Near-Real Time RS applications and services

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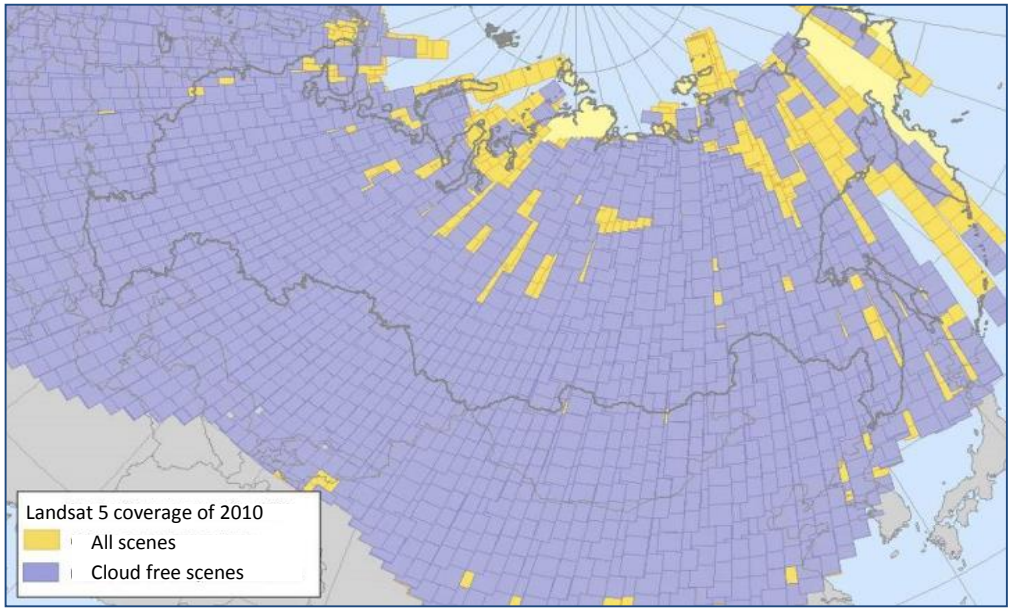
MDGLS and GLS2010 – initiative of NASA and USGS of global coverage with Landsat 5 TM Data



In August, 2006 ScanEx became a participant of the International Mid-Decadal Global Land Survey (MDGLS) Project, managed by NASA and the USGS. During imaging seasons 2009-2010 ScanEx's network of UniScan ground stations collected data in frames of GLS2010 Project followed by MDGLS.

MDGLS Project: 2006-2007
GLS2010 Project: 2009-2010

http://catalog.scanex.ru

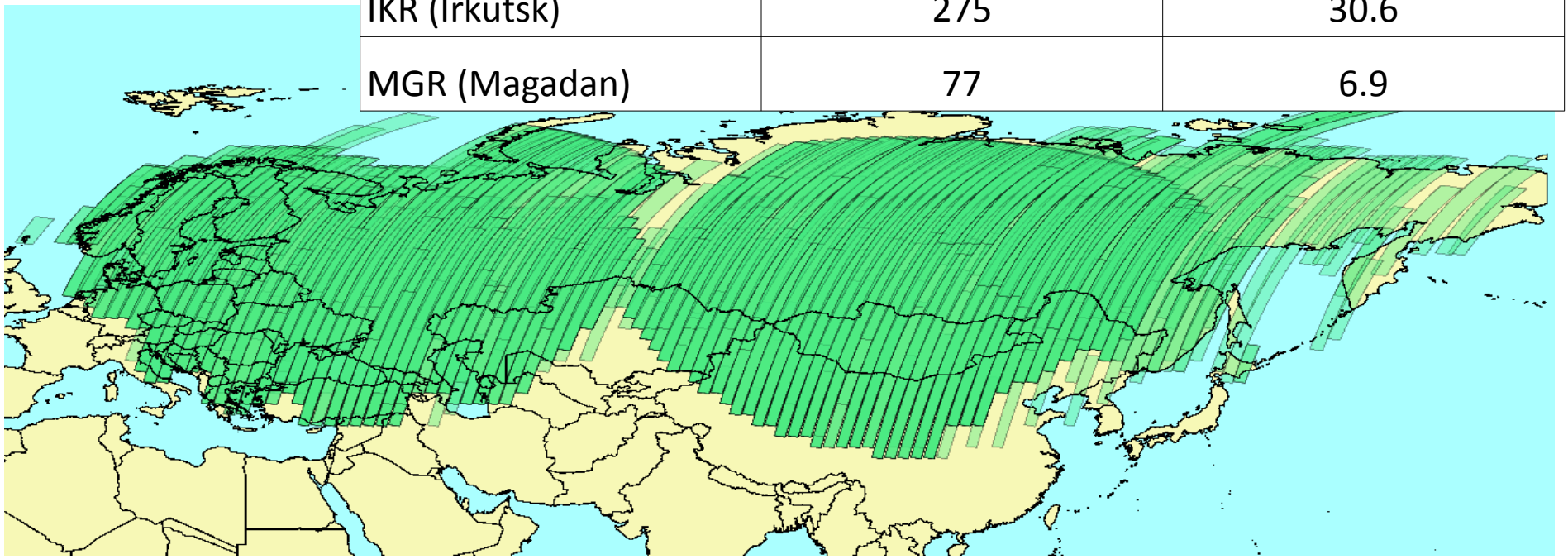
SCANEX Ground Stations Network

SCANEX network consists of 4 receiving centers (2010)
Total 9 operational UniScan™-24 ground stations (22 receiving channels)

GLS-2010, season 2010

Landsat-5 campaign stations - Moscow, Irkutsk, Magadan)

Station	# passes	Downlink duration (h)
MOR (Moscow)	290	33.8
IKR (Irkutsk)	275	30.6
MGR (Magadan)	77	6.9



THEMATIC PROJECTS

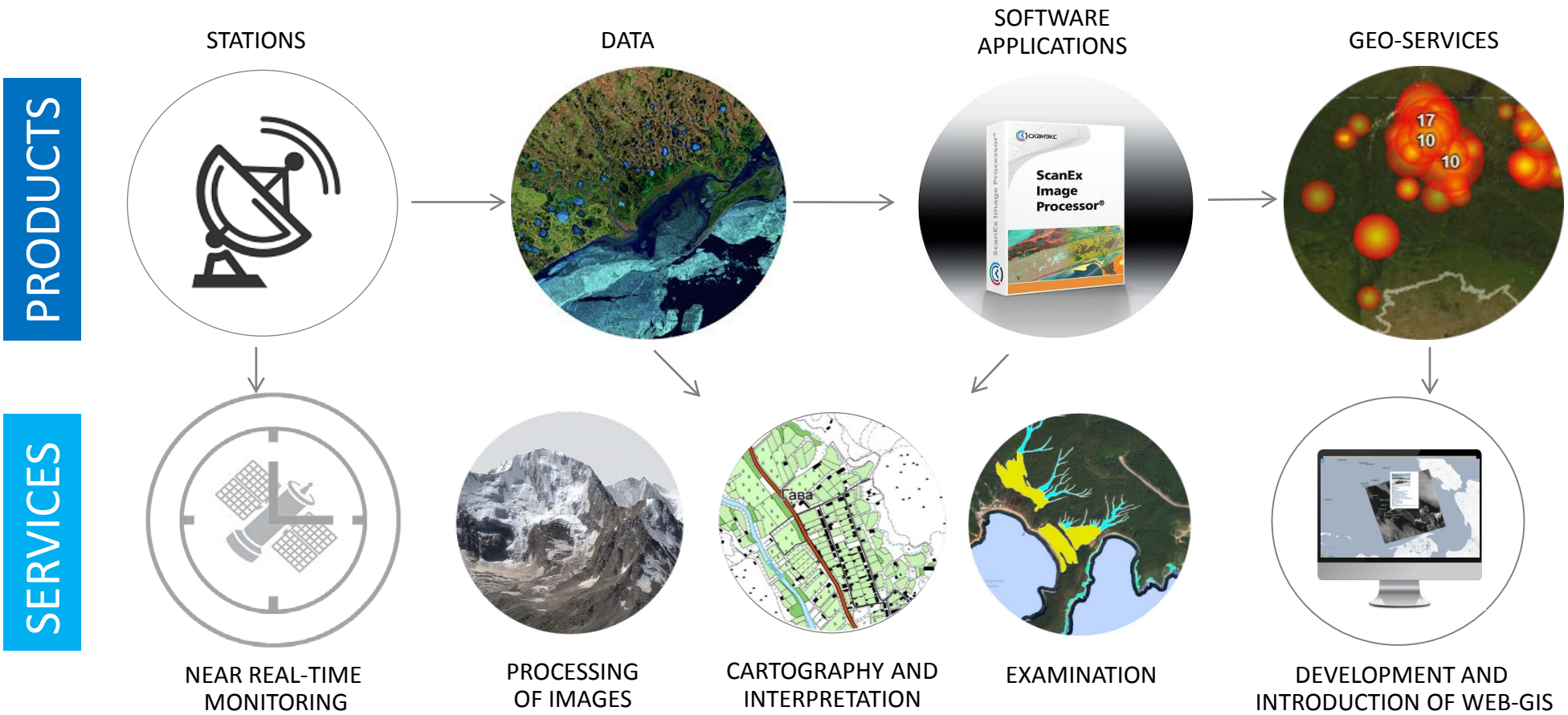
Development and realization of thematic projects in:

- Defence and security
- Emergency situations
- Cartography
- Agriculture
- Forestry
- Cadastre and land use planning and control
- Subsoil use
- Meteorology
- Transport and navigation
- Nature conservation

Types of work:

- Photogrammetric works
- Creation of digital elevation models (DEM), 3D visualization and modeling
- Thematic interpretation and expertise
- Creation of thematic cartographic products and services
- Creation of geoportals
- Monitoring activities
- Research and development

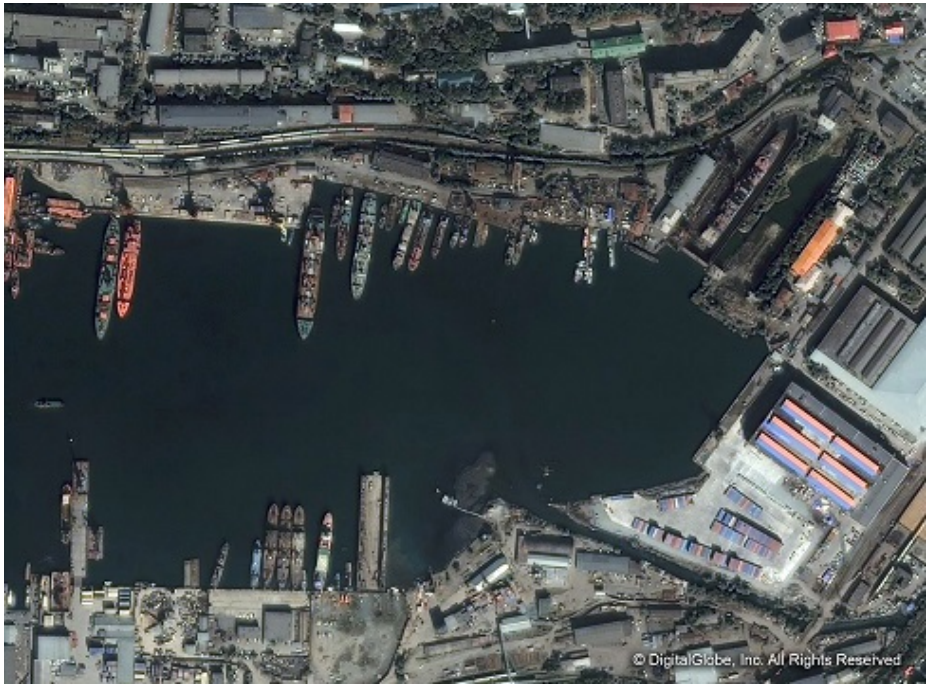
PROCESS FLOW



Ways to receive data	**Advantages**
Procurement/installation of receiving stations	Cost reduction and maximum speed of data acquisition
Buying separate scenes	Possibility of processing and extraction of thematic information
Getting data as a service	Easy access to data

SATELLITE DATA

Space satellites Terra, Aqua, Suomi NPP, FengYun-3, SPOT 6/7, EROS B, Landsat-8, Sentinel-1A, KOMPSAT-3, RADARSAT-2, TerraSAR-X, COSMO-SkyMed Meteor-M, Kanopus-V, Resurs-P and others



Golden Horn Bay, Vladivostok

Novorossiysk

STATIONS

One of the key activities of SCANEX - development and implementation of ground stations for direct data reception from Earth remote sensing satellites

- **UniScan ™** (8 GHz) - stations for receiving data of different spatial resolution (Landsat-8, Spot-6/7, Kompsat-3, TerraSAR-X, RADARSAT 2, EROS A / B, Pleiades-1A / 1B, Kanopus-V, Resurs-P). UniScan station's light antenna systems can be installed virtually on any platform, including roofs of buildings.
- **Panda ™** (2 GHz) - stations for meteorological data reception (NOAA, MetOp , FY-3, Meteor-M).

Receiving systems - digital and fully programmable to receive data via any radio channel in a wide range of parameters at rates up to 750 Mbps (Uniscan stations) and up to to 60 Mbps (Panda stations). Stations can be easily upgraded to receive data from new satellites.
Usage of own receiving stations enables to speed up data reception and reduce their cost.

DATA

SCANEX offers:

1. Supply of archived **remote sensing data** and placement of orders for new imagery from optical and radar satellites: from purchasing an individual image or its fragment to creating a mosaic coverage and 3D terrain models.
SCANEX has been working with the world leading RS Operators, including DigitalGlobe, Airbus Defense and Space, E-geos, ImageSat, MDA, USGS, Satrec Initiative ..

2. Supply of **AIS data** (Automatic identification of ships). AIS is intended to enhance the navigation safety and protect the environment.

3. Supply of **data from the UAVs** (Unmanned Air Vehicles). UAV data is intended to provide highly accurate and highly detailed maps, including 3D-maps.

SOFTWARE APPLICATIONS

Preliminary data processing	Thematic data processing	Web-based applications and services
ScanEx TERRA/AQUA Tools	**SCANEX IMAGE PROCESSOR***	**SCANEX WEB CATALOG***
ScanEx EROS-A/B Tools	ScanMagic	ScanEx Satellite Orbit Kit
ScanEx SPOT-6/7 Tools	ScanEx TaskFlow	Planet SCANEX
ScanEx SMPP Tools	MeteoGamma	Geo-Box 3D
ScanEx Meteo Tools	GISEYE Raster Converter	
	GISEYE Image Transformer	
	GISEYE QuickLook Generator	
	GISEYE Value Converter	
	ScanEx ADPS	

** Scanex Image Processor - software for photogrammetric and thematic satellite data processing and modeling.*

** ScanEx Web GeoMixer - multifunctional platform to create interactive maps and GIS applications on the Internet and in the local area network of an enterprise.*

GEO-SERVICES

SCANEX offers off-the-shelf solutions in the form of geo-services to get access to spatial information and integration into internal systems and data bases of enterprises or external sites.

Map of fires - the service designed for the detection and identification of possible fire sites and fire hazards on the territory of the Russian Federation.

Online catalog - the open geo-service to search for and order satellite images based on preset parameters, combining access to archived and new images of different RS Operators.

CosmosAgro - online service for the upkeep of spatial database, inventory and registration of the agriproduct producers' lands and for operational monitoring of the agricultural activity results.

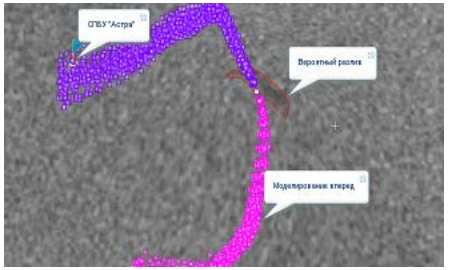
Google Maps for business - a collection of APIs for creating unique Google Maps-based applications to optimize decision-making, resource management and improving the services quality.

NEAR REAL-TIME MONITORING

Real-time monitoring enables to receive up-to-date information about different objects and their properties, regardless of the time of day and weather conditions. Based on the information received thematic products, services, operational monitoring services are created, and examinations conducted aimed at meeting the challenges of the public sector and businesses. Time delay from images acquisition to delivery of finished product to the user is 30-60 minutes on average.

Floods monitoring

Land use monitoring

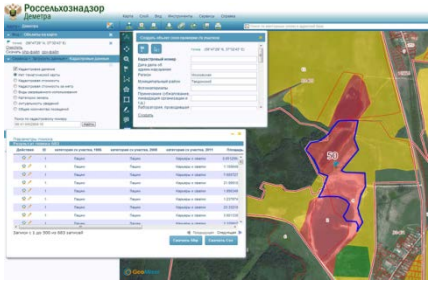


Oil spills monitoring

DEVELOPMENT AND INTRODUCTION OF WEB-GIS

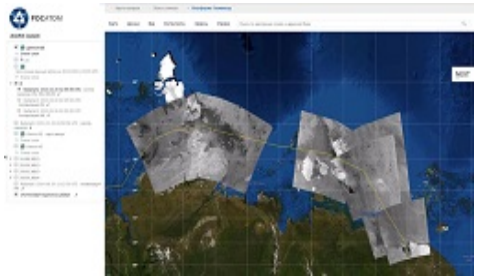
SCANEX offers development of multifunctional geoinformation systems for thematic projects implementation in various branches of the economy. GIS provide collection, processing, analysis, visualization, storage of spatial and business data to solve a large variety of tasks.

GIS "DEMETER" ROSSELHOZNADZOR



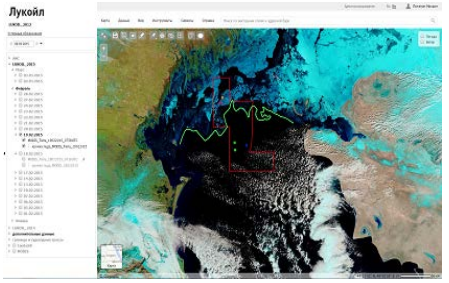
Agricultural monitoring

GIS ATOMFLOT "ONLINE SHIPS NAVIGATION MONITORING"



Information system of the Northern Sea Route support

LUKOIL GEOPORTAL



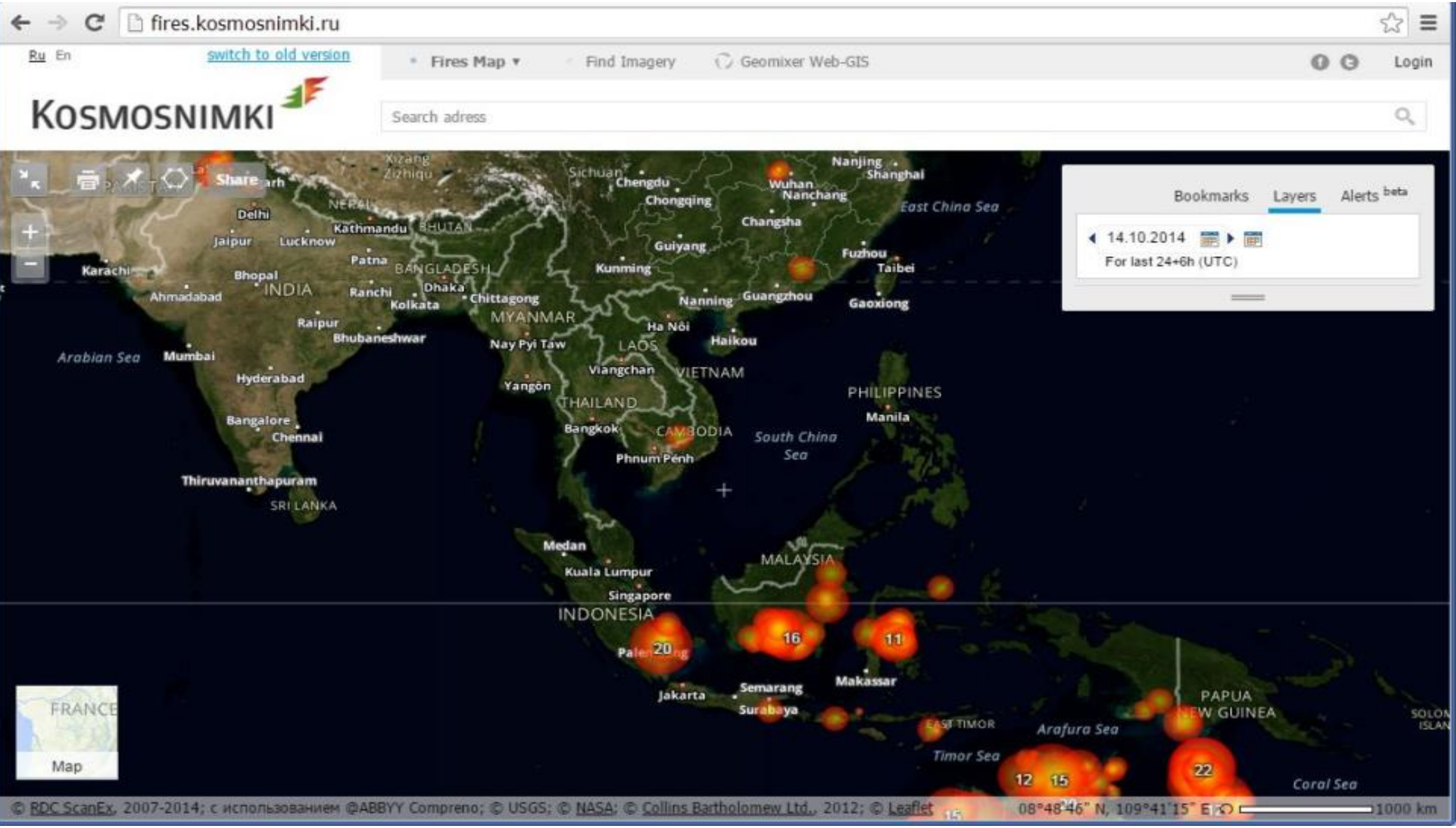
Environmental monitoring of the Caspian Sea

Wildfires – haze /smoke production

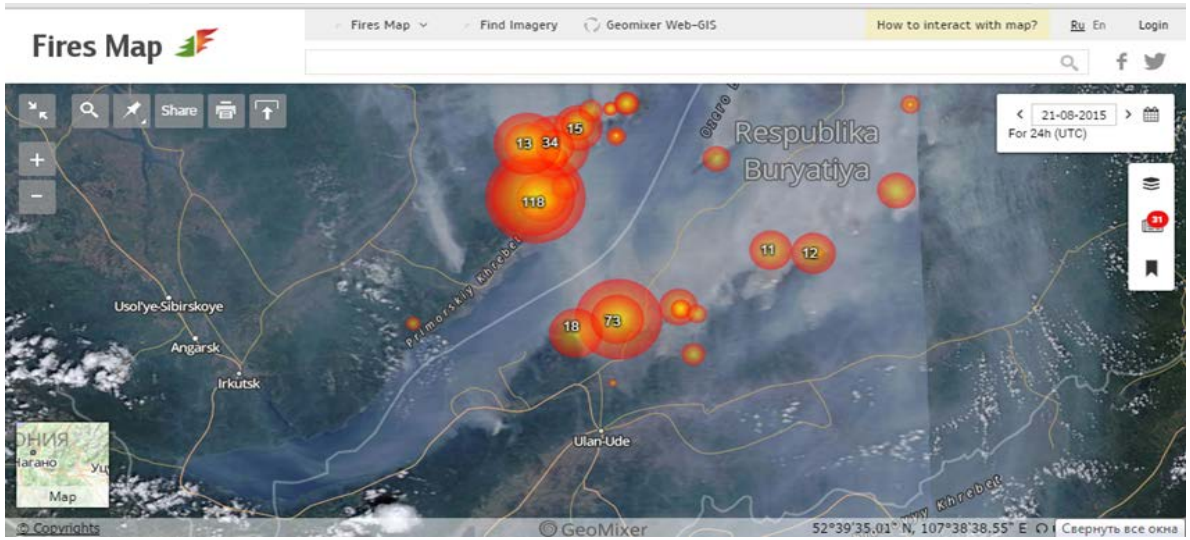
October 14, 2015: MODIS TERRA satellite imagery reveals smoke plumes from massive peat fires on Kalimantan

PHOTO: WORLDVIEW

Fire detection satellite data are available today via online services like this fire monitoring system by Scanex



Geo-service "Map of Fires"

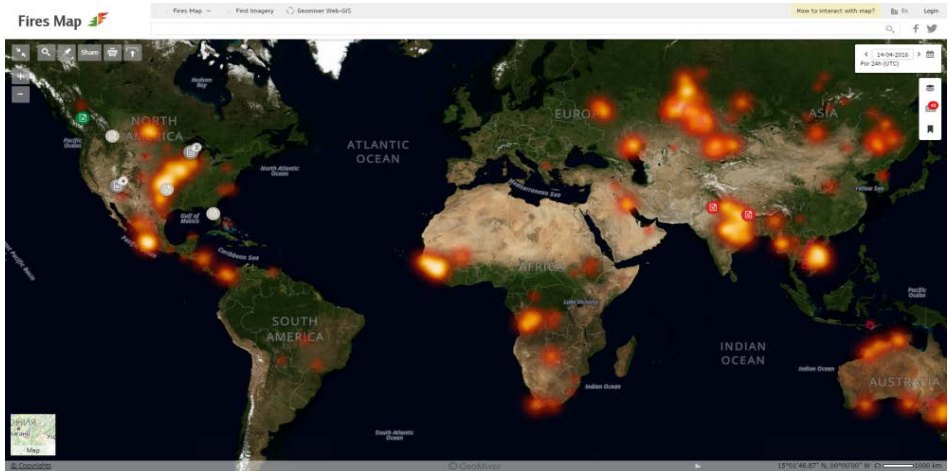


Geo-service "Fires Map" is intended for the detection and identification of possible fire sites (including underground peat fires) and fire situations on the territory of Russia, as well as early warning of responsible and concerned persons.

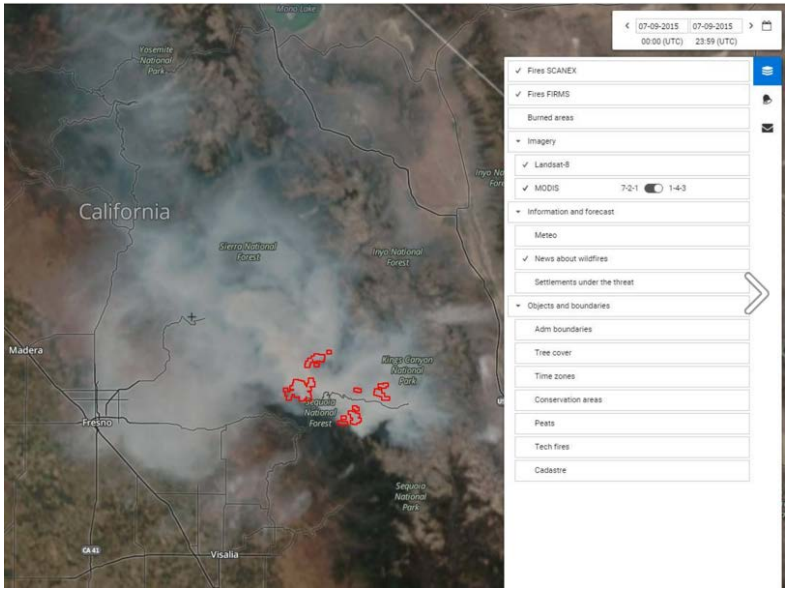
http://fires-map.com/

Fires Map

“Fires Global” - global coverage completed with MODIS and NPP* data based on FIRMS
“Fires Scanex” - provides near-real-time coverage for entire Russian territory including some neighbor countries within the range of Scanex ground stations



*Users can access operative and historical NPP data for North America provided by Wisconsin university



Fires-map.com

Background

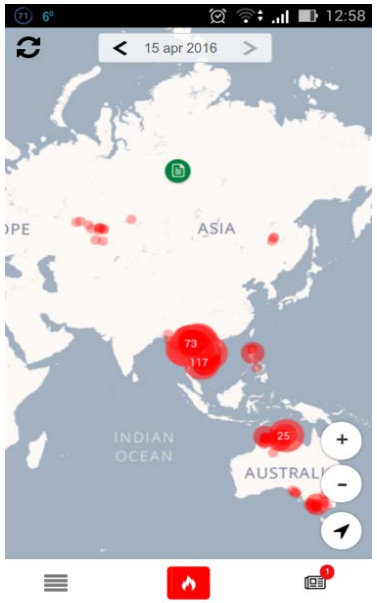
We are a diverse group of professionals in the field of geoinformatics, software engineering, machine learning etc.

Our current work and scientific background includes:

- GIS and mapping
- web and mobile technologies
- data analysis
- image processing
- computational linguistics

We started Fires-map project at 2010, in the significant lack of accurate and public information about wildfires, under the SCANEX RDC

Now we keep on going, developing new models and methods based on satellite monitoring, weather forecasts and location-based technologies

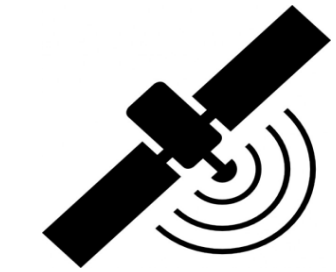


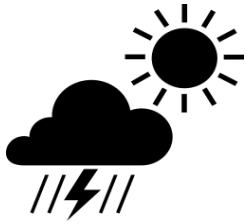
Crisisalert.net / Crisismap.ru

Fires-map.com

CRISIS ALERT

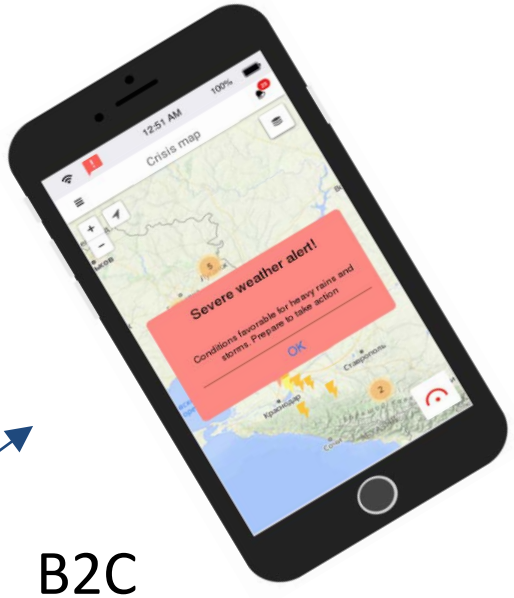
“Crisis Mapping” concept unites models and technologies for getting real time information during a crisis and for analysing a potential risks (natural, social...) for specified location - whether it’s your gps position or a destination





Crisis Alert platform

- EO Monitor
- News aggregator
- Weather models



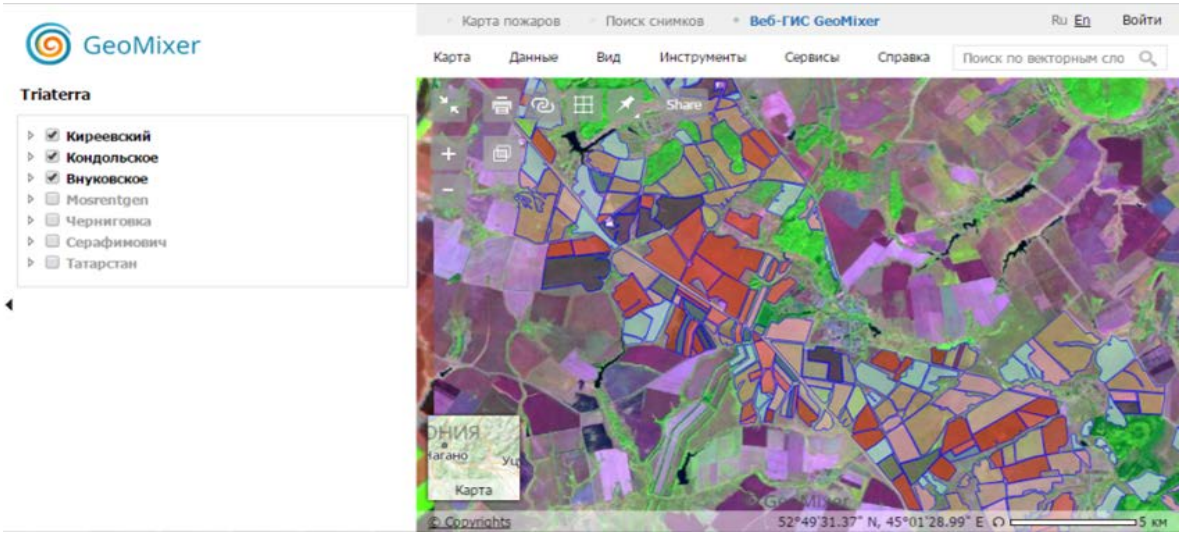
B2C

B2B

B2G

CRISIS ALERT

ComosAgro Online Service



CosmosAgro is the online service to create and develop of spatial data base of agricultural manufacturer s, and for monitoring of agricultural activities. The database is located on the Geoportal of the SCANEX Holding and allows remote online access to work with both visual remote sensing data, and with the information and statistical data from different Russian regions.

Access to Demo version:

http://cosmosagro.kosmosnimki.ru/

Login: demo_user

Password: demo_14

Deforestation is monitored today globally on the annual bases with medium-resolution satellite data

Any preventing measures require spatially precise and up-to-date information

- Mapping nature values to be protected
- Mapping areas with problems
- Environmental monitoring (operative, near-real-time):forest status, threats

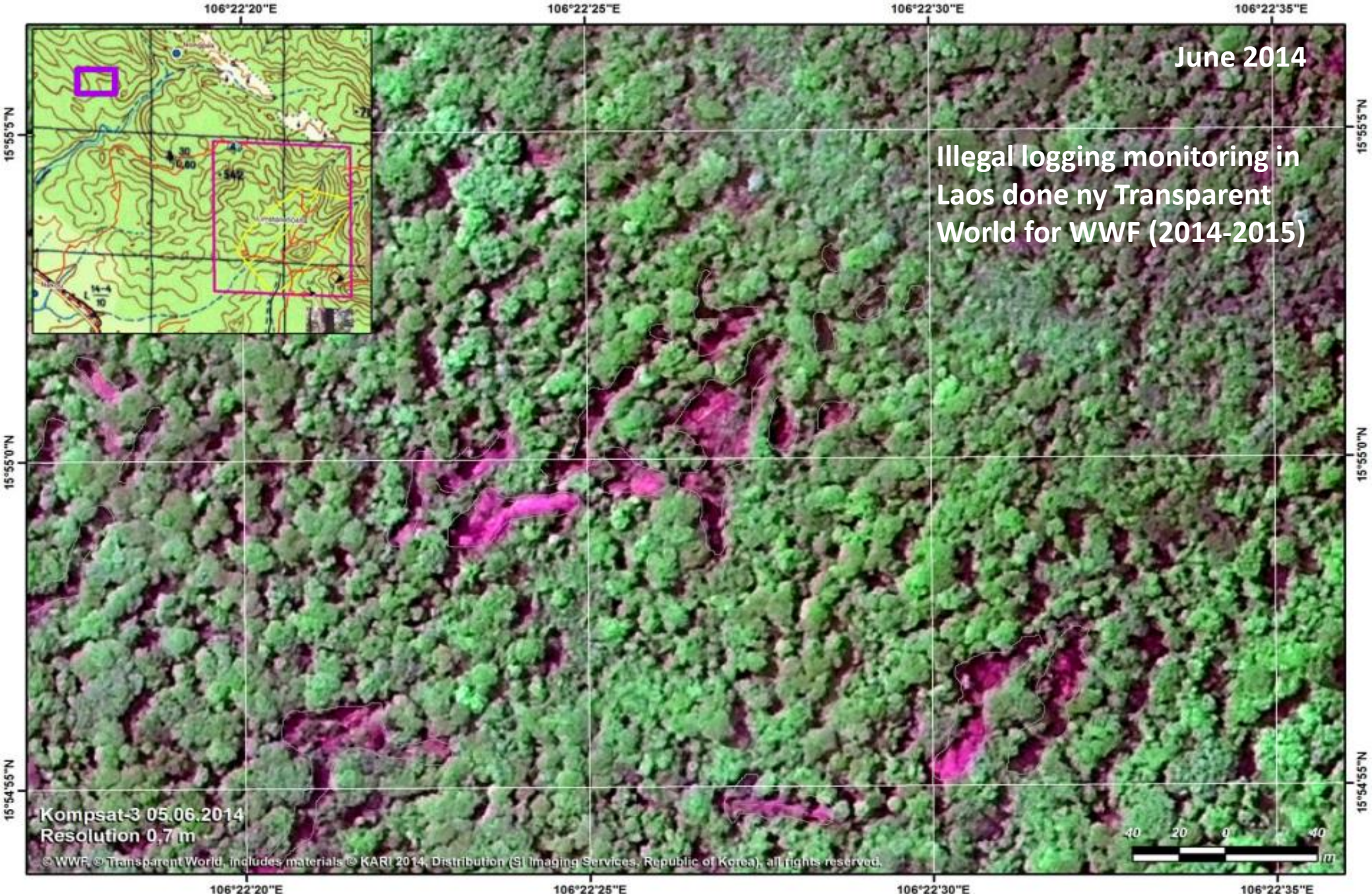
Satellite-based monitoring: operative, semi-automatic

- Forest loss / forest gain
- Fires & haze
- Detecting logging and other small-scale changes
- Infrastructure development
- Water pollution
- Illegal fishing / trafficking

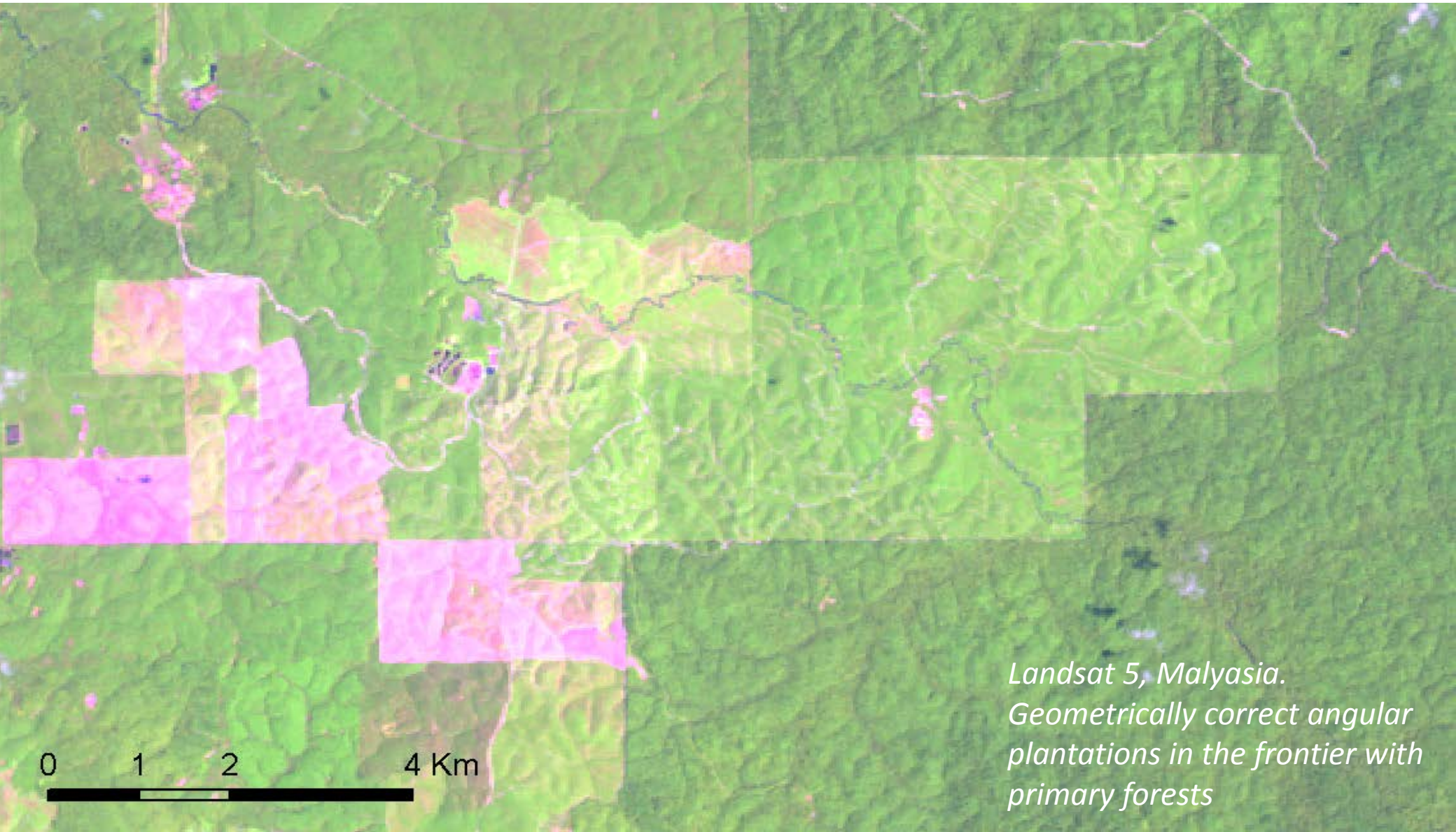
More sophisticated satellite data analysis could also allow mapping of

- High conservation/biodiversity value forests / areas
- High carbon stock forests / areas
- Forest degradation /disturbance level
- Revealing the drivers behind deforestation
- Separation forests and tree plantations
- Measuring the size of selective logging, separating them from other small-scale disturbances

The automatic detection results could be verified with VHR or in the field



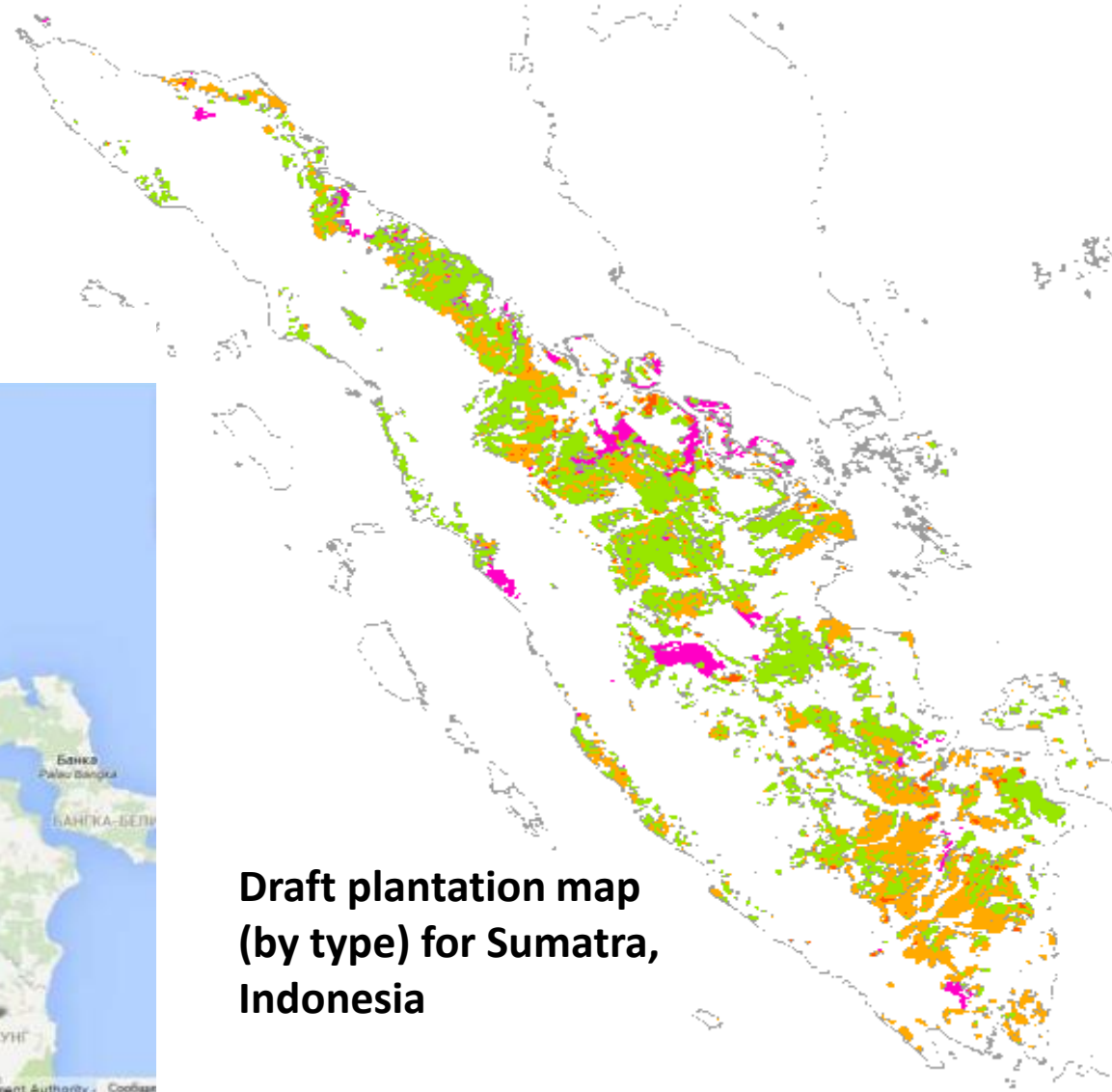
Plantation mapping
(In 2014-2015 Transparent World rapidly mapped tree plantations for 7 tropical countries, including Indonesia and Malaysia.)



Landsat 5, Malyasia. Geometrically correct angular plantations in the frontier with primary forests

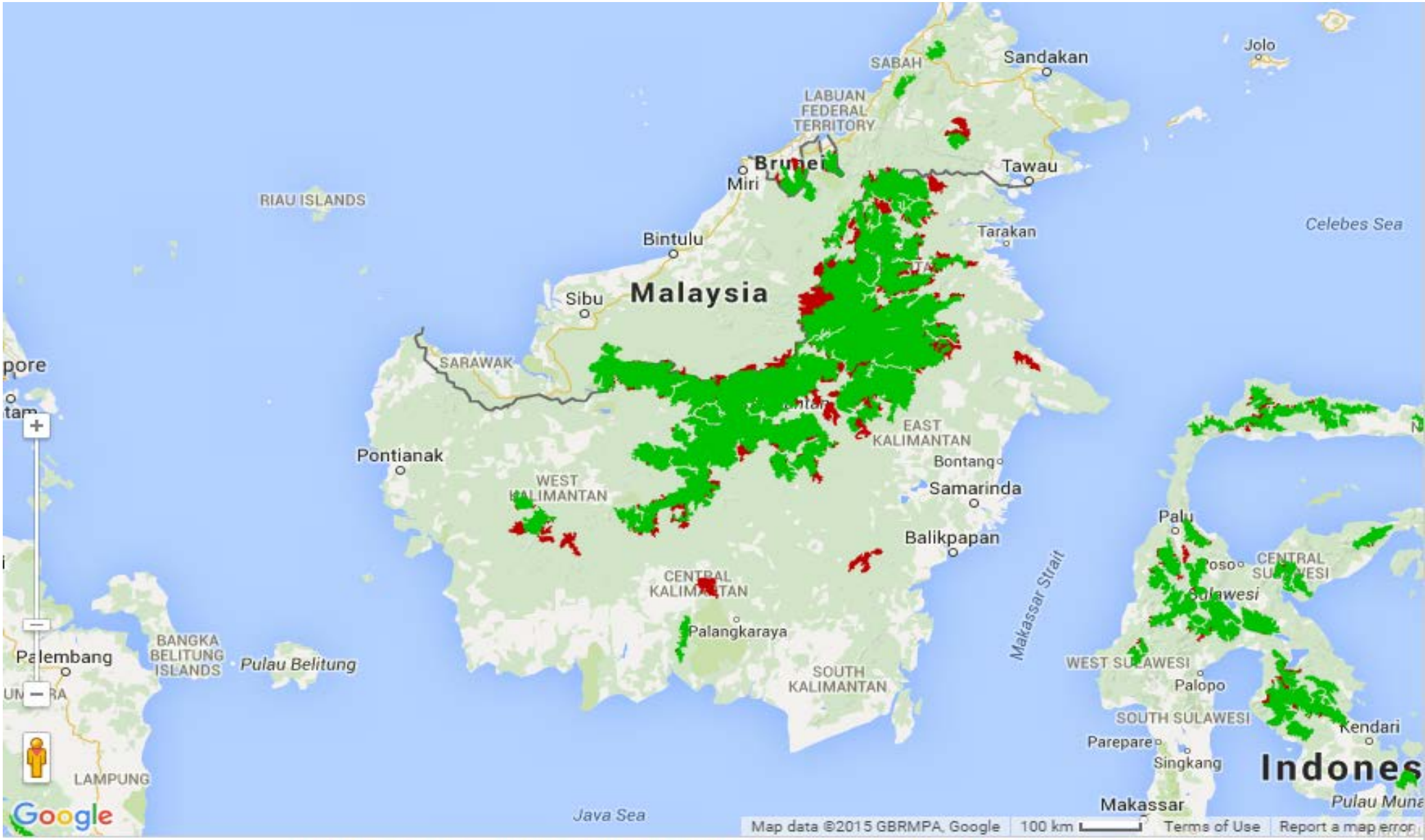
In 2013-2014 Transparent World has mapped tree plantations for 7 countries – Malaysia, Indonesia, Brazil, Peru, Columbia, Liberia and Cambodia (over 50% of world tropical tree plantations)

Field trip route in southern Sumatra



Draft plantation map (by type) for Sumatra, Indonesia

Mapping forests of high conservation value



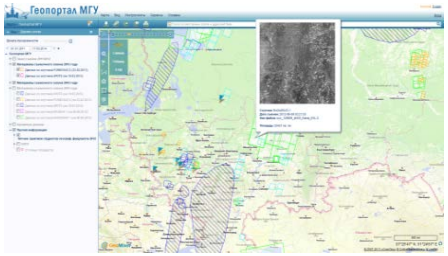
Published by Hansen, Potapov, Moore, Hancher et al. · Powered by Google Earth Engine · Help

Unigeo

SCANEX participates in the creation and development of a network of space monitoring centers based on geoportals at universities. There area 26 Earth remote sensing centers created at the universities in Russia, Spain and Kazakhstan. SCANEX is the "UNIGEO" Consortium member.

The purpose of the Consortium creation is to combine (integrate) intellectual resources and cutting-edge technologies of Russia higher education institutions in the field of remote sensing and geo-informatics to improve the education quality and promote public access to new knowledge and technologies of using remote sensing data.

MSU



In 2010, the MSU Geoportal was created - the geo-information complex, which includes hardware ("UniScan-24" complex, data processing terminals, terminals to work with the geoportal, computer room, server of MSU's geoportal); software (software products designed to work with Earth remote sensing data), as well as a databases of satellite images and maps, which are regularly replenished with new imaging materials.

The project participants are biological, geographical, geological, economic departments of MSU, Department of Soil Science, High School of Social Sciences, High School of Innovative Business and other departments of the Moscow State University.

Integrated Software Ecosystem for Base Geospatial Data Infrastructure

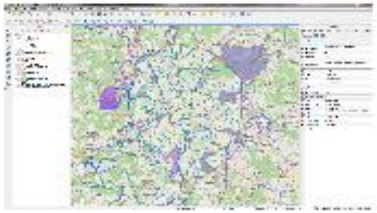
Intergrated Software Ecosystem for Base Geospatial Data Infrastructure

NextGIS Platform - set of software components for building custom GIS applications and services

NextGIS Mobile
Mobile
Geodata Collection & Editing

NextGIS Web
Server backend/frontend
Geodata Access & Storage
SaaS or On-premise

NextGIS QGIS
Desktop
Geodata Creation & Analysis



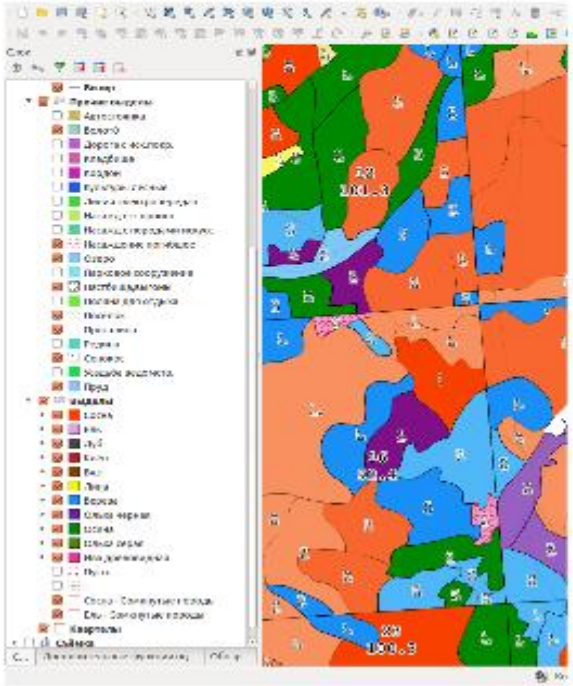
NextGIS Manager
Desktop
Geodata Management

NEXTGIS

Create Wide Range of Services Using Satellite Data

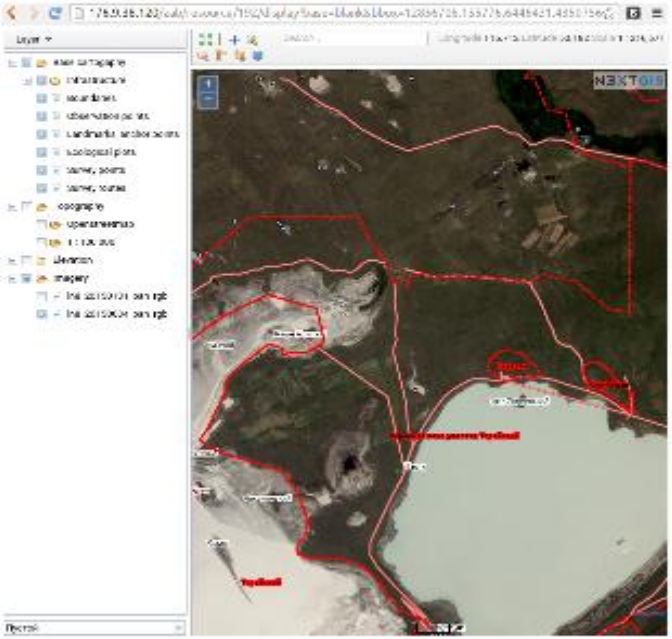
Create Wide Range of Services Using Satellite Data

Forest inventory data and additional layers in **NextGIS QGIS**



NextGIS Mobile showing satellite image from portable ground station

Protected area GIS for various protected areas data in **NextGIS Web**



NEXTGIS

RBC Signals Company

What is RBC Signals?

The RBC Signals Global Ground Station Network aggregates the unused capacity of existing satellite ground stations around the world.

The RBC Signals provide a clean and simple way for ground station operators to increase the revenue generating potential of their systems.

http://rbcsignals.com/

The RBC Signals Global Ground Station Network

Thank you!

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SCANEX, TW, RBC signals