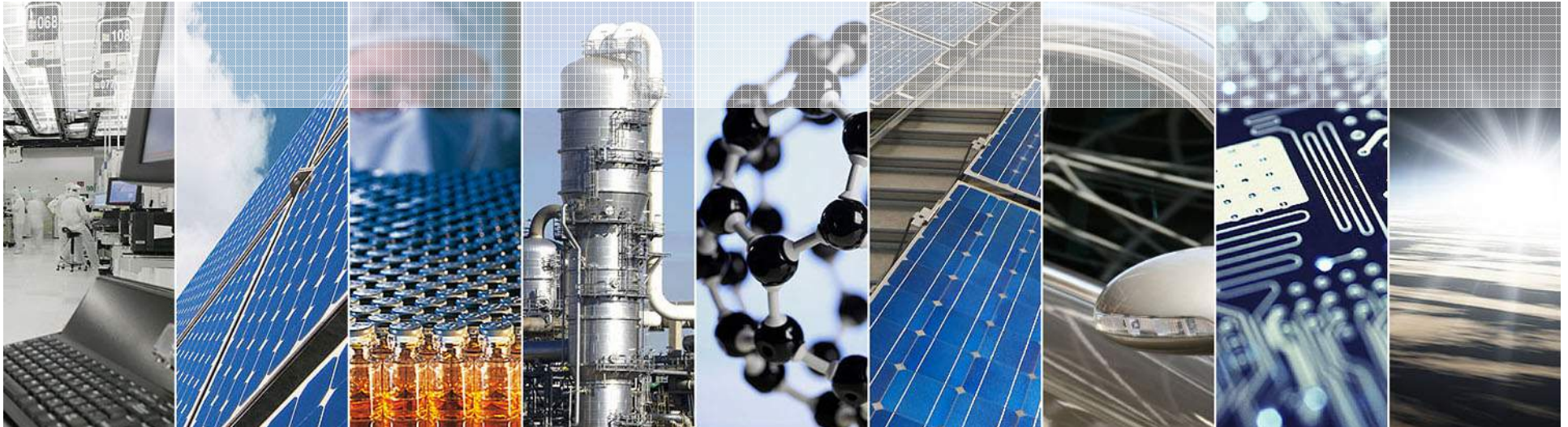




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# NDA BIM 4 Nuclear

Roy Andrade

Director  
Engineering & Technology  
EMEA

# BEPPS1/DIF Overview



## Plant Functionality

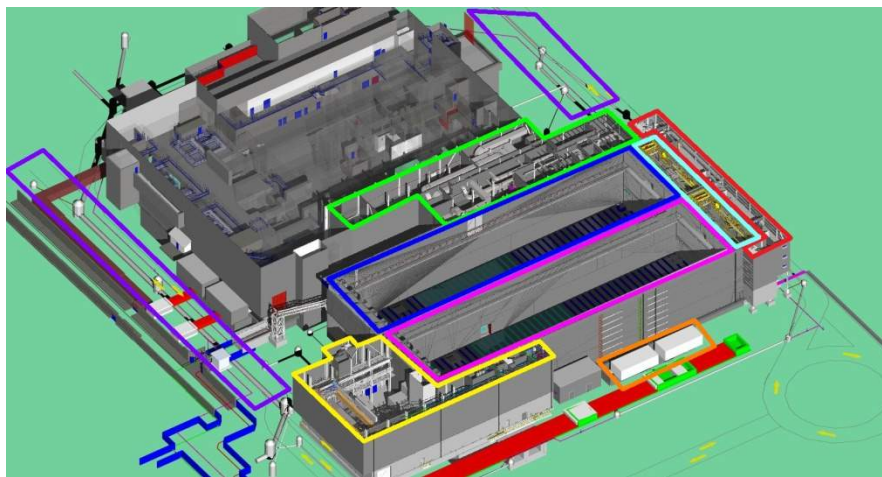
Receive and store 6681 waste containers at a rate of 9 per 24 hour period

Import / export waste containers to / from adjacent BEP building via export tunnel

Receive waste containers from other locations through new DIF building

Store containers for a period of 100 year

Programme to receive containers for a period of 40 years



## Current Project Status

- Preliminary design almost complete with packages moving into detailed design.
- Key delivery team members now migrating to site to support early works activities.
- Construction works progressing with Site Cabins and infrastructure, site mobilisation, early works towards sectional completion and HVAC strip out.
- Hargreaves Early manufacture of duct work progressing with low risk HVAC duct.

# M+W Group Structure



The Stumpf Group

M+W Group

Dr. Herbert Demel (CEO)

● Wolfgang Homey (CFO)

● Dr. Friedrich Schneider (COO)

Americas

EMEA

APAC

## Advanced Technology Facilities

Semiconductor, Photovoltaics, Flat Panel Display, Battery Cells

## Life Science & Chemicals

Pharma & Biotech, Chemicals, Food & Beverage, Medical Devices

## Energy

Solar/Renewable, Waste to Energy  
Natural Gas, Nuclear

## High Technology Infrastructure

Automotive, Datacenters

Integrated Solutions focused on Customer Value

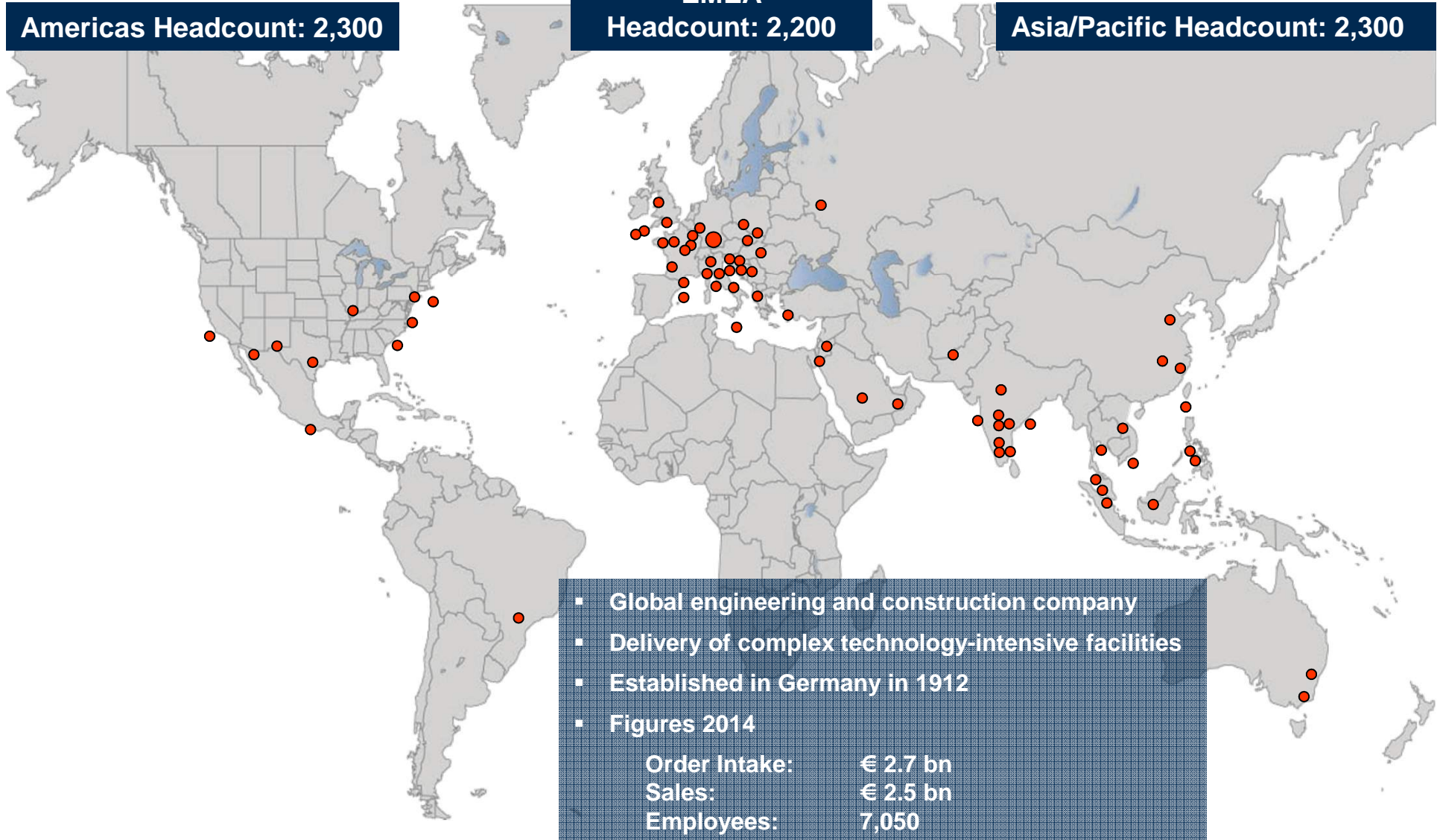
# M+W Group – At Glance



Americas Headcount: 2,300

EMEA Headcount: 2,200

Asia/Pacific Headcount: 2,300

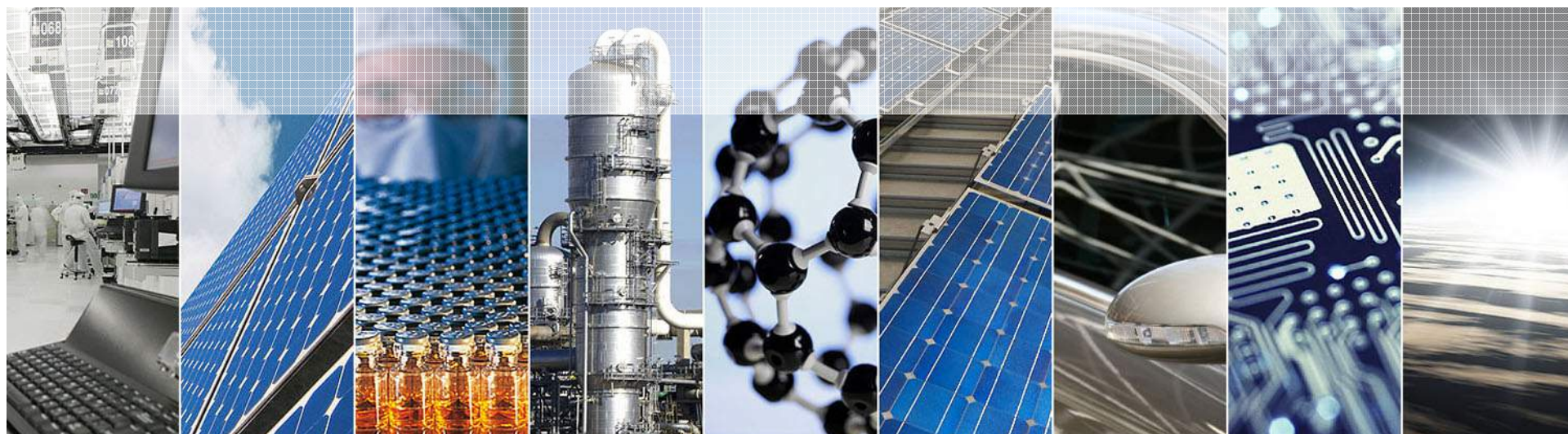


# Agenda

- Why BIM
- What is BIM
- BIM Development
- BIM Deployment & Application
  - Team Collaboration
  - Laser Surveying
  - Parametric Information
  - 4-D
  - 5-D
  - Facilities Management & Operation



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**Why BIM?**



## nbs BIM Toolkit

BRITISH STANDARD

Collaboration of architecture, engineering, construction and information technology  
Code of practice

BSI

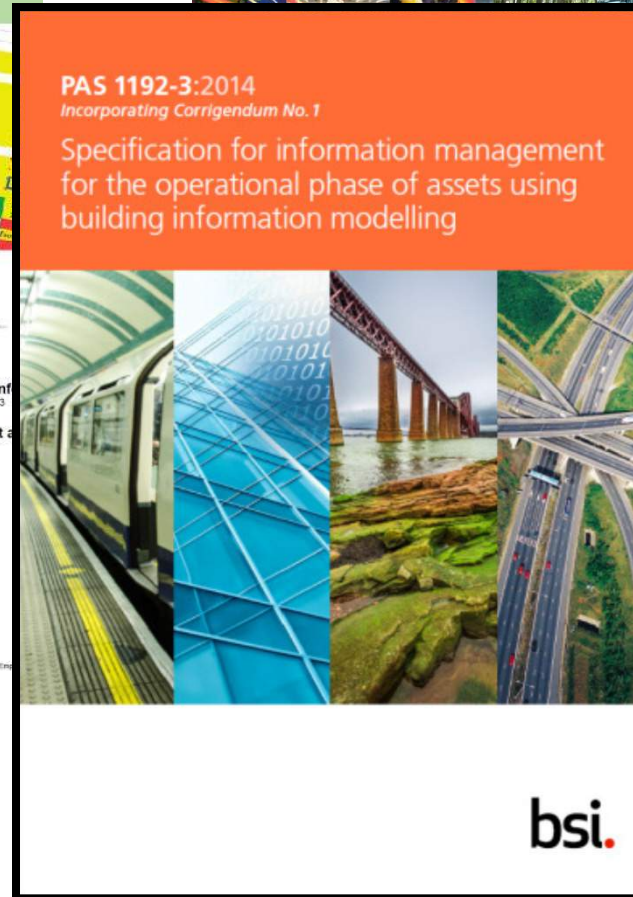
BSI  
British Standards

BS 1192:2007



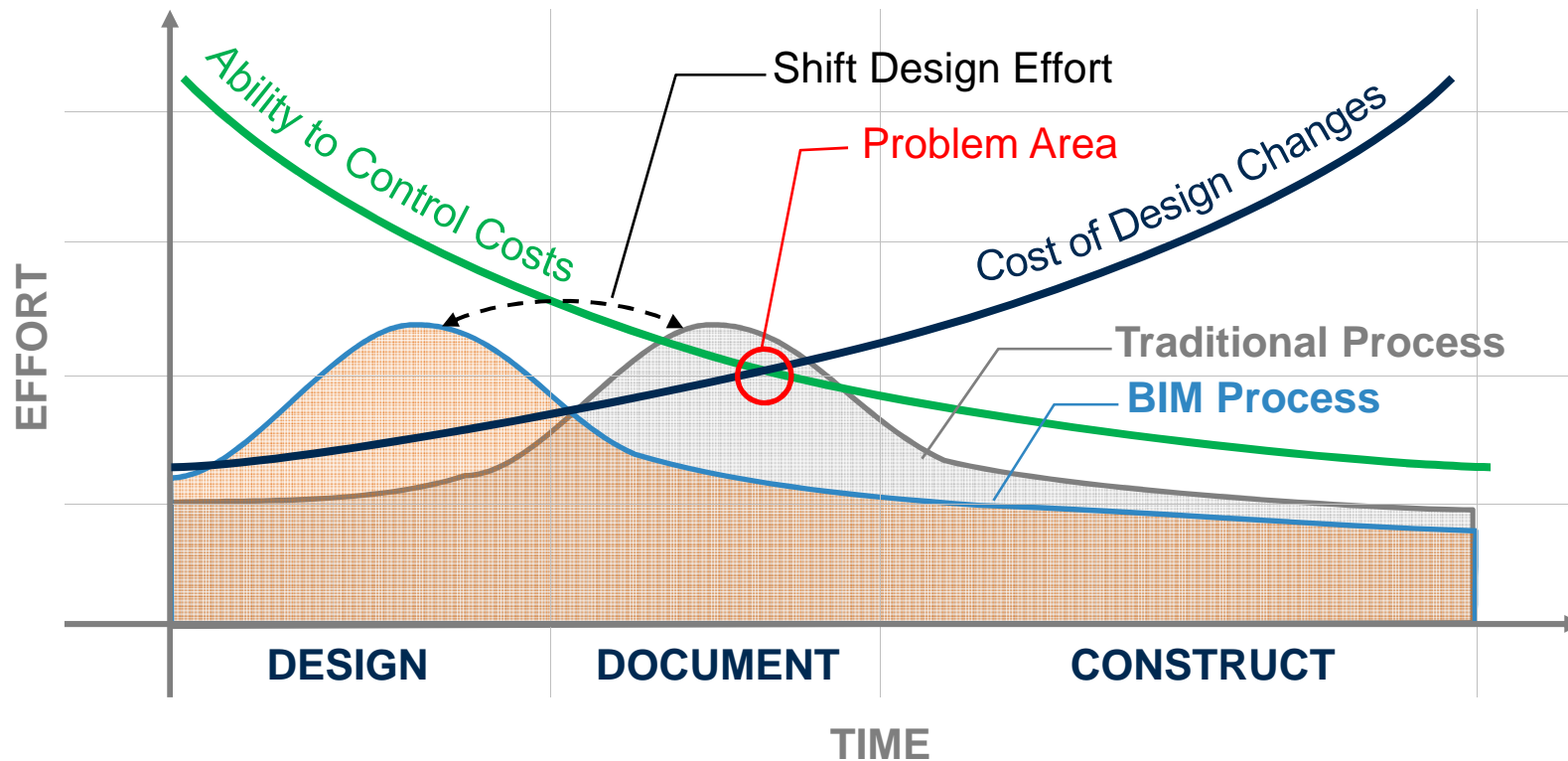
PAS 1192-2:2013  
Incorporating Corrigendum No. 1  
Specification for information management for the capital/delivery phase of construction projects using building information modelling

BS 8541-1:2012



# Efficiency of Outputs

- Shift Design Effort – Reduce Cost of Resolving Problems

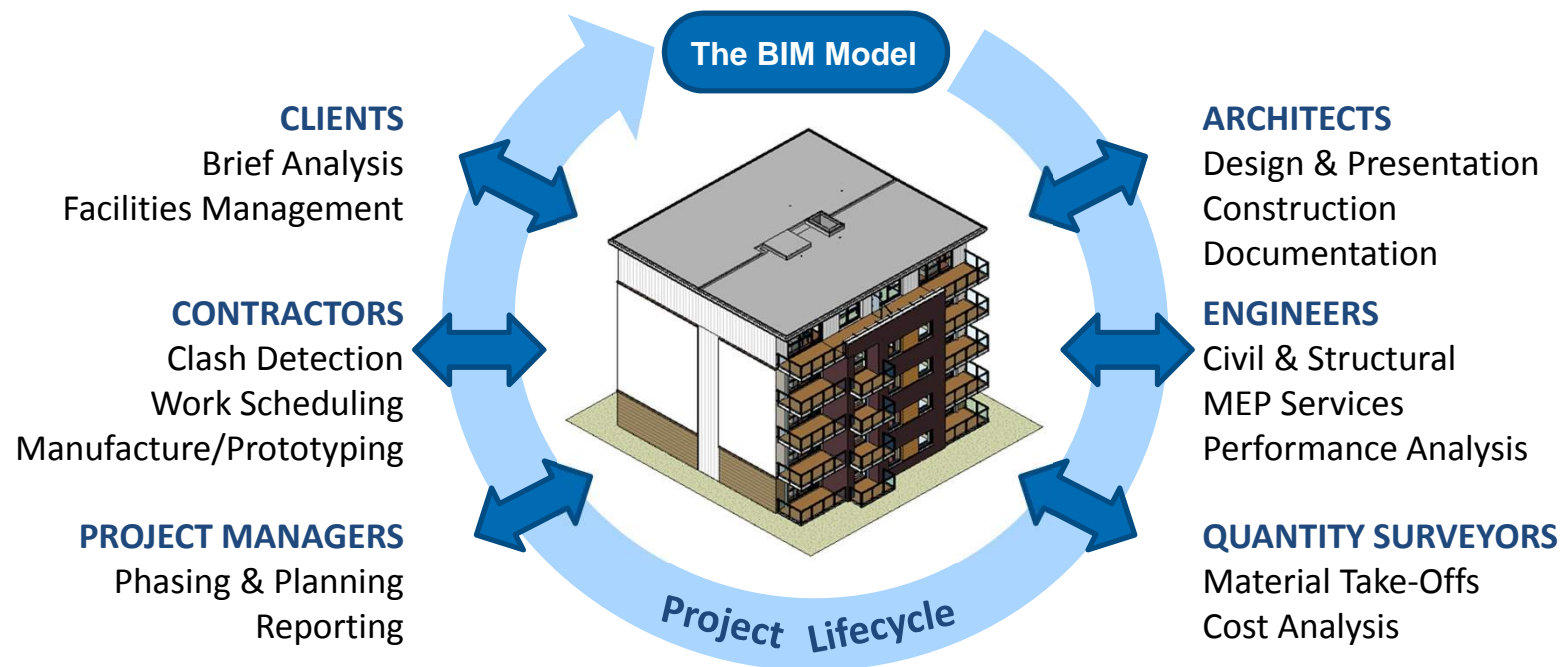


Source: Patrick MacLeamy – HOK



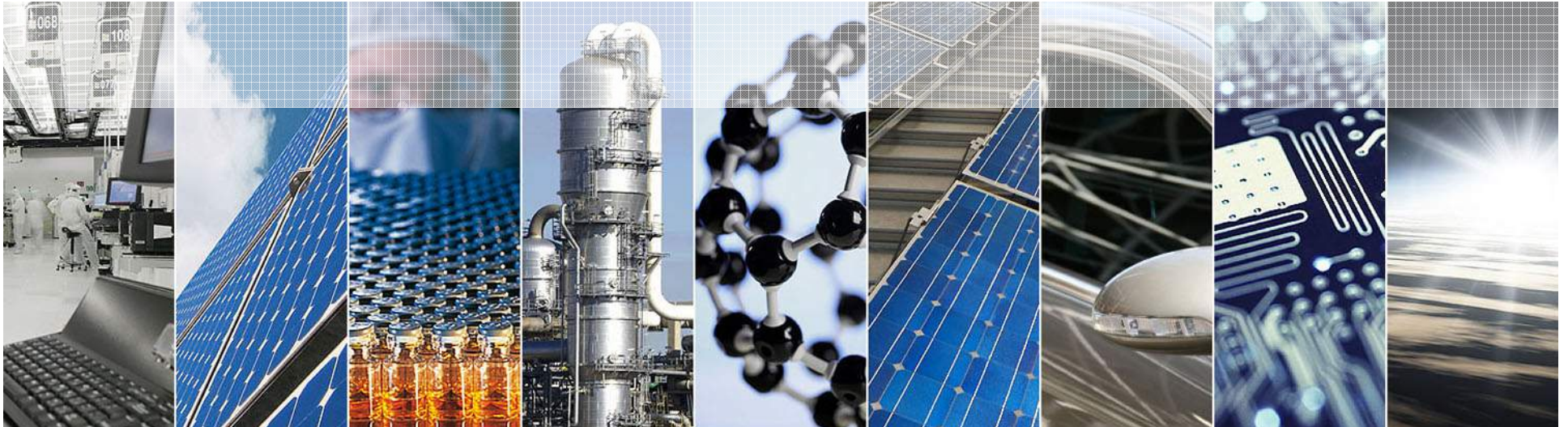
## Objective is for Integrated Project Delivery (IPD/Level 3 BIM)

- Coordinated Collaboration Between all Project Stakeholders
- Management of Building Information throughout Project Lifecycle





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**What is BIM?**

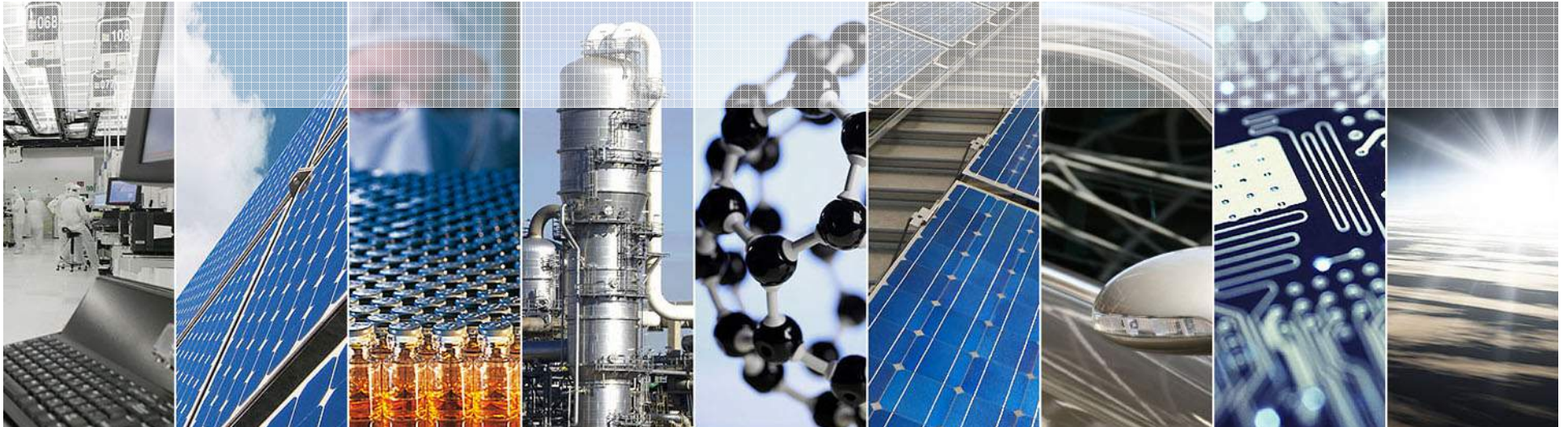
# What is BIM

- Method of communication between all stakeholders
- Method of sharing and collaboration and improve efficiency
- Improved quality through better coordination
- Improved accuracy
- Reduced rework
- Reduced delivery costs
- Reduction of risks and improved visibility of H&S issues
- Transfer operational knowledge

**Touch the paper once**



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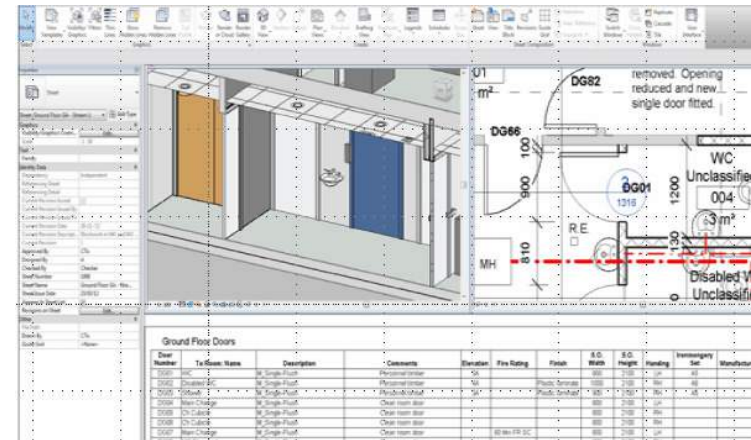


# BIM Deployment

# Deployment

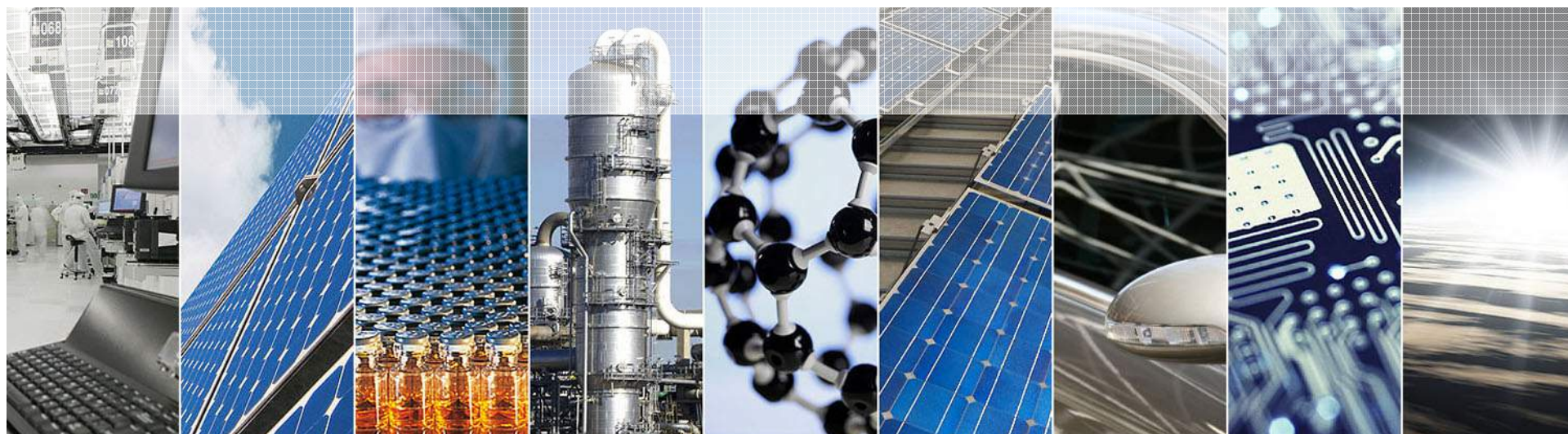


- BIM has to have intelligence for it to be truly useful
- Connection between databases is essential
- BEPPS1/DIF project currently utilises:
  - Inventor - Mechanical Handling
  - Revit – Architecture and Structure
  - Fabrication CAP MEP – Electrical containment & ventilation distribution
  - Plant 3D – Process Piping
  - Civils 3D



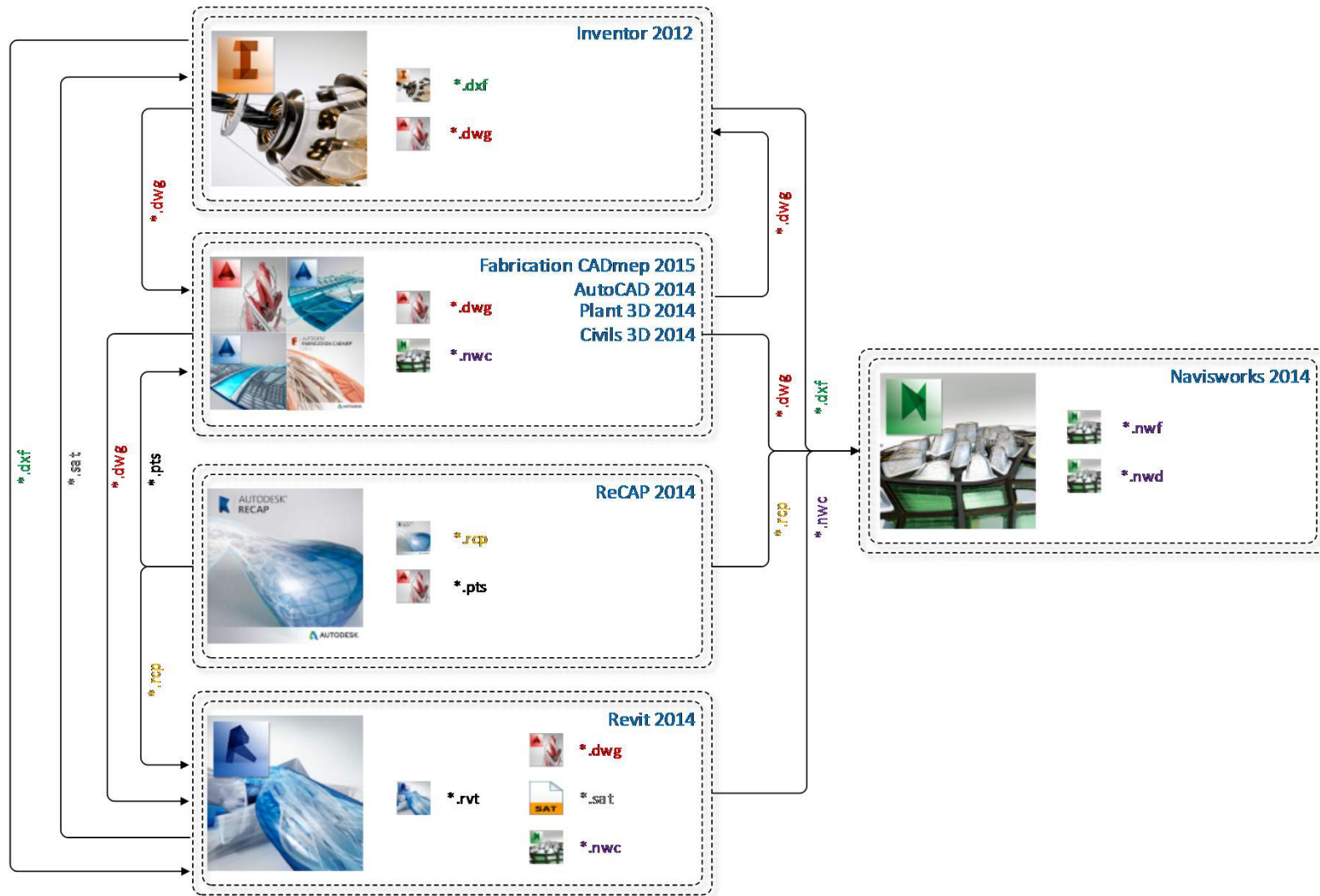


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# Team Collaboration

# Design Packages



# Pre-Construction & Clash Detection



Design Models

**AUTODESK REVIT**

Disipline - A

**AUTODESK REVIT**

Disipline - B

**AUTOCAD CIVIL 3D**

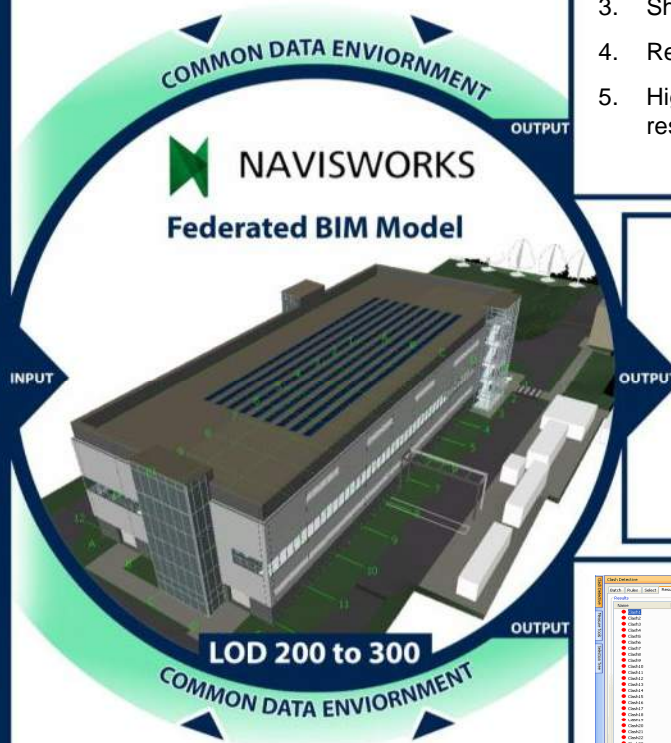
Disipline - C

**CATIA** **SolidWorks**  
**AUTODESK INVENTOR**

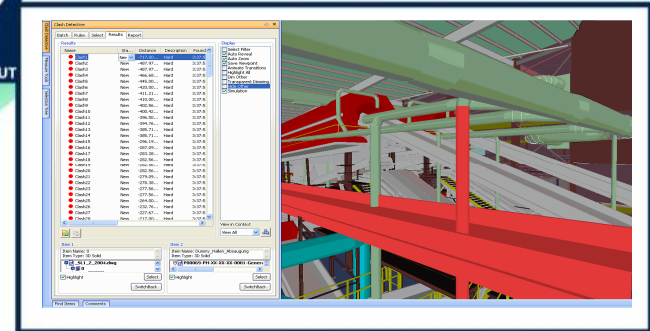
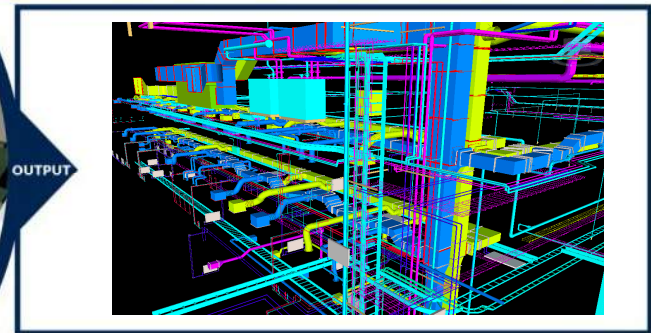
Disipline - D

**AUTODESK AUTOCAD 2014** **MagiCAD**

Disipline - E



1. Manage & track clashes and interferences
2. Export reports & results to communicate issues
3. Share clash scenarios with xml import / export
4. Real-time navigation of complete project model.
5. High level visual for design decisions and problem resolution.





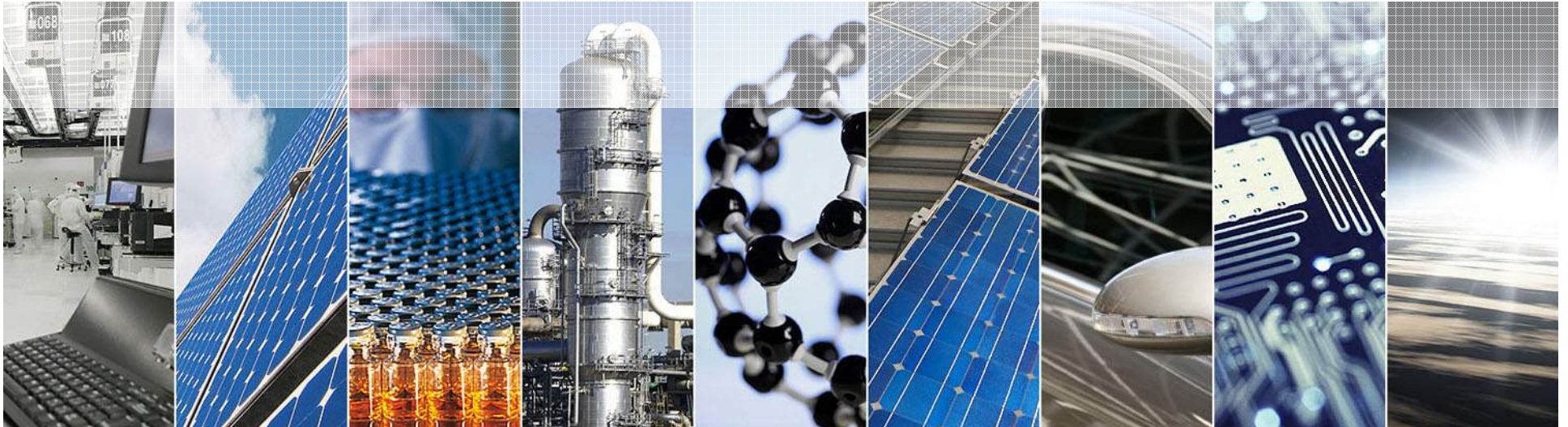
# Citrix - Cloud based computing

- A fully integrated and collaborative process enabled by 'Citrix based cloud computing technology.
- Models and software applications accessed via secure internet connection



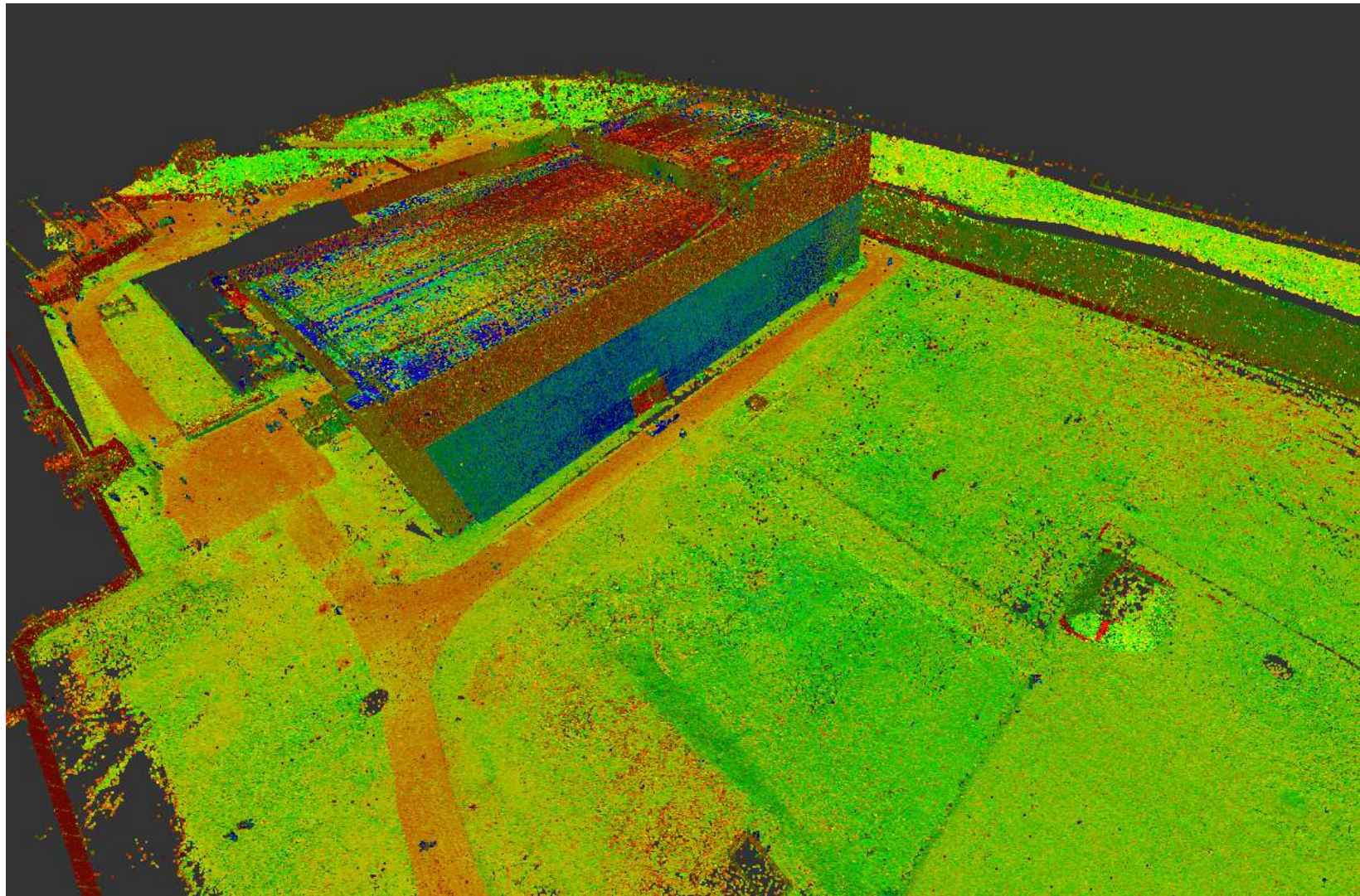


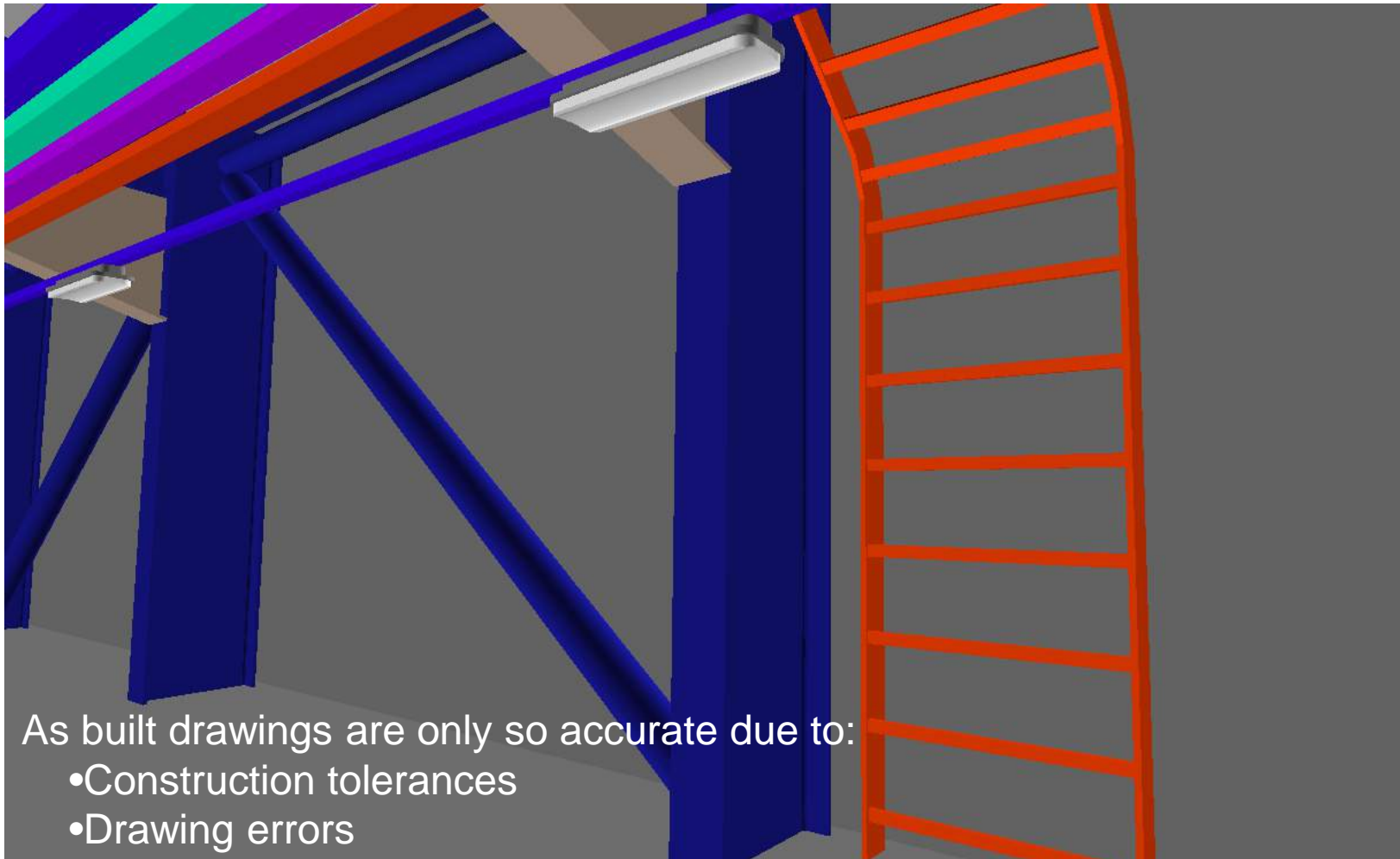
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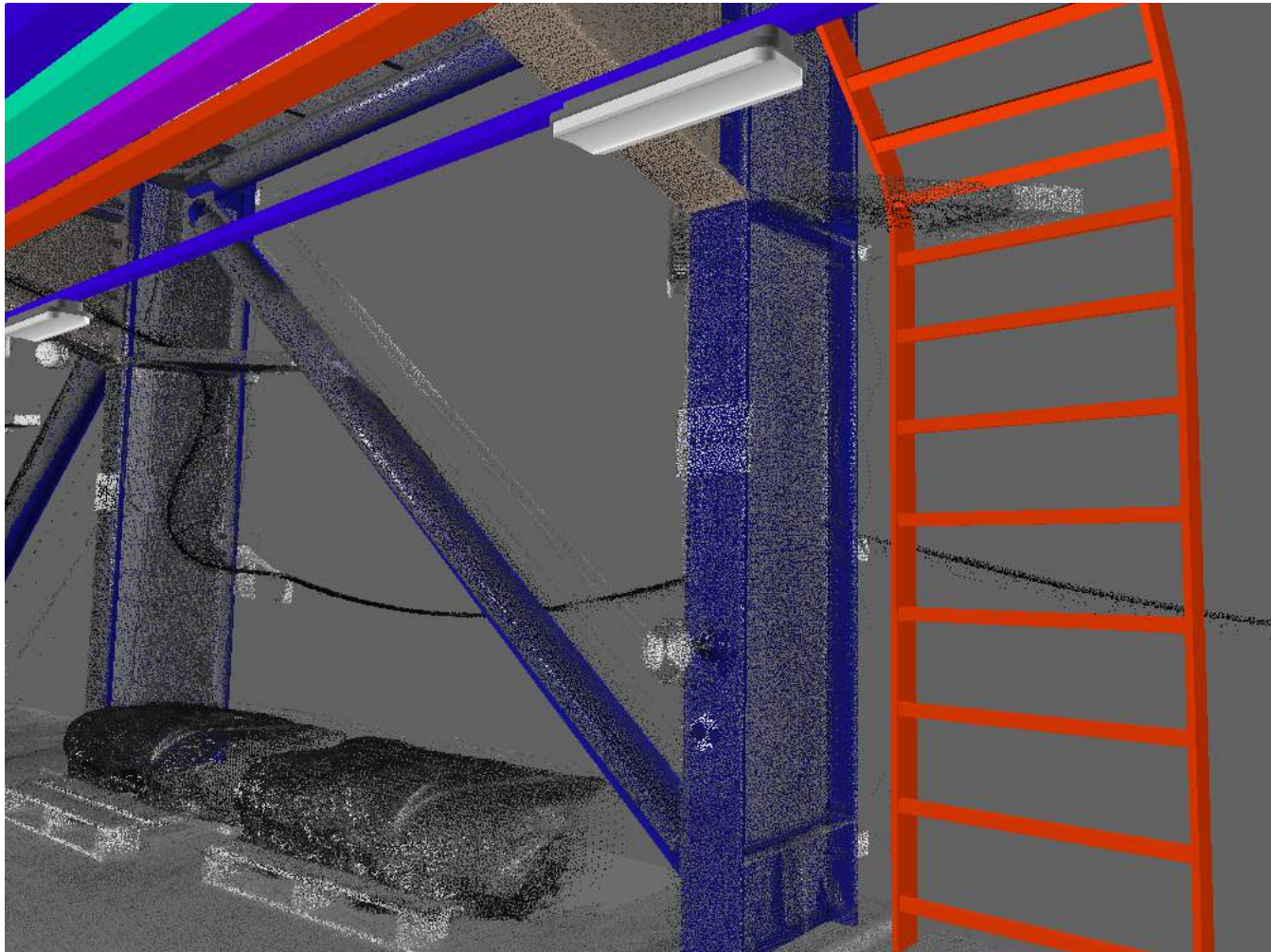
# Laser Surveying

# Laser Accuracy



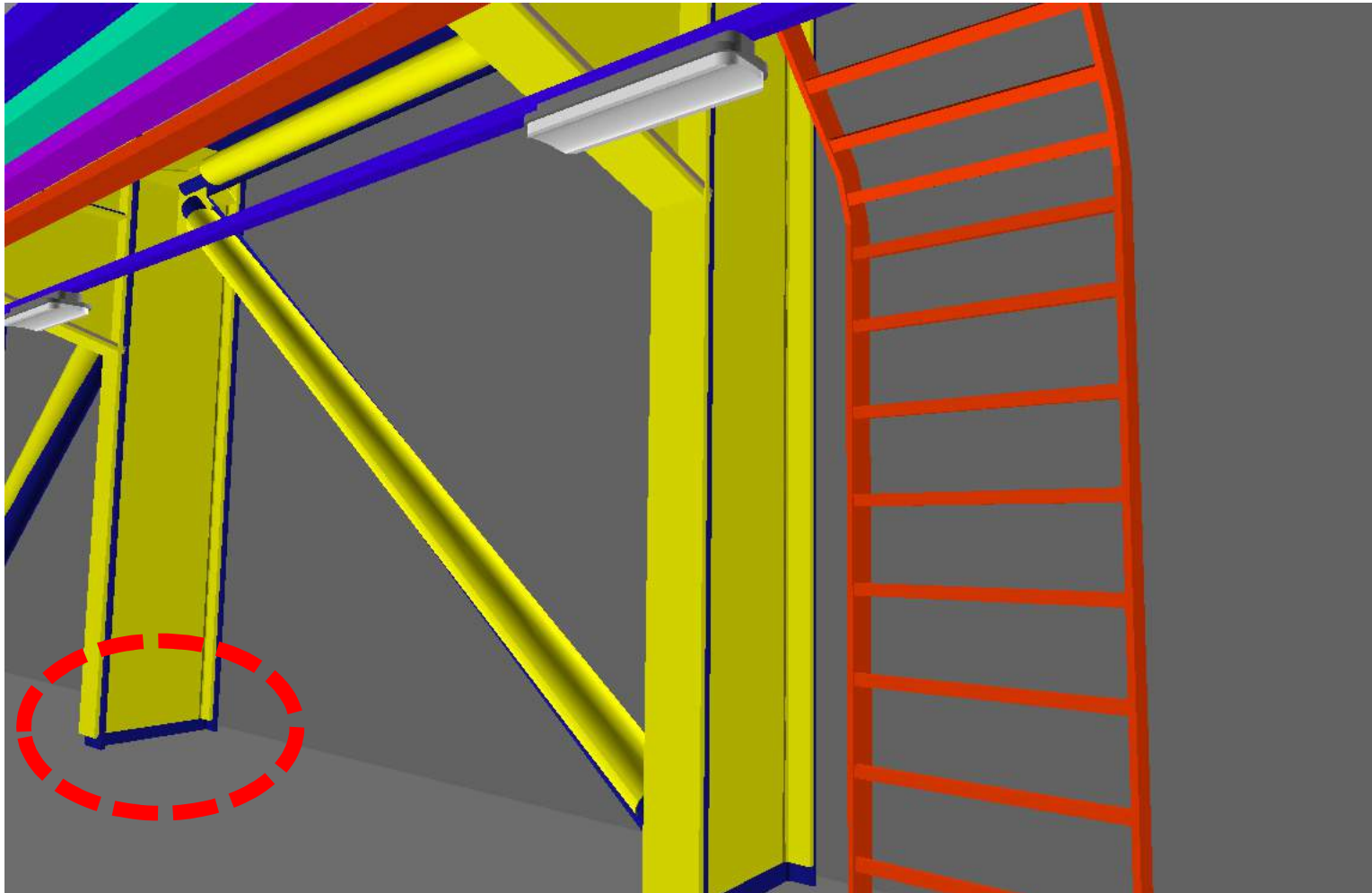


Survey information Point cloud and superimposed on “As Built”



# Data Verification

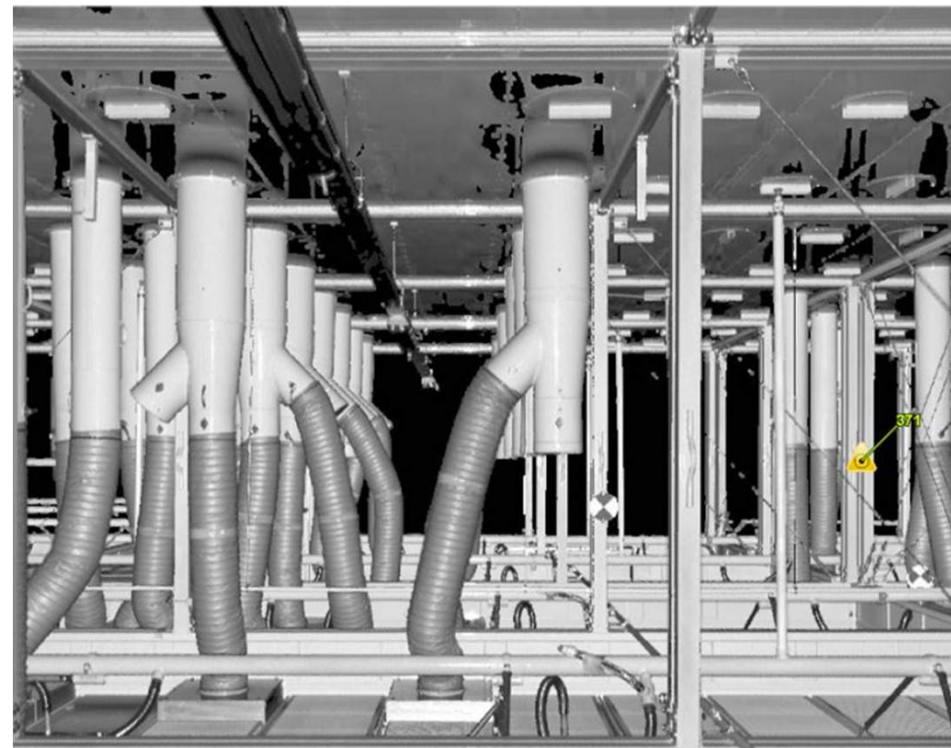
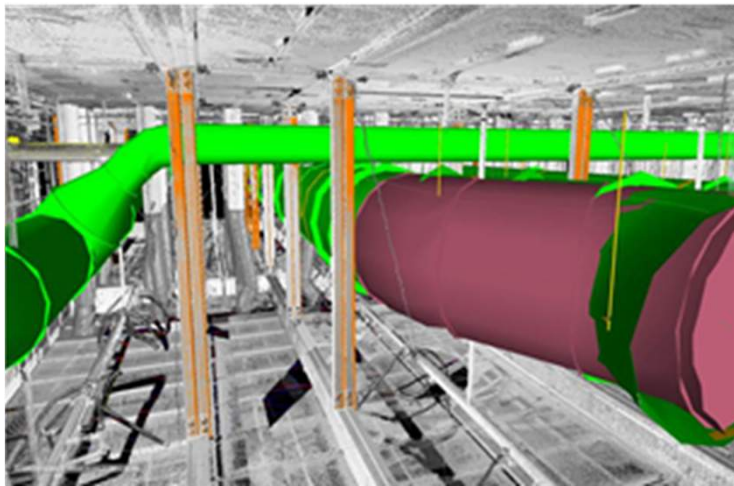
Discrepancies can be clearly identified and accounted for early in the design.



# Utilisation of Scans

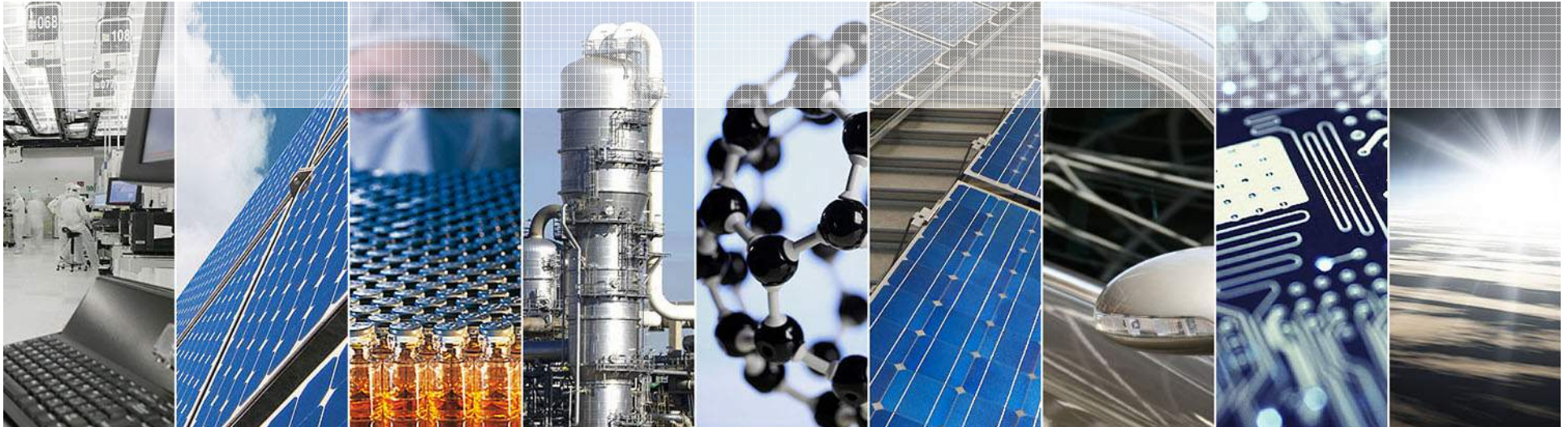
## Laser Scanning deliverable data:

- Photo-realistic high-res fly-through data viewable from any perspective
- 3D CAD environments that allow you to pull dimensions or coordinates with simple mouse-clicks
- Complete capture of existing pre-project conditions preserved
- Verification site installation to reduce future impacts





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# Parametric Information



# Parametric Information Detailed Design Stage



The parametric geometry used has real world physical behavior as well as textual attributes providing 'I' in BIM.



- A dimensionally correct and co-ordinated model.
- Model provides start point for the incorporation of design partner and specialist contractor design models.
- It can include information to be used for fabrication, co-ordination, sequencing and estimating purposes



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4-D

Time

# 4D Construction Sequencing

- Construction programme imported directly into software
- Construction sequencing & Scheduling by linking the model geometry to the Gantt chart.





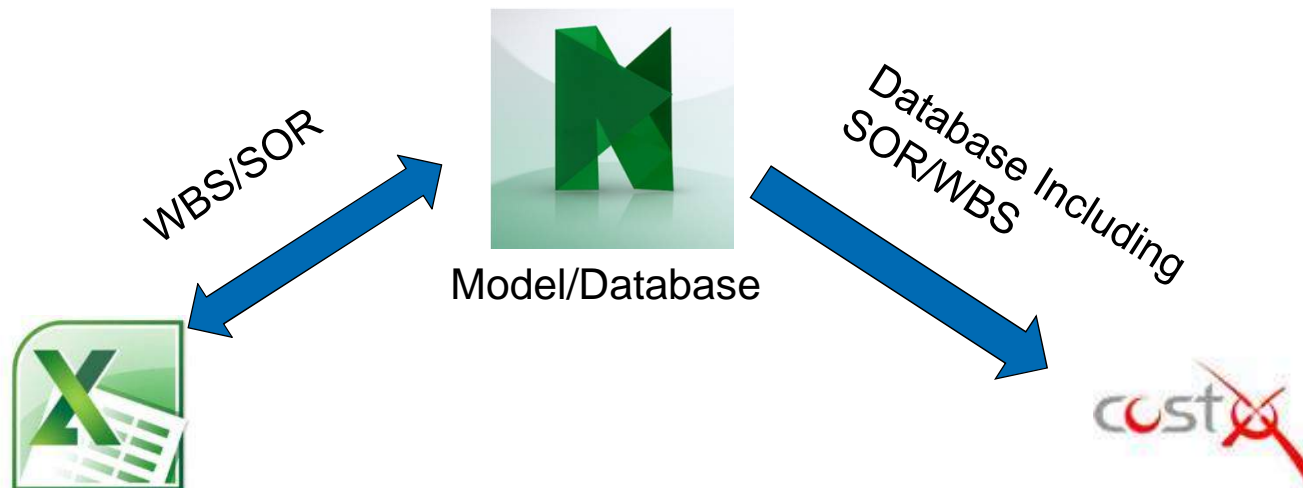
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**5-D**

**Cost**

- Development of links between the Naviswork Central Database and Excel.
- Utilise company package WBS codes as part of the design
- WBS information exported as part of design schedules coordinating with the cost model.
- Schedules with WBS codes can then be fed to CostX for costing.
  - Estimate
  - Cost Plan
  - Bill of Quantities

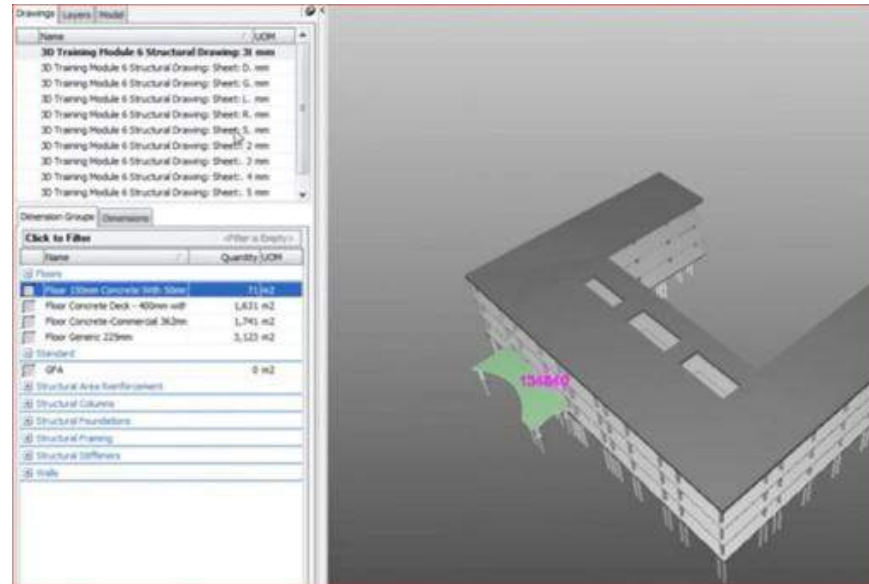


## Aim

- Aim to improve the model outputs in order to capture more cost information.

# BIM Take-off with CostX

- Extract object properties and generate automatic quantities from 3D models
- Estimate
- Cost Plan
- Bill of Materials



This screenshot shows a detailed BOM table with columns for Item, Description, Quantity, Unit, Rate, Subtotal, Escalation, BWC, Pref Name, and Pref Total. It lists various construction items like 'WORK TO NEW BUILDING', 'REINFORCED CONCRETE TO 100mm', etc.

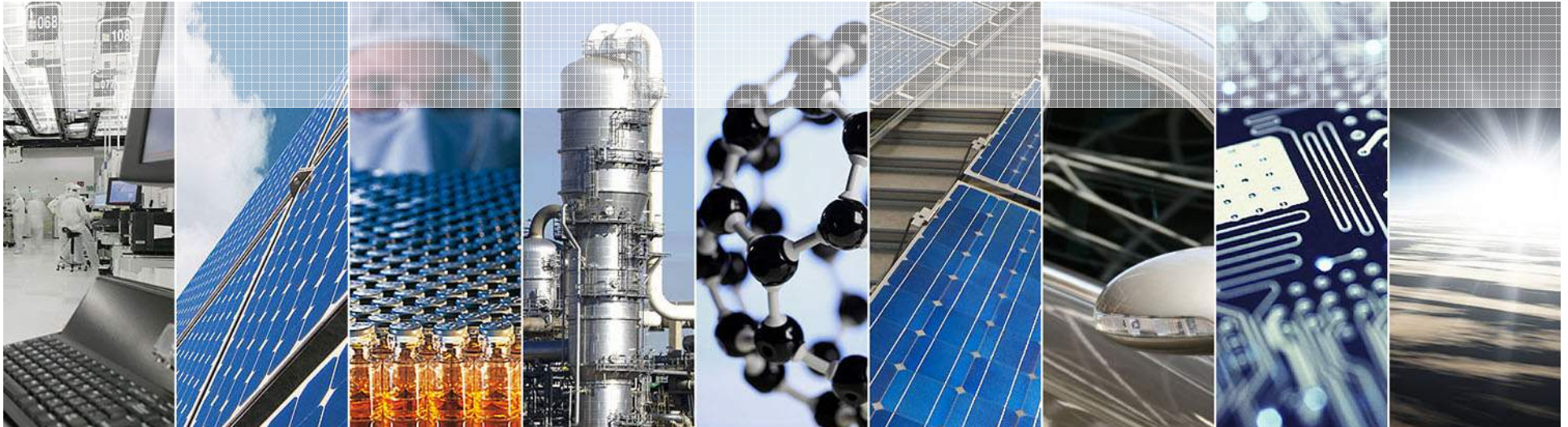
This screenshot shows another detailed BOM table, similar to the previous one, listing construction items and their associated costs.

A.Code	B.Description	C.Quantity	D.Unit	E.Rate	F.Subtotal	I.Contingency	J.Escalation	K.BWC	L.Pref Name	M.Pref Total
	CONCRETE				38,260	1,865	932	0	AAA Concrete	37.29
	FORMWORK				895	2,790	1,395	0	Acme Formwork	55.79
	REINFORCEMENT				45,925	2,220	1,043	0	Reo Boy / Bobs Reo	41.71
	<b>SUBTOTAL</b>				<b>143,080</b>	<b>6,874</b>	<b>3,370</b>	<b>0</b>		<b>134.79</b>
	CONTINGENCY		5.00 %						CONTINGENCY	6.87
	ESCALATION		2.50 %						ESCALATION	3.37
	BWC		0 %						BWC	
					<b>143,080</b>	<b>6,874</b>	<b>3,370</b>	<b>0</b>		<b>145.03</b>

This screenshot shows a detailed BOM table with columns for Item, Description, Quantity, Unit, Rate, Subtotal, Escalation, BWC, Pref Name, and Pref Total. It lists various construction items like 'APARTMENT', 'CONCRETE', 'FORMWORK', etc.

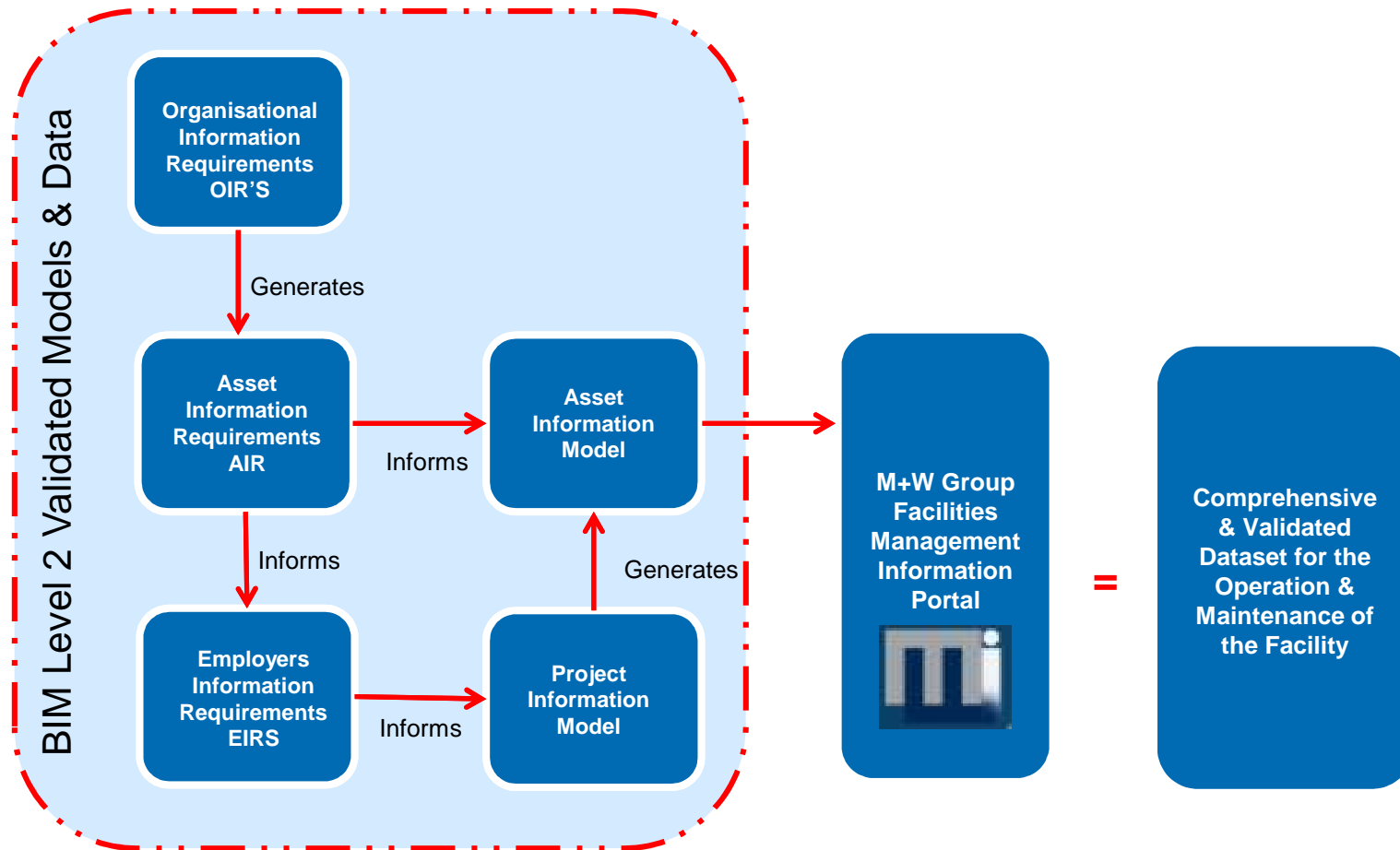


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# Facilities Management & Operation

# The M+W FMi Portal

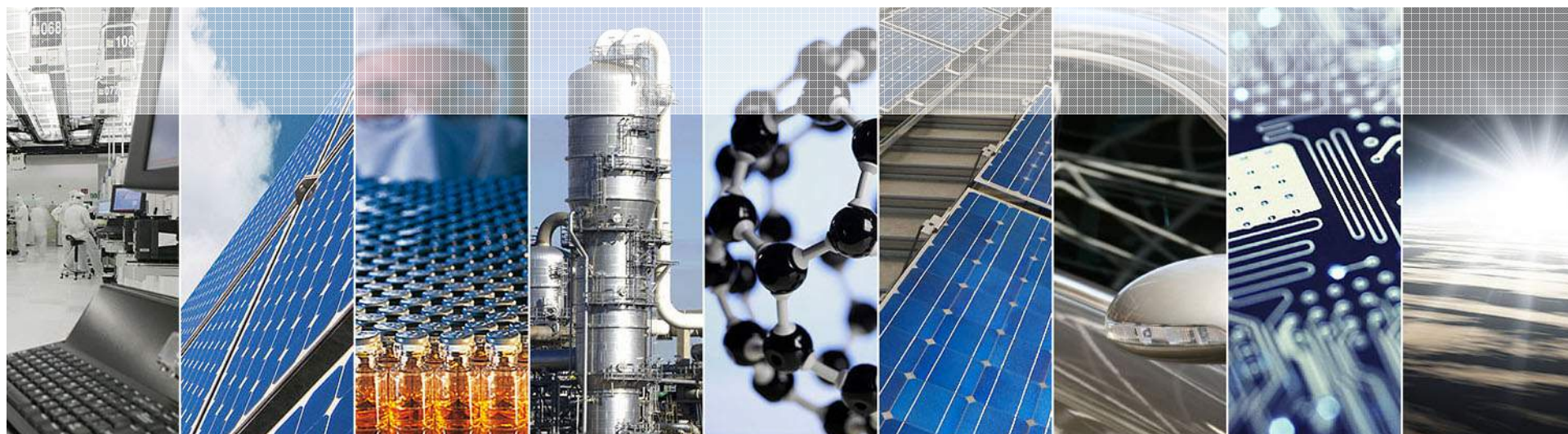








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**Thank You**