Kákonyi Gábor | Trimble UAS Master

GISOPEN 2016

Jó minőségű ortofotó, pontfelhő, könnyen UAS képekből

Summary

- Photogrammetry is complicated?
- Photogrammetry everywhere
- Photogrammetry in Trimble
- Why using a UAS
- Why processing with UASMaster, Workflows

◈ Trimble.

Photogrammetry was complicated!

Trimble Photogrammetry

- The application defines the best suited acquisition method and processing routines
  - Data availability, time for preparation, processing, scale, precision, area size

Inpho

UASMaster

TBC PM

Trimble.

What can I expect?

Imagery with a ground sample distance of up to 1cm / 0.4"

UASMaster capabilities:
- Positional accuracy up to 1 pixel (~1cm/0.4")
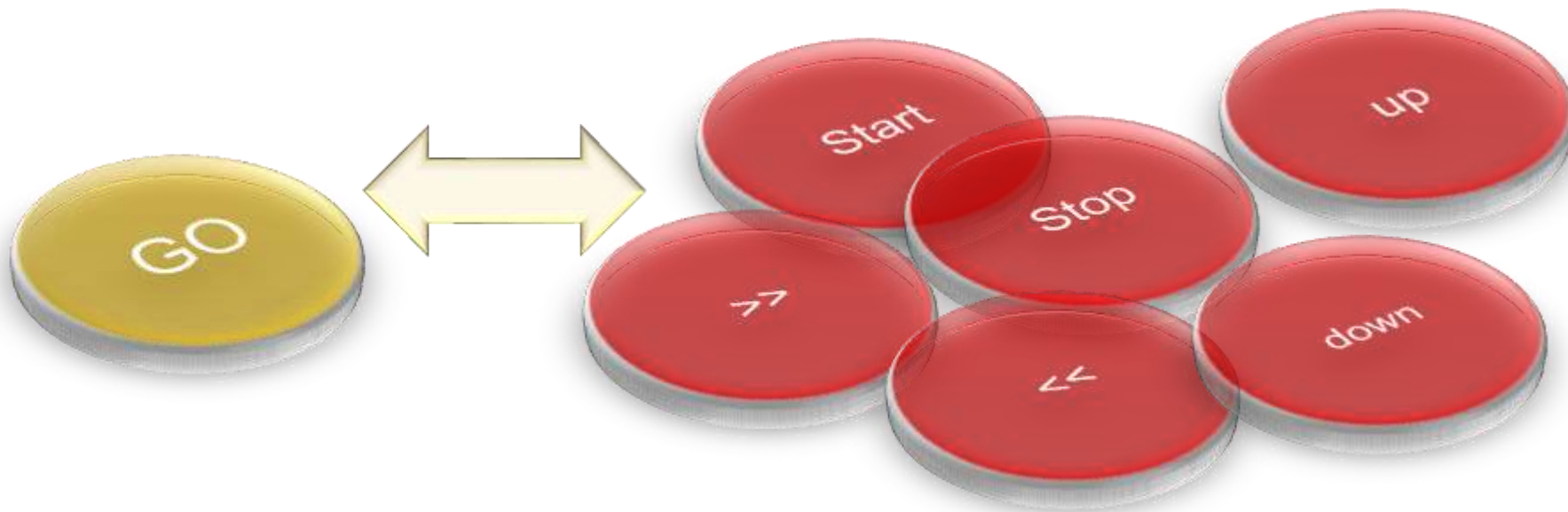- Vertical accuracy up to 1,5 pixel (~2cm/0.8")
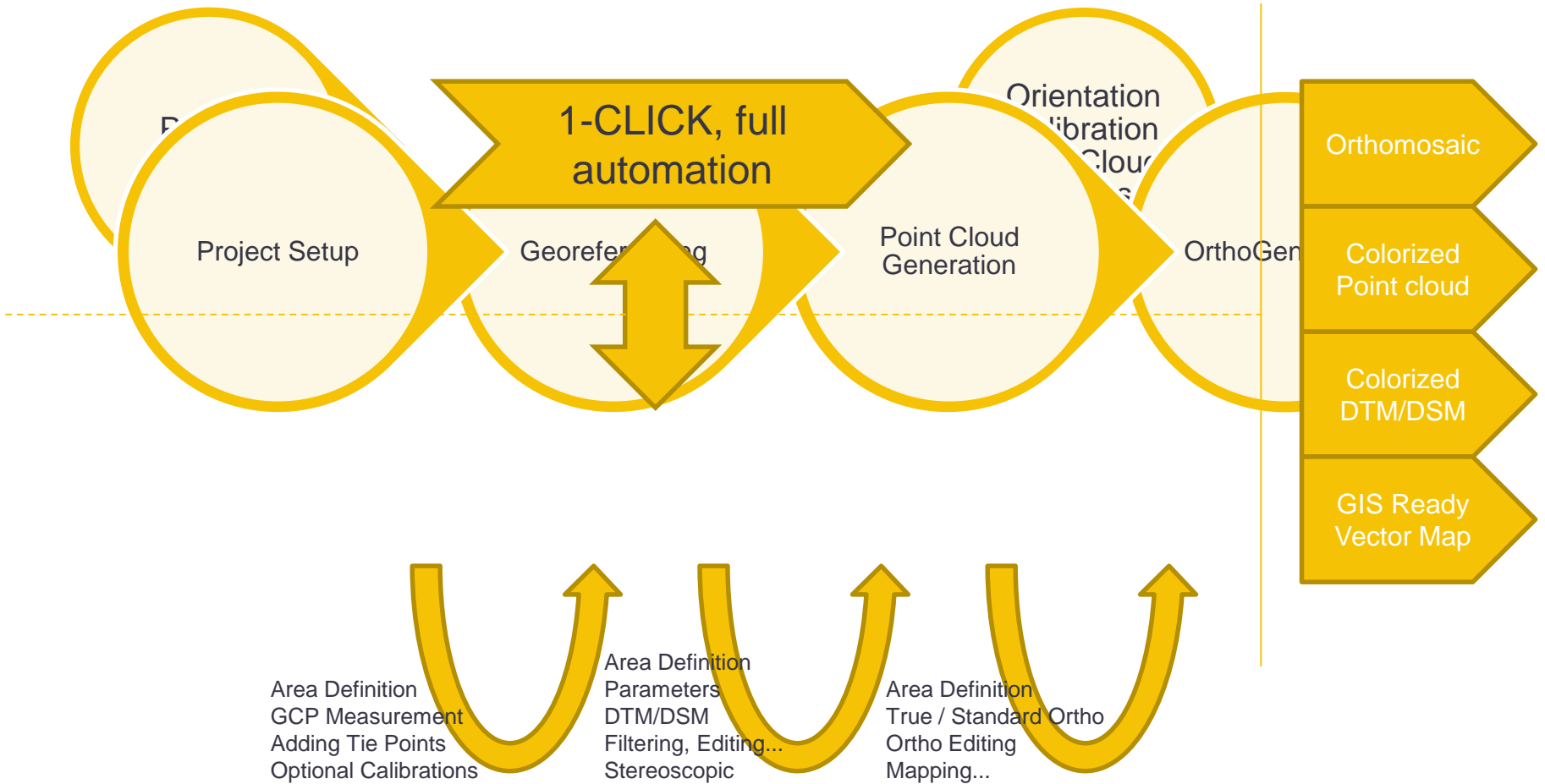
Trimble.

Why UASMaster?

- UASMaster offers full flexibility <u>AND</u> ease of use

Easy to use 1-CLICK processing

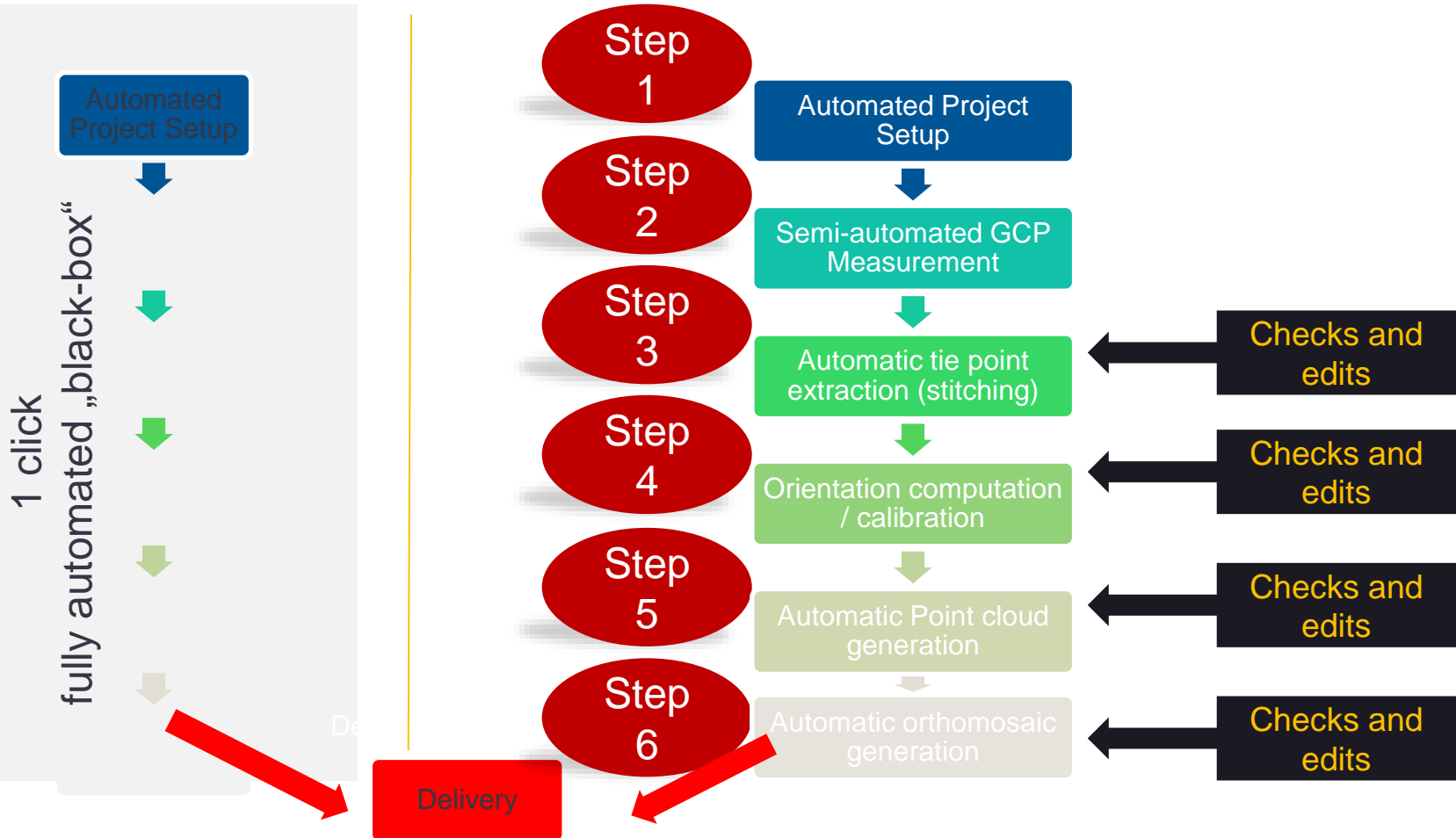**Flexible parameters, full editing capability, detailed analysis**

1-Click or Multi-Stop Process

Project Setup

Georeferencing

1-CLICK, full automation

Point Cloud Generation

Orientation Calibration Cloud

OrthoGen

Orthomosaic

Colorized Point cloud

Colorized DTM/DSM

GIS Ready Vector Map

Area Definition
GCP Measurement
Adding Tie Points
Optional Calibrations

Area Definition
Parameters
DTM/DSM
Filtering, Editing...
Stereoscopic

Area Definition
True / Standard Ortho
Ortho Editing
Mapping...

Trimble.

Open hardware concept

A full process with one click OR interactive processing in just 6 Steps

Guided Workflows

UAS

→ **Project Preparation**
Create, open or edit a project. — Step 1

→ **Quick Processing (optional)**
Processing from georeferencing mosaic image generation. — 1-Click

→ **Georeferencing**
Start UAS Measurement...

→ **Surface and Ortho Generation**
Start UAS Edit...

UAS

→ **Extract**
Acquire tie points — Step 2

→ **Measure**
Digitize tie points or control points — Step 3

→ **Orientate**
Compute exterior orientations — Step 4

UAS

→ **Surface**
Generate DTMs and DSMs — Step 5

→ **Orthos and Mosaic**
Generate orthos and mosaic — Step 6

Task	Status*
Project Preparation	✓
GCP Measurement	✓
Relative Adjustment	✓
Absolute Adjustment	✓
Surface Generation	✓
Surface Editing	(...)
Mosaic Generation	○

⨁ Trimble.

Mission Overview after Project Setup
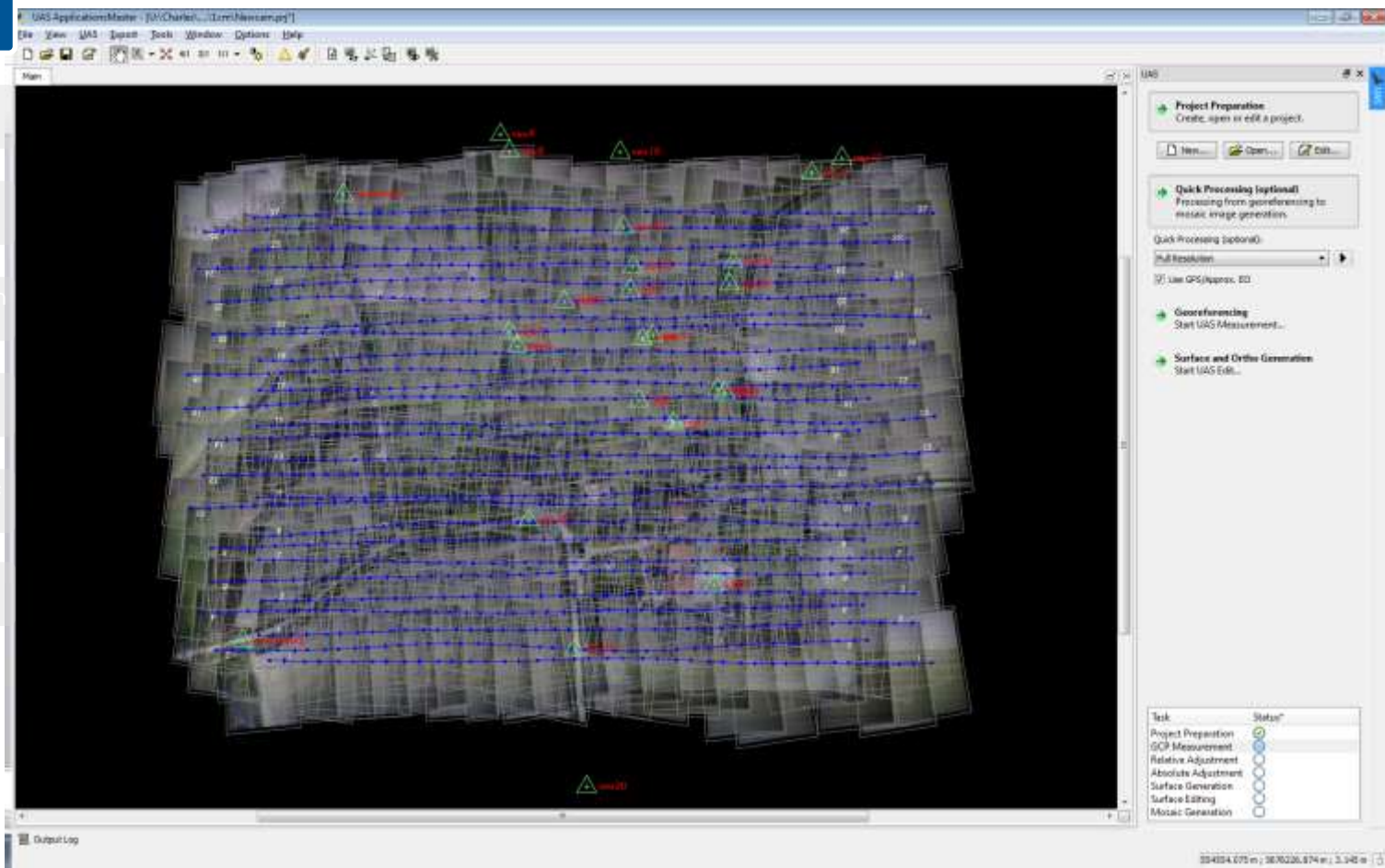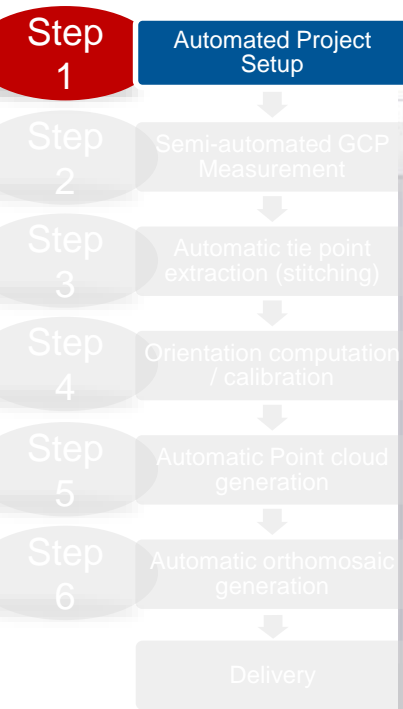
Step 2: GCP Measurement

Step 1 — Automated Project Setup

Step 2 — Semi-automated GCP Measurement

Step 3 — Automatic tie point extraction (stitching)

Step 4 — Orientation computation / calibration

Step 5 — Automatic Point cloud generation

Step 6 — Automatic orthomosaic generation

Delivery
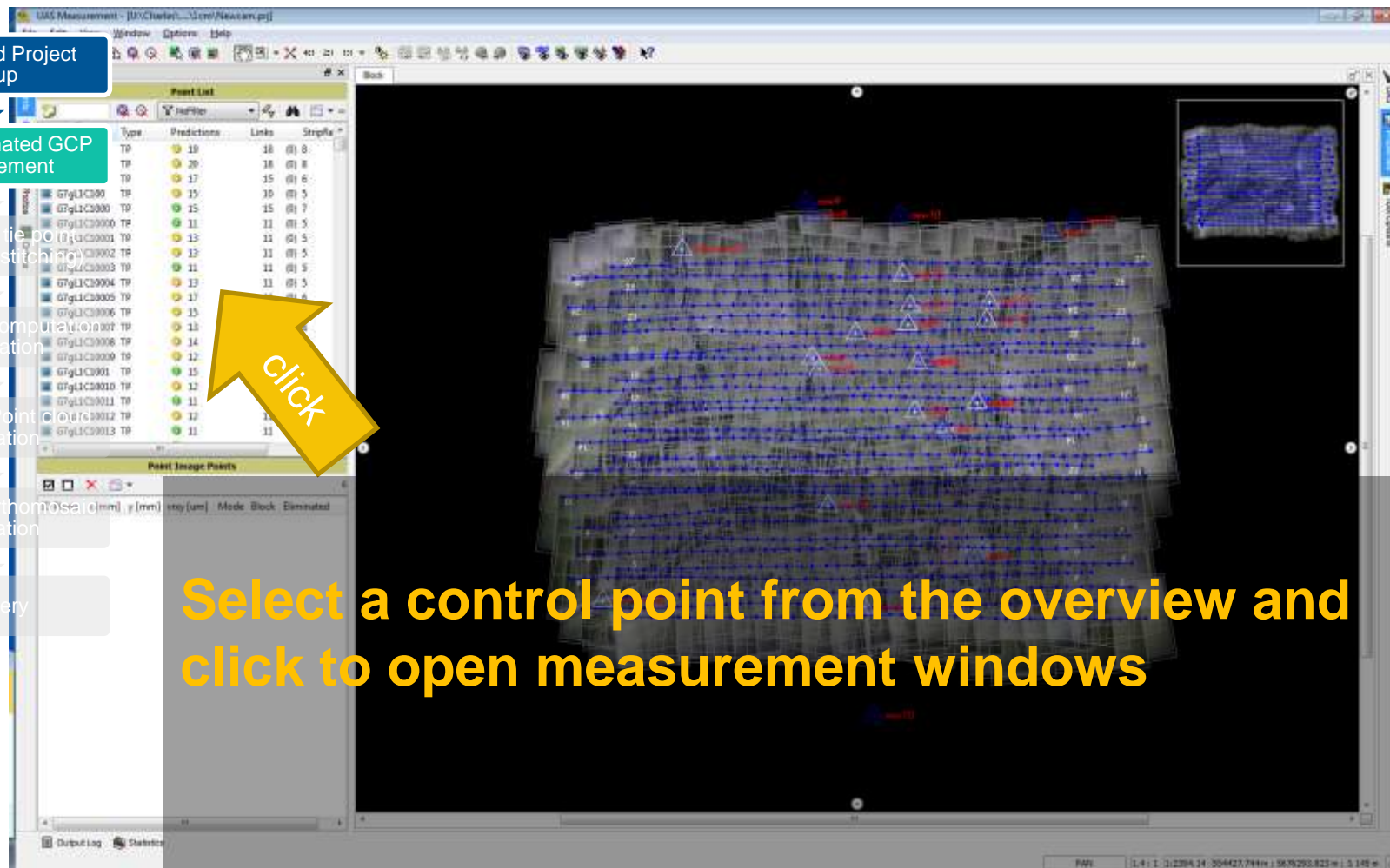
click

Select a control point from the overview and click to open measurement windows

Step 2: GCP Measurement

Step 3: Auto-Extract Tie Points

Step 1 — Automated Project Setup

Step 2 — Semi-automated GCP Measurement

Step 3 — Automatic tie point extraction (stitching)

Checks and edits

Step 4 — Orientation computation / calibration

Step 5 — Automatic Point cloud generation

Step 6 — Automatic orthomosaic generation

Delivery

UAS
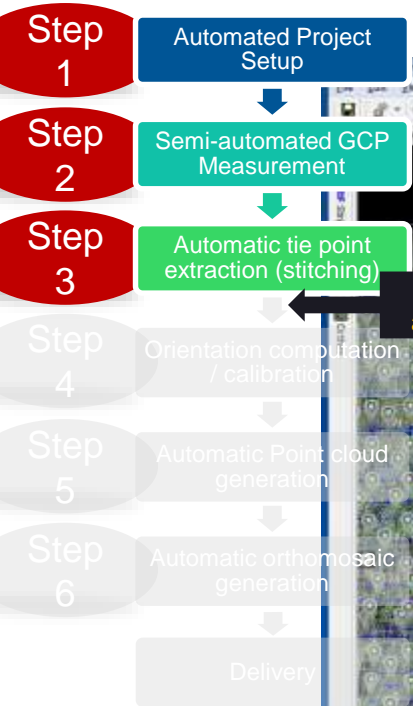
Extract
Acquire tie points

TP Extraction With Adjustment:

Full Resolution

☑ Use GPS/Approx. EO

Measure

Step 4: Orientation and Calibration

Step 5: Point Cloud Generation

Step 1 — Automated Project Setup
Step 2 — Semi-automated GCP Measurement
Step 3 — Automatic tie point extraction (stitching)
Step 4 — Orientation computation / calibration
Step 5 — Automatic Point cloud generation
Step 6 — Automatic orthomosaic generation

Checks and edits

Delivery

UAS

Surface
Generate DTMs and DSMs

Define Area

DTM Extraction:
Detailed

DSM Extraction
Dense

Orthos and Mosaic
Generate orthos and mosaic

Task	Status*
Project Preparation	⊘
GCP Measurement	⊘
Relative Adjustment	⊘
Absolute Adjustment	⊘
Surface Generation	⊘
Surface Editing	(…)
Mosaic Generation	○

Trimble.

Partial editing

Step 1	Automated Project Setup
Step 2	Semi-automated GCP Measurement
Step 3	Automatic tie point extraction (stitching)
Step 4	Orientation computation / calibration
Step 5	Automatic Point cloud generation
Step 6	Automatic orthomosaic generation
	Delivery

Checks and edits

Rectangular Selection
Effects only point data.

LB	Box Select
Ctrl + LB	Box Deselect
Ctrl + RB	Pan
WL	Zoom

Profile

10.944

3.637

Full mode

Trimble.
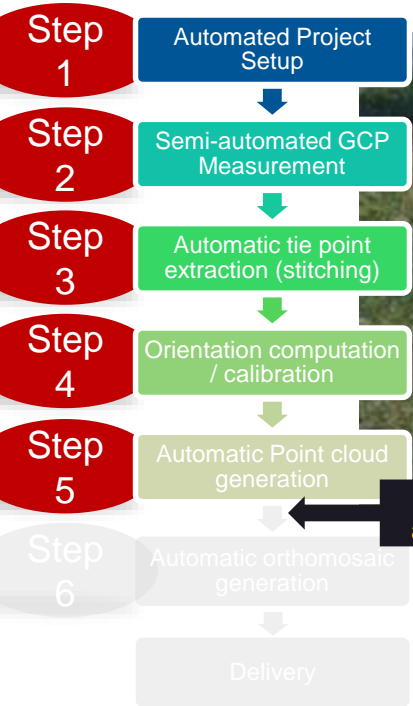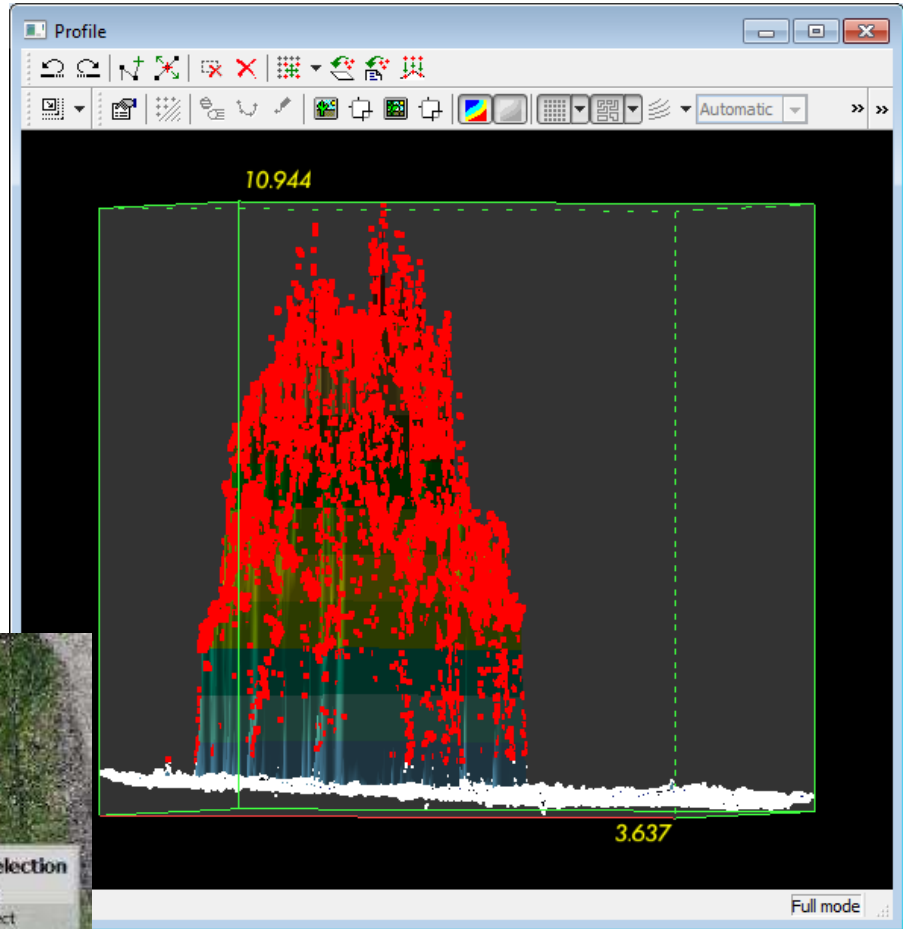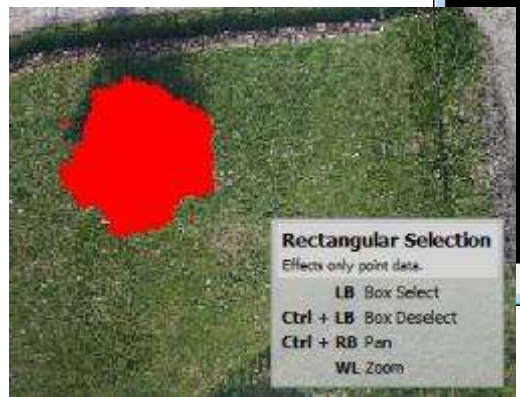
Step 6: Ortho & Digitizing

- Data Checking:
  - Lines/polygons
  - Point-offset / stereo-parallax evaluation
  - Personal stereoscopic height correction value

... automated tools / workflows

... correlation/interpolation-based terrain-following for 3D measure-ments

... al ortho- ... for UAS

Step 1 — Automated Project Setup

Step 2 — Semi-automated GCP Measurement

Step 3 — Automatic tie point extraction (stitching)

Step 4 — Orientation computation / calibration

Step 5 — Automatic Point cloud generation

Step 6 — Automatic orthomosaic generation

Checks and edits

Checks and edits

Delivery

UAS

→ **Surface**
Generate DTMs and DSMs

→ **Orthos and Mosaic**
Generate orthos and mosaic

Ortho Mosaicking:

Pixel size: 1.00 [m]

Classic Ortho ▶

Ortho Patch Generation:

Define Patch Area

Classic Ortho ▶

Ortho Patch Merging:

Default ▶

Task	Status*
Project Preparation	✓
GCP Measurement	✓
Relative Adjustment	✓
Absolute Adjustment	✓
Surface Generation	✓
Surface Editing	✓
Mosaic Generation	…

Trimble Inpho v7.0

® Trimble.

Interoperability

|	
Step 1	Automated Project Setup
Step 2	Semi-automated GCP Measurement
Step 3	Automatic tie point extraction (stitching)
Step 4	Orientation computation / calibration
Step 5	Automatic Point cloud generation
Step 6	Automatic orthomosaic generation
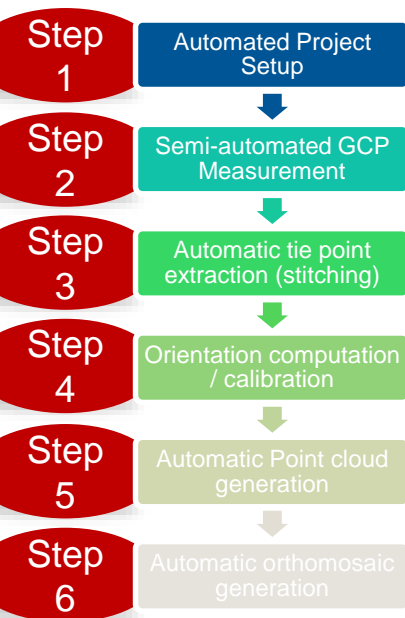
Integration into Trimble and 3rd party software

seamless integration of data and efficient project delivery

- Trimble Geoids
- Jpeg2000
- LAS 1.4
- LasZip
- EXIF-Reader

Trimble Inpho v6.0
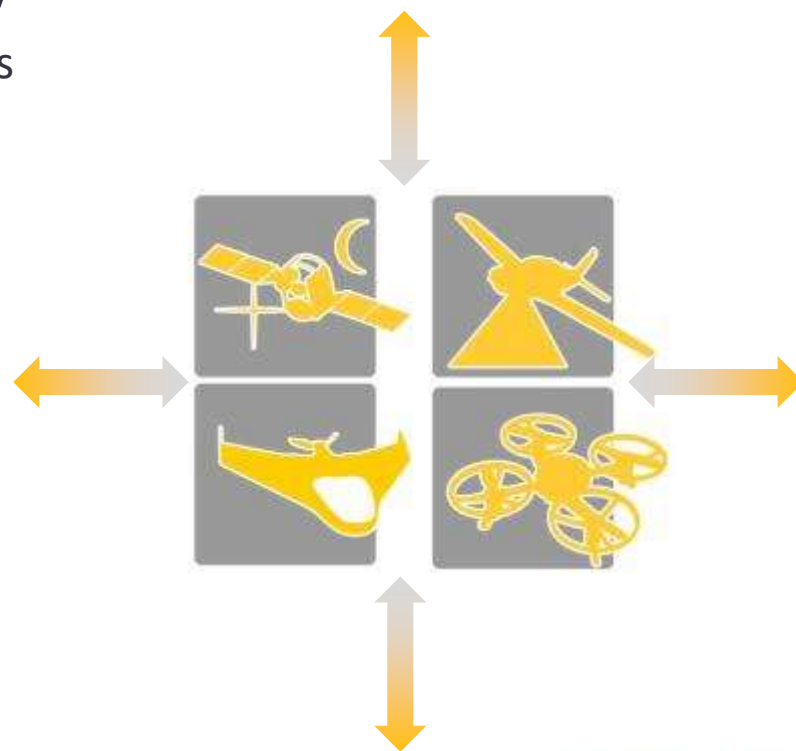
From A to Z in **2.5 hrs**
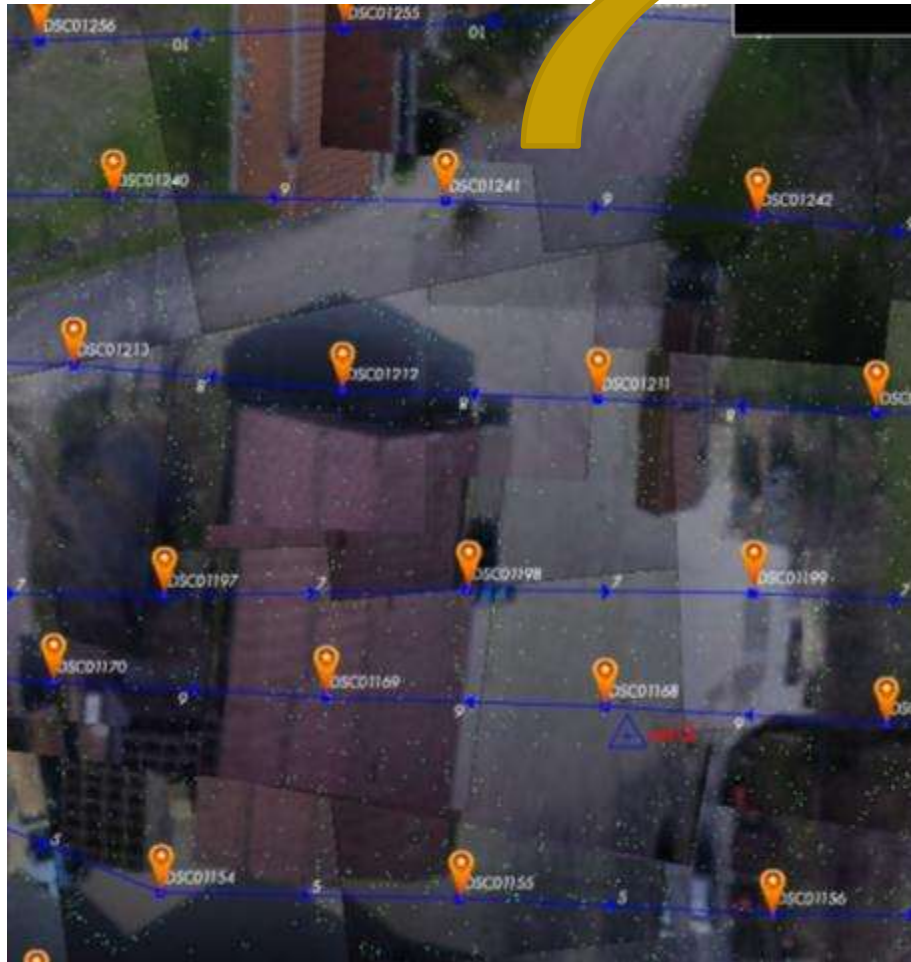
*
Customer project:
729 images (Sony Nex/alpha 6000)
Area-spread 1.4km /0.87mi
5 strips at 70%/80% overlap
Orthomosaic & Pointcloud
Laptop 2012 (i7, 2.8GHz)

Trimble.

UASMaster is different

- 1-Click processing option (black-box) (AT/georeferencing, cameracalibration, DTM/DSM, trueortho or traditional orthomosaic)

- Optional 6-step interactive process with parametrization

- Reliable QA/QC

- Full stereo visualization for better manual/automated editing and mapping

- Complete INPHO technology in one tool, limited to UAS data
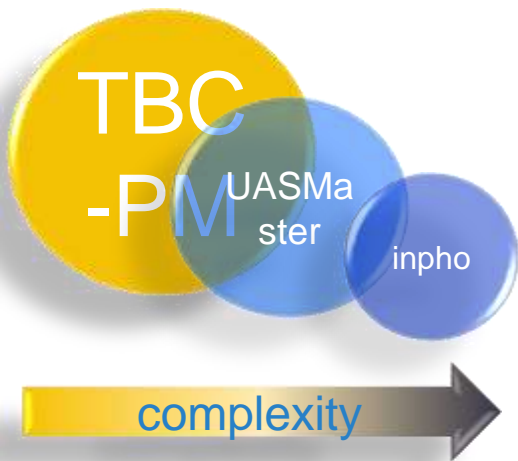
TBC -PM

UASMaster

inpho

complexity

Task	Status
Project Preparation	⊘
GCP Measurement	⊘
Relative Adjustment	⊘
Absolute Adjustment	⊘
Surface Generation	⊘
Surface Editing	⊘
Mosaic Generation	⊙

Trimble.
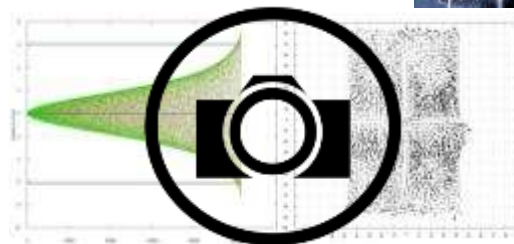
Why UASMaster?

- Reliably deliver highest quality GIS ready data

- Why hassle with missing functionality if you can have one-click processing and full photogrammetric flexibility in one tool

- UASMaster is the right product for any experience level

Trimble.