1. Introduction

1.1. Abbreviations

Abbreviation	Meaning
TAW/DNG	Tweede Algemene Waterpassing / Deuxième Nivellement Général; also known as Ostend height
EGM2008	Earth Gravitational Model 2008

1.2. Definitions

Term	Meaning
Geometric object	spatial object representing a geometric set
Geometric primitive	geometric object representing a single, connected, homogeneous element of space
Point	topological 0-dimensional geometric primitive, representing a position
Line segment	geometric primitive consisting of 2 points, joined by a straight line
Line string	geometric primitive consisting of a sequence of line segments
Surface	topological 2-dimensional geometric primitive, locally representing a continuous image of a region of a plane
Surface patch	2-dimensional, connected geometric object used to represent a continuous portion of a surface using homogeneous interpolation and definition methods
Polygon	surface patch that is defined by a set of boundary line strings and an underlying surface to which these line strings adhere
Elevation	The vertical distance of a point measured from a reference surface.
Height	The vertical distance of a point measured from the ground or water surface.

1.3. Version history

Date	Version	Description	Author
15/02/2019	0.1	First edition	Koen Haveneers
30/10/2019	1.0	Update after reviews	Koen Haveneers
17/10/2022	1.1	New corporate design	Koen Haveneers
28/09/2023	1.2	Removal of explicit reference to ICAO regulations and EUROCONTROL manual, text clarifications	Koen Haveneers
15/02/2023	1.3	Tidy-up	Koen Haveneers

1.4. Scope

These general capture rules are intended as a guideline for the capture of electronic terrain data as it defines the technical requirements for data capture/survey. These drafting guidelines are intended to serve as:

- a consistent basis for the units responsible for data capture and the surveying companies commissioned by them
- technical documentation of the requirements for consistent data capture
- a definition of all data values and features which are required to be captured in accordance with the regulations

2. General terrain change capture rules

2.1. Terrain change definition

Terrain changes constitute all permanent elevations and excavations of the soil within a zone for which the ground level after completion of the work is at least 10 meters higher or lower than the initial ground level. The extent of the zone cannot be entirely covered by a circle of radius equal to 15 m.

2.2. Feature capture specification

The terrain data set shall represent the terrain surface in the form of continuous elevation values at all intersections (points) of a defined grid.

The captured features compose a linear, regular point grid indicating the elevation of the **bare surface of the earth**, without man-made objects or vegetation, in order to make a model of its surface. This includes the **surface of areas of water**: the terrain model is not intended to provide information relating to the sea bed or the bottom of lakes/rivers etc.

2.2.1. Measurement requirements

Positions need to be recorded according to the following specified requirements:

- Reference system:
  - Horizontal: the national horizontal reference system Lambert 2008.
  - Vertical (on land): the national vertical reference system TAW/DNG.
  - Vertical (on sea): the global vertical reference system EGM2008.

- Measurement details:
  - The measurement unit is a meter.
  - Vertical accuracy: $\sigma = 1$ meter or better, for the entire area.

- o Vertical resolution: 1 cm
- o Horizontal accuracy: σ = 2 meter or better, for the entire area.
- o Post spacing: 5 meter
  - ▪ Note that in a zone with large elevation differences, the post spacing will have to be better so that the dataset meets the vertical and horizontal accuracy.

3. Required information

The information shall be provided as a raster and a polygon shapefile. The raster shall contain the horizontal and vertical position of the measured points; the polygon shapefile shall contain the acquisition method, the variations on the measurements and the date and time of the measurements.

3.1. Raster

Information to provide on the raster:

- horizontal position:
  - o The horizontal position of the centre of each pixel shall be clearly defined by georeferencing the raster. This may be done by storing the georeferencing information in the header of a GeoTIFF file or by providing a separate tfw file with a TIFF format raster that is not georeferenced itself. The coordinate reference system used for georeferencing shall be Lambert 2008.

Information to provide on every pixel:

- elevation
  - o The vertical distance of the centre of each pixel, measured from a reference surface, as a number expressed in metres
  - o On land the used reference surface shall be the surface defining zero elevation in the TAW/DNG vertical reference system.
  - o On sea, the used reference surface shall be the surface defining zero elevation in the EGM2008 vertical reference system.

3.2. Polygon shapefile

Information to provide on the centre of each pixel of the raster. A polygon feature can contain this information for one individual pixel or for a group of pixels for which all values are the same.

- acquisition method
  - o The acquisition method relates to the means used to collect the data in the data set
  - o Possible values: choice from a predefined list – see annex 1

- horizontal accuracy

- o Accuracy is the degree of conformance between the estimated or measured value and the true value. For measured positional data the accuracy is normally expressed in terms of a distance from a stated position within which there is a defined confidence of the true position falling. The horizontal accuracy must be a number stated in meters and for a 90% confidence level.

- vertical accuracy
  - o Accuracy is the degree of conformance between the estimated or measured value and the true value. For measured positional data the accuracy is normally expressed in terms of a distance from a stated position within which there is a defined confidence of the true position falling. The vertical accuracy must be a number stated in meters and for a 90% confidence level.

- date
  - o The date of the measurement

4. Annexes

4.1. Annex 1 - Code tables

4.1.1. Method of acquisition - CodeAquisitionMethodType

Value	Description	Remark
1	External data (unspecified)	Grandfathered value. Not accepted anymore for new updates.
2	Conventional Terrestrial Survey	
3	Aerial Photogrammetry	
4	Airborne Laser Scanning (ALS) / LiDAR	
5	Interferometric Synthetic Aperture Radar (IfSAR)	
6	Sensor Fusion (combination of sensors)	
99	unknown	The value is indeterminable or not known at the time of recording.