GAFAG
an e GEOS (ASI / Telespazio) Company

Euro-Maps 3D Product Format

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1 Introduction

The Euro-Maps 3D product family contains several product types consisting of different mandatory and optional layers as described in Table 1-1.

Table 1-1: Product types of the Euro-Maps 3D product family

	Euro-Maps 3D DSM	Euro-Maps 3D DTM	Euro-Maps 3D for Ortho
Height Layer, Type	DSM	DTM	DEM consisting of a good approximation to a DTM for urban areas and a DSM elsewhere
Accuracy Vertical Layer	+	+	-
Mask Layer	-	+	-
Number Layer	+	+	-
Ortho Layer	optional	optional	+
Quality Layer	+	+	-
Source Layer	+	+	-

This document describes the naming convention and data format used for the products.

1.1 Reference Documents

[RD 1] Euro-Maps Product Format
version 4.3, GAF, 2017-01-27
http://Euro-Maps.gaf.de/pdf/GAF.EMPF_____EM_product_format_v4.3_20170127.pdf

[RD 2] Euro-Maps 3D Product Description
version 3.0, GAF, 2020-07-08

2 Definitions

For convenience, Table 2-1 , Table 2-2 and Table 2-3 repeat the required definitions from [RD 1] .

Table 2-1: Basic definitions

Place Holder	Definition	Description
<Digit>	'0'|'1'|...|'9'	The digits 0, 1, ..., 9.
<LCLetter>	'a'|'b'|...|'z'	The lower case letters a, b, ..., z.

Table 2-2: Dates

Place Holder	Definition	Description
<YYYY>	4 * <Digit>	A year in long format, e.g. 2006.
<MM>	2 * <Digit>	A month.
<DD>	2 * <Digit>	A day.
<DateL>	<YYYY><MM><DD>	A date in long format.

Table 2-3: Generic definitions

Place Holder	Definition	Description
<Extension>	3 * <LCLetter>	file extension

Table 2-4: Definitions for product base names

Place Holder	Definition	Description
<Area>	3 * <Digit> ('E' | 'W') 3 * <Digit> ('N' | 'S') 'P' ('A' | 'B' | 'C' | 'D')	Longitude and latitude are the geographic coordinates of the lower left corner of an imaginary 1° x 1° tile with 4 quadrants. See also Figure 2-1. E East W West N North S South P PAN (Compare with [RD 1] Table 3) A Quadrant A B Quadrant B C Quadrant C D Quadrant D
<Format>	'G'	Compare with [RD 1] Table 3 G GeoTIFF
<Internal-ID>	6 * <Digit>	ID of processing run
<Mission>	'P5'	Compare with [RD 1] Table 3 P5 IRS-P5 Cartosat-1
<Ver>	'4'	Version 4 product directory naming convention[1]

[1] Version 4 is the first public version.

Table 2-5: Definitions of further place holders

Place Holder	Definition	Description
<PBN>	<Internal-ID><Mission><Area>___<Format><Ver>	Product base name used for some of the directory and file names
<Product-family>	'em3d'	em3d Euro-Maps 3D
<QC-date>	<DateL>	Date of the final quality control of a tile-based product
<Layer-name>	'acv' | 'dem' | 'dsm' | 'dtm' | 'msk' | 'num' | 'ortho' | 'qc' | 'src'	acv accuracy vertical layer dem digital elevation model dsm digital surface model dtm digital terrain model msk mask layer num number layer ortho ortho layer qc quality layer src source layer For details see Table 3-2.

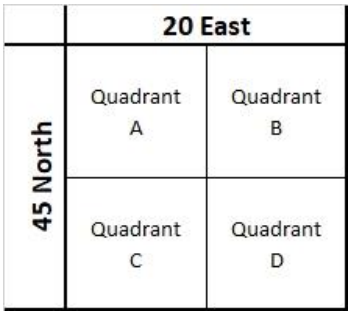

Figure 2-1: Euro-Maps 3D tiling system

3 Product Directory Content

The naming conventions of directories and individual files are not unambiguous when the same product is ordered with different processing options, e.g. map projection, resolution, or height reference system.

For delivery the product is packaged into zip-file:

`<PBN>.<Extension>`

E.g. 094638P5020E045NPC___G4.zip

The zip-file contains the product in a directory:

`<PBN>/`

E.g. 094638P5020E045NPC___G4/

Table 3-1: Product directory

File/Directory	Description
<PBN>/	Base directory of the product; see Table 2-5
EM_Bundle_Tile/	Euro-Maps 3D elevation data product
<Product-family>_<Internal-ID>_<QC-date>_ <Area>_<Layer-name>.<Extension>	Individual files of the Euro-Maps 3D elevation data product e.g. em3d_094638_20191213_020E045NPC_dsm.tif See Table 1-1, Table 2-5 and Table 3-2

Table 3-2: Layer description

<Layer-name>	Description
acv	Accuracy vertical layer containing a value corresponding to the absolute vertical accuracy for each quality controlled height value. 0 may not meet the quality described in the product specifications [RD 2] 5 5 m for slopes < 20 % 7 7 m for slopes 20 % - 40 % 10 10 m for slopes > 40 % 255 NoData Format: 8-bit unsigned integer
dem	Digital elevation model layer containing the height values as a geocoded raster file. This layer consists of a good approximation to a DTM for urban areas and a DSM elsewhere. n height above reference system in m -32767 NoData Format: 16-bit signed integer
dsm	Digital surface model layer containing the height values as a geocoded raster file. n height above reference system in m -32767 NoData Format: 16-bit signed integer
dtm	Digital terrain model layer containing the height values as a geocoded raster file. This layer is derived from a DSM and shows the terrain heights (vegetation and buildings removed). With the DTM, a mask layer is also provided to be able to trace the DSM to DTM conversion. For the DTM product the availability and accuracy depends on the specific area of interest. n height above reference system in m -32767 NoData Format: 16-bit signed integer

<Layer-name>	Description
msk	Mask layer containing 1 for each height value modified during the DSM to DTM conversion. 0 not modified 1 modified 255 NoData Format: 8-bit unsigned integer
num	Number layer containing the information on how many image pairs the matching was successful and therefore from how many matches the height value was derived. 0 height value not derived from IRS-P5 Cartosat-1 stereo pairs 1-n height value derived from 1 or more overlapping IRS-P5 Cartosat-1 stereo pairs 255 NoData Format: 8-bit unsigned integer
ortho	Ortho layer containing TOA reflectances of the near-nadir image, orthorectified with the unedited DSM. 0 NoData 1-n TOA reflectance value scaled with factor 10,000 Format: 16-bit unsigned integer
qc	Quality layer, set to 1 for each height value which was derived from IRS-P5 Cartosat-1 data and was rated by the quality control procedures of the production process to meet or exceed the quality described in the product specifications [RD 2] . 0 may not meet the quality described in the product specifications [RD 2] 1 meets or exceeds the quality described in the product specifications [RD 2] 255 NoData Format: 8-bit unsigned integer
src	Source layer containing information on the source of each pixel. 0 NoData 1 derived from IRS-P5 Cartosat-1 stereo data 2 filled with SRTM 3-9 reserved for other fill-DSMs 10 edited manually and derived from surrounding values 11 detected as water body and edited accordingly 12-255 reserved for future use Format: 8-bit unsigned integer