

# OPK Bundle



OPK Bundle is the latest Menci Software's technology for automatic aerial images triangulation. Software based on a sophisticated algorithm for "Tie Points" research and "Bundle" generation.

Project easy management, assisted collimation of "GCP" and "Check Points", advanced results visualization and automatic Report generation are the striking OPK Bundle features.

image processing tech



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# Main features and workflow

## Features

Import and process images	No limits
"Tie Points" automatic research	✓
Advanced management of the monoscopic collimation	✓
Multi-channel images handling: RGB+IR	✓
Automatic "Bundle" generation	✓
E-mail send at end of process	✓
Automatic Report generation	✓
Advanced result visualization	✓

- No limits to import and elaboration images
- Import and/or select camera passport
- Coordinate projection editor
  - \* Projectum
  - \* Datum
  - \* Fuse
- Multichannel images handling RGB + IR
- "Tie Points" real time visualizzazione
- Automatic text Report generation
- E-mail send to end of process
- Assisted "GCP" monoscopic collimation
- Assisted "Check Points" monoscopic collimation
- "Tie Points", "GCP", "Check Point" and "Foot Print" activate/deactivate visualization
- Automatic "Bundle" calculation
- Advanced management of result displayed
- Bundle threshold Set-up



## OPK Bundle

### New

Select destination folder  
Select your passport → Select  
Coordinate System → Projection / Datum / Fuse

### Images Manager

Images Manager → Add  
Import GPS/IMU Data → Browse → Select All → Import  
Images Manager → Close

### Search Tie Points

### GCP

GCPs Manager → Add  
Import GCPs → Browse → Select All → Import  
GCPs Manager → Close

### GCP Collimation

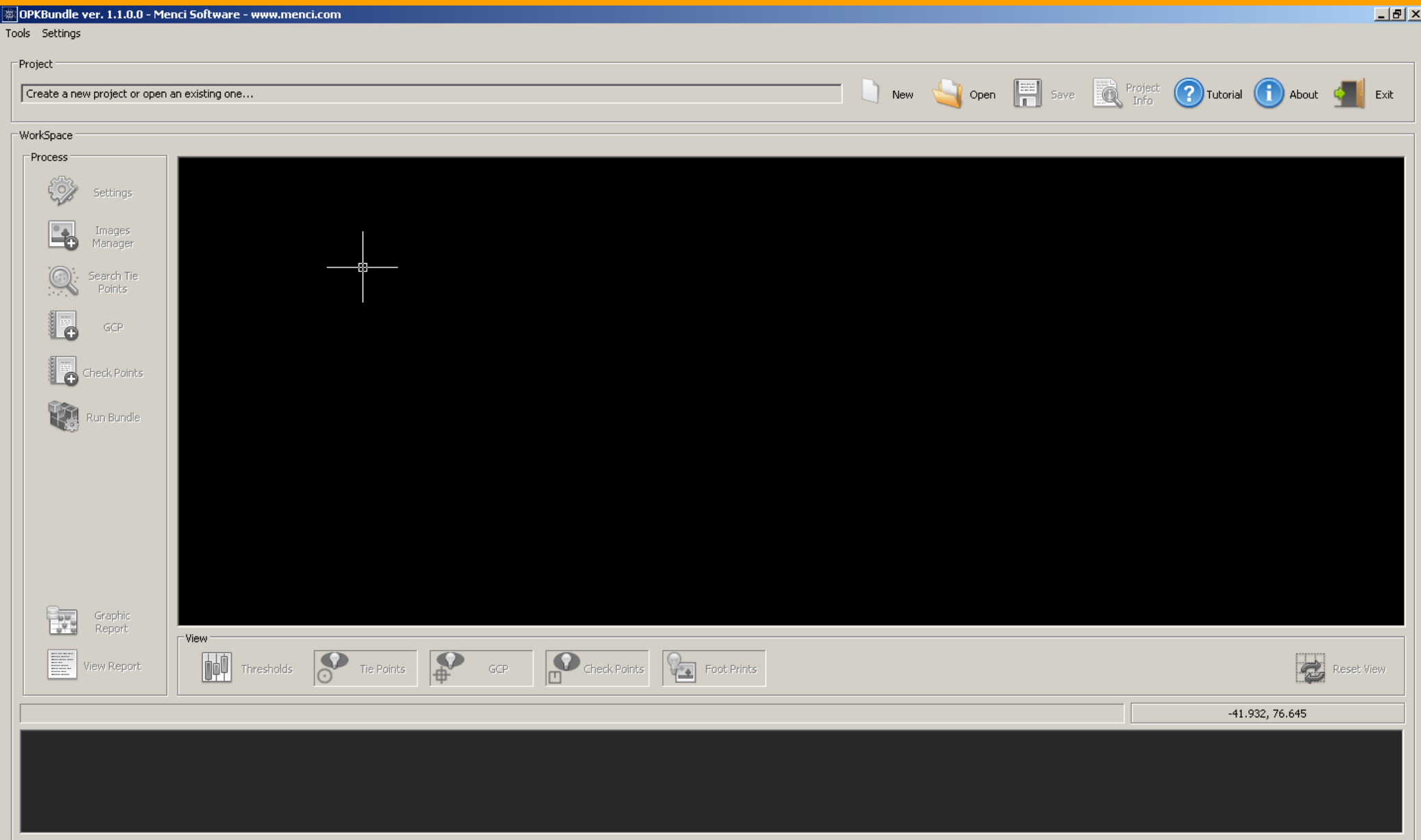
### Check Points

Check Points Manager → Add  
Import Check Points → Browse → Select All → Import  
Check Points Manager → Close

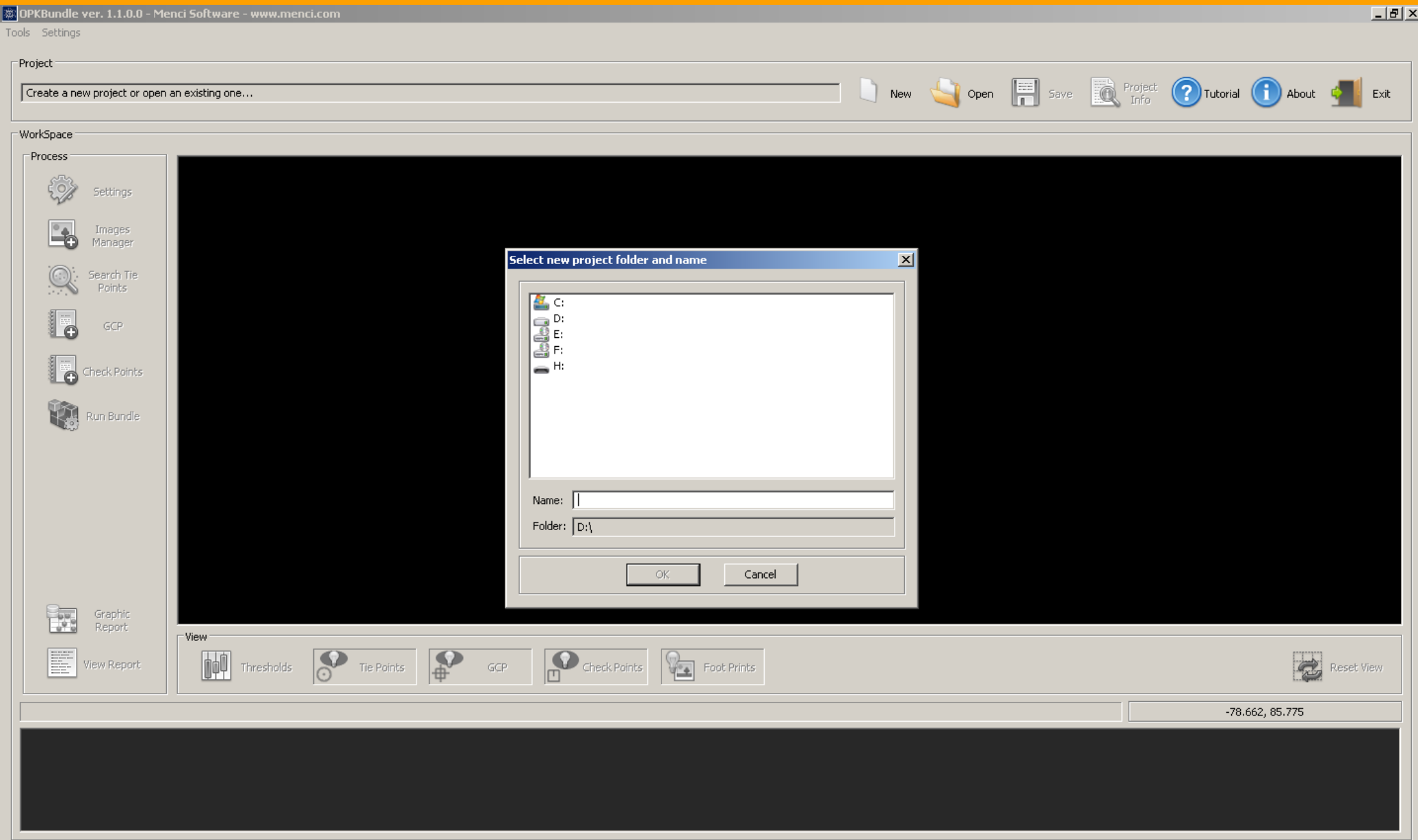
### Check Points Collimation

### Run Bundle

# Main interface



# Project destination folder selecting



# Camera passport importation

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Tools Settings

Project

Create a new project or open an existing one...

New Open Save Project Info Tutorial About Exit

WorkSpace

Process

- Settings
- Images Manager
- Search Tie Points
- GCP
- Check Points
- Run Bundle
- Graphic Report
- View Report

Select your Passport

Passport

uc-sxp-1-90512263\_270\_f100500-90512263-90512263-09-02-2011

Camera parameters	values	different conven...
Camera Model	UC-Sxp-1-90512263_270_F...	
Camera Serial Number	90512263	
Focal Length	16750	100.5
Pixel Size (mm)		0.006
K1	0	0
K2	0	0
K3	0	0
P1	0	0
P2	0	0
Raster Dimension X	11310	
Raster Dimension Y	17310	
Principal Point Coordinates X (pix)	5625	33.75
Principal Point Coordinates Y	8655	51.93
Radial Distortion Formula, dr =	$(K1*r^3)+(K2*r^5)+(K3*r^7)$	
Tangential Distortion Formula, d...	$(P1*x*y)+(P2*r^2*x^2)$	

Import Create Select Cancel

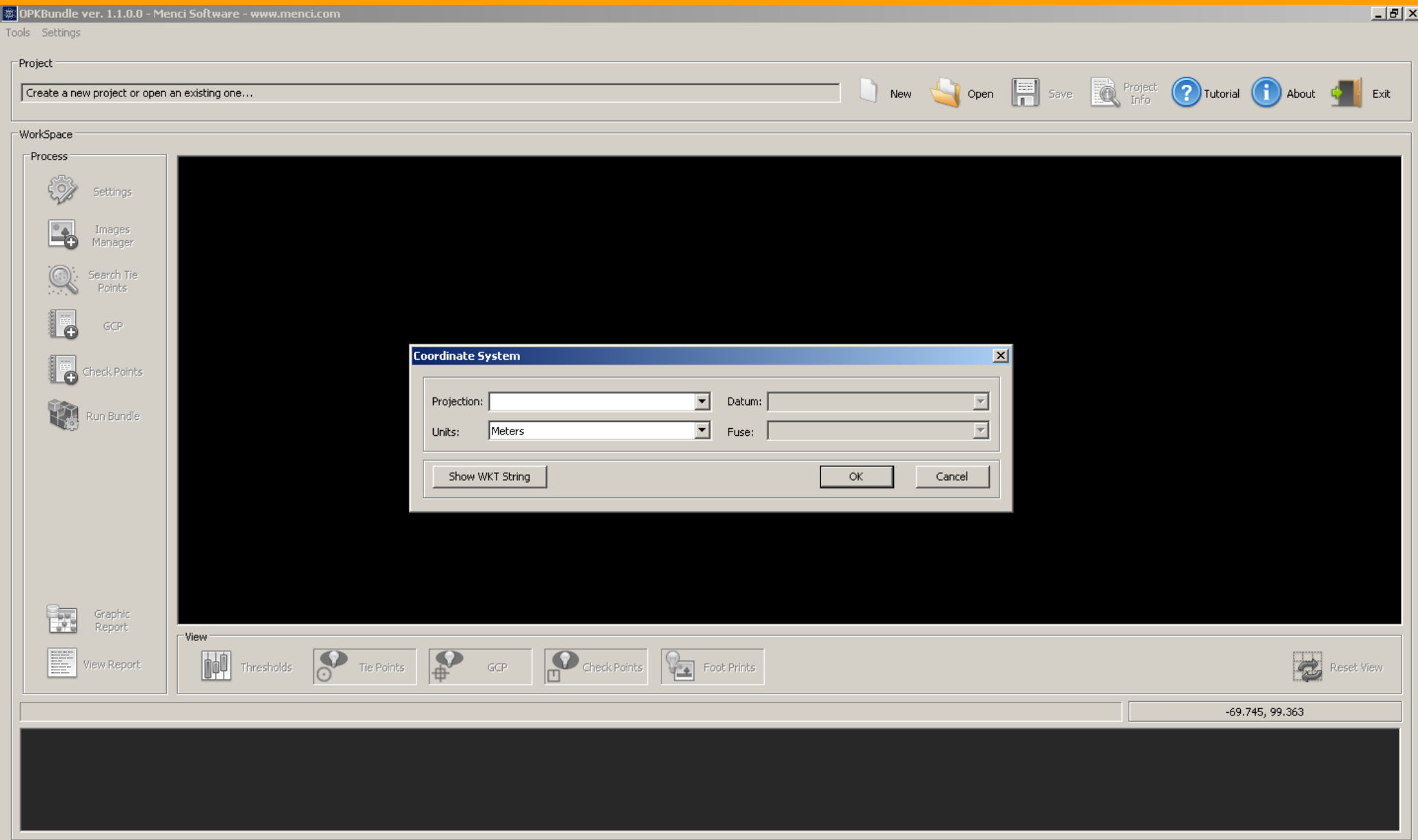
View

Thresholds Tie Points GCP Check Points Foot Prints

Reset View

-78.662, 85.775

# Coordinate system editor



# Import images

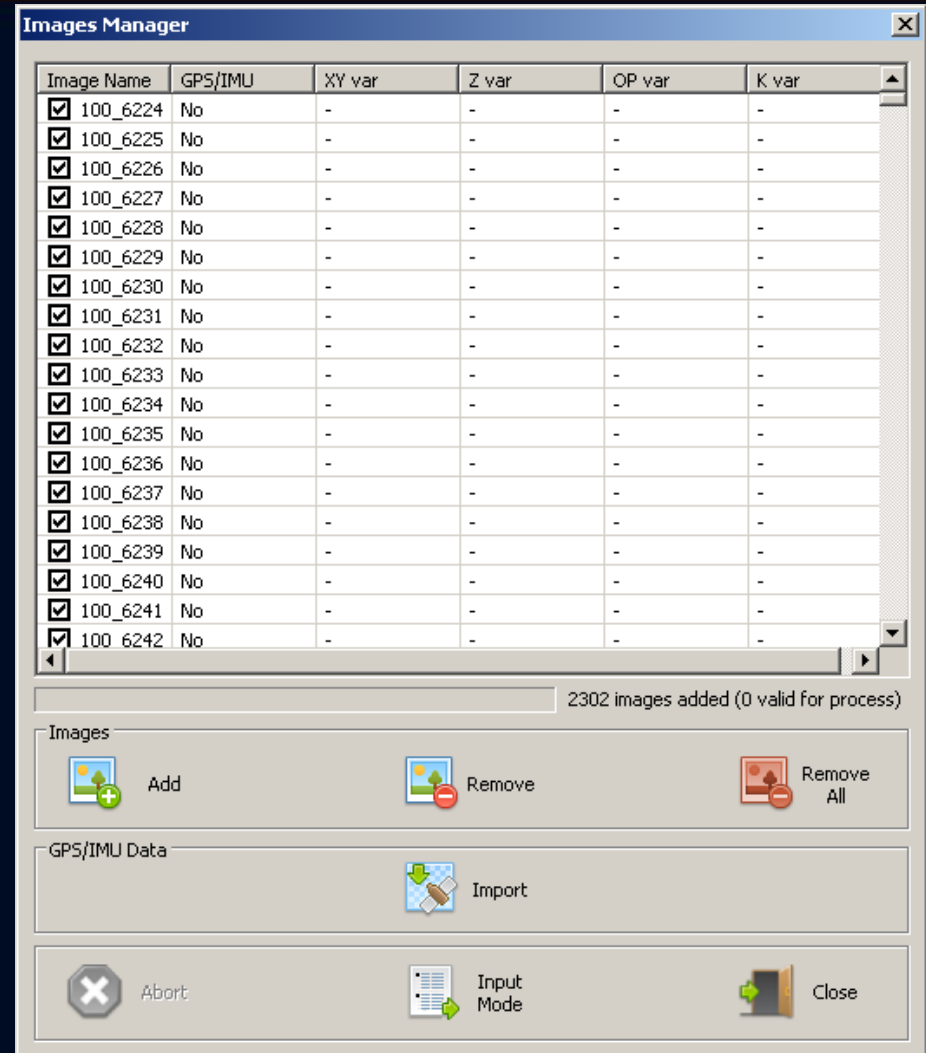
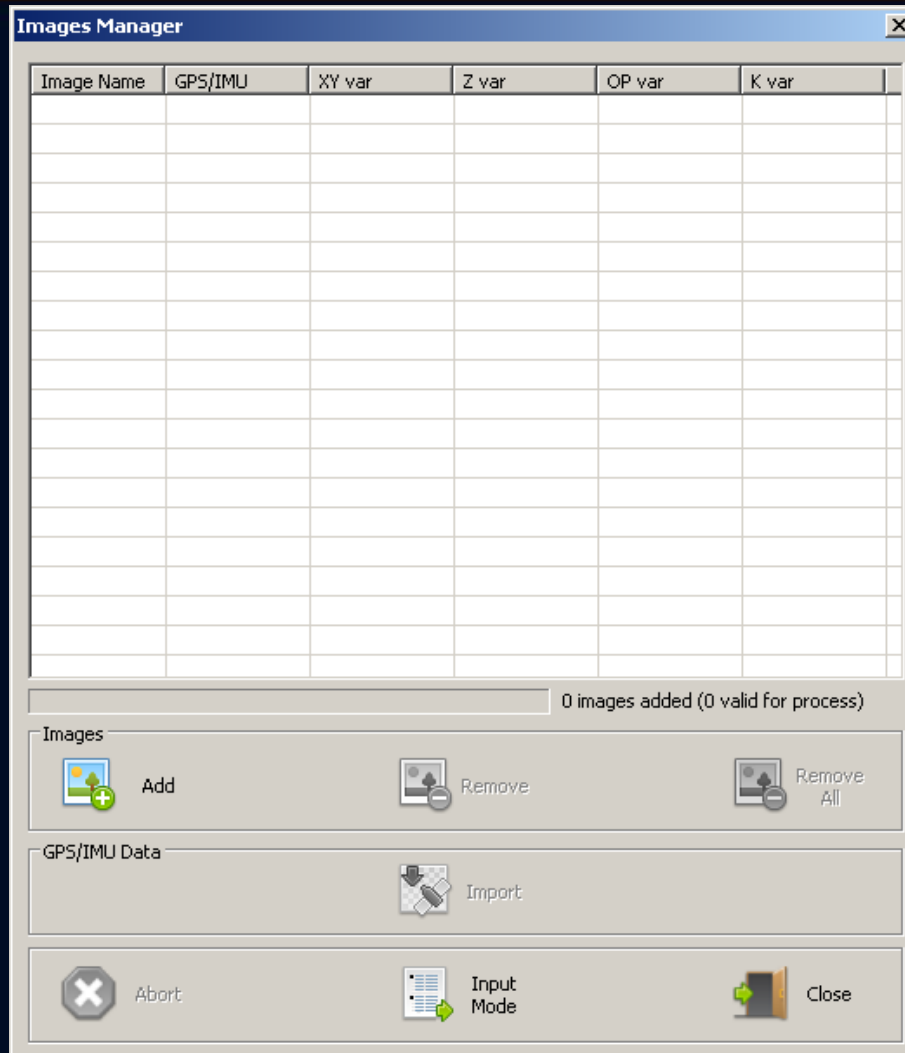


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# Importation GPS/IMU data

Import GPS/IMU data

Input: \\Elab02-pc\E\$\AGEA\Latina\GPS\_DATA\gpsimu\_rad

Parsed Data

Comments: #%@+ Separators: , ;

Click..	Click..	Click..	Click..	Click..	Click..	Click..	Click..	Click..	Click..	Click..	Click..
21_1698	23096...	47050...	3448.6...	-0.014...	0.002640	3.138630					
21_1699	23088...	47050...	3449.0...	0.002927	0.001783	3.136091					
21_1700	23079...	47050...	3449.0...	0.016148	0.001340	3.137771					
21_1701	23071...	47050...	3449.3...	0.005272	0.002173	3.139533					
21_1702	23063...	47050...	3449.0...	0.004951	0.001016	3.137404					
21_1703	23054...	47050...	3449.0...	-0.002...	0.001548	3.137424					
21_1704	23046...	47050...	3448.9...	-0.004...	0.001766	3.137042					
21_1705	23038...	47050...	3449.5...	-0.007...	-0.000...	3.136728					
21_1706	23029...	47050...	3448.9...	0.010510	0.000509	3.135510					

Points to Import

ID	X	Y	Z	Omega	Phi	Kappa	Var XY	Var Z
21_1698	230964...	470504...	3448.6...	-0.014...	0.002640	3.138630		
21_1699	230881...	470504...	3449.0...	0.002927	0.001783	3.136091		
21_1700	230797...	470504...	3449.0...	0.016148	0.001340	3.137771		
21_1701	230714...	470504...	3449.3...	0.005272	0.002173	3.139533		
21_1702	230630...	470504...	3449.0...	0.004951	0.001016	3.137404		
21_1703	230546...	470504...	3449.0...	-0.002...	0.001548	3.137424		
21_1704	230463...	470504...	3448.9...	-0.004...	0.001766	3.137042		
21_1705	230380...	470504...	3449.5...	-0.007...	-0.000...	3.136728		

Select All Unselect All

Output Separator (default ",") Save As... Coordinate Conversion

Import GPS/IMU data

Input: \\Elab02-pc\E\$\AGEA\Latina\GPS\_DATA\gpsimu\_rad

Parsed Data

Comments: #%@+ Separators: , ;

Click..	Click..	Click..	Click..	Click..	Click..	Click..	Click..	Click..	Click..	Click..	Click..
21_1698	23096...	47050...	3448.6...	-0.014...	0.002640	3.138630					
21_1699	23088...	47050...	3449.0...	0.002927	0.001783	3.136091					
21_1700	23079...	47050...	3449.0...	0.016148	0.001340	3.137771					
21_1701	23071...	47050...	3449.3...	0.005272	0.002173	3.139533					
21_1702	23063...	47050...	3449.0...	0.004951	0.001016	3.137404					
21_1703	23054...	47050...	3449.0...	-0.002...	0.001548	3.137424					
21_1704	23046...	47050...	3448.9...	-0.004...	0.001766	3.137042					
21_1705	23038...	47050...	3449.5...	-0.007...	-0.000...	3.136728					
21_1706	23029...	47050...	3448.9...	0.010510	0.000509	3.135510					

Points to Import

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21_1698	230964...	470504...	3448.6...	-0.014...	0.002640	3.138630		
21_1699	230881...	470504...	3449.0...	0.002927	0.001783	3.136091		
21_1700	230797...	470504...	3449.0...	0.016148	0.001340	3.137771		
21_1701	230714...	470504...	3449.3...	0.005272	0.002173	3.139533		
21_1702	230630...	470504...	3449.0...	0.004951	0.001016	3.137404		
21_1703	230546...	470504...	3449.0...	-0.002...	0.001548	3.137424		
21_1704	230463...	470504...	3448.9...	-0.004...	0.001766	3.137042		
21_1705	230380...	470504...	3449.5...	-0.007...	-0.000...	3.136728		

Select All Unselect All

Output Separator (default ",") Save As... Coordinate Conversion Import

Import GPS/IMU data

Input: \\Elab02-pc\E\$\AGEA\Latina\GPS\_DATA\gpsimu\_rad

Parsed Data

Comments: #%@+ Separators: , ;

Click..	Click..	Click..	Click..	Click..	Click..	Click..	Click..	Click..	Click..	Click..	Click..
21_1698	23096...	47050...	3448.6...	-0.014...	0.002640	3.138630					
21_1699	23088...	47050...	3449.0...	0.002927	0.001783	3.136091					
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21_1701	23071...	47050...	3449.3...	0.005272	0.002173	3.139533					
21_1702	23063...	47050...	3449.0...	0.004951	0.001016	3.137404					
21_1703	23054...	47050...	3449.0...	-0.002...	0.001548	3.137424					
21_1704	23046...	47050...	3448.9...	-0.004...	0.001766	3.137042					
21_1705	23038...	47050...	3449.5...	-0.007...	-0.000...	3.136728					
21_1706	23029...	47050...	3448.9...	0.010510	0.000509	3.135510					

Points to Import

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21_1698	230964...	470504...	3448.6...	-0.014...	0.002640	3.138630		
21_1699	230881...	470504...	3449.0...	0.002927	0.001783	3.136091		
21_1700	230797...	470504...	3449.0...	0.016148	0.001340	3.137771		
21_1701	230714...	470504...	3449.3...	0.005272	0.002173	3.139533		
21_1702	230630...	470504...	3449.0...	0.004951	0.001016	3.137404		
21_1703	230546...	470504...	3449.0...	-0.002...	0.001548	3.137424		
21_1704	230463...	470504...	3448.9...	-0.004...	0.001766	3.137042		
21_1705	230380...	470504...	3449.5...	-0.007...	-0.000...	3.136728		

Select All Unselect All Reset Assignments

Output Separator (default ",") Save As... Coordinate Conversion Import Cancel

OPKBundle

2302 GPS/IMU data points selected

OK

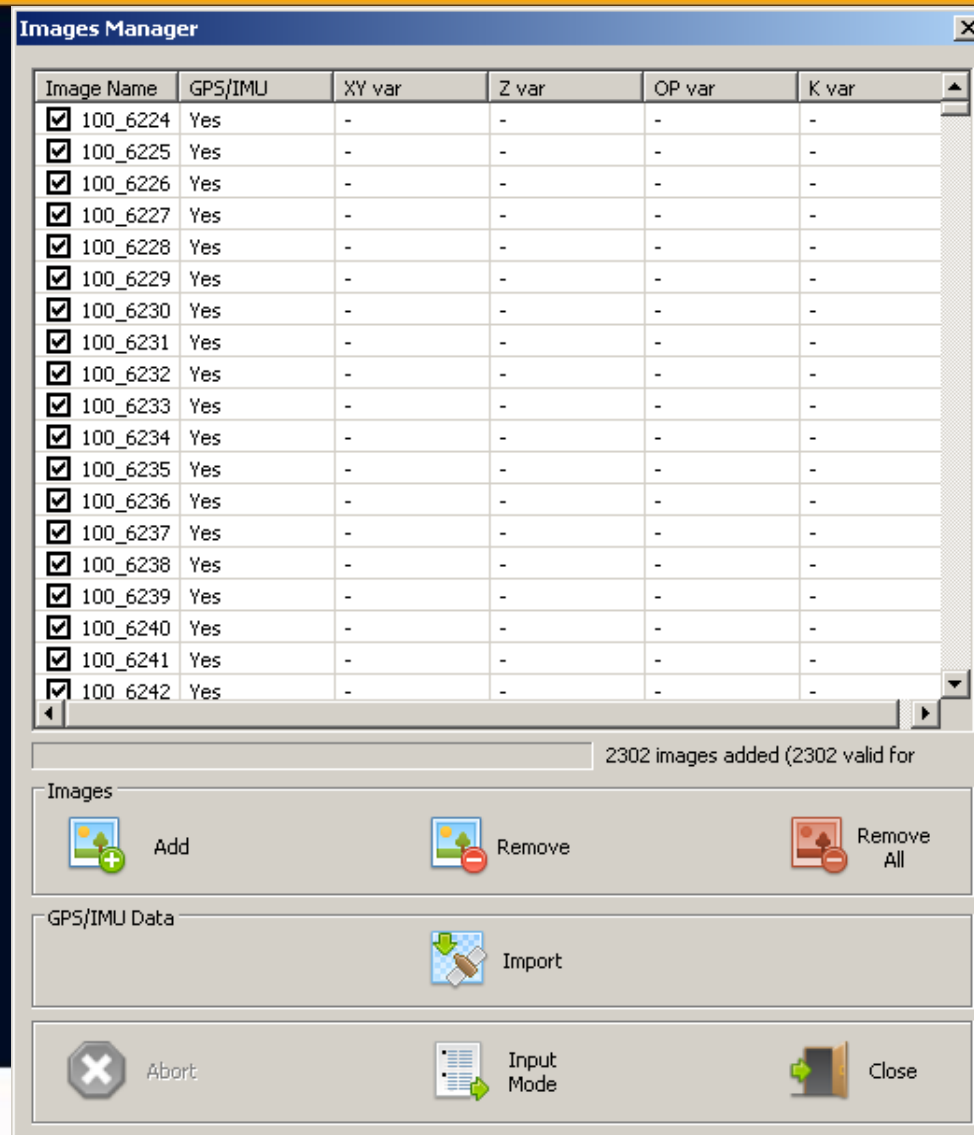
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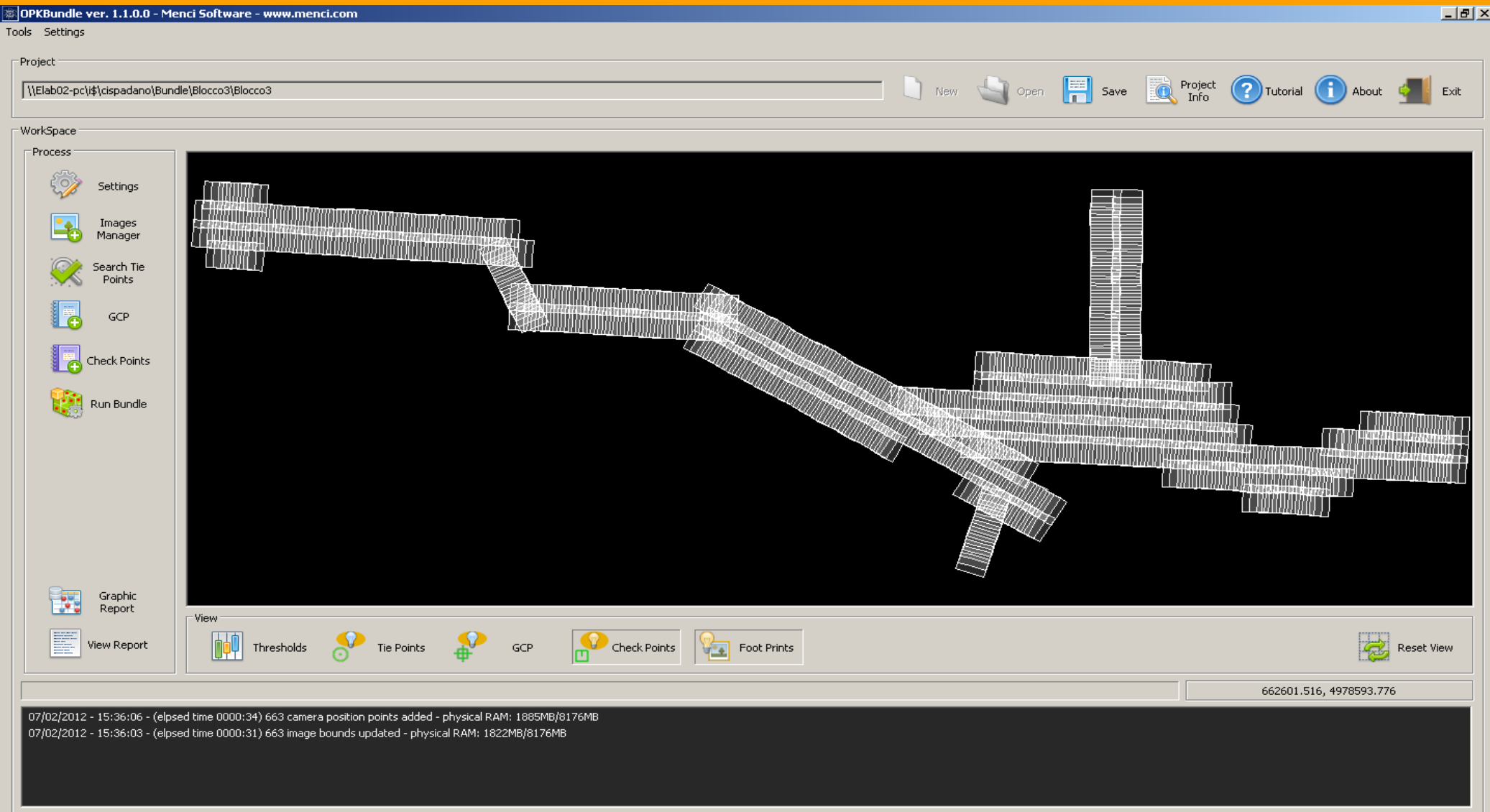
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# Check GPS/IMU data importation

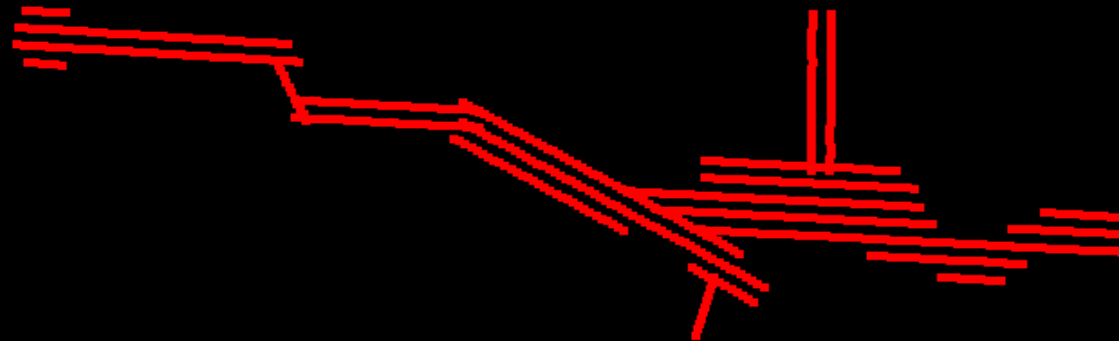


# Footprint visualization



# Search Tie Points: progress 1/3

Tracking Tie Points...



Reset View



Abort

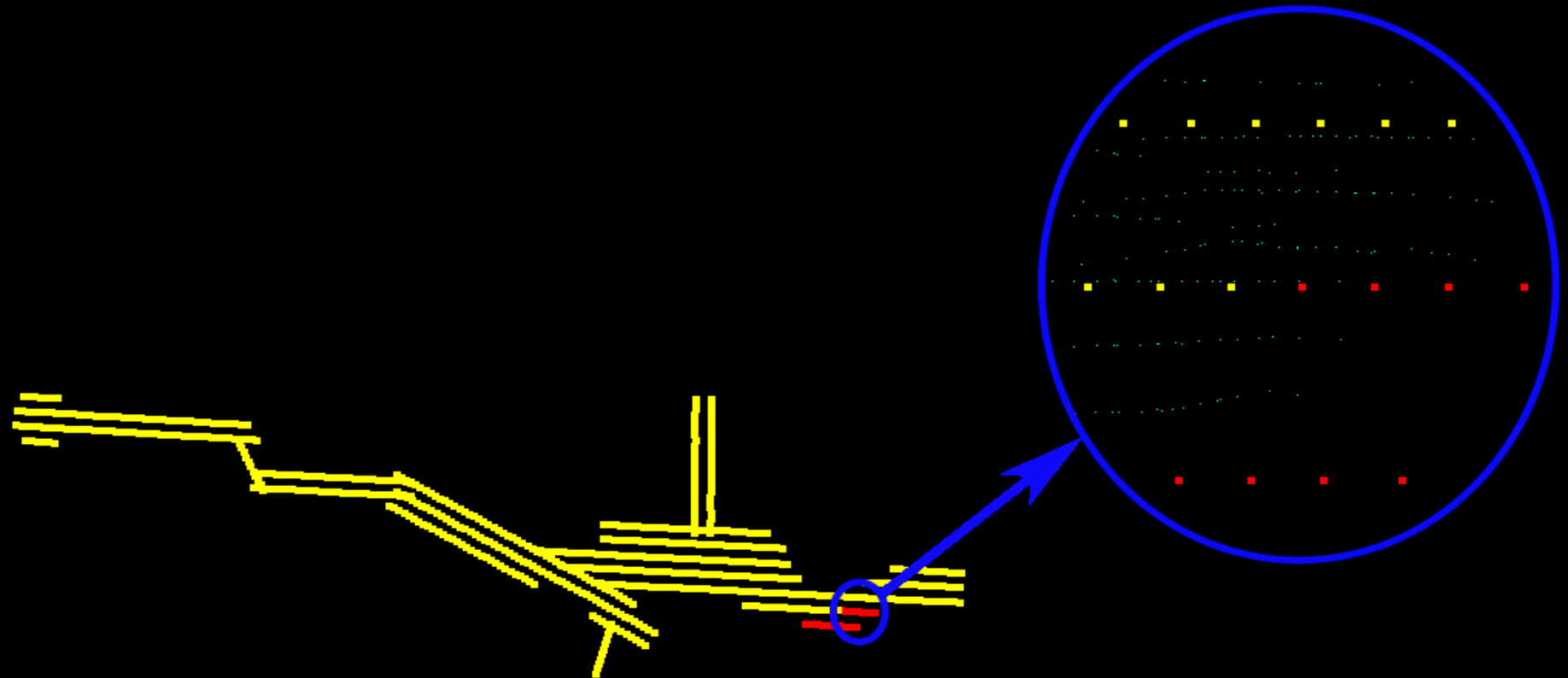
image processing tech



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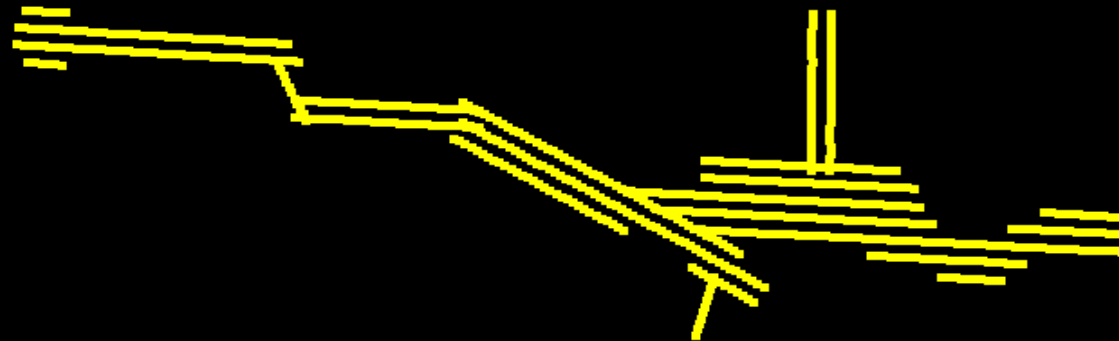
# Search Tie Points: progress 2/3

Tracking Tie Points...



# Search Tie Points: progress 3/3

Tracking Tie Points...



Reset View



Abort

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# Search Tie Points: end

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Tools Settings

Project  
\\Elab02-pc\i\\$\cispadano\Bundle\Blocco3\Blocco3

New Open Save Project Info Tutorial About Exit

WorkSpace

Process

- Settings
- Images Manager
- Search Tie Points
- GCP
- Check Points
- Run Bundle
- Graphic Report
- View Report



View

Thresholds Tie Points GCP Check Points Foot Prints

Reset View

660235.343, 4977939.302

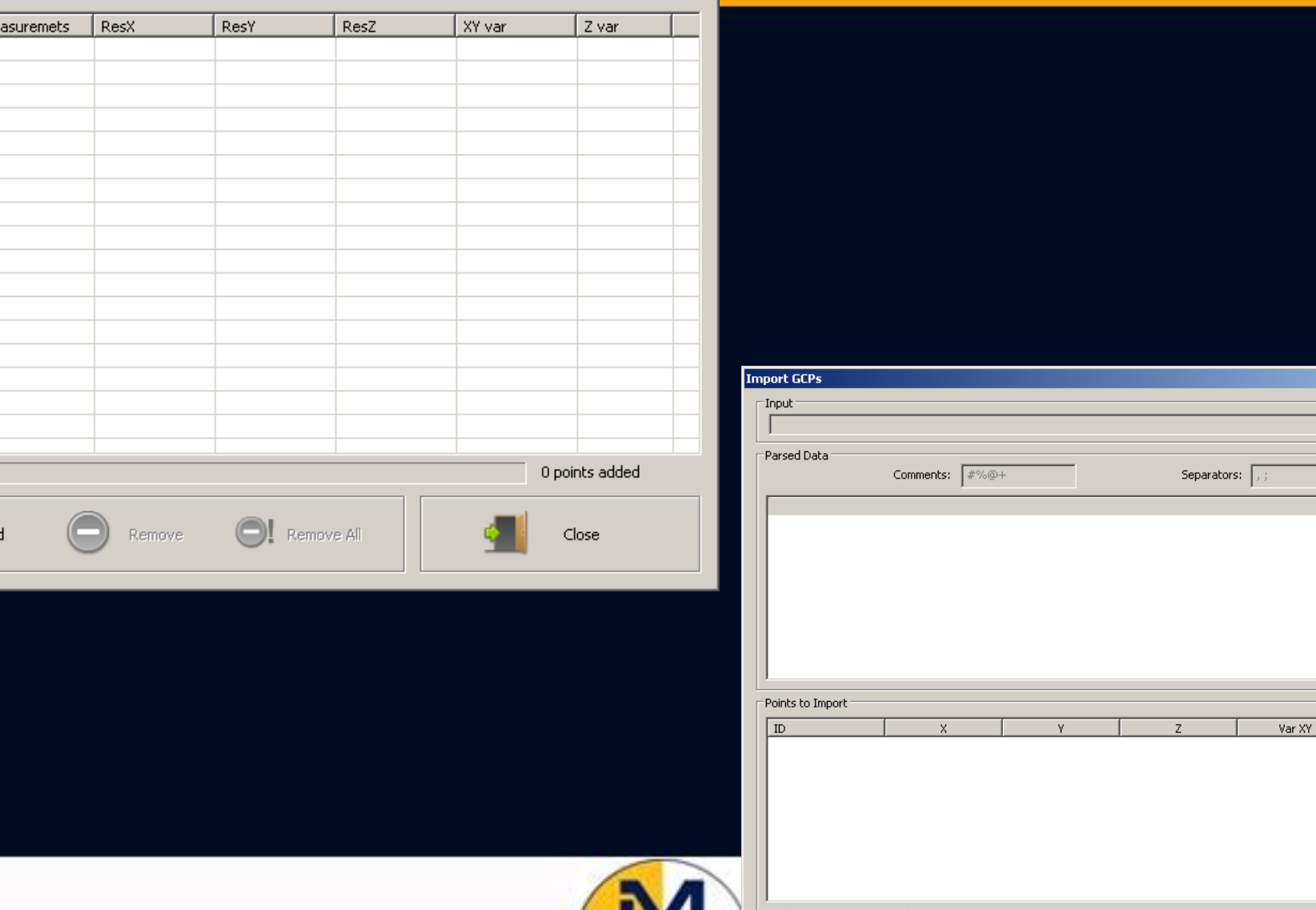
07/02/2012 - 15:36:06 - (elapsed time 0000:34) 663 camera position points added - physical RAM: 1885MB/8176MB  
07/02/2012 - 15:36:03 - (elapsed time 0000:31) 663 image bounds updated - physical RAM: 1822MB/8176MB

image processing tech



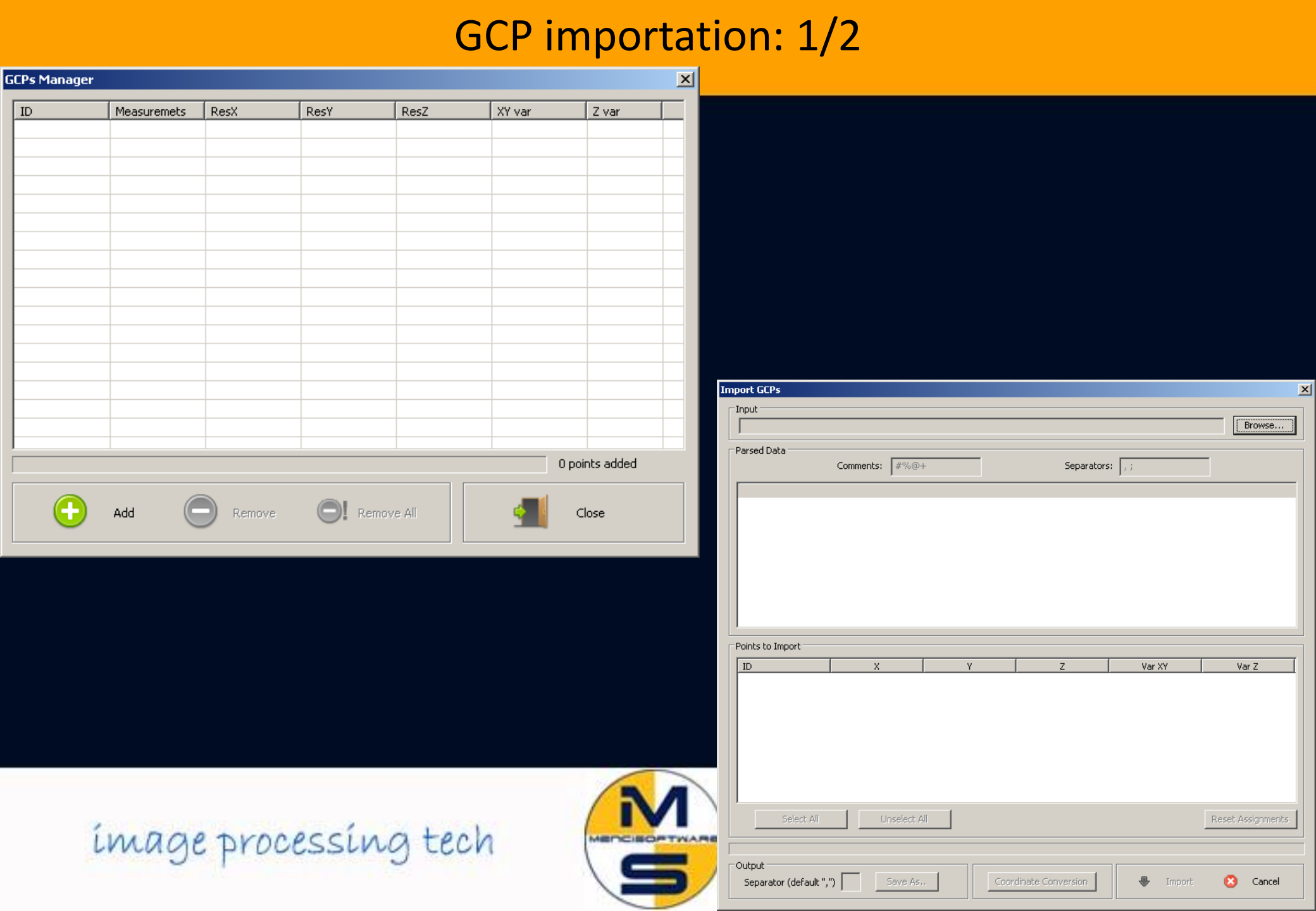
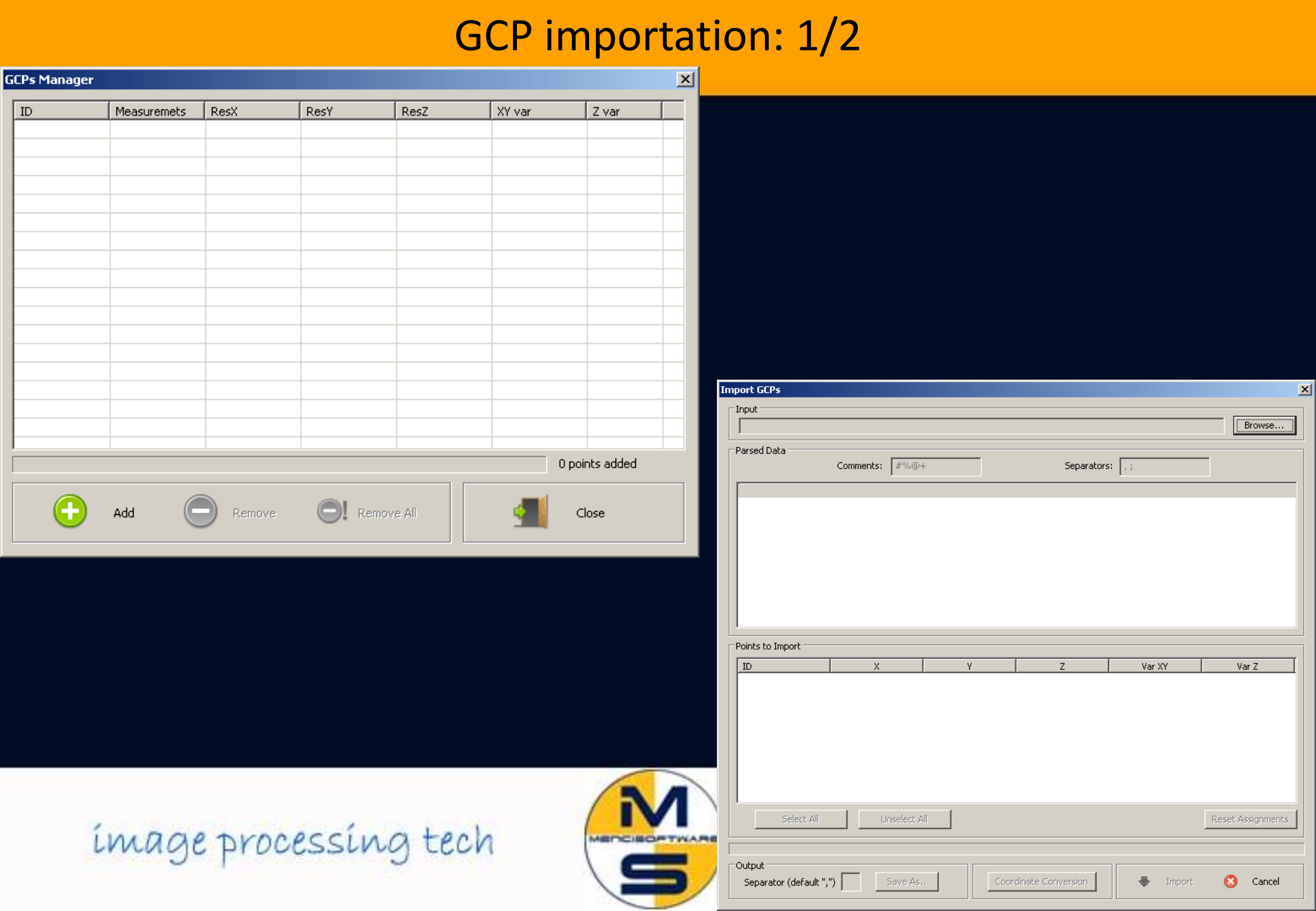

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# GCP importation: 1/2

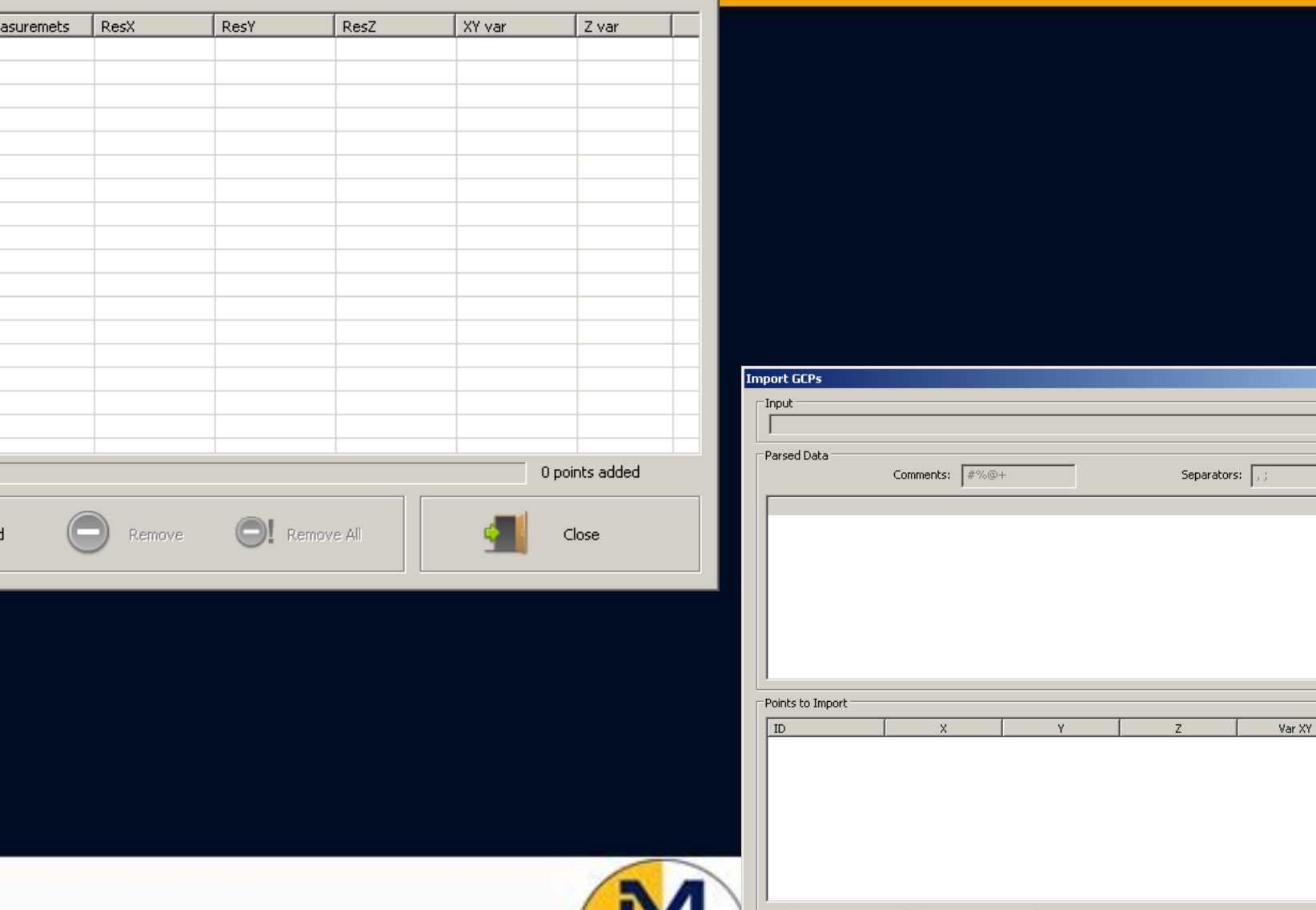


The image displays two software windows. The 'GCPs Manager' window on the left features a table with columns: ID, Measuremets, ResX, ResY, ResZ, XY var, and Z var. Below the table, it shows '0 points added' and buttons for '+ Add', '- Remove', '-! Remove All', and a folder icon for 'Close'. The 'Import GCPs' window on the right includes an 'Input' field with a 'Browse...' button, a 'Parsed Data' section with 'Comments' and 'Separators' fields, a large text area for data, and a 'Points to Import' table with columns: ID, X, Y, Z, Var XY, and Var Z. At the bottom of the 'Import GCPs' window are buttons for 'Select All', 'Unselect All', 'Reset Assignments', 'Output Separator (default ",")', 'Save As..', 'Coordinate Conversion', 'Import', and 'Cancel'.

image processing tech

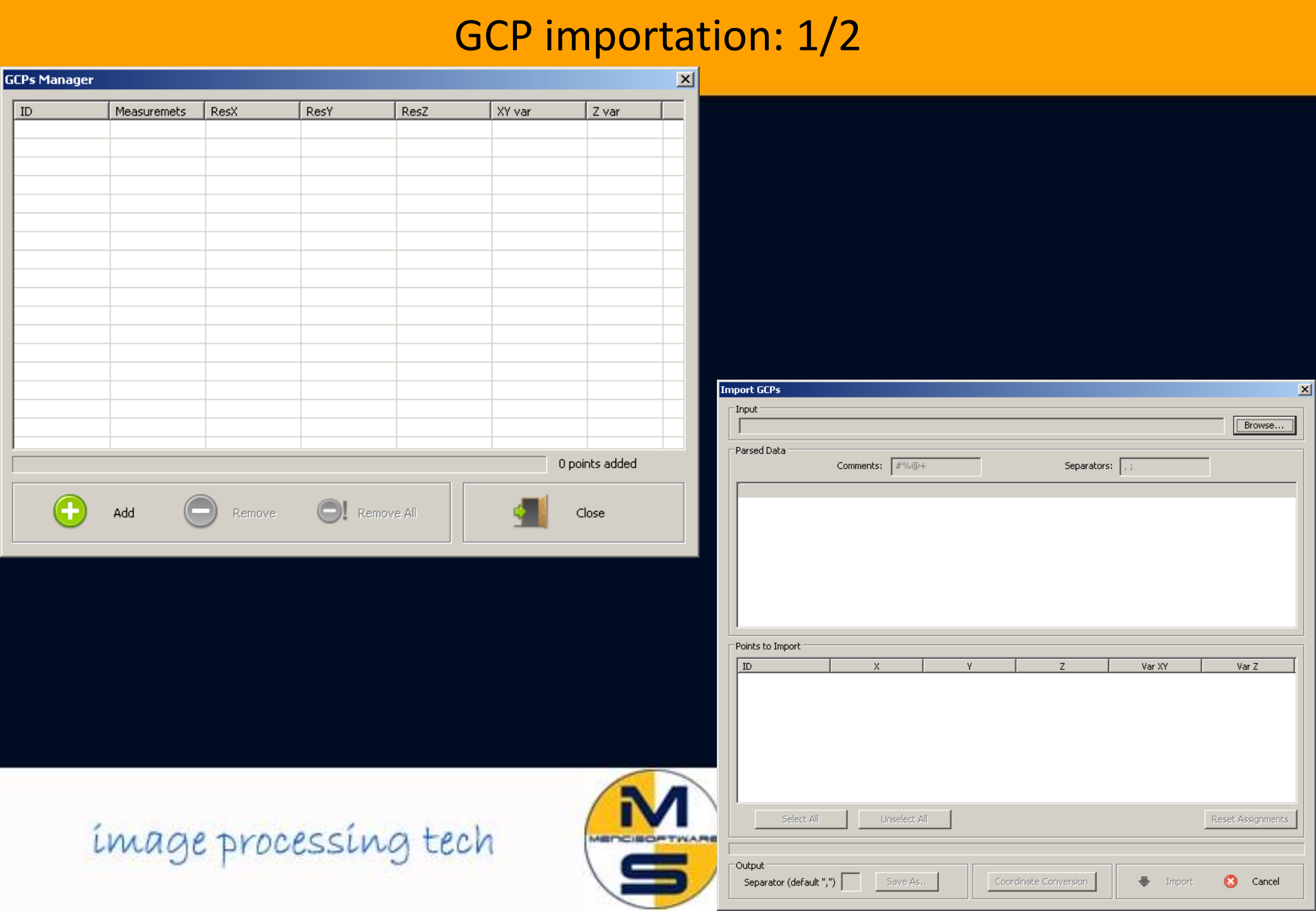



# GCP importation: 1/2



The image displays two software windows. The 'GCPs Manager' window on the left features a table with columns: ID, Measuremets, ResX, ResY, ResZ, XY var, and Z var. Below the table, it shows '0 points added' and buttons for '+ Add', '- Remove', '-! Remove All', and a folder icon labeled 'Close'. The 'Import GCPs' dialog box on the right includes an 'Input' field with a 'Browse...' button, a 'Parsed Data' section with 'Comments' and 'Separators' fields, a large empty text area, and a 'Points to Import' table with columns: ID, X, Y, Z, Var XY, and Var Z. At the bottom of the dialog are buttons for 'Select All', 'Unselect All', 'Reset Assignments', 'Output Separator (default ",")', 'Save As..', 'Coordinate Conversion', 'Import', and 'Cancel'.

image processing tech



# GCP importation: 2/2

The screenshot displays the GCP importation process in QGIS. It features three overlapping windows:

- Import GCPs (Top Left):** Shows the input file path `H:\Latina\blocco_03\GCP\GCP_BLK-03.txt`. The 'Parsed Data' section contains a table of points with columns ID, X, Y, and Z. The 'Points to Import' section shows a table with columns ID, X, Y, and Z, listing 6 points.
- Import GCPs (Middle):** A smaller version of the same window, showing the same input file path and parsed data table.
- GCPs Manager (Bottom Right):** A table with columns ID, Measurements, ResX, ResY, ResZ, XY var, and Z var. It shows 6 points added, with the 'Measurements' column containing values like 0.000000, 0.000000, 0.000000, 0.000000, 0.000000, and 0.000000.

The 'GCPs Manager' window also includes a status bar at the bottom indicating '6 points added' and buttons for 'Add', 'Remove', 'Remove All', and 'Close'.

Import GCPs

Input:

H:\Latina\blocco\_03\GCP\GCP\_BLK-03.txt

Browse...

Parsed Data

Comments:   #%@+                      Separators:   , ;

Click..	Click..	Click..	Click..
10301	2390606.107726	4590457.154687	748.487533
10302	2389349.175812	4590380.803327	825.730378
10303	2390673.977420	4588722.384168	559.481595
10304	2392866.380254	4588634.152007	614.464399
10305	2394301.850476	4587009.832960	336.082463
10306	2390543.090170	4587842.114753	506.696130

Points to Import

ID	X	Y
10301	2390606.107726	4590457.
10302	2389349.175812	4590380.
10303	2390673.977420	4588722.
10304	2392866.380254	4588634.
10305	2394301.850476	4587009.
10306	2390543.090170	4587842.

Select All

Unselect All

Output

Separator (default ",")

Save As..

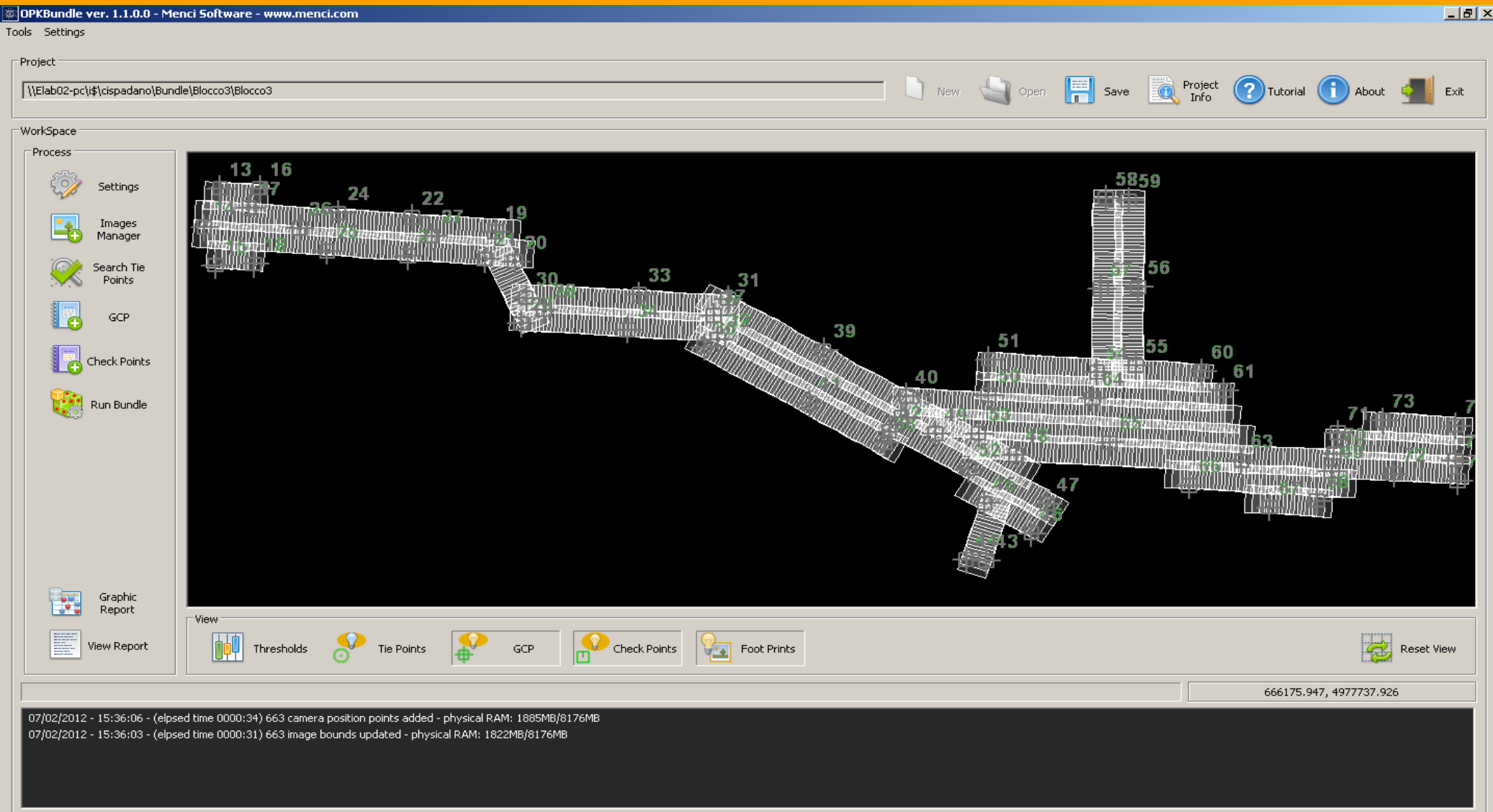
GCPs Manager

ID	Measurements	ResX	ResY
<input type="checkbox"/> 10303	0	0.000000	0.000000
<input type="checkbox"/> 10302	0	0.000000	0.000000
<input type="checkbox"/> 10301	0	0.000000	0.000000
<input type="checkbox"/> 10306	0	0.000000	0.000000
<input type="checkbox"/> 10305	0	0.000000	0.000000
<input type="checkbox"/> 10304	0	0.000000	0.000000

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# GCP importation: end



# GCP collimation: 1/2

GCP - 40



Image 1/5 - 10\_44116

Track Point

Hide Image

GCP - 40



Image 1/5 - 10\_44116

Track Point

Hide Image

OK

Cancel

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# GCP collimation: 2/2



# GCP collimation: end

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Tools Settings

Project  
\\Elab02-pc\i\cispadano\Bundle\Blocco3\Blocco3

New Open Save Project Info Tutorial About Exit

WorkSpace

Process

- Settings
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- GCP
- Check Points
- Run Bundle

Graphic Report  
View Report

View

Thresholds Tie Points GCP Check Points Foot Prints

Reset View

666175.947, 4977737.926

07/02/2012 - 15:36:06 - (elapsed time 0000:34) 663 camera position points added - physical RAM: 1885MB/8176MB  
07/02/2012 - 15:36:03 - (elapsed time 0000:31) 663 image bounds updated - physical RAM: 1822MB/8176MB

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# GCP residuals

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Tools Settings

Project: \\Elab02-pc\\(\\\$)\\cispadano\\Bundle\\Blocco3\\Blocco3

WorkSpace

Process

- Settings
- Images Manager
- Search Tie Points
- GCP
- Check Points
- Run Bundle
- Graphic Report
- View Report

63 points added

63 points added

View: Thresholds Tie Points GCP Check Points Foot Prints

651173.404, 4961074.028

07/02/2012 - 15:49:14 - (elapsed time 0000:37) end Bundle process - physical RAM: 1860MB/8176MB  
07/02/2012 - 15:49:04 - (elapsed time 0000:28) SSBA --- nTiePoints=11825 - nGCP=62 - avgRes=0.262524 - physical RAM: 1971MB/8176MB  
07/02/2012 - 15:48:42 - (elapsed time 0000:05) start Bundle process - physical RAM: 1964MB/8176MB  
07/02/2012 - 15:48:41 - (elapsed time 0000:05) SSBA --- nTiePoints=14816 - avgRes=31.339102 - physical RAM: 1964MB/8176MB  
07/02/2012 - 15:36:06 - (elapsed time 0000:34) 663 camera position points added - physical RAM: 1885MB/8176MB  
07/02/2012 - 15:36:03 - (elapsed time 0000:31) 663 image bounds updated - physical RAM: 1822MB/8176MB

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# Graphic report visualization: 1/3

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Tools Settings

Project: \\Elab02

WorkSpace

Process

**Graphic Report Options**

Image Adjustments

☒ XY (Ellipse) ☐ XY (Vector) ☐ OP (Ellipse) ☐ Z (Circle) ☐ Z (Vector) ☐ K (Circle)

Tie Point Residuals

☐ XY (Ellipse) ☐ XY (Vector)

GCP Residuals

☐ XY (Ellipse) ☐ XY (Vector) ☐ Z (Circle) ☐ Z (Vector)

Check Point Residuals

☐ XY (Ellipse) ☐ XY (Vector) ☐ Z (Circle) ☐ Z (Vector)

Image Adjustments

XY scale	250.000
Z scale	3
Fill XY Ellipses	no
Fill Z Circles	no
XY color	00ffff
Z color	ff00ff
OP scale	100000.000
K scale	100000.000
Fill OP Ellipses	no
Fill K Circles	no
OP color	00ffff
K color	ff00ff

Apply Restore Close

Graphic Report

View Report

View

Thresholds Tie Points GCP Check Points Foot Prints

Reset View

669210.952, 4978052.243

07/02/2012 - 15:49:14 - (elapsed time 0000:37) end Bundle process - physical RAM: 1860MB/8176MB  
07/02/2012 - 15:49:04 - (elapsed time 0000:28) SSBA --- nTiePoints=11825 - nGCP=62 - avgRes=0.262524 - physical RAM: 1971MB/8176MB  
07/02/2012 - 15:48:42 - (elapsed time 0000:05) start Bundle process - physical RAM: 1964MB/8176MB  
07/02/2012 - 15:48:41 - (elapsed time 0000:05) SSBA --- nTiePoints=14816 - avgRes=31.339102 - physical RAM: 1964MB/8176MB  
07/02/2012 - 15:36:06 - (elapsed time 0000:34) 663 camera position points added - physical RAM: 1885MB/8176MB  
07/02/2012 - 15:36:03 - (elapsed time 0000:31) 663 image bounds updated - physical RAM: 1822MB/8176MB

# Graphic report visualization: 2/3

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Tools Settings

Project: \\Elab02-pc\\i\$\\cispai

WorkSpace

Process

Settings

Image Manag

Search Point

GCP

Check P

Run Bu

Graphic Report

View Report

Graphic Report Options

Image Adjustments

☐ XY (Ellipse) ☐ XY (Vector) ☐ OP (Ellipse) ☐ OP (Vector)

☒ Z (Circle) ☐ Z (Vector) ☐ K (Circle) ☐ K (Vector)

Tie Point Residuals

☐ XY (Ellipse) ☐ XY (Vector)

☐ XY (Ellipse) ☐ XY (Vector)

GCP Residuals

☐ XY (Ellipse) ☐ XY (Vector)

☐ Z (Circle) ☐ Z (Vector)

Check Point Residuals

☐ XY (Ellipse) ☐ XY (Vector)

☐ Z (Circle) ☐ Z (Vector)

Image Adjustments

XY scale	250.000
Z scale	3
Fill XY Ellipses	no
Fill Z Circles	no
XY color	00ffff
Z color	ff00ff
OP scale	100000.000
K scale	100000.000
Fill OP Ellipses	no
Fill K Circles	no
OP color	00ffff
K color	ff00ff

Apply Restore Close

View

Thresholds Tie Points GCP Check Points Foot Prints

Reset View

663113.885, 4977752.387

07/02/2012 - 15:49:14 - (elapsed time 0000:37) end Bundle process - physical RAM: 1860MB/8176MB  
07/02/2012 - 15:49:04 - (elapsed time 0000:28) SSBA --- nTiePoints=11825 - nGCP=62 - avgRes=0.262524 - physical RAM: 1971MB/8176MB  
07/02/2012 - 15:48:42 - (elapsed time 0000:05) start Bundle process - physical RAM: 1964MB/8176MB  
07/02/2012 - 15:48:41 - (elapsed time 0000:05) SSBA --- nTiePoints=14816 - avgRes=31.339102 - physical RAM: 1964MB/8176MB  
07/02/2012 - 15:36:06 - (elapsed time 0000:34) 663 camera position points added - physical RAM: 1885MB/8176MB  
07/02/2012 - 15:36:03 - (elapsed time 0000:31) 663 image bounds updated - physical RAM: 1822MB/8176MB



# Graphic report visualization: 3/3

OPKBundle ver. 1.1.0.0 - Menci Software - www.menci.com

Tools Settings

Project: \\Elab02-pc\\i\$\\cis

WorkSpace

Process

Graphic Report Options

Image Adjustments

☐ XY (Ellipse) ☐ XY (Vector) ☐ OP (Ellipse) ☐ Z (Circle) ☐ Z (Vector) ☐ K (Circle)

Tie Point Residuals

☐ XY (Ellipse) ☐ XY (Vector)

GCP Residuals

☒ XY (Ellipse) ☐ XY (Vector) ☒ Z (Circle) ☐ Z (Vector)

Check Point Residuals

☐ XY (Ellipse) ☐ XY (Vector) ☐ Z (Circle) ☐ Z (Vector)

Fill Z Circles: no

XY color: 00ffff

Z color: ff00ff

GCP Residuals

XY scale: 1000.000

Z scale: 1000.000

Fill XY Ellipses: no

Fill Z Circles: no

XY color: 00ffff

Z color: ff00ff

Z color

Z color representation

Apply Restore Close

Graphic Report

View Report

View

Thresholds Tie Points GCP Check Points Foot Prints

Reset View

665832.633, 4978314.649

07/02/2012 - 15:49:14 - (elapsed time 0000:37) end Bundle process - physical RAM: 1860MB/8176MB  
07/02/2012 - 15:49:04 - (elapsed time 0000:28) SSBA --- nTiePoints=11825 - nGCP=62 - avgRes=0.262524 - physical RAM: 1971MB/8176MB  
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07/02/2012 - 15:36:03 - (elapsed time 0000:31) 663 image bounds updated - physical RAM: 1822MB/8176MB



# Report

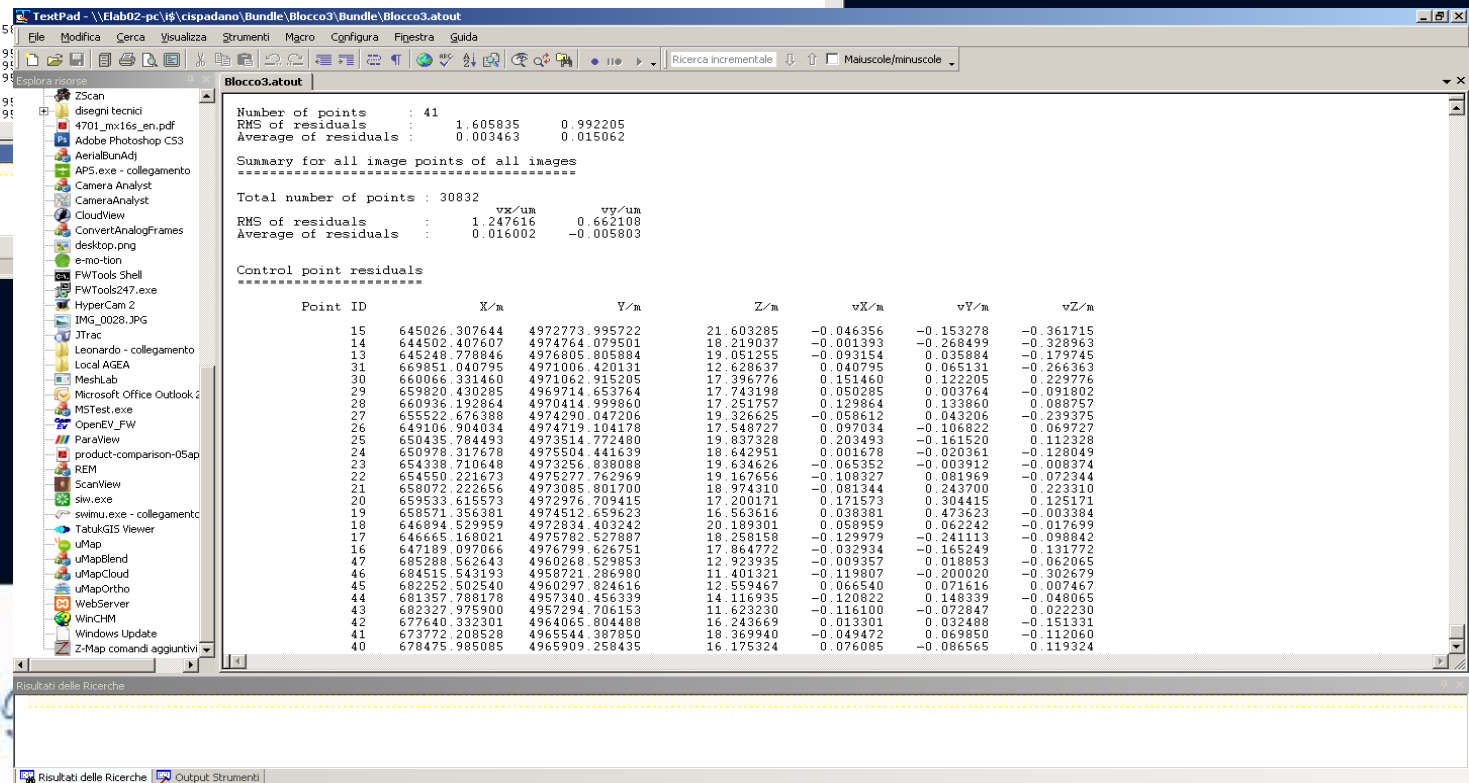
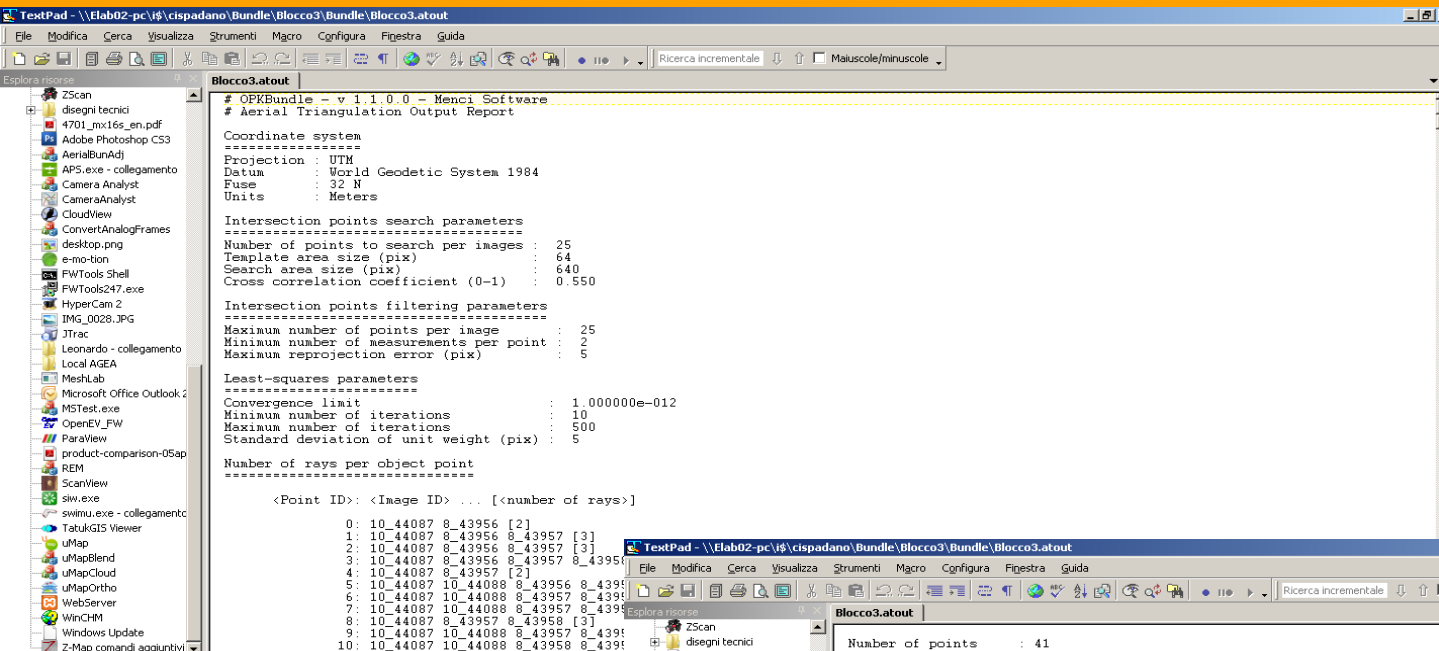


image processing