ADVANCING REALITY MODELING WITH CONTEXTCAPTURE

Knowing the existing conditions of a project is a key asset in any decision process. Governments need to better know their territories, through mapping operations, infrastructure owners want to survey and inspect their assets, project delivery companies have to plan and monitor their actions and report to their customers. Being able to quickly reconstruct a 3D model accurately representing the existing conditions proves every day to be increasingly critical.

Much cheaper and more versatile than laser scanners or depth field cameras, ContextCapture automatically turns simple photos into accurate 3D models. Suited and optimized for surveying, mapping and inspection tasks at any scale, from objects to cities, and at any levels of detail, ContextCapture is the best-in-class solution for the reconstruction of existing conditions of infrastructure and assets.

Developed for 15 years at two major European research institutes, ContextCapture (formerly called Smart3DCapture) is a software solution for automatic high resolution 3D reconstruction from photographs, based on the highest-performance photogrammetry, computer vision and computational geometry algorithms. ContextCapture takes as input a series of digital photographs of a static scene acquired from distinct viewpoints, and automatically turns this dataset into a high resolution and textured manifold triangular mesh that can be exported in various 3D formats.

VALUE PROPOSITION

- No need for any expensive acquisition devices operated by trained users, any cameras suffice.
- From simple objects to entire cities with the same solution. Renders the finest details thanks to a unique technology.
- No human intervention is required.

SOLUTION POSITIONING

- MAPPING
  - 3D Cities
  - 3D Territories
  - 3D Cadastre
  - True orthophotos
  - 2.5D DSM
- SURVEYING
  - Automatic modelling of existing conditions
  - Volume measurement for excavation work
- INSPECTION
  - 3D Inspection of assets conditions
  - Change detection on asset
**CONTEXTCAPTURE** is limited to a single PC and can process up to 30 Gpix / project when **CONTEXTCAPTURE CENTER** is not limited and supports multiple Engines on a cluster.

**MINIMUM CONTEXTCAPTURE CENTER CONFIGURATION = 1 Master + 1 Engine**

**HOW DOES IT WORK?**

- **Photographs** [+metadata if available]
- **3D Mesh** [3MX / OBJ / Collada…]
- **Point Cloud** [POD/LAS]
- **GIS**
- **CAD**
- **WEB DIFFUSION**
- **RECOMMENDED HARDWARE CONFIGURATION:**
  - I7 CPU / 16-64GB or RAM / GPU NVIDIA GeForce GTX 980 Titan or equivalent / Windows OS

**MODULAR SOFTWARE ARCHITECTURE**

**FLEXIBLE**

**COST EFFECTIVE**

**MICROSTATION READY**

**AVERAGE PROCESSING SPEED:**

15 Gpix / day / Engine

**AVERAGE PRECISION = 1-2 PIXELS**
### PRODUCT DATA SHEET

#### USER INTERFACE

- Project steps completion indicator.
- 3D Mesh visualization.
- Project tree.

#### PACKAGING

### CONTEXT CAPTURE | CONTEXT CAPTURE CENTER
---|---
Windows version | ✓ | ✓
Imagery (JPEG / RAW / TIFF) dataset import limitation / project (in Gpix) | 30 | No limit
Mesh export formats (3MX / OBJ / FBX / KML / Collada / STL / OSGB) | ✓ | ✓
Colored point cloud export (POD / LAS) | ✓ | ✓
True Orthophoto + 2.5D DSM (TIFF/GEOTIFF) | ✓ | ✓
Georeferencing | ✓ | ✓
Parallel (cluster) processing for unlimited scalability | | ✓
SDK | | ✓
Modularity (Master + Engine architecture) | | ✓
USE CASES

CITY MAPPING

STOCKHOLM – by BLOM
Area: 500 sq-km (~100,000 photos)
Resolution: 7-8 cm per pixel
Solution: ContextCapture Center with 4 Engines (3 months)
Deliverable: Georeferenced Textured 3D mesh + True orthophotos

GAS PLANT – by GERPHO
#Photos: 180 (36MPix)
Area: 1 ha
Resolution: 2-3 cm per pixel
Solution: 1 Engine (2 hours)
Deliverable: Georeferenced Textured 3D mesh

STREET MAPPING

CHINA STREET (400m) – by IFA Tech
Photos: 1500 (21MPix)
Resolution: 1-2 cm per pixel
Solution: ContextCapture Center with 3 Engines (3 days)
Deliverable: Georeferenced Textured 3D mesh

INSPECTION

BRIDGE – by Diades
#Photos: 1500 (36MPix)
Resolution: 0.2-0.5 cm per pixel
Solution: 2 Engines (3 days)
Deliverable: Georeferenced Textured 3D mesh

MONITORING

STOCKPILE VOLUME
Photos: 80 (21MPix)
Area: 2,000 sq-m
Resolution: 5 cm per pixel
Solution: ContextCapture (1 Engine)
Deliverable: 3D mesh + Volume
**CONTEXT CAPTURE MASTER**

The ContextCapture Master is the master module of ContextCapture. Through a graphical user interface, it allows you to: import the data sets, define the processing settings, submit and monitor tasks, visualize results, etc. The Master does not perform the processing tasks. Instead, it decomposes tasks into elementary jobs which it submits to a job queue. ContextCapture Master's main interface manages the different steps of the ContextCapture workflow through a project.

**CONTEXT CAPTURE ENGINE**

ContextCapture Engine is the worker module of ContextCapture. It runs on a computer in the background, without user interaction. When it is not busy, the Engine takes a pending job in the queue, depending on its priority and date of submission, and executes it. A job usually consists of an aerotriangulation or 3D reconstruction process, using various computationally intensive algorithms (keypoint extraction, automatic tie point matching, bundle adjustment, dense image matching, robust 3D reconstruction, seamless texture mapping, texture atlas packing, level-of-detail generation, etc). ContextCapture Engine makes an extensive use of general-purpose computation on graphics processing units (GPGPU). Each Engine can exploit a single GPU.

**ACUTE3D VIEWER**

Acute3D Viewer is a free lightweight visualization module. It is optimized for Acute3D 's native format, which handles level-of-detail, paging and streaming, thus allowing visualization of terabytes of 3D data, locally or online, with a smooth frame rate. Acute3D Viewer can also read models in OBJ, PLY and OSGB format, record fly-through to generate animations and select tiles. It can also be used in conjunction with ContextCapture Master to control production quality all along the workflow.

**ACUTE3D WEB VIEWER**

ContextCapture solutions can now produce in 3MX format, a proprietary format based on a WebGL compliant structure, that can be easily published on the web and visualized with a mere browser on any platform: PC, Mac, smartphones & tablets.
“The ContextCapture Technology automatically produces extremely precise 3D models that render the finest details of any existing conditions, saving a lot of infographics work. The end result, photorealistic in essence, is simply stunning!”

Julien Roger, CEO of on situ

FOR MORE INFORMATION ON CONTEXTCAPTURE:
Please visit WWW.ACUTE3D.COM or contact your nearest Bentley Systems Office or local Partner.