

PHOTOMOD 6.2

New functionality

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PHOTOMOD 6.2



New easy-to-use PHOTOMOD UAS interface



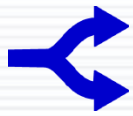
New fast and reliable AT algorithm for UAS imagery



Capability to generate 3D-point clouds in LAS format



Subpixel accuracy for dense DSM by SGM method



New AT tool of automatic strip-by-strip block layout for oblique images



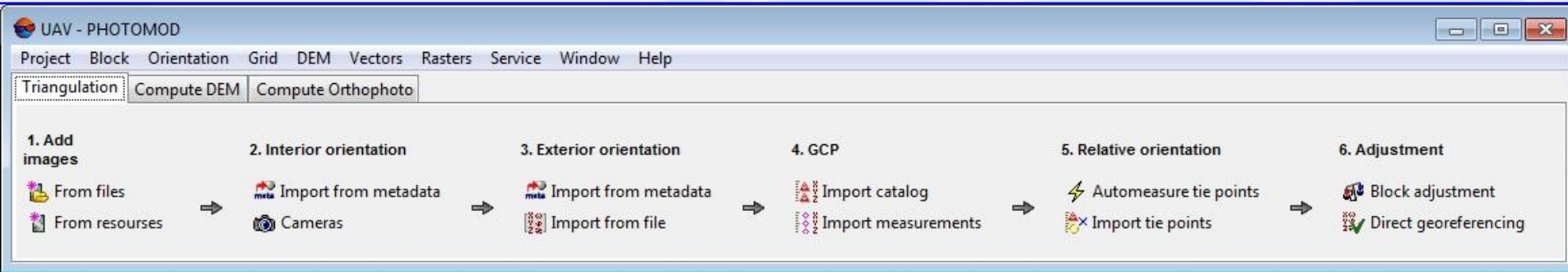
Full GDAL library support



Forestry taxation product – PHOTOMOD StereoMeasure



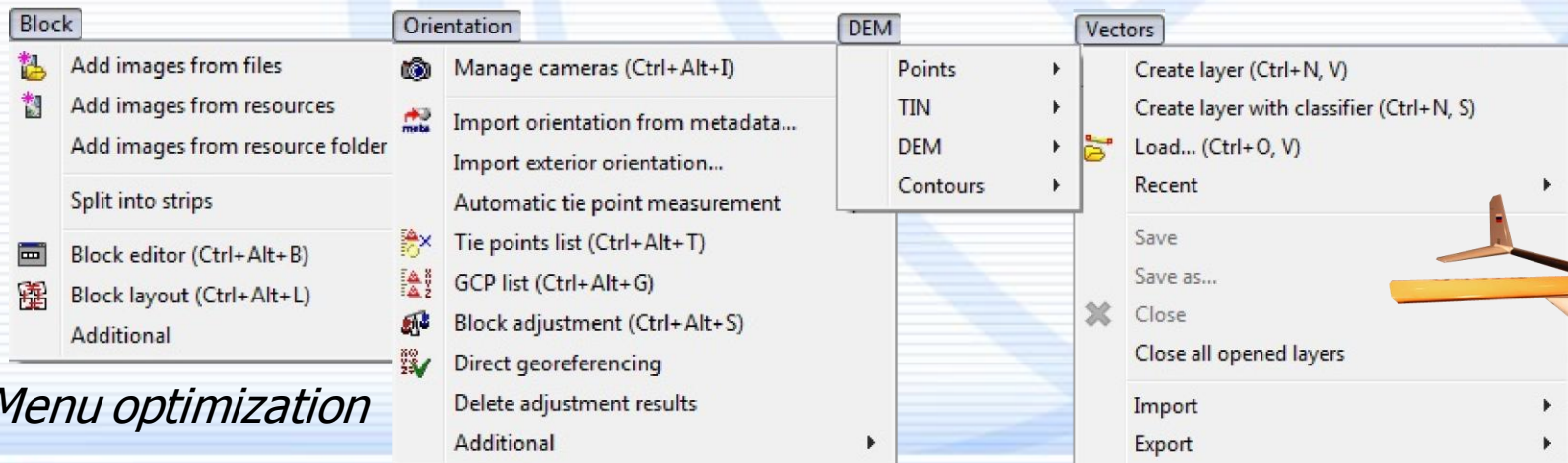
New PHOTOMOD UAS interface



Main panel



Easy-to-use workflow



Menu optimization



Feature-based AT correlator for UAS imagery



Perfect reliability

(large number of measurements: > 150 per stereopair)

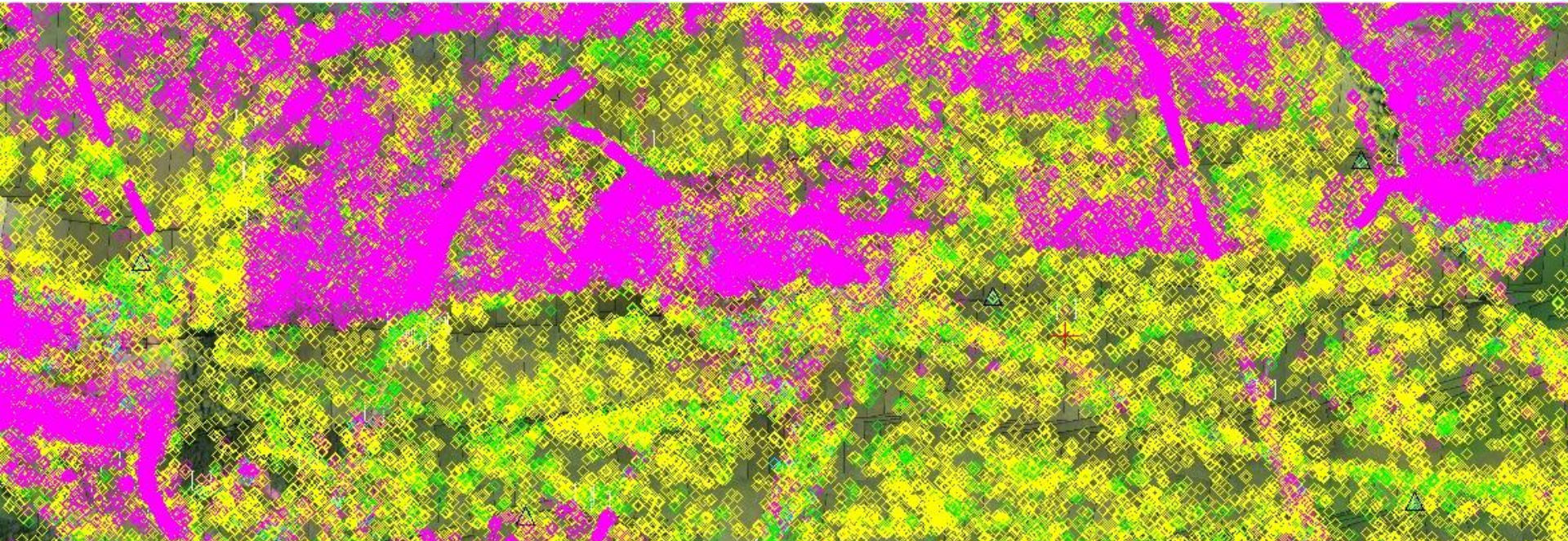


Good for low accurate data

(big EO angle values or no angle values)

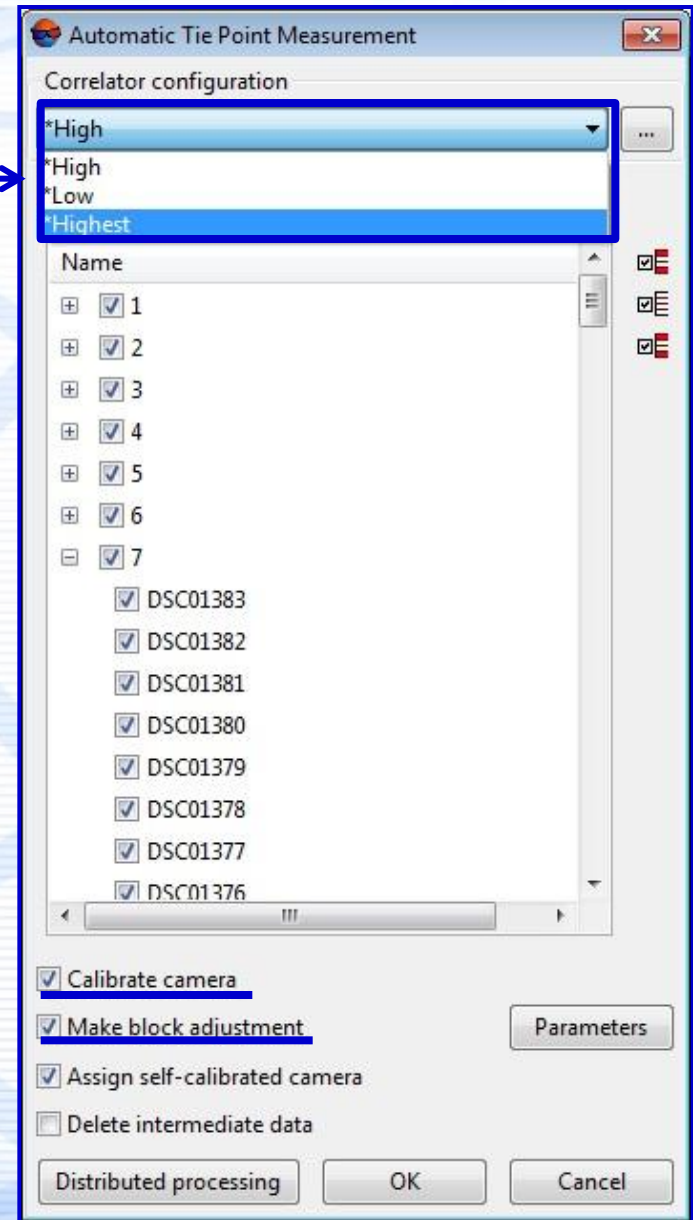


Full automation *(distributed processing available)*



New feature-based AT correlator

- ✓ Three preinstalled correlator presets depending on accuracy required
- ✓ Camera self-calibration included
- ✓ Immediate block adjustment



Old AT correlator vs. New AT correlator

Delta M UAV, SONY DSC-RX1

1212 images, 9.7 sq. km, 5 cm GSD

Area-based

Feature-based

~ 40 000 tie points

~ 200 000 tie points

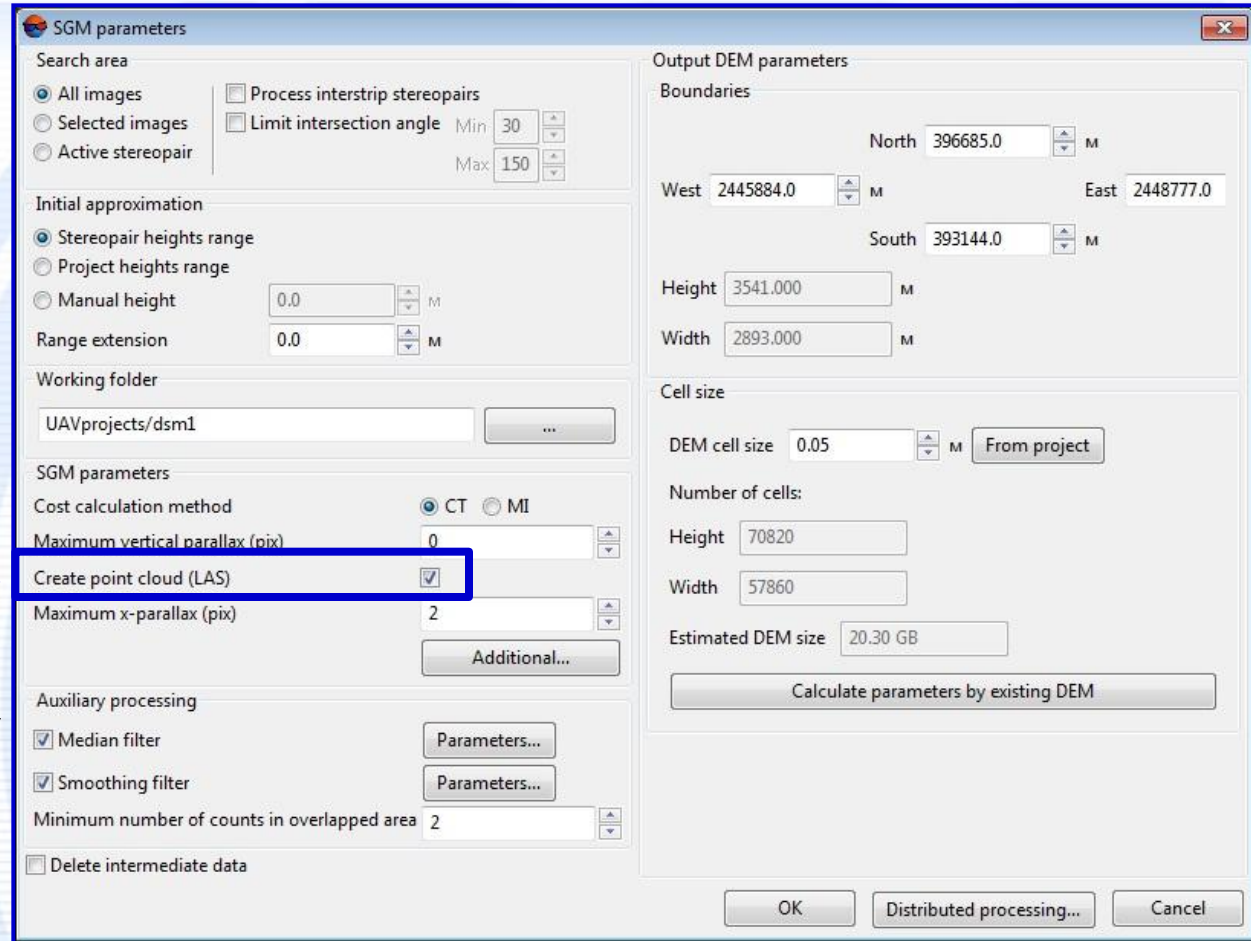


Dense 3D-point cloud

✓ Option in *Dense DSM (SGM method)*

✓ Pixel density

✓ Subpixel accuracy

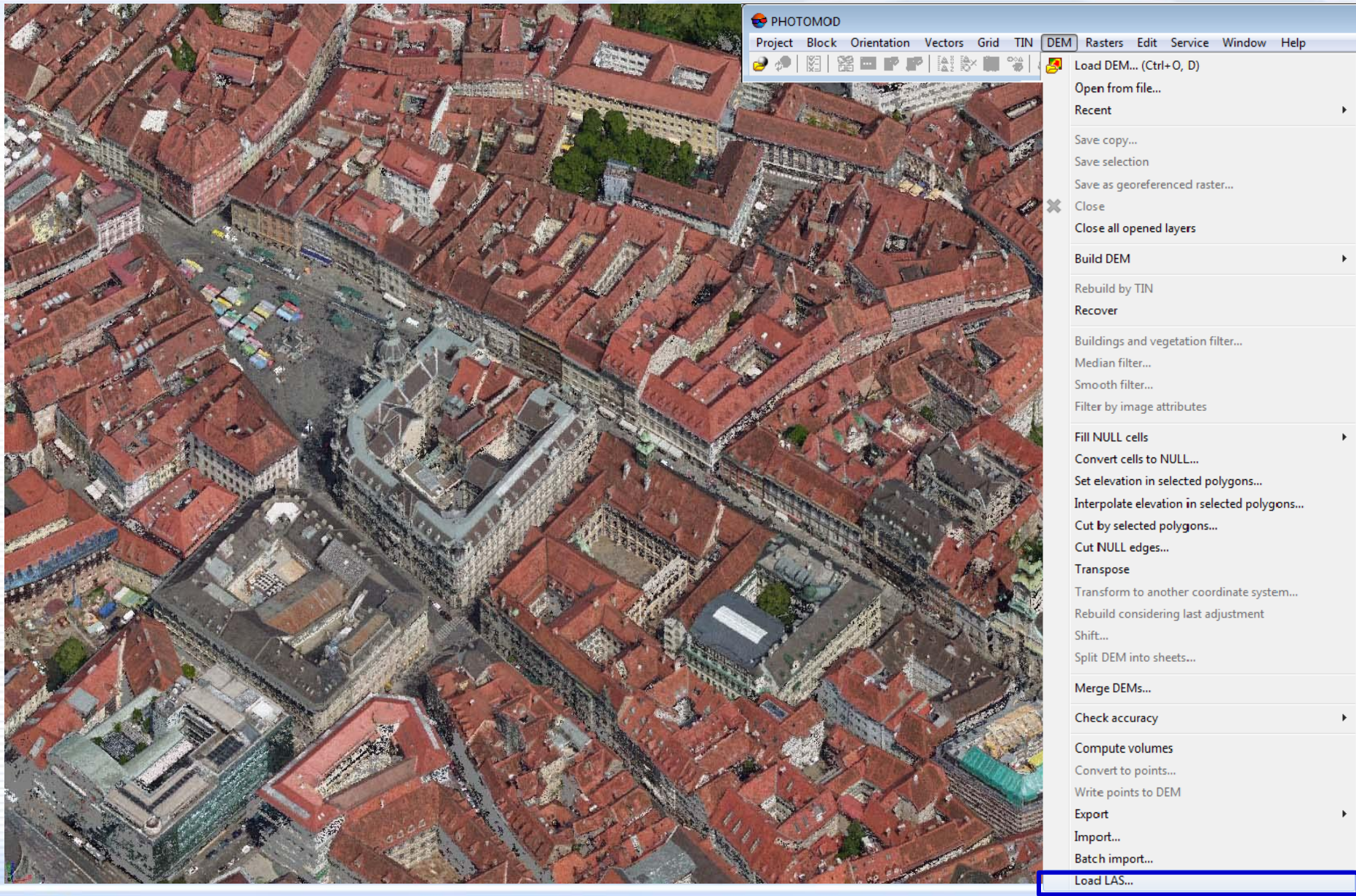


✓ Available for all imagery data types (aerial, UAS, satellite)

✓ Best for oblique aerial imagery



New 3D-viewer for LAS data



3D-point cloud (Graz, UltraCam Osprey Prime II)



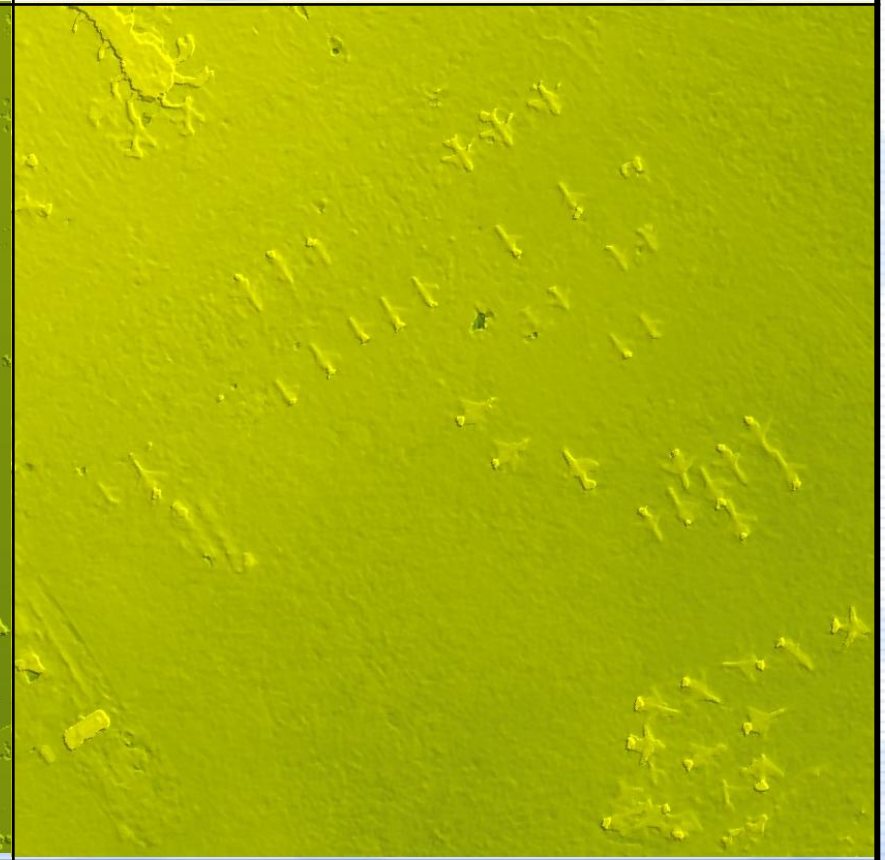
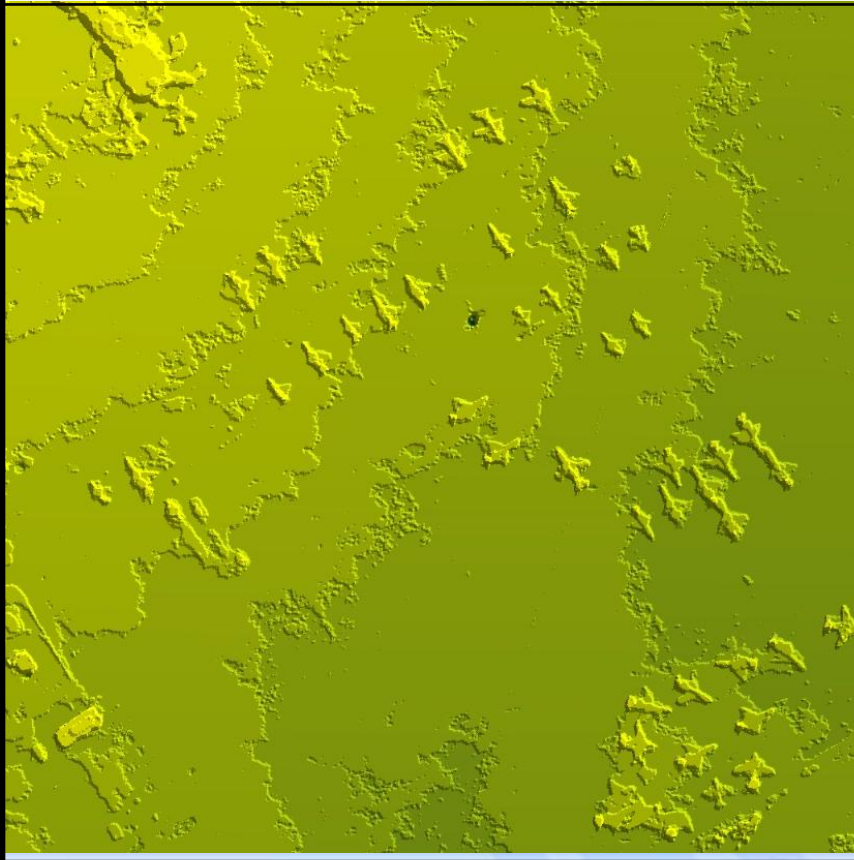
Subpixel accuracy of dense DSM (SGM method)

Domodedovo Airport, IKONOS, 1 m GSD

1 x 1 m DSM

PHOTOMOD 6.0 – 6.1

PHOTOMOD 6.2



Automatic strip-by-strip block layout for oblique images

Block

- Add strip
- Delete strip
- Strip properties
- Invert strips order
- Selected strips to block start
- Selected strips to block end
- Move selected strips up
- Move selected strips down
- Make selected strips irregular
- Make selected strips regular
- Add images from files
- Add images from resources
- Add images from resource folder
- Delete images
- Delete images selectively...
- Image properties
- Move images
- Image radiometric correction...
- Show images
- Show selected images only
- Check images
- Mark all images as checked
- Marker to selected image
- Block layout
 - Split into strips
 - By image names...
 - By exterior orientation data...
 - VisionMap block
 - By metadata
 - Split by multiple cameras**
- Rotate selected images
- Rotate images by block layout
- Set GSD
- Create overlap map...
- Create vector layers from block layout
- Build pre-regions...
- Export block layout to KML...
- Reference crosses conversion

Block editor

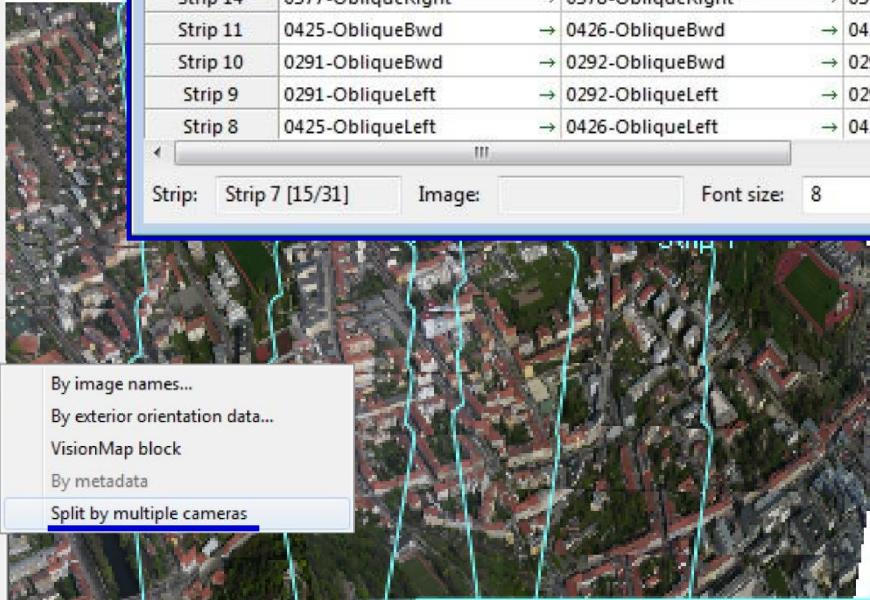
	1	2	3	4
Strip 20	0339-ObliqueRight	→ 0340-ObliqueRight	→ 0341-ObliqueRight	→ 0342-ObliqueRight →
Strip 19	0377-ObliqueBwd	→ 0378-ObliqueBwd	→ 0379-ObliqueBwd	→ 0380-ObliqueBwd →
Strip 18	0377-ObliqueFwd	→ 0378-ObliqueFwd	→ 0379-ObliqueFwd	→ 0380-ObliqueFwd →
Strip 17	Hi-RGB0377	→ Hi-RGB0378	→ Hi-RGB0379	→ Hi-RGB0380 →
Strip 16	0339-ObliqueFwd	→ 0340-ObliqueFwd	→ 0341-ObliqueFwd	→ 0342-ObliqueFwd →
Strip 15	Hi-RGB0339	→ Hi-RGB0340	→ Hi-RGB0341	→ Hi-RGB0342 →
Strip 12	0339-ObliqueBwd	→ 0340-ObliqueBwd	→ 0341-ObliqueBwd	→ 0342-ObliqueBwd →
Strip 13	0291-ObliqueFwd	→ 0292-ObliqueFwd	→ 0293-ObliqueFwd	→ 0294-ObliqueFwd →
Strip 14	0377-ObliqueRight	→ 0378-ObliqueRight	→ 0379-ObliqueRight	→ 0380-ObliqueRight →
Strip 11	0425-ObliqueBwd	→ 0426-ObliqueBwd	→ 0427-ObliqueBwd	→ 0428-ObliqueBwd →
Strip 10	0291-ObliqueBwd	→ 0292-ObliqueBwd	→ 0293-ObliqueBwd	→ 0294-ObliqueBwd →
Strip 9	0291-ObliqueLeft	→ 0292-ObliqueLeft	→ 0293-ObliqueLeft	→ 0294-ObliqueLeft →
Strip 8	0425-ObliqueLeft	→ 0426-ObliqueLeft	→ 0427-ObliqueLeft	→ 0428-ObliqueLeft →

Strip: Strip 7 [15/31] Image: Font size: 8

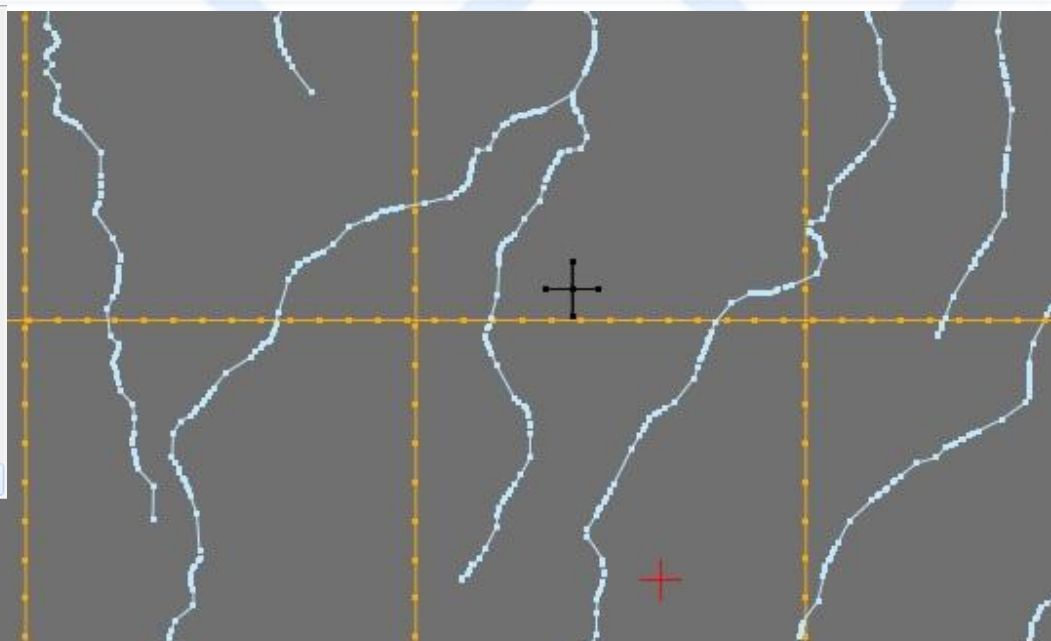
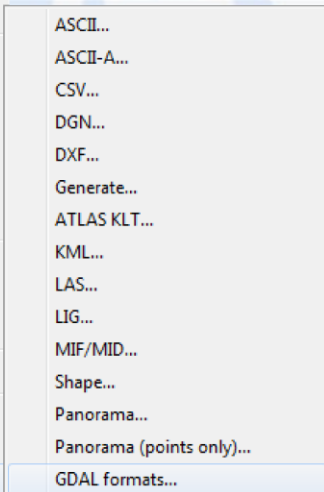
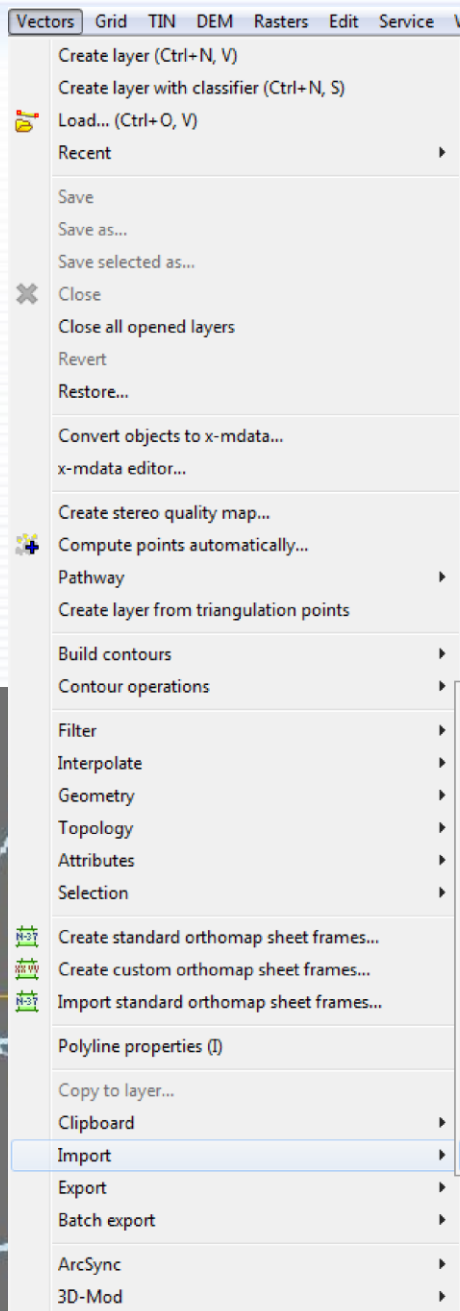
Split parameters

- Using image names
- Using ExtOr
- Max angle deviation
- Auto mode

OK Cancel



Full GDAL library



Support of KOMPSAT-3 pan-sharpened product

Products

ID	Product type	Product format	
L0F_20140819085828_12034_101	Level1R	GEOTIFF	2
L0F_20140819085828_12034_101	Level1R	GEOTIFF	1
L0F_20140926085348_12589_078	Level1R	GEOTIFF	2
L0F_20140926085348_12589_078	Level1R	GEOTIFF	1
L0F_20150930084446_17979_070	Level1R	GEOTIFF	2

Product files list

Name	
k3_20140819071531_12033_06511409_ilr_aux.xml	\\COREZ\
k3_20140819071531_12033_06511409_ilr_PB.tif	\\COREZ\
k3_20140819071531_12033_06511409_ilr_PG.tif	\\COREZ\
k3_20140819071531_12033_06511409_ilr_PN.tif	\\COREZ\
k3_20140819071531_12033_06511409_ilr_PR.tif	\\COREZ\
k3_20140819071531_12033_06511409_ilr_P_rpc.txt	\\COREZ\
k3_20140819071531_12033_06511409_ilr_brjpg	\\COREZ\

Product images list

ID	Width	Height	Bands	Bytes/l
L0F_20140819085828_12034_101 Level1R PMS	24060	22220	4	8

Images

Project images

- L0F_20140819085828_12034_101 Level1R PMS
- L0F_20140926085348_12589_078 Level1R PMS
- L0F_20150930084446_17979_070 Level1R PMS
- L0F_20151110072852_18577_070 Level1R PMS[1]

Current image

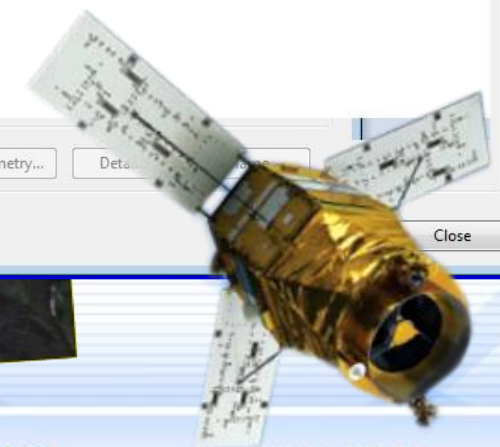
ID: L0F_20140819085828_12034_101 Level1R PMS

Name in project: L0F_20140819085828_12034_101 Level1R PMS

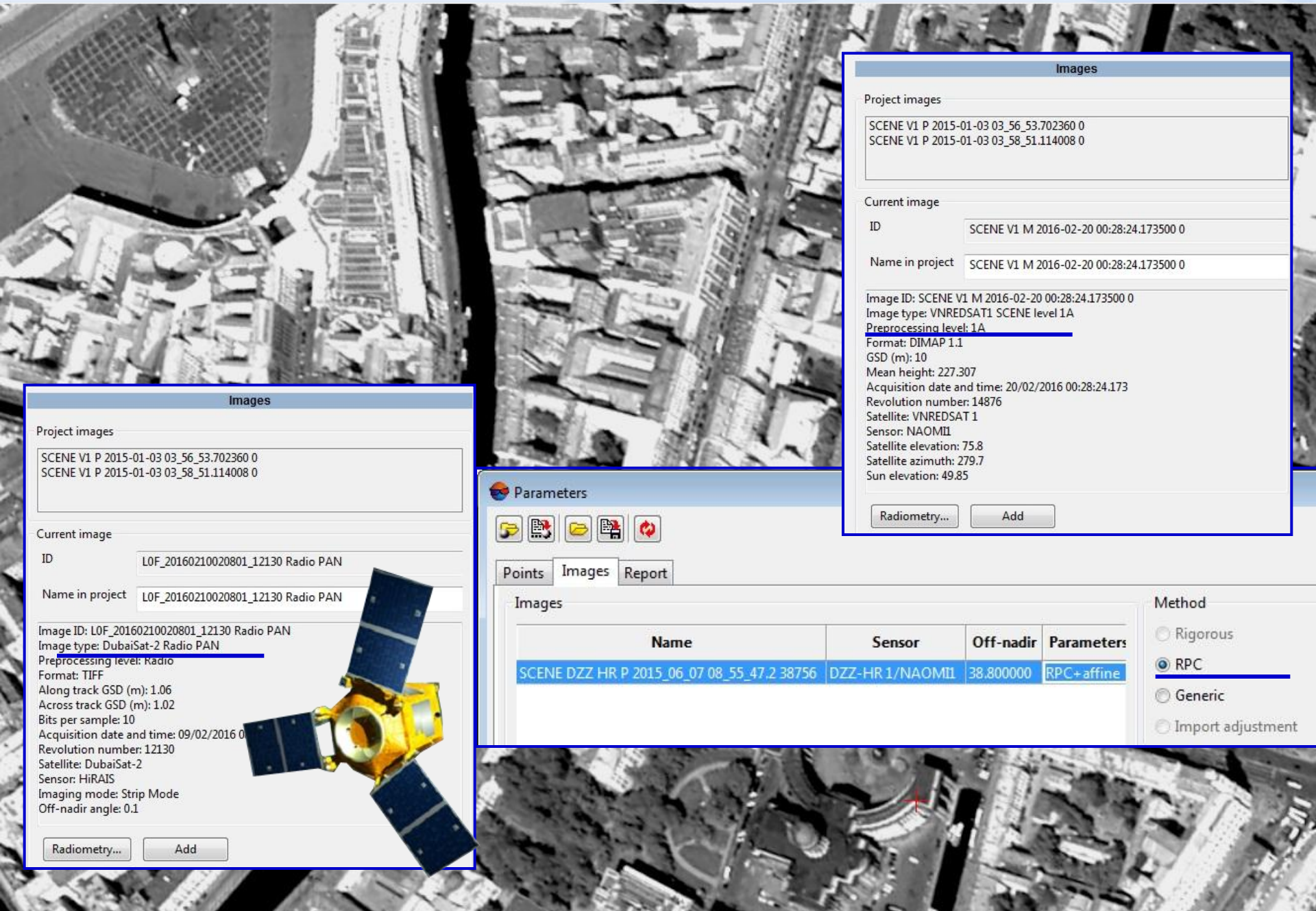
Image ID: L0F_20140819085828_12034_101 Level1R PMS
 Image type: KOMPSAT-3 Level1R PMS
 Preprocessing level: Level1R
 Format: GEOTIFF
 Along track GSD (m): 0.720101
 Across track GSD (m): 0.725193
 Acquisition date and time: 19/08/2014 07:15:57.326
 Revolution number: 12033
 Satellite: KOMPSAT-3
 Sensor: AEISS
 Imaging mode: Strip Imaging Mode
 Off-nadir angle: 7.9
 Raster height: 22220

Added images

Name	R	ID	Type	Width	Height	Bands	Bytes/pixe



VNREDSat-1, DubaiSat-2, KazEOSat (RPC)



Images

Project images

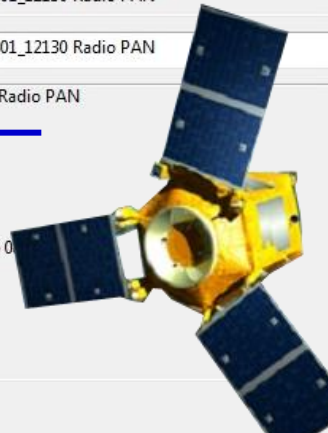
SCENE V1 P 2015-01-03 03_56_53.702360 0
SCENE V1 P 2015-01-03 03_58_51.114008 0

Current image

ID: LOF_20160210020801_12130 Radio PAN






Name in project: LOF_20160210020801_12130 Radio PAN

Image ID: LOF_20160210020801_12130 Radio PAN
Image type: DubaiSat-2 Radio PAN
Preprocessing level: Radio
Format: TIFF
Along track GSD (m): 1.06
Across track GSD (m): 1.02
Bits per sample: 10
Acquisition date and time: 09/02/2016 0
Revolution number: 12130
Satellite: DubaiSat-2
Sensor: HiRAIS
Imaging mode: Strip Mode
Off-nadir angle: 0.1



Radiometry... Add

Parameters

Points Images Report

Images

Name	Sensor	Off-nadir	Parameters
SCENE DZZ HR P 2015_06_07 08_55_47.2 38756	DZZ-HR 1/NAOMII	38.800000	RPC+affine

Images

Project images

SCENE V1 P 2015-01-03 03_56_53.702360 0
SCENE V1 P 2015-01-03 03_58_51.114008 0

Current image

ID: SCENE V1 M 2016-02-20 00:28:24.173500 0

Name in project: SCENE V1 M 2016-02-20 00:28:24.173500 0

Image ID: SCENE V1 M 2016-02-20 00:28:24.173500 0
Image type: VNREDSAT1 SCENE level 1A
Preprocessing level: 1A
Format: DIMAP 1.1
GSD (m): 10
Mean height: 227.307
Acquisition date and time: 20/02/2016 00:28:24.173
Revolution number: 14876
Satellite: VNREDSAT 1
Sensor: NAOMII
Satellite elevation: 75.8
Satellite azimuth: 279.7
Sun elevation: 49.85

Radiometry... Add

Method

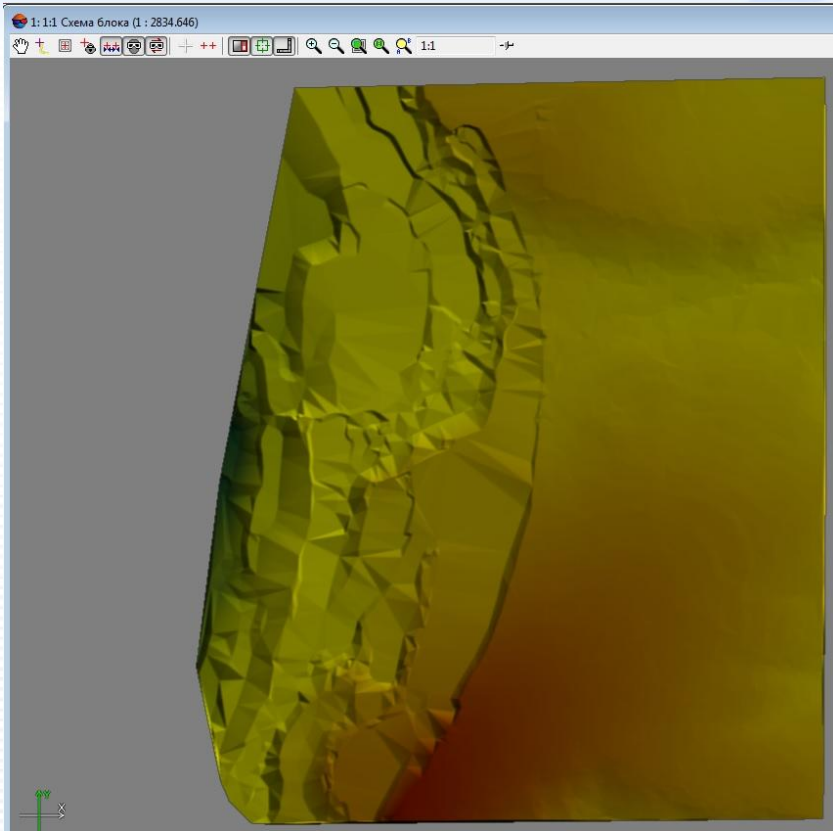
Rigorous

RPC

Generic

Import adjustment

Cut and fill volume calculations



Volumes calculation

Data for calculation

TIN

DEM /Civil 3D/DEM_excavator_1m.x-dem

Precision of DEM 1.0 metre

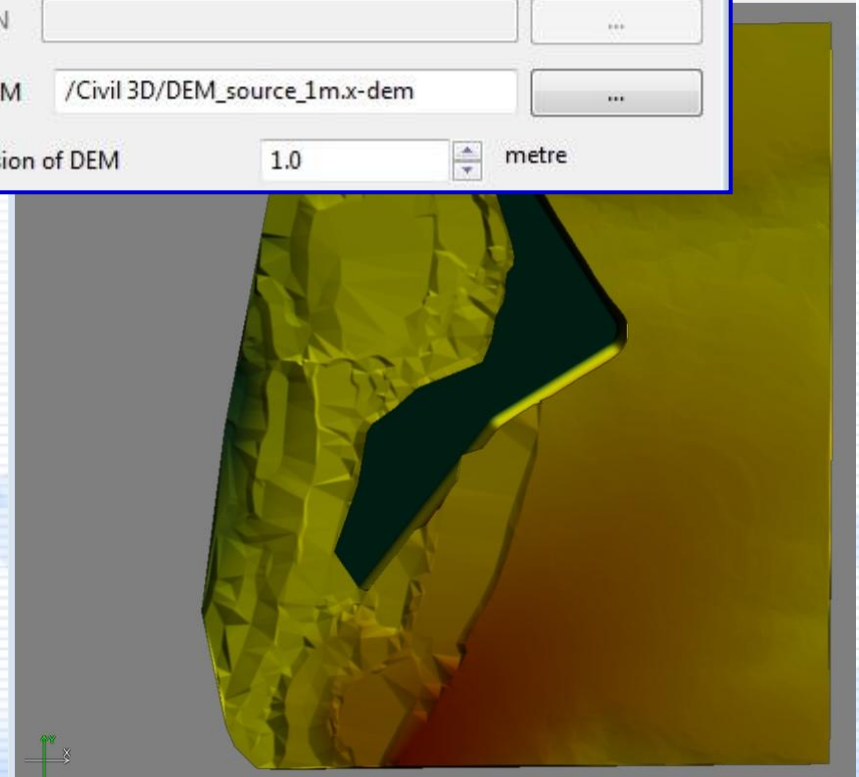
Reference data

Constant elevation 0.0 metre

TIN

DEM /Civil 3D/DEM_source_1m.x-dem

Precision of DEM 1.0 metre



Embankment volume: 244.99m³

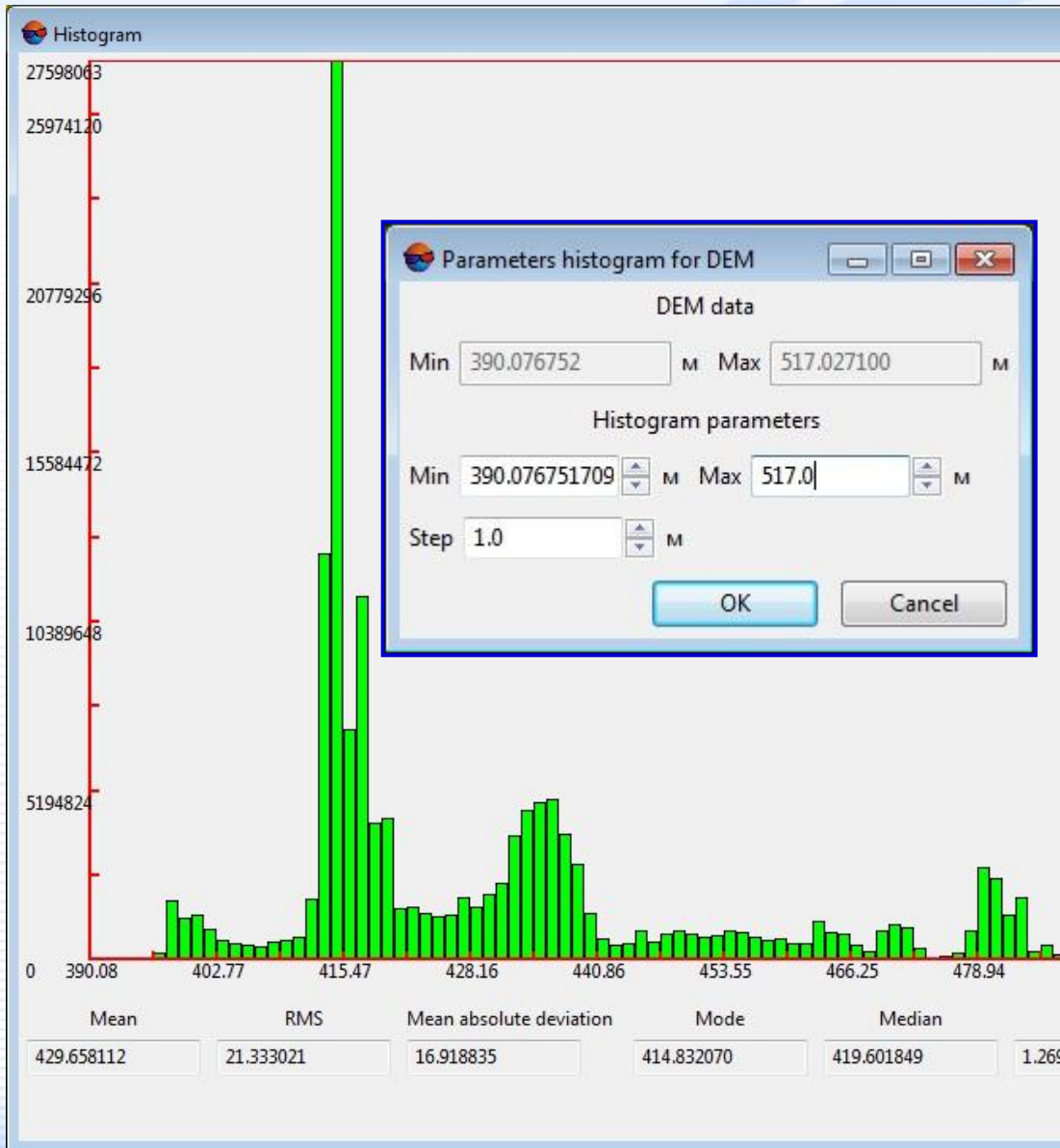
Excavation volume: 386109m³

Relative volume of changes: -385864m³

Absolute volume of changes: 386354m³

Target area: 39995m²

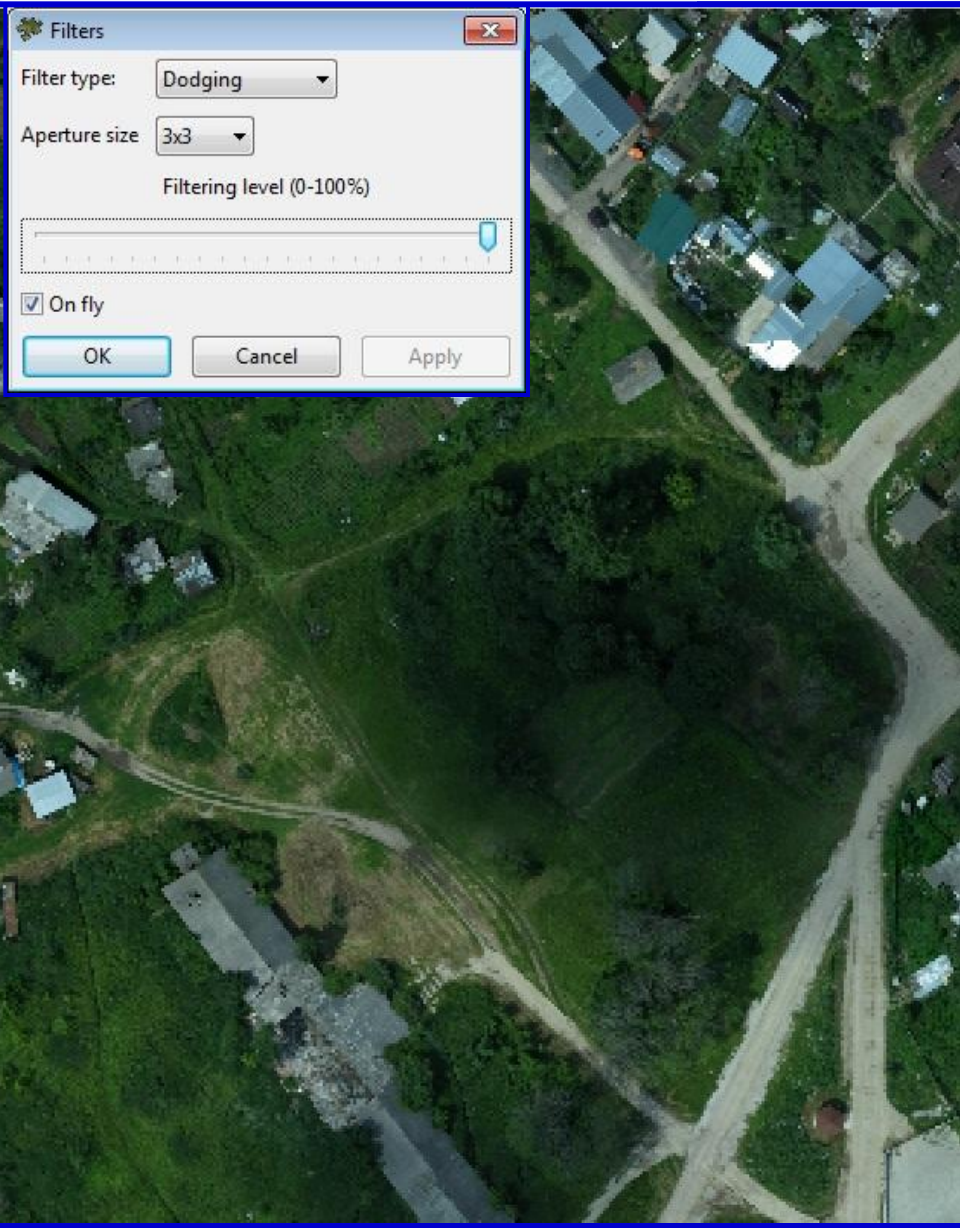
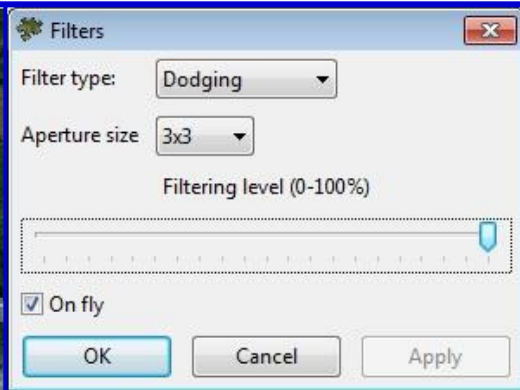
Histogram by DEM



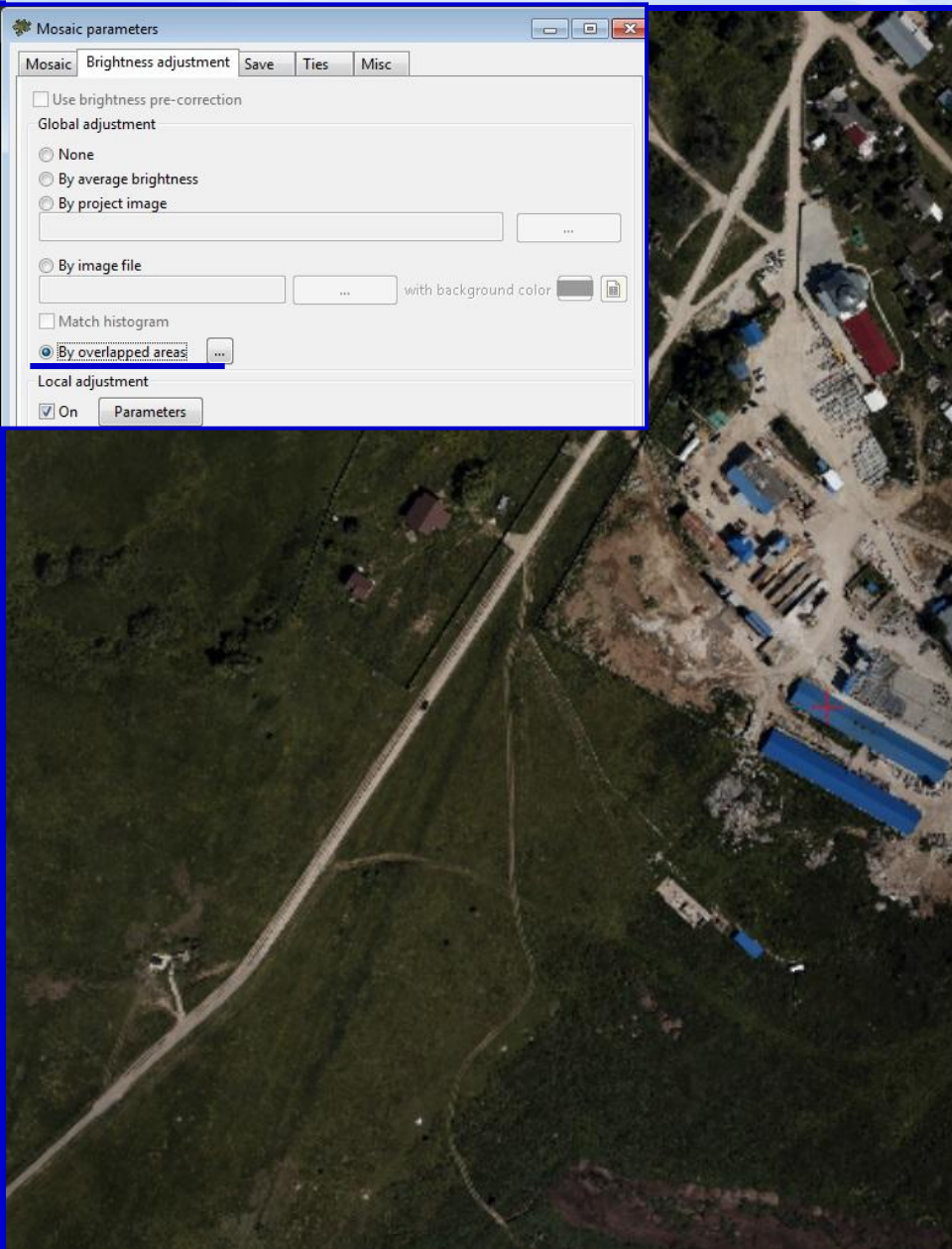
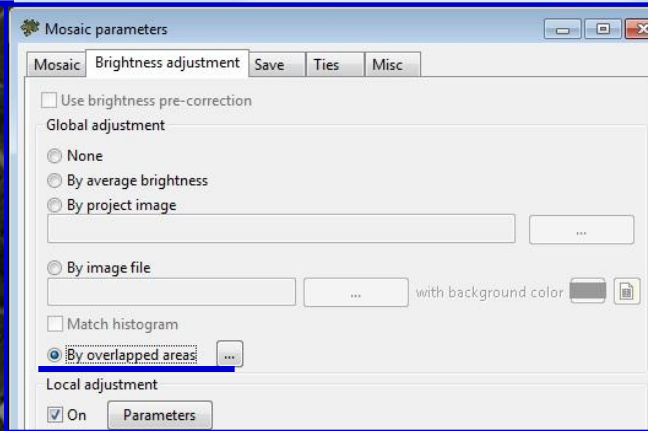
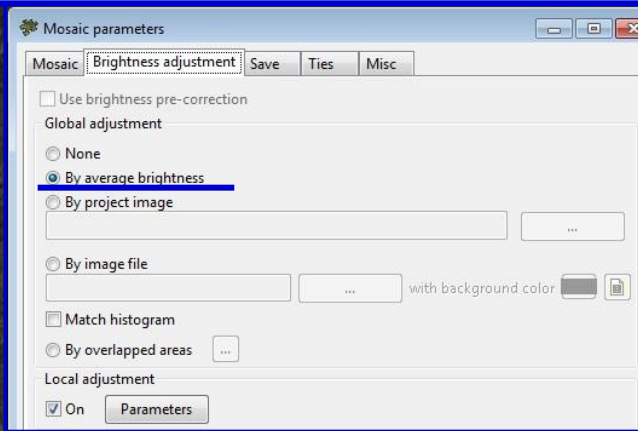
- DEM Rasters Edit Service Window Help
- Load DEM... (Ctrl+O, D)
- Open from file...
- Recent
- Save copy...
- Save selection
- Save as georeferenced raster...
- Close
- Close all opened layers
- Build DEM
- Rebuild by TIN
- Recover
- Buildings and vegetation filter...
- Median filter...
- Smooth filter...
- Filter by image attributes
- Fill NULL cells
- Convert cells to NULL...
- Set elevation in selected polygons...
- Interpolate elevation in selected polygons...
- Cut by selected polygons...
- Cut NULL edges...
- Transpose
- Transform to another coordinate system...
- Rebuild considering last adjustment
- Shift...
- Split DEM into sheets...
- Merge DEMs...
- Check accuracy
- Compute volumes
- Convert to points...
- Write points to DEM
- Export
- Import...
- Batch import...
- Load LAS...

- Build difference DEM...
- Compare DEMs...
- Search for NULL cells
- Check against TIN
- Check against vector objects
- Check against triangulation points
- Calculate DEM boundaries...
- Create histogram by DEM

Dodging



Color balancing by overlapped areas



PHOTOMOD StereoMeasure



Stereomeasurement



Stereovectorization



Stereointerpretation

Measurement

Save measurements in layer

X	3226029.552	Y	529092.258	Z	73.242
Xp	3226029.552	Yp	529092.258	Zp	43.896
dX	0.000	dY	0.000	dZ	29.347

ForestInterpretation

Project Edit Directories Help

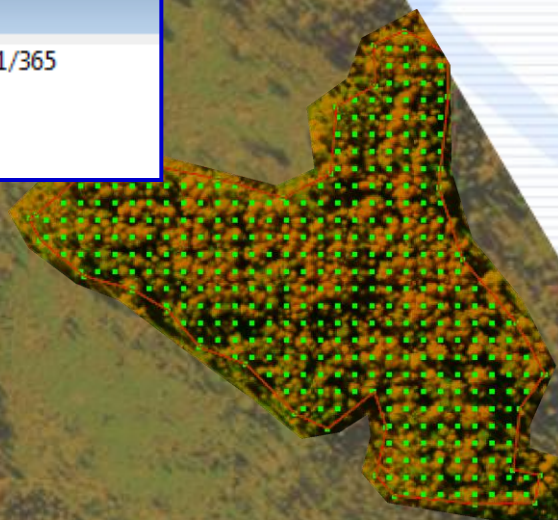
+ -

	Breed	Crown color	Crown projection shape	Shadow shape	Crown convexity	Crown projection size	Gap shape	Gap size	Visibility in depth	Gap color
1										

PHOTOMOD 6.1.1979

0 28.09.2016 20:19:14: Pickets/Grid nodes: 331/365
Canopy of forest: 0.906849

0



More features in PHOTOMOD 6.2

Raster operations

- ✓ Loading reference rmc-file to the Radiometric correction window

AT and Block adjustment

- ✓ Export of triangulation points sketches
- ✓ Ability to show adjustment errors and sort points based on them

DTM

- ✓ DEM loading from external sources (SRTM)
- ✓ DEM filtration by radiometric properties
- ✓ Ability to hide TIN with a hot key while editing points

Orthorectification

- ✓ Filling invisible areas by background color

Satellite imagery processing

- ✓ Ability to use image georeference while pan-sharpening

Vector editor

- ✓ Interactive managing settings of vectors interpolation

Utilities

- ✓ PHOTOMOD GeoCalculator. First version for Android OS
- ✓ Estimation of AT and SGM calculation productivity in PHOTOMOD system



PHOTOMOD GeoCalculator for Android OS

GeoCalcGOST

Geodetic WGS 84, heights above ellipsoid

φ 57 26 43.875

λ 38 54 12.886

H 12.023

↓ ↑

Gauss-Kruger, Pulkovo 95, heights above EGM96 geoid model

X 6369632.420

Y 7494325.459

H 6.235

← GeoCalcGOST

GOST Version

GOST R 51794-2001

GOST R 51794-2008

Latitude/longitude

Degrees

Degrees Minutes Seconds

Extended

Enable additional calculations

The additional calculations include conversions from/to WGS-84/UTM reference system and using EGM96 geoid model which are not considered in GOST 51794.

10:20

VDNKh ВДНХ

Kosmonavtov-St

pr-t. Mira

Yaroslavskae ul.

Google

Парк Дорога к Храму

← ↻ 📍 ✓

Productivity of AT and SGM in PHOTOMOD

Calc Performance PHOTOMOD

Camera Advanced Exit

Active Camera: >

Survey		Hardware	
Instrip overlap, %	<input type="text" value="80"/>	Write speed, MB/s	<input type="text" value="32"/>
Interstrip overlap, %	<input type="text" value="80"/>	Number of cores	<input type="text" value="12"/>
Images in strip	<input type="text" value="100"/>	Image size, MB	<input type="text" value="220.0"/>
Number of strips	<input type="text" value="50"/>	SGM	
Number of Images	<input type="text" value="5000"/>	Cell size, m	<input type="text" value="0.3"/>
<input checked="" type="radio"/> GSD, m	<input type="text" value="0.1"/>	Performance for block Mpix / 1 core / h	<input type="text" value="19.52"/>
<input type="radio"/> Height above ground, m	<input type="text" value="1 642.86"/>	Performance for stereopair Mpix / 1 core / h	<input type="text" value="121.51"/>
Area of survey, km ²	<input type="text" value="484.632"/>	Time	
		Images loading, h	<input type="text" value="9.55"/>
		AT, h	<input type="text" value="2.28"/>
		SGM, h	<input type="text" value="68.96"/>
		Total, h	<input type="text" value="80.79"/>

(c) Racurs 2016



Thank you for attention !

