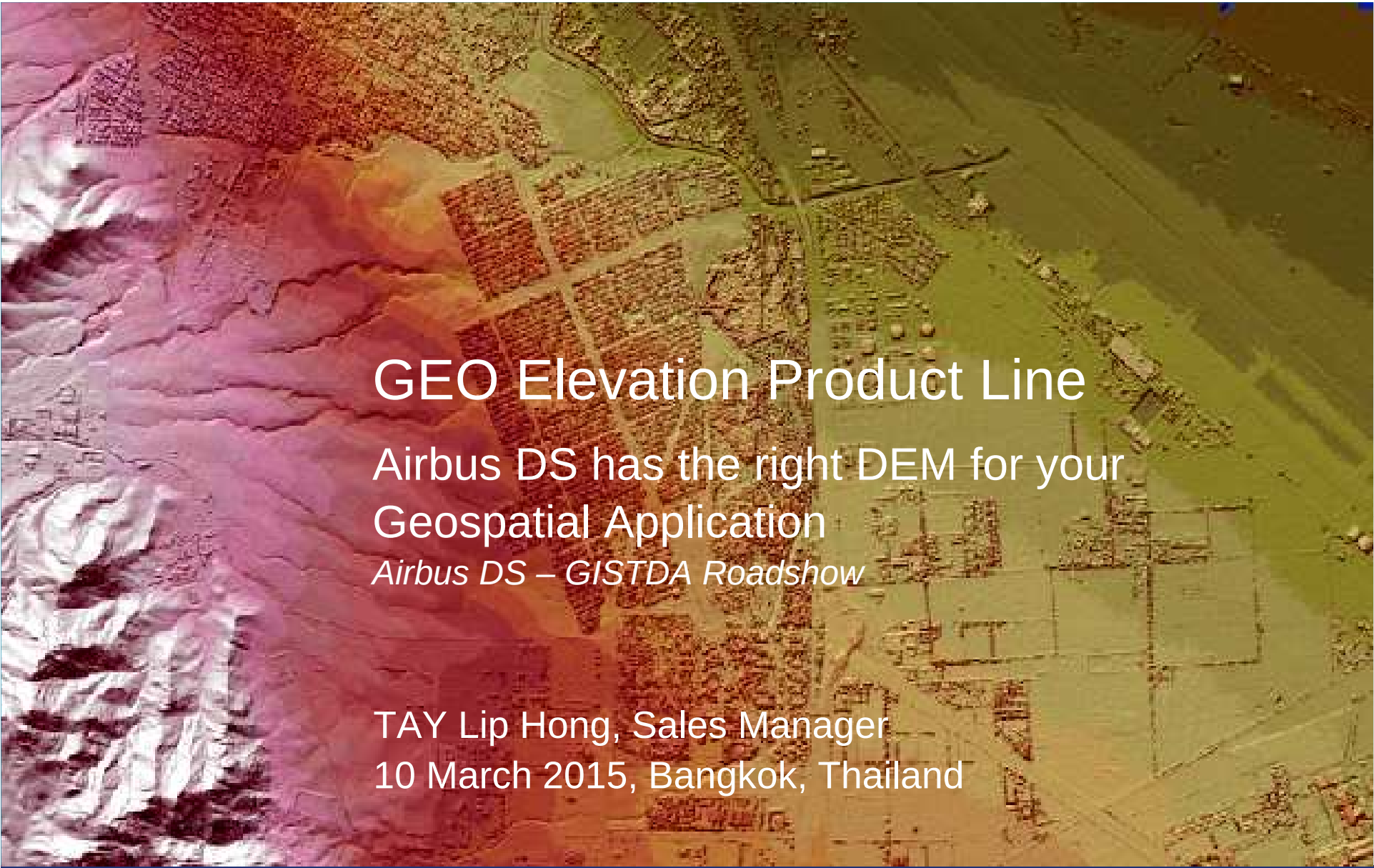




GEO Elevation Product Line

Airbus DS has the right DEM for your
Geospatial Application

Airbus DS – GISTDA Roadshow

TAY Lip Hong, Sales Manager
10 March 2015, Bangkok, Thailand

Our key assets

- Genuine satellite constellations
- Complete and unrivaled Elevation production range
- Long-time experience: the Elevation history has begun in 2002



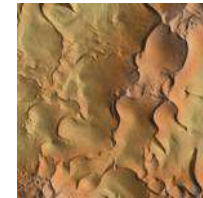
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What can you use the elevation for?

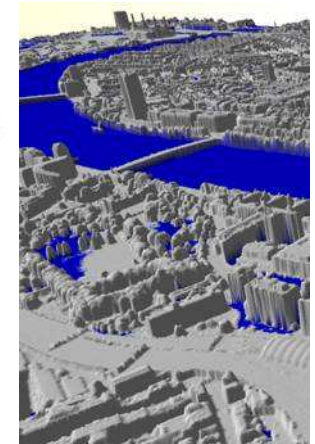
- High-quality image ortho-rectification
- Multi-scale mapping
- Defence mission preparation & rehearsal
- Terrain knowledge for flight guidance
- Register intelligence and ease target identification
- Water body identification
- Infrastructure & networks planning, feasibility studies
- Flood modelling
- 3D visualisation



defence



oil & gas



risk & emergency



national mapping



civil engineering

GEO Elevation Product Line

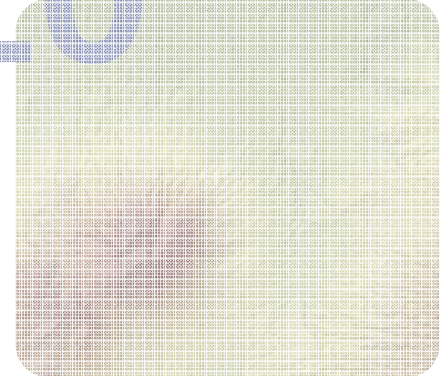
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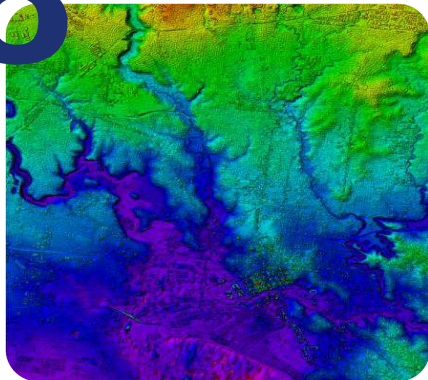
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10



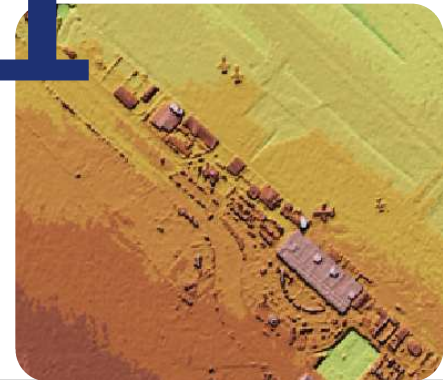
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4

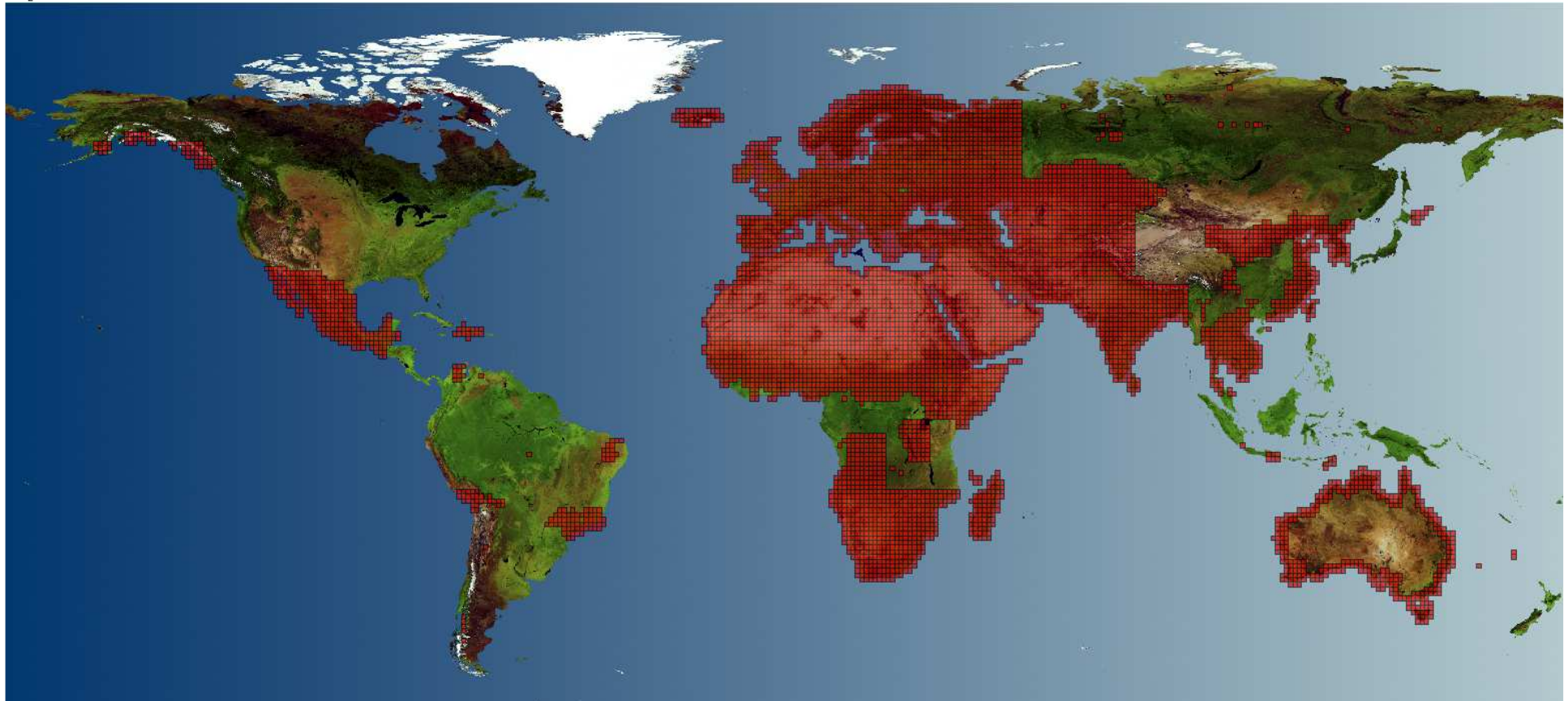


1



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Elevation30 – Off-the-shelf Coverage

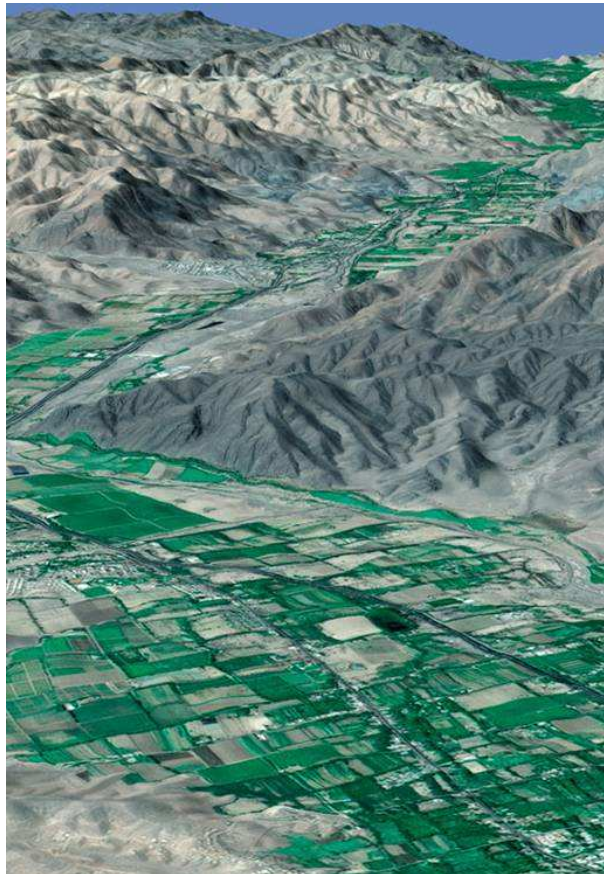


75M km²

Off-the-shelf DTED Level 2

Elevation30

Unique worldwide 3D geographic reference database for all global coverage needs, especially suited for large area coverage for mapping, GIS and military needs.



- Available for **> 75 million km²** worldwide
- **6m** horizontal and **10m** vertical accuracy at **30m** grid spacing
- Based on **DTED level 2** standards
- Excellent accuracy data
- **3 layers**: DTED2 DEM, Orthoimage, Quality masks
- Derived from both optical (SPOT) and radar (TerraSAR-X) spaceborne technologies, allowing a greater coverage independent of terrain characteristics and weather conditions.

Elevation30 Latest Global DEM Evaluation

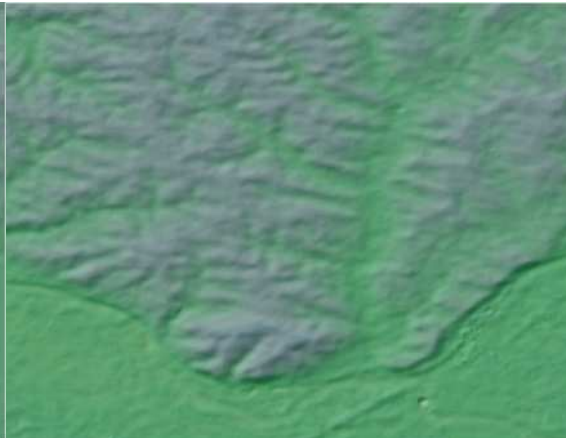
performed by L'Institut Géographique National Français (IGN)

- Evaluation methods**
- Altitude performance => use of Icesat and GPS points, approx. 1 millions points
 - Resolution equivalence => Comparison with resampled high resolution DEM
 - Non-indicated artefacts => visual analyse
 - Landforms restitution => visual analyse

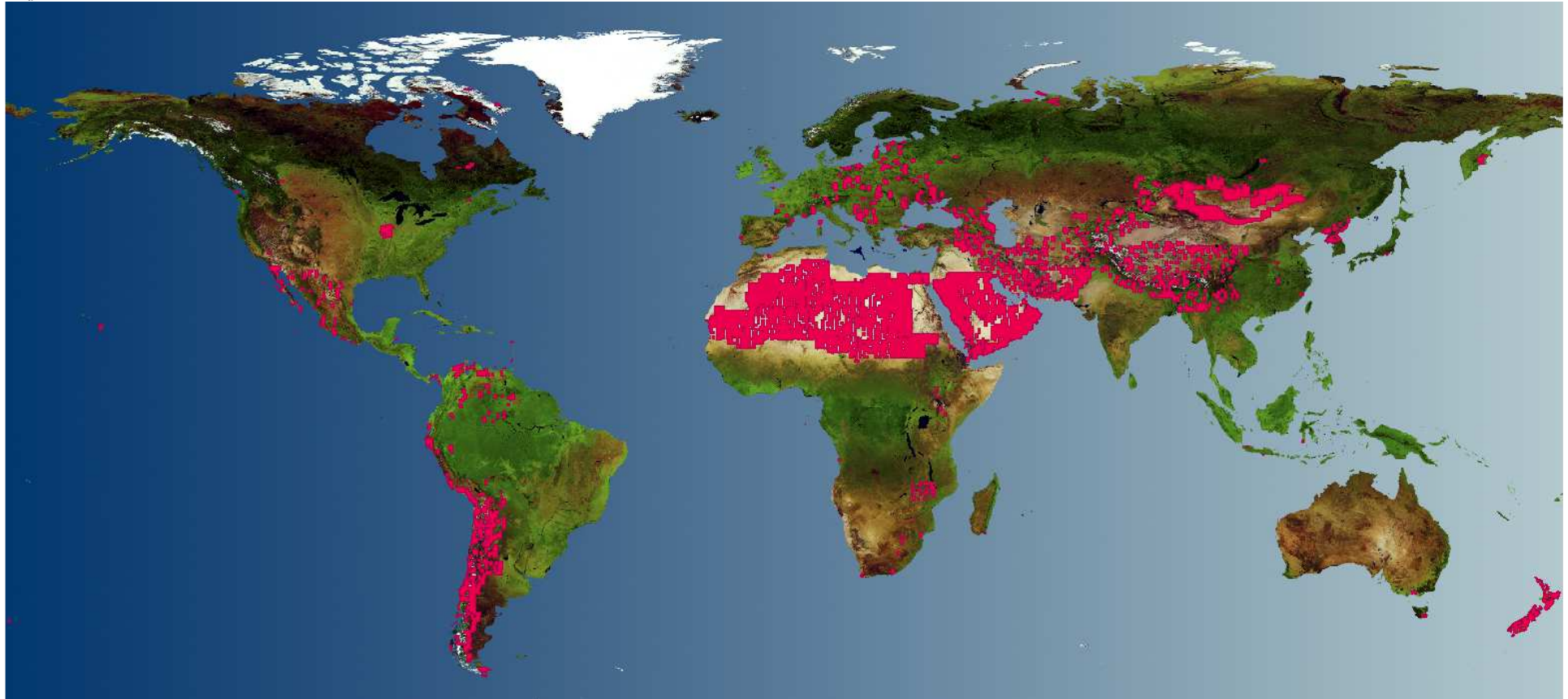
	SRTM	GDEM V2	Reference3D®
Coverage	≈120 M km ²	≈140 M km ²	80 M km ²
Altitude max 90%*	≈9m	≈12m	≈7m
Altitude max 95%*	≈12m	≈20m	≈10m
Sampling	90m	30m	30m
Equiv. resolution	90m	≈100-120m	30m
Artefacts	Less then 1% Local No mask	Less then 5% Everywhere No mask	Less then 0.5% Local 90% indicated in MQu mask

* Global measured performance – Performance is better in plains and worse in high mountains, but performance order and ratio between the DEM are globally identical.

DEM Samples Landforms

STRM**GDEM V2****Reference3D®***Mountains***STRM****GDEM V2****Reference3D®***Rolling Hills*

Elevation8 – Stereo Coverage



17M km² With SPOT6 only

Elevation8

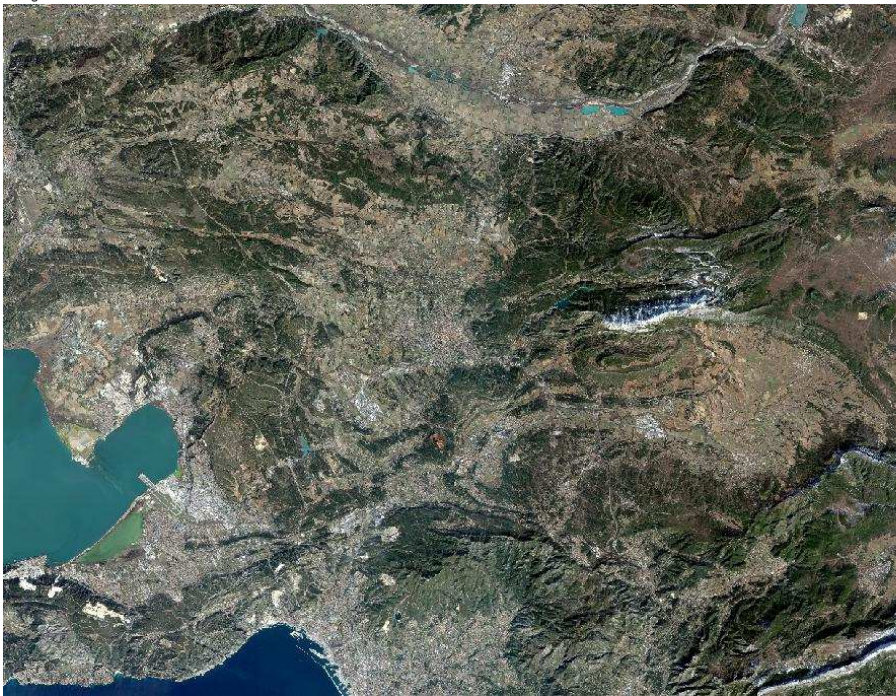


Corsica by SPOT 6

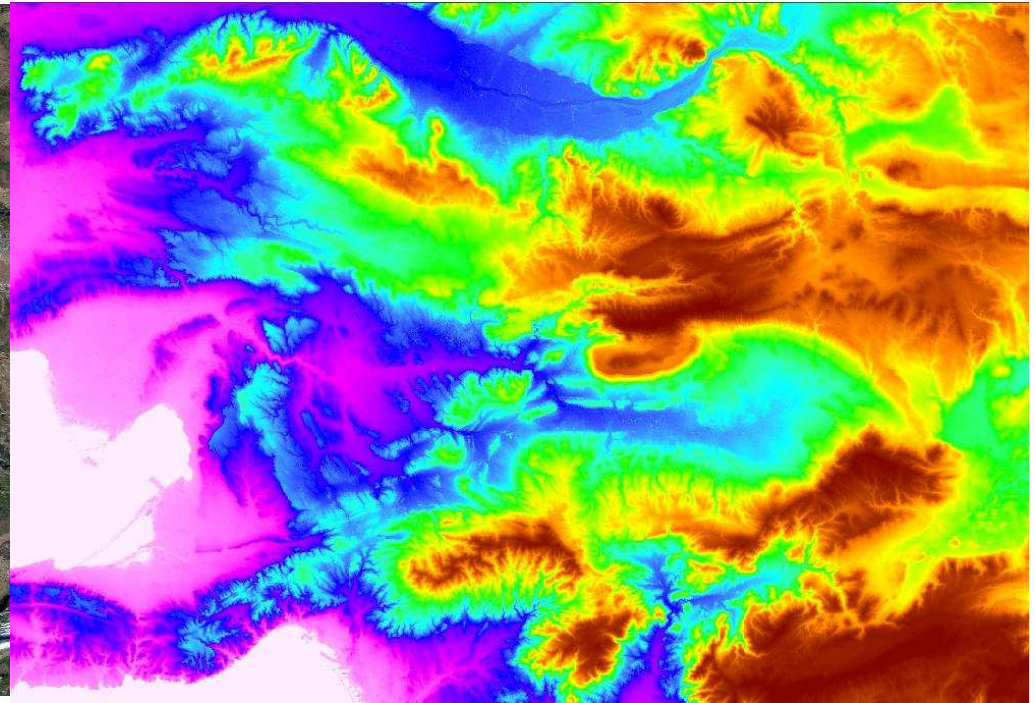
- SPOT 6 great acquisition capability enables to cover **wide** coverage in very **short** time.
- Simultaneous stereo / tri-stereo data acquisition
 - DSM with great accuracies at a very competitive price
 - E.g.: one geocell (**10,000km²**) can be acquired in stereo in **one single** pass
- Grid spacing: **8m**
- Vertical accuracy of **3m** (with ≥ 5 accurate GCPs)
 - Without accurate GCPs, E30 is used in standard
 - Outside the Elevation30 coverage: product is based on the sensor absolute location
- Anywhere in the world, suitable for large surfaces
- Package includes **DSM** or **DTM** and stereo / tri-stereo pair
- Perfectly adapted for updating map, hydrology and oil and gas study over large areas

Elevation8

Ortho Image

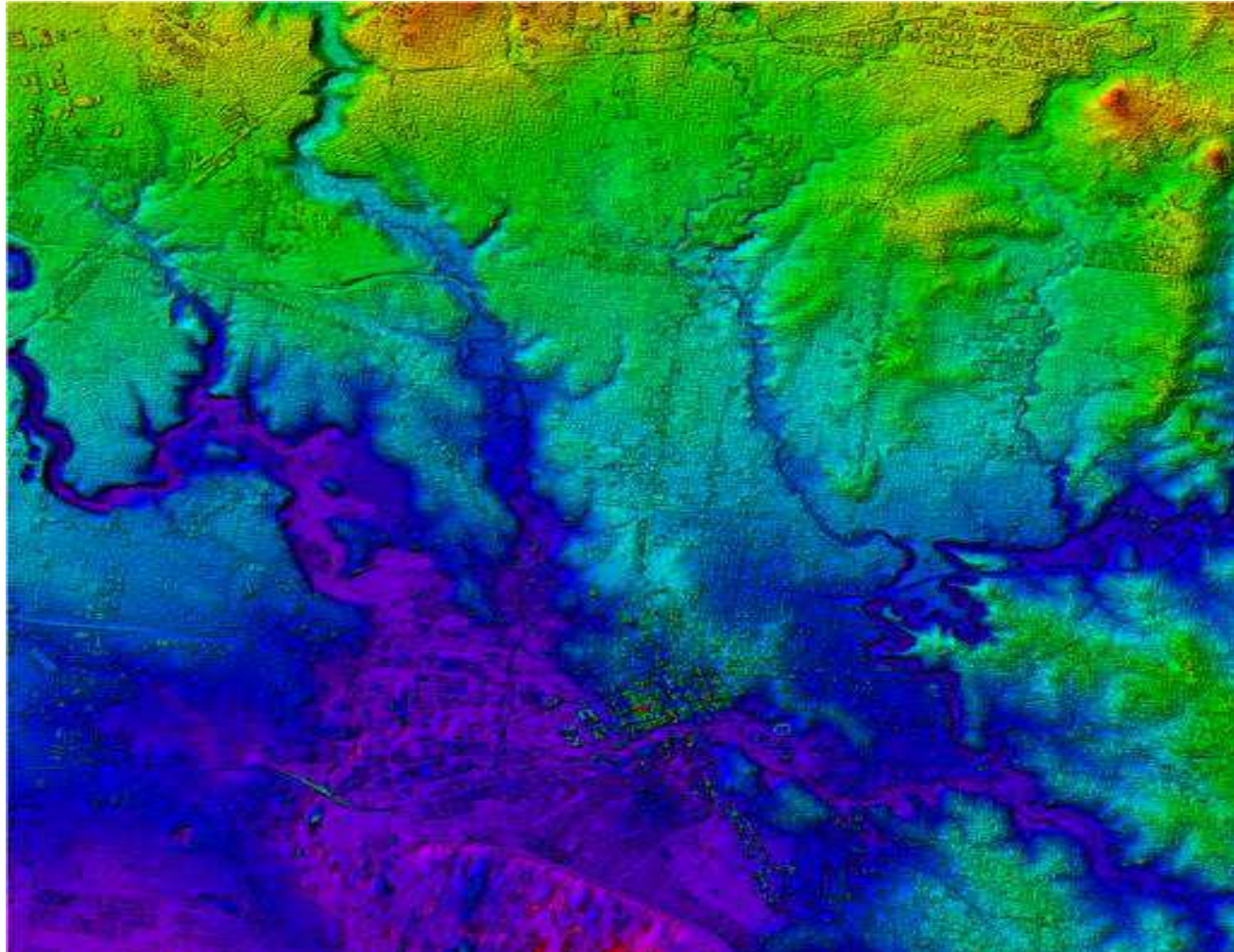


DSM



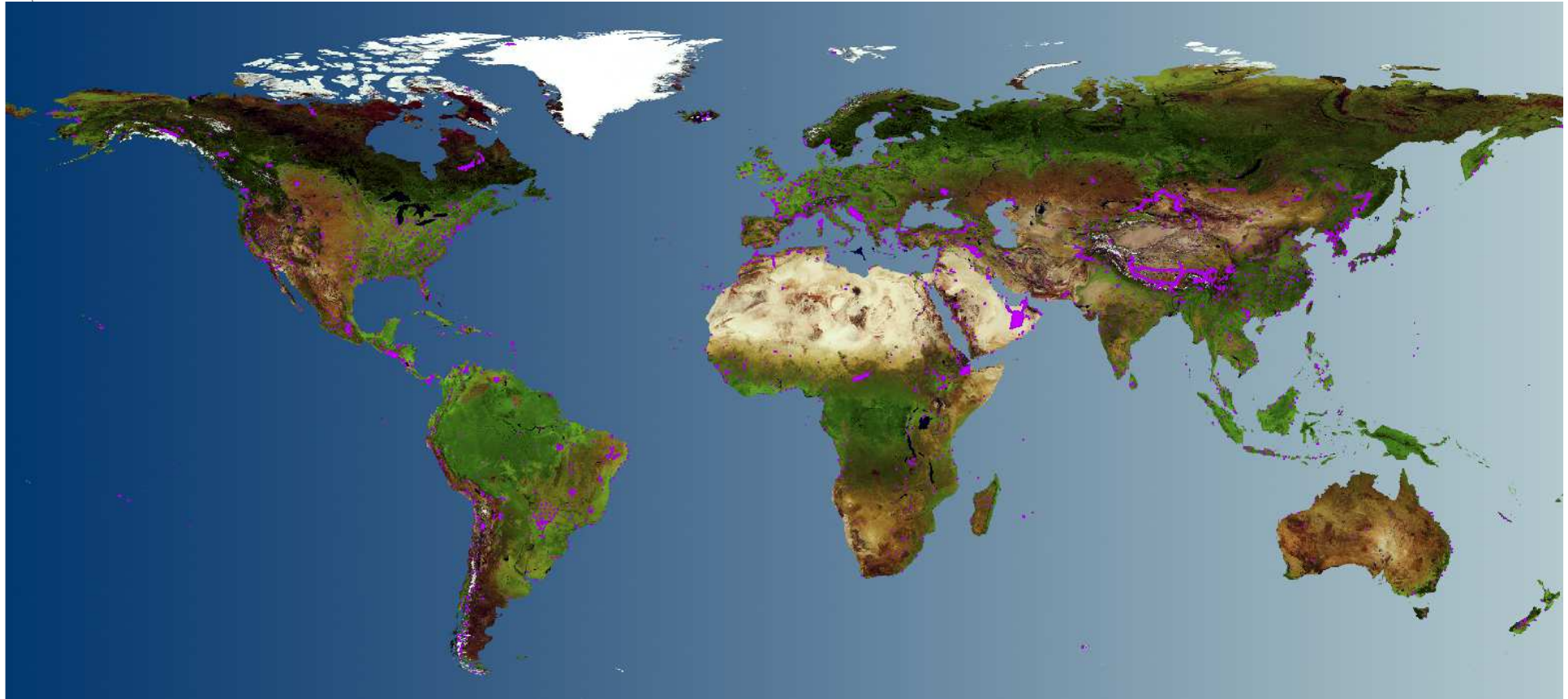
Bouches du Rhône, France

Elevation8



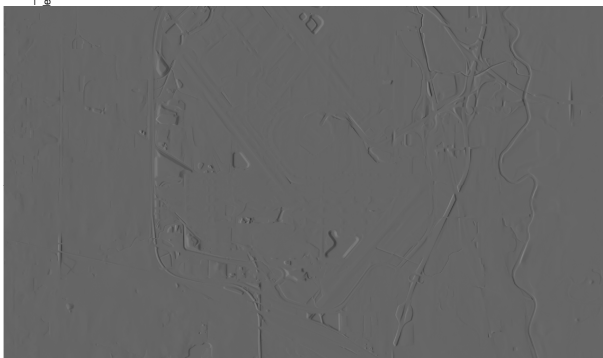
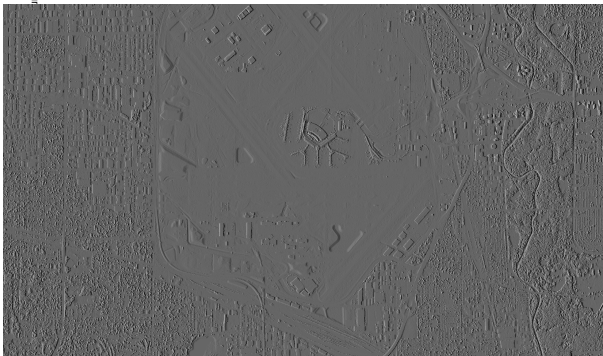
Melbourne, Australia

Elevation4 & Elevation1 – Stereo Coverage



1.9M km² Incl. 1000+ cities, airports, harbours

Elevation4 & Elevation1

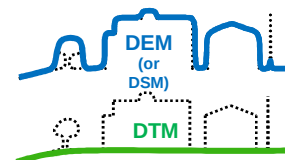


■ Elevation4

- **Accurate** product based on matching of Pleiades stereo images
- Automatic raw DSM correlation at **4m** grid spacing and high vertical accuracy (up to **2m**).

■ Elevation1

- Applicable to mineral / open areas with few (or low) vegetation and few buildings.
 - Very accurate product based on matching of Pleiades stereo images
 - Automatic raw DSM correlation at **1m** grid spacing and high vertical accuracy (up to **1.5m**).
- Nice rendering of terrain relief details
 - Particularly adapted to OGM, civil engineering and urban mapping applications
 - DTM available

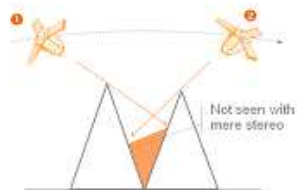


Stereo or Tri-stereo?

*Illustration of **Tri-stereo** benefits over Melbourne*
Difficult urban area - concentration of skyscrapers

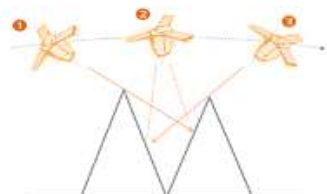
Stereo

All kind of areas
 (natural or urban) with
 few relief or low slopes

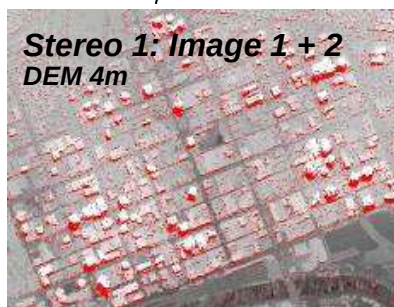


Tri-stereo

Area with relief / slopes
 or urban landscape

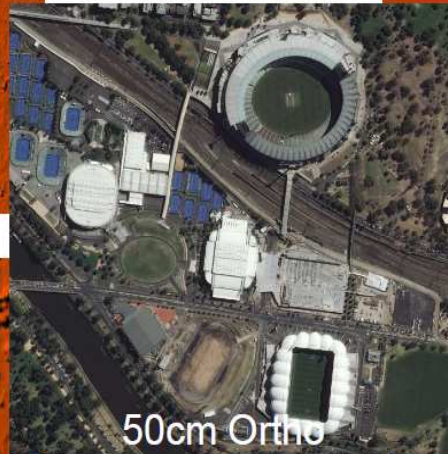
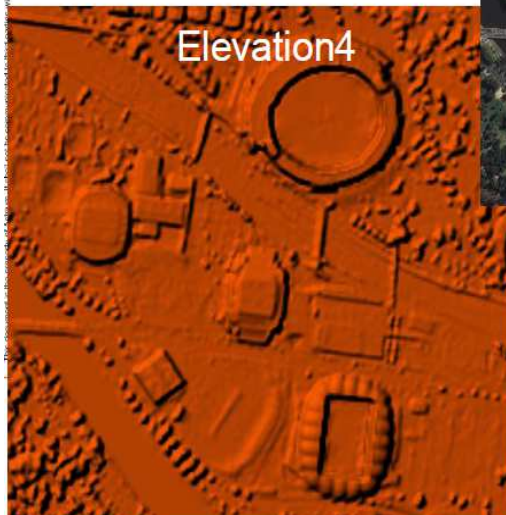
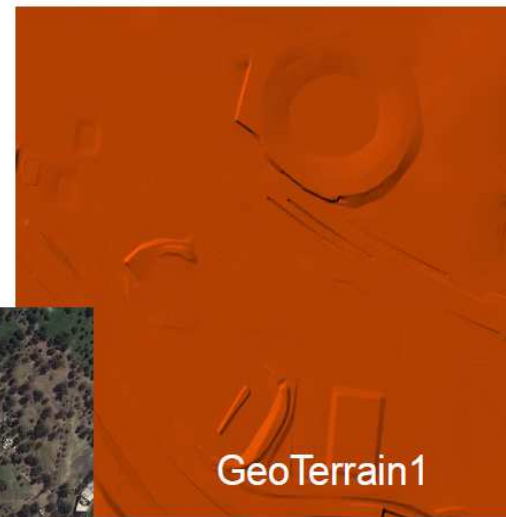
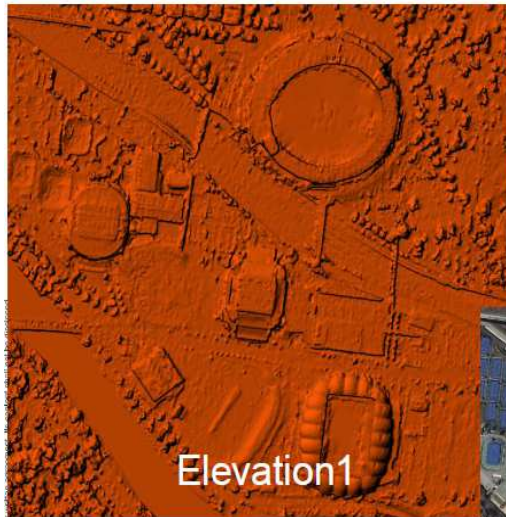


Merge of the 3 stereo DEMs



In red:
 hidden items

Elevation1 & Elevation4 – DSM and DTM Products



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Elevation1 – DSM Example

... *Mashhad (Ortho)*



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Elevation1 – DSM Example

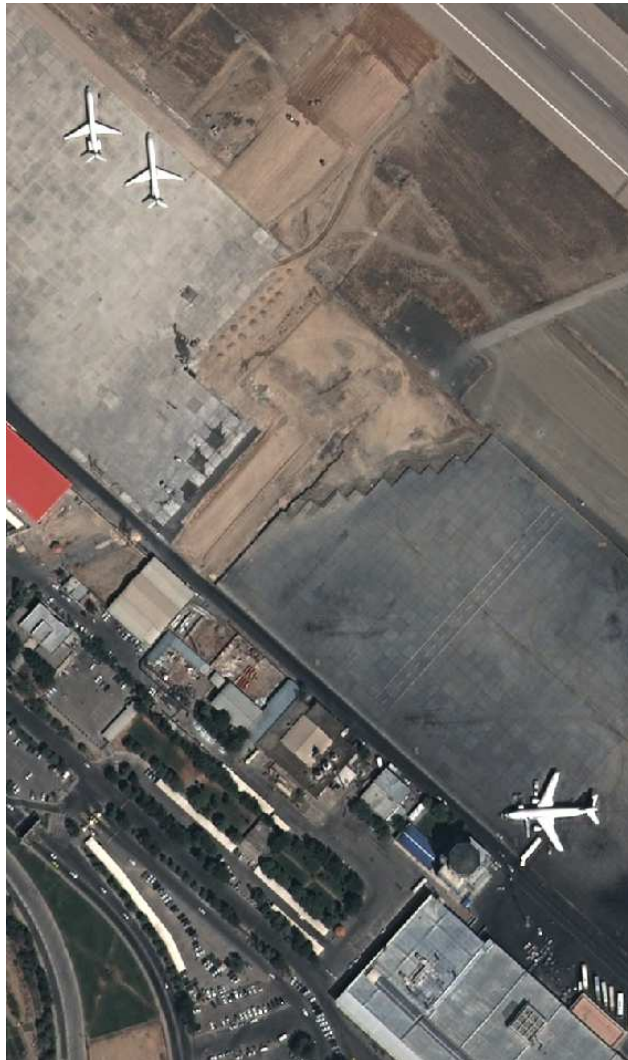
... *Mashhad (DSM)*



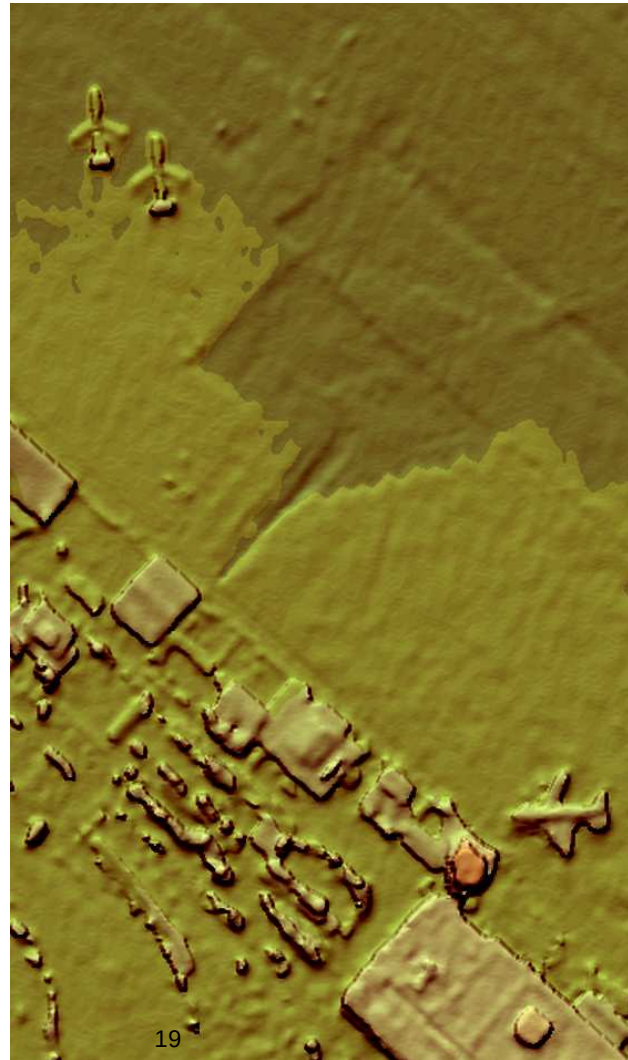
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Elevation1 – DSM Example

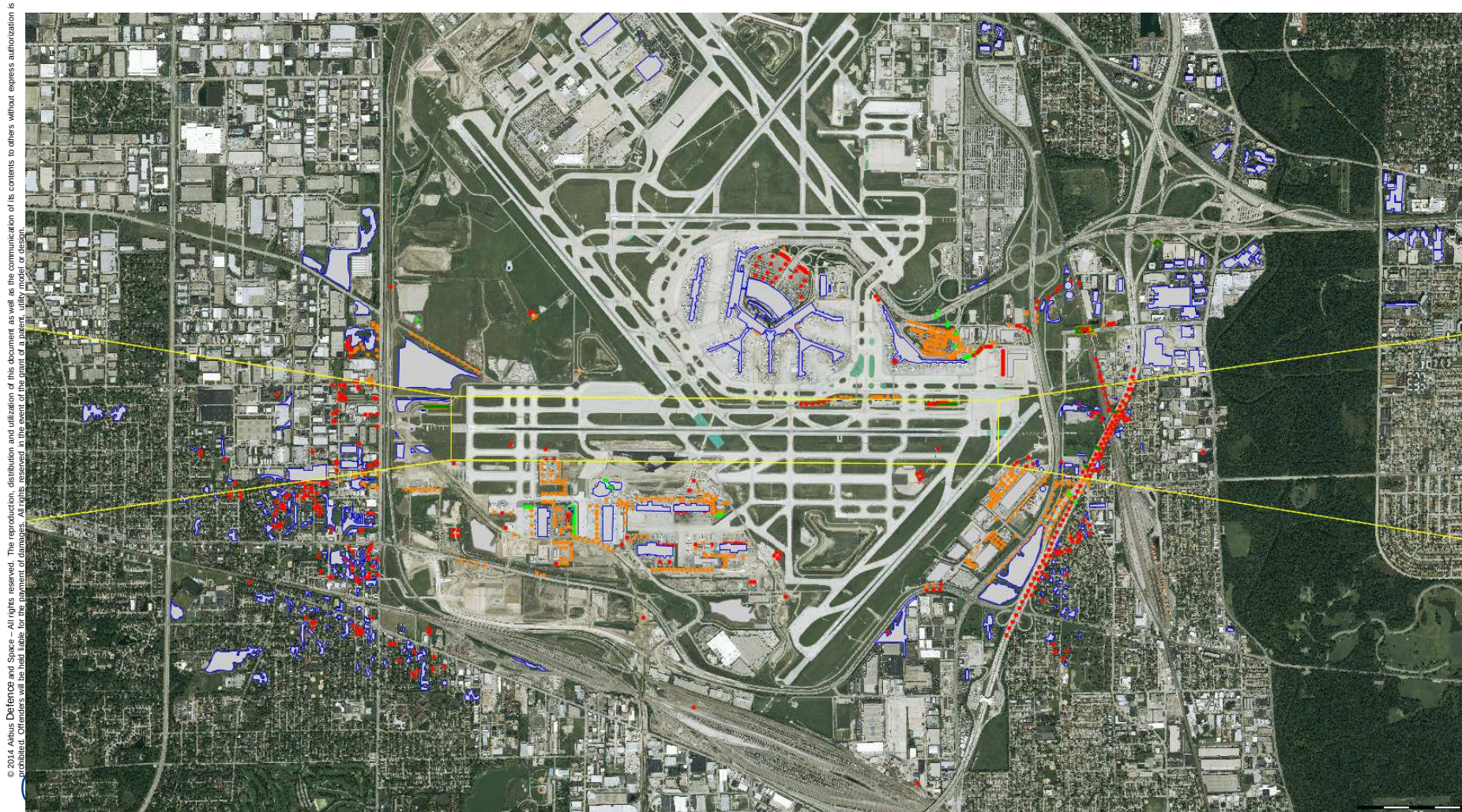
Ortho Image



DSM



Case Study: Obstacles identification



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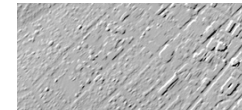
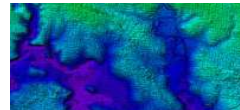
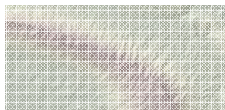
PROJECT REFERENCE

- Chicago O'Hare Airport, USA
- Elevation1 and 0.5m Pléiades imagery
- (Stereo) Interpretation of features

GEO Elevation Portfolio - Specification

		Elevation30	Elevation10		Elevation8		Elevation4		Elevation1		
Product		DSM	DSM _{basic}	DSM	DTM	DSM	DTM	DSM	DTM	DSM	DTM
Sensor		SPOT5 HRS	TerraSAR-X			SPOT6		Pléiades 1A & 1B		Pléiades 1A & 1B	
Method		Photogrammetry	Radargrammetry			Photogrammetry		Photogrammetry		Photogrammetry	
Specification Level		DTED-2	HREGP (HRTE3)			HRE80		HRE40		HRE10	
Grid Spacing		1 arc second (~ 30m)	10m			8m		4m		1m	
Vertical Accuracy (LE90)	Abs.	10m	5m - 10m		10m	≥3m*		≥2m*	2m*	≥1.5m*	1.5m*
	Rel.	8m	<5m		8m	3m		2m	1.5m	1m	1.5m
Horizontal Accuracy (CE90)	Abs.	6m - 10m	5m - 10m		10m	≥2.5m*		≥1.5m*	≥1.5m*	≥1.5m*	1.5m*
	Rel.	5m	<5m		5m	2m		1.5m	n.a.	1.5m	n.a
Minimum Order		3000 km²	500 km² [& 20km width]			1,000 km² [& 20km width]		100 km² [& 10km width]		100 km² [& 10km width]	
Coverage		>75 Mio km² available	On demand			On demand		On demand		On demand	
Extras & Add-ons		Metadata included	Metadata included			(Tri-)Stereo data is included		(Tri-)Stereo data is included		(Tri-)Stereo + Ortho images included	• Ortho image (0.5m) • Stereo data • 3m contours are included
		• Quality Masks • Ortho Image (5m)	• Quality Layers • Ortho Image (2.5 m)		Ortho image		• Ortho Image (0.5 m) • DTM: Contours				

*Elevation 8, 4 & 1 accuracy dependent on ground control points (GCPs); valid for slopes ≤20%



The right DEM for any kind of needs

GEOElevation has the suitable DEM for users' needs

Need	Suitable Elevation Model
Rapid delivery •Off-the-shelf product	Elevation30 <i>>75 M km² already available</i>
Up-to-date Information •Information after a disaster •Update elevation information	Elevation10, Elevation8, Elevation4, Elevation1 <i>Acquisition & Production on demand</i>
No location constraint •Tropical belt and cloudy areas	Elevation30, Elevation10 <i>Weather independence of radar (E30: fill-in of radar based data)</i>
Detailed & high accurate information of elevation •City models •Engineering & infrastructure projects	Elevation4, Elevation1 <i>Elevation based on VHR data (Pléiades)</i>
Terrain Model •Elevation of bare earth	Elevation10, Elevation8, Elevation4, Elevation1 <i>Removal of buildings, trees and man-made objects</i>
Accuracy Levels •DTED 2, HRTE3, HRE40, HRE10	E30, E10, E4&E1
Manage expenses •Limited budget	Elevation30

Thank you!

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