Identification_Information:
    Citation:
        Citation_Information:
            Originator: EarthData International of Maryland, LLC
            Publication_Date: 20020900
            Publication_Time: Unknown
            Title: Digital Land Base Mapping of the Town of Liberty Grove, 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 Town of Liberty Grove 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: -087.165828
            East_Bounding_Coordinate: -086.946311
            North_Bounding_Coordinate: 45.306926
            South_Bounding_Coordinate: 45.114949
    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: Town of Liberty Grove
        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
                    City: Gaithersburg
                    State_or_Province: MD
                    Postal_Code: 20878
                    Country: USA
                Contact_Voice_Telephone: 301-948-8550
                Contact_Facsimile_Telephone: 301-963-2064
                Contact_Electronic_Mail_Address: metadata@earthdata.com
                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:

Equirectangular:

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
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Contact_Electronic_Mail_Address: metadata@earthdata.com
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: