

U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

REGISTRY NUMBER(S):

**Outside Source  
Data Report**

**W00313**

State/Territory:	<b>Massachusetts</b>		
General Locality:	<b>Approaches to Plymouth</b>		
Sub-Locality:	<b>Approaches to Plymouth</b>		
Survey Scale:	<b>1:10,000</b>	Dates of Survey:	<b>05/26/2015 – 05/27/2015</b>
Instructions Dated:	<b>N/A</b>	Project Number:	<b>OSD-PHB-16</b>
Vessel:	<b>U.S. Army Corps of Engineers Joint Airborne Lidar Bathymetry Technical Center of eXpertise</b>		
Chief of Party:	<b>Data Production Manager, USACE JALBTCX</b>		
Surveyed by:	<b>USACE JALBTCX</b>		
Soundings by:	<b>LIDAR</b>		
Compilation by:	<b>Pacific Hydrographic Branch</b>		
HCell Specification:	<b>10/01/2015</b>		
HCell compilation units:	<b>Decimeters at MLLW</b>		
HCell Compilation Scale:	<b>1:20,000</b>		

## Metadata to Accompany Survey W00313

During inspection and QC of the lidar point cloud, flightline to flightline elevation differences met the CZMIL sensor specifications. This data set covers the spatial extent of topographic lidar data obtained during this survey.

The data positions were obtained using post processed KGPS methods. The horizontal accuracy of CZMIL in the joint topo/bathy mode of operation is  $\pm 1$  m,  $2 \sigma$ .

The data positions were obtained using post processed KGPS methods. The vertical accuracy of CZMIL in the joint topo/bathy mode of operation is  $\pm 15$  cm,  $2 \sigma$ . In the hydrographic mode of operation, the vertical accuracy of CZMIL is  $[0.3^2 + (0.013 \times \text{depth})^2]^{1/2}$  m,  $2 \sigma$  in depths of 0-30 m.

LAS files are imported into GeoCue V2012.1.27.7, which is a geospatial workflow production and management software tool employed by JALBTCX to perform and monitor production of data products. Upon import into GeoCue, a customized classification macro, built upon the TerraScan V13 module within Microstation V8i, classifies valid topobathy data as ground points (2) and unclassified points (1), and valid bathymetric points (29). Upon completion the macro, the classification results undergo quality control and any misclassified points are manually edited. In areas of dense vegetation the bare earth ground points might be incorrectly classified due to the inability of the laser to penetrate the canopy and reach the bare ground. In these areas, JALBTCX defaults to the algorithm's "ground" surface instead of manually reclassifying those points. They are partitioned into a series of 5km or quarter quad delivery boxes, one Classified LAS file per box. The format of the file is LAS version 1.2. Data are classified as 1 (valid non-ground topographic data), 2 (valid ground topographic data), and 29 (valid bathymetric data).

Data is then converted to Massachusetts State Plane. MLLW US Survey feet in NOAA's Vdatum program version 3.4

These data were collected using the CZMIL system. It is owned and operated by the U.S. Army Corps of Engineers (USACE). The system collects topobathy lidar data at 10 kHz and RGB imagery at 2 Hz. A CASI-1500 hyperspectral line scanner is integrated with the system as well. Aircraft position, velocity and acceleration information are collected through a combination of Novatel and POS A/V 510 equipment. All raw data streams are transferred to the office for downloading and processing in CZMIL's Hydro Fusion software. Aircraft position data are processed using POSpac software and the results are combined with the lidar data to produce 3-D positions for each lidar shot. Upon inspection and QA/QC in the software packages Fledermaus and PFM\_ABE, anomalous data are flagged as invalid. PFM\_ABE software then converts all valid data from ellipsoid to orthometric heights based on the NGS' GEOID12A model and exports valid lidar data as a series of unclassified LAS files.

These data have been developed from the best available sources. Although efforts have been made to ensure that the data are accurate and reliable, errors and variable conditions originating from physical sources used to develop the data may be reflected in the data supplied. Users must be aware of these conditions and bear responsibility for the appropriate use of the information with respect to possible errors, scale, resolution, rectification, positional accuracy, development methodology, time period, environmental and climatic conditions and other circumstances specific to these data. The user is responsible for understanding the accuracy limitations of the data provided herein. The burden for determining fitness for use lies entirely with the user. The user should refer to the accompanying metadata notes for a description of the data and data development procedures.<sup>i</sup>

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<sup>i</sup> Based on correspondence with Gretchen Imahori (see below) PHB chose to use the data from W00313 only to update depths in the area. All charted features were retained.

**Subject:**Re: W00313 Sensor Information?

**Date:**Tue, 30 Aug 2016 09:41:02 -0400

**From:**Gretchen Imahori - NOAA Federal <[gretchen.imahori@noaa.gov](mailto:gretchen.imahori@noaa.gov)>

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Hi Grant,

I understand from Josh that the CZMIL has a 2x2 meter spot spacing and it doesn't talk about feature detection capabilities in the report for your survey because they are still working on the feature detection report. Not sure if you are aware but if not, they did an objection detection test in 2015 and we heard at the recent JALBTCX workshop in July, the report is still not done. Josh is going to touch base with them again and see when a report is expected to be out.

Regarding your second question about using lidar to remove features:

Last year during the JALBTCX workshop a bunch of lidar experts (Shachak, Nick Johnson (USACE), Wayne (USGS EAARL now NOAA) and Christine (USGS -EAARL), Josh (RSD), Carol L (industry) etc. and a couple of hydro heads (Nick Forfinski and Toshi) had a meeting to discuss AHB's question about removing charted items using lidar data. Jasko and Eric told us they were sure the items no longer existed and wanted to use our RSD bathy lidar data to confirm the item should be removed.

It was a lengthy discussion and after many meetings and looking through different data the group as a whole recommended that lidar was not able at this point to fully be used to remove features we believed to no longer be there. We can add features but not remove them. I believe there was a BOH meeting about this and Jasko presented the recommendations (or was supposed to) but perhaps I am mistaken... maybe it was just about the idea of removing the items and the recommendations were not made clear at the BOH.

An additional item I should point you to is the [new Tech Memo CS36](#) - in case Eric & Mike G forgot to send this to you. In section 3.1 it says that the USACE NCMP had systems that had a 5x5 meter spot spacing until 2014 - this is referring to the SHOALS system according to Josh and he says he thinks Fugro still uses the SHOALS system for contract work so you may want to be sure to check system is the CZMIL even if it is current data. I'm sure you guys do this but just in case....

If you are already aware of all this because I took too long to get back to you - my apologies. If not - hope this helps and doesn't cause confusion

Best,

g

APPROVAL PAGE

W00313

Data partially meet current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in specific areas as delineated during office processing.

The following products will be sent to NCEI for archive:

- Collection of depth varied resolution BAGS
- Processed survey data and records
- W00313\_GeoImage.pdf

The survey evaluation and verification has been conducted according current OCS Specifications.

Approved: \_\_\_\_\_

**Peter Holmberg**

Cartographic Team Lead, Pacific Hydrographic Branch

The survey has been approved for dissemination and limited usage of updating NOAA's suite of nautical charts.

Approved: \_\_\_\_\_

**CDR Benjamin K. Evans, NOAA**

Chief, Pacific Hydrographic Branch