Reality Modeling with ContextCapture

Tom Brown - Bentley Systems
Agenda

• Introduction
• Why Reality Modelling
• Military Applications
• Some examples
Bentley’s mission is to provide innovative software and services for the enterprises and professionals who design, build, and operate the world’s infrastructure – sustaining the global economy and environment for improved quality of life.
Why Reality Modeling?
Why Reality Modeling?

• Reality Modeling: Processing images of the physical environment into 3D representations to provide current context within *geospatial modeling* environments

  – No need to start from a blank canvas
  – Using the *reality* as *context* to support decision making
  – New source for improving spatial analysis and model creation
From equipment…
... to sites...
…to streets…
…to cities!

Photos  ➜  3D model
ContextCapture | From Sites to Cities

• Automatically produces a 3D ‘reality mesh’ from photographs—engineering-quality models that capture real-world context

• Existing conditions modeled in real-time, to support a variety of mission sets
What is a reality mesh?

- A 3D surface model created from photographs
- Georeferenced
- Accurate
- Realistic
- Interactive
Outputs

• 4 core outputs:
  – The 3D model – known as a 3D Mesh Model or a Reality Model
  – TrueOrtho Imagery – fully corrected overhead imagery
  – DSM – Digital Surface Model – essentially the 3D Model as a wireframe without the textures
  – Point cloud data
Models Generated in Operational Environment

Imagery import

Operator(s)

Job queue

Automated processing

Textured 3D model

OBJ Import

OBJ Export

3D geometry & texture editing

THIRD PARTY SOFTWARE

Scalable & Fast Processing of Data
Reality Modeling for Defense
Applications of reality models

Detailed Modeling - fixed structures and terrain

Physical change over time – landslip, mudslides, flooding, structural collapse

Visualize dynamic environmental conditions — time of day, seasons, vegetation, people, vehicles, etc.
Representative data is more useful than historical…
Areas for consideration in Defense

• Geolnt – putting true 3D into the Intelligence cycle
  – Take into full account the impact of vegetation, lines of sight and terrain complexity

• Mission Planning & Rehearsals
  – Possible scenarios supported include garrison/range modeling, disaster response, engineer and route reconnaissance, BDA, C-IED, post-blast forensics, urban mapping and major event planning

• Change detection – enhance C-IED, BDA, force protection, MSR maintenance

• Rapid Mapping

• Enhancing UAV capabilities and use

• EOD multi-mission (route recon, post-blast analysis, munition/IED forensics)
Terrain Modeling
Road Corridor
Change Analysis
Incorporating engineering data
Model Demonstrations
Extracting DEMs
Models from Video

Video from Smart Phone
Summary

Three key messages about ContextCapture

1. Speed
   • Clustering and automated processing enables rapid response

2. Comprehensiveness
   • If the object is photographed and stationary it can be modelled

3. Accuracy
   • Better than 50mm accuracy from aerial based systems
Questions
Thank you!