A research towards completing the asset information life cycle

An analysis of the relationships between data exchange, BIM and the asset life cycle and the solutions to overcome existing issues at Amsterdam Airport Schiphol.
Contents

Asset life cycle

Design
Maintain
Construct
Operate
Assignment

Clients problem:

“BIM, that is (not) something for Schiphol!”

What Schiphol really wanted to know:
- Should Schiphol adopt BIM?
- What are the (dis)advantages of BIM?
- What is the view of the main contractors on BIM?
- How can BIM be realized with the current Asset Information Systems?
- What are the effects on financial, organizational and technical elements?
Related projects

- 3D
- BIM (technical)
- BIM (process)

CANCELLED
Research

Research question:

“What is necessary to complete the asset information life cycle in terms of data exchange, related to BIM and the current situation at Amsterdam Airport Schiphol?”
Research

Sub questions / methodology:

DATA
EXCHANGE

BIM

SGIS

PROBLEMS

SOLUTIONS
BIM is a PROCESS
in which relevant ACTORS COLLABORATE
on creating, analysing and managing
MULTIPLE DIMENSION DATA
within a DYNAMIC MODEL
representing one or more ASSETS
throughout its/their LIFE CYCLE.
BIM

SDI - view

Dynamic

People
Access network
Policy
Standards
Data

Technology

BIM

Collaboration
IFC / native

BIM - view
DATA MODELS

- **SGIS:** Data model redesigned
- **IFC:** What needs to be compared

- **Fundamental:**
  
  “What is data exchange and what are relevant aspects?”
DATA (EXCHANGE) CHARACTERISTICS

- **Structural**
  - Representation of real world phenomena
  - Identification Attributes
    - Geometry / Space
    - Temporality
    - Scale
  - Constraint by

- **Syntactic**
  - File format
  - Encoding

- **Semantic**
  - Context
  - Domain Relations
DATA EXCHANGE STRATEGY

1. Is there more than one source?
   - Yes: Need understanding of differences and similarities?
     - Yes: Change (all) source datasets?
       - Yes: Mapping
       - No: Alignment
     - No: Conversion
   - No: Fusion
2. Will there be a target dataset?
   - Yes: Is the target data model fixed?
     - Yes: Fusion with conversion
     - No: Will the target have the same format/encoding?
       - Yes: Will any characteristic of an object change?
         - Yes: Fusion with conversion
         - No: Conversion
       - No: Fusion
   - No: START
SCHIPHOL GIS

- Asset Information System
- Portal
- Data model
SCHIPHOL GIS – DATA MODEL

- 77 themes
- Relations and views
SCHIPHOL GIS – PORTAL

- Access to all geo-information
- "GIS enables" non geo-information
PROBLEMS
SOLUTIONS - OVERALL

NOT POSSIBLE
SOLUTIONS - OVERALL

NOT POSSIBLE
SOLUTIONS – AEC to GIS

- Conversion

- Key duplication
SOLUTIONS – GIS to AEC

- Conversion:
  - to IFC
  - to traditional AEC
SOLUTIONS – GIS to AEC

- As-is
  - Web Feature Services
  - FDO Access Technology
  - IFC
Prototyping - Revit

- Conversion:

Create exchange files and sets options.

- CAD Formats
  - Create DWG, DXF, DGN, or SAT files.

- DWF/DWFx
  - Create DWF or DWFx files.

- Images and Animations
  - Saves animations or image files.

- Reports
  - Saves a schedule or Room/Area report.

- FBX
  - Saves a 3D view as an FBX file.

- gbXML
  - Saves the project as a gbXML file.

- Mass Model gbXML
  - Saves the conceptual energy model as a gbXML file.

- IFC
  - Saves an IFC file.

- Options
  - Sets export options for CAD and IFC.

- ODBC Database
  - Saves model data to an ODBC database.

- Family Types
  - Exports family types from the current family to a text (.txt) file.
Prototyping - FME

- Transformations:

Encountered two field names ('Materiaal' and 'materiaal') in table 'PSet_Revit_Type_Materials_and_Finishes' which differ only in case.

An error occurred while attempting to create the table 'PSet_Revit_Type_Materials_and_Finishes'. The error number from ArcObjects is: '-2147220649'. An attempt was made to insert a duplicate field name.

A fatal error has occurred. Check the logfile above for details.
Prototyping - ArcGIS

- Read and display:
IFC = data model, format = .txt
Prototyping – Revit input

- Read and display:
Recommendations - SGIS

- Use 3D SDO\_geometry
- Adopt CB-NL
- Analysis of double information
- Evaluate with users
- Design process and tech. specs for IFC
Recommendations - Other

- Development of a single geometrical model for spatial and (geo)graphical software

- Support for web services in 3D AEC modelling software
Reflections

- Partly content
- Technical vs Analytical
- Applicable vs Development
Questions

- IfcDoor_line
- IfcDoor_surface

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Thank you for your attention

... and have a safe flight home!
Bibliography