Bentley®
Advancing Infrastructure

Reality Modeling for Smarter Cities

Ahmed Taha,
Application Engineer, Bentley Systems

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Smart City

- One way to tackle the problem is to create intelligent cities from the get-go As done with **Masdar in Abu Dhabi.**

  This is a visionary city that sets out to showcase

  what planning in an integrated fashion can achieve.

- How about old cities with existing infrastructure ?
- First step is to as built models for this cities, where Reality modelling comes into the picture.

Most cities are developed incrementally – and this is where the biggest challenges lie.

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Sustaining Infrastructure

News Release
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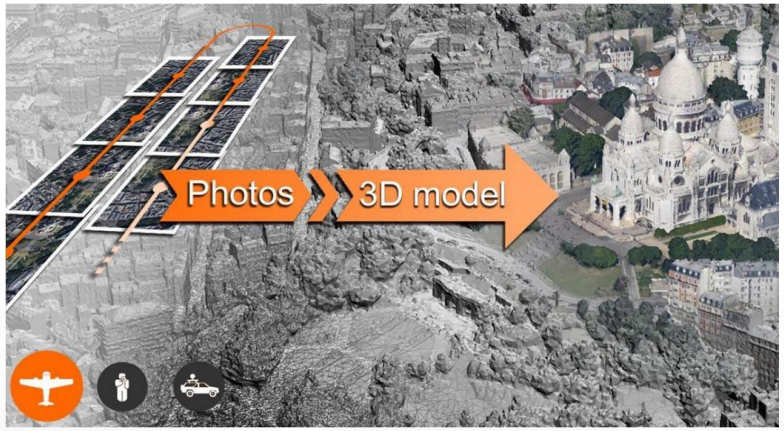
Bentley Acquires Acute3D to Advance *Reality Modeling*

To Align Design Modeling *and* Construction Modeling *with Existing Conditions' Context –for Every Infrastructure Project and Asset*

EXTON, Pa., U.S.A. – Feb. XX, 2015 – Bentley Systems, Incorporated, the leading company dedicated to providing comprehensive software solutions for *sustaining infrastructure*, today announced that it has acquired France-based Acute3D, provider of *Smart3DCapture* software for *reality modeling*. Through *reality modeling*, observations of existing conditions are processed into representations for contextual alignment within environments for *design modeling* and *construction modeling*. Rapid technology advancements in scanning and photography—and especially the burgeoning application of unmanned aerial vehicles (UAVs) for these purposes—are making the capture of such observations broadly affordable in sustaining infrastructure.

Acute3D empowers users to automatically generate high-resolution 3D mesh models from ordinary photographs taken with off-the-shelf digital cameras, but also can work with purpose-built specialty cameras. The cameras provide high-resolution color information that Acute3D automatically maps to the reconstructed mesh geometry to



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Solutions Products Services Subs

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Bentley Systems Introduces LumenRT CONNECT Edition Subscription

September 16, 2015

Empowering Infrastructure Professionals to Develop 'Environmentally Enlivened' Designs While Streamlining Their Ability to Communicate Winning Design Stories to All Stakeholders

PITTSBURGH, Pa., U.S.A. – 57th Annual IHEEP Conference – Bentley Systems, Incorporated, a leading global provider of comprehensive software solutions for *sustaining infrastructure*, today introduced its new *LumenRT CONNECT Edition* subscription. With this innovative offering, infrastructure professionals need no longer become computer graphics experts to integrate life-like digital nature into their simulated infrastructure designs and create high-impact visuals for stakeholders. Bentley users engaged in the capture of existing conditions to provide context for their designs can further benefit from *reality modeling* "enlivened" with digital nature. The new subscription includes Bentley's *LumenRT* software plus Azure-cloud access to rich content libraries containing plants, trees, people, vehicles, architectural objects, civil engineering elements, and more.

LumenRT empowers visual optioneering by providing "live," real-time immersive interaction, animating infrastructure environments with traffic simulations, active characters, wind-swept plants, seasonal trees, rolling clouds, and rippling water. Through the "cinematic" quality of *LumenRT* scenes and the software's intuitive, hands-on interface, every infrastructure professional can readily envision his or her proposed design alternatives as they would be experienced in actual operation.

LumenRT also lets infrastructure professionals quickly create photographic images, high definition videos, and real-time immersive presentations of architecture, landscape, urban, and infrastructure designs created with all versions of *MicroStation*, including V8*i* SELECTseries and *CONNECT Edition*. Additionally, *LumenRT* supports other leading CAD/BIM/GIS systems and 3D formats. *LumenRT*'s engaging and compelling productions enable clients and other project stakeholders to experience design work in a natural world environment.

Through the new *LumenRT CONNECT Edition* subscription, users can:

- enhance designs with rich, fully animated environmental elements,
- easily generate attention-grabbing, cinematic-quality images and videos,
- share interactive immersive 3D presentations with any stakeholder using *LumenRT* LiveCubes,
- leverage Bentley's *ProjectWise Catalog Services CONNECT Edition* to select, regularly extend, and share their preferred libraries of natural and engineered digital content (forthcoming).

David Burdick, Bentley industry executive, visualization, said, "When used with Bentley's innovative infrastructure solutions, our new *LumenRT CONNECT Edition* subscription gives architects, engineers, and other infrastructure professionals the ability to craft more environmentally-coherent designs. It also provides them with easy-to-use tools to effectively and efficiently communicate those designs to all stakeholders, increasing their chances of garnering buy-in. With this inexpensive and easily accessible subscription, *every* engineer can improve, present, and share his or her work."

"Enlivened" Reality Modeling

...with Bentley's *Acute3D* context capture software, the new *LumenRT CONNECT*

Real-Time Rendering technology

Bentley

ContextCapture | From Sites to Smart Cities

- Automatically produces a 3D ‘reality mesh’ from photographs–intrinsically in the same geometric idiom as engineering models, readily aligning the real-world context.

- Existing conditions are considered throughout the architecture, engineering, construction, and operations of any infrastructure asset

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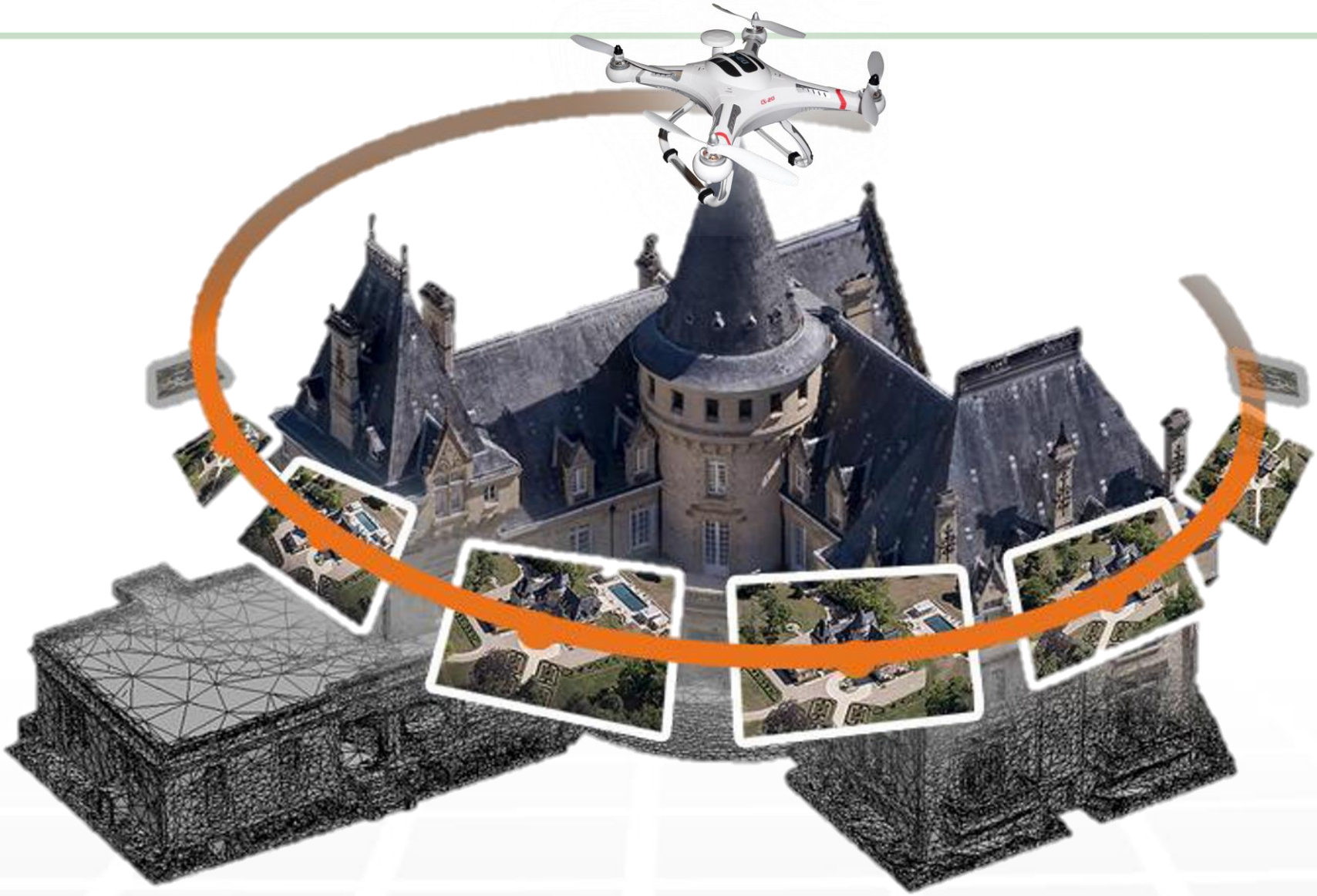
Capture the reality…



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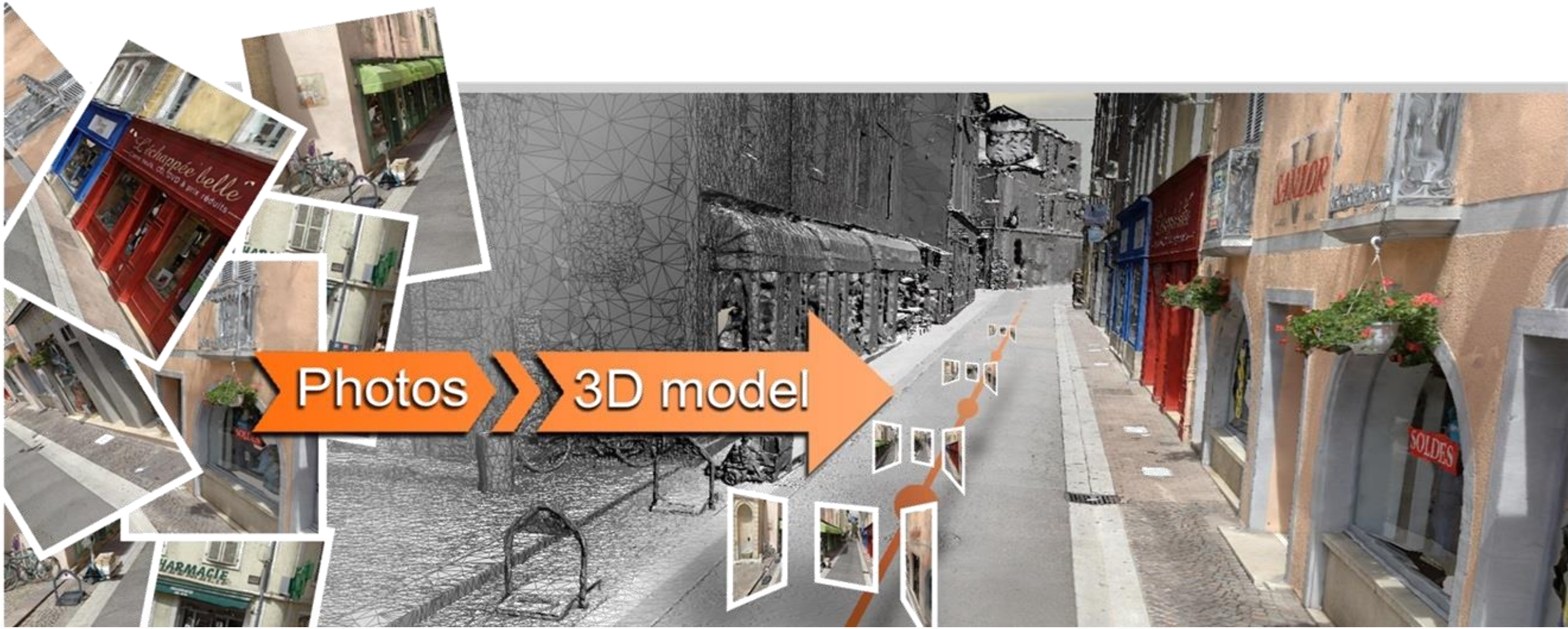
Street level



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Uses: Survey any site with Change Monitoring

Full Job Execution Time *3 Hours*

Flying time 1 hour

Model Rendering time 2 Hours

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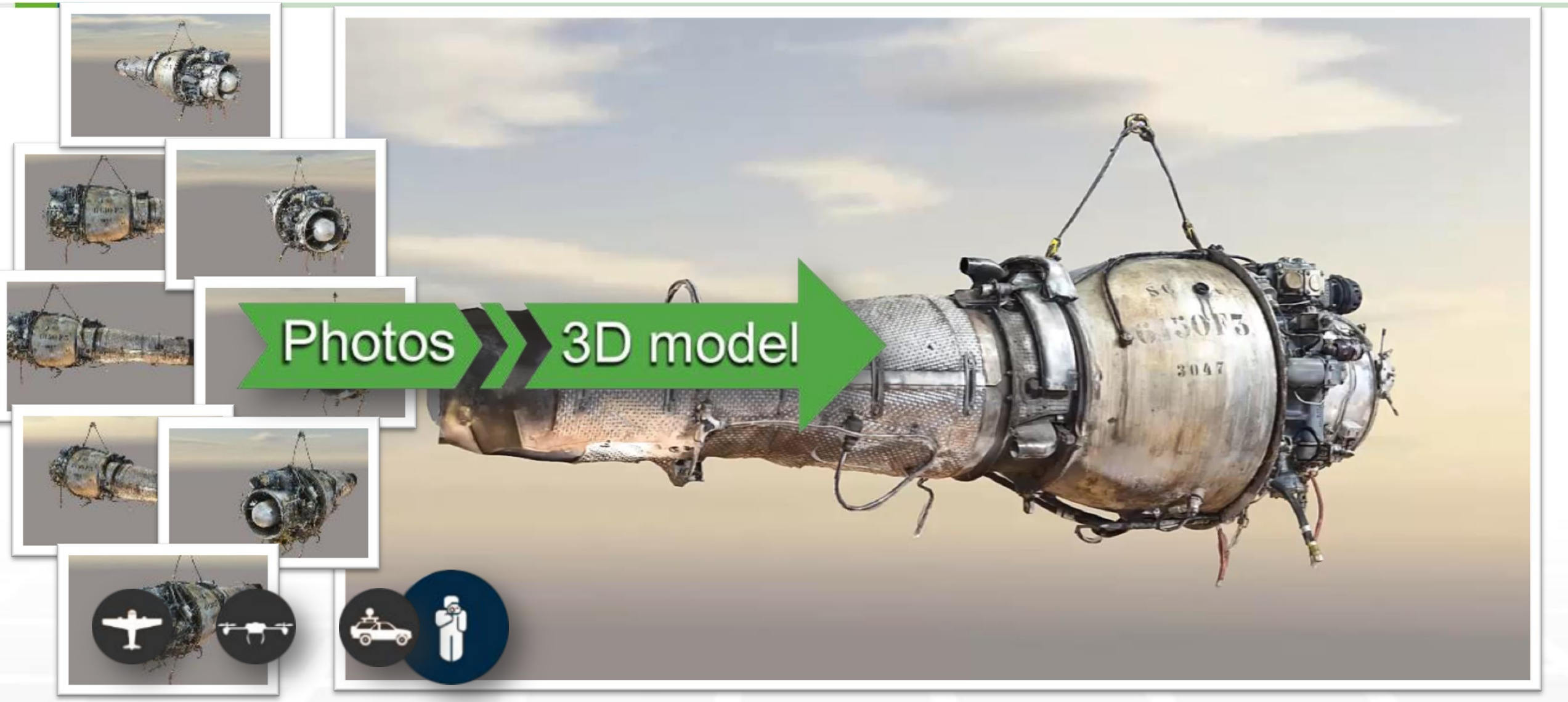
Uses: From equipment…



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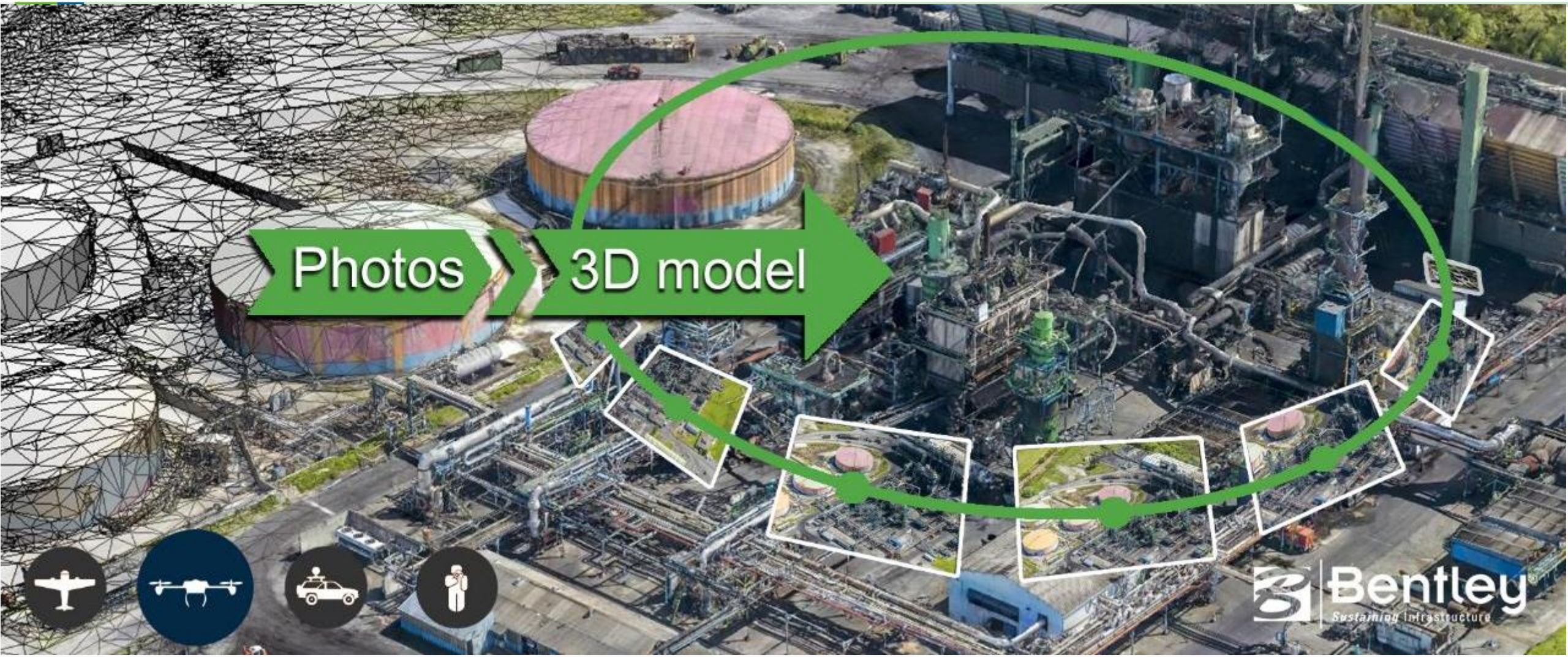
Uses: to sites…



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Information Mobility

3D Mesh / point cloud

CAD

BIM?

GIS / 3D Maps

3D Mesh / Orthophoto / DSM

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City Modeling

Sakae district, Nagoya, Japan

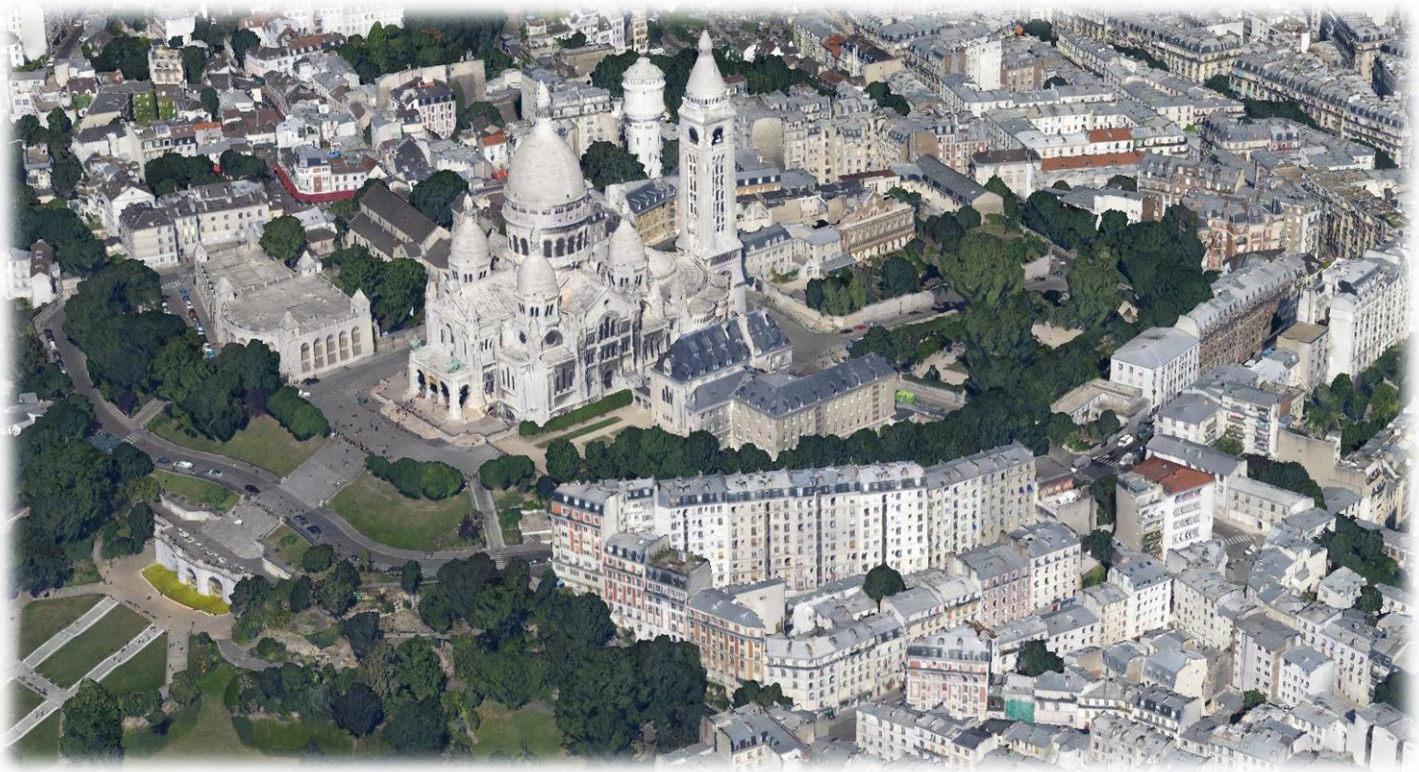
Dataset : 552 21Mpix aerial vertical and oblique photographs
Computation : 20 hours on 3 computers
Area : 0.5 km2
Resolution: 5 cm / pixel
Output: 3D DSM

Paris (subset), France

Dataset : 8000 aerial vertical (210Mpix) and oblique (80Mpix) photographs
Computation : 4 days on 10 computers
Area : 100 km2
Resolution: 7-8 cm / pixel
Output: 3D DSM

Marseille, France

Dataset : 15470 aerial vertical (210Mpix) and oblique (80Mpix) photographs
Computation : 12 days on 10 computers
Area : 200 km2
Resolution: 5-7 cm / pixel
Output: 3D DSM



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Urban Planning | Aligning Conceptual Design With Reality

City of Stockholm

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ContextCapture for Transportation

Automatic 3D model of a complex road network (Asia Air Survey)

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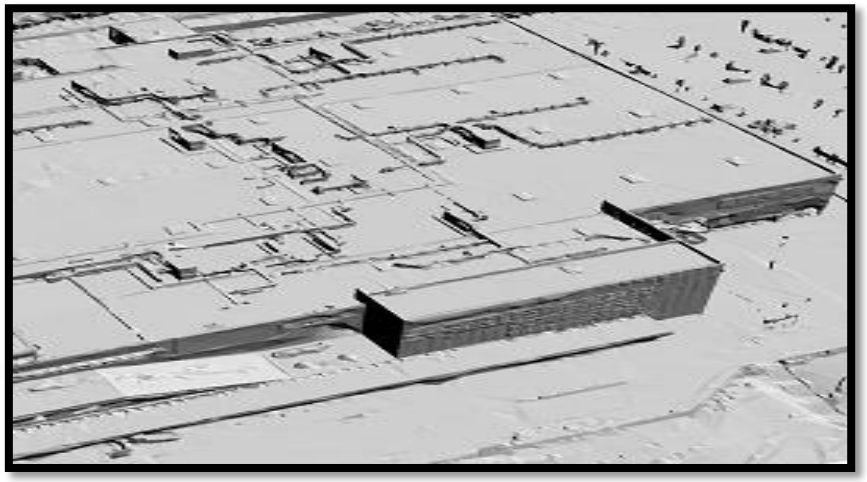
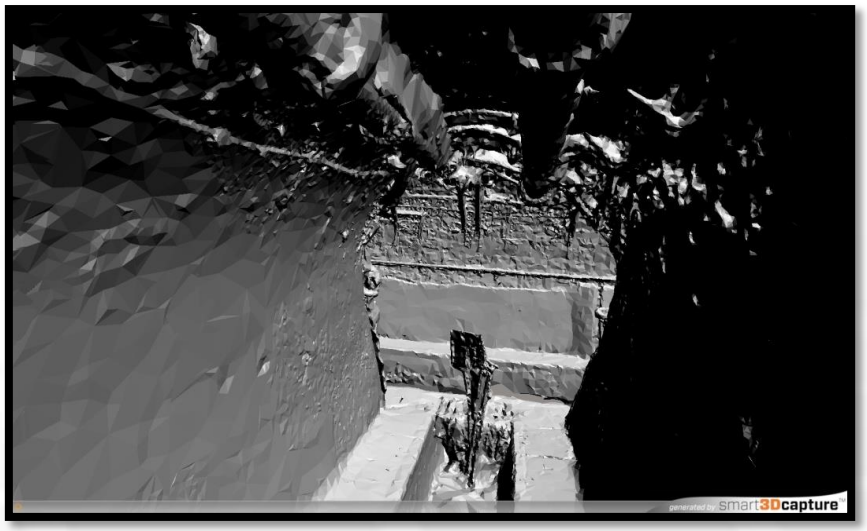
Surveying | Building Conditions, Roof Structures, Sewer





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Reality Modeling for the Philadelphia Papal Visit

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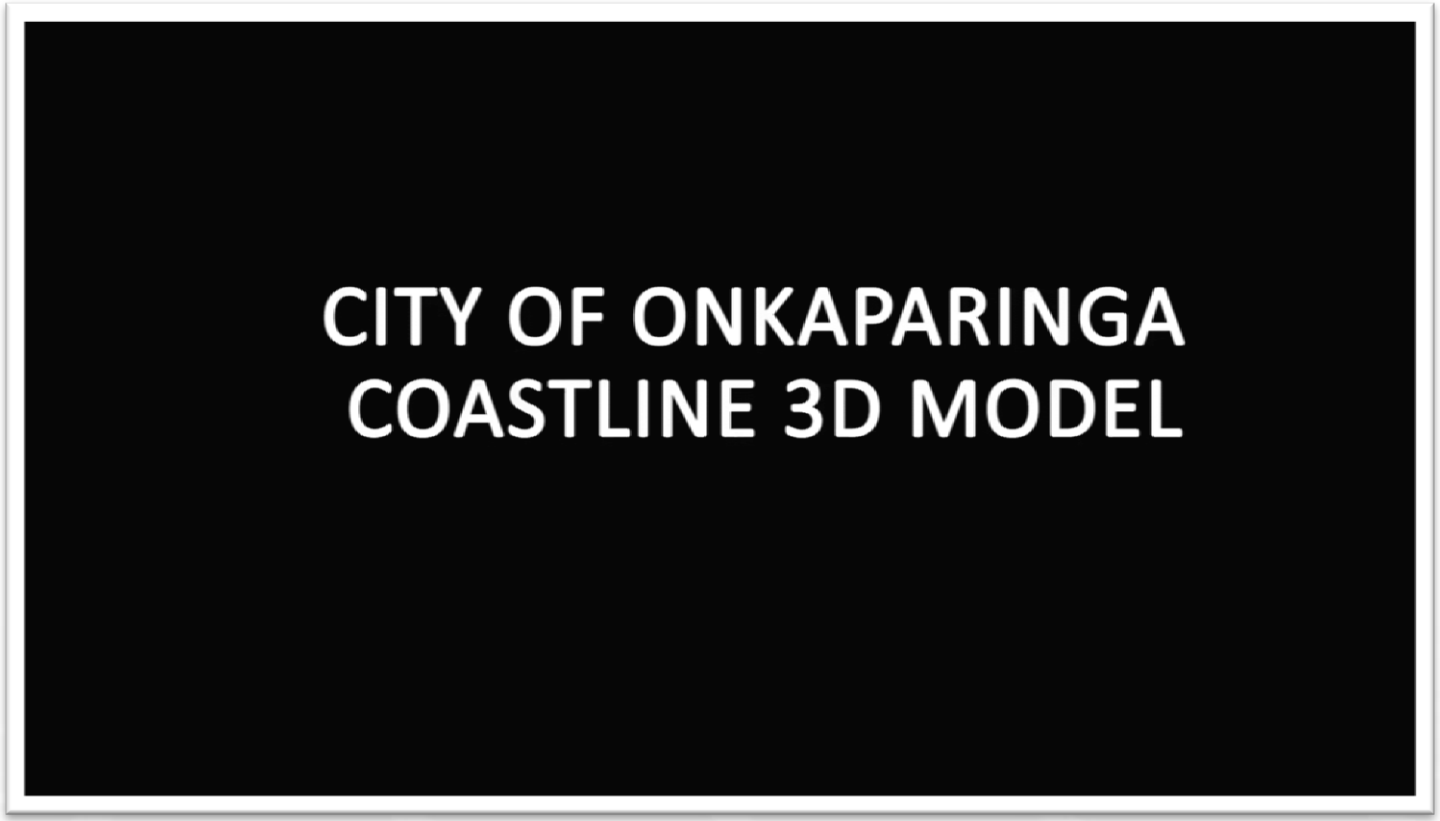
City of Onkaparinga, Australia

- **Problem:** Major coastal erosion causing safety concerns for the 164 thousand citizens of the local authority

- **Outcomes**:
  - 30 KM of coastline modeled in high-definition
  - 25,000 oblique photographs and 125 ground-control points meshed for the model
  - Change management analysis to monitor the worsening conditions

- **Playbook:** ContextCapture



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Thank you

- For more information, please visit:

  www.Bentley.com/contextcapture

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