Building Information Modelling in the China (and the UK)

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Introduction

- University of Nottingham Ningbo China
- D-CiTi Lab
- Motivation for BIM
- Motivation for BIM teaching
- BIM Teaching at UNNC
- BIM example in China

University of Nottingham Ningbo China (UNNC)
宁波诺丁汉大学

- 7,000+ students
-7000+ 学生

- 89% home; 11% International
-89%本土，11%国际生

- 700+ employees
-700+ 名员工

D-CiTi Lab

Digital City Infrastructure and Technology Innovation Laboratory

On December 11th 2015 , **"D-CiTi Lab Launch Ceremony and International Forum on Digital Built Britain"** was held in Shanghai British Centre. Experts, scholars and executives from domestic and overseas BIM relevant industries gave impressive speeches and presentations for the ceremony.

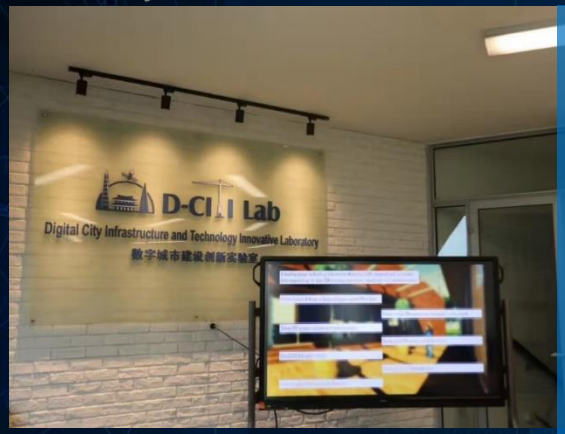
Based on the development of **BIM technology and smart city**, D-CiTi Lab combines researches with innovation

D-CiTi Lab has more than 10-year BIM project experience, with world-leading R&D:

- ❑Provision of the first UK MSc in Geospatial Engineering with BIM in China
- ❑Provision of certified BIM executive and management training course
- ❑Delivery of BIM project and its solution and implementation
- ❑Development of global BIM standard and its formulation
- ❑Global BIM R&D collaboration
- ❑Organizing global BIM conference
- ❑Market development

实验室布局—D-CiTi Lab

D-CiTi Lab Layout



156 ㎡ area

12 high performance 3D design workstations

6 high performance graphic rendering workstations

2 mobile graphic workstation

1 smart meeting room

1 virtual reality exhibition hall

1 augment reality and artificial intelligent exhibition hall

Ir Dr Llewellyn Tang

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BIM Hardware and Software

Photogrammetry and Remote Sensing Laboratory
GIS实验室

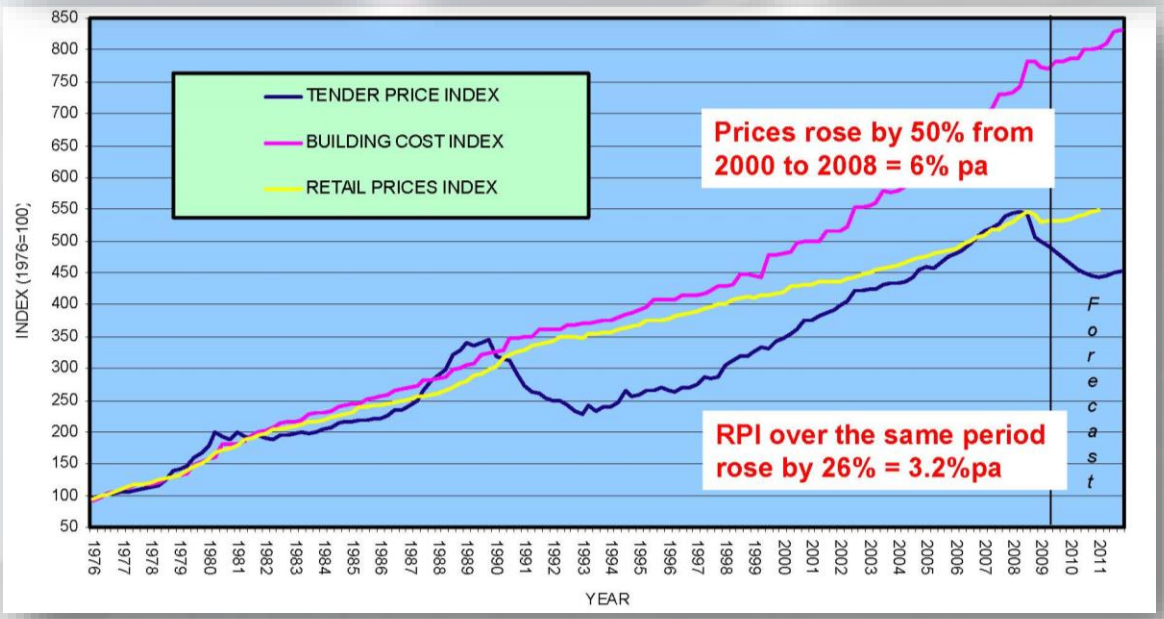
BIM Computer Room
BIM 机房 (130+)

D-CiTi Lab Partners

BIM Motivation (in the UK and China)

- Low Productivity
- High Cost
- Government Policy

Low productivity and high cost in UK construction industry

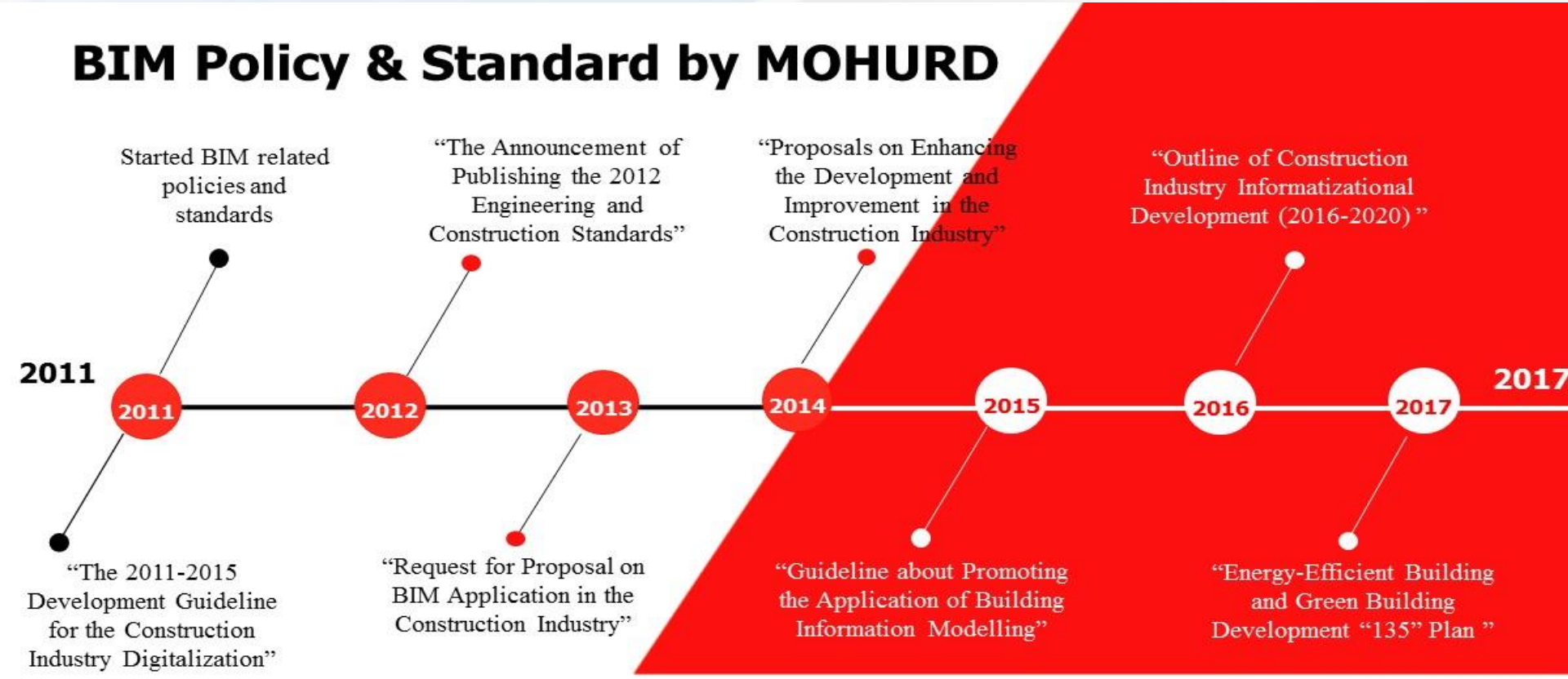


Between 1997-2006:

- Inflation rose by 25%
- Car cost rose by 1.5%
- Construction cost rose by 89%

BIM Education Motivation (in China)

China has started to make BIM standards and policies that meet national requirements since 2011. The following timeline shows BIM policy and standard released by Ministry of Housing and Urban-Rural Development (MOHURD)



BIM Government Policies in China

The Urban and Rural Construction Committee and 7 provinces have initiated policies to promote BIM technology in construction industry.

BIM Government Policies in China

Very recently, the **Urban and Rural Construction Committee** released a guideline on pushing BIM in China; by **2020**, all public building level 1 design institutes and construction companies need to be BIM ready, for major projects, green building and communities, the usage needs to meet 90% target.

- Focus of Construction Unit
- Focus of Survey Institute
- Focus of Design Institute
- Focus of Engineering General Contractor
- Focus of O&M Unit

中国建筑信息化

Digitalization in China Construction Industry

D-CIT Lab × The University of Nottingham
UNITED KINGDOM • CHINA • MALAYSIA

Strategic Plan started in 2009

- Over 70,000 construction companies
- Direct workforce > 4000m
- Before 2010 – conceptual stage
- 2010-2015 – BIM and other digital technology adoption
- 2015-2020 – fully implemented

Applying BIM in China:
Is it the trend or uphill battle?
Or it will be done in ONE years?!

Annual new construction area growth

>800-900 billion m^2

New construction Type	Resident-ial building	General Public Facilities	Large-scale Public Facilities
Proportion %	58.5%	36.1%	5.4%
Area (billion m^2)	468-526	289-325	43-49

Mandatory to use BIM

Government encourage to use BIM by tax elimination, pre-sale policy and etc.

Government Policies

The Urban and Rural Construction Committee released "2016~2020 construction information development outline". This is the guidance document that will lead the development of China's construction industry over the next 5 years. Recently, the quality and safety supervision division head interpreted this document:

Key words of informatization technology in the outline:

BIM, Big data, Intelligentization, Mobile communication, Cloud computing, Internet of things, Digitization, Cyberization , 3S(RS\GIS\GPS), Location based services (LBS), Sensor, Radio frequency identification, Near field communication, QR droid, 3D print, Intelligent robot, Intelligent monitoring equipment, 3D laser scanning, Virtual reality, Augmented reality and Mixed reality.

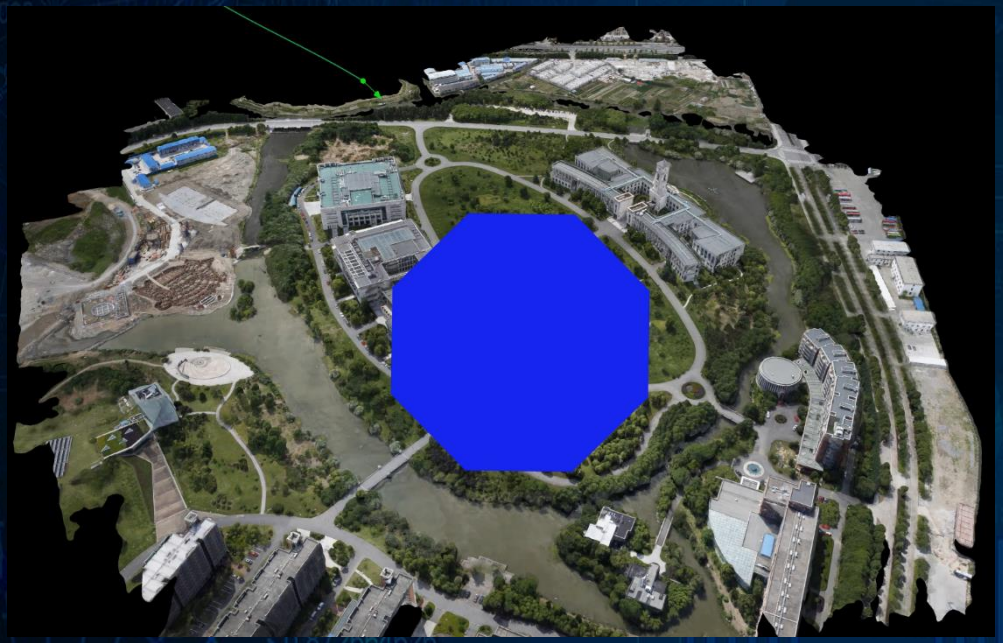
Opinions on further strengthening the application and popularization of BIM in Shanghai (September 6th, 2016)

For projects which use BIM technology through a construction company, if BIM is used in design and construction phase, will get 20 RMB subsidy for each square meter, the maximum is not more than 3 million yuan; if use BIM in the design, construction and operation phase, will get 30 RMB subsidy for each square meter, the maximum is not more than 5 million RMB.

In 2014 an investigative report in China found that 67% of Chinese companies involved in the construction sector saw a lack of BIM trained staff as a limiting factor to the expanding use of BIM within the industry. (SCTA, 2014)

英国BIM任务组课程学习目标体系

UK BIM Task Group and Training Learning Outcome Framework



学习目标体系

1

理解BIM的概念，BIM Level2的要求，以及其和2025年政府建设战略和产业战略的联系。

Understand what BIM is, the contextual requirement for BIM Level 2 and its connection to the Government Construction Strategy and Industrial Strategy 2025.

2

理解BIM对企业组织的潜在影响和价值主张。

Understand the implications and value proposition of BIM within your organization

3

根据1192标准和PAS55 / ISO 55000中所描述的，理解供应商和客户之间的管理和信息交换的要求。

Understand the requirement for the management and exchange of information between supply chain members and clients as described in the 1192 suite of standards and PAS55 / ISO 55000.

BIM @ Nottingham

Teaching

Civil Engineering

BEng Civil Engineering
MSc Engineering

Surveying and geodesy

MSc Geospatial Engineering with BIM

Architecture and Built Environment

BEng Architecture

BEng Architectural Environment Engineering

Research

Geospatial and Geohazards

Research Projects

PhD Students

CPD

D-CiTi Lab

BIM Innovation Team

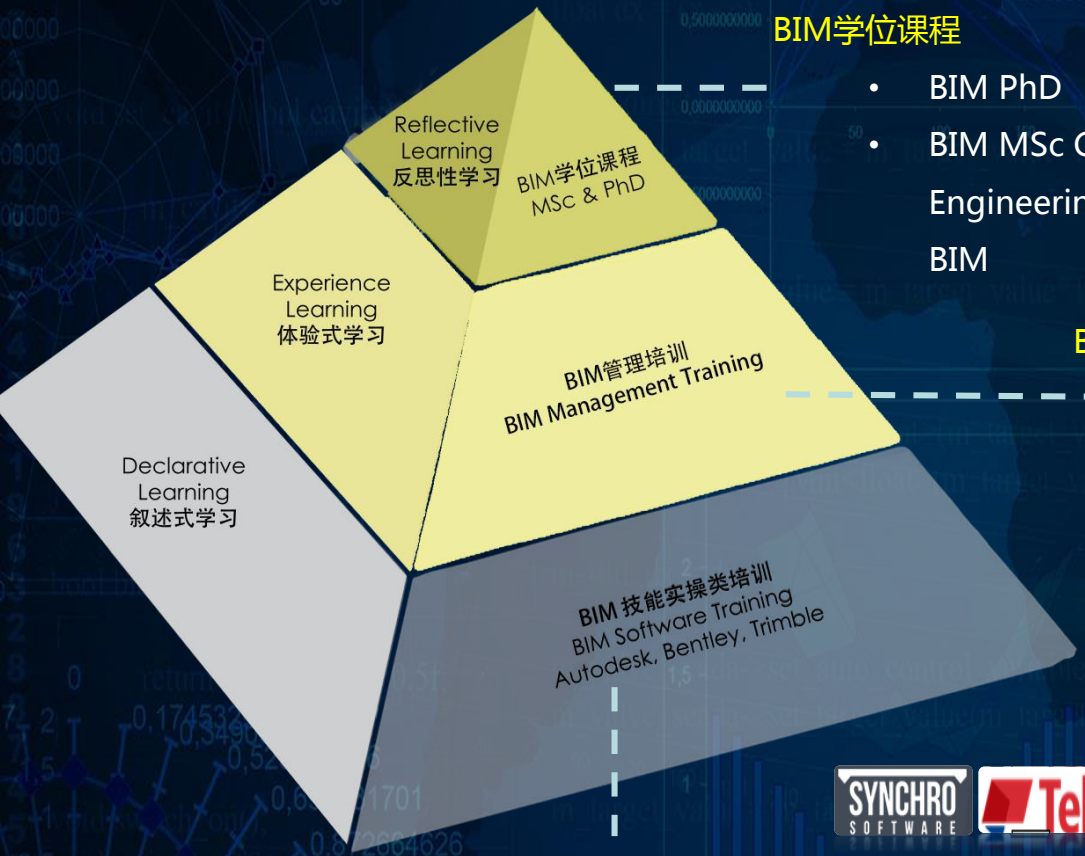
Research Projects

PhD Students

CPD

D-CiTi Lab 培训体系

D-CiTi Lab Training Academy



BIM学位课程

- BIM PhD
- BIM MSc Geospatial Engineering with BIM


Certificate of Accreditation

This is to certify that the

MSc Geospatial Engineering with BIM

at

The University of Nottingham, Ningbo

Has been accredited as meeting the requirements of the Chartered Institution of Civil Engineering Surveyors

The accreditation is valid until 31 March 2020

Chartered Institution of CIVIL ENGINEERING SURVEYORS

BIM管理培训 BIM Management

- 高级管理类培训
- 全球认证系统

CIOB THE CHARTERED INSTITUTE OF BUILDING

bsi.

技能实际操作类型培训

SYNCHRO SOFTWARE · Tekla · VICO SOFTWARE Integrating Construction

Bentley · AUTODESK.

BIM Education at Nottingham China

- Interdiciplinary Case Study Design
- As Built BIM projects

BIM Education @ Nottingham China

- BIM education is not simply changing the engineering education tool from 2D CAD to 3D visualization (Tang et al. 2015).
- Collaboration was deemed the key of BIM implementation (Eadie et al., 2013; Szeda, 2013; Tang et al., 2015).

BIM Module @ Nottingham - Project Workflow

see Jin et al (2016).

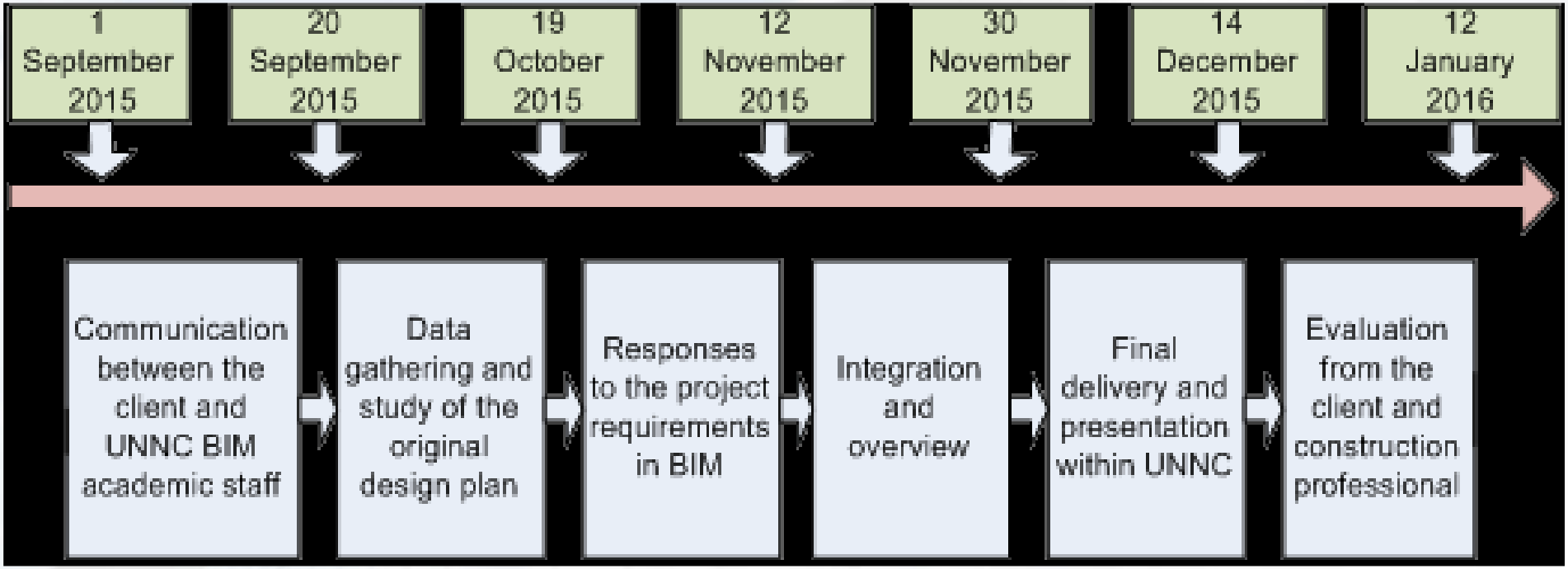
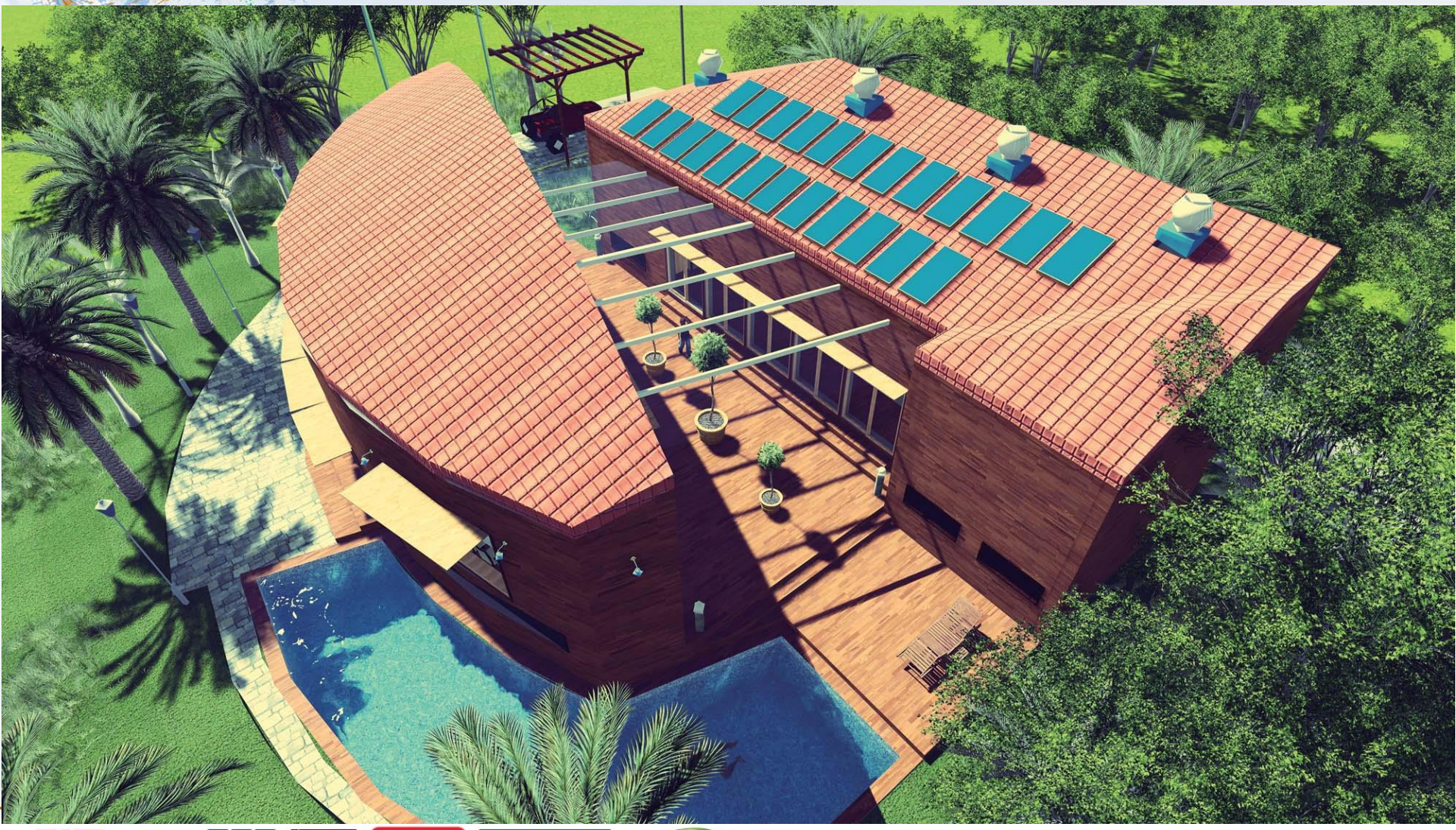


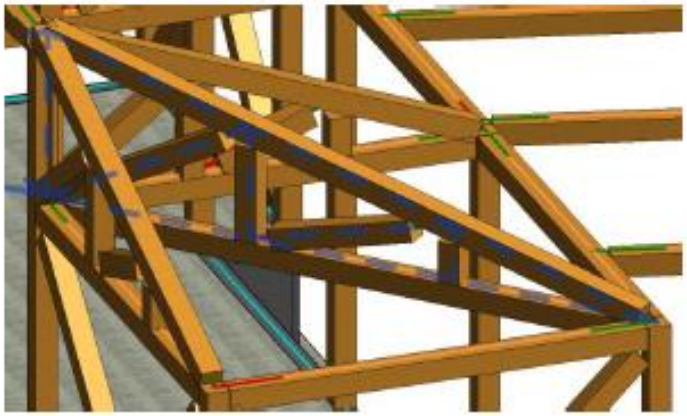
FIG WORKING WEEK 2017

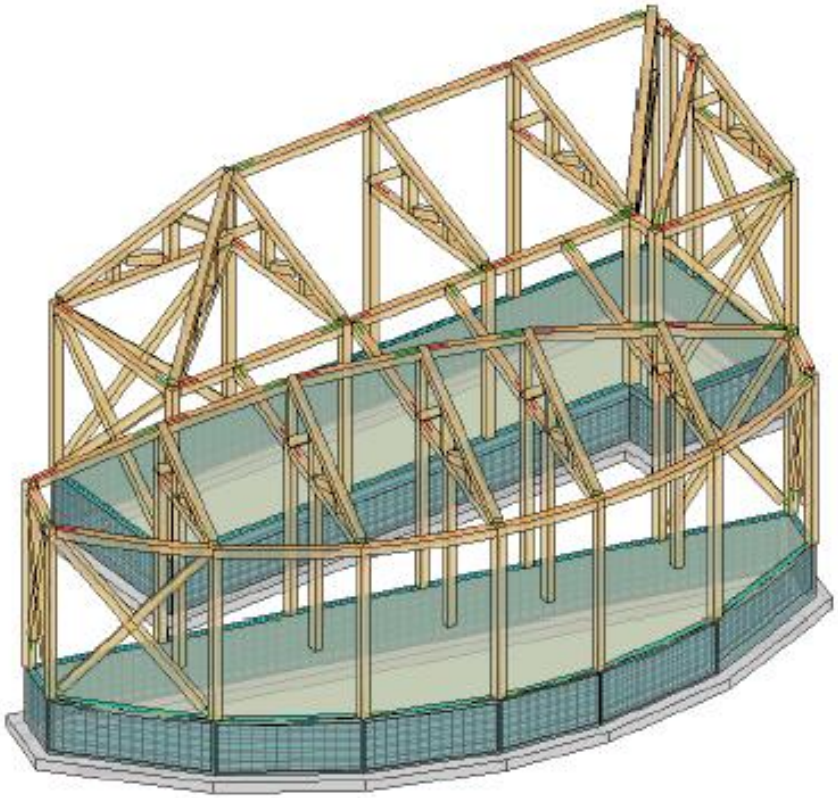
BIM FOR SURVEYORS

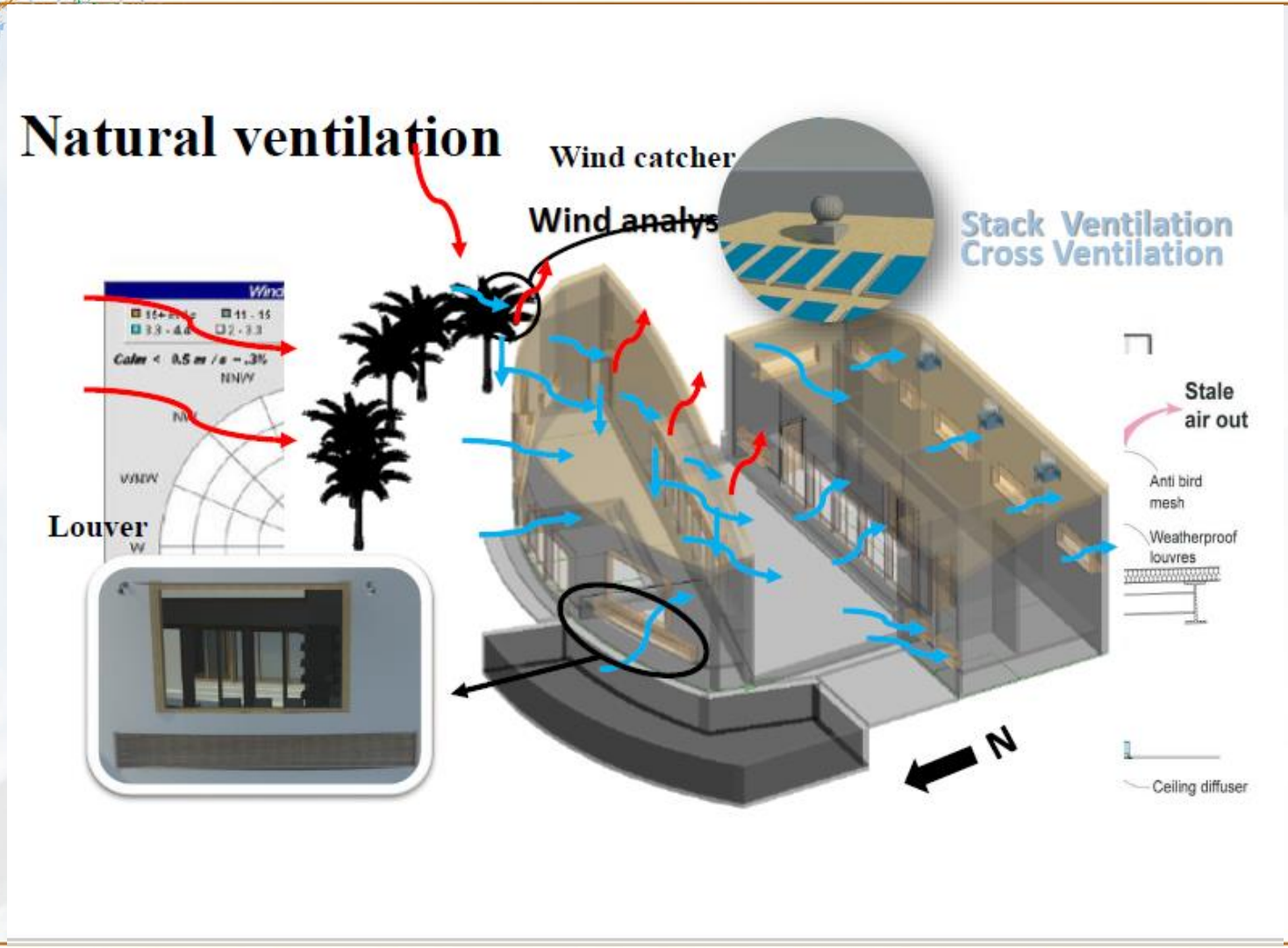
Helsinki Finland **Sunday 28 May 2017**



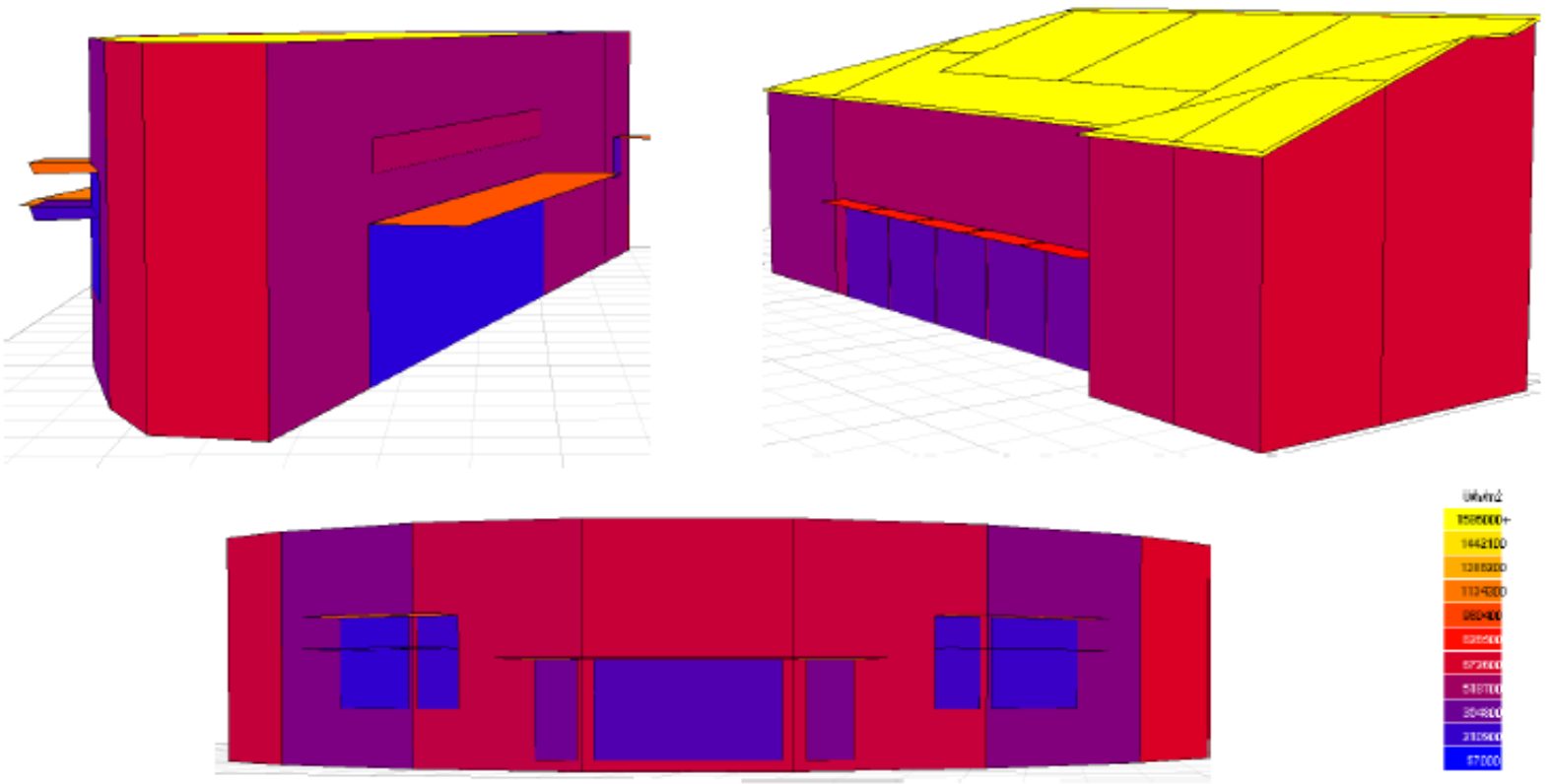
Structure Redesign






Natural ventilation
Wind catcher
Wind analys
Stack Ventilation
Cross Ventilation
Louver
Stale air out
Anti bird mesh
Weatherproof louvres
N
Ceiling diffuser

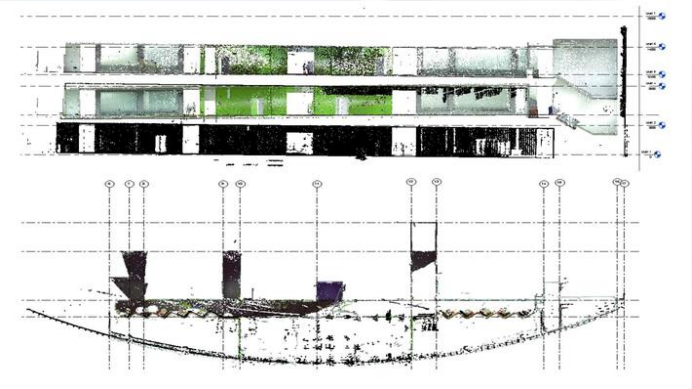
Simulation of Shading Device: Total Radiation

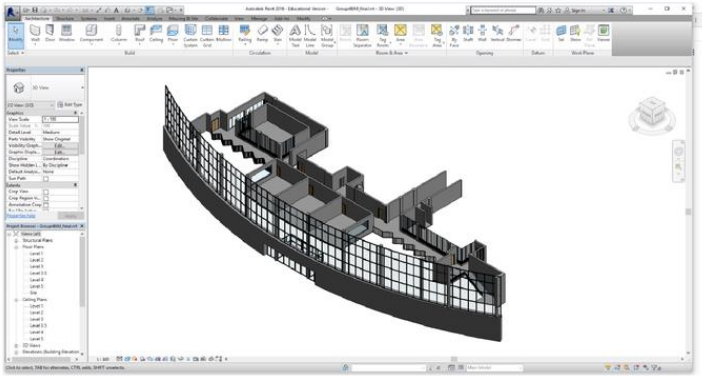


Surveying for BIM – Optional Module (Workshop)

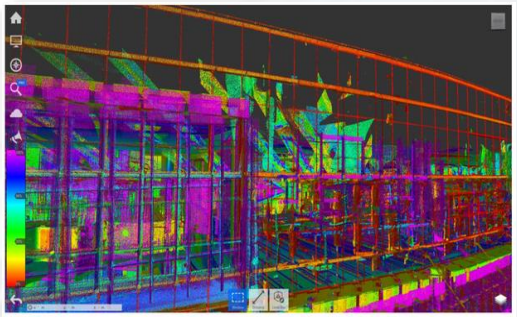
see Hancock et al 2016

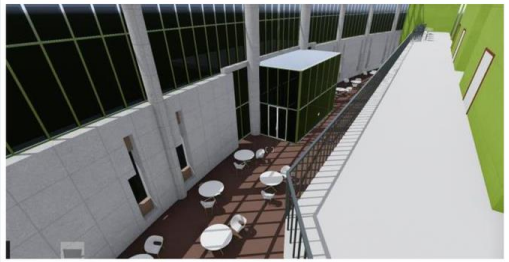
Lectures → Survey Practical → BIM Software Practical → Group and Individual Work → Reports and Presentation



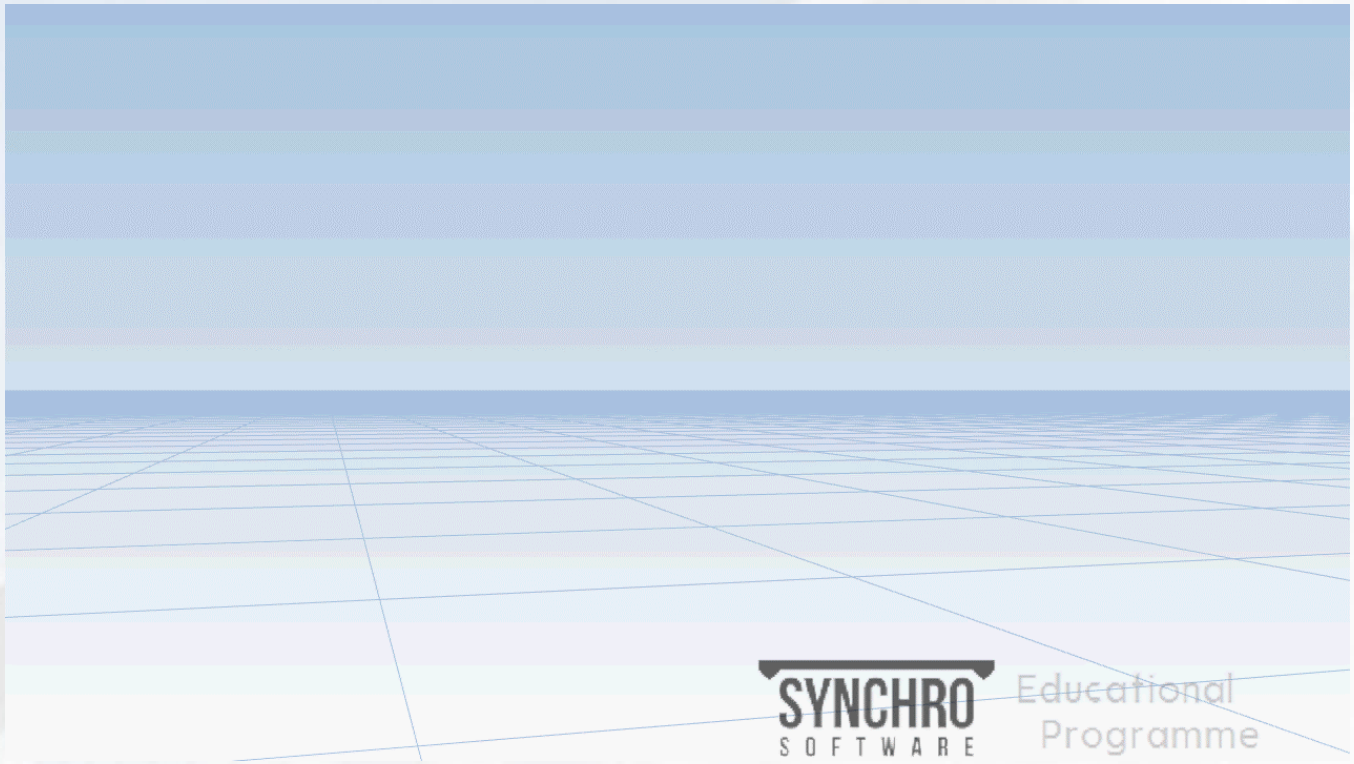


Data collection → 3D point cloud → BIM model





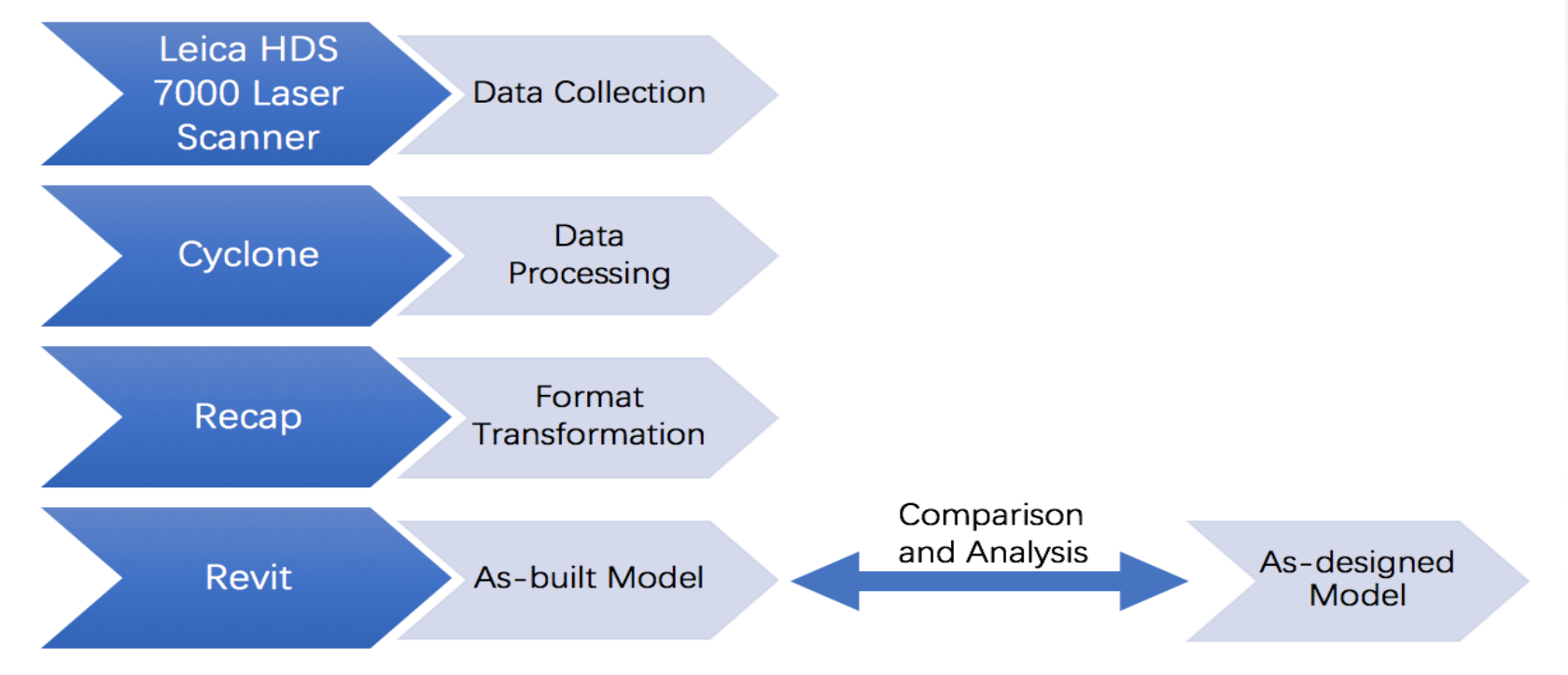
Student As Built BIM of on Campus Building



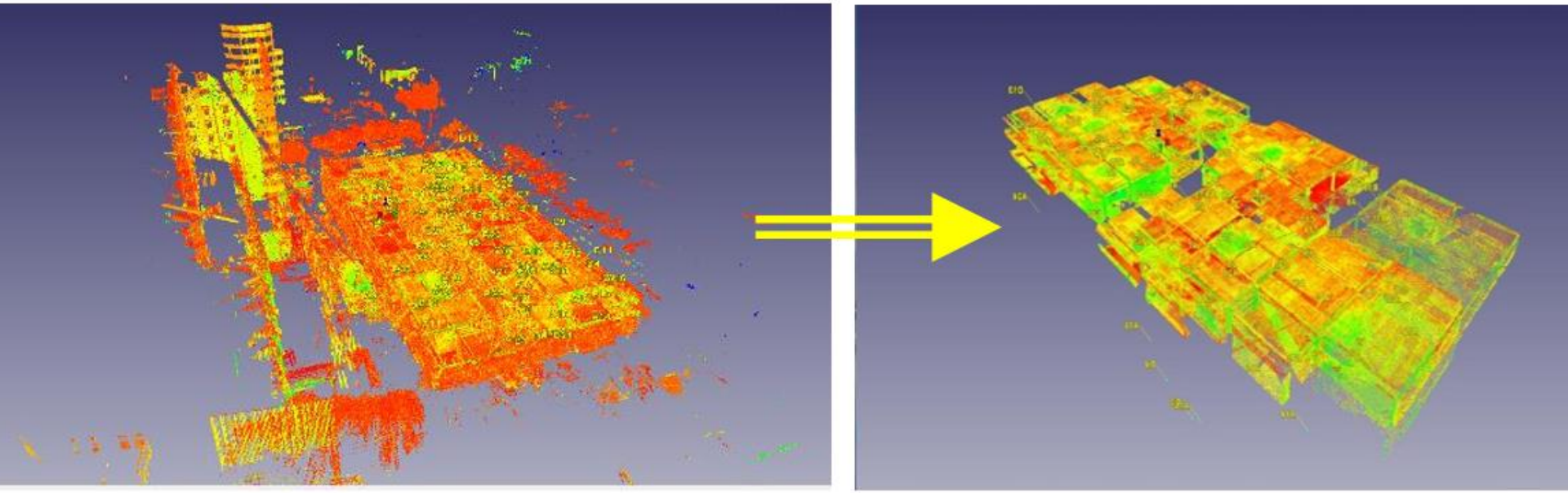
Student BIM Feedback

Benefits from BIM adoption	Disadvantages and challenges in BIM usage
• Improved communication from the virtual environment provided by 3D visualization • Enabled building information exchange • Enhanced collaboration among different disciplines • Efficiency in converting building models into drawings and rendering	• Lack of interoperability when exchanging building information among disciplines • Lack of sufficient families in the existing library of Revit • Lack of standards for BIM implementation • Difficulty in expressing architectural ideas in the early design stage • Lack of user-friendliness in MEP design

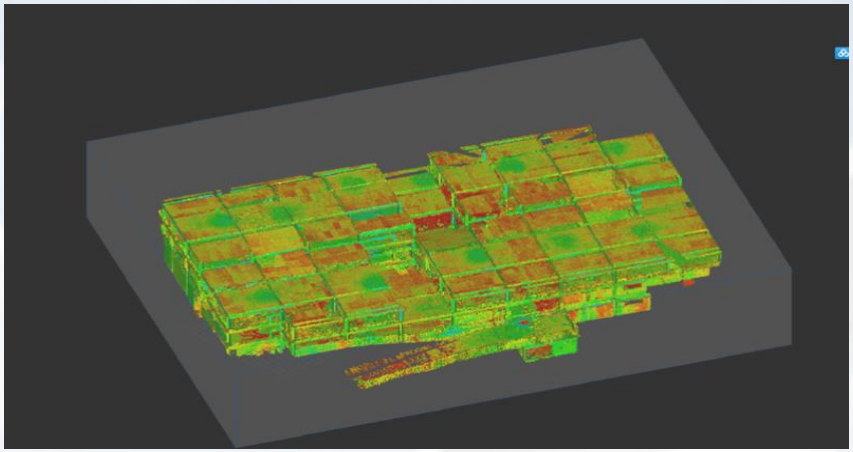
Newly Built Car Park in Ningbo – The 1st As-Built BIM in Ningbo

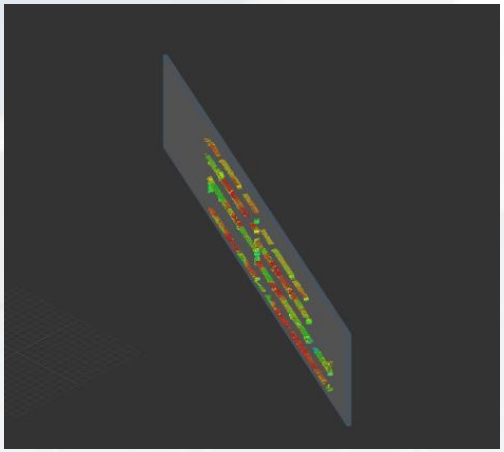


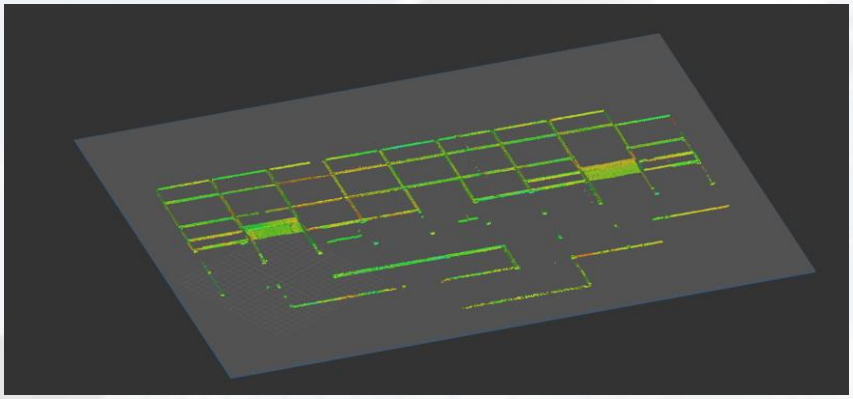
Newly Built Car Park in Ningbo – The 1st As-Built BIM in Ningbo



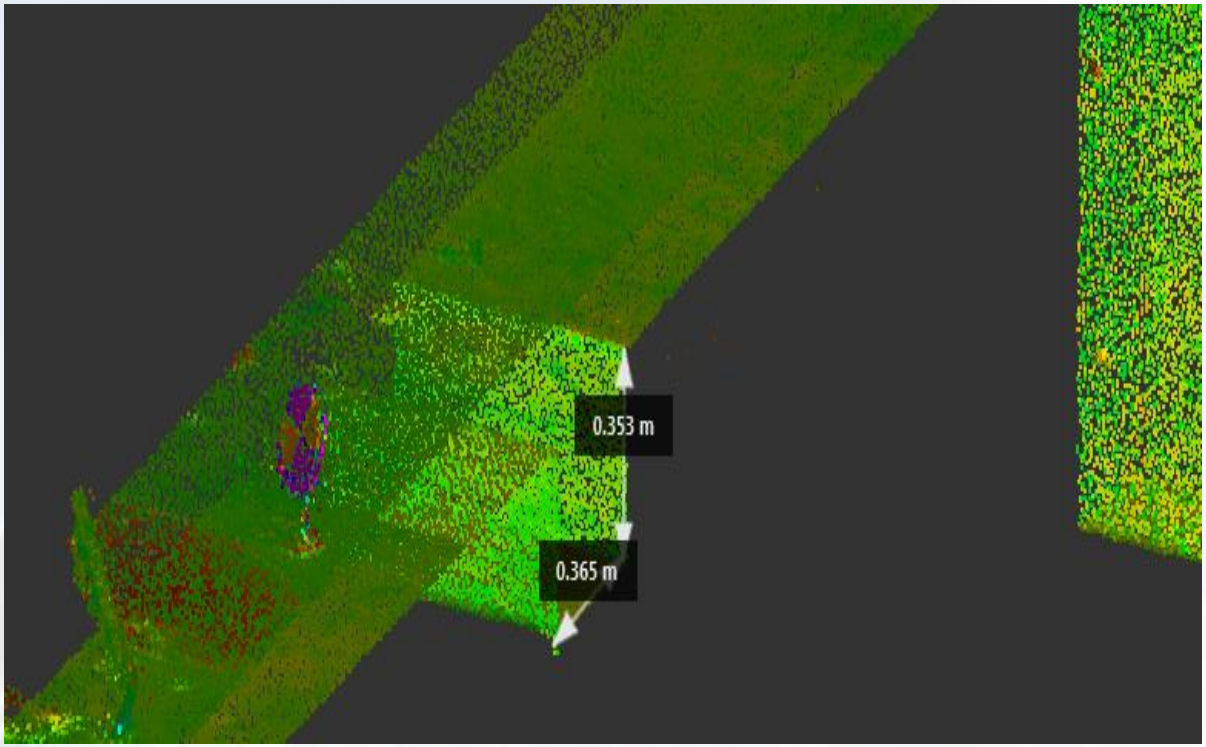
Modifications made in AutoDesk Recap



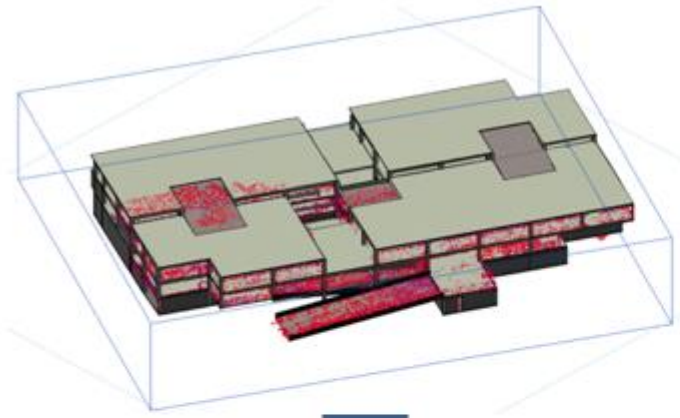


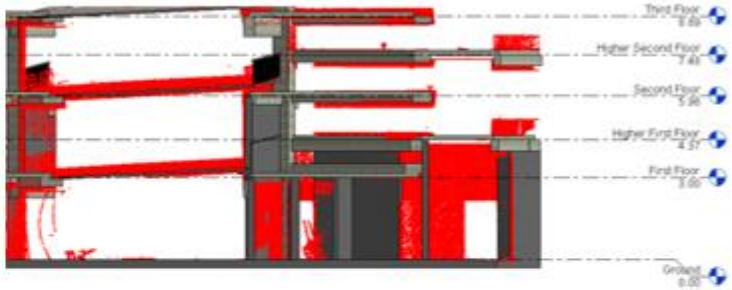


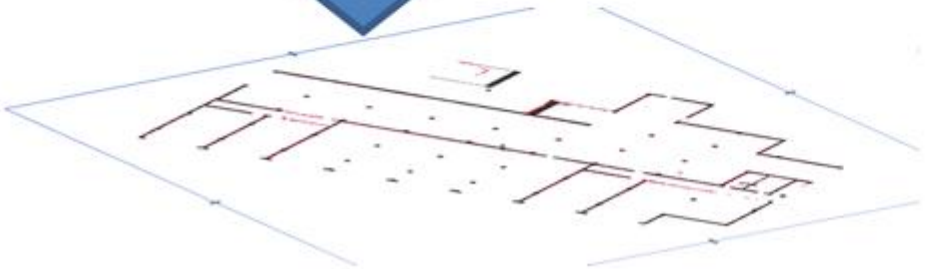
Checked against the structural design



Finally Import model in REVIT and set levels and grids

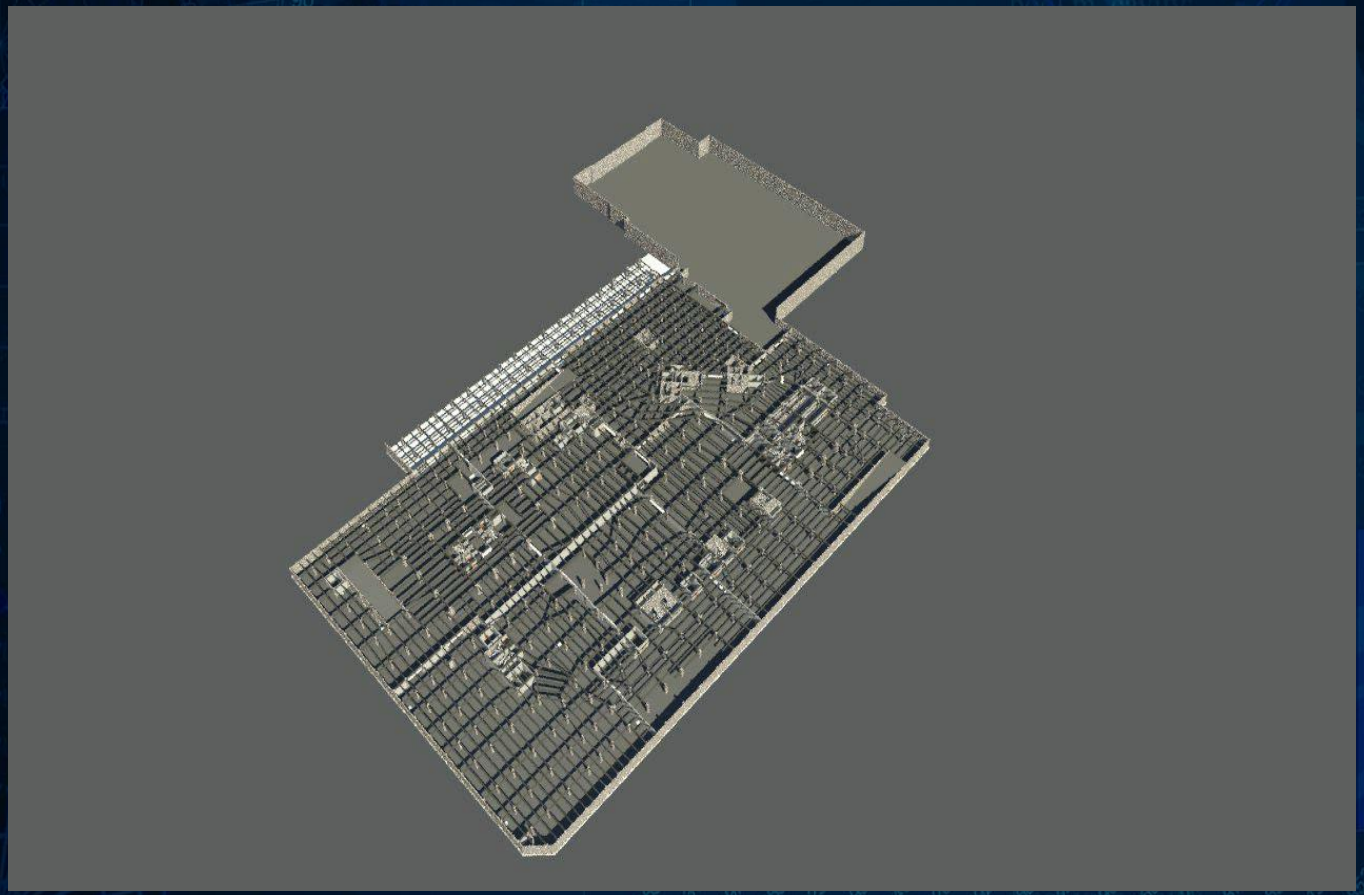


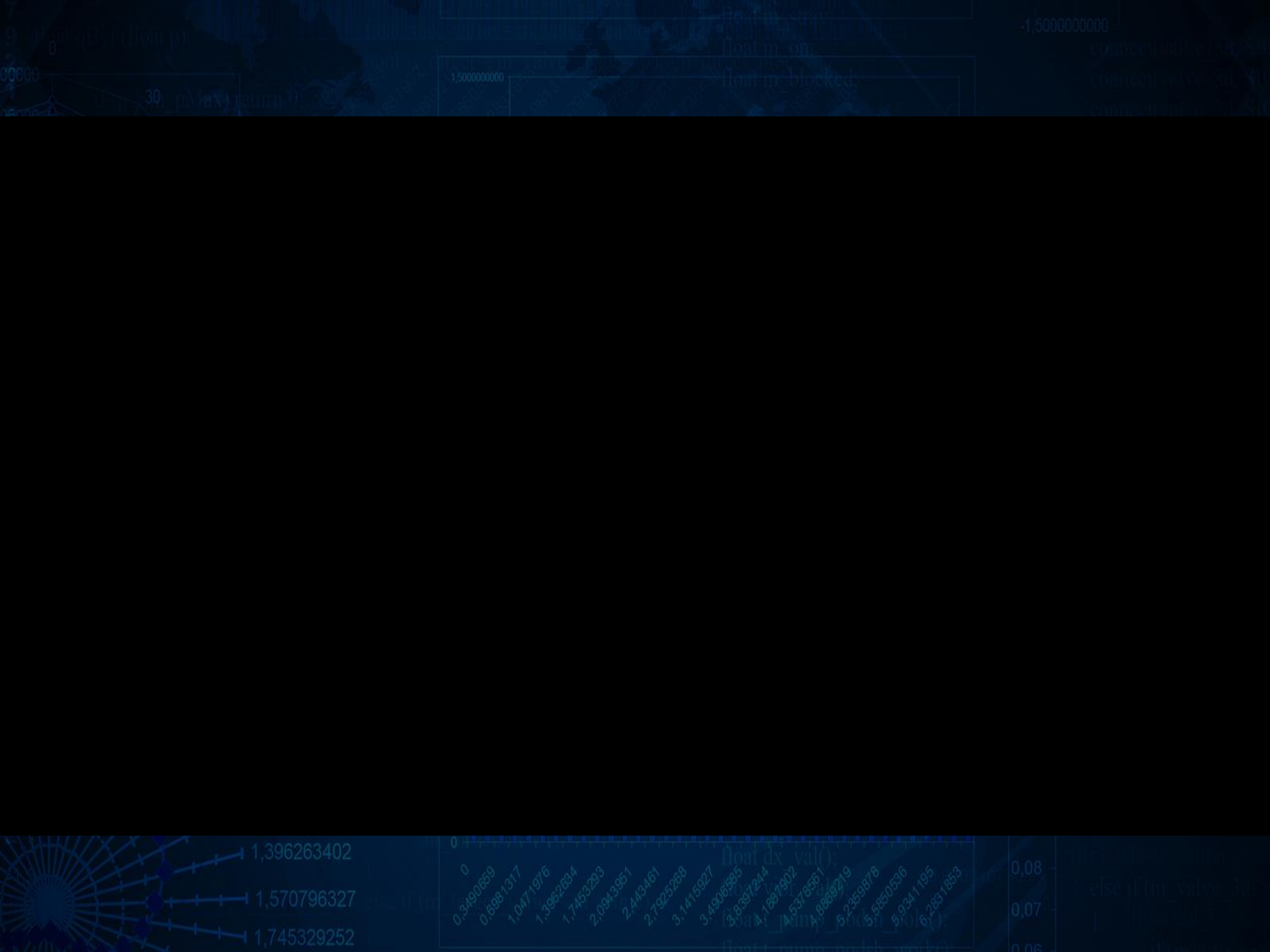




可视化协同设计

Visualization Coordinative Design

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Thank you!

Any Questions?

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