



XXVI FIG CONGRESS

6-11 May 2018, İstanbul



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BIM Motivation and Education

Christian Clemen

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Hochschule für
Technik und Wirtschaft
Dresden
University of Applied Sciences

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Faculty of Spatial Information

Bachelor (7 semesters)

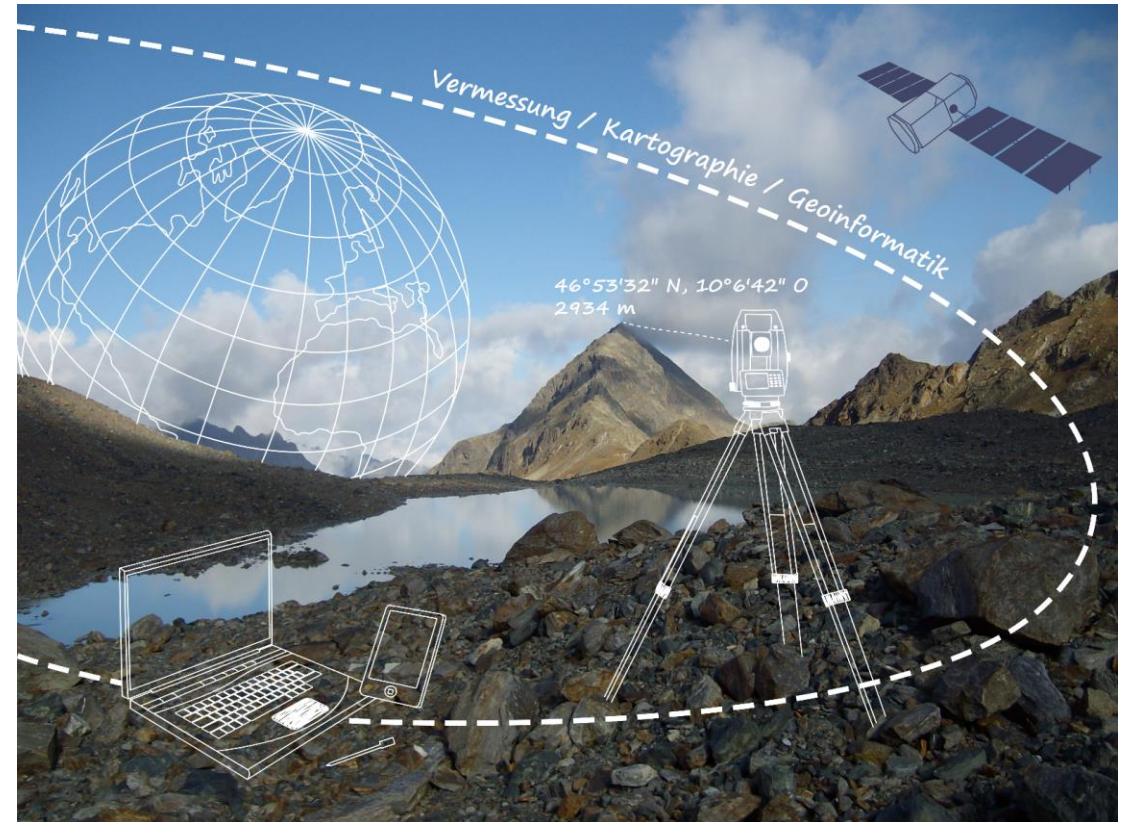
Geomatic Engineering (BIM 6th Semester)

Master (3/4 semesters)

Geoinformation and Management (BIM 2nd Semester)

Distance Learning Diplom (10 semesters)

Focus on Surveying/Land Management (shows high demands on well educated engineering's having knowledge on BIM)



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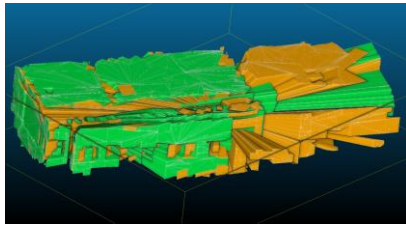
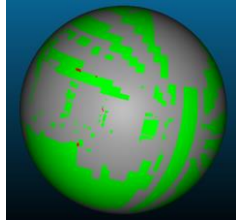
Current Research Project

Supported by:



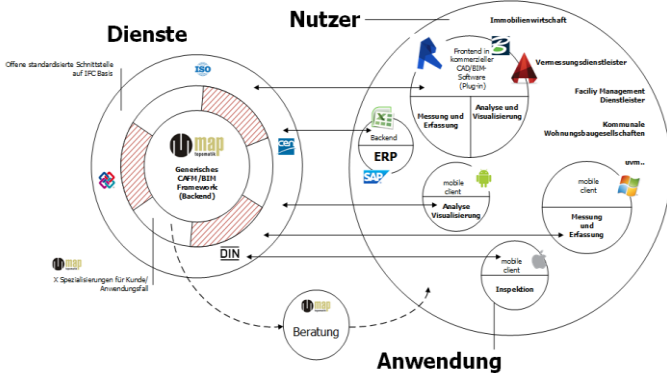
on the basis of a decision by the German Bundestag

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TLS2BIM: Extracting Solids (Building Elements) from TLS point clouds. (2017-2018), Partner: technet GmbH, Berlin

CityBIM: Integration of Building Models (BIM) and 3D-City Models (GIS) (2018-2020), Partner: VCS, Berlin



IMMOMATIK: BIM and GIS for CAFM applied in real estate (housing associations)(2018-2020), Partner map Hamburg

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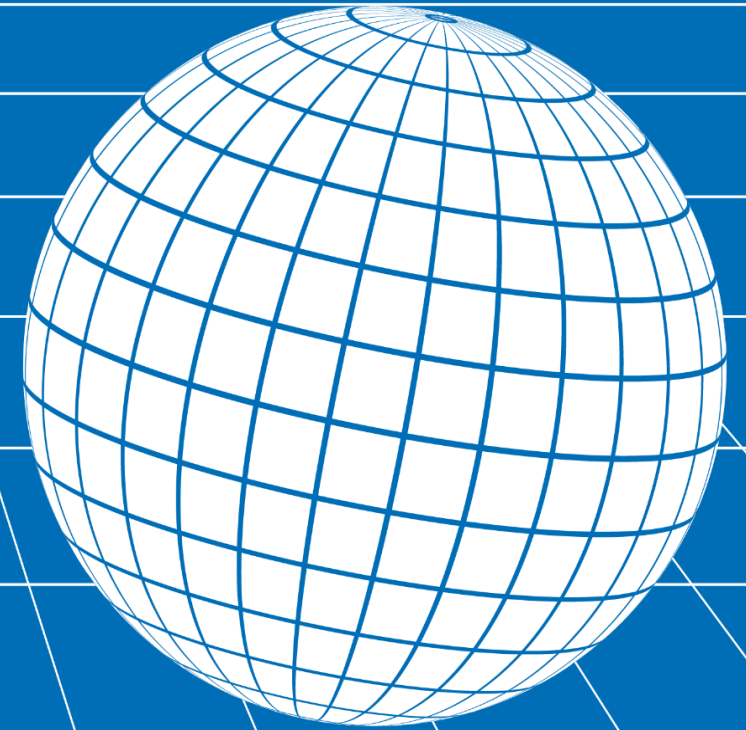
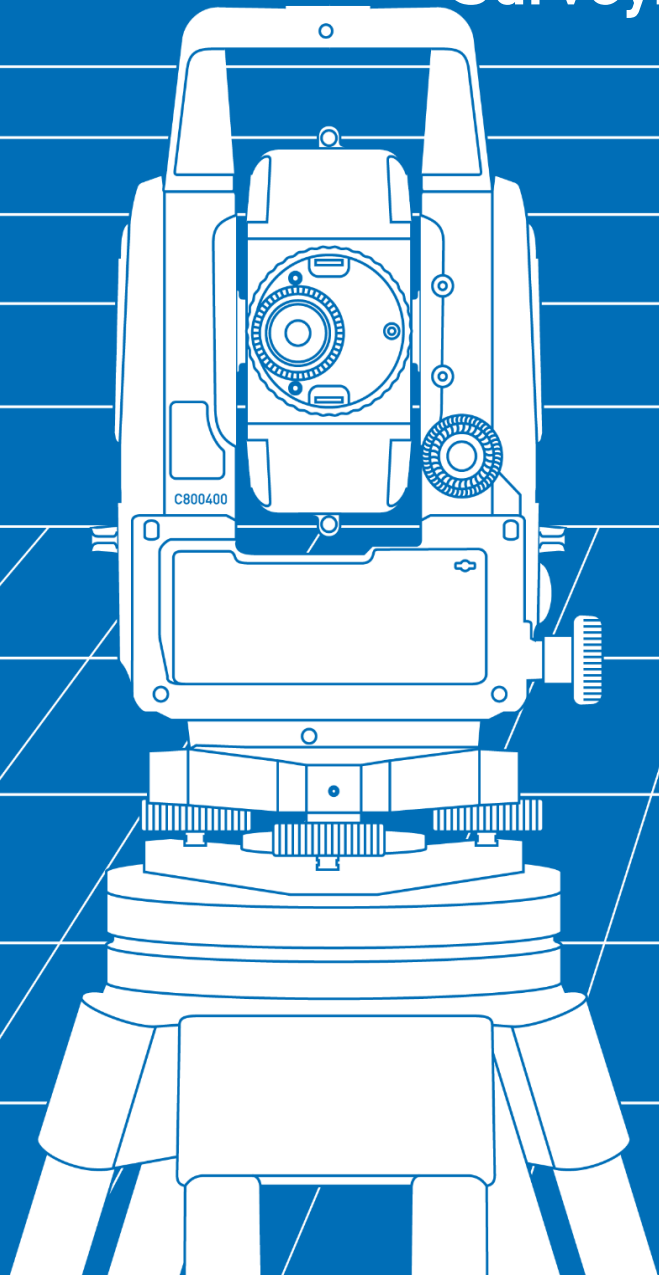
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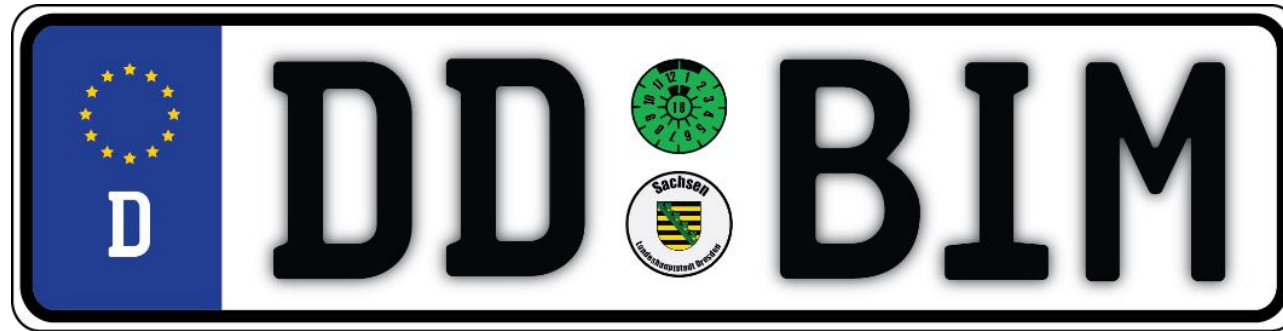


Professional Network on Digital Data exchange of Surveying-, Geospatial- and Buildingmodels (BIM)





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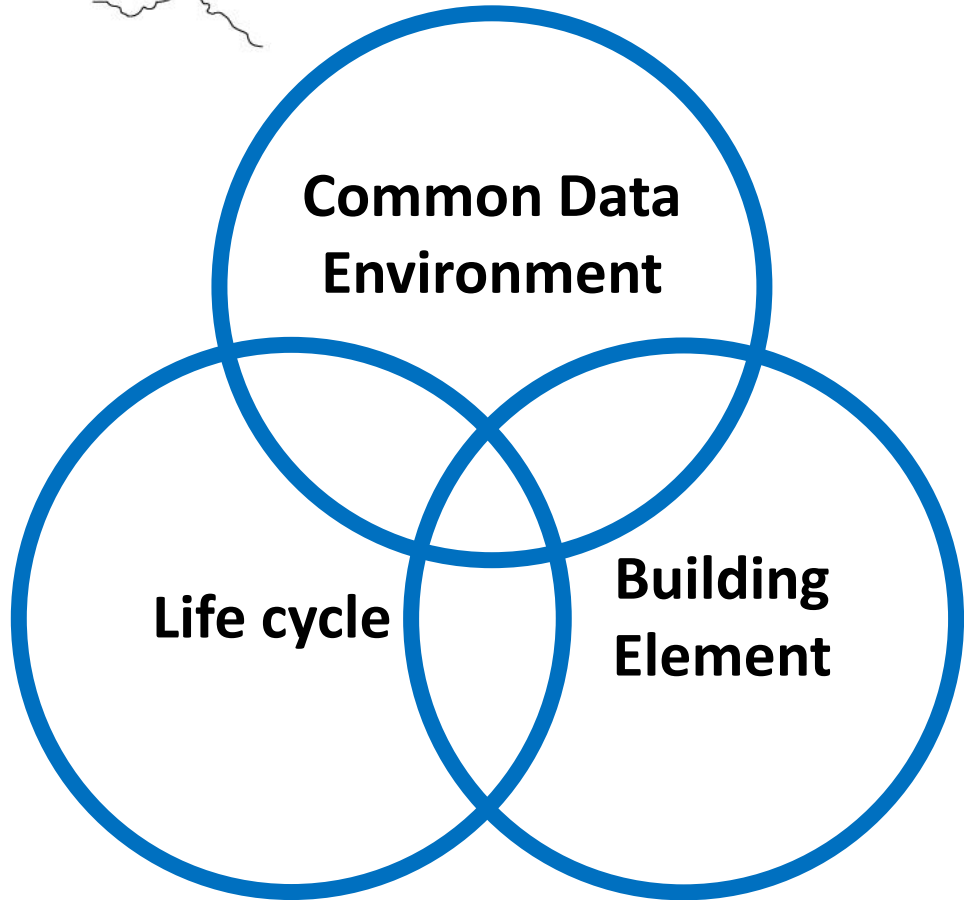


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Topics of the lecture “Surveying and BIM” (Master)

- BIM Motivation (Quality, Cost reduction, Business, Administration)
- Geometry, Topology, Semantics (Parametric Modeling)
- Best practice for engineering surveys and Geospatial/BIM-integration
- Data Exchange with IFC and other buildingSmart/ISO Standards
- BIM Management (EIR, BAP, CDE, roles)
- Legal and business issues (Types of contracts, BIM related laws, professional fee)

Good starting point for education:

- Geomatic Engineering students are very good in 3D-modelling and computer sciences / programming
- Students are highly motivated due to “BIM hype” and excellent job opportunities

Challenge: With BIM students have to gain extra knowledge on Building Construction and Design

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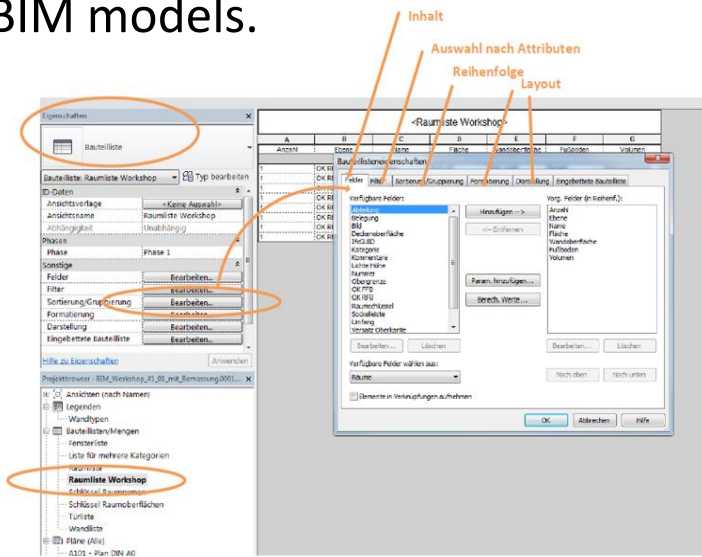
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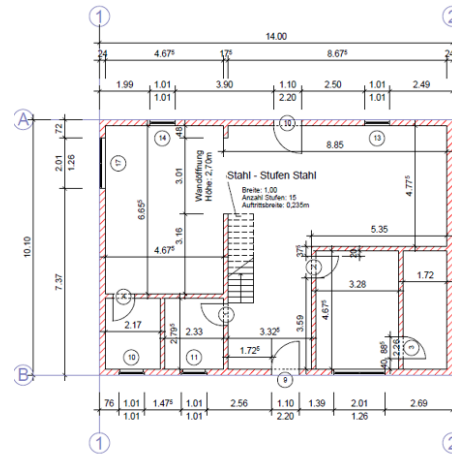
Practice #1 BIM basics

BIM as **database** – not drawing. Query BIM models.



Practice #2 CAD to BIM migration

precise modelling with building objects. Given floorplans, sections and workflows



- outer walls**
 1. Select Type
 2. Sketch
 3. Align/fix to grid
- inner walls**
 1. Select type
 2. Sketch
 3. Fix and check dimensions
- ground plate and ceiling**
- openings**
 1. Sketch
 2. Set height parameter
 3. Fix and check dimensions
- windows & doors**
 1. Load or create family
 2. Select family, set parameters
 3. Sketch, consider orientation
 4. Fix and check dimensions



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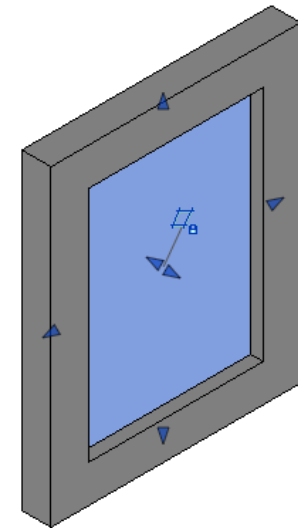
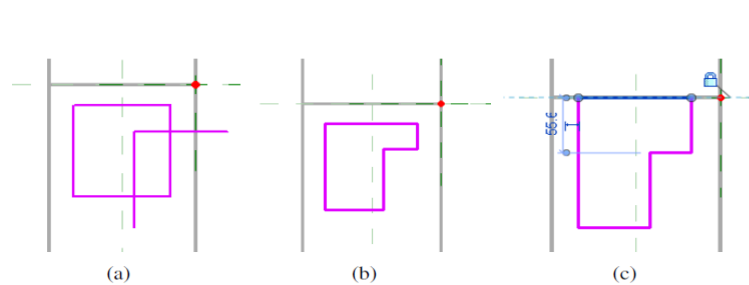


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Practice #3: Creating Types for Object Libraries

- Creating and managing **building elements** (objects) with Autodesk Revit Family Editor
- **Parameterisation** of dimensions and materials
- Showing the importance of **object libraries** also for measuring existing buildings
- Reference-plane and topology of building elements



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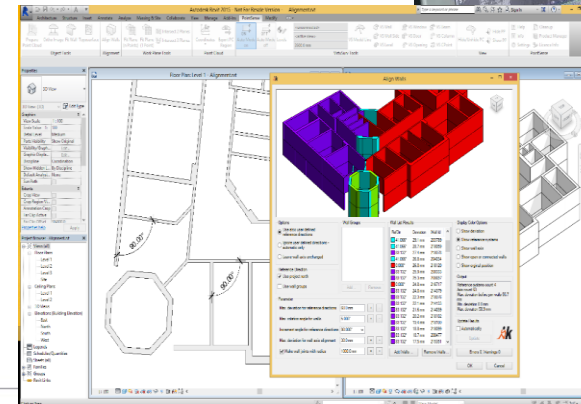
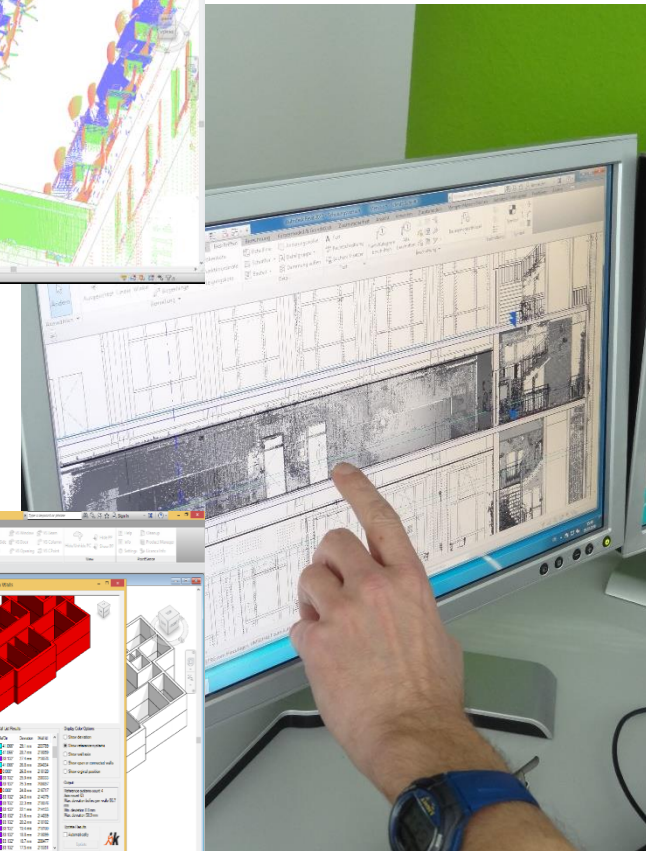
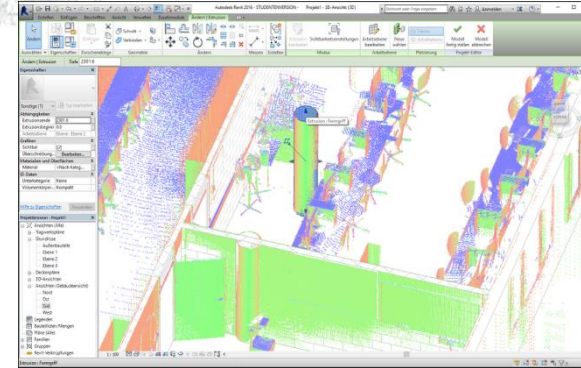


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Practice #4: 3D-Pointclouds for BIM

- **preparation** of the point cloud for BIM Authoring Software
- pointcloud as **reference** for the **digitalization** of building elements
- **as-build comparison** between an existing model of the building and the point cloud
- PointSense for Revit, Faro 3D Software GmbH (Dresden)
- Point cloud in family editor
- **Semiautomatic detection** and placing of building elements
- BIM-Beautification (89,9° vs. 90°)



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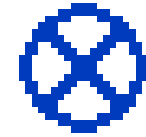


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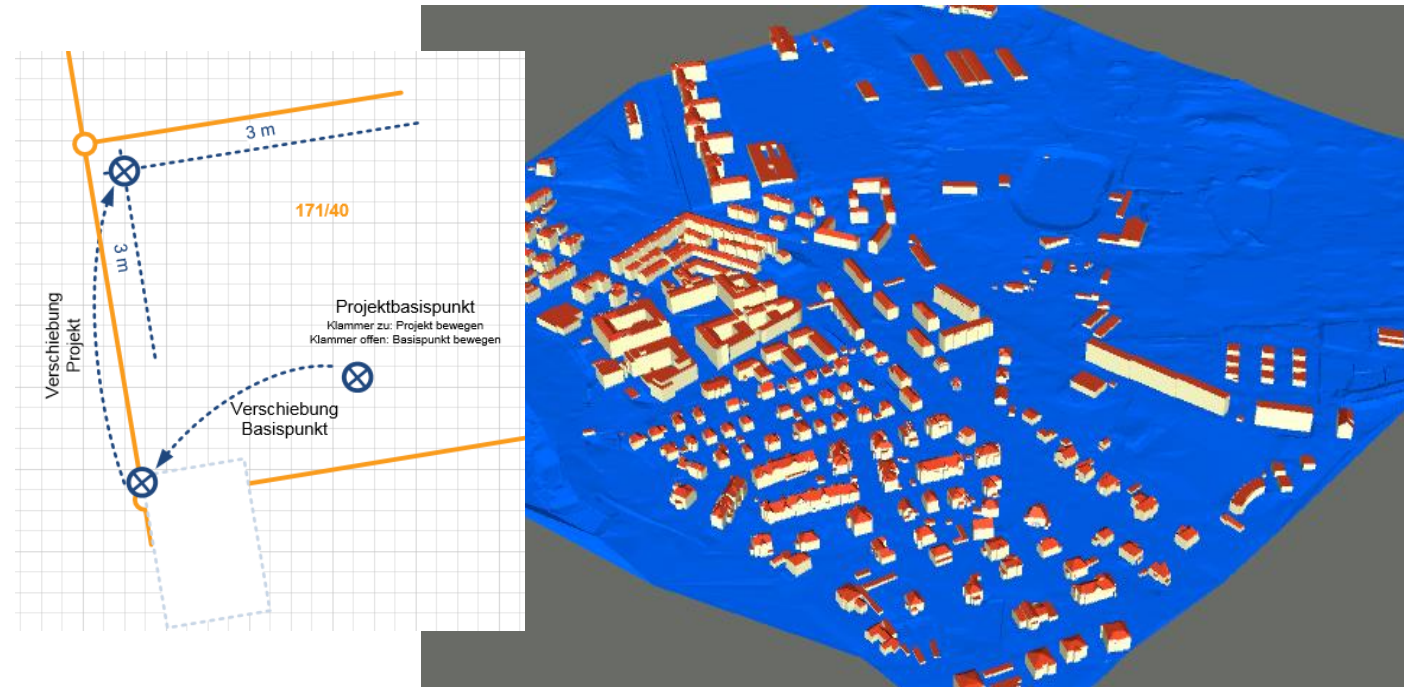


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Practice #6: GIS/BIM Coordinate Systems



- **Concepts and limitations** of internal, project and shared coordinate system
- Working with **georeferenced** CAD-files
- **Adjusting** a planned building (BIM) to a parcel boundary (Land Management)
- Digital Terrain Models (DTM)
- **3D-City Models**



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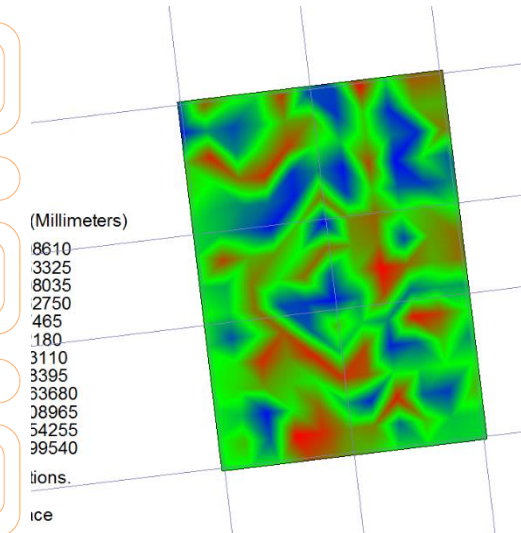
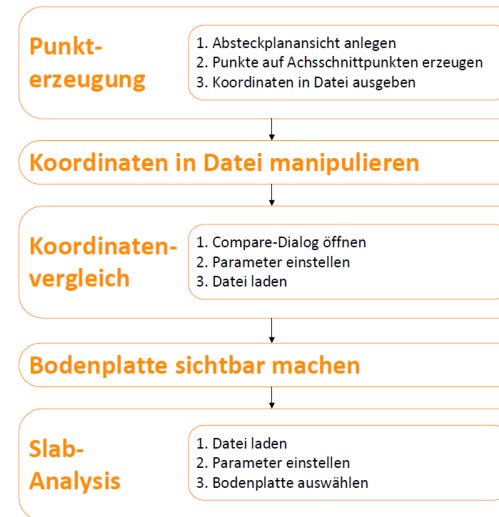
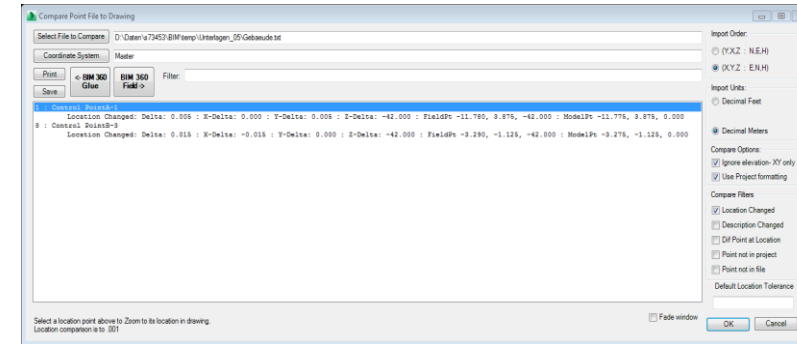
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Practice #7: Setting out

- **Creating numbered points in BIM**
- **managing surveying points**
- **comparing points as-planned vs. as-built**
- **slap analysis**
- **setting out reports**
- **best-practice workflows**



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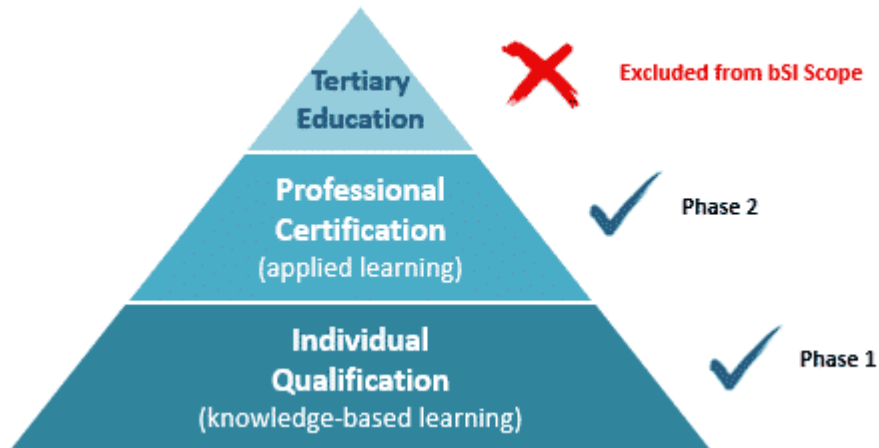


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Standards for education

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Individual Qualification (launched):

- concepts and principles of openBIM.
- focusses on theory-based learning
- not include software training
- can be delivered in a 2-day course.

Professional Certification (late 2018)

- addresses the application of openBIM principles in the project environment.
- practice-driven, comprehensive training
- comprised of specific role based modules (e.g. BIM Manager, BIM Coordinator, Information Manager)
- Each module will require 200+ hours of class learning in addition to live project work.

<https://www.buildingsmart.org/compliance/professional-certification/>

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35.240.67	VDI/BS-RICHTLINIEN	Dezember 2017
VEREIN DEUTSCHER INGENIEURE buildingSMART	Building Information Modeling Qualifikationen Basiskenntnisse	VDI/BS 2552 Blatt 8.1 Entwurf
Building information modeling – Qualifications – Fundamental knowledge		<i>Einsprüche bis 2018-05-31</i> <ul style="list-style-type: none"> • vorzugsweise über das VDI-Richtlinien-Einspruchportal http://www.vdi.de/einspruchportal



Establishing a **unique basis** for the education, training and further education of BIM in Germany.

The basic knowledge is consistently based on a dynamic system consisting of the **five BIM factors**: People, processes, data, technology and framework conditions as well as their basic-interactions with their environment.

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