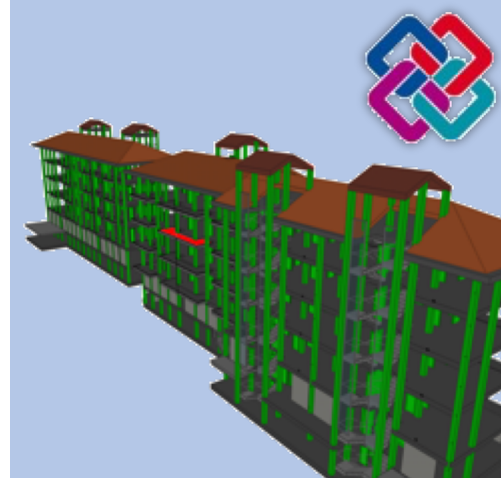
**small building test
software functionalities**
in the most reliable way
as possible.



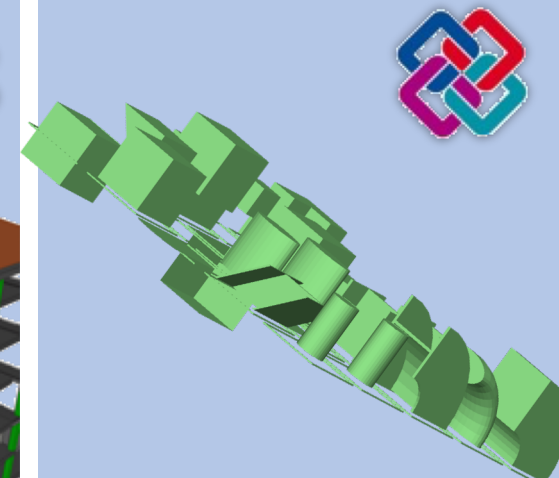
**big project, heavy file, test
connected software-and-
hardware performances.**



IFC4 building.



Specific geometries



The ISPRS-EuroSDR GeoBIM benchmark

Tasks:



1. What is the **support for IFC** within BIM (and other) software?



2. What options for **geo-referencing BIM** data are available?



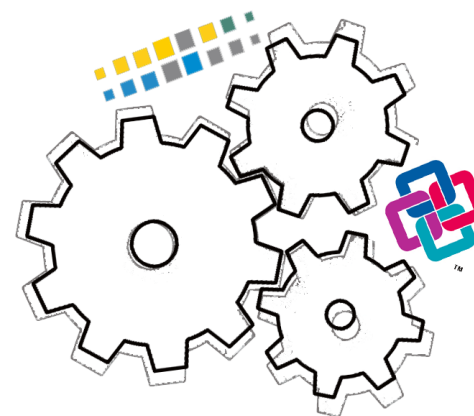
3. What is the **support for CityGML** within GIS (and other) tools?



4. What options for **conversion (IFC ↔ CityGML)** are available?



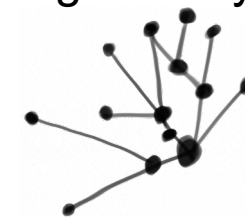
<https://3d.bk.tudelft.nl/projects/geo-bim-benchmark/>



georeferencing



geometry



semantics



Sw functionalities

The ISPRS-EuroSDR GeoBIM benchmark: numbers

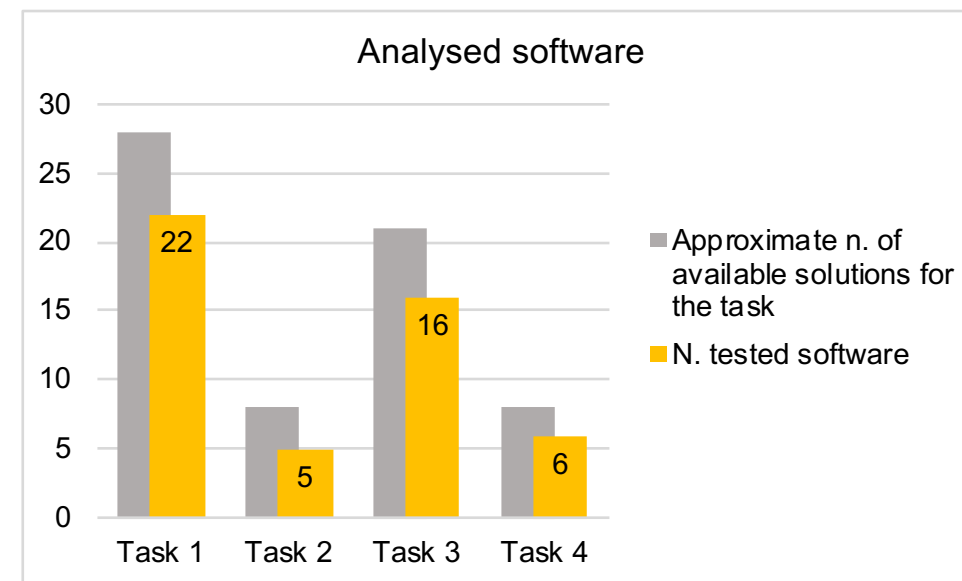
77 participants registered	→	Large interest awarded!
41 participants delivering results	→	Good voluntary response



Registered participants from 19 Countries

Outcomes:

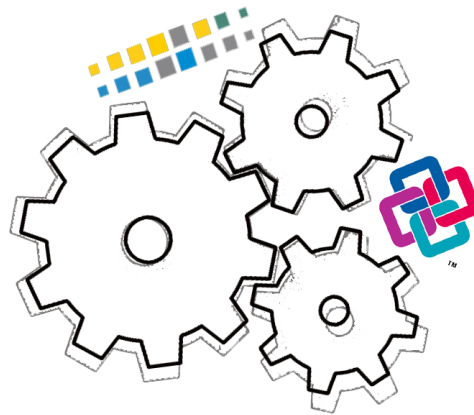
- List of tools / guidelines and best practices, as a reference to use standardized data
- Report on main open standards issues
- Report on main software issues



Delivered Results:

- **Integrated** by testing the missing software
- **Analysed** to provide the final outcomes
- Will be **published** in the coming months





3D city models interoperability
(OGC CityGML open standard)



BIM interoperability (buildingSMART Industry
Foundation Classes – IFC open standard)

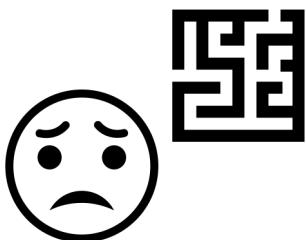


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2. Data **interoperability**
3. Reliable **conversion procedures**
4. Integration of **procedures** (BIM and GIS tools)





AMSTERDAM SCHOOL OF
MANAGEMENT

GeoBIM benchmark workshop

Programme

Katerbosweg 51, Building 127W, 1018 JA Amsterdam
Room "Beving/Daaglab"



EUROSDR

2nd December 2019

9.30-10.30 **Welcome and Introduction on GeoBIM**
(Parvaneh Pourzari)

Part 1: 3D City models

9.30-11.00 **3D City models overview:**
(Julian Doherty & Tom Conrath)

Introduction and 3D city models overview
effective use cases
data and related standards (CityGML, CityJSON, ...)

9.10-10.15 **1.1 CityGML**
(Julian Doherty)

9.15-10.15 **1.2 CityGML benchmark: results. The support for CityGML within GIS (and other) tools (Task 2)**
(Thomas Hirtler)

11.45-12.00 **Q&A / Discussion**

Part 2: Building Information Modelling (BIM)

9.30-10.30 **Building Information Modelling overview:**
(Jeroen Ploeg & Nageh Shoush)

Introduction and BIM overview
effective use cases
data and related standards (Industry Foundation Classes)

9.10-10.15 **2.1 CityGML benchmark: results. The support for IFC within BIM and other software (Task 1)**
(Thomas Hirtler)

12.30-12.45 **Q&A / Discussion**

14.15-15.00 Coffee Break

9.30-10.15 **2.2 The world is not of CityGML and IFC: other GeoBIM standards (LandXML, gINT, HDS/IFC)**
(Julian Doherty)

9.15-10.15 **2.3 Workshop**
(Repeating the results for Task 1)

9.15-10.15 **2.4 Workshop**
(Repeating the results for Task 2)

9.15-10.15 **2.5 Conclusions, Vision & Next steps**
(Repeating the results for Task 1)

9.15-10.15 **2.6 Conclusions, Vision & Next steps**
(Repeating the results for Task 2)

3rd December 2019

9.30-10.15 **2.1 Welcome to the second day**
(Parvaneh Pourzari)

9.15-10.15 **2.2 The GeoBIM Q&BIR project**
(Julian Doherty)

Part 3: GeoBIM use cases

9.30-10.15 **3.1 GeoBIM for building performance testing**
(Thomas Hirtler & Parvaneh Pourzari)

9.15-10.15 **3.2 GeoBIM for sustainable simulations**
(Phragmatic Equinox & Nageh Shoush)

10.45-11.00 Coffee Break

9.15-10.15 **3.3 GeoBIM for asset management**
(Rafael Muehl & Clara Wolf)

9.15-10.15 **3.4 Deep-digging paper title: transitioning for 3D city models**
(Julian Doherty)

9.15-10.15 **3.5 Q&A / Discussion**

9.15-10.15 **3.6 GeoBIM for BIM and IFC: case: GeoBIM for BIM**
(Jeroen Ploeg & Clara Wolf)

9.15-10.15 **3.7 Task 2: results for generalising BIM**
(Thomas Hirtler)

10.15-11.00 Coffee Break

9.15-10.15 **3.8 Options for conversion: IFC to CityGML, and CityGML to IFC (Task 1)**
(Parvaneh Pourzari)

9.15-10.15 **3.9 Task 2: results for CityGML, or IFC to CityGML**
(Parvaneh Pourzari)

9.15-10.15 **3.10 Conclusions, Vision & Next steps**





TU Delft



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NUS

https://3d4h.eu/4h4h/ams/geo-bim-workshop.html

Changelog/geo-bim-workshop.html



