КОМПАНИЯ «СОВЗОНД»

ГЕОИНФОРМАЦИОННЫЕ СИСТЕМЫ И КОСМИЧЕСКИЙ МОНИТОРИНГ

SOVZOND

СОВЗОНД

PROCESSING OF NEW TYPE OF REMOTE SENSING DATA - VIDEOS CAPTURED BY SKYSAT SATELLITES

Lisbon 2015
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GEOGRAPHIC INFORMATION SYSTEMS AND SPACE MONITORING

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SPATIAL DATA

Remote Sensing

- Optoelectronic satellites
- Radar satellites

Orthoregion

Regional Spatial Datasets

Topographic and thematic maps

Digital Terrain Models and Digital Surface Models

SOFTWARE

INPHO

PhotoScan

ENVI Platform

SARscape

ArcGIS

Waterloo Hydrogeologic

TECHNICAL EQUIPMENT

Unmanned Aerial Vehicles

Computing clusters

Mobile workstation

Mobile mapping systems

Ground complex data acquisition and processing of remote sensing

Information visualization equipment

GEOINFORMATION ONLINE SERVICES

Firstlook

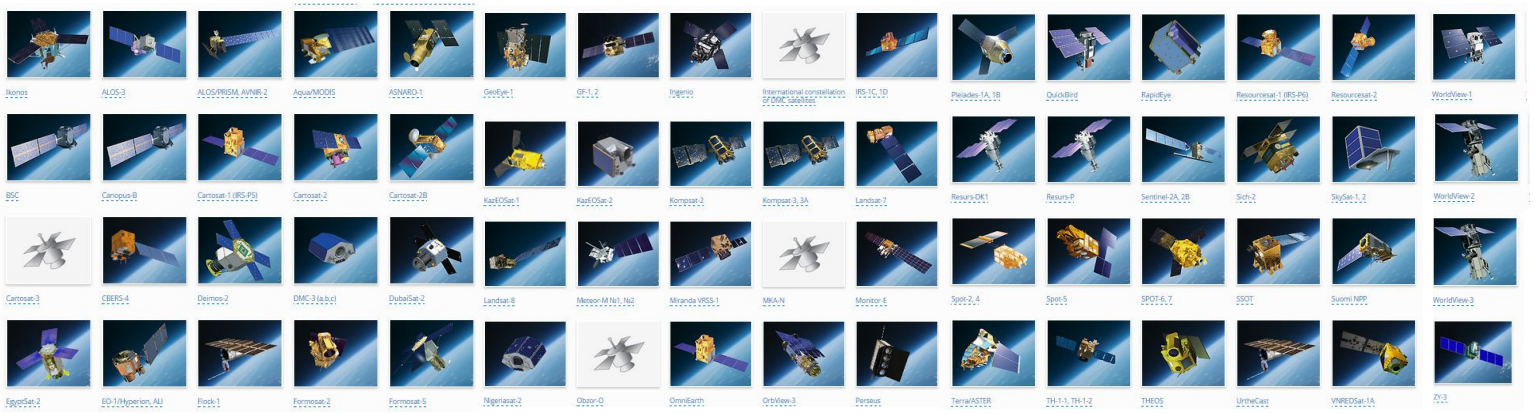
Global Basemap

Geomonitor

Catalog of satellite images

GEO-storage

Persistent Change Monitoring



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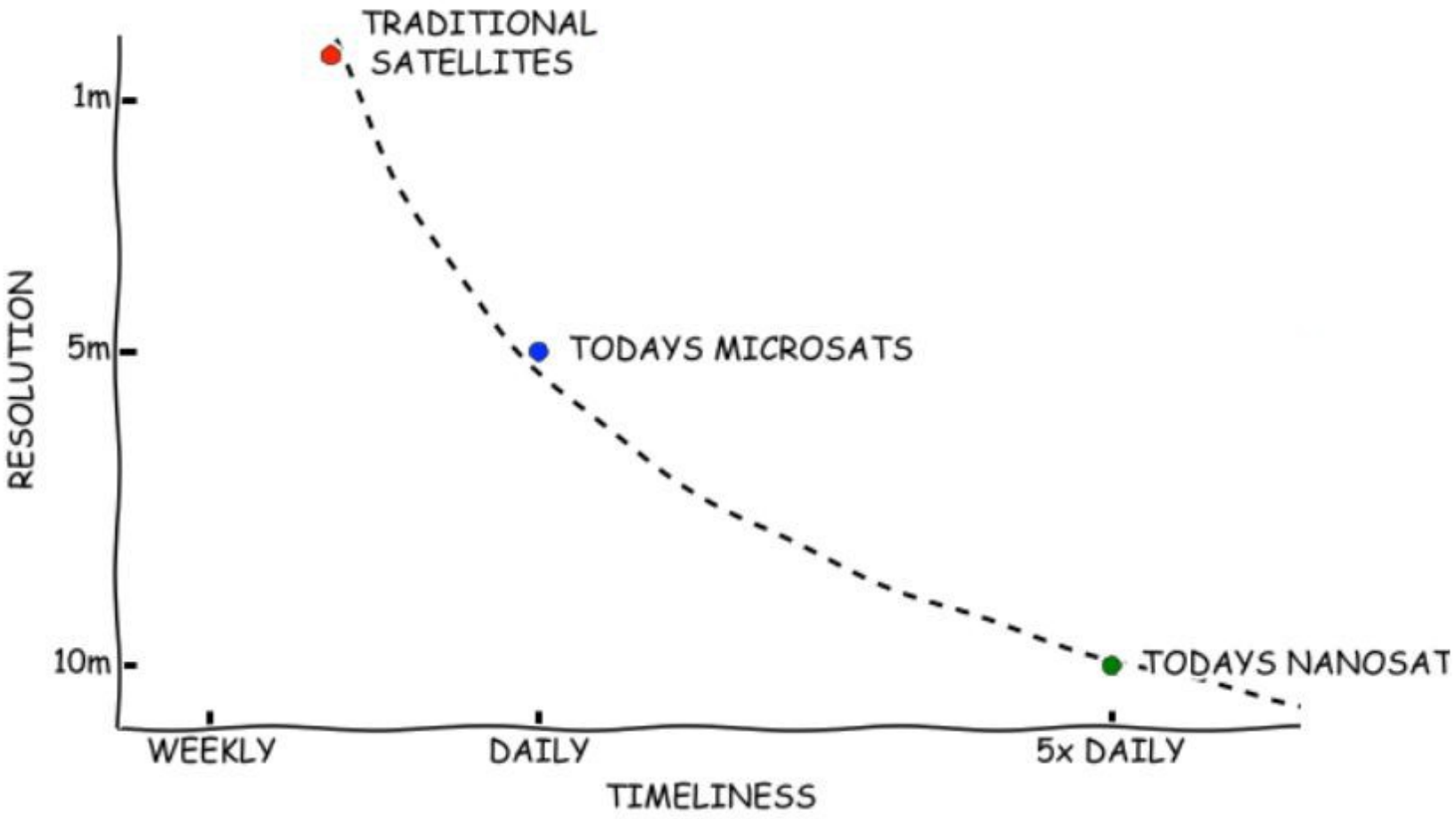
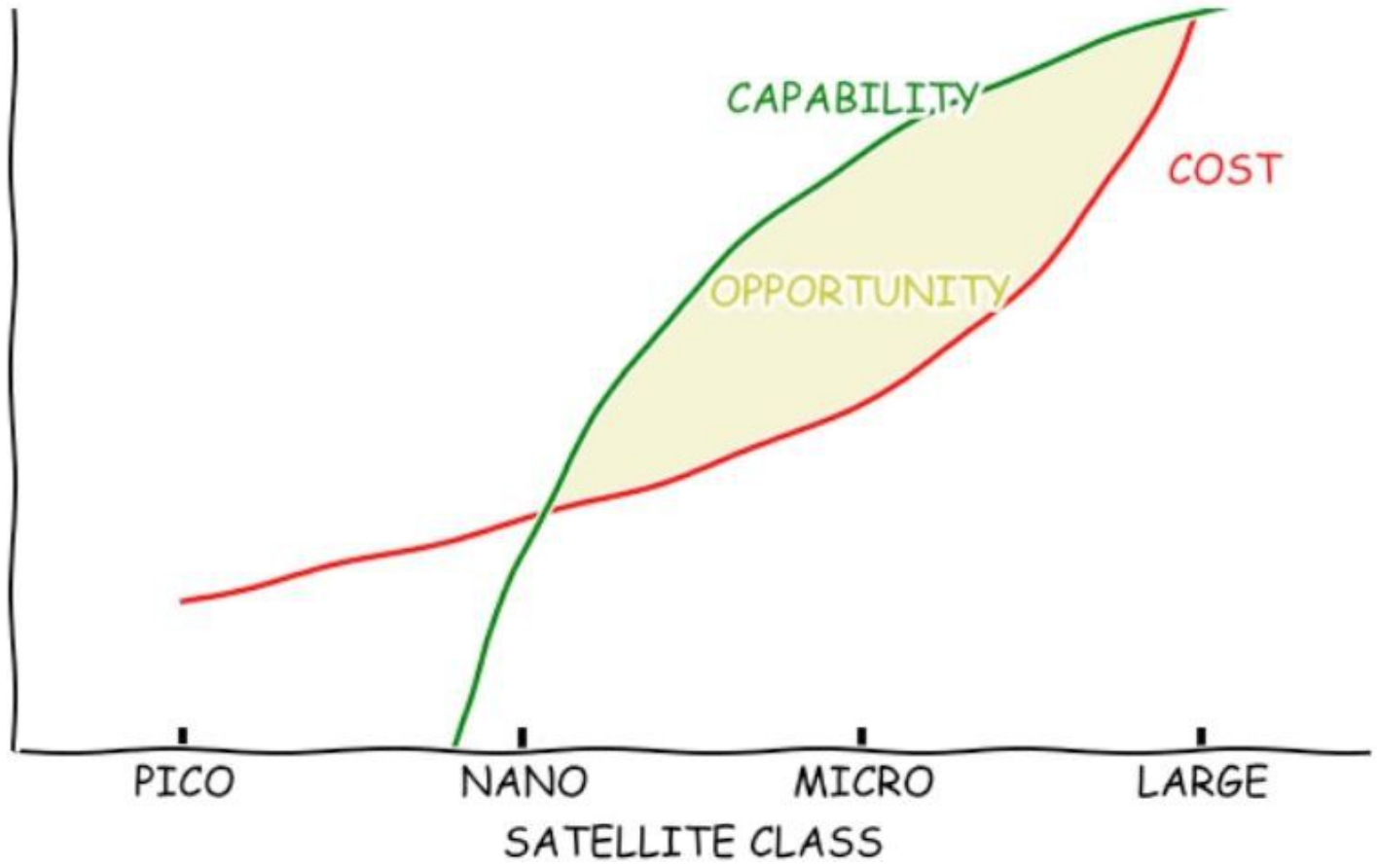
Satellite class



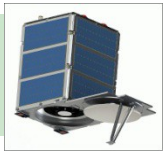
Satellite class



Satellite class

Skybox Imaging

SKYSATS



SkySat-1 specification

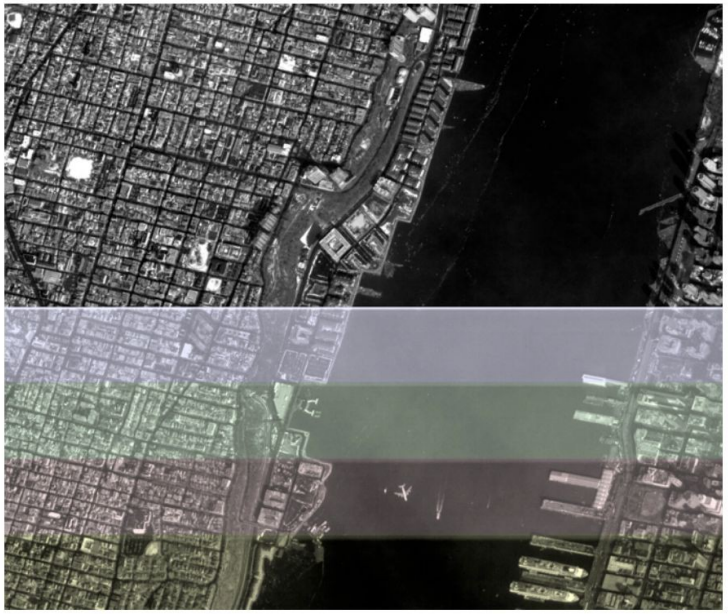
Launch Information	Date: November 21, 2013 Launch Vehicle: Dnepr Launch Site: Yasny, Russia
Orbit	Altitude: 590 kilometers
Mission Life	4+ years
Spacecraft Size and Mass	60cm x 60cm x 80cm 83kg
Sensor Bands	• Panchromatic: 450 - 900 nm • 4 Multispectral: Blue: 450 - 515 nm Green: 515 - 595 nm Red: 605 - 695 nm Near-IR: 740 - 900 nm
GSD	• Panchromatic: 0.9m at nadir • Multispectral: 2m at nadir • VIDEO (pan): 1.1m at nadir
Swath Width	8 km at nadir
Onboard Storage	768 GB
Communications	X-band Downlink: 300Mbps S-band Uplink. 16kbps
Revisit Frequency (at 40°N Latitude)	SkySat constellation in 2015: 1.8 per day

SkySat-2 specification

Launch Information	Date: July 8, 2014 Launch Vehicle: Soyuz-2/Fregat Launch Site: Baikonur, Kazakhstan
Orbit	Altitude: 590 kilometers
Mission Life	4+ years
Spacecraft Size and Mass	60cm x 60cm x 80cm 83kg
Sensor Bands	• Panchromatic: 450 - 900 nm • 4 Multispectral: Blue: 450 - 515 nm Green: 515 - 595 nm Red: 605 - 695 nm Near-IR: 740 - 900 nm
GSD	• Panchromatic: 0.9m at nadir • Multispectral: 2m at nadir • VIDEO (pan): 1.1m at nadir
Swath Width	8 km at nadir
Onboard Storage	768 GB
Communications	X-band Downlink: 300Mbps S-band Uplink. 16kbps
Revisit Frequency (at 40°N Latitude)	SkySat constellation in 2015: 1.8 per day

SkySat-1 & 2 cameras

"Pushframe" architecture
- Capture overlapping 2D images
- Stitch & blend on the ground



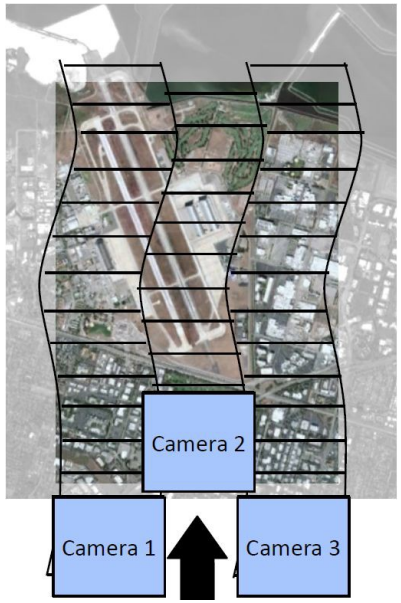


Image Bands	Pan	450 - 900 nm
	Blue	450 - 515 nm
	Green	515 - 595 nm
	Red	605 - 695 nm
	Near-IR	740 - 900 nm
Panchromatic GSD	90 cm at nadir	
Multispectral GSD	2 m at nadir	
Swath Width	8 km at nadir	
File Format	16-bit GeoTIFF	

SkySat-1 & 2. Imagery examples

Dameisha Beach in Shenzhen, China (Collected by SkySat-1 on 15.01.2014)

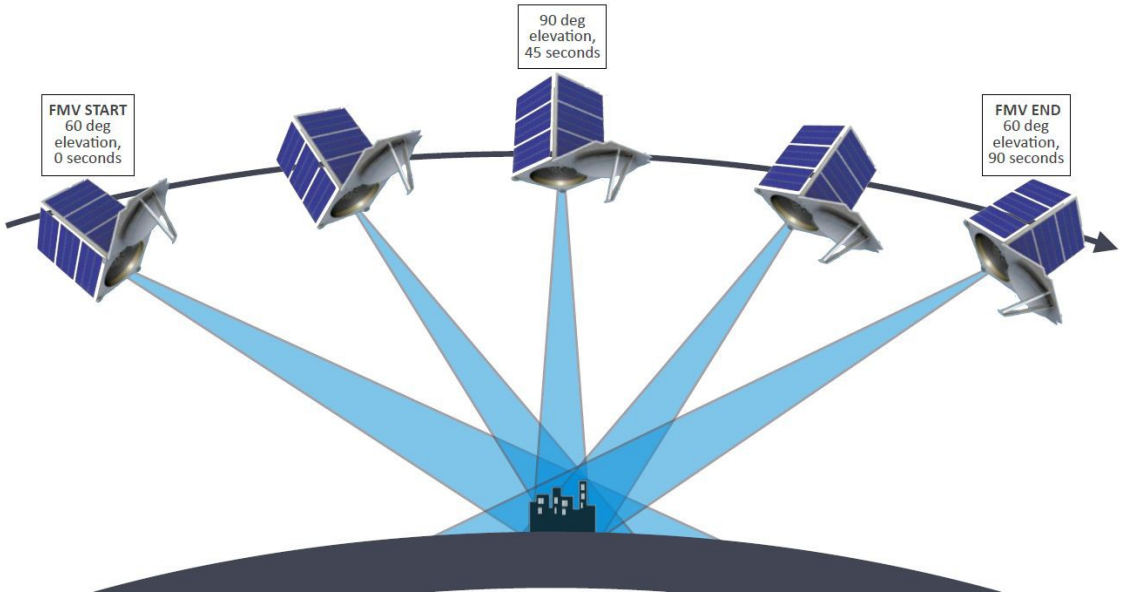
SkySat-1 & 2. Imagery examples

Port-au-Prince, Haiti (Collected by SkySat-2 on 10.07.2014)

SkySat-1 & 2. Imagery examples

Saga Prefecture, Kyushu, Japan (Collected by SkySat-1 on 15.05.2014)

SkySat-1 & 2 videos



Color	Panchromatic
GSD	1.1 m at nadir
Duration	Up to 90 seconds
Frame Rate	30 frames per second
Field of View	2 km by 1.1 km
File Format	MPEG-4 (H.264)

SkySat-1 & 2. Video examples

SkySat-1 Video of Turkey Mine on March 23, 2014

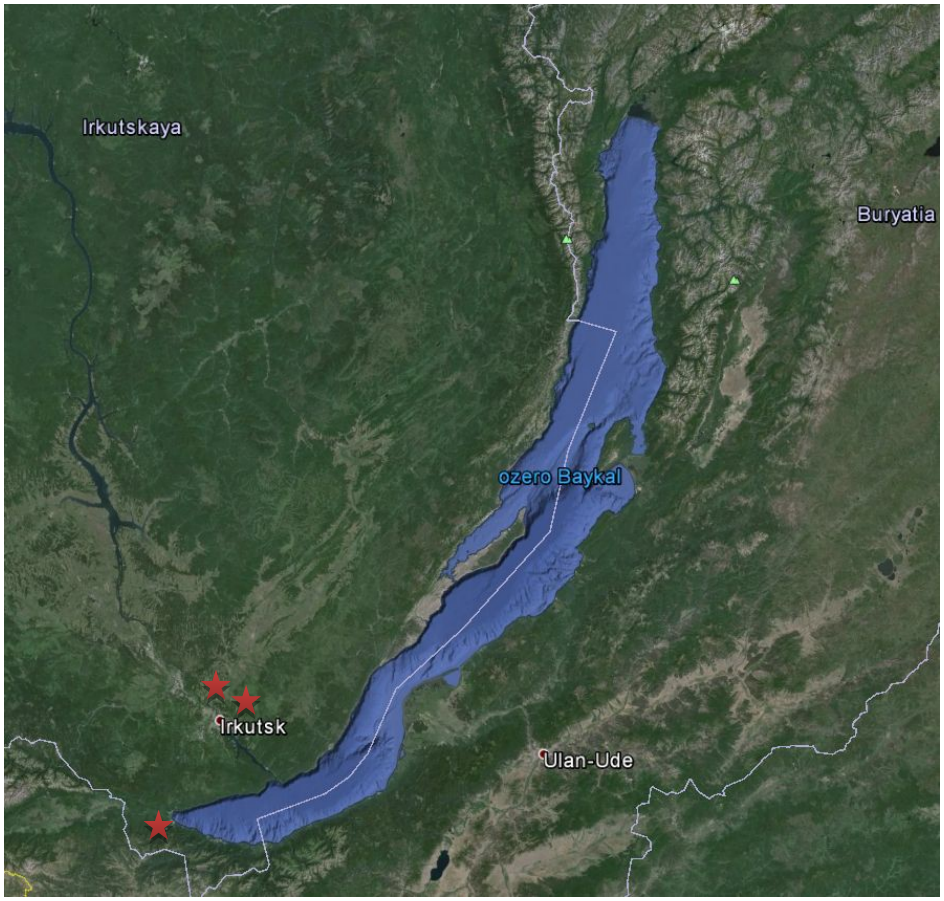
SkySat-1 & 2. Video examples

Software

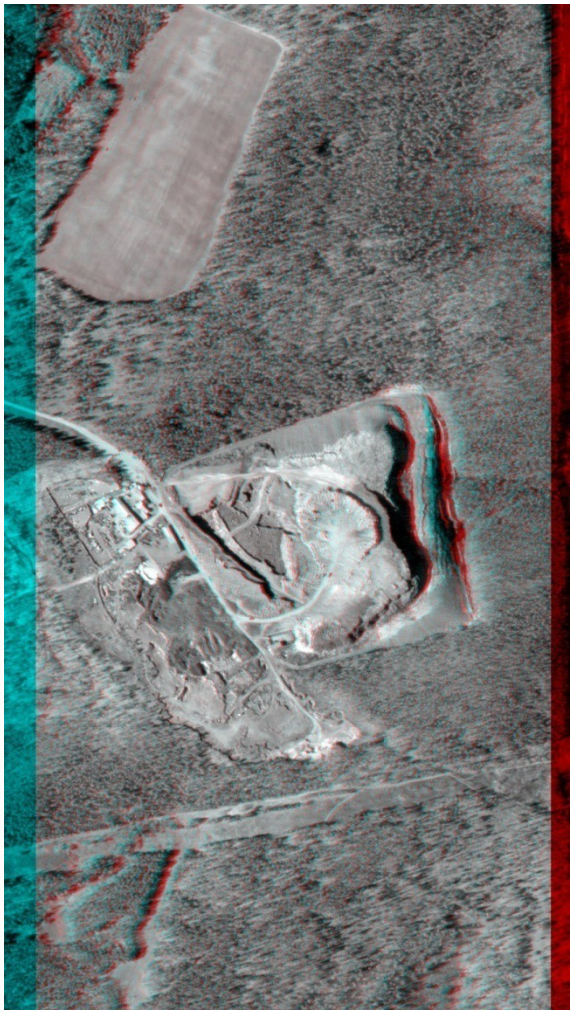
Software Partner	Software	Supported Version	Support	Date
BAE Systems	Socet GXP	v 4.1 patch	Virtual mosaic from image frames or metadata file (via RPCs)	June 2014
Intergraph	ERDAS IMAGINE	v 2014, SP1	Virtual mosaic from image frames (via RPCs) SkySat frame model in IMAGINE Photogrammetry	April 2014
Exelis VIS	ENVI	v 5.1 patch	Virtual mosaic and orthomosaic from image frames or metadata file (via RPCs)	March 2014
ESRI	ArcGIS	*TBD*	*TBD*	*TBD*
PCI	Geomatica	2013, SP3	Virtual mosaic and orthomosaic from image frames or metadata file (via RPCs)	Dec 2013

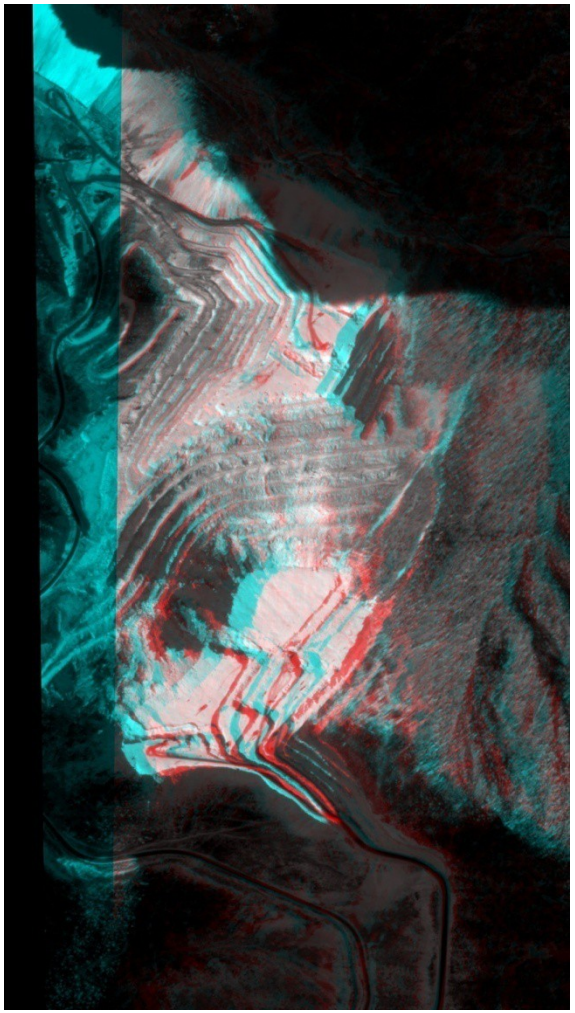
About test data

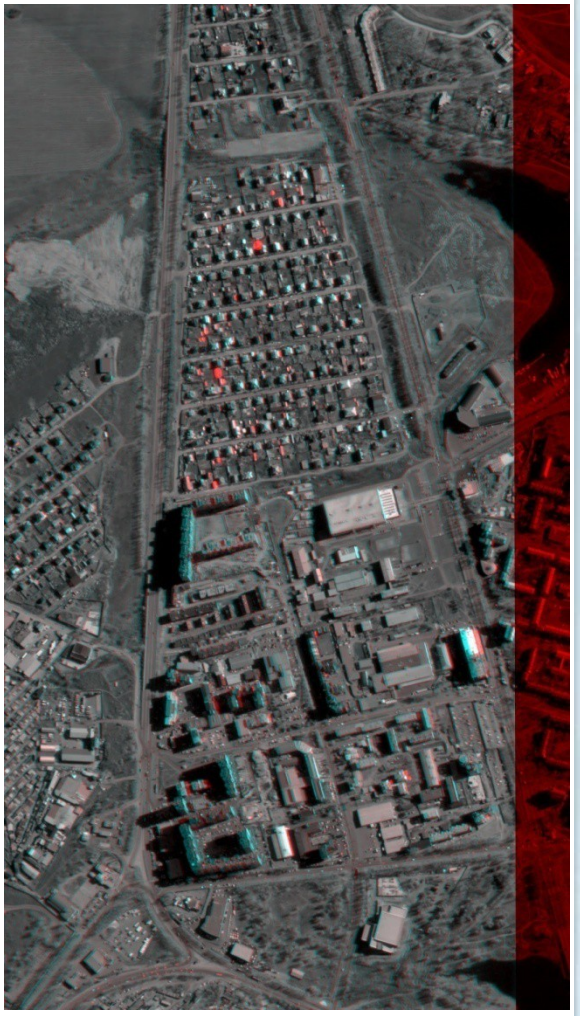
Russia, Irkutsk



About test data

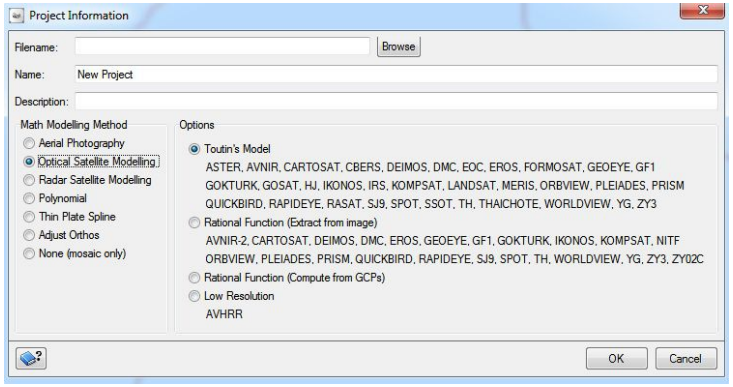


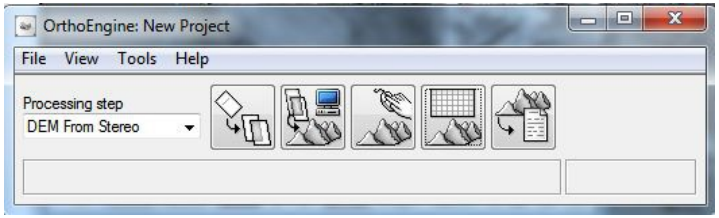


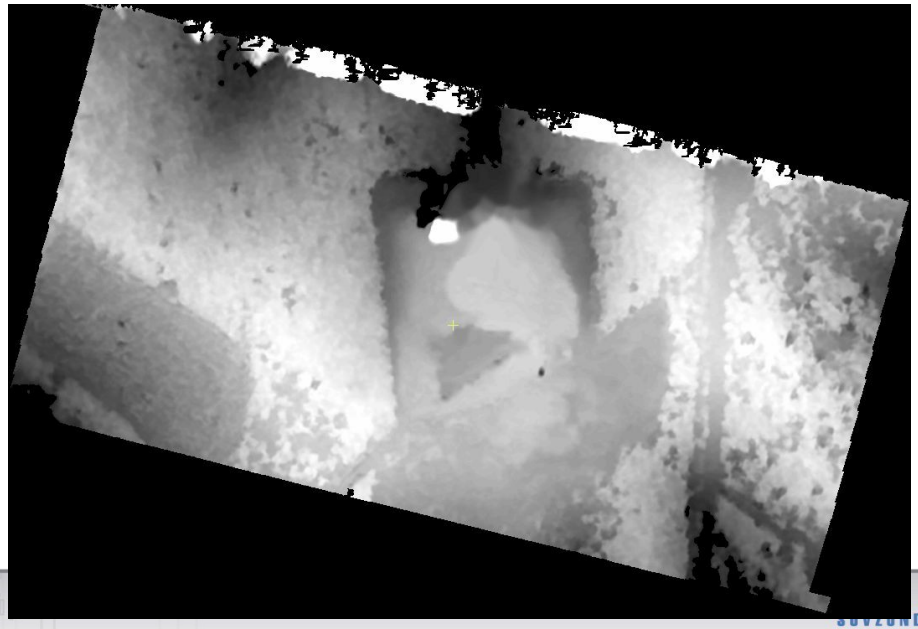


Geomatica. Orbit modeling

The 3D physical model is Toutin’s universal multi-sensor model (TM) embodied into OrthoEngine photogrammetric software from PCI Geomatics







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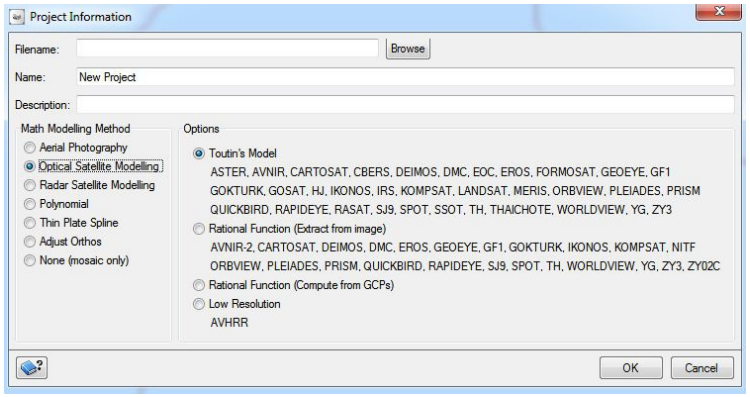
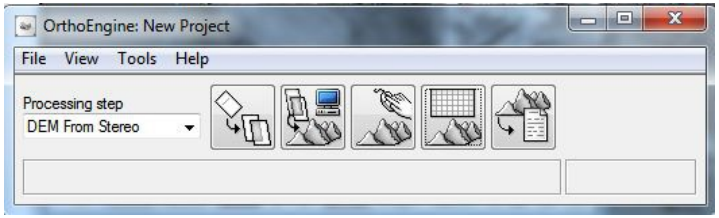
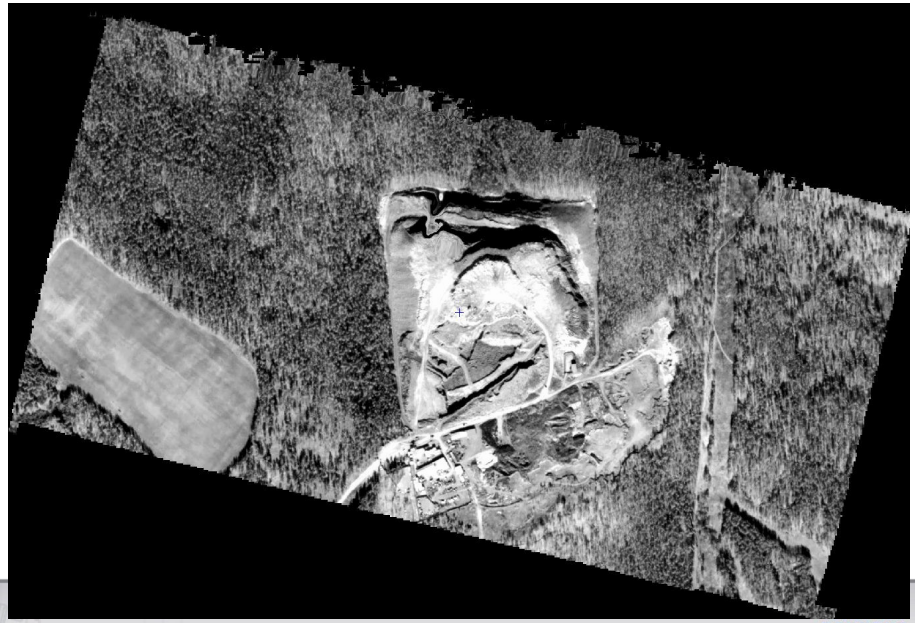
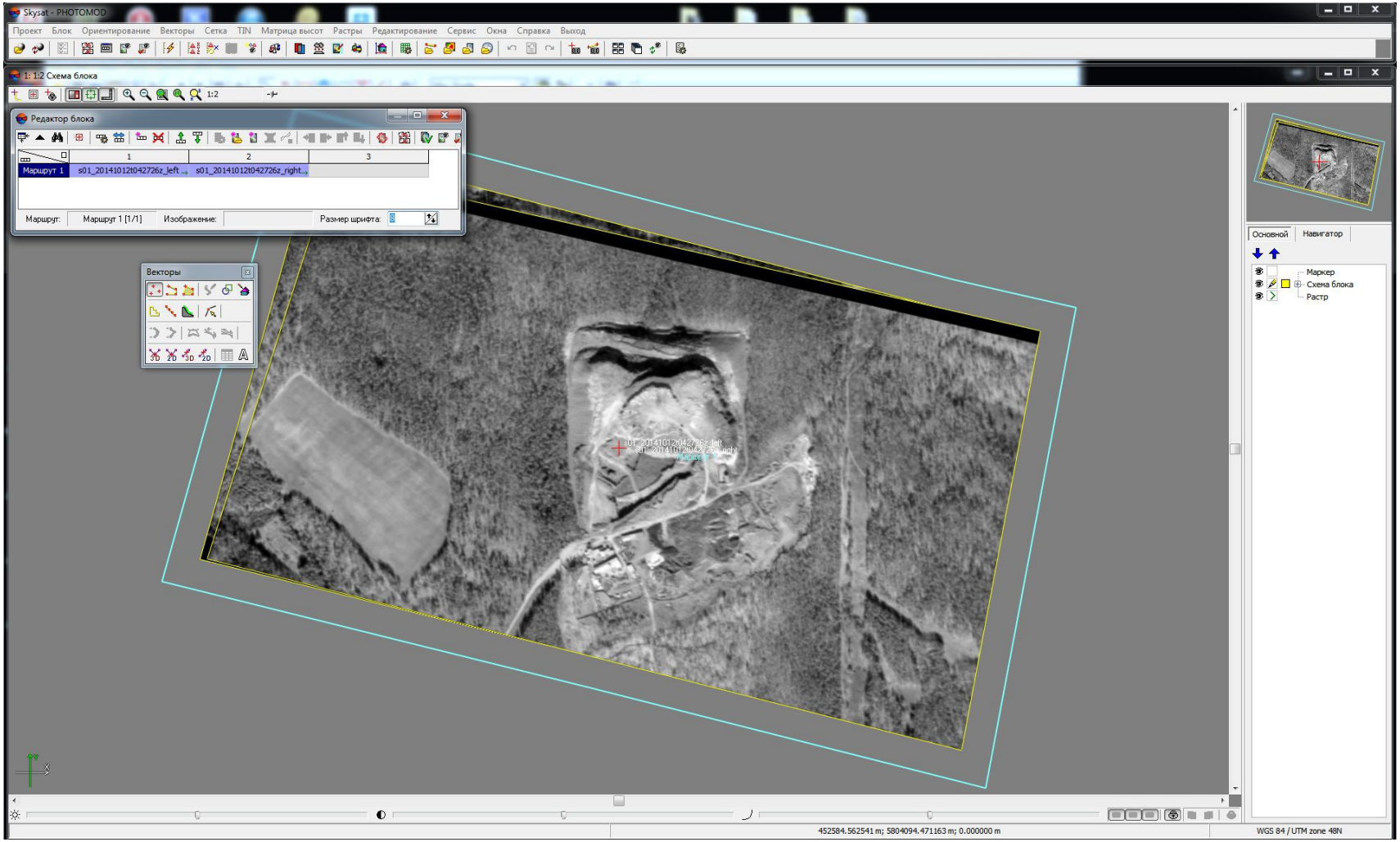


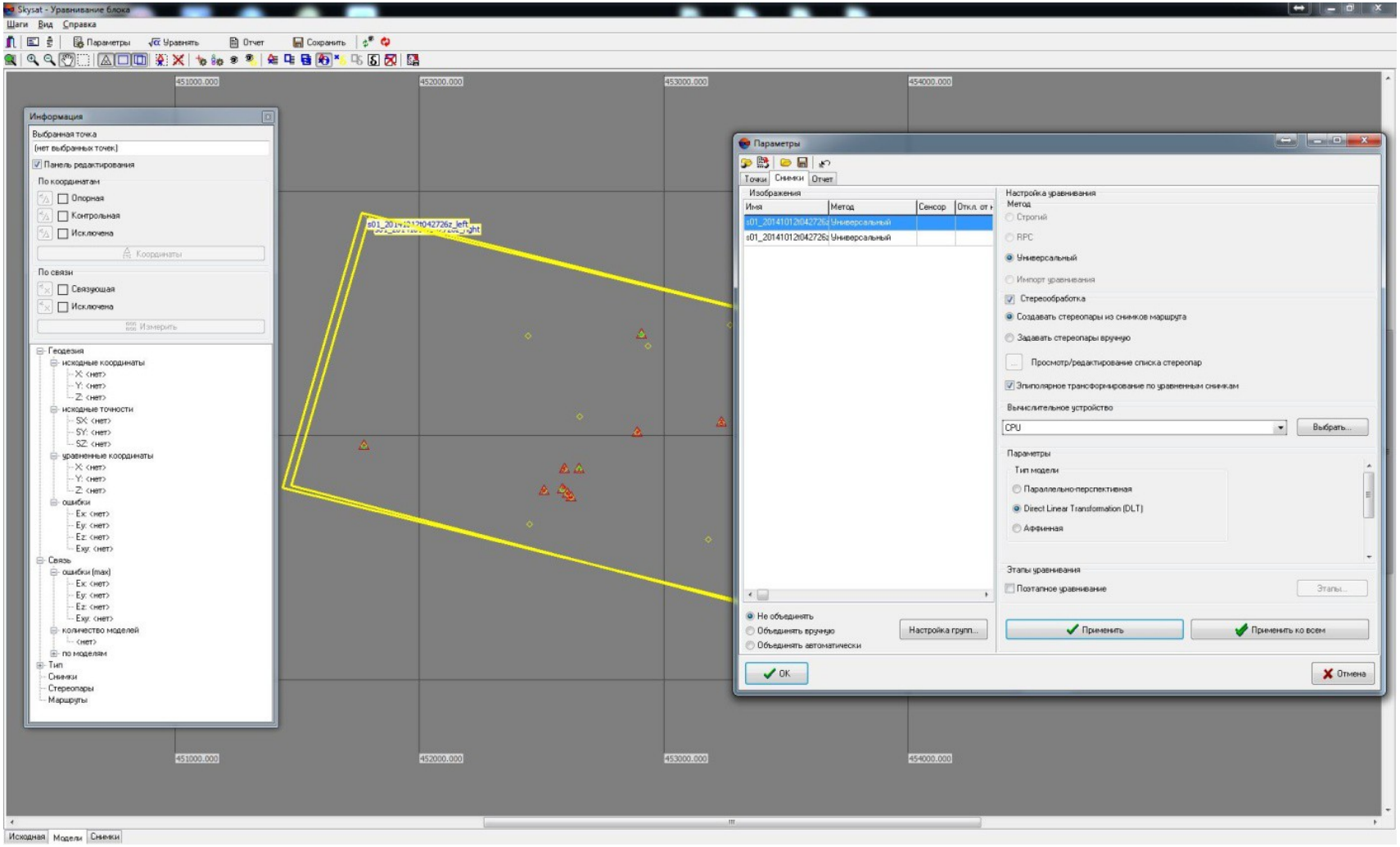




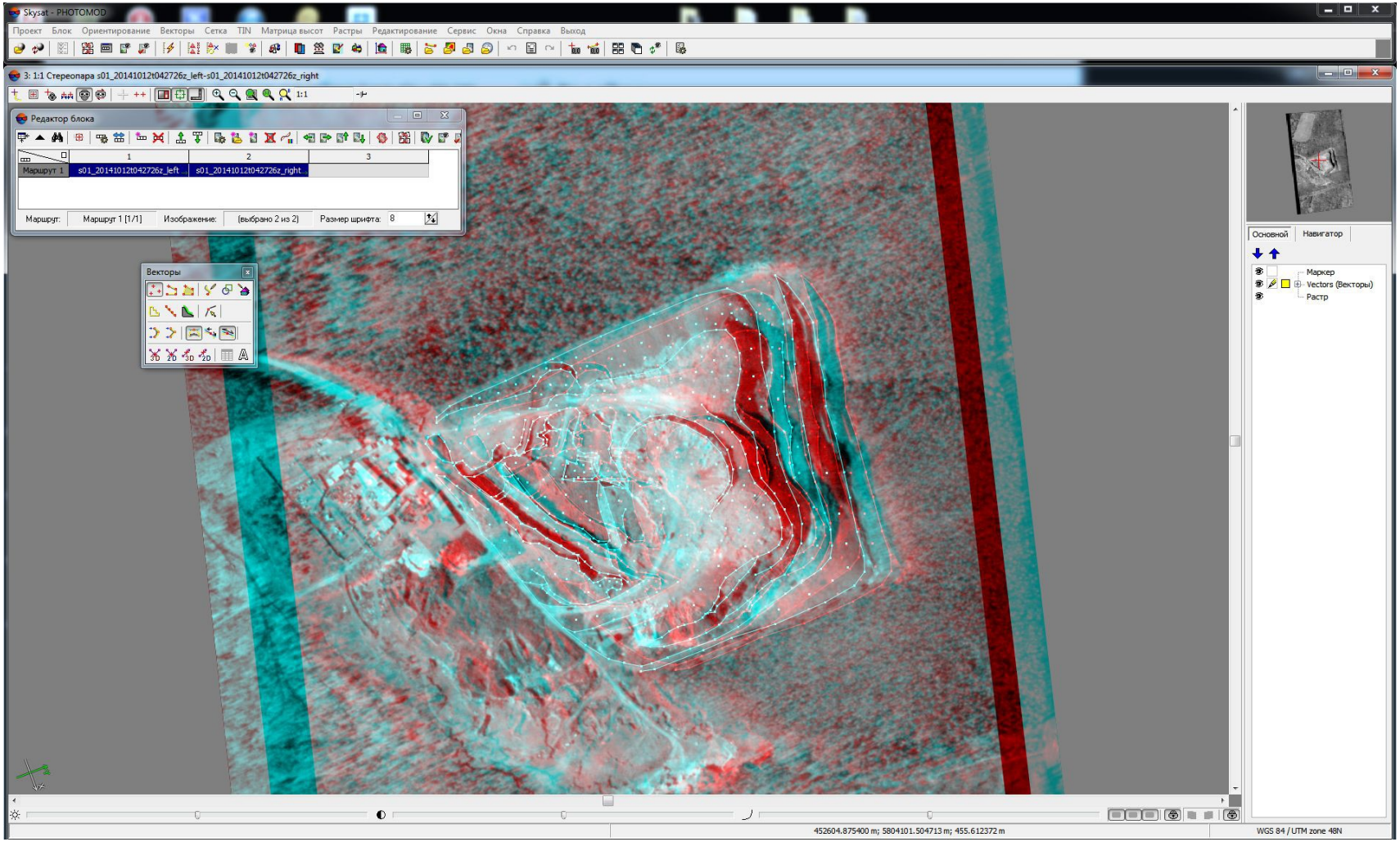
Photomod. DLT



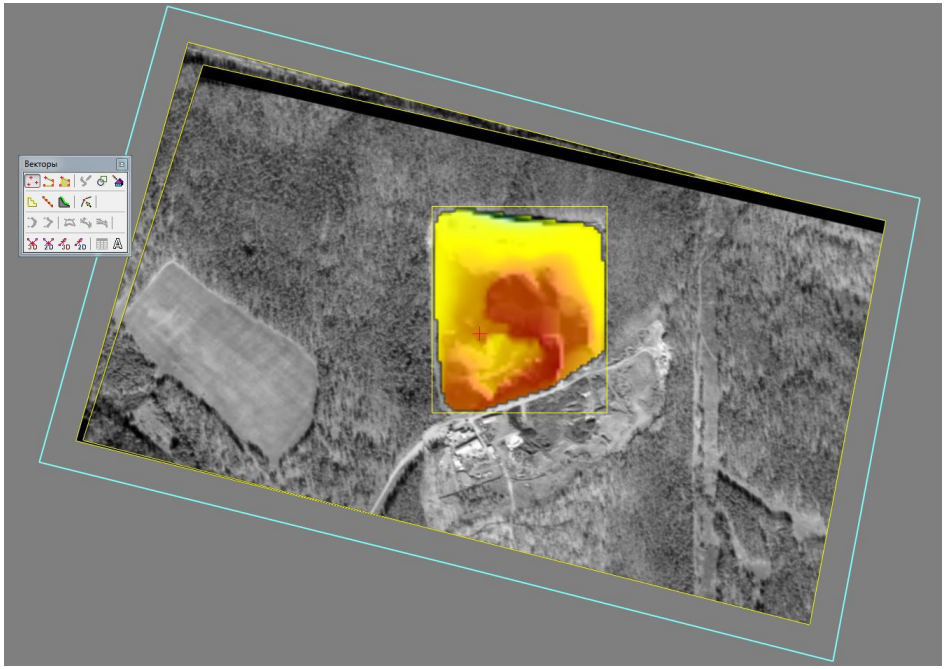
Photomod


Skysat - Уравнивание блока
Шаги Вид Справка
Параметры Уравнять Отчет Сохранить
Информация
Выбранная точка
(нет выбранных точек)
Панель редактирования
По координатам
Опорная
Контрольная
Исключена
Координаты
По связи
Связующая
Исключена
Измерить
Геодезия
исходные координаты
X: <нет>
Y: <нет>
Z: <нет>
исходные точности
SX: <нет>
SY: <нет>
SZ: <нет>
уравненные координаты
X: <нет>
Y: <нет>
Z: <нет>
ошибки
Ex: <нет>
Ey: <нет>
Ez: <нет>
Exy: <нет>
Связь
ошибки (max)
Ex: <нет>
Ey: <нет>
Ez: <нет>
Exy: <нет>
количество моделей
<нет>
по моделям
Тип
Снимки
Стереопары
Маршруты
Параметры
Точки Снимки Отчет
Изображения
Имя Метод Сенсор Откл. от
s01_20141012t042726z Универсальный
s01_20141012t042726z Универсальный
Настройка уравнивания
Метод
Строгий
RPC
Универсальный
Импорт уравнивания
Стереообработка
Создавать стереопары из снимков маршрута
Задавать стереопары вручную
Просмотр/редактирование списка стереопар
Эпиполярное трансформирование по уравненным снимкам
Вычислительное устройство
CPU
Выбрать...
Параметры
Тип модели
Параллельно-перспективная
Direct Linear Transformation (DLT)
Аффинная
Этапы уравнивания
Поэтапное уравнивание
Этапы...
Не объединять
Объединять вручную
Объединять автоматически
Настройка групп...
Применить
Применить ко всем
OK
Отмена
451000.000
452000.000
453000.000
454000.000
Исходная Модели Снимки

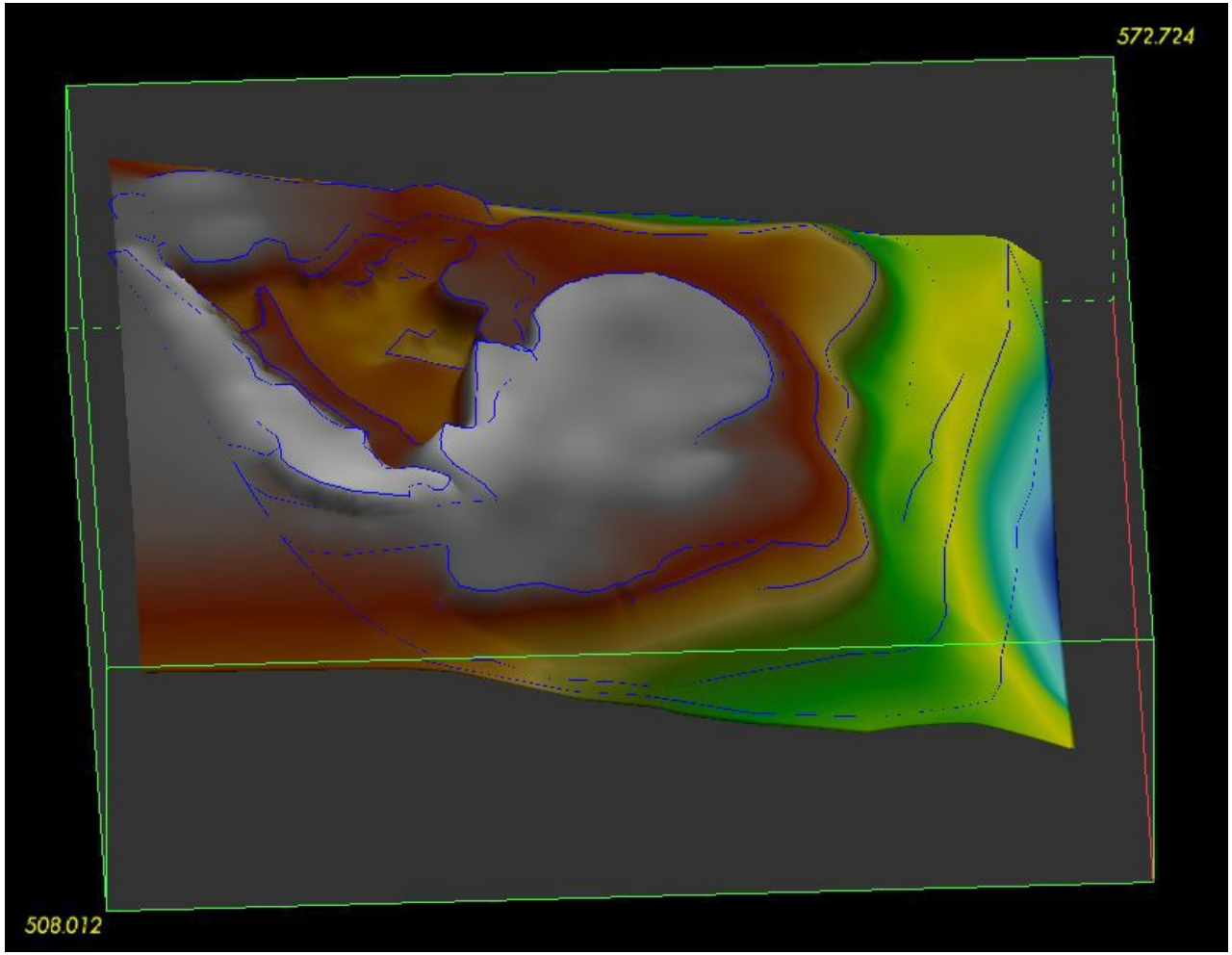
Photomod


Skysat - PHOTOMOD
Проект Блок Ориентирование Векторы Сетка TIN Матрица высот Растры Редактирование Сервис Окна Справка Выход
3: 1:1 Стереопара s01_20141012t042726z_left-s01_20141012t042726z_right
Редактор блока
Маршрут 1
s01_20141012t042726z_left
s01_20141012t042726z_right
Маршрут: Маршрут 1 [1/1] Изображение: (выбрано 2 из 2) Размер шрифта: 8
Векторы
Основной Навигатор
Маркер
Vectors (Векторы)
Растр
452604.875400 m; 5804101.504713 m; 455.612372 m
WGS 84 / UTM zone 48N

Photomod

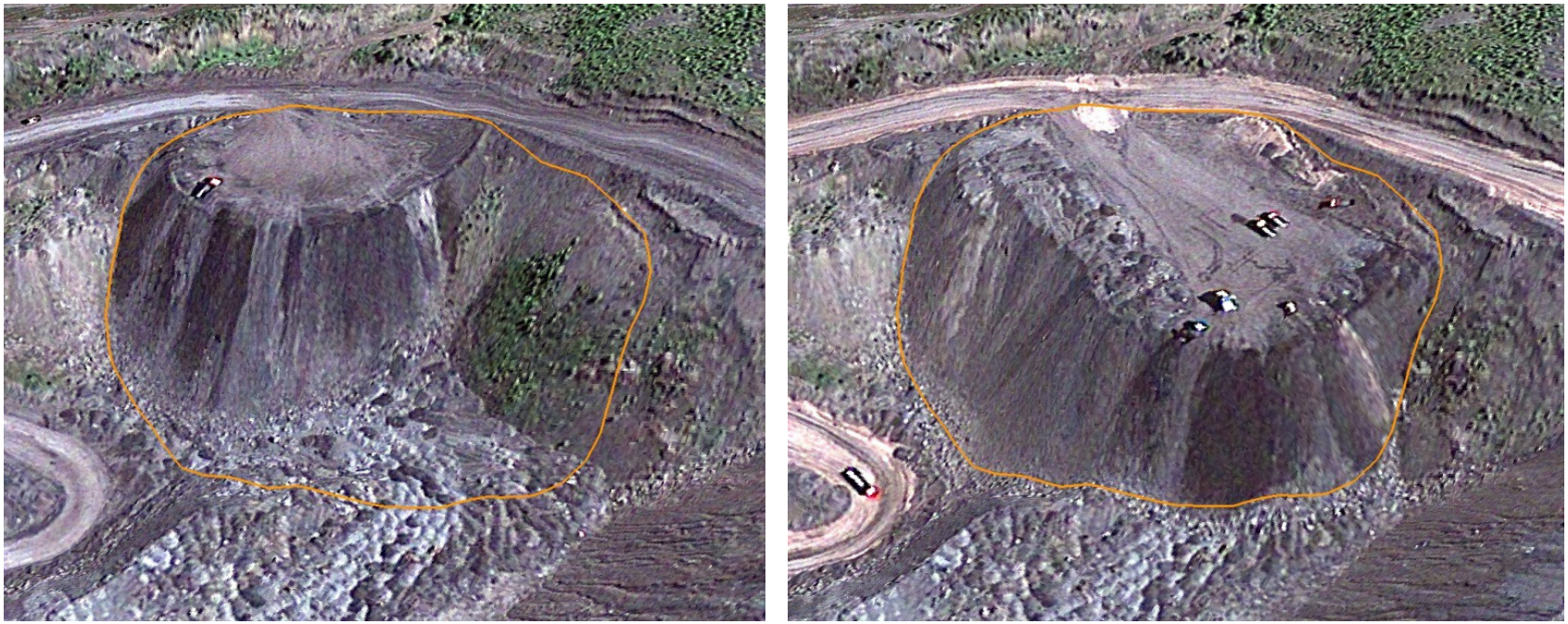


Trimble Inpho



Height data applications

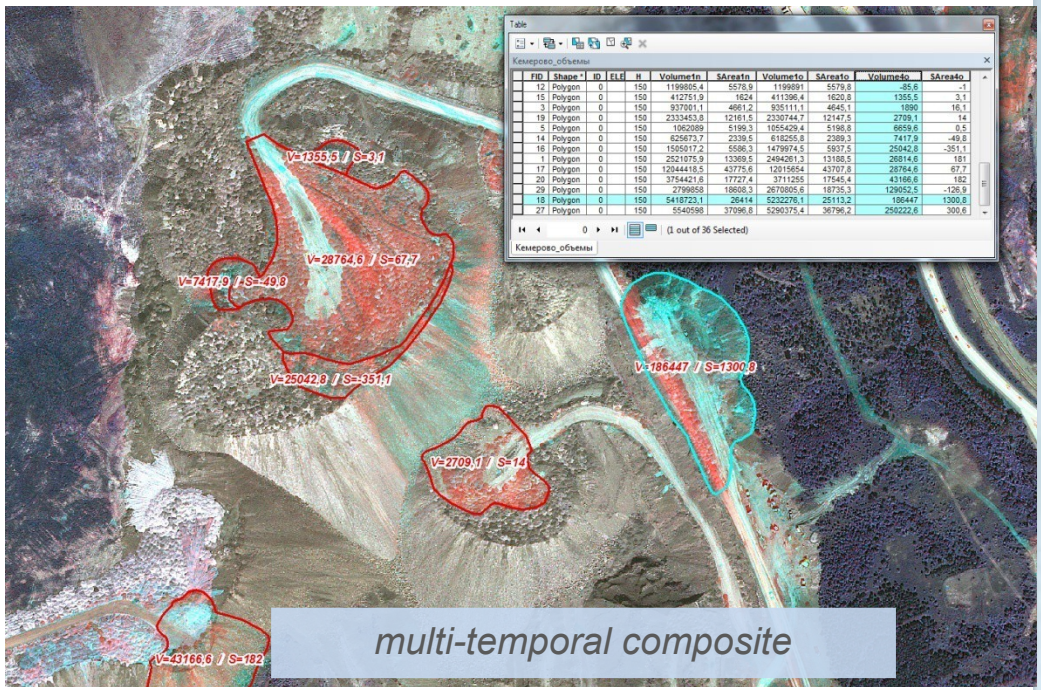
Using high information extracted from satellite stereo images in order to get actual information about open-pit mines



A pit forming

Height data applications

Using high information extracted from satellite stereo images in order to get actual information about open-pit mines

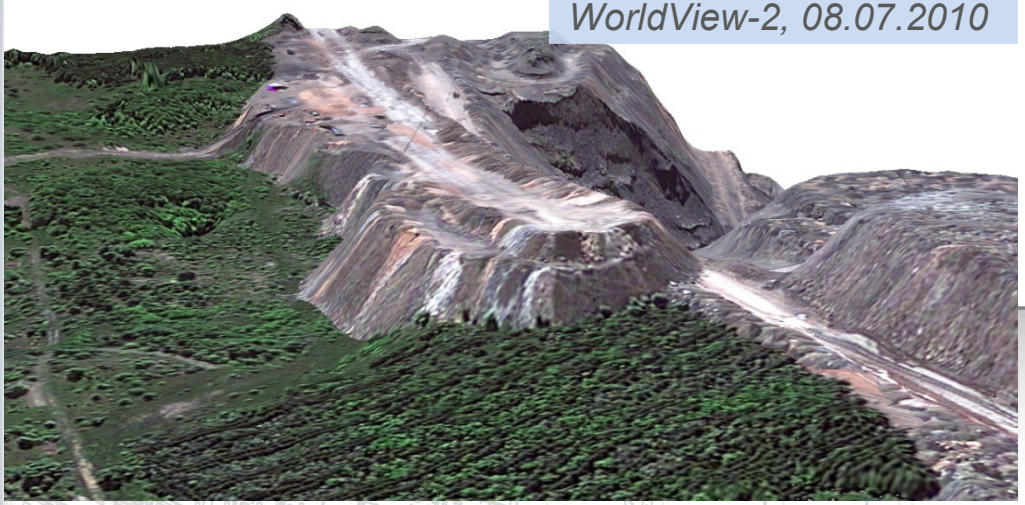


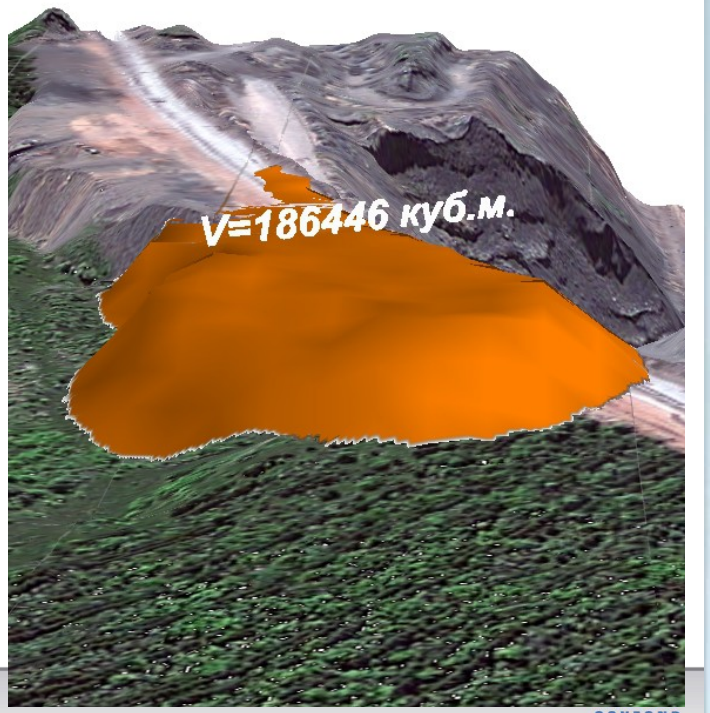
Height data applications

Using high information extracted from satellite stereo images in order to get actual information about open-pit mines

WorldView-2, 16.06.2010

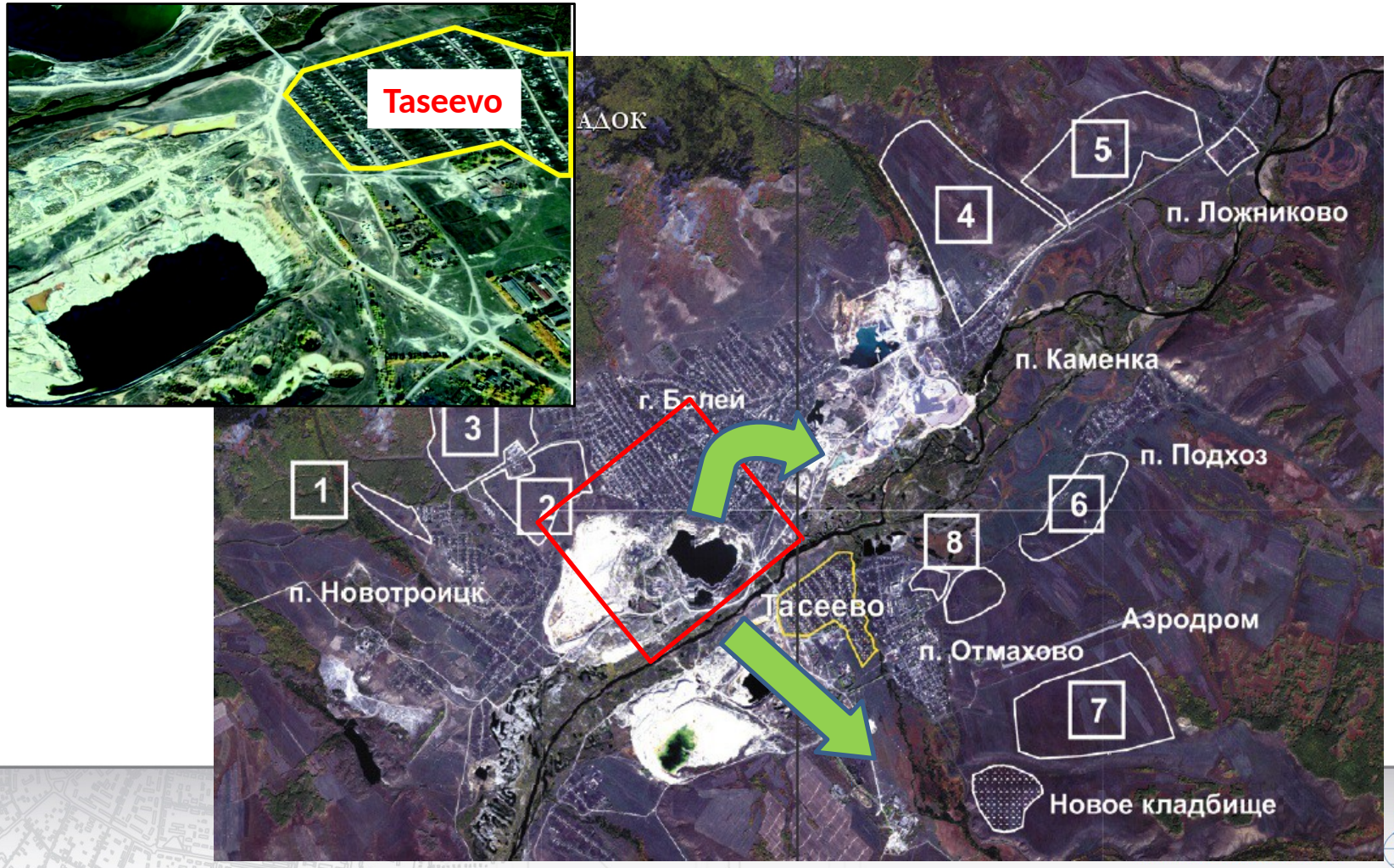
WorldView-2, 08.07.2010





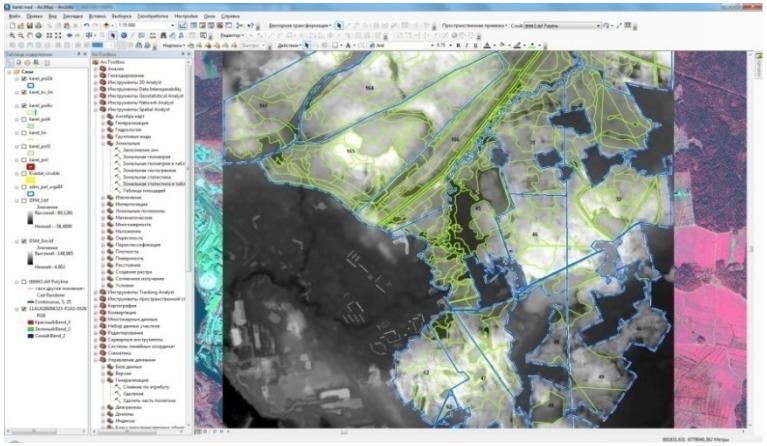
Height data applications

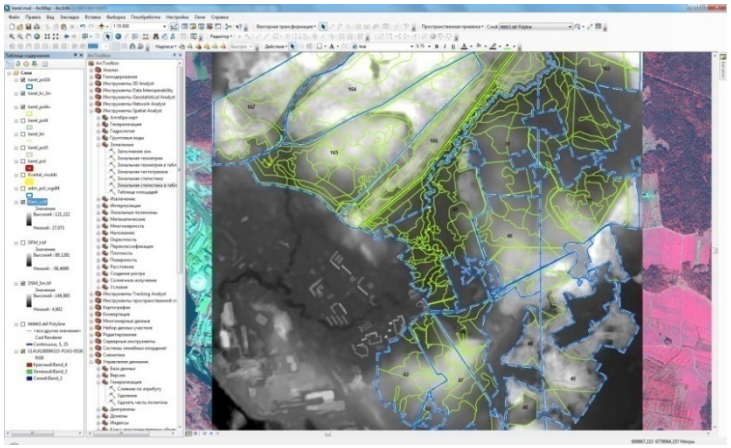
Using high information extracted from satellite stereo images for the monitoring of dangerous exogenous processes and for environmental purposes



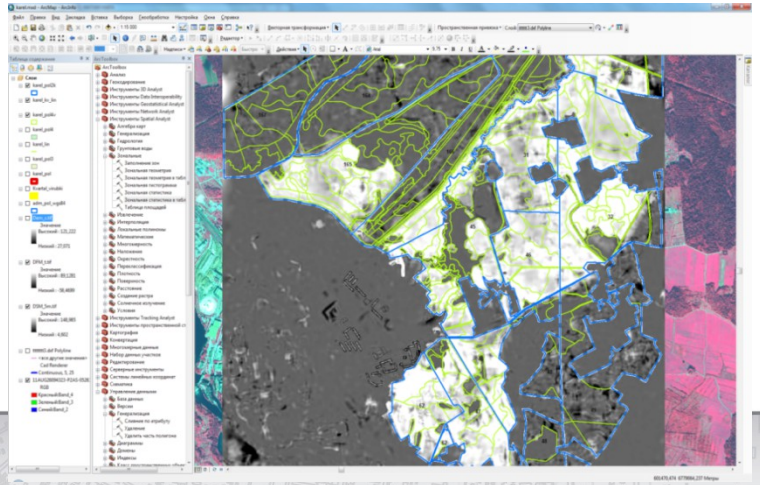
Height data applications

Using high information extracted from satellite stereo images in order to get actual information about forestry

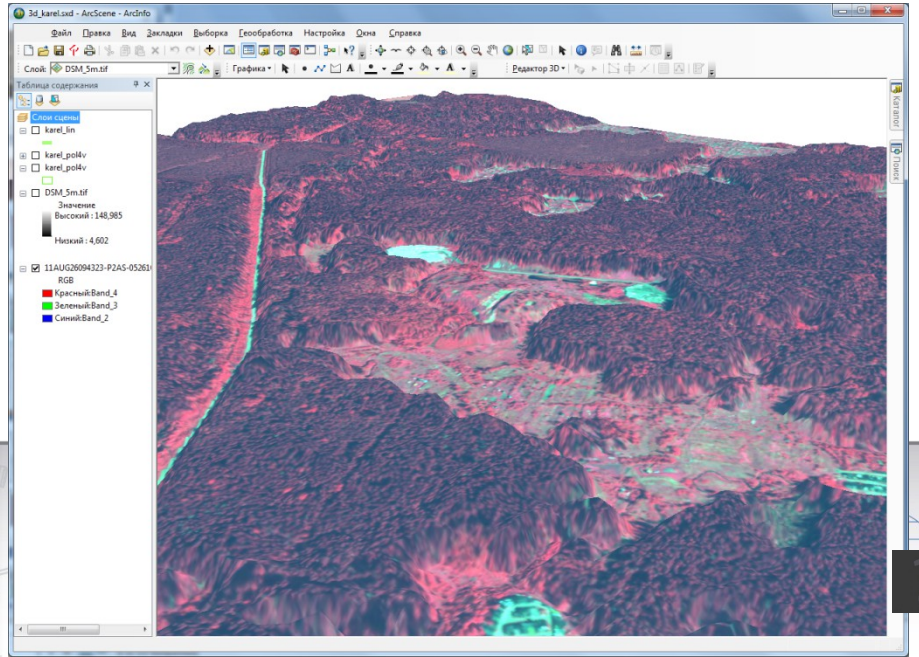




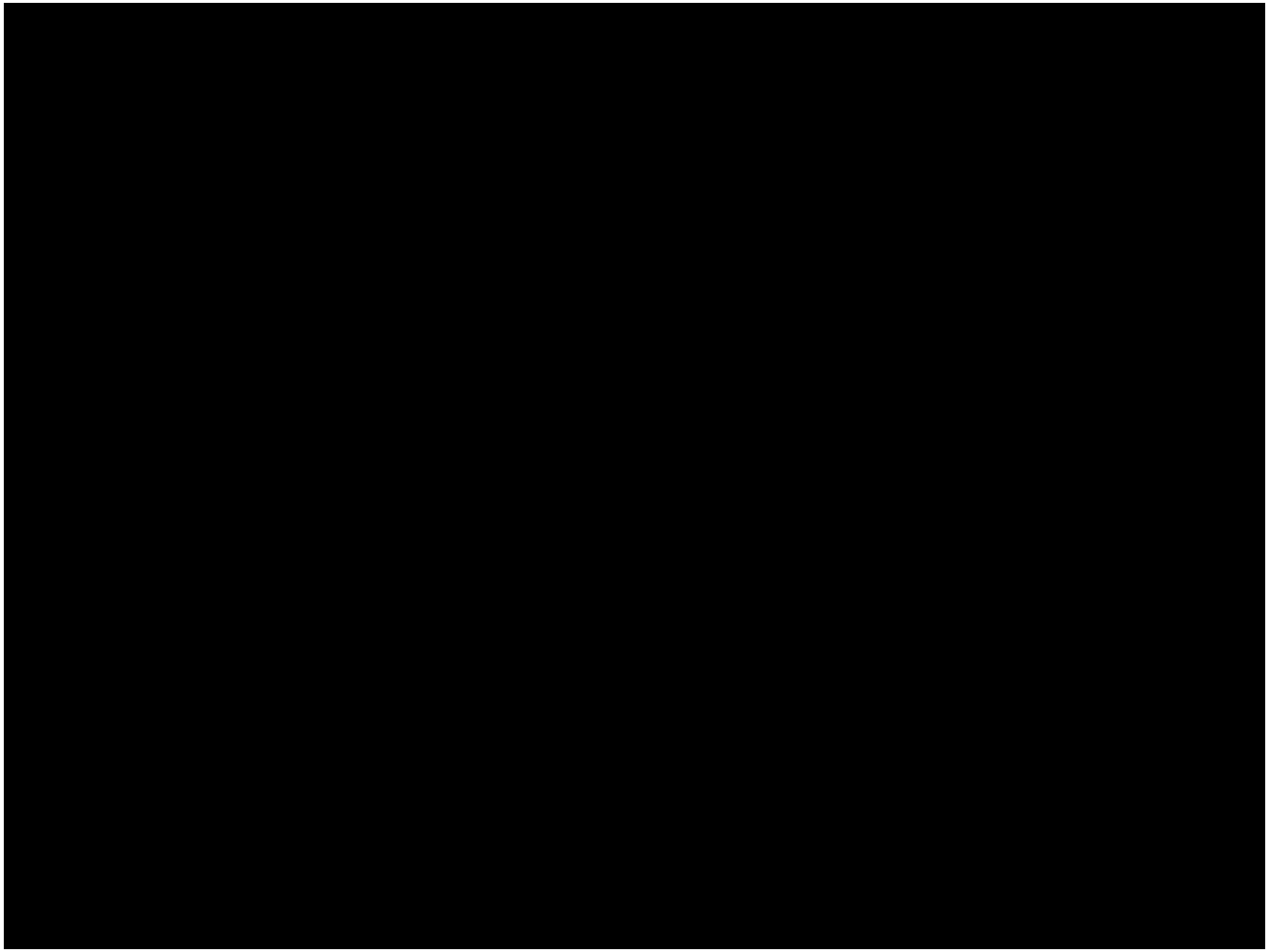
DSM - DEM = DFM (Digital Forest Model)



Digital forest model



Moving objects



Municipal solid waste landfill near Irkutsk (SkySat-1 October 12, 2014)

Moving objects

Municipal solid waste landfill near Irkutsk (SkySat-1 October 12, 2014)

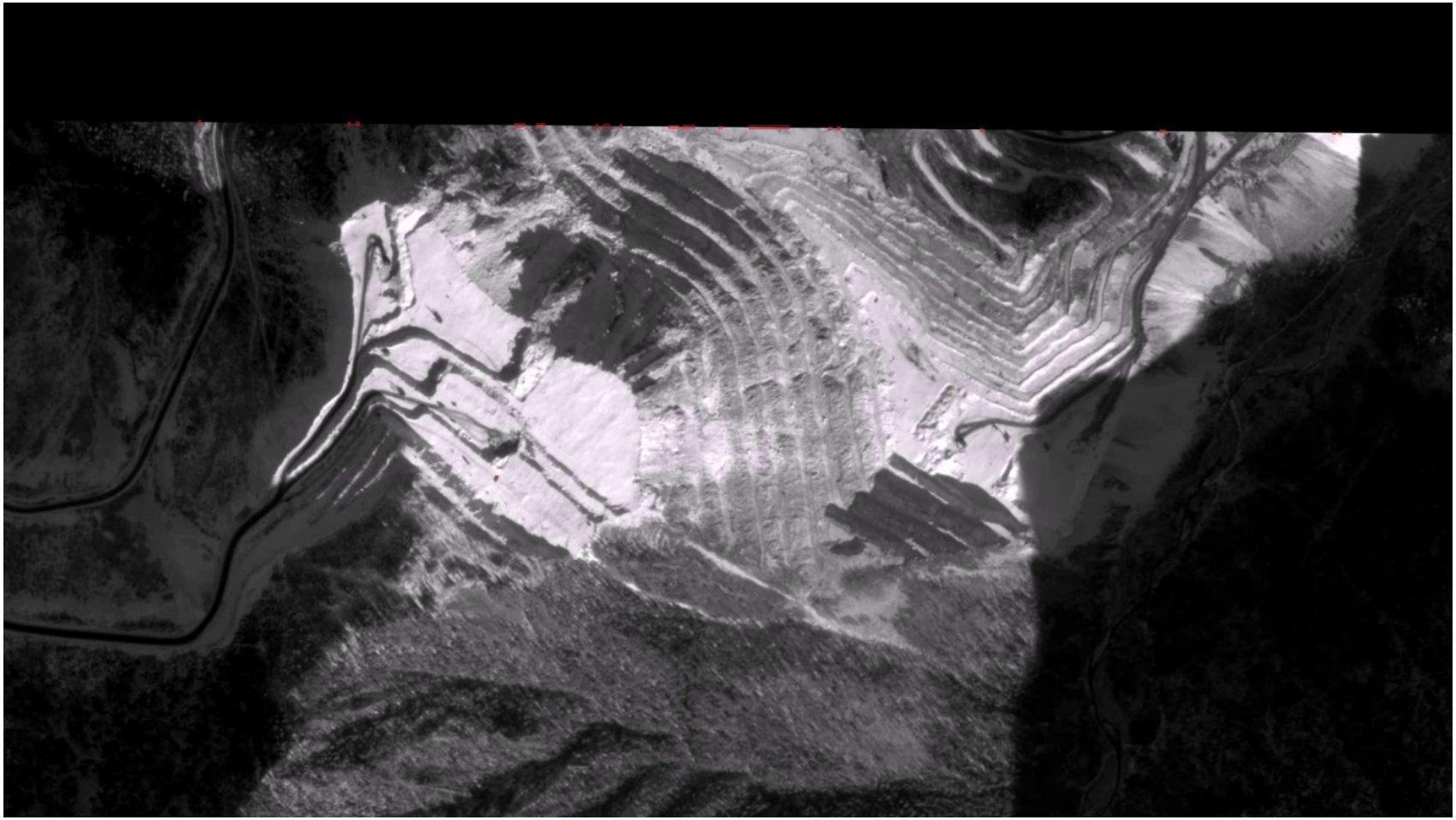
Moving objects

Building in Irkutsk (SkySat-1 October 13, 2014)

Moving objects

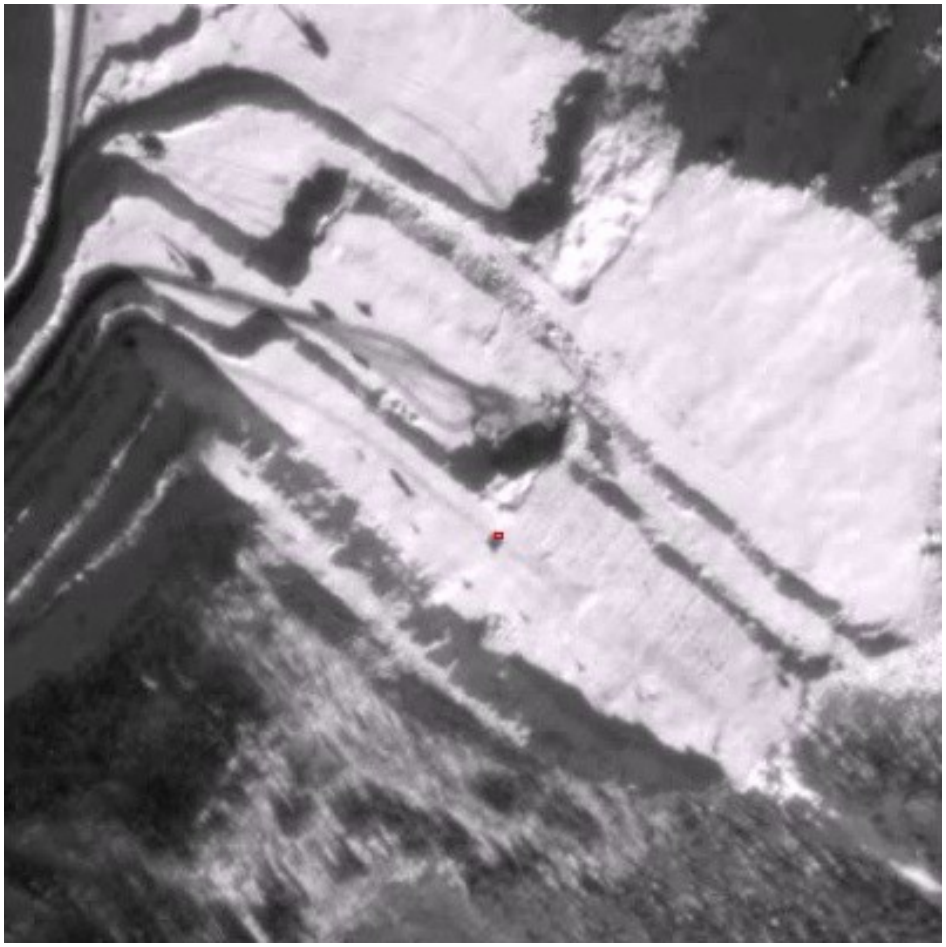
Building in Irkutsk (SkySat-1 October 13, 2014)

Moving objects



Marble quarry near Sludyanka (SkySat-1 October 29, 2014)

Moving objects



Marble quarry near Sludyanka (SkySat-1 October 29, 2014)

Pansharpned video

Video frame (Irkutsk, SkySat-1 October 13, 2014)

Satellite image (Irkutsk, RapidEye July 28, 2011)

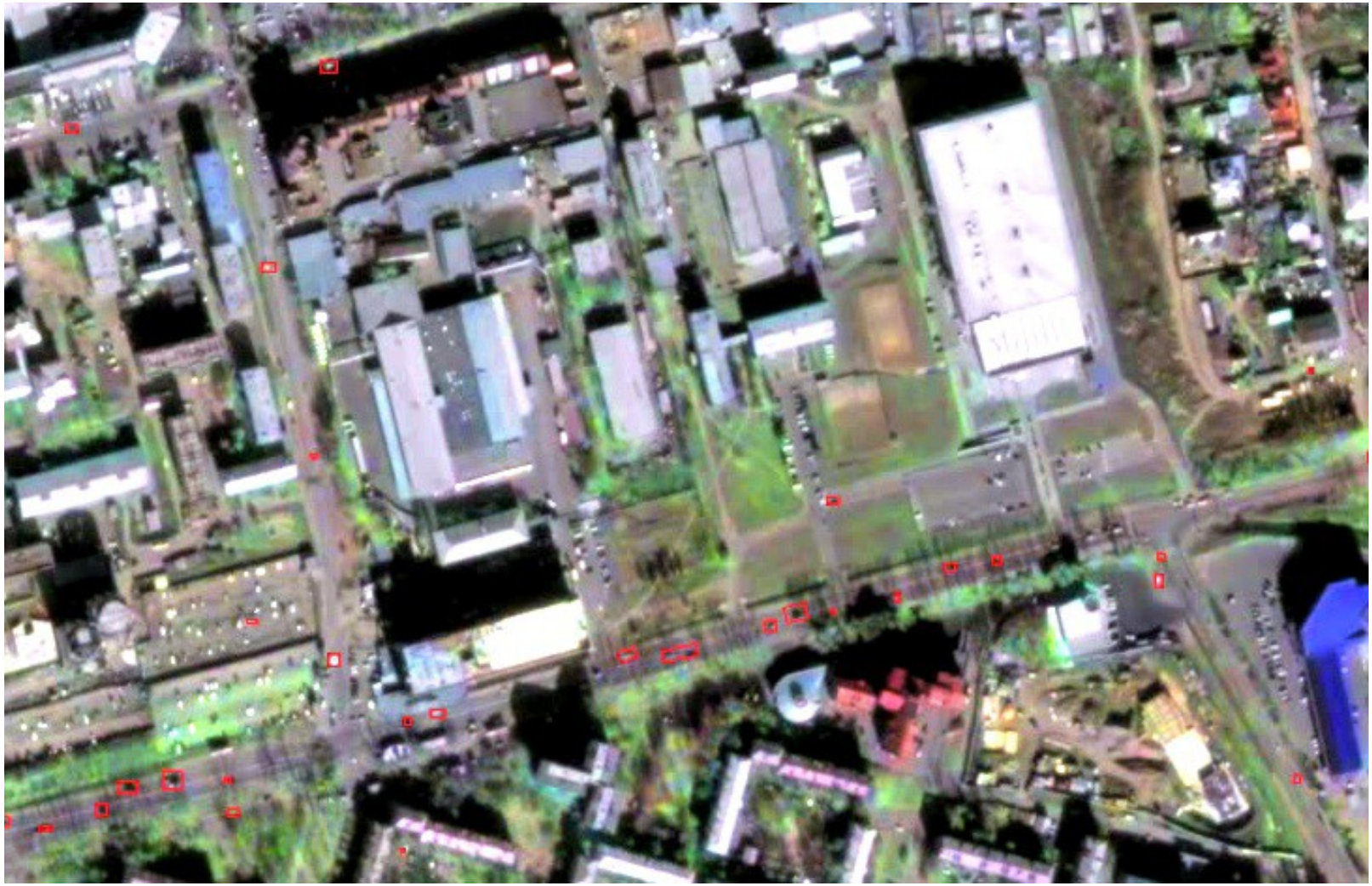
Pansharpened video + moving objects

Municipal solid waste landfill near Irkutsk (SkySat-1 October 12, 2014)

Pansharpened video + moving objects

Building in Irkutsk (SkySat-1 October 13, 2014)

Pansharpened video + moving objects



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