The Year in INFRASTRUCTURE 2020 Conference

Digital Cities Media Session

Digital Twins Going Mainstream
Introductions

Robert Mankowski
Senior Vice President, Digital Cities
Bentley Systems

Teresa Elliott
Senior Industry Marketing Director, Cities and Water Utilities
Bentley Systems
Introductions

Gregg Herrin
Vice President, Water Infrastructure
Bentley Systems

Jeremy Shaffer
Vice President, Mobility
Bentley Systems
Watch For These Icons

Press Release

Advancement Insights
I know you will have questions!
Let’s Talk About…

• Industry Trends and Key Drivers
• Latest Innovations
• User Successes
• Sessions you Don’t Want to Miss!
Industry Trends and Key Drivers

• Operating During Pandemic
• Change is Constant with Cities
• Investing for New Normal
The World Economic Forum predicts the current 4.2 billion people living in urban areas will increase by 2.5 billion by 2050.
~World Urbanization Prospects: The 2018 Revision
“Nearly 90% of Cities Less Able to Meet Fiscal Needs in 2021”
~National League of Cities
US ~$360b Budget Shortfall over next 2 Years
~ National League of Cities
Technology Helps with Rethinking Processes and Creating Efficiencies
Usual Patterns of Mobility Dramatically Effected
Removing so many cars from the roads has even led to cleaner air, clearer views, and more room for outdoor recreation, even in major cities.

Source: Brookings Metro’s COVID-19 Analysis
COVID-19 recession anticipated to be more severe, recovery slower than initial forecast.

Bluefield projects network modeling software & service spend to reach nearly US$100 million by 2030, with a CAGR of 8.6%.
Going Digital
Digital Advancement from Planning to Performance

Also available in the Press Kit
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- Multi-discipline Collaboration
- Contractual Deliverables Management
- Project Coordination
- Project Insights
- Asset Lifecycle Information Management
- Capital Project Management
• Improving Understanding with Context

• Improving Water System Operations with Digital Twins

• Improving Planning with Digital Twins
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Multi-discipline Collaboration • Contractual Deliverables Management • Project Coordination • Project Insights

Capital Project Management

INFRASTRUCTURE DIGITAL TWINS
Reality Modeling
ContextCapture, Orbit

- Digital Context - B to Z
- Digitally enabled workflows across the portfolio
- Orbit Point Cloud Streaming
- ContextCapture Cloud Processing Shorter Delivery Times for large reality mesh (7 days to 7 hours)
Mobility Simulation and Analysis

- **Streetlytics** - use, condition and characteristics of multimodal transportation
- Solve previously unsolvable problems (transportation planning and operations, air quality and more).
- Extend coverage to Canada roadway segment elevation
Bay Area Air Quality

- Need reliable information on movement of people and goods
- All modes of transportation to model air pollution
- Critical Digital Context to Accurately Model

Data derived to support West Oakland Action Plan
Mobility Simulation and Analysis

- **CUBE** – know the impact before implementation
- Detailed simulation of large cities
- Land Use Transport Integration Model (LUTI)
Geotechnical Information Management

OpenGround® Cloud

- **New** Field-Based OpenGround Data Collector – Field to Office in Minutes.
- Enterprise Cloud Collaboration Platform with Full REST API
- Comprehensive solution for collecting, reporting, managing, visualizing, analyzing, and accessing geotechnical data – Borehole, Lab, CPT and more.

Learn more
### Design
- Mapping and Surveying
- Modeling and Visualization
- Reality Modeling
- Bridge Design
- Building Design
- Communications Network Engineering
- Communication Tower Design
- Electrical Design
- Geotechnical Engineering
- Rail Design
- Road Design
- Site Design
- Steel and Concrete Design and Detailing
- Substation Design
- Tunnel Design
- Utility Network Design

### Simulate
- Bridge Analysis
- Building Energy Analysis
- District Heating Analysis
- Electrical Network Analysis
- Flood Analysis
- Gas Network Pressure Analysis
- Geotechnical Analysis
- Hydraulics Analysis
- Hydrology Analysis
- Mobility Simulation and Analysis
- Pedestrian Simulation and Analysis
- Pipe Stress and Vessel Analysis
- Structural Analysis
- Transportation and Land Use Analysis

### Construct
- 4D Modeling and Scheduling
- Advanced Work Packaging
- Construction Project Management
- Cost Management
- Field Management

### Operate
- Asset Reliability
- Bridge Load Rating and Analysis
- City Digital Twin
- Electric Network Digital Twin
- Geotechnical Information Management
- Machine Learning and Predictive Analytics
- Rail Assurance
- Rail Network Management and Analysis
- Road Network Management and Analysis
- Routing and Permitting
- Water Infrastructure Digital Twins
Water Infrastructure

Digital Twins

WaterSight

• Federate SCADA, GIS, hydraulic modeling, and customer information
• Real-time access to critical system and individual asset performance information
• Share current network performance, expected consequences and improvement for actions
• Water service interruptions fell by 22.9%
• Service connections improved by 8.3% and 45.5%, respectively
• Volume of non-revenue water dropped by 3.5%
Águas do Porto

- Water service interruptions fell by 22.9%
- Service connections improved by 8.3% and 45.5%, respectively
- Volume of non-revenue water dropped by 3.5%

Pedro Vieira
Information and Innovation Systems Director, Águas do Porto

TWINTALKS DIGITAL CITIES | LIVE NOV 5, 10 AM EST
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Multi-discipline Collaboration • Contractual Deliverables Management • Project Coordination • Project Insights • Asset Lifecycle Information Management

Capital Project Management
City Digital Twins

OpenCities Planner

- Cities, campuses and supply chain
- Automate citizen engagement for urban planning and project development
- Improve access to real-time operational data

Learn more
Dublin, Ireland

- Improve planning & project engagement
- Virtual town hall meetings and public feedback on proposals
- Start small, prove, then scale
- Collaborative partnership with Murphy Surveys, Microsoft, and Bentley
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**Multi-discipline Collaboration** • **Contractual Deliverables Management** • **Project Coordination** • **Project Insights** • **Asset Lifecycle Information Management**

**Capital Project Management**
Royal Holloway, University of London

- Digital Twin of Above and Below Ground
- Improves Stakeholder Collaboration and Reduces Costs

Landscape Engineering
Mobility Innovation District (MIND)

- Pioneers Multi-modal Mobility Simulation to Inform Master Planning
- Creating New Conversations Technology Providers, Mobility Operators, and Architects

Systematica S.r.l.
YII Awards Finalists

*Digital Cities*

- **Skanska-Costain-STRABAG Joint Venture**
  Revolutionise AECOO via GeoBIM

- **City of Helsinki, Finland**
  Digital City Synergy

- **Systematica S.r.l.**
  Milano Innovation District (MIND)

[Digital Cities – Finalist Presentations]
YII Awards Finalists

*Reality Modeling*

- **Khatib & Alami**
  3D Reality Model for Military

- **AUAV**
  Warragamba Pipeline Digital Twin

- **Merius Oy**
  Merius Smart Mill
YII Awards Finalists

*Water, Wastewater and Stormwater Networks*

- **DTK Hydronet Solutions**
  Digital Water Network Engineering & Asset Management of Dibrugarh Water

- **Companhia de Saneamento Básico do Estado de São Paulo - Unidade de Negócio Centro**
  Operational Restructuring Project of Cursino Water Supply System in São Paulo City

- **NJS Engineers India P Limited**
  JICA Assisted Guwahati Water Supply Project
YII Awards Finalists

**Water/Wastewater Treatment**

- **AECOM/Wessex Water**
  Durleigh WTC Reconstruction

- **PowerChina ZhongNan Engineering Corporation Limited**
  Research on the Deep Application of BIM and Digital Twin Technology of Water Delivery Project Based on Bentley

- **Hatch**
  Ashbridges Bay Treatment Plant Outfall

*Water and Wastewater Treatment – Finalist Presentations*
Key Reference Materials

- Update Report
- Advancement Insights
- LandScope Engineering Creates Digital Twin Providing a Single View of All Survey Data for Royal Holloway, University of London to Improve Collaboration and Reduce Costs
- Mobility Innovation District (MIND) Pioneers Multi-modal Mobility Simulation to Inform Master Planning
- Other Content
- Going Digital Videos

Find this and much more in the YII Virtual Press Kit
If you want to attend another Industry Press Briefing session, they are available on-demand.
Key Takeaways

- Continue to Deliver Safe, Resilient, and Reliable Infrastructure
- Digital Advancement Necessary
- Understanding Context is Everything
- Improving Water System Operations with Digital Twins
- Improving Planning with Digital Twins
THANK YOU!
Going Digital

*Digital Advancement from Planning to Performance*

bentley.com/going-digital-rail
bentley.com/going-digital-roads
bentley.com/going-digital-cities