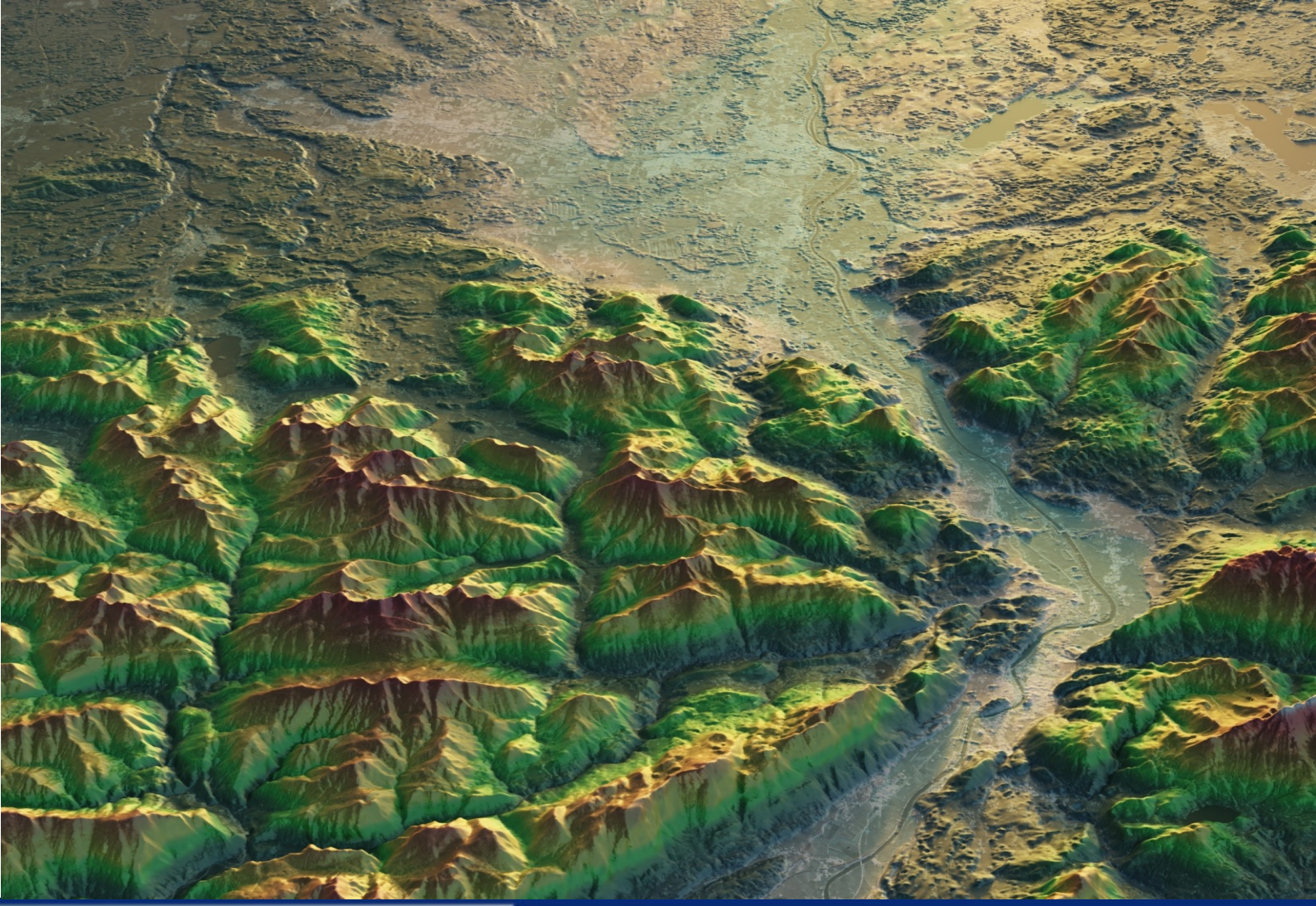


WorldDEM™

WorldDEM Neo DTM

Technical Product Description

Version 2.1

AIRBUS DEFENCE AND SPACE
Intelligence

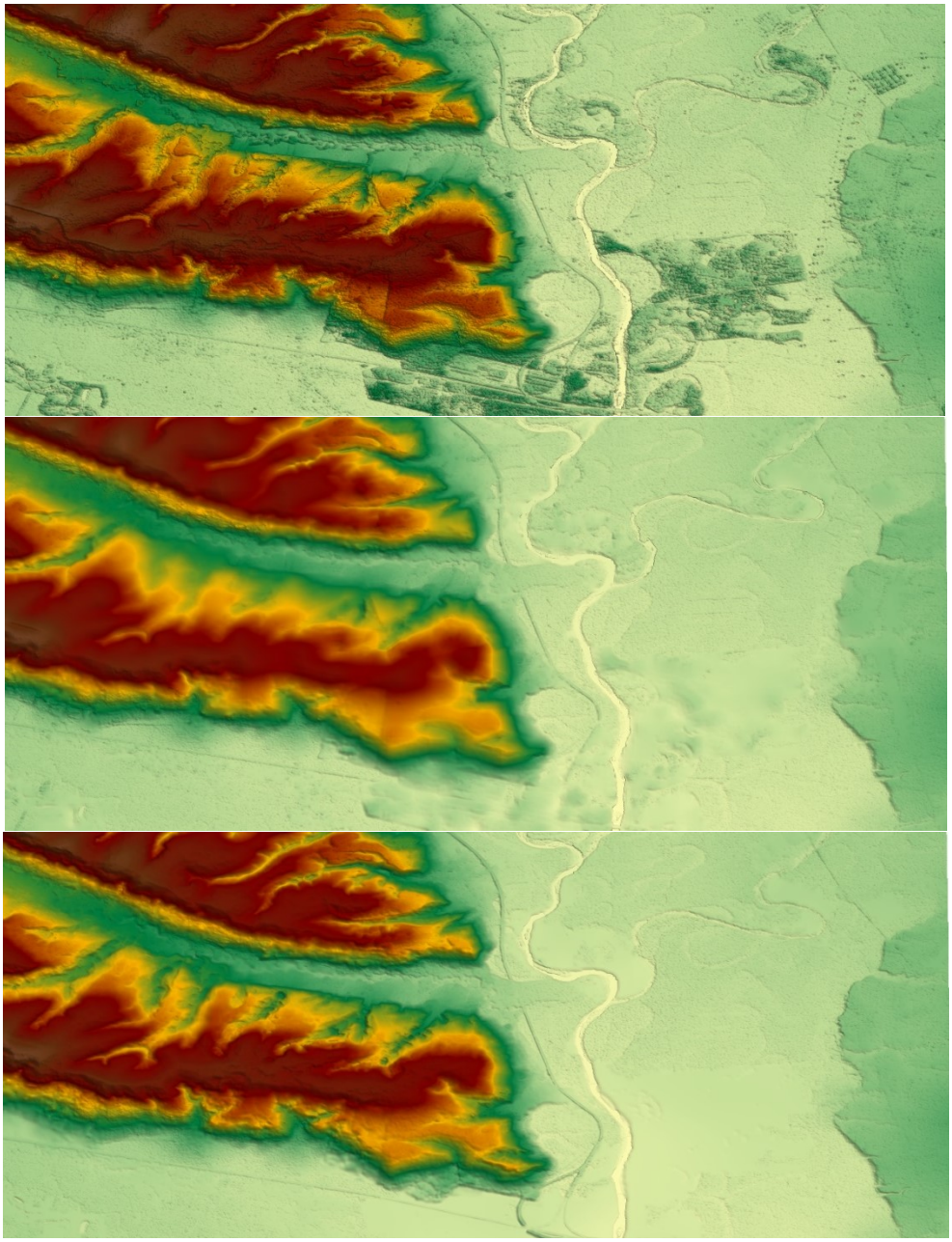
AIRBUS

WorldDEM Neo DTM™ –
Up-to-date global digital terrain model with 5m pixel spacing

WorldDEM Neo DTM is a Digital Terrain Model, providing a continuous distribution of terrain heights derived from the WorldDEM Neo DSM.

Elements over the surface of the Earth with a vertical dimension, such as buildings or forests are identified and their heights transformed to bare ground. The characteristic of the relief, as well as specific features such as dams, for example are conserved.

WorldDEM Neo products are built upon satellite imagery and the corresponding interferometric elevation data of the continuing TanDEM-X Mission, primarily acquired in the years 2017 to 2021. The grid spacing of WorldDEM Neo is 0.15 arcseconds and follows Level4b of the DGED Product Implementation Profile.



Comparison of WorldDEM Neo Digital Surface Model (upper image) and WorldDEM Neo DTM Level 1(middle image) and Level 2 (lower image)

WorldDEM Neo DTM – Fact Sheet

The WorldDEM Neo DTM is available in two versions, as standard WorldDEM Neo DTM Level 1 and as WorldDEM Neo DTM Level 2, where enhanced editing has been applied. Both WorldDEM Neo DTM versions are derived separately from the WorldDEM Neo DSM.

Source

Satellite imagery data of the continuing TanDEM-X Mission primarily acquired in the years 2017 to 2021 and derived interferometric elevation data, auxiliary layers.
In addition, information of the edited WorldDEM 12m DSM product (2010-2015, 0.4 arcseconds) have been used.

WorldDEM Neo DTM™ - Level 1	**WorldDEM Neo DTM™ - Level 2**
Minimum AOI Size 1,000 km²	Minimum AOI Size 100 km²
Editing	**Enhanced editing**
Removal of surface structures (non-terrain structures) from the DSM such as built-up areas and tall vegetation.	Refinement of land cover borders, extended preservation of topological features, modelling of transport structures, enhanced water body mapping.

File Format

32-bit floating-point raster data, GeoTIFF

Grid Spacing

WorldDEM Neo grid spacing is 0.15 arc seconds (~5m, DGED Level 4b).
The longitude convergence is addressed with a variable grid spacing dep. on latitude:

Latitude pixel spacing	Longitude pixel spacing					
	0°-50°	50°-60°	60°-70°	70°-80°	80°-85°	85°-90°
0.15”	0.15”	0.225”	0.3”	0.45”	0.75”	1.5”

Other grid spacing levels are possible upon customer request

Coordinate Reference System

Geographic Coordinates with vertical units in meters. The horizontal reference datum is the World Geodetic System (WGS84-G1150) and the vertical reference datum is the Earth Gravitational Model 2008 (EGM2008).

Delivery Unit and Dataset Identification

The standard tile size does cover 0.5°x0.5° (according to DGED Product Implementation Profile).
The identification of a standard tile is according to the lower left coordinate of the dataset.

Accuracy*

Absolute Vertical Accuracy *)***)	< 1.4m (90% linear error, aligned to WorldDEM Neo DSM)
Relative Vertical Accuracy **)***)	< 2m (slope ≤ 20%) < 4m (slope > 20%)
Absolute Horizontal Accuracy *)**)***)	< 6m (90% circular error)

*) Based on validation results using ICESat 2 ATL08 terrain reference points (with no presence of canopy height), excluding parts with permanent snow/ice cover of Antarctica and Greenland (physical reflection properties differ between WorldDEM Neo and reference data).
**) Based on TanDEM-X coherence analysis, excluding parts with permanent snow/ice cover of Antarctica and Greenland (microstructure of regions with permanent snow/ice cover and signal penetration would lead to an overestimation of relative height error and are therefore excluded).
***) Due to the global coverage of the WorldDEM Neo, all accuracy statistics and values stated in this document are calculated as an arithmetic mean on global level. Local deviations occur.

WorldDEM Neo DTM – Editing Approach & Use Cases

For the automated DTM Level 1 generation, DSM-based surface structures (non-terrain structures) such as built-up areas, tall vegetation, as well as selected smaller surface elements with a vertical component (e.g., power pylons, small groups of trees) are identified and levelled down to approximate bare Earth elevation, while preserving terrain characteristics.
Water bodies (lakes, rivers) are based on the hydrographic features of the DSM. Their extend is adapted, respective water levels are adjusted accordingly.

If there is a preference for a higher-fidelity DTM, the DTM Level 2 provides enhanced data quality by an operator-guided editing process. It features the following improvements over Level 1:

- refinement of land cover borders (vegetation, urban areas) down to single objects (trees, houses) before reducing the elevation to the terrain level
- extended preservation of ridge lines and canyons
- precise modelling of transport structure (bridges, motorways, embankments).
- detailing the extents of hydrographic features (water bodies, reservoirs, rivers) and respective alignment of water surface heights

As a result, the two versions are applicable for a different variety of use cases, as noted in the table below.

WorldDEM Neo DTM Level 1	WorldDEM Neo DTM Level 2

• Geospatial analysis at large scale for: Site selection, land use planning, infrastructure location, mining, environmental impact assessment.
• Large scale relief representations (mapping & navigation applications, Location-Based Services)
• Large scale flood hazard modelling
• Near-Real-Time (NRT) emergency data analysis (Flood Mapping, Organizing Relief Activities, SAR planning)
• As input for mapping activities, it improves automation rate and reduces classification errors
• Contour line creation for topographic maps
• Forest biomass estimation (together with DSM)
	• Detailed geospatial analysis
	• Create or update maps up to 1:10,000 map scale: accurate presentation of relief in map due to conservation of topological features (break lines, hills, valleys, embankments, bridges)
	• Flood Hazard Modelling for local areas
	• Oil-Gas-Minerals market (OGM): accurate input required for
	  ○ Geophysical data processing
	  ○ Monitor oil and gas production related surface movements (OGM)
	  ○ Reliable terrain information to assess potential exploration sites, seismic planning, develop scouting activities, geophysical surveying
	• Emergency: monitoring of natural hazards, risk-prone areas (e.g. landslides)
	• Environmental impact monitoring

Main applications and use cases for the WorldDEM Neo DTM Level 1 & Level 2

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