Improving Plant Information Management: CFIHOS and Beyond

Adrian Park, VP Pre-Sales EMIA Region

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Hexagon at a Glance

Our focus is autonomy

Leveraging data to its fullest potential– **moving beyond automation to autonomy**
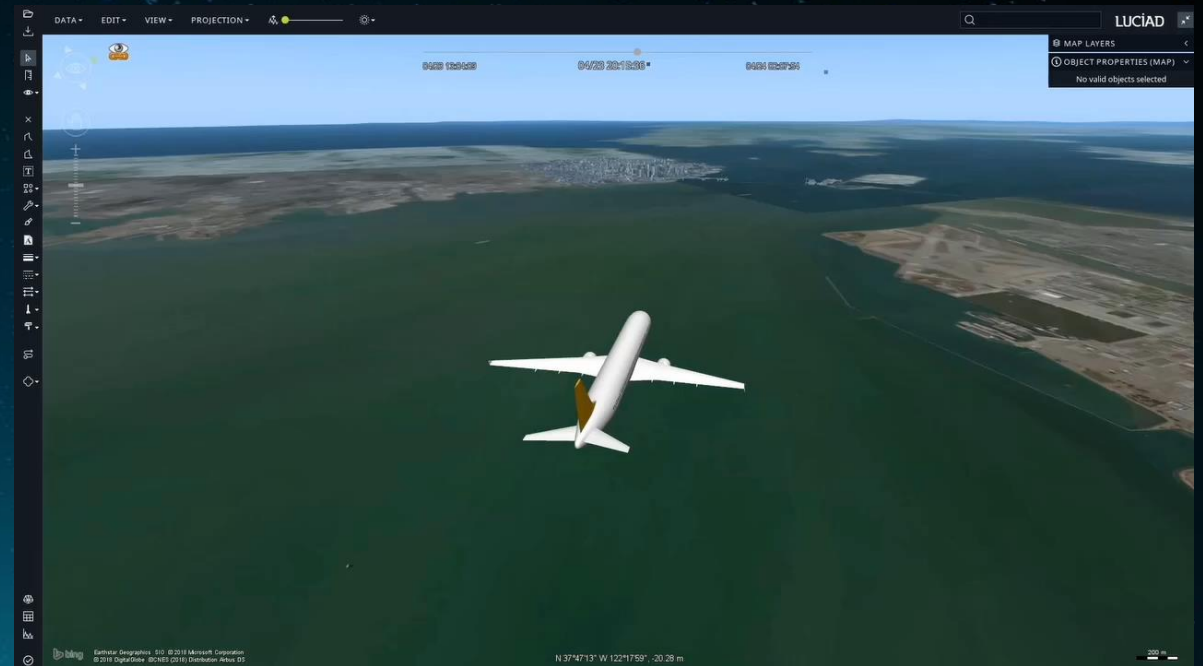
Our commitment is innovation

With **nearly 4,000 employees in R&D and more than 3,700 active patents**

Our value is strategically vital

Efficiency, **productivity** and **quality** results in scalable sustainability

Our stability is consistently proven

Sales growth from €500 million in 2000 to **€3.8 billion** in 2020 with **approximately 21,000 employees across 50 countries**

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The digital reality feedback loop

Hexagon's core technology competencies enable a digital reality feedback loop – creating freedom of insight so you can be proactive, preventative and event-predictive

Reality Capture ▶

Digital capture of the physical world

Real World

Autonomous Technologies ▶

Automation of any task, workflow, machine or decision – enabling action without human intervention

Design & Simulation ▶

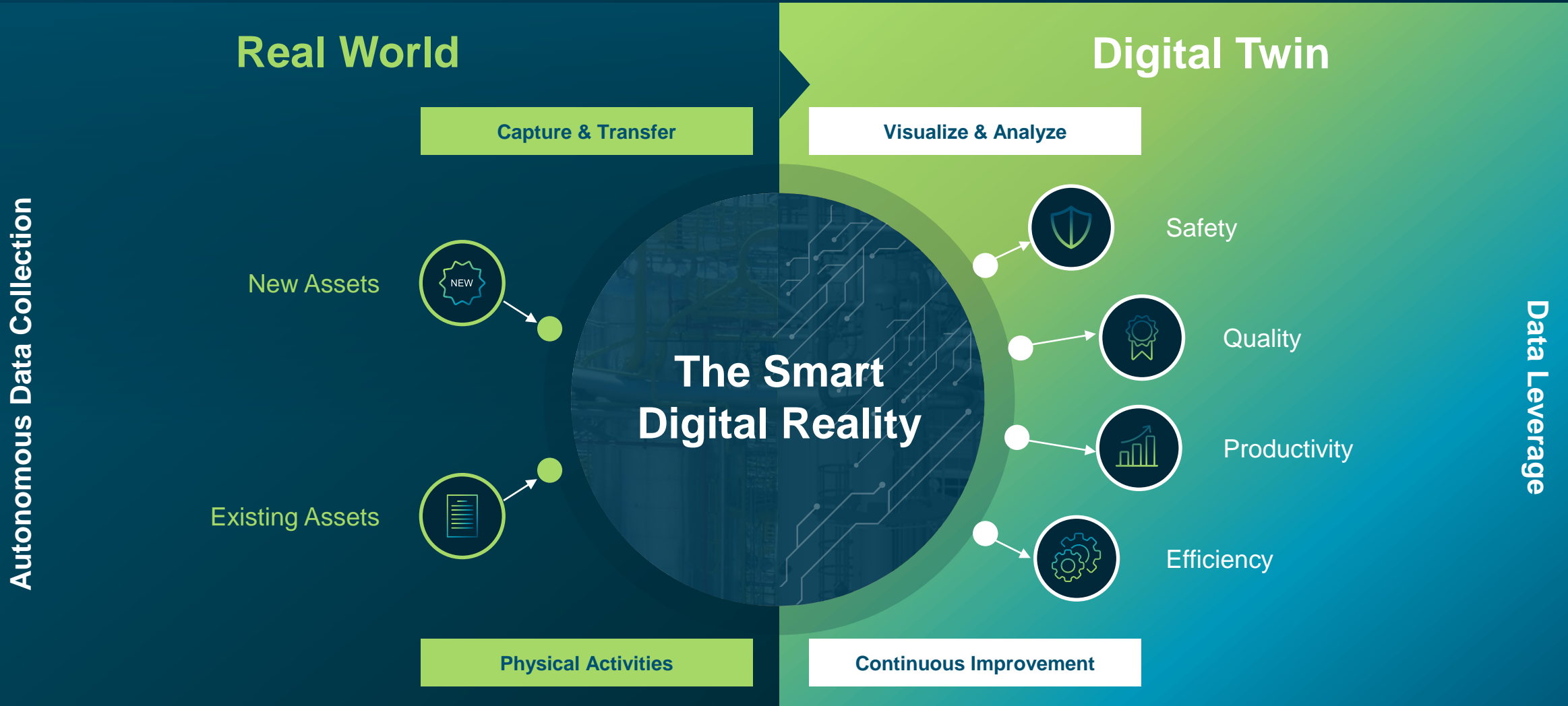Design and replication of real-world scenarios

Digital Twin

Positioning ▶

Location, tracking, navigation and/or control of anything, anywhere

Location Intelligence ▶

Active, geo-referenced intelligence of real-world situations

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Industrial Facilities – Realizing Value from Your Data

Real World

Digital Twin

Autonomous Data Collection

Data Leverage

Capture & Transfer

Visualize & Analyze

New Assets

Existing Assets

The Smart Digital Reality

Safety

Quality

Productivity

Efficiency

Physical Activities

Continuous Improvement

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Hexagon PPM – 40+ years of standards support

From CAD formats to Structured Data

- 1980s – 1990s
  - Advent of CAD; US Air Force required IGES
  - Advent of AutoCAD; Autodesk creates DXF
  - Advent of Intergraph Jupiter technology – Microsoft OLE4D&M

Hexagon PPM – 40+ years of standards support

From CAD formats to Structured Data

> **The great thing about standards:**
> *There are so many of them*
> *There are always new ones to compete with the old ones*

- 1980s – 1990s
  - Advent of CAD; US Air Force required IGES
  - Advent of AutoCAD; Autodesk creates DXF
  - Advent of Intergraph Jupiter technology – Microsoft OLE4D&M
- 1990s – 2000s
  - POSC Caesar
  - PlantSTEP / ISO10303
    - Application Protocols 221, 227, 232
    - CIMSteel & CIS/2
- 2000s - Today
  - ISO 15926
  - IFC
  - Industry-specific – KKS, RDS-PP, PIP, DEXPI. etc
  - CFIHOS

Lifecycle Digital Twin

Conceptual & FEED	Detailed Design	Construction	Operation	Maintenance & Reliability

DIGITAL THREAD / INFORMATION BACKBONE

Conceptual & FEED
Process Simulation
Equipment Design
Process Safety
Conceptual Layout
Basic Engineering
Capital Cost Estimation

Detailed Design
P&ID
Instrumentation
3D Plant Design
Electrical
Analysis

Construction
Project Controls
Procurement & Materials Management
Fabrication
Construction
Quality Management
Completions & Turnover

Operation
Supply Chain Optimization
Planning & Scheduling
Dynamic Optimization & APC
MES/Historian
Process Simulation
Operations Management
Situational Awareness
Cyber Security

Maintenance & Reliability
Predictive Maintenance
Risk & Reliability Analysis
Control of Work
Connected Worker
EAM

Data Tourism & Exploitation across the Digital Asset Lifecycle

Digital Projects

Portfolio & Project Planning

Conceptual Design

Detail Engineering

Procurement

Materials Management

Fabrication

Construction

Digital Backbone

Digital Assets

Common Administration

Vendor Documents & Drawings

Autonomous Data & Graphics Checks

Interactive Visualization, Collaboration & Interrogation

Shutdown, Turnaround, Outage

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Digital Assets

Digital Projects

Operational Excellence

Process Safety

Workforce Competency

Managed Equipment Strategies

Maintenance Effectiveness

Sustaining Engineering

OT / ICS Cybersecurity

Connected Worker

Interoperability Work Process Enhancement

Integration Process Data Asset Information

Interactive Visualization, Collaboration & Interrogation

Robots & Autonomous Scanners

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AI-based Handling for all External Project Data

AUTOTAGGING

Vendor Drawing
Smartification
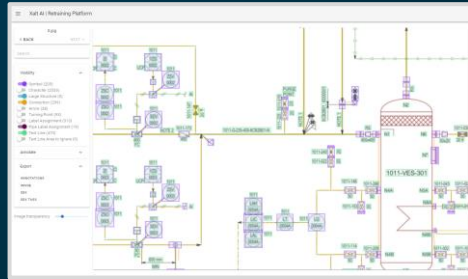
Vendor Document
Smartification

Skid Supplier Smartification
Pipe Fabrication Smartification
Steel Detailer Smartification
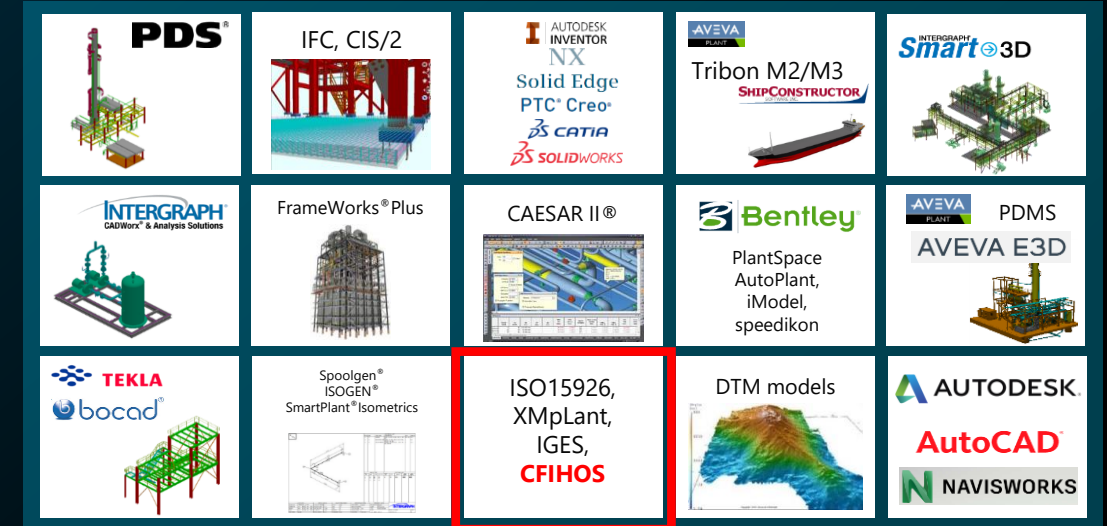
Programmatically Connecting Into Twin

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CFIHOS Experience

CFIHOS delivered as default in SDx digital twin platform

- All class trees available:

  - Disciplines

  - Discipline Document Types (as Document Classes)

  - Tag classifications

  - Equipment classifications

  - Attribution (ie. Property-is-valid-for-class)

Classification Trees - mechanism

- Data Validator enables you to load up class trees and the attribution:

CFIHOS Importing Capabilities

- Data Validation methods have been setup to import and validate the CFIHOS registers

- Will support regular formats but RAW/inverted formats as well

- Can upload document metadata and their files
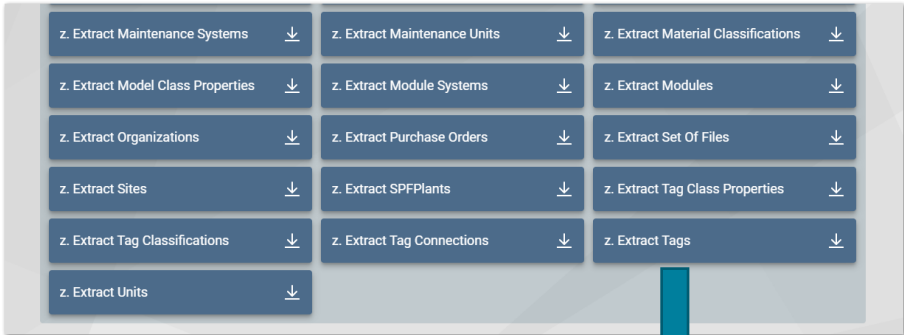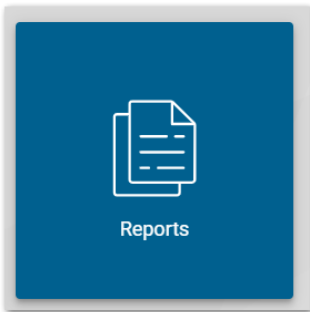
- Input formats examples for Tags:

  - Regular format:

plant code	tag name	tag description	parent tag name	area code	process unit code	tag class name	tag status	requisition code	designed
CEX	P-0100	centrifugal pu...			CT	centrifugal pump	approved for c...	RQ1234	DC
CEX	P-0101	Pump			03	piston pump	approved for c...	RQ1234	DC
CEX	P-0102	Cent. Pump			CT	centrifugal pump	approved for c...	RQ1234	DC
CEX	P-0103	Screw Pump			CT	screw pump	approved for c...	RQ1234	DC
CEX	P-0200	Inlet Pump			CT	rod pump	approved for c...	RQ1234	DC
CEX	P-0201	Inlet Pump			CT	vane pump	approved for c...	RQ1234	DC

  - RAW/Inverted format:

plant code	tag name	property name	property value	property value uom
CEX	P-0100	explosion protection gas group	IIC	
CEX	P-0100	explosion protection temperature class	T5	
CEX	P-0100	explosion protection zone	Zone 1	
CEX	P-0100	liquid hazardous category	Category 1	
CEX	P-0100	lower limit operating temperature	55	C
CEX	P-0100	upper limit operating temperature	70	C

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CFIHOS Extracting Capabilities

- Ad Hoc reports have been setup to extract data from the system into CFIHOS formatted csv's
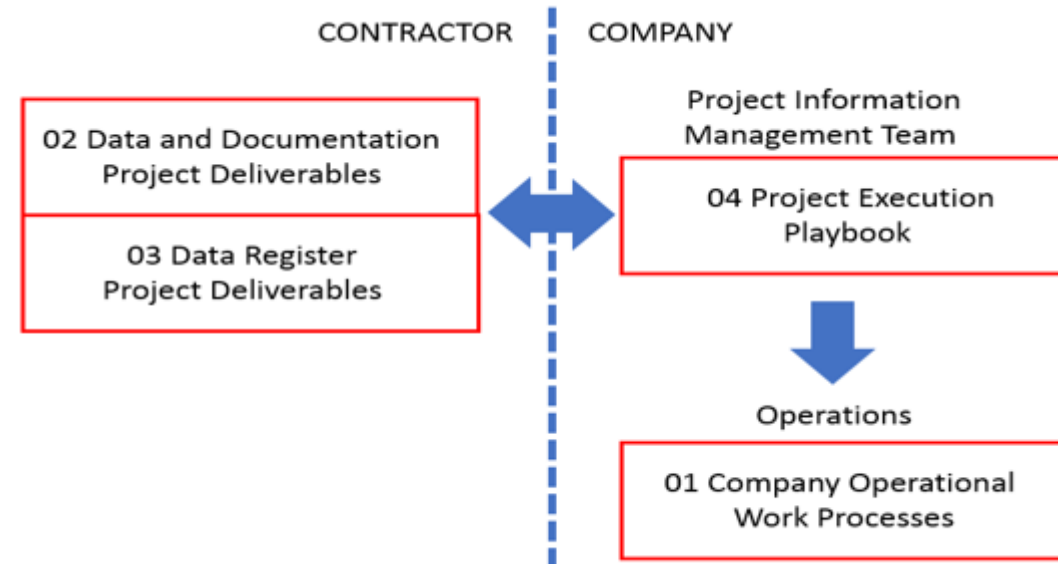- Intention is to communicate data out of the system towards external contractors

Hexagon CFIHOS Implementation Guidelines

- Detailed guidelines for «Company/Principal» and «Contractors»

- Based on previous handover guidelines

- Go beyond scope of CFIHOS e.g.
  - Organization/responsibilities
  - Set-up of seed files for design tools
  - 3D model guidelines
  - Management of vendor package scopes
  - Etc..

- Being updated to CFIHOS v1.5

- Available free of charge to customers – please contact Mika Hanninen
  mika.hanninen@hexagon.com

CONTRACTOR | COMPANY

02 Data and Documentation Project Deliverables

03 Data Register Project Deliverables

Project Information Management Team

04 Project Execution Playbook

Operations

01 Company Operational Work Processes

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Thank You