Digitalization of Asset Information Management

Alexander Worp
INTRODUCTION

Alexander Worp

Strategic Advisor BIM at Asset Management Schiphol (till May 1st).

Worked for 6 years on implementing Building Information Management at Schiphol.

Vice Chairman of the board of buildingSMART Benelux since June 2017.

Started the user group ‘Airport Room’ in 2016 as part of BuildingSMART int.

After May 1st I continue as an independent advisor on Digitization of Asset Information

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More successful asset management is only possible through collaboration with all stakeholders throughout the entire lifecycle. By exchanging structured open data that can be validated and verified.
The Digitalization of Asset Information Management

For Clients / Asset Owners

Alex(ander) Worp
INTRODUCTION

Can Clients make better decisions during the lifecycle of their assets?
THE CHALLENGE WITH ASSETS AS CLIENTS

Many players, assets & data
THE OPPORTUNITY

New technology opens opportunities for improvement
THE OPPORTUNITY

Information structure has to improve
With an improved Information structure

We can make better decisions
and optimize the performance
of your assets
THE OPPORTUNITY
VISION: Clients need to go FROM…

Being a dominant party that opens up their own systems to partners, suppliers and for consumptions. A closed collaboration…

complex  redundant  time consuming  error-sensitive
TO...

A collaborative digital system where multiple parties work together and share their information with common standards, processes and roles.

- Shared data
- More knowledge
- Predictable maintenance
- Improved efficiency
- Cost reduction
Then to a Digital Twin

The Gemini Principles

Digital twins of physical assets are helping organisations to make better-informed decisions, leading to improved outcomes.

Creating an ecosystem of connected digital twins – a national digital twin – opens the opportunity to release even greater value, using data for the public good.

This paper sets out proposed principles to guide the national digital twin and the information management framework that will enable it.

The Digital Twin Principles

The Gemini Principles

**Purpose:** Must have clear purpose

**Public good:** Must be used to deliver genuine public benefit in perpetuity

**Value creation:** Must enable value creation and performance improvement

**Insight:** Must provide determinable insight into the built environment

**Trust:** Must be trustworthy

**Security:** Must enable security and be secure itself

**Openness:** Must be as open as possible

**Quality:** Must be built on data of an appropriate quality

**Function:** Must function effectively

**Federation:** Must be based on a standard connected environment

**Curation:** Must have clear ownership, governance and regulation

**Evolution:** Must be able to adapt as technology and society evolve
THE OPPORTUNITY

Trace your Assets during the whole life cycle by the GS1 open standard

buildingSMART and GS1 signed a Memorandum of Understanding to advance global standards in the construction sector

New Standard: Global Model Number (GMN)

For more information contact:
Enzo Blonk: enzoblonk@gs1.org
Aidan Mercer: aidan.mercer@buildingsmart.org
THE OPPORTUNITY
GMN in the whole Asset life cycle

 GENERIC product/function

 GENERIC product/function (ETIM)

 GMN
 GTIN
 GTIN Batch
 GTIN Batch S/N

 Pre-study
 Drawing

 Planning

 Projecting

 Tenders - Calculation - Purchases

 Handover

 Change

 Winding up

 Construction Management

 Use

 Dismantling

 Recycling

 Raw material

 Distribution

 Article production

 Digital

 Physical

 GS1

 buildingSMART

 International home of openBIM

 https://www.youtube.com/watch?v=pcj7Pso0sNs
Use cases

BIM is very simple, but the most difficult thing is simple BIM

Playing football is very simple, but the hardest thing there is is simple football. Johan Cruyff

Coming together is a **beginning**;
Keeping together is **progress**;
Working together is **SUCCESS**

Henry Ford
Validation
IFCxml messages into GIS

IFC in Operational Phase

IFC 4.2 XML message Containing:
- 1 Asset
  - UUID (??GS1??)
  - Attribute data of that asset
  - Geometry of that asset
- Revision type;
  - Create, Update Delete asset
  - And/or

XML containing asset documents

Realtime Data

Processed in:
- CDE
- Maximo
- EDMS

Up to date GIS

Work done by Maya Tryfona for the Airport Room
Message Dashboard
WAYFINDING

Goal: Dynamic route calculation for Schiphol travelers

Data Sources:
- 3D model
- Online status of the assets
- Floorplans

3D component out of IFC
THE OPPORTUNITY

With uniform, consistent structured and validated ‘linked’ data clients/asset owners can make better decisions and optimize the performance of their assets.
WILL YOU JOIN?

BIM is very simple, but the most difficult thing is simple BIM

BIM for Asset Management;
‘A process, including digital systems, where multiple parties collaborate unambiguously and share relevant information based on open standards, workflows and roles.’
Your door to gate advice
Based on your flightnumber

Flightdetails  Routeplanner

flightnumber  dd-mm-yyyy
Design Costs vs Realization Costs

Shift in Design Costs

2D revision information transformed to 3D model
Automated checking

Ruleset for reviewers
Visualization – Planning – Realisation
Validation
Validation As-Build vs Model

Ceiling higher than designed in IFC model
Validated (data)Information in FM-systems
Integration FM-system with 360pointcloud

https://schiphol.4indoor.nl/#/?poi=7&fov=61.3
EAM system – GIS – Indoor Viewer
SGIS APPLICATIONS

Case: Bird App
Goal: Prevent birdstrikes

Data Sources:
- Bird Radar
- Dynamic planes positions
- Dynamic vehicles location
- Runway management
WILL YOU JOIN?

The success of **BIM** is based on the **managed exchange of structured information** throughout an asset’s lifecycle.

**BIM for Asset Management;**
‘A process, including digital systems, where multiple parties collaborate unambiguously and share relevant information based on open standards, workflows and roles.’
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Working together is SUCCESS
Henry Ford
HOW

Employer’s Information Requirements

IIFC
uniform data structure
Information Delivery Specifications

clear agreements
BIM-protocol

IDM

uniform data structure
Information Delivery Specifications

IFC

Organizational Information Requirements

Asset Information Requirements

Employer’s Information Requirements

Plain Language Questions

see PAS 1192-2
HOW
Information Delivery Cycles/Process

DELIVERY
information delivery plan

PROVIDING THE ASSIGNMENT

OFFER
Including BEP

TENDERING
DESIGN/ CONSTRUCTION TEAM

PROJECT DEFINITION
project requirements
AIM protocol
LS

PROJECT START

PROJECT PREPARATION

DATA SOURCES

1 2 3 4 5 6 X X

START MAINTENANCE

MAINTENANCE & REUSE

DELIVERY

PROJECT DATA ENVIRONMENT
Aspect model driven

ASSET DATA ENVIRONMENT
Object driven

BIM

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BIM
Employers Information Requirements

From excel to Object Type Library

**Tools**
- Create a document

**Summary of assettypes**
- The assettypes that will

**Project phases and "datadrops"**
- Specifies when the

**IDM Information products**
- Specifies the products that are required to be delivered.
Align with ISO19650
Collaborate
with all Stakeholders, through all phases and with Standardisation Organisations

[Logos of buildingSMART, OGC, GEOSPATIAL, BIM Loket, NL/SfB, DigiDealGO, ISO]
TIPS

Use unambiguous agreements, uniform data structures and (most important) base them on open standards.

Work together, with all stakeholders, through all the phases of the asset life cycle to all learn and improve.

Use automated Validation techniques on the delivered Information Models based on the Employer’s Information Requirements.

Explore more the usage of combining BIM and GIS applications (beyond visualization – spatial analyses)

realizes that BIM and Geo Information must be combined and brought into relation to really add value.

I have taken the first steps, but continue to look for cooperation, to ultimately make the best choices for connecting GEO|Design+BIM.
WILL YOU JOIN?

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BIM for Asset Management;
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STRATEGIE INFORMATIEMANAGEMENT

Schiphol

PROJECT

MC

DATA ROOM

Aspect model exchange

Asset Data Object driven exchange

BEHEER & ONDERHOUD

DATA INTERFACE

CENTRALE DATAVOORZIENING

Output

Data Dictionary Schiphol

Asset Informatic

BIM

Flappenages
Analytics
Asset Info Viewer
Apps

Data Interface

Smart Assets

BIM

Document mgmt.
Financial mgmt.
GIS
Portfolio mgmt.

Document mgmt.
BIM func.
Asset register.
Expansion Crown Lounge KLM

Design

Realization
Expansion Crown Lounge KLM

Lessons Learned

1. Design
2. Engineering
3. Construction
4. Hand over
5. Maintain
Departure Hall 1a; limited Time

2 months design

5 months realization
Departure Hall 1a

Lessons Learned

1. Design
2. Engineering
3. Construction
4. Hand over
5. Maintain
Digitization of Asset Management

**(B)IM:**
Digitization/computerization of Asset Management with (large scale) exchange of information throughout the life cycle to optimize processes and decisions making

**Virtualization:**
Creating a digital copy of a physical object or process, supplementing or replacing processes and simulation. From BIM to ‘Digital Twin’

**Internet of Things:**
the direct interaction between Digital, Virtual and physical reality.