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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

LY/T 3184-2020

Technical specification for virtual 3D forest map making

虚拟三维林相图制作技术规程

(English Translation)

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Foreword

This regulation was drafted in accordance with the rules given in GB/T1.1-2009.

This regulation was proposed by the State Forestry and Grassland Administration.

This regulation is under the jurisdiction of the National Forest Resources Standardization Technical Committee (SAC/TC370).

Drafting organizations of this regulation. State Forestry and Grassland Administration Investigation, Planning and Design Institute, Hunan Forestry Investigation, Planning and Design Institute.

1 Scope of application

This regulation stipulates the technical requirements for the method, process, and result quality of the virtual three-dimensional forest diagram production.

This regulation is applicable to the production of virtual three-dimensional forest diagrams for forest resource investigation, planning and design.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article Pieces. For undated references, the latest version (including all amendments) applies to this document.

GB/T 18316-2008 Quality Inspection and Acceptance of Digital Surveying and Mapping Results
GB/T 26424-2010 Technical Regulations for Forest Resources Planning, Design

and Investigation CH/T 1015.2-2007 Basic Geographic Information Digital Products
1.10000, 1.50,000 Part 2: Digital Elevation Model LY/T 1662.7-2008 Digital Forestry
Standards and Specifications LY/T 1954-2011 Technical Regulations for Making Satellite
Remote Sensing Image Maps of Forest Resources Survey

3 Terms and definitions

The following terms and definitions apply to this document.

Image fusion

Using a certain algorithm model, the remote sensing images with different spatial resolutions and different spectral bands covering the same area will be spatially registered Then carry out information combination technology.

Image mosaic

For adjacent remote sensing images, based on the unified projection coordinate system, through image digital processing methods such as tone adjustment and splicing, the formation of A technique for images with balanced colors and no overlapping areas.

Digital elevation model (DEM) an ordered array of values describing the spatial distribution of ground elevation or altitude.

Trunk

From the root neck to the first main branch (if there is no main branch, the first branch).

Tree branches

There is a parent-child relationship between each trunk and branches, where the first-level branch is attached to the parent trunk, and each first-level branch can only have one parent Trunk, a parent trunk can have multiple first-level branches, and first-level branches can have no second-level branches.

Leaf branches

The branch structure of each leaf contains the leaf structure.

Orthorectification of standing wood 3D model A three-dimensional model of trees established by three-dimensional modeling software such as 3D MAX.

Three-dimensional terrain model Using digital elevation model and remote sensing images (aerial photos), the three-dimensional image after superposition processing.

3D visualization

Based on computer graphics and image processing technology, the spatial data information of a certain area on the earth's surface is displayed as a three-dimensional map on the screen.

A technology that displays images or graphics in the form of interactive processing.

3.10

Virtual 3D forest form map Using three-dimensional visualization technology and virtual reality technology to visually represent the spatial structure and distribution of forest resources in the form of standing trees Information, obtain vivid, lifelike 3D visualization renderings, forest diagrams that can roam simulation, 3D image rendering and attribute query.

4.1.1 Coordinate system

Using 2000 geodetic coordinate system.

4.1.2 Projection method

Using Gauss-Krüger projection;

1:5000 scale is divided by 3°;

1:10000 scale is divided by 3°.

4.1.3 Elevation system

The 1985 national elevation datum is used.

4.2.1 Spatial resolution

The resolution of remote sensing images (aerial photos) should be higher than 2.5m×2.5m.

4.2.2 Data requirements

The data should meet the following requirements.

- The cloud cover area is less than 5%, and can cover the main work area;
- The image is clear, rich in layers, uniform in tone and moderate in contrast;
- The lateral viewing angle of data reception should generally be less than 15°, not more than 25° in plain areas, and not more than 20° in mountainous areas;
- There is no banding, speckle noise, row loss, etc. in the data;
- The shooting time of the image data should be selected in the season when the vegetation grows vigorously.

4.3 Topographic map data requirements

Collect the latest electronic version or paper version with a scale not less than 1:10000 national standard basic topographic maps. Topographic map data requirements should be include.

--The paper topographic map should be checked for its surface flatness, whether the symbols, lines, outline points and kilometer nets are complete, and whether the Connection situation Paper topographic maps need to be scanned and corrected. The scanning resolution is 300dpi, stored in TIF format, and raster topographic maps are corrected by the geometric precision correction method is used to calibrate, and the intersection point is selected as the control point of each kilometer grid, and the raster topographic map is corrected to the grid consistent with its coordinate system and projection.

Grid image, and then vectorized.

--The inspection of electronic topographic maps shall be carried out in accordance with GB/T 18316-2008.

4.4.1 Elevation model data

Use vectorized topographic maps to generate corresponding scale digital elevation models; or use aerial stereo images to build digital elevation models.

4.4.2 Data quality requirements

Data quality should meet the following requirements.

--There is no crack phenomenon after the adjacent framing DEM is connected;

--The elevation value of the overlapping area should be consistent;

--DEM has complete metadata, and records the coordinate system, precision, grid sampling size and other information of the data in detail;

--1. The grid size of 10000 DEM should not be less than 12.5m, the location of elevation data should reach 0.1m, and the DEM accuracy should reach CH/T 1008 Requirements.

4.5.1 Tree requirements

The selected trees should be representative, have good growth conditions, conform to normal growth rules, and have no undesirable growth phenomena such as broken shoots.

The surrounding weeds should not be higher than 0.5m.