BIM and the Surveyor

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Outline

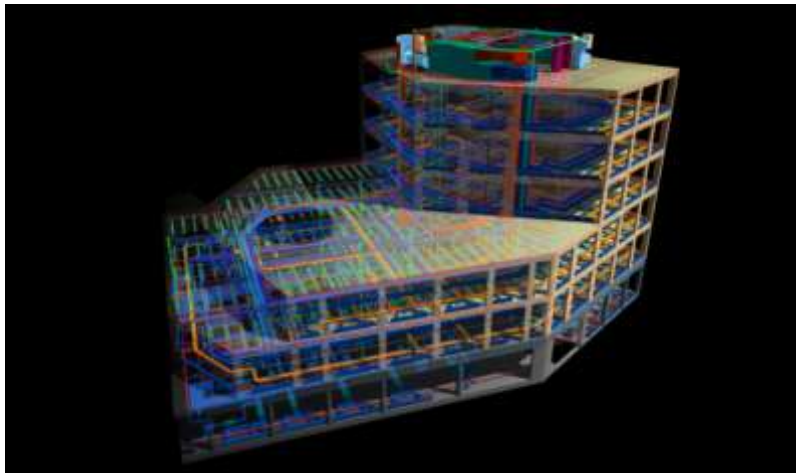
- What is a BIM
- What does a BIM do
- Why use a BIM
- BIM Software
- Where are BIM's currently being used
- How do they relate to us in the Surveying and Spatial industry
- LISTECH Neo – The surveyors interface to BIM

What is a BIM

The US National Building Information Model Standard Project Committee definition:

- *Building Information Modelling (BIM) is a digital representation of physical and functional characteristics of a facility.*

- *A BIM is a shared knowledge resource for information about a facility forming a reliable basis for decisions during its life-cycle.*



What is a BIM

What does a BIM do?

Currently building design works with 2D plans and 3D CAD systems - (position and elevation).

BIM extends beyond 3D with:

- time (4D)
- cost (5D)
- Plus more…

In a BIM project:

- The professionals involved are able to access virtual information to allow data to be transferred:
  - from the design team
    (architects, landscape architects, surveyors, civil, structural and building services engineers, etc.)
  - to main contractor and subcontractors
    (surveyors, civil, structural and building services engineers etc.)
  - to maintenance / refurbishment
    (architects, landscape architects, surveyors, civil, structural and building services engineers, etc.)

- It goes beyond the planning and design phases, it extends throughout the building life cycle.

Efficient communications + Fluent transfer = Integrated workflow and a better finished product

BIM Dimensions

3D – Model
- Walk throughs
- Clash detection
- Visualisation
- Virtual modelling
- Prefabrication

4D – Time
- Construction planning & management
- Schedule visualisation

5D – Cost
- Take offs
- Real-time cost estimating

6D – Sustainability
- Conceptual energy analysis and tracking

7D – Facilities Management
- Life cycle strategies
- BIM As Builts

Why use a BIM…

Current figures show:

- *20% reduction in build costs*
- 33% reduction is costs over the lifetime of the building
- *47% to 65% reduction in conflicts and re-work during construction*
- 44% to 59% increase in the overall project quality
- *35% to 43% reduction in risk, better predictability of outcomes*
- 34% to 40% better performing completed infrastructure
- 32% to 38% improvement in review and approval cycles
- 80% of a buildings total cost in its lifecycle is maintenance
- To collect data on a building is 8 x more expensive after construction

BIM Software

Software designed specifically for BIM include:

- Bentley AECOsim Building Designer
- ArchiCAD
- Tekla Structures
- Autodesk Revit
- VectorWorks

These packages have their proprietary data formats.

Non-proprietary or open BIM standards

- BIM is associated with Industry Foundation Classes (IFCs) and aecXML
- IFCs have been developed by buildingSMART (the former International Alliance for Interoperability), as a neutral, non-proprietary or open standard for sharing BIM data among different software applications.

Where BIM's are used

Asia

- **Hong Kong**
  - The Hong Kong Institute of Building Information Modelling (HKIBIM) established in 2009.
  - Housing Authority set a target of full BIM implementation in 2014/2015.
  - BuildingSmart Hong Kong was inaugurated in late April 2013.
- **Singapore**
  - The Building and Construction Authority (BCA) announced that BIM would be introduced for architectural submission (by 2013), structural and M&E submissions (by 2014) and for plan submissions of all projects with gross floor area of more than 5,000 square metres by 2015.
- **South Korea**
  - Since 2010, the Korean government has been gradually increasing the scope of BIM-mandated projects.

Where BIM's are used

United Kingdom

- May 2011 UK Government called for BIM adoption on UK government construction projects of £5million and over.
- Intention to require collaborative 3D BIM (with all project and asset information, documentation and data being electronic) on its projects by 2016.
- The April 2014 survey of 1,000 UK construction professionals revealed that BIM adoption had increased from 13% in 2011 to 54% in 2014.
- BIM Level 2 released in 2016 and is being widely adopted around the world

Where BIM's are used

Australia

- Federal – Gradual approach to BIM implementation
  - Department of Defence is using BIM to enhance the development and operation of its assets
- State
  - Victoria – BIM pilot studies in budget for government infrastructure projects. Announced the formation of a BIM implementation plan.
  - Queensland – Research partnerships with a number of institutions on the benefits of BIM - Department of Transport and Main Roads
  - New South Wales - Transport for NSW (TfNSW) has developed a strategy for implementing BIM.
  - Western Australia - starting to use BIM in some of its high profile infrastructure projects

Source: ipwea.org

Where BIM's are used

Australia

Successful Australian projects that have used elements of BIM include:

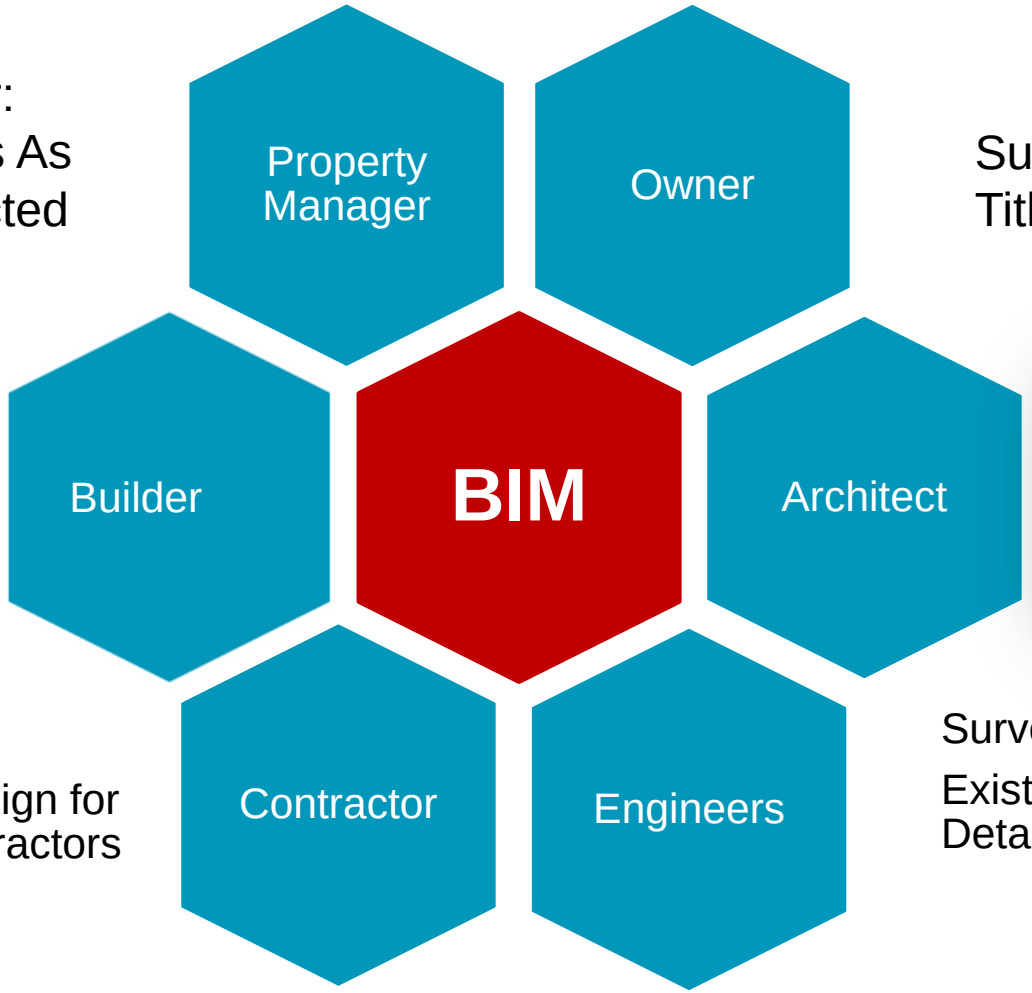
- Moorebank Intermodal Terminal Project;
- Barangaroo development, including Wynyard Walk;
- North West Rail Link;
- Southern Freight Link; Figure 1: BIM and its participants
- Regional Rail Link Victoria;
- South West Rail Link;
- Auburn Stabling Yard;
- New Generation Rolling Stock Stabling, Ipswich;
- Sydney CBD light rail early works;
- Perth Children's Hospital;
- Perth Stadium; and
- Perth Museum.

source - ipwea.org

BIM and the Surveyor

Surveyor:
Performs As Constructed Survey

Surveyor:
Sets out Design for Builder/Contractors



Surveyor:
Title Survey

Surveyor:
Existing conditions / Detail Survey

BIM and the Surveyor

Issues that Surveyors will and do encounter with BIM.

- Measuring with Total Stations and GNSS
  - Set out
  - As constructed
  - Creating Point Data
  - Attributing
- Coordinate Systems

Coordinate Systems

BIM's a system for the management of the construction of a "Building"

- Usually on a "local" coordinate datum
- No scale factors

BIM's now being used for larger infrastructure projects – rail, road and other such projects that are over a larger area.

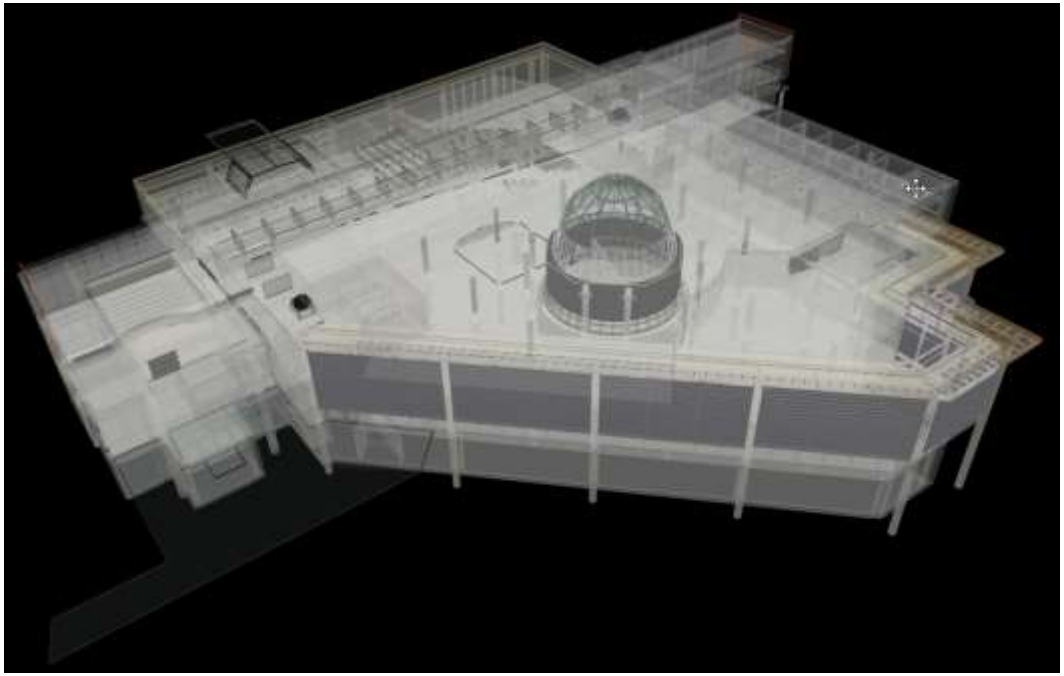
- Need to work in the real world
  - Datum's and Projections
  - Real world coordinates

LISTECH Neo

The Surveyors interface to BIM

Introducing

LISTECH Neo is new generation geospatial software, offering exciting functionality with increased productivity and ease of use.



User Definable Attributes

Design and tailor attribute definitions to suit client needs.

- Create attributes automatically by importing from another system
- Add and edit them
- Automatically populate with default values
- Optionally increment as objects are created

Deliver product tailored to your client needs.

Seamless Transfer

BIM Processing & Exchange

Neo – *BIM*

Integrated Measurement Database

Complete control over the processing and reduction of field surveys.

- Field data automatically imported
  - Appears in Neo as on the instrument
  - Automatic attributing
- Reprocess Measurements information
  - Update dynamically
  - Automatic Update attributing

Rigorous Geodetic Computations

Rigorous geodetic computations and editing functionality

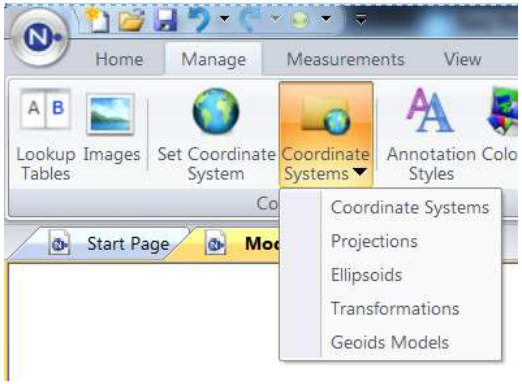
Information can be manipulated using the extensive tools available:

- Create
- Examine
- Modify
- Find

Coordinate systems may be plane or geodetic.

Uses known Coordinate systems or user defined.

- ellipsoids,
- projections,
- transformations
- geoid models are supported.



Transformations can be performed between coordinate systems.

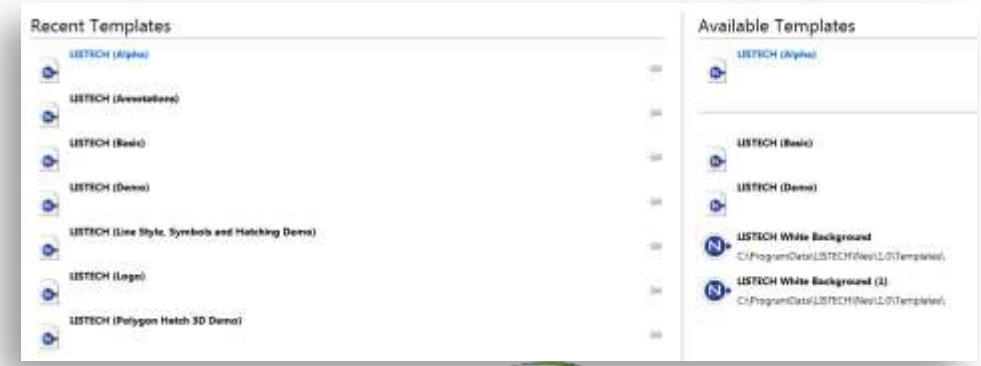
Template Based

Neo projects are customisable and template based

New projects with required customisation are created simply by selecting the appropriate template.

- Sample project templates are included,

- Custom tailored templates can be saved for future use.



Additional Functionality

- Various Imagery tools
  - Image GeoRef – Work with Geo-referenced imagery
  - Image Connect – Connect to web-server (WMS) imagery
  - Image Xtract – Create objects from total station imagery
- Adjustments
- Terrain modelling
- Volumes
- Point Cloud
- Additional functionality added with each release…

LISTECH

Thank you...