Intelligent Asset Management for Operations And Maintenance By Using Digital Twin Of Railway System

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Dr. Abel Maciel

University College London

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Royal Institute of British Architects (RIBA)
Architects Registration Board (ARB)
Engineering Doctorate in Virtual Environments,
Imaging and Visualization (EngD)

Academic positions

Senior Research Associate
The Bartlett Faculty of the Built Environment
University College London
Hyperledger Academic Partner at UCL
Frontiers Expert and Editor

Research collaborations

Architectural Association - London
Ecole Spéciale d'Architecture (ESA) - Paris
University of Nottingham
University of Sydney
The Alan Turing Institute

DESIGNCOMPUTATION.ORG

CONSTRUCTIONBLOCKCHAIN.ORG
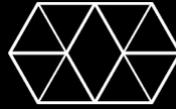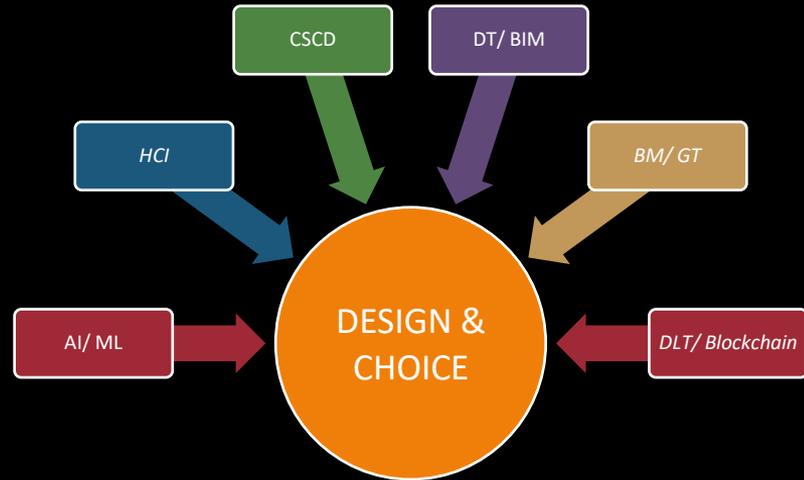
HYPERLEDGER.ORG

BARTLETT ARCHITECTURE
BARTLETT SUSTANABLE
CONSTRUCTION
UCL NEUROSCINECE

Design Computation Knowledge platform

Director of Construction Workgroup

Peer-Reviewer SIGGRAPH

CSCD

DT/ BIM

HCI

BM/ GT

AI/ ML

DESIGN & CHOICE

DLT/ Blockchain

Design Computation Ltd.

PRACTICE

Systems Modelling

Digital Prototype Management, including BIM Delivery and Training

Digital Twin Engineering

Smart Contracts Development

Multidisciplinary Research for Design Innovation (Design Concept Development)

SECTORS

Built Environment

Transportation

CLIENTS

Heatherwick Studio | Buro Happold | ARUP | EOC | Zaha Hadid Architects | Foster & Partners |

Darling Associates | Autodesk | UCL | Mishcon de Reya LLP | UK Government

APPLE CAMPUS
FOSTER + PARTNERS, EOC

GOOGLE CAMPUS
HEATHERWICK STUDIO + BIG

THE VESSEL
HEATHERWICK STUDIO, 2018

ROYAL THEATRE OF RABAT
ZAHA HADID ARCHITECTS

BIM Management and Coordination Advancements

- More Complex

- Higher Quality

- More Predictable

- Less Risky

Construction Blockchain Consortium

Knowledge Transfer

To track and distil emerging technologies for construction.

Research & Development

To build pre-competitive proof-of-concept and generate IP.

Education & Training

Enhancing and re-skilling professionals staff required to deploy the new technologies.

UCL believes the most effective way to do this is a knowledge transfer and R&D consortium.

Digital Practice

- Systems thinking
  - Processes, people and tools
  - Systems Approach to Infrastructure Delivery (SAID)
- Transparent Processes
  - Breaking away from data silos
- Federated Workflows
  - Close-coupling teams and organizations
  - Real-time feed-back loops
- Long-Term Vision
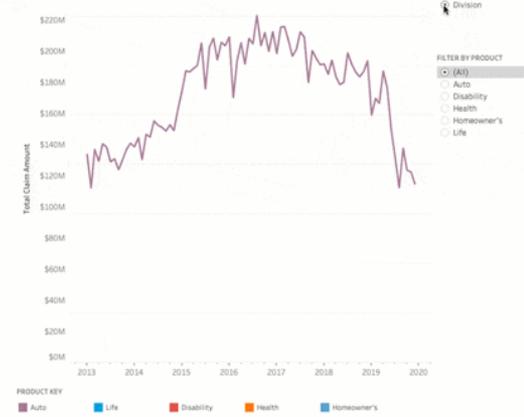 - Data Quality and Value
  - Data Provenance & Legacy
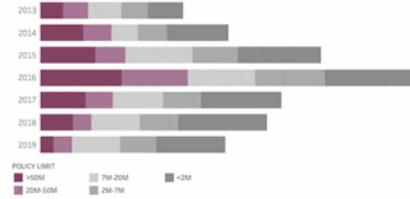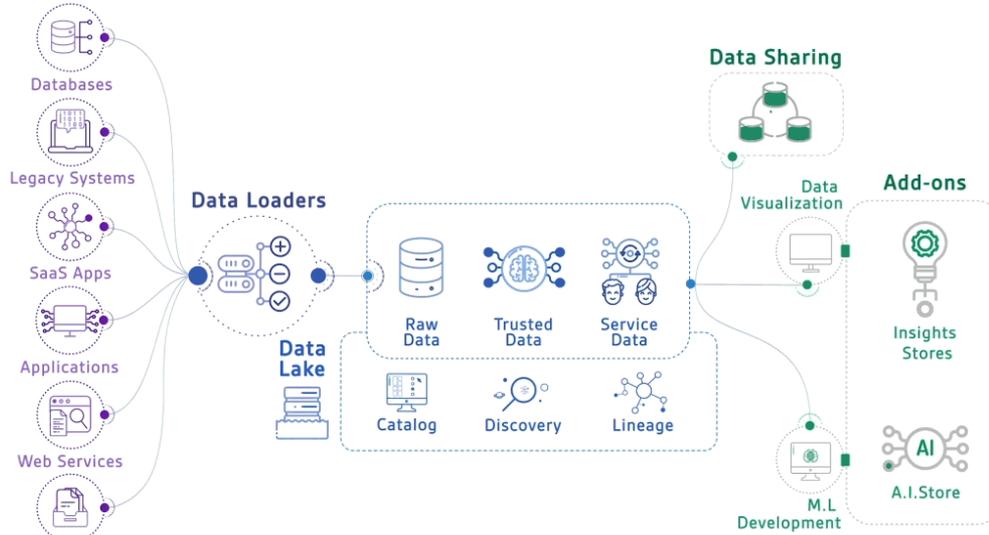
The Blockchain Foundation Layer

BIM & Digital
Twin Disruption

GovTech → Open Source / Industrywide

LawTech → Smart Legal Contracts

FinTech → Blockchain & Tokenized Economy

ManagTech → Team Coordination

Design Tech → Geometry Specification Simulation
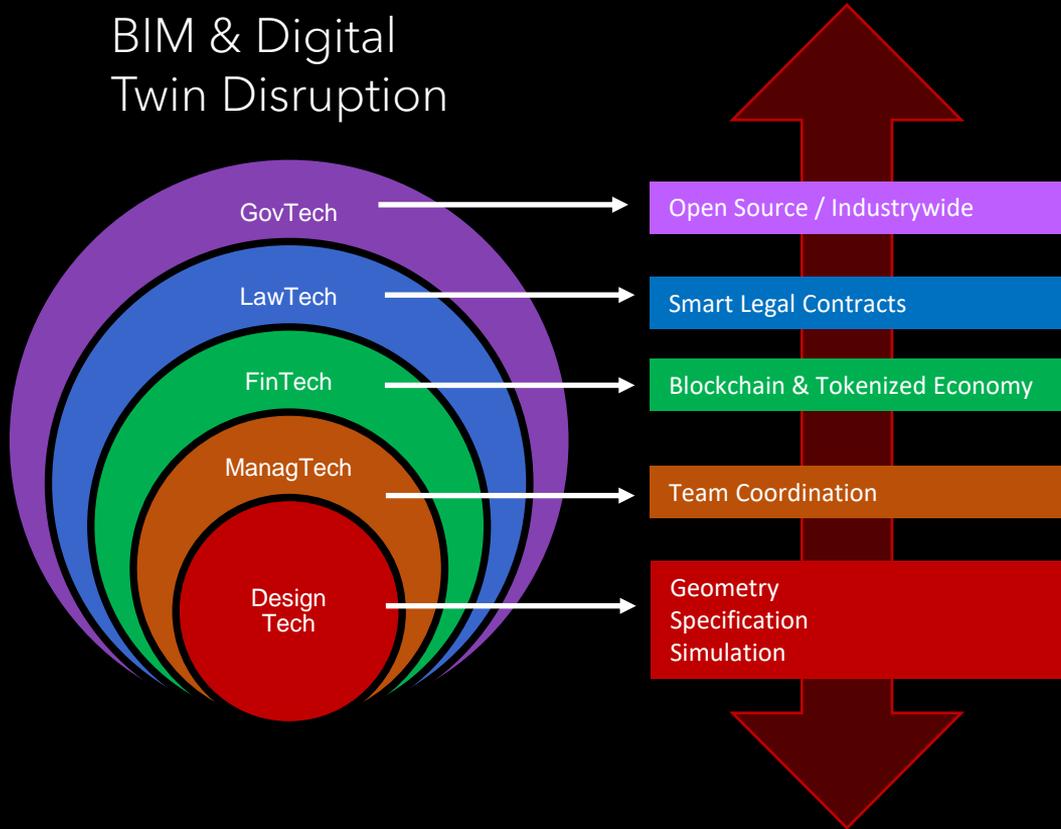
- Traceable SoS for the Built Environment
- Better Governance in BIM, Digital Twins and Reality Mesh
- New models for networks of value
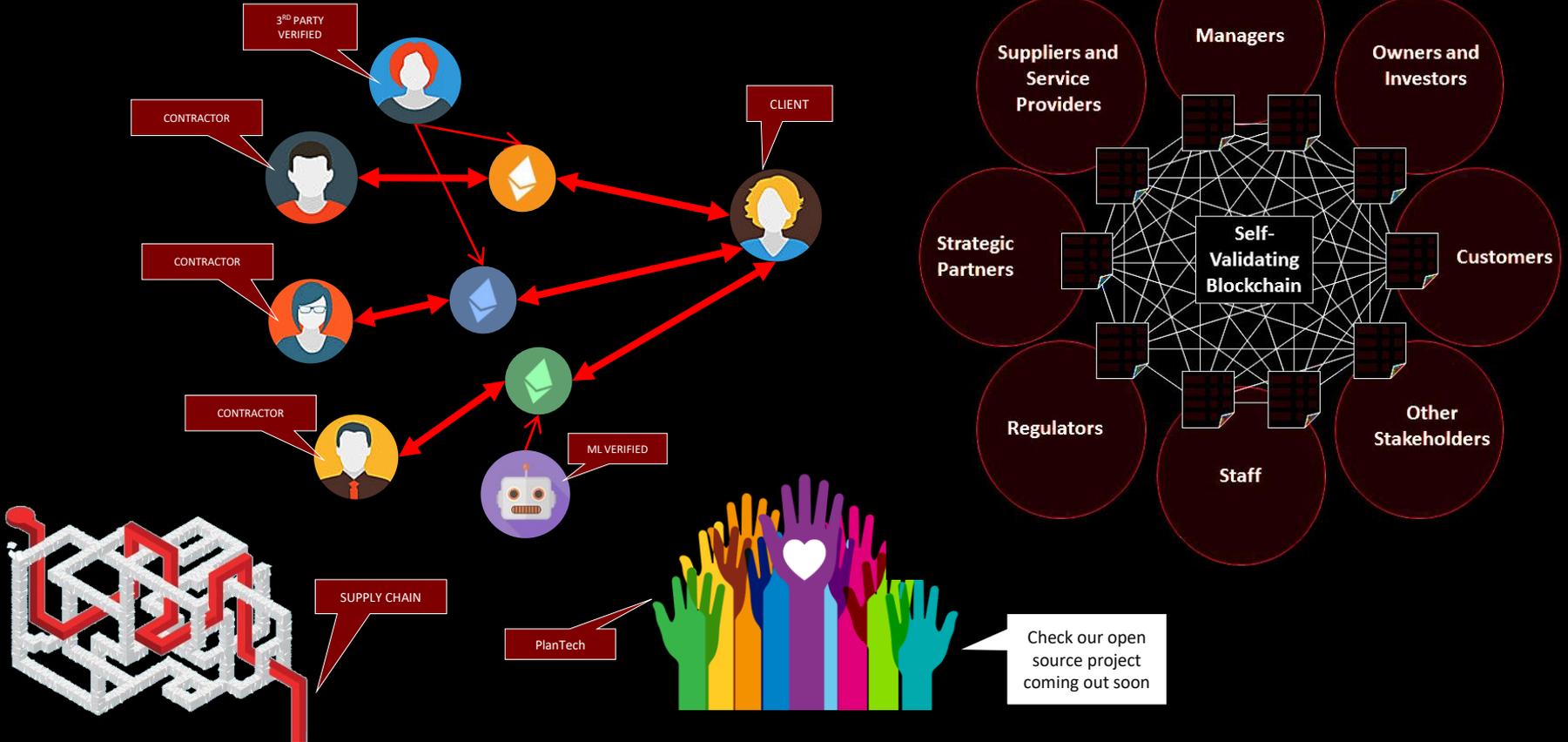
Smart Legal Contracts

Properties:
- Automated
- Pro-active (vs. reactive)
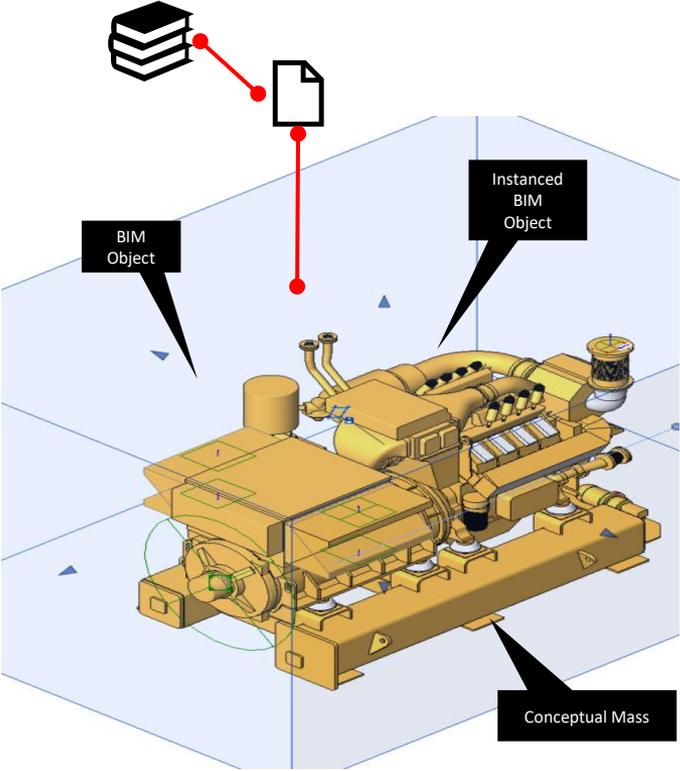- Resilient
- Auditable
- Intelligent

Implications:
- Untested
- The promise of unforeseen efficiencies in many industries
- A foundation technology for the intelligent environments
- Eradications of corruption
- Transparent global development
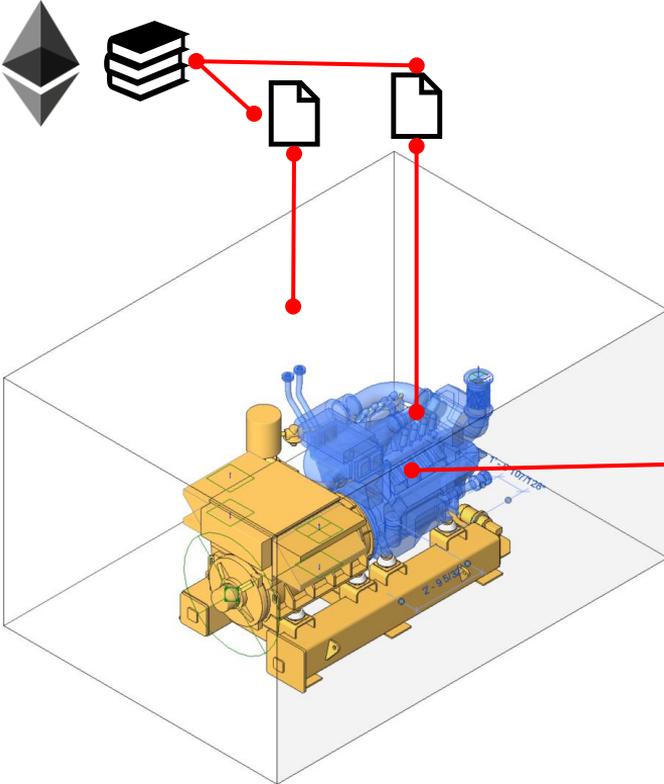
Smart Legal Contracts

A sovereingless Accountability chains

3RD PARTY VERIFIED

CONTRACTOR

CONTRACTOR

CONTRACTOR

CLIENT

ML VERIFIED

SUPPLY CHAIN

PlanTech

Check our open source project coming out soon

Suppliers and Service Providers

Managers

Owners and Investors

Strategic Partners

Self-Validating Blockchain

Customers

Regulators

Staff

Other Stakeholders

Industry Foundation Classes

Industry Foundation Classes
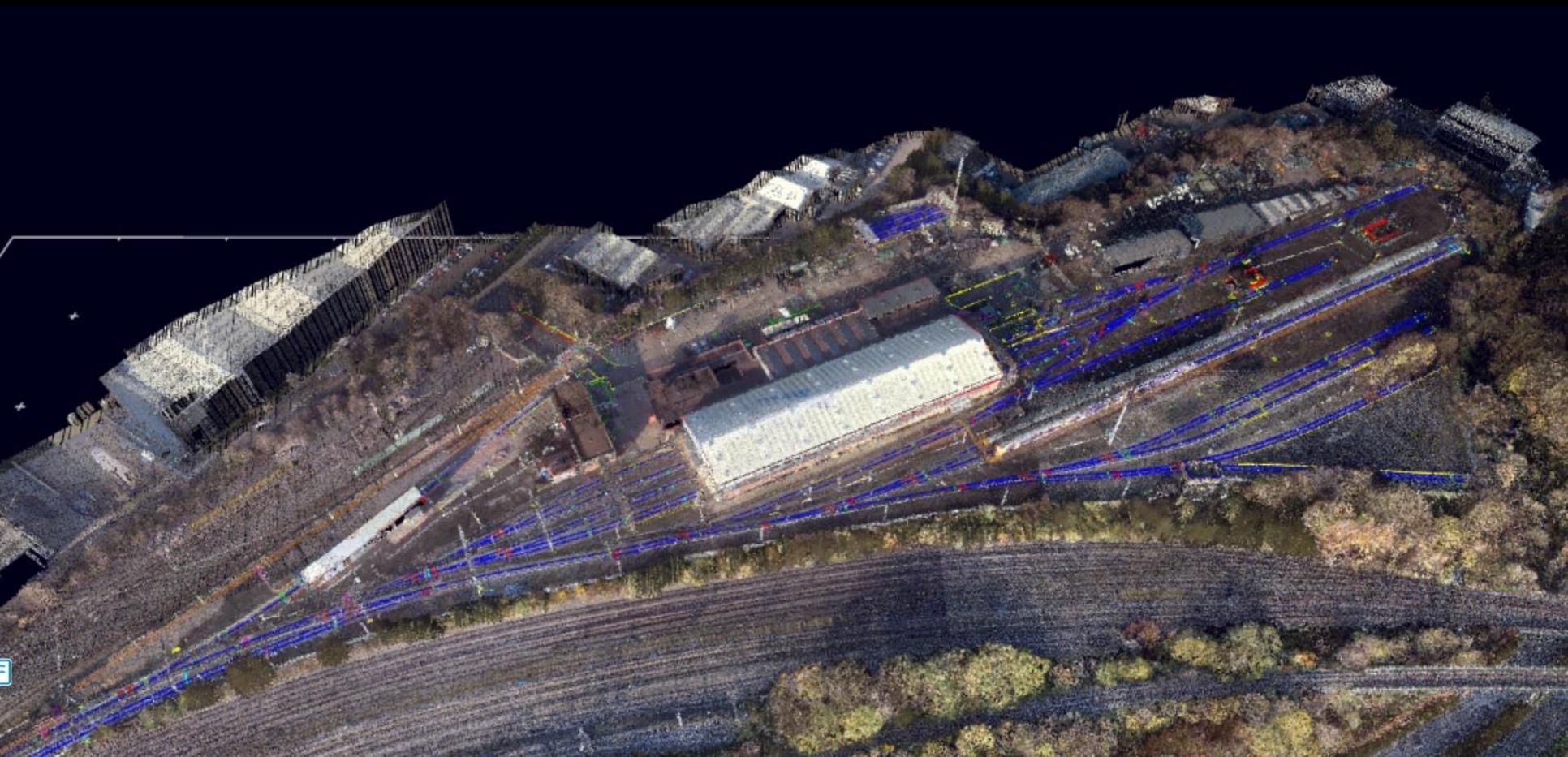
Enterprise Smart Asset Management

- From Business Case to Domain specific use cases

- Consider IDM Frameworks for the specific industry

- Exchange requirement as links between process and data

- Layer of Exchange

  - Ontologies

  - OTLS vs ABS

  - IFC extensions for multi-verticals

  - Asset Foundation Layers

- Many industries still do not have a plan.

Experimental Research
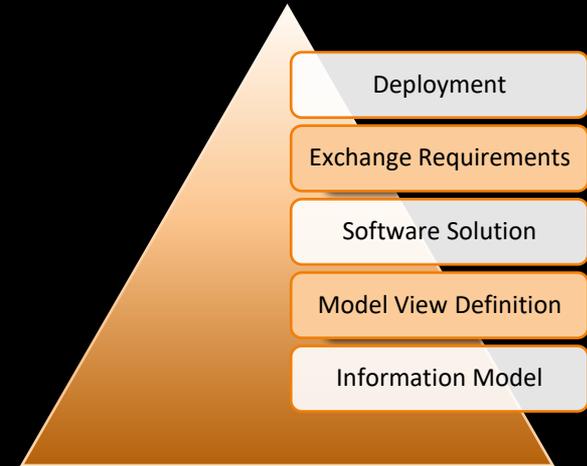
- Leveraging the Scientific Method For Architecture
  - Cognition and Choice Modelling
  - Human factors and Virtual Environments
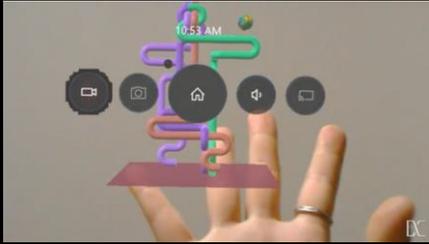
Smart Assets & Reality Mesh Modelling

Smart Assets & Reality Mesh Modelling

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Advancing Infrastructure

How to engage:

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