Digitisation: Emerging Technologies and Applications

Richard Fletcher – Managing Director, Trimble Structures Division, UK & Ireland
Contents

- The Company
- Digitisation
  - What – Content
  - How – Visualisation Tools
  - Why – Customer Experience
Trimble Inc

**Founded in:** 1976

**Publicly traded on the NASDAQ since:** 1990

**Employees:** 8000+

**Developers worldwide:** >2,000

**Patents:** >1,000

**Offices:** 35 countries

**Customers:** >150 countries

**Engineering & Construction:** 55%+

**Revenue:** $2.4B (25% Europe, $1B from software)
Trimble Segments

Buildings & Infrastructure
- Building Construction
- Civil Construction

Resource & Utilities

Transportation

Geospatial
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<td>2002</td>
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Trimble Technology Evolution

Positioning & Sensors
- Scanner
- Total Station
- RFID
- GNSS Receiver
- Image capture
- Laser tools
- Machine control

Connectivity
- Cell
- Radio
- IP
- WiFi
- Bluetooth
- Satellite

Modeling
- Virtual Reality
- Field Inspection
- 3D modeling
- Point cloud
- Visualization
- Project Management
- Mechanical design
- Structural design
- Clash Detection

Analytics
- Asset Optimization
- Work Management
- Yield Management
- Fleet analytics
- Driver safety
- Environmental
- Cost analysis
- Time analysis
- Road/rail alignment
- Design coherency

Full Solutions
Construction & Operations divisions

Architecture
- Conceptualisation, visualisation and communication software for architects and planners.

Structures
- Trimble’s suite of hardware and software solutions for MEP contractors, from the office to the field.

MEP Contractors
- Building-intelligence software, hardware, and services for general contractors and construction managers.

General Contractors
- Machine control, site positioning and software solutions to optimise productivity and improve profitability.

Site Preparation
- Capital project and facility management solutions spanning a building’s entire lifecycle.

Real Estate & Workplace Solutions
- Machine control, site positioning and software solutions to optimise productivity and improve profitability.
What?

The Content
Today’s Project Information

Stakeholders & Disciplines

Many File Formats & Tools

2D Documents  3D BIM
What Trimble Connect Delivers

Ecosystem of Collaboration
Agnostic, Secure, Simple, Robust, Global, Cloud Platform & Technology Services
Single Source of Truth
Cloud Ecosystem
For the Survey – Design – Construct – Operate lifecycle.
Driving communication and Connectivity across people, tools and data
Digital Data Driven Workflow

- **Input**: The real existing world
- **Output**: The virtual existing world
- **Input**: Intelligent Scan Data
- **Output**: Civil Design & Planning
- **Input**: Buildings Design & Planning
- **Output**: Civil Construction
- **Input**: Buildings Construction
- **Output**: GIS Asset Tracking
- **Input**: Facilities Management
- **Output**: The virtual future world
- **Input**: The virtual future world to real existing world
- **Output**: The updated future world to real existing world

**Design** | **Build** | **Operate**
What is Trimble Connect?

Enable a network of project data that seamlessly passes between stakeholders and their tools across the Survey, Design, Construct and Operate Lifecycle.

Product
Store, collaborate, track and connect with an easy to use interface. Access data from one place on any device.

Platform
Interoperability & collaboration pipeline between stakeholders & their professional tools
One Project Connected….

Collaborate across 40+ tools & Integrations + 16 Languages

Communicate and manage data across 3D Models, 2D Drawings & Geospatial Data

Process data on the way to the office with Cloud processing

Work where you want Web, Desktop, Mobile or Hololens
Data Workflow

Trimble Connect Platform Services
(Processing depends on queue, priority can be set by project)

Connect Web
Connect Desktop
Connect Sync Tool
my.sketchup

…… (Other API integrations)

Connect Mobile
Connect Hololens
Design Workflow

- Owner
- Permitting
- GC/CM
- Architect
- SketchUp
- Trimble Connect™
- Structural
- Trimble MEPdesigner
- Tekla
Collaborate with Revit Models

- Architect
- MEP
- Structural
- Owner

Trimble Connect
Estimating & Scheduling Workflow

MEP Engineer

Architect

SketchUp

Structural Engineer

Trimble MEPdesigner

Trimble Connect

GC/CM

VICO Software

Transforming the way the world works.
Field Layout Workflow
How?
Visualisation Tools
Mixed Reality

Overlaying digital information on the physical world in real time.

The Reality Virtuality Continuum

Mixed Reality

Real
World
Unmodelled

Augmented
Reality

Augmented
Virtuality

Virtual
Completely
Modelled

World Partially Modelled
Broader View

Hardware agnostic

One Trimble platform for MR, AR, VR

Transform the way our customers consume, interact, and communicate data
What is HoloLens

Wearable, self-contained computer

Sensors that map the environment

See-through holographic display

Windows 10

Interaction with 3D holograms blended into the real world
Trimble and HoloLens

Partnersed with Microsoft

Proof of concept

Mixed Reality applications
Facility Management

- Critical real-time data
- Remote expert
- Through the wall
- Maintenance history
- Context-driven data
Data in Context
Geospatial - POC

On-site AR viewer

Site planning

Machinery guidance

Structure envelope

Survey stakeout
Why?
Customer Experiences
Multinational engineering firm with 95,000 employees
Fortune 500 company

“Exploring complex structures in a mixed-reality environment has huge potential to accelerate the engineering design process. With this technology we can gain greater clarity earlier in the design review.”
Award winning “Starchitect”
Professor of architecture at UCLA, Yale School of Architecture, Univ. of Applied Arts, Vienna.
Owner of Greg Lynn FORM architectural firm

“Trimble mixed-reality technology and Microsoft HoloLens bring the design to life and bridge the gap between the digital and physical”
Thank you