Title: Lidar data for Southeastern Wisconsin 2015 Lidar and Elevation Project
SEWRPC_QL2_2015

Geospatial_Data_Presentation_Form: Vector digital data

Description:

Abstract:

Geographic Extent:
Milwaukee, Ozaukee, Walworth, Washington, and Waukesha Counties in southeastern Wisconsin, covering approximately 2,071 square miles.

Dataset Description:
The SEWRPC 2015 LiDAR project called for the Planning, Acquisition, processing and derivative products of LiDAR data to be collected at a nominal pulse spacing (NPS) of 0.7 meters. Project specifications are based on the U.S. Geological Survey National Geospatial Program Base LiDAR Specification, Version 1.2. The primary set of deliverable data was developed based on the following two horizontal projection/datum systems as specified in the contract:
NAD27 State Plane Wisconsin South Zone, US survey feet; NGVD29, US survey feet for Milwaukee, Ozaukee, and Walworth Counties

LiDAR data was delivered in RAW flight line swath format, and processed to create Classified LAS 1.2 Files formatted to individual 10,000-foot x 10,000-foot tiles. Tile counts are listed below:
Milwaukee: 89 tiles in NAD27
Ozaukee: 85 tiles
Walworth: 192 tiles
Washington: 146 tiles in NAD83 (2011)
Waukesha: 187 tiles

Corresponding hydro-flattened Digital Terrain Model (DTM) files were created in Esri file geodatabase format. 1-foot contours were created from the hydro-flattened digital terrain model data and delivered in Esri file geodatabase format.

Additionally, a secondary set of unclassified and classified lidar data was developed for the following counties:
Washington County: 154 tiles in NAD27 State Plane
Wisconsin South Zone, US survey feet; NGVD29, US survey feet
Milwaukee County: 91 tiles in NAD83 State Plane Wisconsin South Zone, US survey feet; NAVD88 (2011), US survey feet

Ground Conditions:
LiDAR collection began in Spring 2015, while no snow was on the ground and rivers were at or below normal levels. In order to post process the LiDAR data to meet task order specifications, Quantum Spatial established a total of 127 QC points that were used to calibrate the LiDAR to known ground locations established throughout the project area.

Purpose:
Classified LAS files are used to show the manually reviewed bare earth surface. This allows the user to create Breaklines and DTMs.
The purpose of these lidar data was to produce high accuracy contours.
These raw lidar point cloud data were used to create classified lidar LAS files, 3D breaklines, and hydro-flattened DTMs, and contours as necessary.

Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
  Beginning_Date: 20150324
  Ending_Date: 20150507
Currentness_Reference: ground condition

Status:
Progress: Complete
Maintenance_and_Update_Frequency: None planned

Spatial_Domain:
Bounding_Coordinates:
  West_BoundingCoordinate: -88.7954451566949
  East_BoundingCoordinate: -87.7552048758465
  North_BoundingCoordinate: 43.5669587735573
  South_BoundingCoordinate: 42.4669599815093

Keywords:
Theme:
  Theme_Keyword_Thesaurus: None
  Theme_Keyword: Elevation data
  Theme_Keyword: Lidar
  Theme_Keyword: Hydrology
Place:
  Place_Keyword_Thesaurus: None
  Place_Keyword: Wisconsin
  Place_Keyword: Milwaukee
  Place_Keyword: Ozaukee
  Place_Keyword: Walworth
  Place_Keyword: Washington
  Place_Keyword: Waukesha
Access_Constraints: No restrictions apply to this data.
Use_Constraints: None. However, users should be aware that temporal changes may have occurred since this dataset was
collected and that some parts of these data may no longer represent actual surface conditions. Users should not use these data for critical applications without a full awareness of its limitations.

Point_of_Contact:
Contact Information:
  Contact_Organization_Primary:
    Contact_Organization: Quantum Spatial, Data Acquisition Department
    Contact_Person: John DiGiovanni
    Contact_Address:
      Address_Type: mailing and physical
      Address: 523 Wellington Way
      City: Lexington
      State_or_Province: KY
      Postal_Code: 40503
      Country: USA
    Contact_Voice_Telephone: 859-277-8700
    Contact_Facsimile_Telephone: 859-277-8901
    Contact_Electronic_Mail_Address:
      jdigiovanni@quantumspatial.com
    Hours_of_Service: Monday through Friday 8:00 AM to 5:00 PM (Eastern Time)
    Contact_Instructions: If unable to reach the contact by telephone, please send an email. You should get a response within 24 hours.
Native_Data_Set_Environment:
  MicroStation Version 8; TerraScan Version 15; TerraModeler Version 15; GeoCue Version 2014.1.21.1; ESRI ArcGIS 10.2; Global Mapper 16; Leica Cloud Pro 1.2; Windows 7 Operating System
  \PSIHQ_NX3200\Projects\Projects\26119_SEWRPC 38.0 GB and \matrix\matrix\LIDAR\26119_SEWRPC 1.65 TB
Data_Quality_Information:
  Logical_Consistency_Report: Data cover the entire area specified for this project.
  Completeness_Report:
    These raw LAS data files include all data points collected.
    No points have been removed or excluded.
    A visual qualitative assessment was performed to ensure data completeness.
    No void areas or missing data exist. The raw point cloud is of good quality and data passes Nonvegetated Vertical Accuracy specifications.
  Positional_Accuracy:
    Vertical_Positional_Accuracy:
      Vertical_Positional_Accuracy_Report:
        The specifications require that only Fundamental Vertical Accuracy (FVA) be computed for raw lidar point cloud swath files.
        The vertical accuracy was tested with 37 independent survey located in open terrain. These check points were not used in the calibration or post processing of the lidar point cloud
data. The survey checkpoints were distributed throughout the project area. Specifications for this project require that the RMSEz be 0.5 feet or better.

Quantitative_Vertical_Positional_Accuracy_Assessment:
  Vertical_Positional_Accuracy_Value: 0.041
  Vertical_Positional_Accuracy_Explanation: The FVA was tested using 37 independent survey located in open terrain. The survey checkpoints were distributed throughout the project area. The 37 independent check points were surveyed using GPS techniques. See survey report for additional survey methodologies. Elevations from the unclassified lidar surface were measured for the x,y location of each check point. Elevations interpolated from the lidar surface were then compared to the elevation values of the surveyed control. The RMSEz was computed to be 0.041 meters (0.135 feet) and AccuracyZ to be 0.080 meters (0.264 feet). RMSEz has been tested to 0.5 feet or better per the task order specifications. AccuracyZ has been tested to meet 18.13 cm Fundamental Vertical Accuracy at 95 Percent confidence level using RMSE(z) x 1.9600 as defined by the National Standards for Spatial Data Accuracy (NSSDA); assessed and reported using National Digital Elevation Program (NDEP)/ASRPS Guidelines.

Lineage:
  Source_Information:
  Source_Citation:
  Citation_Information:
    Originator: Quantum Spatial
    Publication_Date: 2015
    Title: Control Survey Report of LiDAR Ground Control Points
  Publication_Information:
    Publication Place: Lexington, KY
    Publisher: Quantum Spatial
    Type_of_Source_Media: online
  Source_Time_Period_of_Content:
  Time_Period_Information:
    Range_of_Dates/Times:
      Beginning_Date: 20150422
      Ending_Date: 20150508
    Source_Currentness_Reference: ground condition
    Source_Citation_Abbreviation: SEWRPC(QL2)_2015_LiDAR_gnd_ctrl
  Source_Contribution: This data source was used (along with the airborne GPS/IMU Data) to aid in the georeferencing of the lidar point cloud data.
  Source_Information:
  Source_Citation:
  Citation_Information:
    Originator: Quantum Spatial
    Publication_Date: 2015
    Title: Lidar RAW Data for SEWRPC QL2 2015
    Geospatial_Data_Presentation_Form: lidar data
Source_Contribution: This data source was used to populate the lidar point cloud data.

Process_Step:
- Process_Description: Hydro-flattened DTM Creation:
  - Class 8 LiDAR in conjunction with the hydro breaklines were used to create a DTM in Esri file-geodatabase format.

Process_Contact:
- Contact_Information:
  - Contact_Organization_Primary: Quantum Spatial
  - Contact_Organization: Quantum Spatial
  - Contact_Person: Paul Bishop
  - Contact_Address:
Address_Type: mailing and physical
Address: 523 Wellington Way
City: Lexington
State_or_Province: KY
Postal_Code: 40503
Country: USA
Contact_Voice_Telephone: 859-277-8700
Contact_Facsimile_Telephone: 859-277-8901
Contact_Electronic_Mail_Address: pbishop@quantumspatial.com
Hours_of_Service: Monday through Friday 8:00 AM to 5:00 PM (Eastern Time)
Contact_Instructions: If unable to reach the contact by telephone, please send an email. You should get a response within 24 hours.
Spatial_Data_Organization_Information:
  Direct_Spatial_Reference_Method: Vector
  Point_and_Vector_Object_Information:
    SDTS_Terms_Description:
      SDTS_Point_and_Vector_Object_Type: String
  Spatial_Reference_Information:
    Horizontal_Coordinate_System_Definition:
      Planar:
        Grid_Coordinate_System:
          Grid_Coordinate_System_Name: State Plane Coordinate System 1927
        State_Plane_Coordinate_System:
          SPCS_Zone_Identifier: 4803
          Lambert_Conformal_Conic:
            Standard_Parallel: 42.73333333333333
            Standard_Parallel: 44.06666666666667
            Longitude_of_Central_Meridian: -90.0
            Latitude_of_Projection_Origin: 42.0
            False_Easting: 2000000.0
            False_Northing: 0.0
        Planar_Coordinate_Information:
          Planar_Coordinate_Encoding_Method: coordinate pair
          Coordinate_Representation:
            Abscissa_Resolution: 0.01
            Ordinate_Resolution: 0.01
          Planar_Distance_Units: survey feet
  Geodetic_Model:
    Horizontal_Datum_Name: North American Datum of 1927
    Ellipsoid_Name: Clarke 1866
    Semi-major_Axis: 6378206.4
    Denominator_of_Flattening_Ratio: 294.9786982
  Vertical_Coordinate_System_Definition:
    Altitude_System_Definition:
      Altitude_Datum_Name: National Geodetic Vertical Datum of 1929
      Altitude_Resolution: 0.01
      Altitude_Distance_Units: feet
Altitude_Encoding_Method: Explicit elevation coordinate included with horizontal coordinates

Entity and Attribute Information:
Detailed_Description:
Entity_Type:
   Entity_Type_Label: ModelKey
   Entity_Type_Definition: A collection of geographic features with the same geometry type (such as point, line, or polygon), the same attributes, and the same spatial reference.
   Entity_Type_Definition_Source: http://support.esri.com/en/knowledgebase/GISDictionary/term/feature%20class
Attribute:
   Attribute_Label: FID
   Attribute_Definition: Internal feature number.
   Attribute_Definition_Source: Esri
   Attribute_Domain_Values:
      Unrepresentable_Domain: Sequential unique whole numbers that are automatically generated.
Attribute:
   Attribute_Label: Shape
   Attribute_Definition: Feature geometry.
   Attribute_Definition_Source: Esri
   Attribute_Domain_Values:
      Unrepresentable_Domain: Feature geometry - Point ZM
Attribute:
   Attribute_Label: X
   Attribute_Definition: Easting coordinate in project coordinate system for each model key point
   Attribute_Definition_Source: LiDAR data
   Attribute_Domain_Values:
      Unrepresentable_Domain: Values are calculated from LiDAR data
Attribute:
   Attribute_Label: Y
   Attribute_Definition: Northing coordinate in project coordinate system for each model key point
   Attribute_Definition_Source: LiDAR data
   Attribute_Domain_Values:
      Unrepresentable_Domain: Values are calculated from LiDAR data
Attribute:
   Attribute_Label: Z
   Attribute_Definition: Elevation in project coordinate system for each model key point
   Attribute_Definition_Source: LiDAR data
   Attribute_Domain_Values:
      Unrepresentable_Domain: Values are calculated from LiDAR data
Attribute:
   Attribute_Label: Class
   Attribute_Definition: Point classification
Attribute Definition Source: LiDAR data
Attribute Domain Values:
  Unrepresentable Domain: Values are calculated from LiDAR data
Detailed_Description:
Entity_Type:
  Entity_Type_Label: Breaklines
  Entity_Type_Definition: A collection of geographic features with the same geometry type (such as point, line, or polygon), the same attributes, and the same spatial reference.
  Entity_Type_Definition_Source: http://support.esri.com/en/knowledgebase/GISDictionary/term/feature%20class
Attribute:
  Attribute_Label: FID
  Attribute_Definition: Internal feature number.
  Attribute_Definition_Source: Esri
  Attribute_Domain_Values:
    Unrepresentable Domain: Sequential unique whole numbers that are automatically generated.
Attribute:
  Attribute_Label: Shape
  Attribute_Definition: Feature geometry.
  Attribute_Definition_Source: Esri
  Attribute_Domain_Values:
    Unrepresentable Domain: Feature geometry - Polyline ZM
Attribute:
  Attribute_Label: B_LINE_TY
  Attribute_Definition: Breakline Type
  Attribute_Definition_Source: LiDAR Data
  Attribute_Domain_Values:
    Enumerated_Domain:
      Enumerated_Domain_Value: Lake Pond
      Enumerated_Domain_Value_Definition: LiDAR Data
      Enumerated_Domain_Value_Definition_Source: LAS
    Enumerated_Domain: {version 1.4} {Attribute_Domain_Values:}
    Enumerated_Domain:
      Enumerated_Domain_Value: Lake Pond Island
      Enumerated_Domain_Value_Definition: LiDAR Data
      Enumerated_Domain_Value_Definition_Source: LAS
    Enumerated_Domain: {version 1.4} {Attribute_Domain_Values:}
    Enumerated_Domain:
      Enumerated_Domain_Value: Double Line Drain
      Enumerated_Domain_Value_Definition: LiDAR Data
      Enumerated_Domain_Value_Definition_Source: LAS
    Enumerated_Domain: {version 1.4} {Attribute_Domain_Values:}
    Enumerated_Domain:
      Enumerated_Domain_Value: Double Line Drain Island
      Enumerated_Domain_Value_Definition: LiDAR Data
Enumerated_Domain_Value_Definition_Source: LAS

version 1.4
Attribute_Domain_Values:
  Enumerated_Domain:
    Enumerated_Domain_Value: Bridge
    Enumerated_Domain_Value_Definition: LiDAR Data
    Enumerated_Domain_Value_Definition_Source: LAS

version 1.4
Attribute_Domain_Values:
  Enumerated_Domain:
    Enumerated_Domain_Value: Top Wall
    Enumerated_Domain_Value_Definition: LiDAR Data
    Enumerated_Domain_Value_Definition_Source: LAS

version 1.4
Metadata_Reference_Information:
  Metadata_Date: 20160511
  Metadata_Contact:
    Contact_Information:
      Contact_Organization_Primary:
        Contact_Organization: Quantum Spatial
        Contact_Person: Sarah Zibart
      Contact_Address:
        Address_Type: mailing and physical
        Address: 523 Wellington Way
        City: Lexington
        State_or_Province: KY
        Postal_Code: 40503
        Country: USA
      Contact_Voice_Telephone: 859-277-8700
      Contact_Facsimile_Telephone: 859-277-8901
      Contact_Electronic_Mail_Address:
        szibart@quantumspatial.com
    Hours_of_Service: Monday through Friday 8:00 AM to 5:00 PM (Eastern Time)
    Contact_Instructions: If unable to reach the contact by telephone, please send an email. You should get a response within 24 hours.
  Metadata_Standard_Name: FGDC Content Standard for Digital Geospatial Metadata
  Metadata_Access_Constraints: None.
  Metadata_Use_Constraints: None.
  Metadata_Security_Information:
    Metadata_Security_Classification_System: None.
    Metadata_Security_Classification: Unclassified
    Metadata_Security_Handling_Description: NONE