

ORTHOPHOTO MAP



Orthophoto (Source: GeoVille)

PRODUCT DESCRIPTION

Category

- | | |
|---|---|
| <input type="checkbox"/> Topographic information | <input type="checkbox"/> Surface deformation |
| <input type="checkbox"/> Impact assessment | <input type="checkbox"/> Precision ortho-images |
| <input type="checkbox"/> Change detection / continuous monitoring | <input type="checkbox"/> Terrain information |
| <input checked="" type="checkbox"/> Land cover / use | <input type="checkbox"/> Water quantity & quality |
| <input type="checkbox"/> Near surface geology | |

Uses

Logistics planning and operations
 Orthophoto – used as visual basis for infrastructure set-up
 Orthophoto – used as basis visual for ownership map

Challenges addressed

Development and Operations – Land Ownership Mapping

Geo-information needs

DO-3: Land owned by operation

Description

Information on ownership structure regarding the mining activities as well as the surrounding area is vital. Remote sensing can provide orthophotos that can be used as a basemap for maps regarding land cover by the mining operation. An orthophoto may support various tasks in logistics planning and operations as it provides a good overview on a big area. Compared to other imagery sources, a bigger area is covered. The generated orthophoto provides a good visual basis for infrastructure set-up. Also, a map showing the ownership over a special area can be generated. However, additional data such as cadastre data regarding ownership and other titles of possession is needed that can be provided by public authorities.

Orthophotos support this additional data with a visualization as a background image of the earth's surface. They are derived from satellite imagery through geometrical corrections ("orthorectification"). Contortions through altitude differences of the terrain as well as the curvature of the earth and the satellites elevation angle must then be corrected, otherwise the image shows terrain displacement with hundreds of meters. Digital Elevation Models (DEM) are used here to remove the distortions as well as other techniques such as radar interferometry and LiDAR to meet required accuracy rates.

When orthorectification is completed, several thematic maps showing ownership of company and other types of ownership and possession within the mining area as well as the surrounding can be the output of the product.

Known restrictions / limitations

How well a product represents the earth's surface is highly dependent on the quality and resolution of satellite imagery. Additional data is needed to get the required information on ownership.

Lifecycle stage and demand

Exploration	Environmental Assessment & Permitting	Design, Construction & Operations	Mine Closure & Aftercare
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Environmental Assessment & Permitting:

- At this stage, information on ownership can be useful to get information about existing constraints.

Design, Construction & Operations:

- All lands owned by the company need to be recorded on a monthly basis.

Geographic coverage

Globally available.

EARSC Thematic Domain

DOMAIN	LAND
Sub-domain	Land use
Product description	Assess land value, ownership, type

PRODUCT SPECIFICATIONS

Input data sources

Sampling of available products:

<i>Satellite</i>	<i>RapidEye</i>	<i>IKONOS</i>	<i>Worldview 1, 2 and 3</i>	<i>SPOT 6, 7</i>	<i>Pleiades</i>
Status	In operation	Archive	In operation	In operation	In operation
Operator	Planet Labs	Digital Globe	Digital Globe	Airbus Defence and Space	Airbus Defence and Space/CNES
Data availability	Commercial, on demand	Public	Commercial, on demand	Commercial, on demand	Commercial, on demand
Resolution (m)	6,5	1 – 4	0.31 - 0.46	1.5	0.5
Coverage	Global	Global	Global	Global	Global
Frequency (days)	< 6	< 3	< 2	< 1	< 1
Launch year	2008	1999 – 2015	2007 / 2009 / 2014	2012 / 2014	2011
Website	link	link	link	link	link

Minimum Mapping Unit (MMU)

Minimum Mapping Unit depends on spatial resolution, see details above.

Accuracy / constraints

Thematic accuracy:

An orthophoto map provides a visualization of the earth's surface. As for thematic aspects, additional data is needed.

Spatial accuracy:

Dependent on input pixel resolution.

Accuracy assessment approach & quality control measures

Accuracy is assessed by comparing orthophotos with other imagery to see whether there are shifts.

Frequency / timeliness

Observation frequency:

Every one or more days, depending on satellite.

Timeliness of delivery:

Within five (working) days of sensing.

Availability

IKONOS (1999–2015) and SPOT data (SPOT 6: since 2012; SPOT 7 since 2014) are freely available through the portal of ESA.

WorldView, Pléiades as well as RapidEye data are commercial licenses and must be purchased through the operator/vendor. WorldView is provided by DigitalGlobe, RapidEye is distributed through Planet Labs. Pléiades can be purchased from Airbus Defence and Space. Usually available within hour(s) of satellite fly-over.

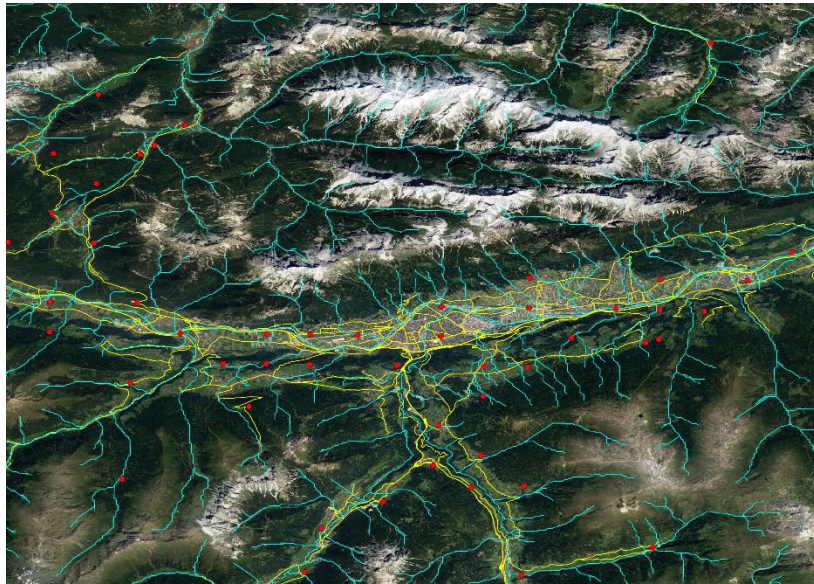
Delivery / output format

Data type: Raster formats

File format: GeoTIFF, JPEG

Other delivery formats: Report

USE CASE



(Source: GeoVille)

Digital Reference Data

An orthophoto map can be used as a visual basis for various needs. The example above shows a combination with transport data as well as the river structure. Also, infrastructure, buildings and various points of interest may also be combined with such data.
