

Please provide the following information, and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

1. General Description of Data to be Managed

1.1. Name of the Data, data collection Project, or data-producing Program:

2018 TWDB Lidar: Coastal Texas

1.2. Summary description of the data:

The Texas Water Development Board (TWDB) in cooperation with their project partners tasked Fugro Geospatial, Inc. (Fugro) under the Department of Information Resources (DIR) Geographic Information Systems (GIS) Hardware, Software and Services contract also known as the Texas Strategic Mapping (StratMap) Contract to acquire high resolution elevation data and associated products from airborne lidar systems during the 2017-2018 leaf-off season. The StratMap Program promotes inter-governmental collaboration and partnerships to purchase geospatial data products that provide cost savings and project efficiencies. Both the StratMap Program and the StratMap Contract are administered by the Texas Natural Resources Information System (TNRIS), a division of TWDB. Project partners include: Houston-Galveston Area Council (H-GAC), Harris County Flood Control District (HCFCD), and the United States Geological Survey (USGS). This Coastal Texas project consists of approximately 9,758 DO4Q tiles and is located on the Texas Coast covering much of Orange to Matagorda County along with Harris County and the surrounding area. The project includes large metropolitan areas as well as coastal areas. The Urban and Coastal AOIs consist of approximately 4,045 square miles and were acquired between January 12 and March 22, 2018 utilizing both Riegl LMS-Q680i and Riegl LMS-Q780 sensors; collecting multiple return x, y, and z as well as intensity data. Specialized in-house and commercial software processes the native lidar data into 3-dimensional positions that can be imported into GIS software for visualization and further analysis. The data were delivered with the horizontal datum of North American Datum of 1983 (NAD83, 2011) in meters and the vertical datum is the North American Vertical Datum of 1988 (NAVD88) in meters realized with GEOID12B.

The NOAA Office for Coastal Management (OCM) downloaded this data set from this TNRIS site:

<https://data.tnrис.org/collection/b5bd2b96-8ba5-4dc6-ba88-d88133eb6643>

These files were processed to the Data Access Viewer (DAV) and https. The total number of files downloaded and processed was 9071.

In addition to these lidar point data, the bare earth Digital Elevation Models (DEM) created from the lidar point data are also available. These data and the breaklines are available for download at the links provided in the URL section of this metadata record.

1.3. Is this a one-time data collection, or an ongoing series of measurements?

One-time data collection

1.4. Actual or planned temporal coverage of the data:

2018-01-13, 2018-01-14, 2018-01-15, 2018-01-17, 2018-01-18, 2018-01-22, 2018-01-23, 2018-01-24, 2018-01-25, 2018-01-28, 2018-01-29, 2018-01-30, 2018-01-31, 2018-02-02, 2018-02-08, 2018-02-19, 2018-02-23, 2018-02-26, 2018-03-01, 2018-03-02, 2018-03-03, 2018-03-06, 2018-03-07, 2018-03-08, 2018-03-11, 2018-03-12, 2018-03-13, 2018-03-14, 2018-03-19, 2018-03-20, 2018-03-21, 2018-03-22

1.5. Actual or planned geographic coverage of the data:

W: -96.609375, E: -93.687525, N: 31.031225, S: 28.59375

1.6. Type(s) of data:

(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)
Model (digital)

1.7. Data collection method(s):

(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)

1.8. If data are from a NOAA Observing System of Record, indicate name of system:

1.8.1. If data are from another observing system, please specify:

2. Point of Contact for this Data Management Plan (author or maintainer)

2.1. Name:

NOAA Office for Coastal Management (NOAA/OCM)

2.2. Title:

Metadata Contact

2.3. Affiliation or facility:

NOAA Office for Coastal Management (NOAA/OCM)

2.4. E-mail address:

coastal.info@noaa.gov

2.5. Phone number:

(843) 740-1202

3. Responsible Party for Data Management

Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name:

3.2. Title:

Data Steward

4. Resources

Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?

Yes

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

Unknown

5. Data Lineage and Quality

NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible

(describe or provide URL of description):

Process Steps:

- 2018-04-01 00:00:00 - All acquired lidar data went through a preliminary review to assure that complete coverage had been obtained and that there were no gaps between flight lines before the flight crew left the project site. Once back in the office, the data was run through a complete iteration of processing to ensure that it is complete, uncorrupted, and that the entire project area has been covered without gaps between flight lines. There are essentially three steps to this processing: 1) GPS/IMU Processing - Airborne GPS and IMU data was processed using the airport GPS base station data. 2) Raw Lidar Data Processing - Technicians processed the raw data to LAS format flight lines with full resolution output before performing QC. A starting configuration file is used in this process, which contains the latest calibration parameters for the sensor. The technicians also generated flight line trajectories for each of the flight lines during this process. 3) Verification of Coverage and Data Quality - Technicians checked the trajectory files to ensure completeness of acquisition for the flight lines, calibration lines, and cross flight lines. The intensity images were generated for the entire lift at the required 0.5 meter NPS. Visual checks of the intensity images against the project boundary were performed to ensure full coverage to the 300 meter buffer beyond the project boundary. The intensity histogram was analyzed to ensure the quality of the

intensity values. The technician also thoroughly reviewed the data for any gaps in project area. The technician generated a sample TIN surface to ensure no anomalies were present in the data. Turbulence was inspected for each flight line; if any adverse quality issues were discovered, the flight line was rejected and re-flown. The technician also evaluated the achieved post spacing against project specified 0.5 meter NPS as well as making sure no clustering in point distribution.

- 2018-05-11 00:00:00 - The boresight for each lift was done individually as the solution may change slightly from lift to lift. The following steps describe the Raw Data Processing and Boresight process: 1) Technicians processed the raw data to LAS format flight lines using the final GPS/IMU solution. This LAS data set was used as source data for boresight. 2) Technicians first used Fugro proprietary and commercial software to calculate initial boresight adjustment angles based on sample areas within the lift. These areas cover calibration flight lines collected in the lift, cross tie and production flight lines. These areas are well distributed in the lift coverage and cover multiple terrain types that are necessary for boresight angle calculation. The technician then analyzed the results and made any necessary additional adjustment until it is acceptable for the selected areas. 3) Once the boresight angle calculation was completed for the selected areas, the adjusted settings were applied to all of the flight lines of the lift and checked for consistency. The technicians utilized commercial and proprietary software packages to analyze the matching between flight line overlaps for the entire lift and adjusted as necessary until the results met the project specifications. 4) Once all lifts were completed with individual boresight adjustment, the technicians checked and corrected the vertical misalignment of all flight lines and also the matching between data and ground truth. The relative accuracy was ± 3 cm RMSDz within swath overlap (between adjacent swaths) with a maximum difference of ± 17 cm. 5) The technicians ran a final vertical accuracy check of the boresighted flight lines against the surveyed ground control points after the z correction to ensure the requirement of RMSEz (non-vegetated) ± 10 cm, NVA ± 19.6 cm 95% Confidence Level was met.

- 2018-05-29 00:00:00 - Once boresighting was completed, the project was set up for automatic classification. First, the lidar data was cut into production tiles and the flight line overlap points, noise points, ground points, and building points were classified automatically. Fugro utilized commercial software, as well as proprietary, in-house developed software for automatic filtering. The parameters used in the process were customized for each terrain type to obtain optimum results. These parameters were also customized to capture multiple categories of vegetation based on height (low, medium, and high vegetation). After all "low" points are classified, points remaining are reclassified automatically based on height from the ground. Once the automated filtering was completed, the files were run through a visual inspection to ensure that the filtering was not too aggressive or not aggressive enough. In cases where the filtering was too aggressive and important terrain were filtered out, the data was either run through a different filter within local area or was corrected during the manual filtering process. Bridge deck points and culvert

points were classified as well during the interactive editing process. Interactive editing was completed in visualization software that provides manual and automatic point classification tools. Fugro utilized commercial and proprietary software for this process. All manually inspected tiles went through a peer review to ensure proper editing and consistency. After the manual editing and peer review, all tiles went through another final automated classification routine. This process ensures only the required classifications are used in the final product (all points classified into any temporary classes during manual editing will be re-classified into the project specified classifications). Once manual inspection, QC and final autofilter is complete for the lidar tiles, the LAS data was packaged to the project specified tiling scheme, cut to the approved tile layout, and formatted to LAS v1.4. It was also re-projected to UTM Zone 15 north; NAD83(2011), meters; NAVD88 (GEOID12B), meters. The file header was formatted to meet the project specification. This Classified Point Cloud product was used for the generation of derived products. This product was delivered in fully compliant LAS v1.4, Point Record Format 6 with Adjusted Standard GPS Time. Georeferencing information is included in all LAS file headers. Each tile has File Source ID assigned to zero. The Point Source ID matches to the flight line ID in the flight trajectory files. Intensity values are included for each point, normalized to 16-bit. The following classifications are included: Class 1 – Processed, but unclassified; Class 2 – Bare earth ground; Class 3 – Low Vegetation (0.01m to 1.00m above ground); Class 4 – Medium Vegetation (1.01m to 3.00m above ground); Class 5 – High Vegetation (greater than 3.01m above ground); Class 6 – Building; Class 7 – Low Point (Noise); Class 9 – Water; Class 10 – Ignored Ground; Class 14 – Culverts; and Class 17 – Bridge Decks. The classified point cloud data was delivered in tiles without overlap using the project tiling scheme.

- 2019-11-19 00:00:00 - The NOAA Office for Coastal Management (OCM) downloaded this data set from this TNRS site: <https://data.tnris.org/collection/b5bd2b96-8ba5-4dc6-ba88-d88133eb6643> The total number of files downloaded and processed was 9071. There were 913 files in UTM Zone 14 and 8158 files in UTM Zone 15. The data were in UTM Zone 14 and 15 North (NAD83 2011) meters coordinates and NAVD88 (Geoid12B) elevations in meters. The data were classified as: 1 - Unclassified, 2 - Ground, 3 - Low Veg (0.01 - 1m above ground), 4 - Medium Veg (1.01 - 3 m above ground), 5 - High Veg (greater than 3.01 m above ground), 6 -Buildings, 7 - Low Noise, 9 - Water, 10 - Ignored Ground, 14 - Culverts, 17 - Bridge Decks. OCM processed all classifications of points to the Digital Coast Data Access Viewer (DAV). Classes available on the DAV are: 1, 2, 3, 4, 5, 6, 7, 9, 10, 14, 17. OCM performed the following processing on the data for Digital Coast storage and provisioning purposes: 1. An internal OCM script was run to check the number of points by classification and by flight ID and the gps and intensity ranges. 2. Internal OCM scripts were run on the laz files to convert from orthometric (NAVD88) elevations to ellipsoid elevations using the Geoid 12B model, to convert from UTM Zone 14 and 15 North (NAD83 2011) coordinates in meters to geographic coordinates, to assign the geokeys, to sort the data by gps time and zip the data to database and to http.

5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:

5.2. Quality control procedures employed (describe or provide URL of description):

6. Data Documentation

The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive?

No

6.1.1. If metadata are non-existent or non-compliant, please explain:

Missing/invalid information:

- 1.7. Data collection method(s)
- 3.1. Responsible Party for Data Management
- 5.2. Quality control procedures employed
- 7.1.1. If data are not available or has limitations, has a Waiver been filed?
- 7.4. Approximate delay between data collection and dissemination
- 8.3. Approximate delay between data collection and submission to an archive facility

6.2. Name of organization or facility providing metadata hosting:

NMFS Office of Science and Technology

6.2.1. If service is needed for metadata hosting, please indicate:

6.3. URL of metadata folder or data catalog, if known:

<https://www.fisheries.noaa.gov/inport/item/58236>

6.4. Process for producing and maintaining metadata

(describe or provide URL of description):

Metadata produced and maintained in accordance with the NOAA Data Documentation Procedural Directive: https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-Data_Documentation_v1.pdf

7. Data Access

NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted

to justify any approach other than full, unrestricted public access.

7.1. Do these data comply with the Data Access directive?

Yes

7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?

7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:

7.2. Name of organization of facility providing data access:

NOAA Office for Coastal Management (NOAA/OCM)

7.2.1. If data hosting service is needed, please indicate:

7.2.2. URL of data access service, if known:

<https://coast.noaa.gov/dataviewer/#/lidar/search/where:ID=8898>

<https://noaa-nos-coastal-lidar-pds.s3.amazonaws.com/laz/geoid12b/8898/index.html>

7.3. Data access methods or services offered:

Data is available online for bulk and custom downloads.

7.4. Approximate delay between data collection and dissemination:

7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:

8. Data Preservation and Protection

The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:

(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)

NCEI_CO

8.1.1. If World Data Center or Other, specify:

8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:

8.2. Data storage facility prior to being sent to an archive facility (if any):

Office for Coastal Management - Charleston, SC

8.3. Approximate delay between data collection and submission to an archive facility:

8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection

Data is backed up to tape and to cloud storage.

9. Additional Line Office or Staff Office Questions

Line and Staff Offices may extend this template by inserting additional questions in this section.