

Identification_Information:

Citation:

Citation_Information:

Originator: EarthData International of Maryland, LLC
 Publication_Date: 20020900
 Publication_Time: Unknown
 Title: Digital Land Base Mapping of the Village of Ephraim, Door County, WI
 Edition: 1st Edition
 Geospatial_Data_Presentation_Form: map
 Series_Information:
 Publication_Information:
 Larger_Work_Citation:
 Citation_Information:
 Series_Information:
 Publication_Information:

Description:

Abstract:

This metadata document describes the collection and processing of Light Detection and Ranging (LIDAR) data of the Village of Ephraim in Door County, Wisconsin. The resulting data are a bare ground elevation model generated from LIDAR data and topographic mapping with a 2' contour interval produced for the United States Army Corps of Engineers.

Purpose:

This dataset is intended for use by the United States Army Corps of Engineers for base mapping.

Time_Period_of_Content:

Time_Period_Information:

Single_Date/Time:
 Calendar_Date: 20020900
 Range_of_Dates/Times:
 Multiple_Dates/Times:

Currentness_Reference: Publication Date

Status:

Progress: Complete
 Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -087.211487
 East_Bounding_Coordinate: -087.138506
 North_Bounding_Coordinate: 45.196604
 South_Bounding_Coordinate: 45.132535

Keywords:

Theme:

Theme_Keyword_Thesaurus: None
 Theme_Keyword: Digital Land Base Mapping
 Theme_Keyword: Light Detection and Ranging (LIDAR)
 Theme_Keyword: Topographic Map

Place:

Place_Keyword_Thesaurus: None
 Place_Keyword: United States of America (USA)
 Place_Keyword: Wisconsin (WI)
 Place_Keyword: Door County (55029)
 Place_Keyword: Village of Ephraim

Stratum:

Temporal:

Access_Constraints: None

Use_Constraints: None

Point_of_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Organization_Primary:

Contact_Organization: EarthData International of Maryland

Contact_Address:

Address_Type: mailing and physical address

Address: 45 West Watkins Mill Rd

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Postal_Code: 20878

Country: USA

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Hours_of_Service: 9:00-5:00 M-F

Security_Information:

Cross_Reference:

Citation_Information:

Series_Information:

Publication_Information:

Data_Quality_Information:

Attribute_Accuracy:

Logical_Consistency_Report:

Height values between individual LIDAR points within a 3.5 meter radius were differentiated against surveyed control points. A statistical result was determined and indicated that the vertical RMSE was +/- 0.15 meters (1 sigma) over the project area.

The resultant map products are fully compliant with National Map Accuracy Standards.

Completeness_Report:

Differences between individual LIDAR points within a 3.5 meter radius were calculated against surveyed control points. A statistical result was determined and indicated that the vertical RMSE was +/- 0.15 meters (1 sigma) for the entire project.

The following software was used for the validation.

1. Bentley - Microstation
2. Terrasolid - Terrscan
3. Trimble - Terramodel
4. Esri - ArcInfo
5. EarthData Proprietary software

Positional_Accuracy:

Horizontal_Positional_Accuracy:

Vertical_Positional_Accuracy:

Lineage:

Source_Information:

Source_Citation:

Citation_Information:

Originator: Towill

Publication_Date: 20020400

Publication_Time: Unknown

Title: Ground Control Survey of Door County, WI

Geospatial_Data_Presentation_Form: model

Series_Information:

Publication_Information:

Publication_Place: Towill, Inc, San Francisco, CA

Publisher: Towill

Larger_Work_Citation:
 Citation_Information:
 Series_Information:
 Publication_Information:
 Source_Scale_Denominator: 14,400
 Type_of_Source_Media: electronic mail system
 Source_Time_Period_of_Content:
 Time_Period_Information:
 Single_Date/Time:
 Calendar_Date: 20020400
 Range_of_Dates/Times:
 Multiple_Dates/Times:
 Source_Currentness_Reference: Publication Date
 Source_Citation_Abbreviation: GPS Ground Control
 Source_Contribution:
 Ground control was established prior to the acquisition of aerial data acquisition. The ground control points were established using GPS for vertical and horizontal coordinate values. Ground control references the Wisconsin Central State Plane NAD83, NAVD29, US Survey Feet.

Source_Information:
 Source_Citation:
 Citation_Information:
 Originator: EarthData Aviation
 Publication_Date: 20020417
 Publication_Time: Unknown
 Title: LIDAR Coverage of Door County, WI
 Geospatial_Data_Presentation_Form: model
 Series_Information:
 Publication_Information:
 Publication_Place: Hagerstown, MD
 Publisher: EarthData Aviation
 Larger_Work_Citation:
 Citation_Information:
 Series_Information:
 Publication_Information:
 Type_of_Source_Media: CD-ROM
 Source_Time_Period_of_Content:
 Time_Period_Information:
 Single_Date/Time:
 Calendar_Date: 20020300
 Time_of_Day: Unknown
 Range_of_Dates/Times:
 Multiple_Dates/Times:
 Source_Currentness_Reference: Publication Date
 Source_Citation_Abbreviation: Earthdata Aviation
 Source_Contribution:
 The project area was flown using EarthData Aviation's Navajo Chieftain aircraft equipped with an AeroScan LIDAR system, an Inertial Measurement Unit (IMU), and dual frequency GPS receiver and antennae. The position and orientation (omega, phi, and kappa) of the aircraft were determined using a GPS receiver located at an existing NGS control point.
 The LIDAR, IMU, and GPS data were correlated using GPS time and processed using LIDAR post-processing software to determine the coordinate of each point on the ground. A reflective surface DEM of the project area

was delivered with a relative accuracy of +/- 0.15 meters.

Process_Step:

Process_Description:

EarthData has developed a unique method for processing LIDAR data to identify and remove elevation points falling on vegetation, buildings, and other above-ground structures. The algorithms for filtering data were utilized within EarthData's proprietary software and commercial software written by TerraSolid. This software suite of tools provides efficient processing for small to large-scale projects and has been incorporated into ISO 9001 compliant production work flows. The following is a step-by-step breakdown of the process.

1. Using the LIDAR data set provided by EarthData Aviation, the technician performed a visual inspection of the data to verify that the flight lines overlap correctly. The technician also verified that there were no voids, and that the data covered the project limits. The technician then selected a series of areas from the dataset and inspected them where adjacent flight lines overlapped. These overlapping areas were merged and a process which utilizes 3-D Analyst and EarthData's proprietary software was run to detect and color code the differences in elevation values and profiles. The technician reviewed these plots and located the areas that contained systematic errors or distortions that were introduced by the LIDAR sensor.

2. Systematic distortions highlighted in step 1 were removed and the data were re-inspected. Corrections and adjustments can involve the application of angular deflection or compensation for curvature of the ground surface that can be introduced by crossing from one type of land cover to another.

3. The LIDAR data for each flight line were trimmed in batch for the removal of the overlap areas between flight lines. The data were checked against a control network to ensure that vertical requirements were maintained. Conversion to the client-specified datum and projections were then completed. The LIDAR flight line data sets were then segmented into adjoining tiles for batch processing and data management.

4. The initial batch-processing run removed 95% of points falling on vegetation. The algorithm also removed the points that fell on the edge of hard features such as structures, elevated roadways and bridges. In addition, points not classified as ground are coded as intermediate canopy, top of canopy, building, etc. Thus the LIDAR data was classified into thematic layers that can be analyzed separately or together.

5. The data were processed interactively by the operator using LIDAR editing tools. During this final phase the operator generated a TIN based on a desired thematic layers to evaluate the automated classification performed in step 4. This allowed the operator to quickly re-classify points from one layer to another and recreate the TIN surface to see the effects of edits. The use of geo-referenced images were toggled on or off to aid the operator in identifying problem areas. The data was also examined with an automated profiling tool to aid the

operator in the reclassification.

6.The data were separated into a bare-earth DEM. A grid fill program was used to fill data voids caused from reflective objects such as buildings and vegetation. The final DEM was written as an ASCII file (comma & space delimited), ESRI Shape file, and an ESRI TIN file to a CDROM.

Source_Used_Citation_Abbreviation: EarthData International

Process_Date: 20020900

Process_Contact:

Contact_Information:

Contact_Person_Primary:

Contact_Person: Raquel Charrois

Contact_Organization: EarthData International

Contact_Organization_Primary:

Contact_Address:

Address_Type: mailing and physical address

Address: 45 West Walkins Mill Road

City: Gaithersburg

State_or_Province: Maryland

Postal_Code: 20878

Country: USA

Contact_Voice_Telephone: 1-301-948-8550

Contact_Facsimile_Telephone: 1-301-963-2064

Contact_Electronic_Mail_Address: international-md@earthdata.com

Hours_of_Service: 9 AM - 5 PM Mon. - Fri.

Cloud_Cover: 0

Spatial_Data_Organization_Information:

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Grid_Coordinate_System:

Grid_Coordinate_System_Name: State Plane Coordinate System 1983

Universal_Transverse_Mercator:

Transverse_Mercator:

Universal_Polar_Stereographic:

Polar_Stereographic:

State_Plane_Coordinate_System:

SPCS_Zone_Identifier: Wisconsin Central (4802)

Lambert_Conformal_Conic:

Standard_Parallel: 44 15 0.0

Standard_Parallel: 45 30 0.0

Longitude_of_Central_Meridian: -090.000000

Latitude_of_Projection_Origin: +43.833333

False_Easting: 600000.0

False_Northing: 0.0

Transverse_Mercator:

Oblique_Mercator:

Oblique_Line_Point:

Polyconic:

ARC_Coordinate_System:

Equiarectangular:

Azimuthal_Equidistant:

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 2

Ordinate_Resolution: 2

Distance_and_Bearing_Representation:

Planar_Distance_Units: Survey Feet
Geodetic_Model:
Vertical_Coordinate_System_Definition:
Altitude_System_Definition:
Altitude_Datum_Name: National Geodetic Vertical Datum of 1929
Altitude_Resolution: 0.15
Altitude_Distance_Units: Meters
Altitude_Encoding_Method: Explicit elevation coordinate included with horizontal coordinates
Depth_System_Definition:
Entity_and_Attribute_Information:
Detailed_Description:
Entity_Type:
Attribute:
Attribute_Domain_Values:
Attribute_Value_Accuracy_Information:
Overview_Description:
Distribution_Information:
Distributor:
Contact_Information:
Contact_Person_Primary:
Contact_Organization_Primary:
Contact_Organization: United States Army Corps of Engineers - Detroit District
Contact_Address:
Address_Type: mailing and physical address
Address: 477 Michigan Avenue
City: Detroit
State_or_Province: MI
Postal_Code: 48226
Country: USA
Contact_Voice_Telephone: 313-226-6751
Distribution_Liability: None.
Standard_Order_Process:
Digital_Form:
Digital_Transfer_Information:
Digital_Transfer_Option:
Online_Option:
Computer_Contact_Information:
Network_Address:
Dialup_Instructions:
OffLine_Option:
Recording_Capacity:
Available_Time_Period:
Time_Period_Information:
Single_Date/Time:
Range_of_Dates/Times:
Multiple_Dates/Times:
Metadata_Reference_Information:
Metadata_Date: 20021000
Metadata_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Organization_Primary:
Contact_Organization: EarthData International of Maryland, LLC
Contact_Address:
Address_Type: mailing and physical address
Address: 45 West Watkins Mill Road
City: Gaithersburg
State_or_Province: MD
Postal_Code: 20878

Country: USA

Contact_Voice_Telephone: 301-948-8550

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Hours_of_Service: 9:00 AM - 5:00 PM (ET) M-F

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: FGDC-STD-001-1998

Metadata_Security_Information: