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BIM for infrastructure make easy with Laser Scanner

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Beng Chieh Quah
Head of Marketing
Asia Pacific

who is FARO®?

founded in 1981

NASDAQ since 1997

Global technology company

Offering a range of 3D Portable Measurement and Imaging Solutions, that are DISRUPTIVE in Pricing, Features and Design

FARO

global presence

Headquarter: USA

Regional Office: Germany (EMEA)
Singapore(APAC)

What is BIM and its trends

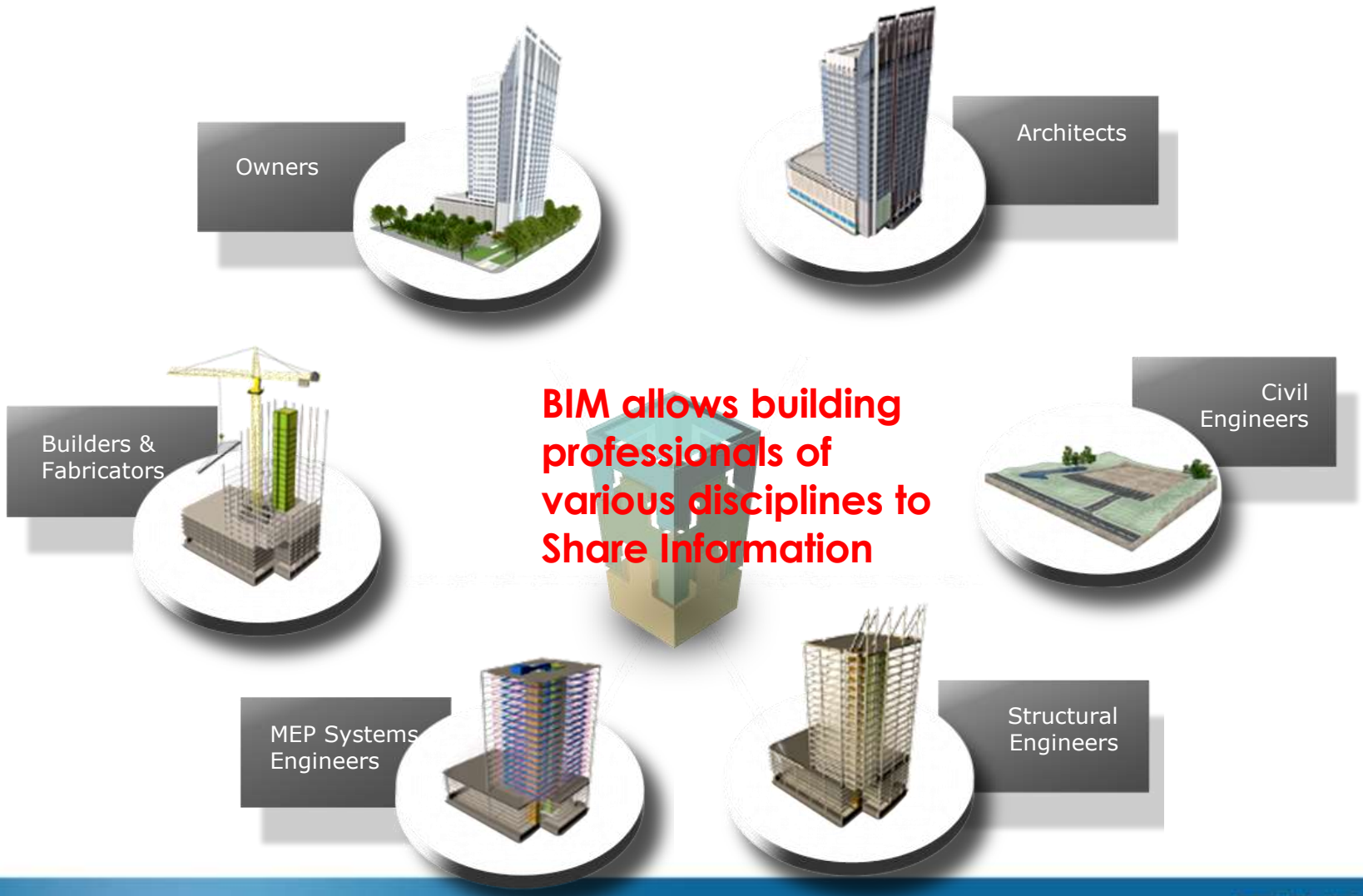
What is Building Information Modeling (BIM)

- Building Information Modelling (BIM) is a three-dimensional (3-D) modelling technology that allows building professionals of various disciplines (architects, structural engineers, structural professionals, mechanical and electrical (M&E) engineers and contractors) to explore the building project digitally through an integrated process, before it is even built.

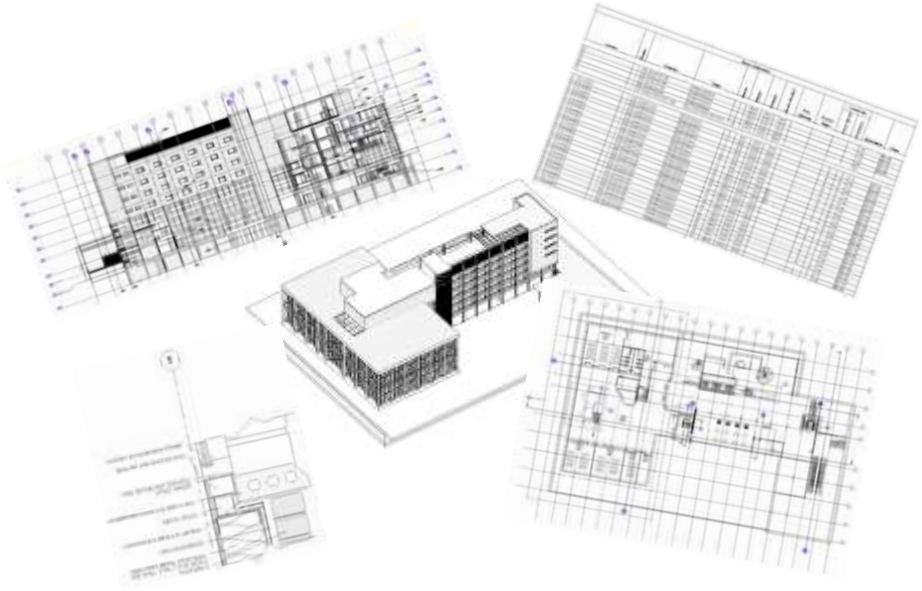
Trends in Asia Pacifc

- Increasing use of BIM for Infrastructure by Government and Private Enterprise
- Increasing awareness of tangible benefits of BIM for co-ordinated decision making among stakeholders
- Increasing automation in construction process due to rising wages

Building Information Modelling



Building Information Modelling



Previously drawing centric
Data duplication – errors
Dumbing down of 3D data

-> Now model based
-> Single model - lots of views
-> Maximum reuse of data
-> Visualisation and Simulation

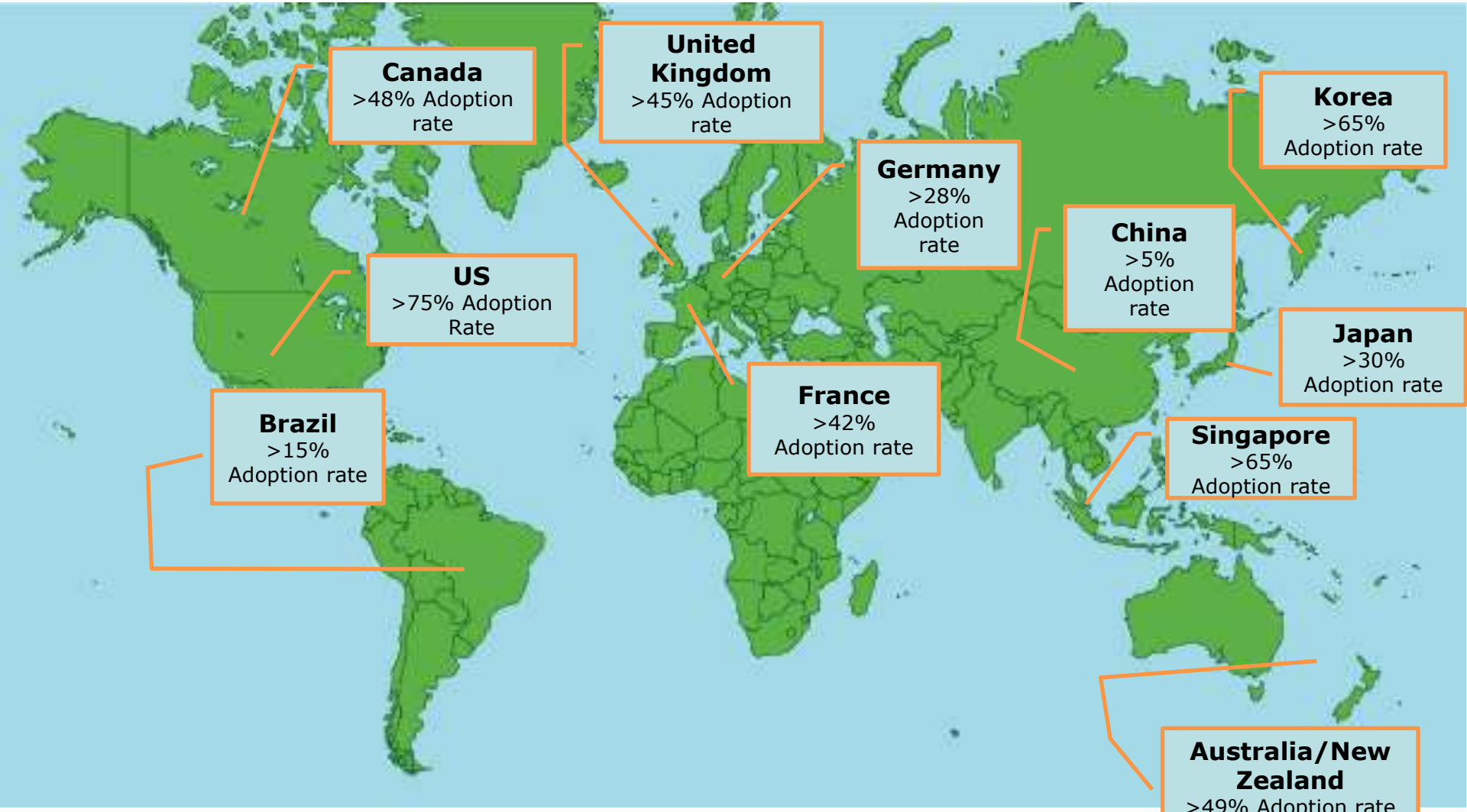
BIM Adoption and Implementation

- ✓ 67% of current user of BIM for infrastructure report a positive ROI on their BIM investments.
- ✓ BIM experience user have gained 50% or greater of ROI
- ✓ Improved productivity

Example:
The construction of US$5.88B Australia's first fully automated transit rail in Sydney. BIM helping the project to streamline the workflows and improve efficiency which results saving cost, time, waste and better communication

Source: *McGraw-Hill Construction "Business Value of BIM for Infrastructure*

BIM Adoption rates in the world

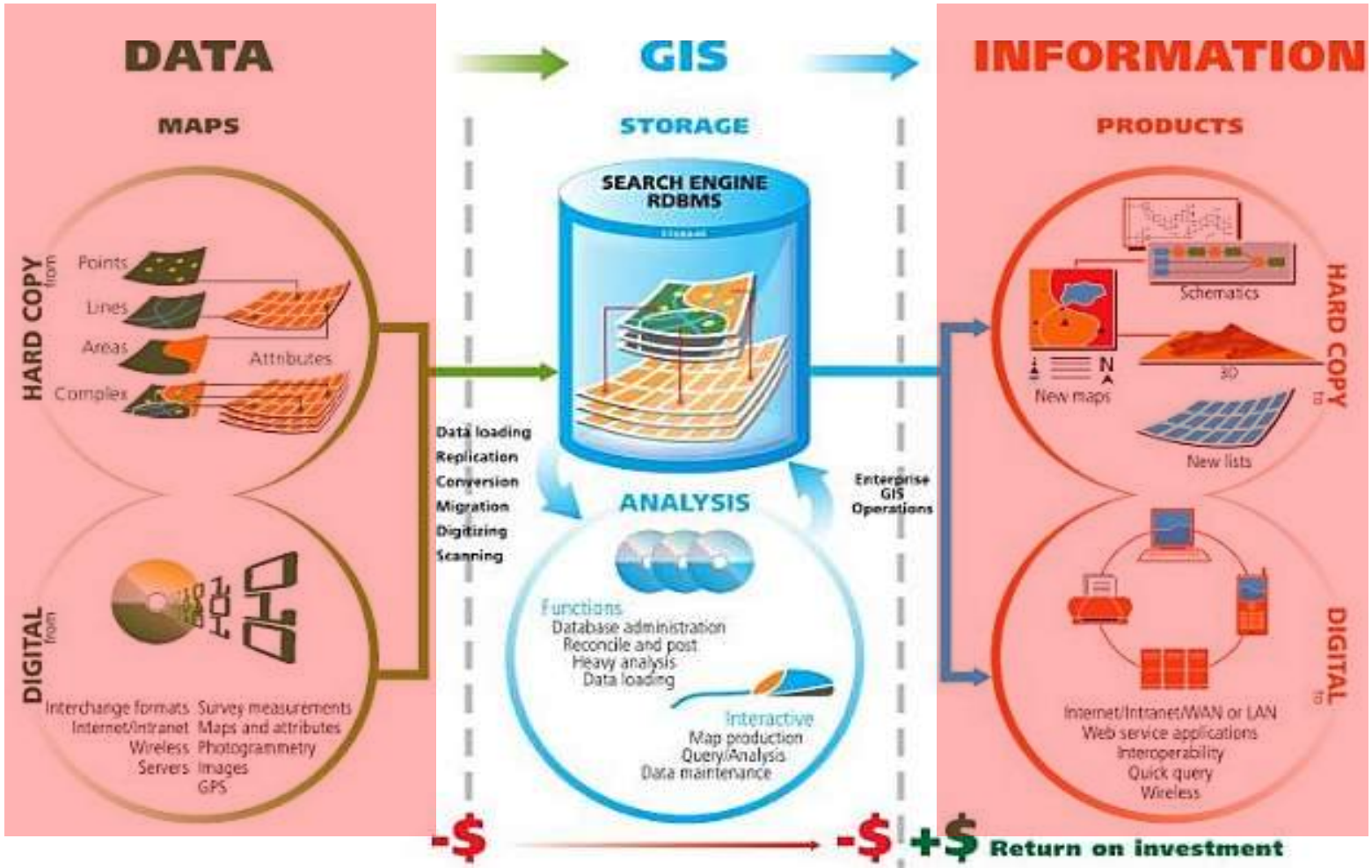


Source: McGraw Hill Construction 2013

A **Geographic/Geospatial Information System** is a facility that enable users to capture, store, analyze and manage spatially referenced data

Comprehensive GIS requires a means of

- Data input
- Data storage, retrieval and query
- Data transformation, analysis, and modeling
- Data reporting

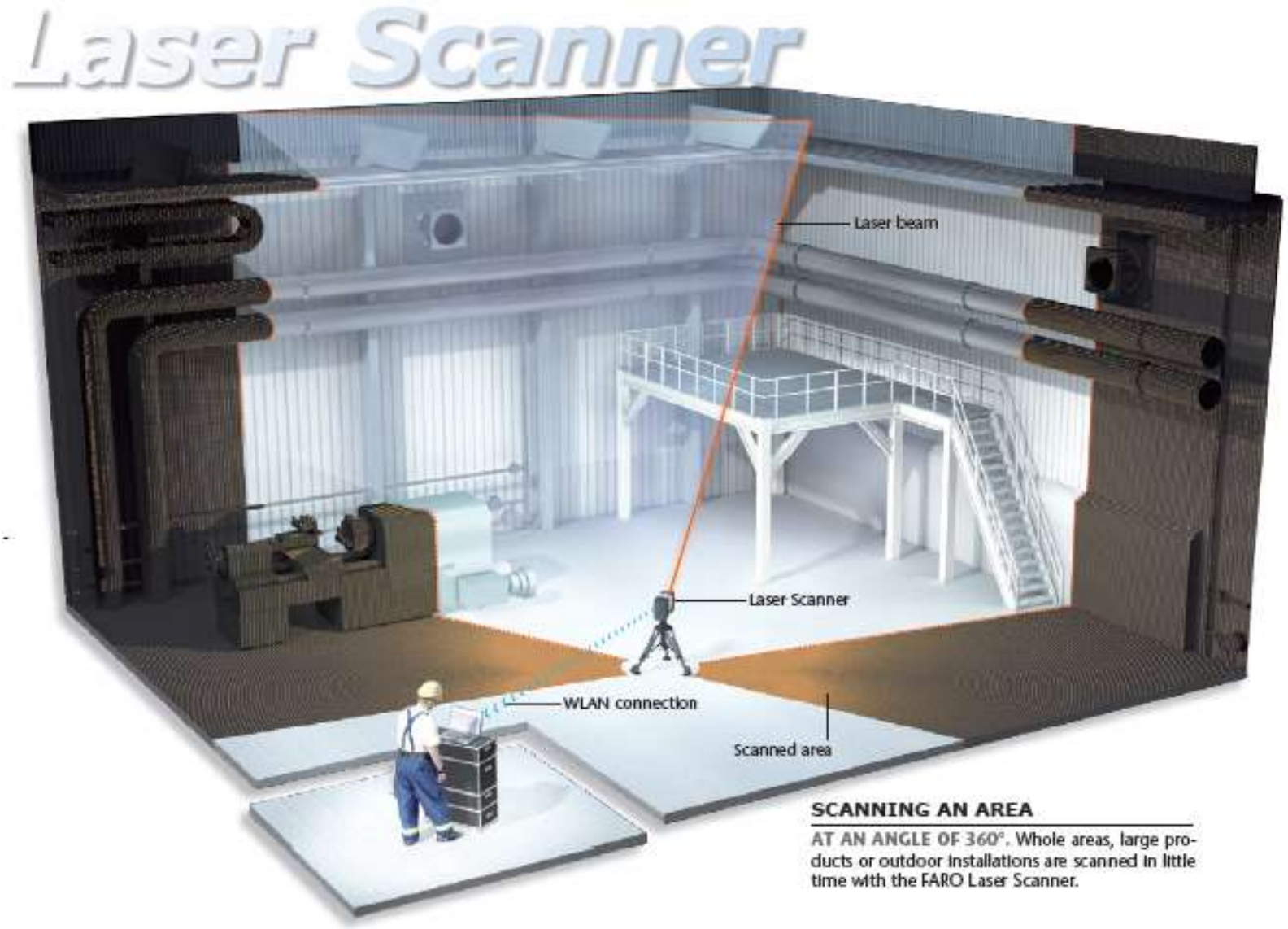


Laser Scanning

A laser scanner constructs 360-degree point clouds of scanned surfaces to create 3D models

High speed laser scanning for detailed 3D images of complex environments and geometries

Overview of 3D Terrestrial Laser Scanner



Overview of FARO 3D Laser Scanner

- High-speed 3D laser scanner for detailed measurement & documentation
- Produces detailed 3D images of complex environments & geometries in only a few minutes
- Integrated 70 megapixel camera for colorization of point clouds
- Captures up to 1 million points a second

How does a Terrestrial Laser Scanner work?

Uses phase shift technology

- Infrared light of varying length are projected outward
- Upon contact with an object, they are reflected back to the scanner
- x, y, z coordinates are calculated
- Scanner covers a 360° x 300° field of view

Laser Scanner – How It Works

What Laser Scanner Benefits

Laser Laser Scanner able to scan in long range up to 350m

Light Weight, compact and mobile that you will take it with you wherever you go.

Able to creates a precise in millimetre-accuracy at a blazing speed of 976,000 measurement points per second

Reduce time and laborious in documenting existing building infrastructures for building modelling

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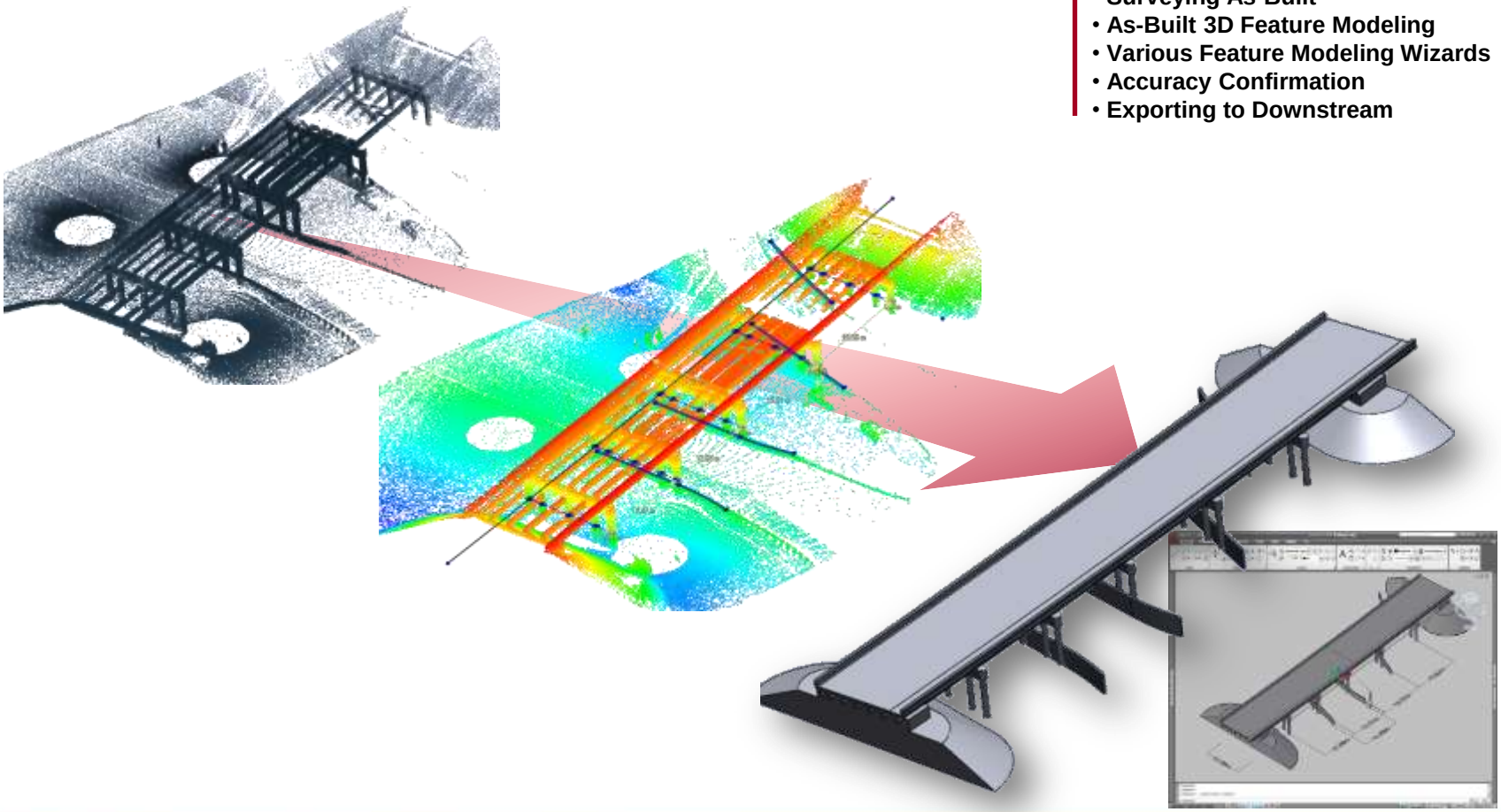
As-Built Model

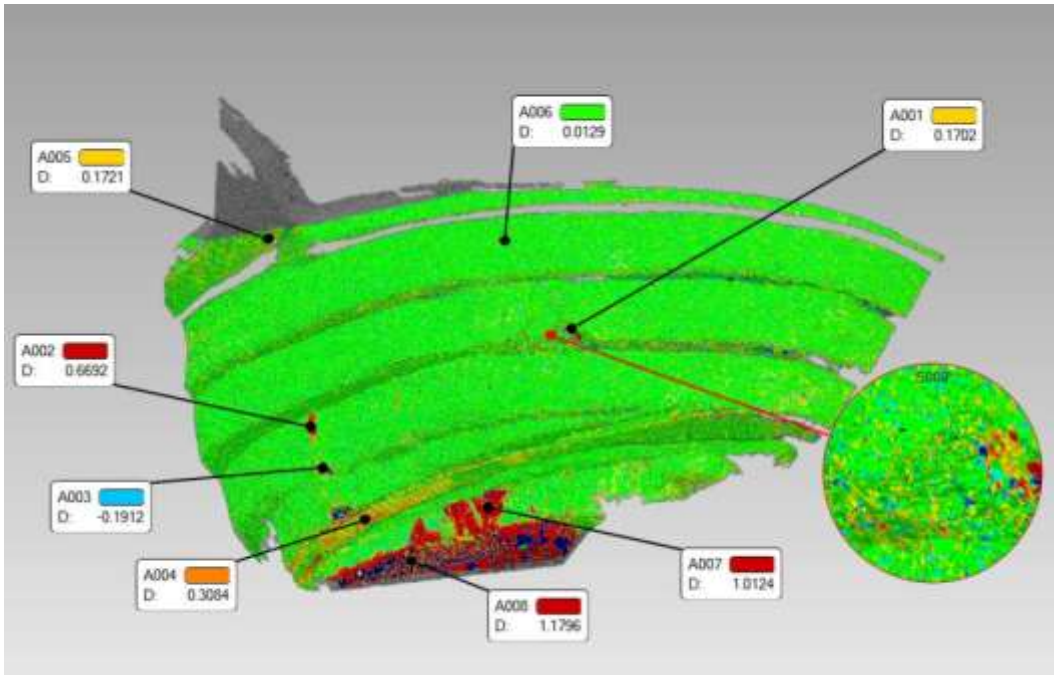
Create fully editable 3D CAD models directly from point cloud or mesh data using realtime accuracy analysis tools

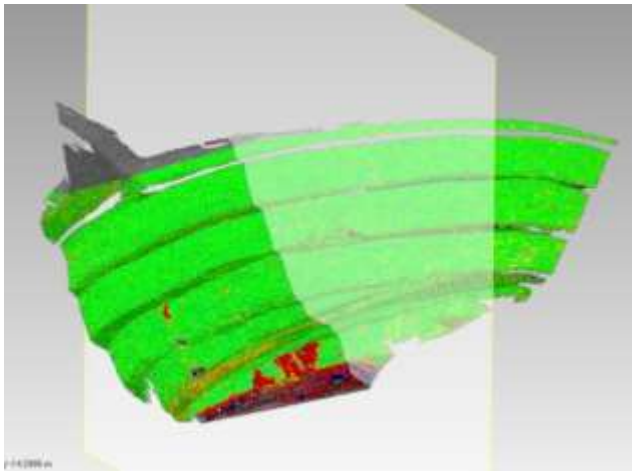
Extracting Feature Information and 3D Feature Modeling

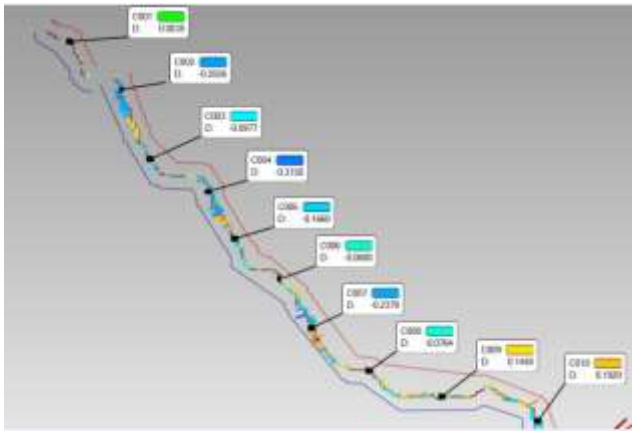
- **Surveying As-Built**
- **As-Built 3D Feature Modeling**
- **Various Feature Modeling Wizards**
- **Accuracy Confirmation**
- **Exporting to Downstream**



Deformation Monitoring

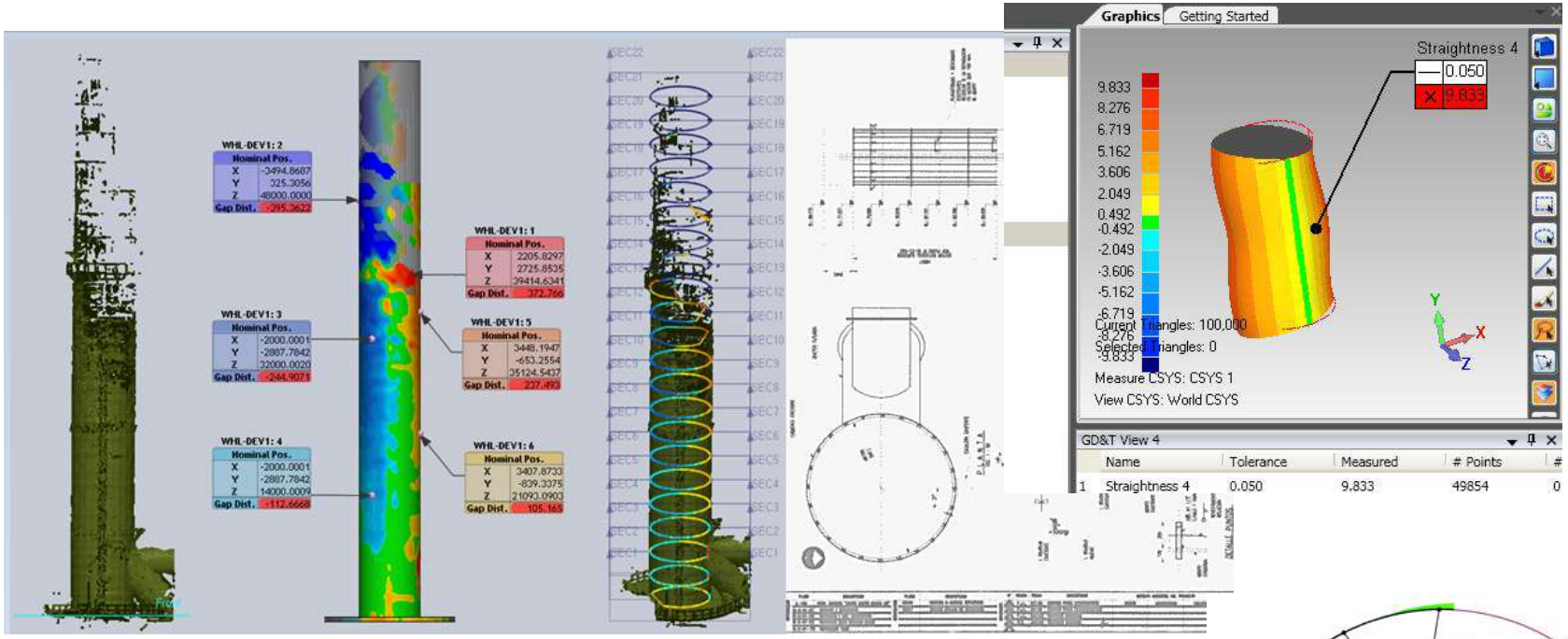




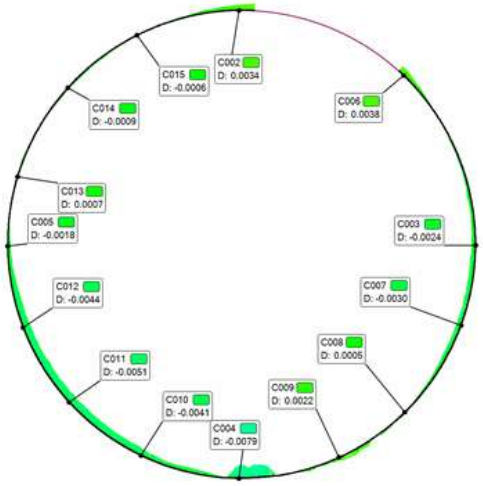


- Terrain & Retainer Wall Monitoring
- Quick and easy identification using 3D colour mapping deviation analysis or Cross Sectional with required colour spectrum

Tank and Chimney analysis



- Deformation analysis
- Roundness & straightness analysis
- Cross Sectional Measurements



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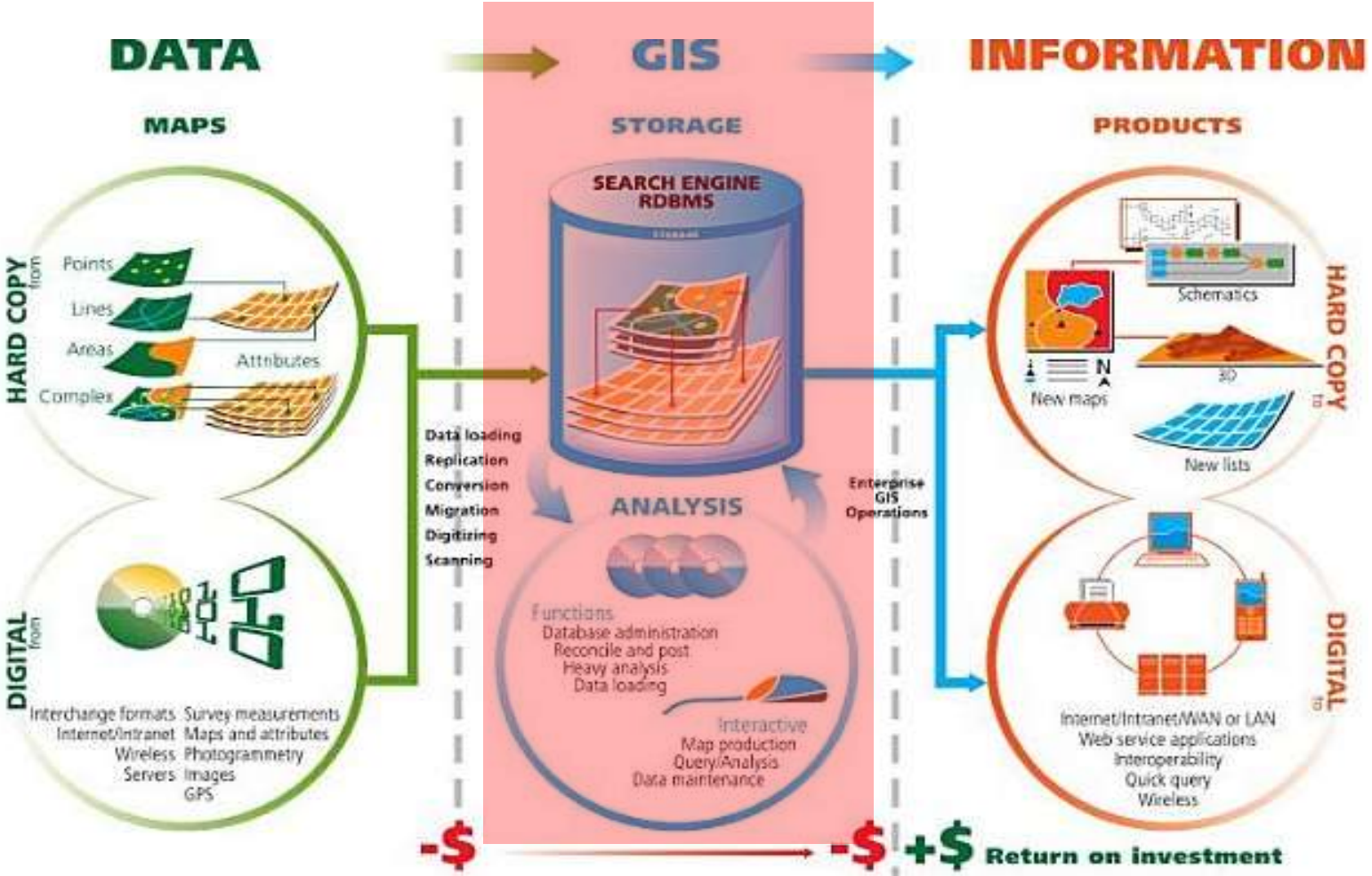
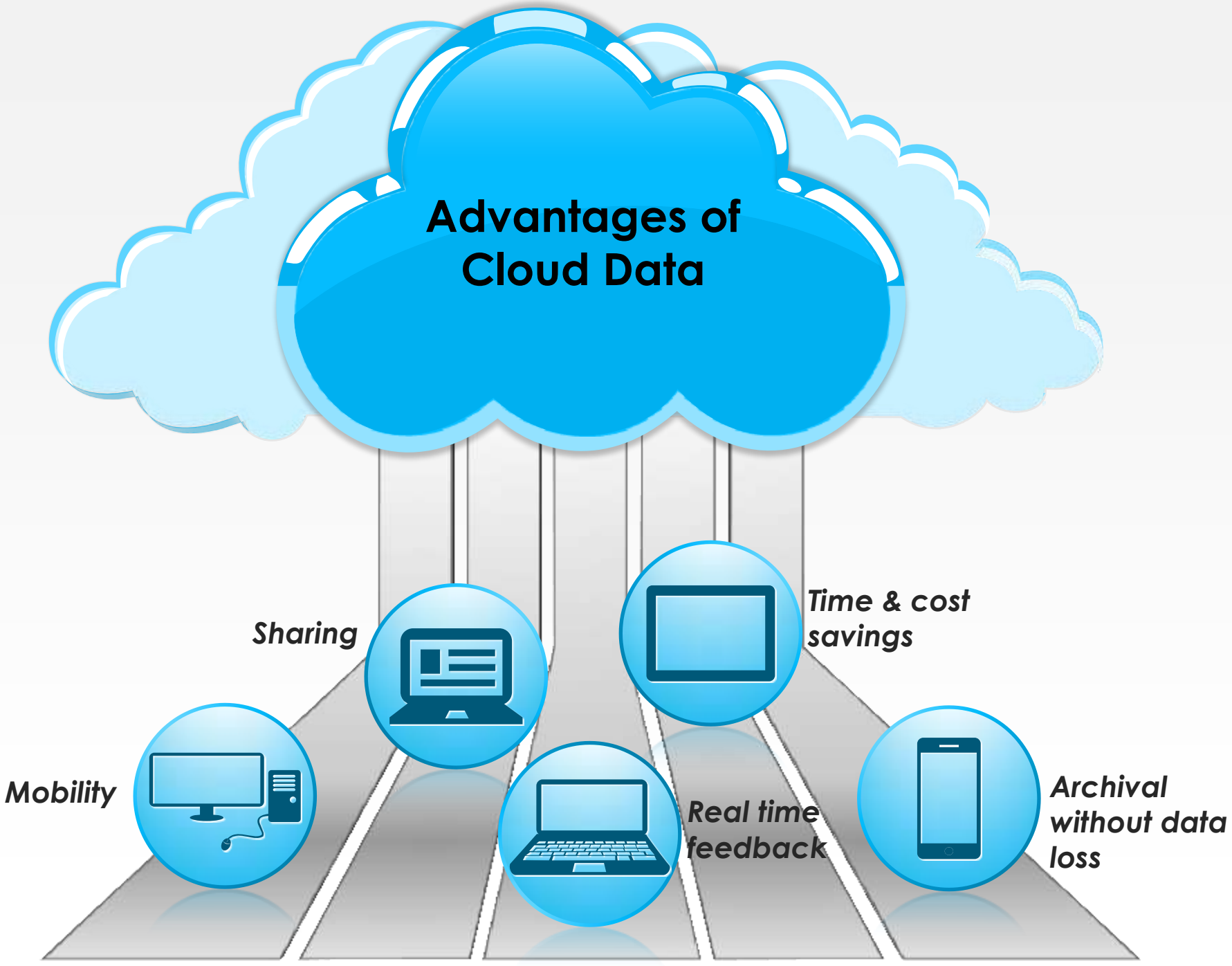
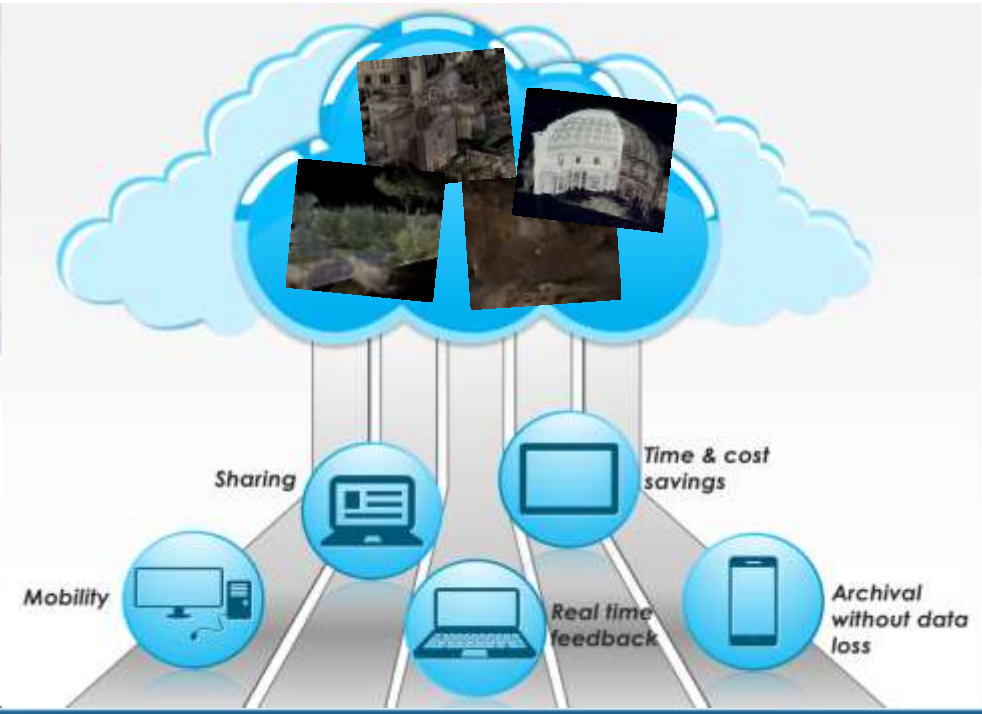



Advantages of Cloud Data
Sharing
Time & cost savings
Mobility
Real time feedback
Archival without data loss

SCENE
WebShare

SCENE WebShare Cloud: a cloud-based hosting solution from FARO for easy and secure sharing of scan data worldwide via the internet



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Success stories – Infrastructure Monitoring: Tunneling made easy with FARO 3D LS Solution

***Company* : Beijing Urban Construction Exploration & Surveying Design Research Institue**

- Projects for railway construction and monitoring of tunnel deformation
- Providing surveying appraisals for clients for quality control

Challenges with using traditional solution

- Multiple point data acquisition is slow and time consuming
- Data collected is incomplete due to limited number of points

Results

- **Reduce data acquisition time by more than 50% (down to 4hours)**
- **Improve productivity and accuracy**

Success stories – Infrastructure Monitoring: FARO's 3D Laser Scanning Technology Used to Detect Instability in Urban Structures

***Company* : Aisei Ltd (Japan)**

- Monitored Urban old Infrastructure and reinforced or repaired before a breakdown occurs
- inspects, investigates, and analyze urban structures for possible deterioration

Challenges with using traditional solution

- Assess many bridges without an original design blueprint in hand
- Manual measurements is risky to accomplish and often inaccessible areas

Results

- **Improve operators' safety**
- **Assess the condition of infrastructure more accurately and quickly with digital information**
- **Increase efficiency by using less resources per project**

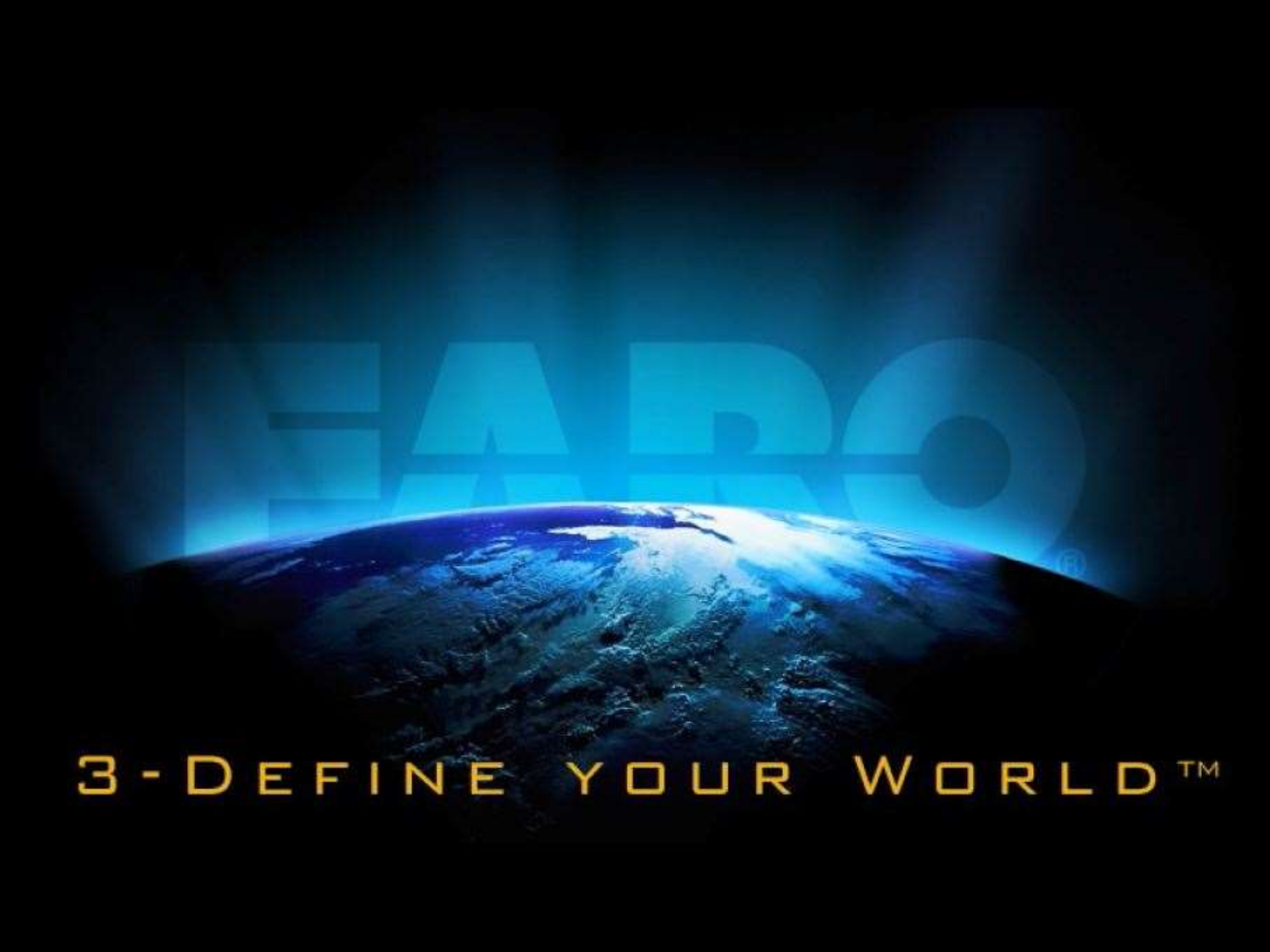
Conclusion

The advancement and numerous benefits of BIM solutions have helped to empower the Private Enterprises, Government and the users with more accurate and real time data.

In addition, the workflow has been simplified and accelerated with the advancement of 3D Laser scanning technology today:

- Complex infrastructure projects completed with high ROI
- Resource optimization - fast and precise scanning up to 1 million points per second
- Use of Cloud storage and sharing technology to improve efficiency – real time and mobile


FARO Success Story with AISEI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