

Automated processing for 3D Mosaic generation,  
a change of paradigm

FIG2014 Conference

Frank Bignone



## Contents

- Introduction of 3D Database
- Street Factory™ Processing Flow
- 3D Mosaic applications
- Conclusion



# Introduction for 3D Database



## What are we looking for?

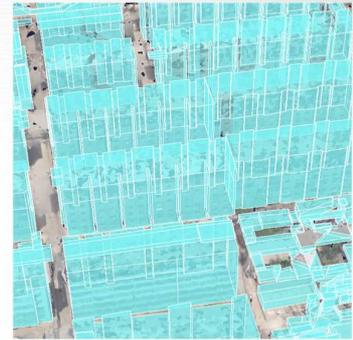


# Classification of 3D Database

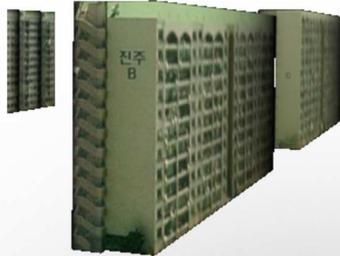
- From LOD-0 to LOD-4
- Depending on geometry, texture, complexity, and metadata information
- Our interest is for LOD-3 data type
  - High level geometry and complexity
  - Real 3D
  - Real texture



LOD-0



LOD-1



LOD-2



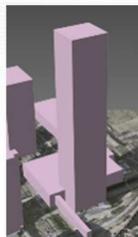
LOD-3

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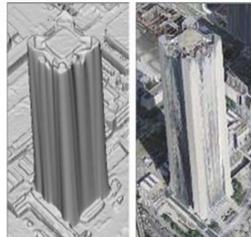


# Available 3D reconstruction technologies

**Block building**



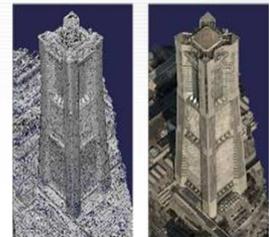
**Nadir building**



**CG modeling**



**3D Mosaic**

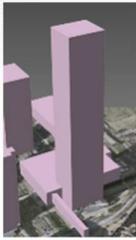
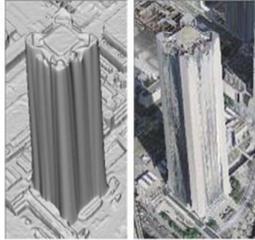
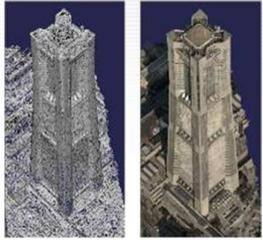


	Block building	Nadir building	CG modeling	3D Mosaic
<b>Reality</b>	Not good Cubic shape	Normal Detailed ground & roof	Good Realistic models only done manually	Excellent Realistic thanks to high density 3D TIN
<b>Data size</b>	Not large Ground and cubic model only	Large Need a lot of NADIR image	Large CG building with pseudo – real texture	Quite Large Need a lot of multi-view images
<b>Automation</b>	Normal Needs 2D footprints	Good Almost automatic	Not Good Ground is same as previous but many building manually extracted	Good Fully automated
<b>Methodology</b>	Stereo Plotting, LIDAR, DSM LPS, SUMMIT, etc	Nadir image matching, Bundle, DSM PIXELFACTORY, LPS etc.	CG manual labor Pseudo texture 3DSMAX, etc.	Multi-views image matching Bundle, Dense TIN STREETFACTORY, etc.

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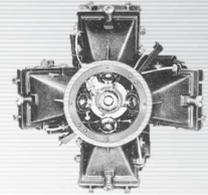
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## Example of real production



# Possible from all those sensors



- Many oblique camera systems available
  - Pictometry
  - TrackAir Midas
  - IGI-DigiCam
  - GeoVision SWDC-5
  - Leica RCD30 Oblique
  - TopRS Oblique
  - Vexcel Oblique UCO
  - A3 VisionMap
  - Helicopter
  - Classic frame camera
  - UAV camera



- And also ground systems
  - LadyBug
  - In-house MMS...

- And also possible for very high resolution satellite systems

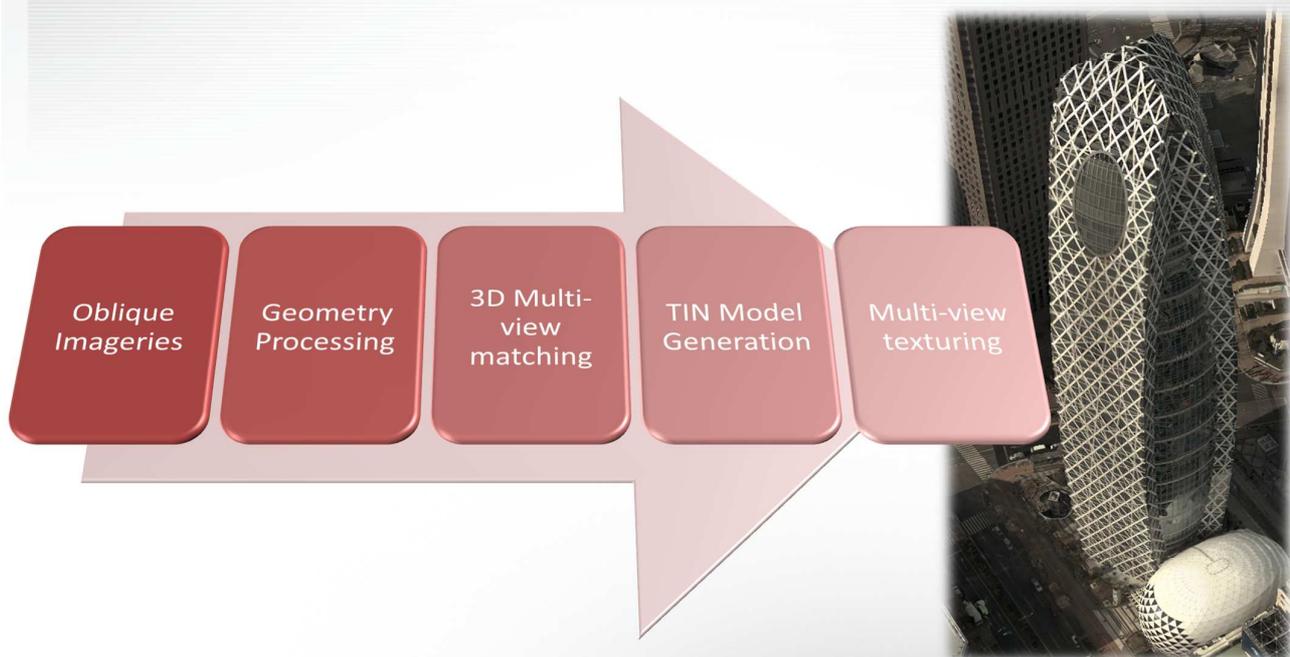


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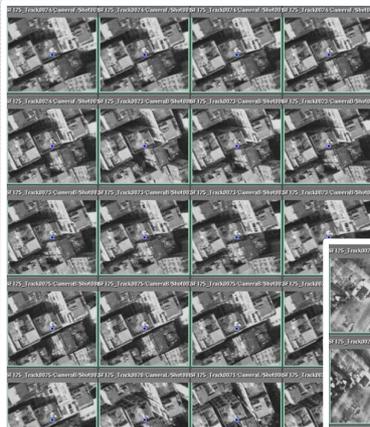
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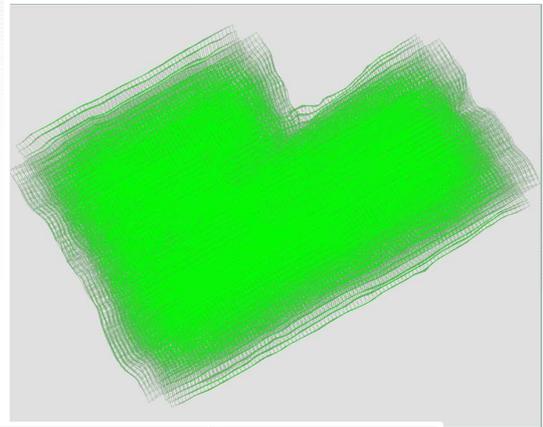
# Typical Processing Workflow



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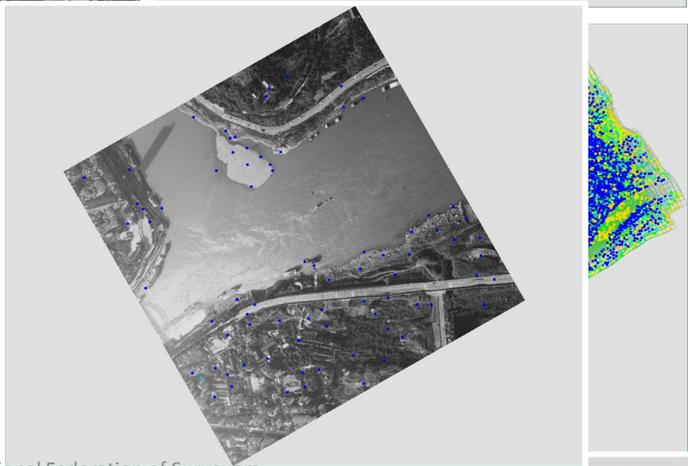
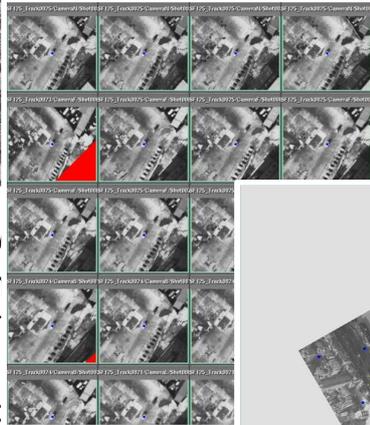


hundreds of



EXAMPLE OVER

- Sichuan Prov
- Done by Sich Institute usir solution
- 20,000+ Leic
- over 80+ km<sup>2</sup>



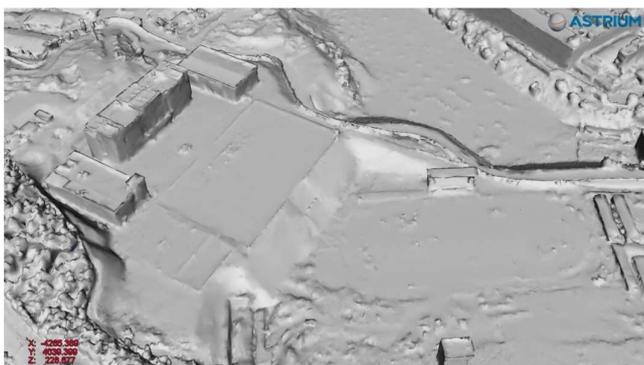
- Accuracy of few centimete

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## Resulting 3D automated reconstruction

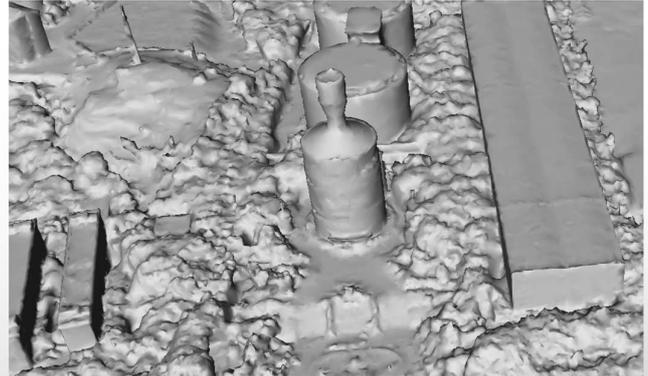
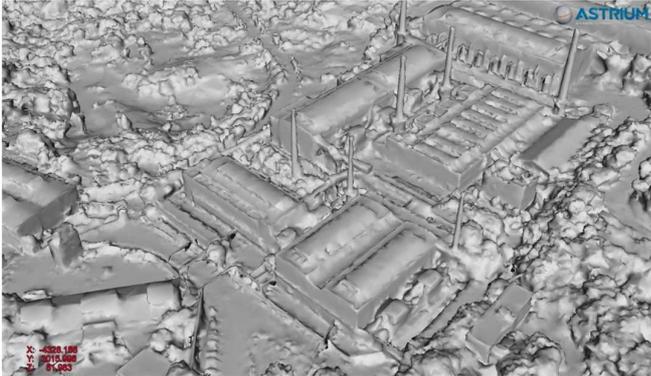


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# Resulting 3D automated reconstruction



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# Strengths

- Street Factory™ brings

- Photogrammetry accuracy
- Multi-sensors geometry
- Mapping multi-products
- Professional applications integration
- Large projects performance



- Unique solution for accurate professional full 3D / classic mapping with high performance

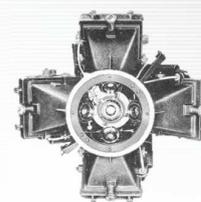


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# Turn-key available solution

- Camera-vendor partnership and support
  - Multiple cameras
  - Airborne / MMS / UAV / Handheld support
- All interfaced with Street Factory™ processing solutions
  - Generic camera support system
  - Native ground – airborne support
  - Photogrammetric mapping
- Dissemination for multiple applications
  - Web-mapping and streaming
  - Media presentation
  - Building models (BIM market)



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# 3DMosaic™ applications

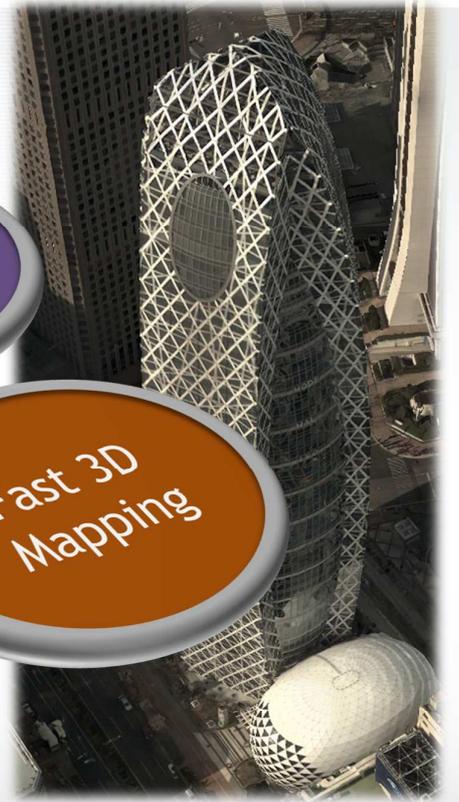
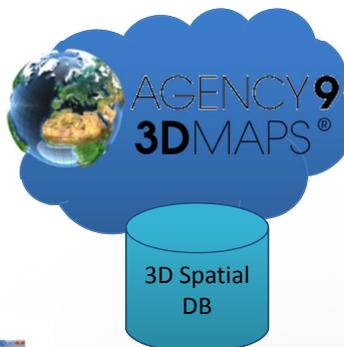


Image courtesy Pasco Corporation

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# 3DMosaic™ web-applications

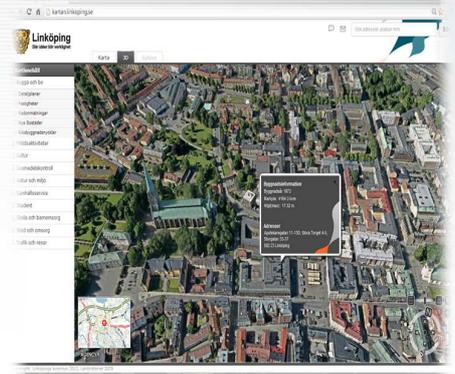


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# 3<sup>rd</sup> Party Integration

- Web Mapping
  - Agency9 SDK for web applications
  - For Street Factory™ solution
  - Distribution rights & integration services over China
- Multiple 3<sup>rd</sup> party native integration
  - GIS, Online...



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## Summary

- Possible now to compute fully automatically 3D database aka 3D Mosaic
  - Allowing more than only viewing capabilities
  - Used already in numerous 3D GIS
  - Offering new applications development and support of existing mapping applications
- 3DMosaic™ brings a new era in 3D mapping products with high accuracy
  - Consistent XYZ accuracy in all points thanks to Street Factory™ processing
  - Real texture for all points
  - Quick processing (between 1-3h per km<sup>2</sup>)
- Street Factory™ is the only photogrammetric solution for 3DMosaic™ database
  - Based on latest technology and research
  - Already used by many national / provincial mapping agencies and large private mapping companies
  - Benefit from Pixel Factory™ shared research and development
  - Supporting all sensors available to customers



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Thanks you

