

NTT DATA Corporation

AW3D Standard™ Product Guide

Product Specification Document



Change Record

Rev	Section(s)	Description of Changes	Changed By	Date	Release
0.9	All	Draft	Hide Shiraishi	2016/10/28	

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1. Introduction

1.1 Purpose

The purpose of this document is to define the AW3D™ standard product specifications and to give a guide to resellers, distributors, and customers.

1.2 Product Outline

AW3D Standard is 5m-resolution Digital Elevation Model (DEM) derived from Advanced Land Observing Satellites (ALOS) of Japan Aerospace Exploration Agency (JAXA). This is the world first 5m-resolution off-the-shelf product which covers entire land area of the world. Digital Surface Model (DSM), Digital Terrain Model (DTM), and ortho image are available in its product lineup.

Table 1. Product Outline

Product Outline		
Titles	DEM	Ortho imagery
Product lineup	<p>Level 1: DSM Global coverage, off-the-shelf product. Error uncorrected raw data.</p> <p>Level 2: DSM Error corrected, void infilled, and quality checked product. On demand basis.</p> <p>Level 3 : DTM A product that the height of trees, buildings, and other structures are eliminated from Level 2: DSM. On demand basis.</p>	<p>Panchromatic Ortho Imagery banded with; Level 1: DSM Unmosaiced Ortho imagery to be layered for DSM products.</p> <p>Level 2: DSM and Level 3: DTM Mosaiced Ortho imagery to be layered for DSM/DTM products.</p>
Resolution	5.0m	2.5m
Horizontal accuracy	5m RMSE / 7m CE90	
Vertical accuracy	5m RMSE / 7m LE90	N/A
Minimum order size per AOI	Level1: 400 km2 Level2: 400 km2 Level3: 100 km2	Aligned with DEM order size
Delivery time	Level1: 1 week Level2: 2 weeks (400 km2) Level3: 2 weeks (100 km2)	Delivered with DEM
Delivery method	Online or DVD	
File Format	Geotiff 16-bit signed integer (If geotiff 32-bit signed floating point is required, please contact us.)	
Horizontal datum	WGS84 (if other datum is required, please contact us.)	
Vertical datum/ellipsoid	WGS84 (Ellipsoid) or EGM96 (Elevation)	-

Product Outline		
Titles	DEM	Ortho imagery
Map projection	- Lat/Lon or UTM (Level 1: DSM) - UTM (Level 2: DSM and Level 3: DTM)	
Void infill	Level 1: DSM Not available Level 2: DSM and Level 3: DTM using SRTM1 (ASTER G-DEM for > N. 65 degree and > S. 60 degree) is available on Level 2 and Level 3 product.	-

2. Product Specification

2.1 Product resolution and accuracy

Table 2. Product resolution and accuracy

Product resolution and accuracy				
Titles	Level 1: DSM	Level 2: DSM	Level 3: DTM	Ortho imagery
Resolution	5m			2.5m
Horizontal accuracy	5m RMSE / 7m CE90			
Vertical accuracy	5m RMSE / 7m LE90			N/A

2.2 Product Quality

Table 3. Product Quality

Product Quality	
Quality overview	Level 1 and 2: DSM Includes terrain, cultural, manmade, and vegetative features. Level 3: DTM 'Bare earth' model – Terrain only. Cultural, manmade, and vegetative features are removed.
Level 2 processing	<ul style="list-style-type: none"> • Errors such as spikes, wells, and blunders will be removed manually to aesthetically meet product quality. • Deficiency such as void of cloud/snow will be interpolated or be infilled with SRTM. • High value for inland water area and 0m value for sea area will be stored. • Coastal line will be corrected using SRTM water body dataset (SWBD).
Level 3 processing	<ul style="list-style-type: none"> • The height of trees, buildings, and other structures are eliminated from Level 2: DSM. Average height of the trees will be estimated and used for the elimination processes. • Regarding the heavy vegetation area, such as the case that the ground surface cannot be seen on the satellite imageries, a 'best effort'

Product Quality	
	methodology will be used and those area may not meet designated product accuracy.
Null values	The value of '-9999' is set for; - the area of deficiency such as void of cloud/snow (Level 1) - the area out of AOI
Cloud area	<u>Level 1: DSM</u> Cloud area will be recognized as void and the the null value of '-9999' will be set. <u>Level 2: DSM and Level 3: DTM</u> The height value will be interpolated or infilled with SRTM.
Mask file	Mask file, which includes the information of cloud or snow, inland water, and sea, will be provided as one of the deliverables. The values stored in the mask file is as follows; <u>Level 1: DSM</u> - Available area = 0 - Cloud or snow = 1 - Inland water = 2 - Sea = 3 <u>Level 2 : DSM and Level 3: DTM</u> - Available area = 0 - Mask area = 1
Stack file	Stack file, which has the number of DSM used for stacking, is included as one of the deliverables.
Contour line	Contour option is available and contour line every 10m will be provided in the deliverables.
Tiled area	

3. Ordering Parameters

The following parameters will be collected by reseller or distributor for an AW3D standard order. A response to all parameter is required, except where noted.

Table 4. Ordering Parameters

Ordering Parameters			
Parameter	Response	Required	Notes
Level 1: DSM 1x1 Degree	<ul style="list-style-type: none"> • Yes • No 	One is required	<ul style="list-style-type: none"> • A customer must order a DSM or a DTM product. • A customer may order a DSM and a DTM product in the same order.
Level 1: DSM clipped by mesh	<ul style="list-style-type: none"> • Yes • No 		
Level 1: DSM clipped by AOI	<ul style="list-style-type: none"> • Yes • No 		
Level 2: DSM clipped by AOI	<ul style="list-style-type: none"> • Yes • No 		
Level 3: DTM clipped by AOI	<ul style="list-style-type: none"> • Yes • No 		
Panchromatic Ortho (2.5m resolution) clipped by AOI	<ul style="list-style-type: none"> • Yes • No 	Optional purchase with Level 1: DSM	Unmosaiced Ortho imagery to be layered for DSM products which is created concurrently with DSM and will be provided on path flame basis.
Panchromatic Ortho (2.5m resolution) clipped by AOI	<ul style="list-style-type: none"> • Yes • No 	Optional purchase with Level 2: DSM or Level3: DTM	Mosaiced Ortho imagery to be layerd for DSM/DTM products which is created concurrently with DSM and will be provided on AOI basis.
Quality control file / layer (5m resolution)	<ul style="list-style-type: none"> • Yes • No 	Optional purchase with Level 1: DSM, Level 2: DSM, and Level 3: DTM	<ul style="list-style-type: none"> • Raster data which is created during the DSM process. • It includes “correlation values” of (0 – 200) using unsigned 8 bits expressing conficence level of DSM height value. • It will be provided by AOI basis.
Contour	Please contact us if this option is necessary.	Optional purchase with Level 1: DSM, Level 2: DSM, and Level 3: DTM	Contour line every 10m will be provided.
AOI file name	AOI file name	Required	Required for the order of Level 1 – 3.

Ordering Parameters			
Parameter	Response	Required	Notes
AOI	<ul style="list-style-type: none"> • Shapefile (WGS84) • Kml file 	Required	Shape file or kml file expresses the customer's AOI needs to be submitted. The conditions of the AOI is as follows; <ul style="list-style-type: none"> • Minimum order size is; <ul style="list-style-type: none"> - 400km2 for Level 1 and 2, - 100km2 for Level 3 • The shape like 'ring' or 'doughnut' and multiple polygon is not accepted. • Minium width is 1km • Maxmum points of polygon is 1000.
Delivery method	<ul style="list-style-type: none"> • Online • DVD • Others 	Required	Chose one
Delivery file format	<ul style="list-style-type: none"> • Geotiff • (DXF) • (DWG) • (CSV (ASCII text)) • (STL) 	Required	<ul style="list-style-type: none"> • Geotiff signed 16 bit is default and guaranteed format. • Please contact us if other format or geotiff unsigned 32 bit floating points is necessary. • Decimal values are not guaranteed in the case of unsigned 32 bit floating point format.
Vertical datum/ellipsoid	<ul style="list-style-type: none"> • WGS84 (Ellipsoid) • EGM96 [default] (Elevation) 	Required	Chose one
Map projection	<ul style="list-style-type: none"> • UTM • Lat/Lon 	Required	Chose one
User information	User information	Required	(TBD)

4. Product Deliverables

Table 5. Product Deliverables

Product Deliverables		
Deliverables	File names	File extensions
(Base file name)	<p><hXXXXXXXXXXXX>_<hXXXXXXXXXXXX>_<map projection>_<product type></p> <p><hXXXXXXXXXXXX>: coordinate of upper left (and lower right) minimum bounding rectangle h: hemisphere (N or S) XXXXX: coordinate (latitude or longitude) H: hemisphere (E or W)</p> <p><map projection>: LT (latitude/longitude) or UM (UTM)</p> <p><product type>: DSM or DTM or MSK or STK</p>	-
DSM	<p><NXXXXXXXXXXXX>_<NXXXXXXXXXXXX>_<map projection>_DSM.tif</p> <p>*If the size is over 2GB, the file will be divided.</p>	.tif
DTM	<p><NXXXXXXXXXXXX>_<NXXXXXXXXXXXX>_<map projection>_DTM.tif</p> <p>*If the size is over 2GB, the file will be divided.</p>	.tif
Mask file	<p><NXXXXXXXXXXXX>_<NXXXXXXXXXXXX>_<map projection>_MSK.tif</p>	.tif
Stack file	<p><NXXXXXXXXXXXX>_<NXXXXXXXXXXXX>_<map projection>_STK.tif</p>	.tif
Aux file	<p><NXXXXXXXXXXXX>_<NXXXXXXXXXXXX>_<map projection>_<product type>.aux</p>	.aux
Rrd file	<p><NXXXXXXXXXXXX>_<NXXXXXXXXXXXX>_<map projection>_<product type>.rrd</p>	.rrd
Xml file	<p><NXXXXXXXXXXXX>_<NXXXXXXXXXXXX>_<map projection>_<product type>.tif.aux.xml</p>	.xml
Readme file	<p>Readme_<country name>.txt</p>	.txt

Product Deliverables		
Deliverables	File names	File extensions
Panchromatic Ortho		
Quality control file / layer		
Contour		

5. Delivery Layout

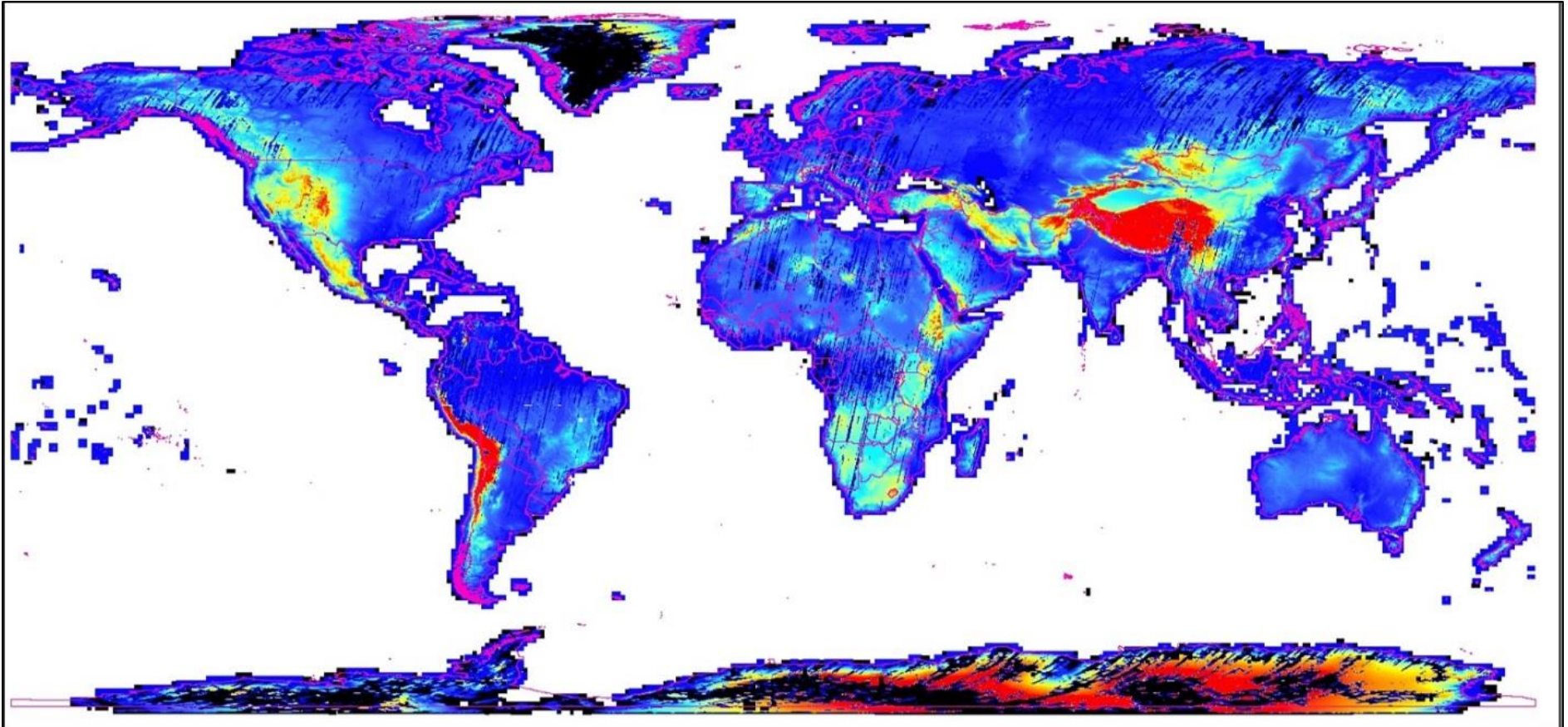
Table 6. Delivery Layout

Product Support Data	
Top directory name	<p><hXXXXXXHXXXXXX>_<hXXXXXXHXXXXXX></p> <p><hXXXXXXHXXXXXX>: coordinate of upper left (and lower right) minimum bounding rectangle h: hemisphere (N or S) XXXXX: coordinate (latitude or longitude) H: hemisphere (E or W)</p>
Contents in the top directory	<ul style="list-style-type: none"> • Geotiff file • Mask file • Stack file • Aux file • Rrd file • Xml file • Readme file

6. Product prices

Product level	Order option	Price	Notes
Level1 DSM	1 degree x 1 degree	JPY 200 / km2	
	Clipped by AOI	JPY 300 / km2	
Level2 DSM	Clipped by AOI	JPY 500 / km2	
Level3 DTM	Clipped by AOI	JPY 3,500 / km2	When order size is 100 km2.
		JPY 1,600 / km2	When order size is 400 km2.
Ortho Imagery	(Same as DEM)	JPY 100 / km2	

7. Coverage



8. License

Category		Price
S		es
M		
M	(TBD)	
DG		
1		