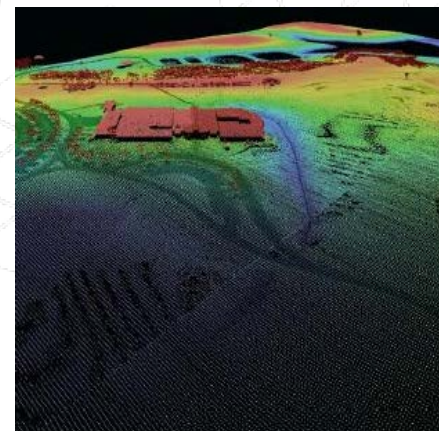
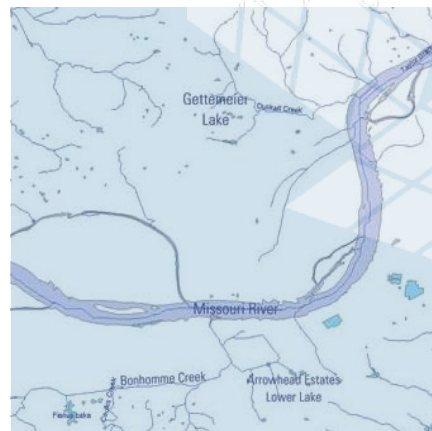
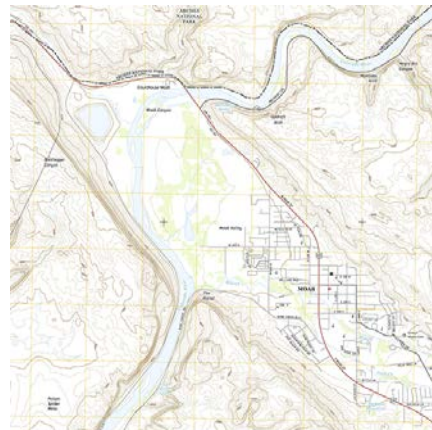




# 3D Elevation Program Products & Services



**Scientific Technical Assessment & Reporting Team**  
**Chesapeake Bay Program**  
**September 28, 2017**





# 3DEP IS A COLLABORATIVE

Coordinated by USGS

- 9 Federal Agency Members
- Includes: state government, private, non-profit, academic, tribal agencies and groups
- Non Feds participate via the Broad Agency Announcement (BAA)
- Primarily leaf-off collection
- Topographic lidar only – so far
- Delivers data to a standard, standard deliverable data



# 3DEP Data Contracted in FY16

PRELIMINARY Results – Subject to Change

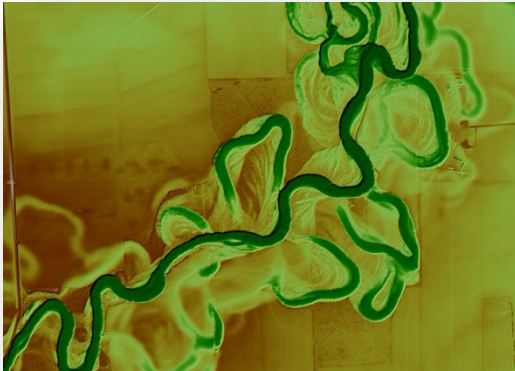
3

	3DEP Funds			Partner Contributions		Total Project Value	Square Miles
	USGS	FEMA	NRCS	Other Feds	Non-Federal		
Broad Agency Announcement	\$6.5 M	\$2.1 M	\$3.9 M	\$0.8 M	\$14.4 M	\$27.8 M	121.0 K
	\$12.5 M			\$15.2 M			
Other partnerships	\$2.7 M	\$9.9 M	\$6.1 M	\$0.6 M	\$2.0 M	\$21.2 M	82.1 K
	\$18.6 M			\$2.6 M			
TOTAL	\$9.2 M	\$11.9 M	\$10.0 M	\$1.4 M	\$16.4 M	\$49.0 M	203.1 K
	\$31.2 M			\$17.8 M			

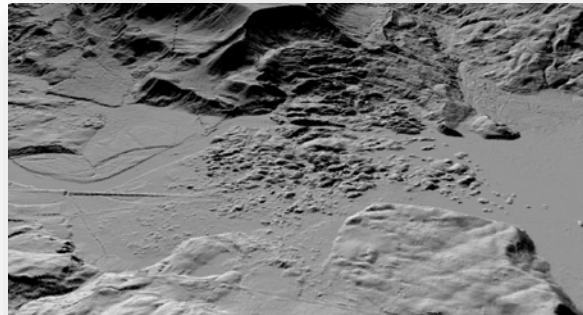
- Additional investments were made in FY16 that are being contracted in FY17:  
\$44.8M Lidar; \$1.2M for Alaska IfSAR
- FY15 \$39M and 150,000 square miles

# + 3D Elevation Program (3DEP)

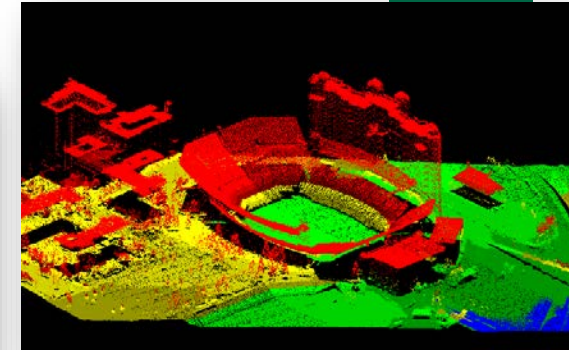
## Mission Critical Applications



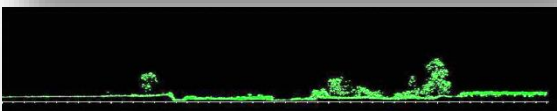
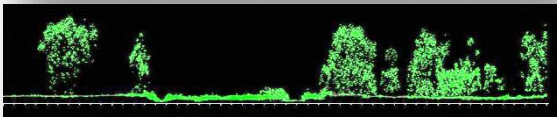
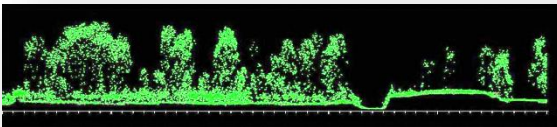
**Flood Risk Management**



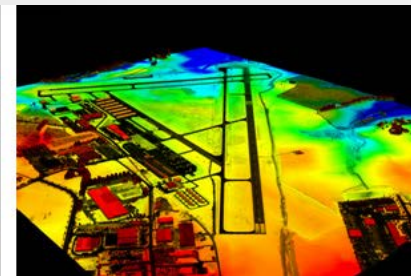
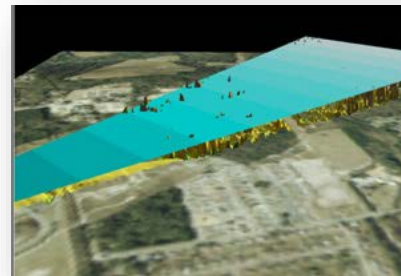
**Geologic Hazards**



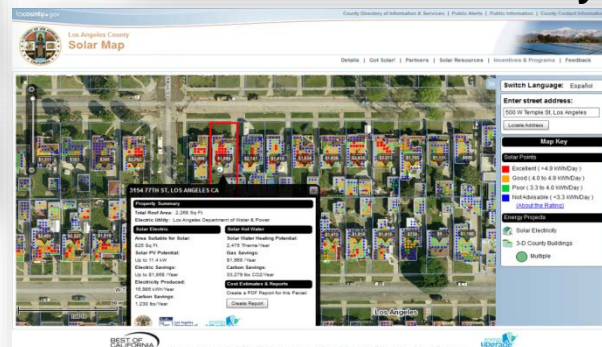
**Infrastructure Management**



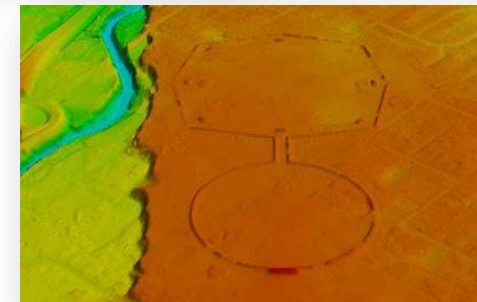
**Precision Forestry**



**Aviation Safety**



**Alternative Energy**



**Archaeology**

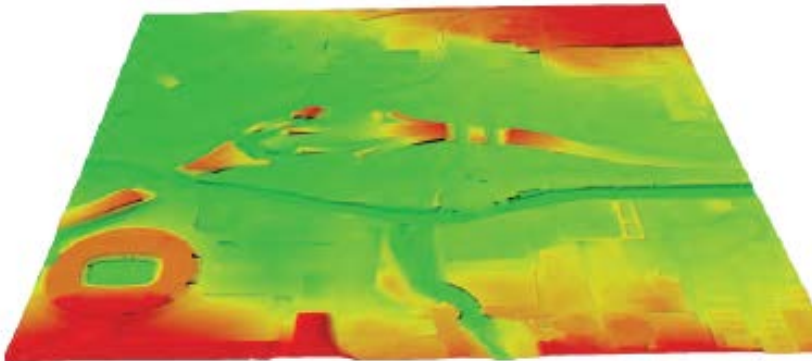
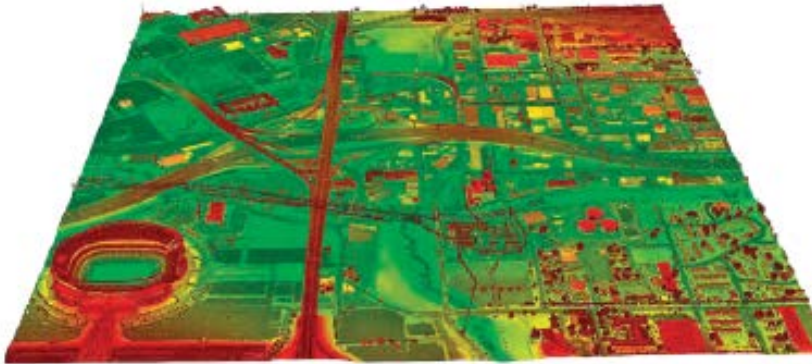


# + 3DEP For America's Infrastructure

The significant challenge of improving the Nation's infrastructure depends on high-quality elevation data

Uses include:

- Route, grade, line-of-sight, and utility surveys and corridor mapping
- Terrain and other obstruction identification for aviation
- Dam, levee, and coastal-structure failure modeling and mitigation
- Hydraulic and hydrologic modeling
- Evaluations of geologic, coastal, and other natural hazards, and geotechnical evaluations
- Permit application and construction plan development and evaluation
- Drainage issues and cut-and-fill estimate requirements
- Vegetation, topographic, and geomorphologic feature analysis
- As-built model development
- Preliminary engineering, estimate development, and quantity estimation activities
- Bridge site selection
- Base-map and elevation model creation



Lidar point cloud (top) and a derived bare-earth digital elevation model (bottom) for Denver, CO

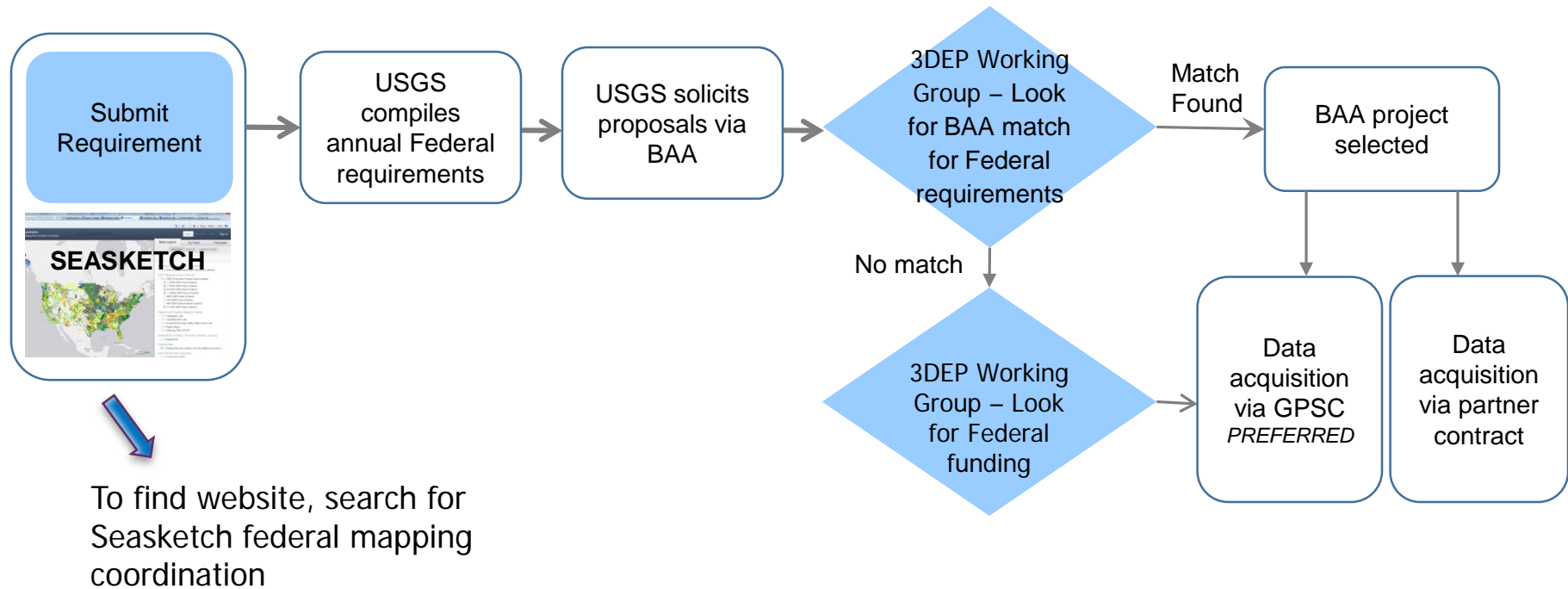
# + Lidar Quality Levels

Current 3DEP acquisition is QL2 Topographic Lidar

Quality Level	Min pts/sq meter	Pulse Spacing	RMSEz
QL1	8	About .35m	10cm
QL2	2	.7 m	10cm
QL3	.25 – 1	1-2m	18.5cm

# 3DEP Data Acquisition

## Steps for Federal Agencies in BLUE





## 3DEP Deliverable Data and Reports

- Metadata
- Reports: collection, processing, QA/QC, surveyed control points, check points
- Raw Point Cloud
- Classified Point Cloud
- Bare Earth 1m Grid DEM
- Breaklines
- Hydro-flattened water features



# + 3DEP Products

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## ■ Standard DEMs

### ■ Nationally Seamless

- 2 Arc Second
- 1 Arc Second
- 1/3 Arc Second

◆ Previously referred to as the  
National Elevation Dataset (NED)

### ■ Project-based (seamless within collection projects)

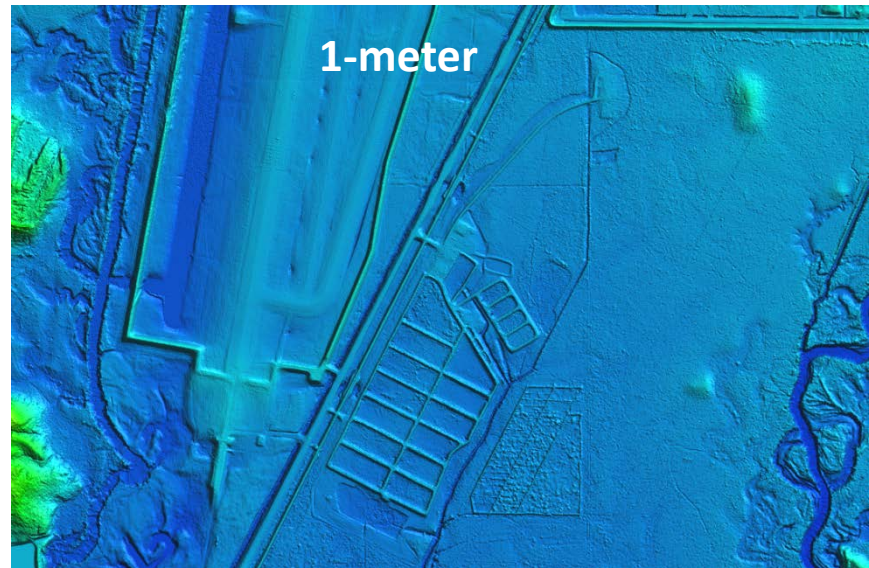
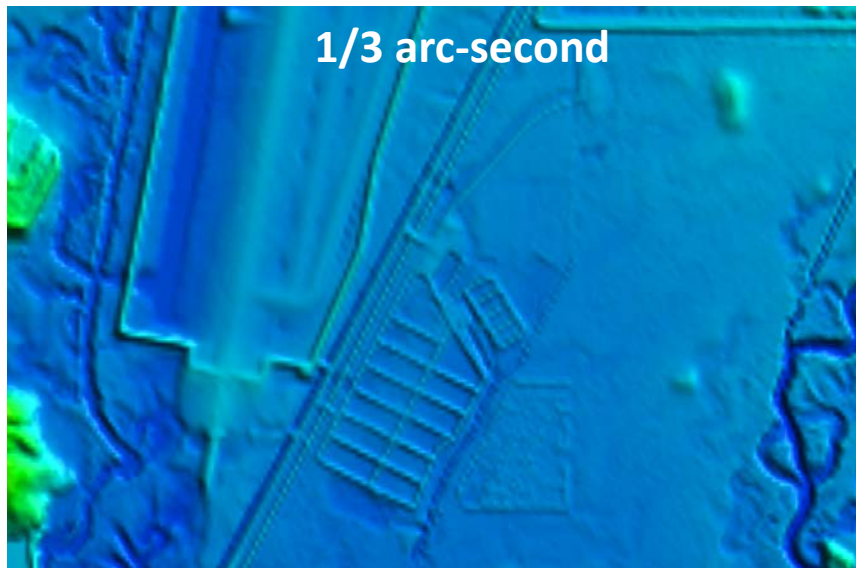
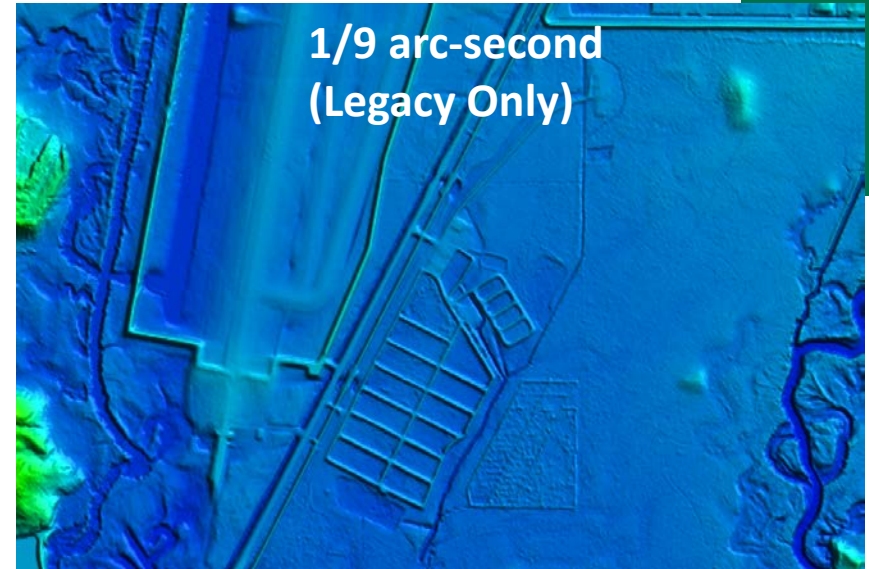
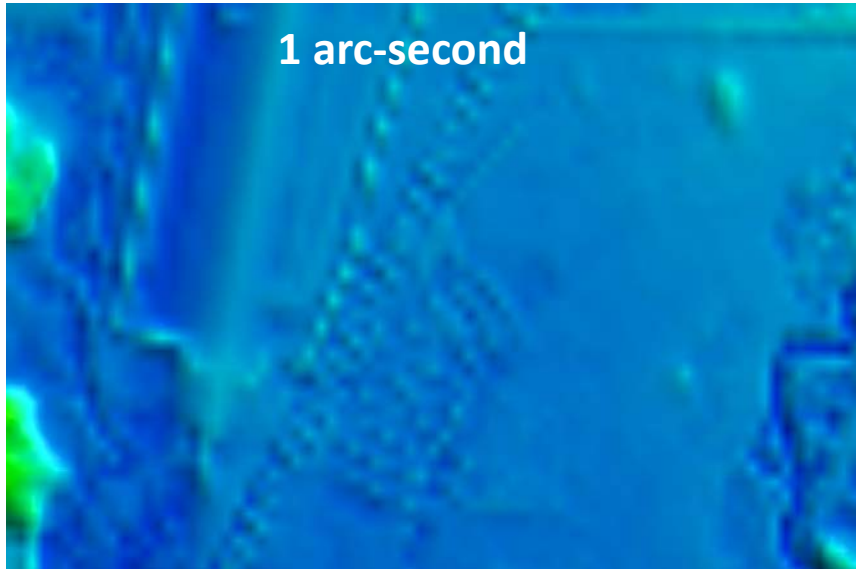
- 1/9 Arc Second (legacy)
- 1-meter
- 5-meter (Ifsar - Alaska)

## ■ Source Data

- Source DEMs (original product resolution)
- Lidar Point Cloud
- Digital Surface Model (Ifsar - Alaska)
- Orthorectified Radar Intensity Imagery (Ifsar - Alaska)

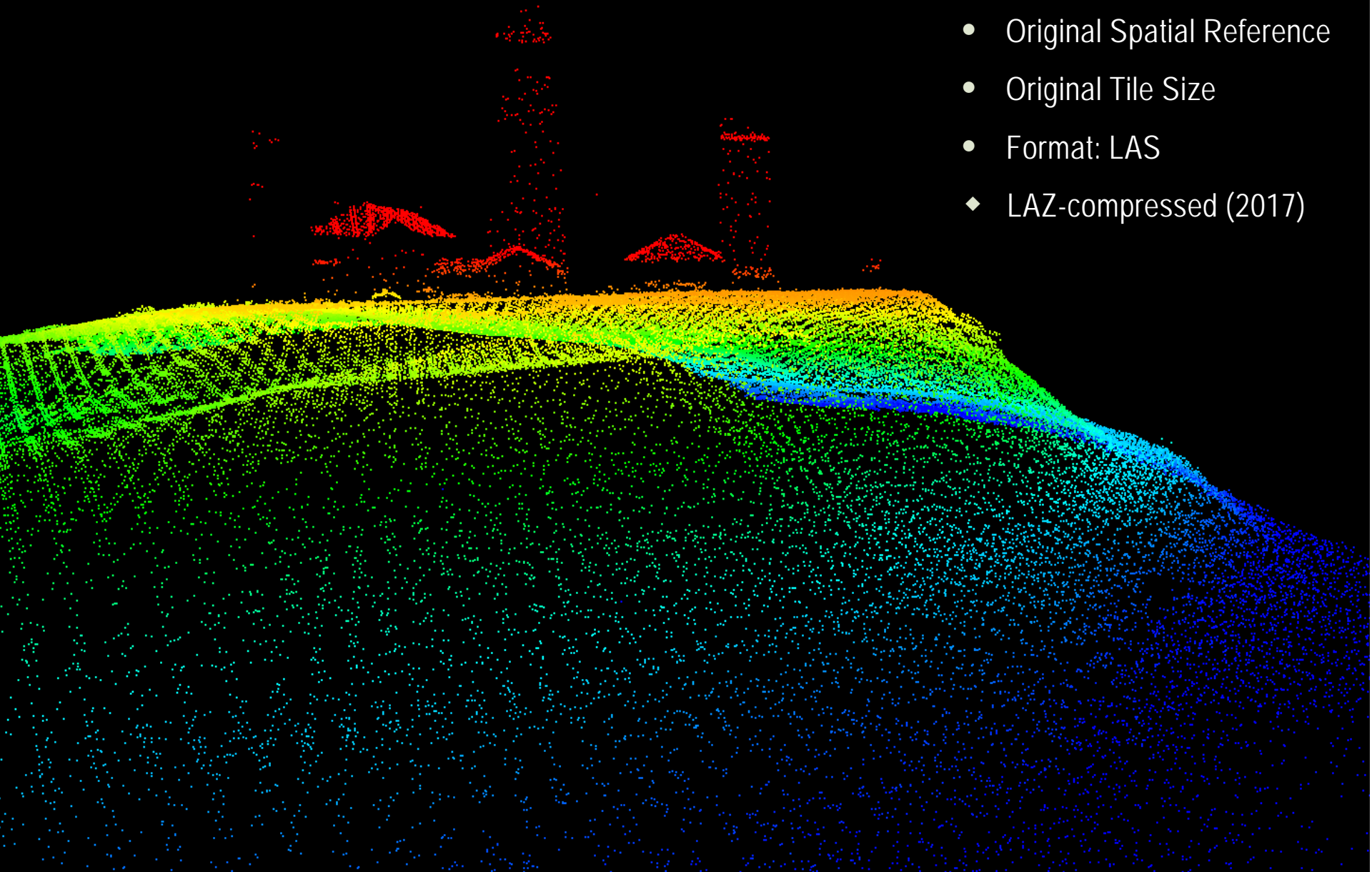
# +3DEP Standard DEM Products (Lidar source)

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# Lidar Point Cloud

- Point classifications
- Original Spatial Reference
- Original Tile Size
- Format: LAS
- ◆ LAZ-compressed (2017)



# + Elevation Web Services

## ■ Point Query Service

- Elevation at x, y – single point or bulk query
- Interpolates from 1/3 arc second seamless DEM

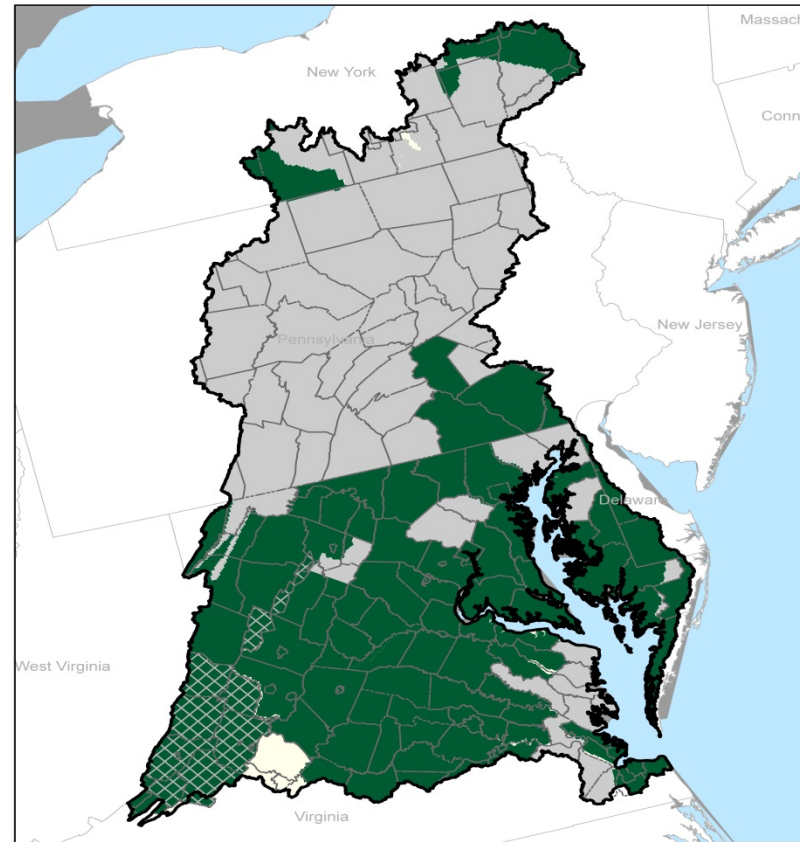
## ■ Coming in FY17:

- Image service for DEM viewing applications (shaded relief, slope, aspect, etc.)
- GRiD service for viewing and download of lidar point cloud within area of interest







# Simple Bay Watershed Coverage Map

Lidar Data in the Chesapeake Bay Watershed



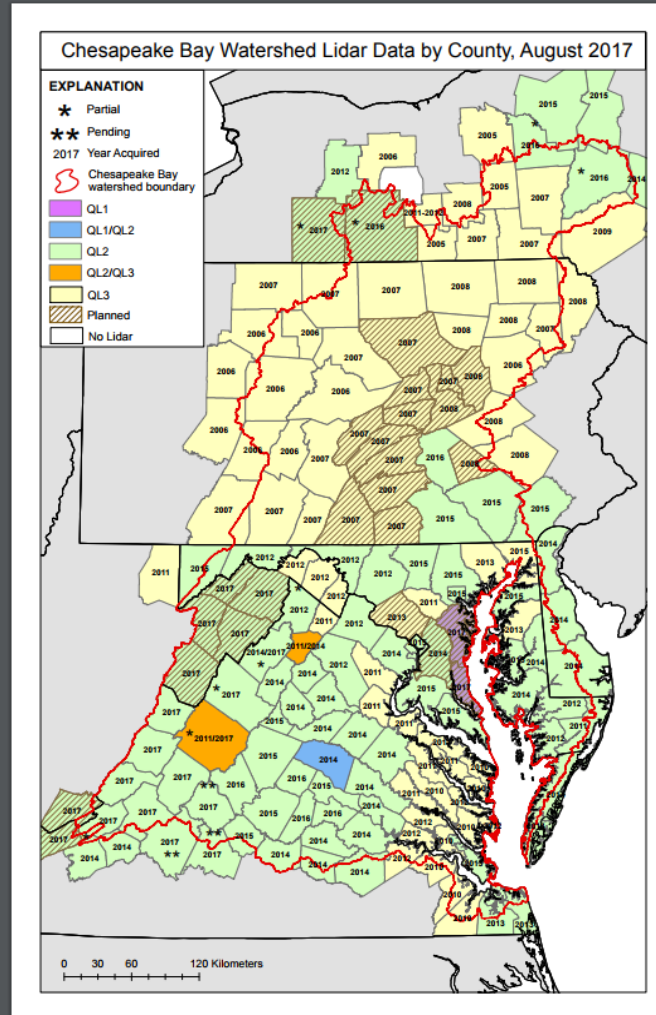
as of March 2017

## Explanation

-  FY17 Funded Projects
-  Meets 3DEP base-level specification for lidar
-  Other lidar data
-  No publicly available data



# Current Lidar Coverage Status With Quality Level





# +Watch for new Products & Services at [Nationalmap.gov/3dep/](http://Nationalmap.gov/3dep/)

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## 3D Elevation Program (3DEP)

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Benefits »

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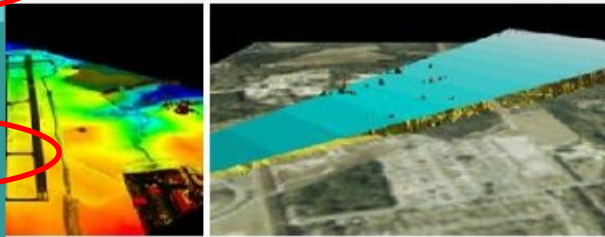
### Introduction and Goals

Download Elevation Products

Find Elevation At A Point

Learn About 3DEP Products & Services »

Elevation Data From Other Organizations



*detect potential obstacles that present hazards to air navigation.*

Lidar is used to detect potential obstacles that present hazards to air navigation.

The 3D Elevation Program (3DEP) initiative is being developed to respond to growing needs for high-quality topographic data and for a wide range of other three-dimensional representations of the Nation's natural and constructed features. The primary goal of 3DEP is to systematically collect enhanced elevation data in the form of high-quality light detection and ranging (lidar) data over the conterminous United States, Hawaii, and the U.S. territories, with data acquired over an 8-year period. Interferometric synthetic aperture radar (IfSAR) data will be collected over Alaska, where cloud cover and remote locations preclude the use of lidar over much of the State. The 3DEP initiative is based on the results of the [National Enhanced Elevation Assessment](#).

### 3DEP Data Acquisition Partnership Opportunities



**NEW! - Public Webinars to introduce the upcoming FY17 USGS Broad Agency Announcement (BAA) for the 3D Elevation Program (3DEP)**

The FY16/FY17 Broad Agency Announcement (BAA) for 3D Elevation Program (3DEP) is scheduled to be released in August 2016. The BAA will provide detailed information on



As of 7/01/2016

For more on the 3D Elevation Program (3DEP) visit: <http://www.nationalmap.gov/3dep/>

Visit the US Interagency Elevation Inventory (USIEI) at: <http://usieei.nasa.gov/inventory/>

#### 3D Elevation Program - FY16 Partnerships



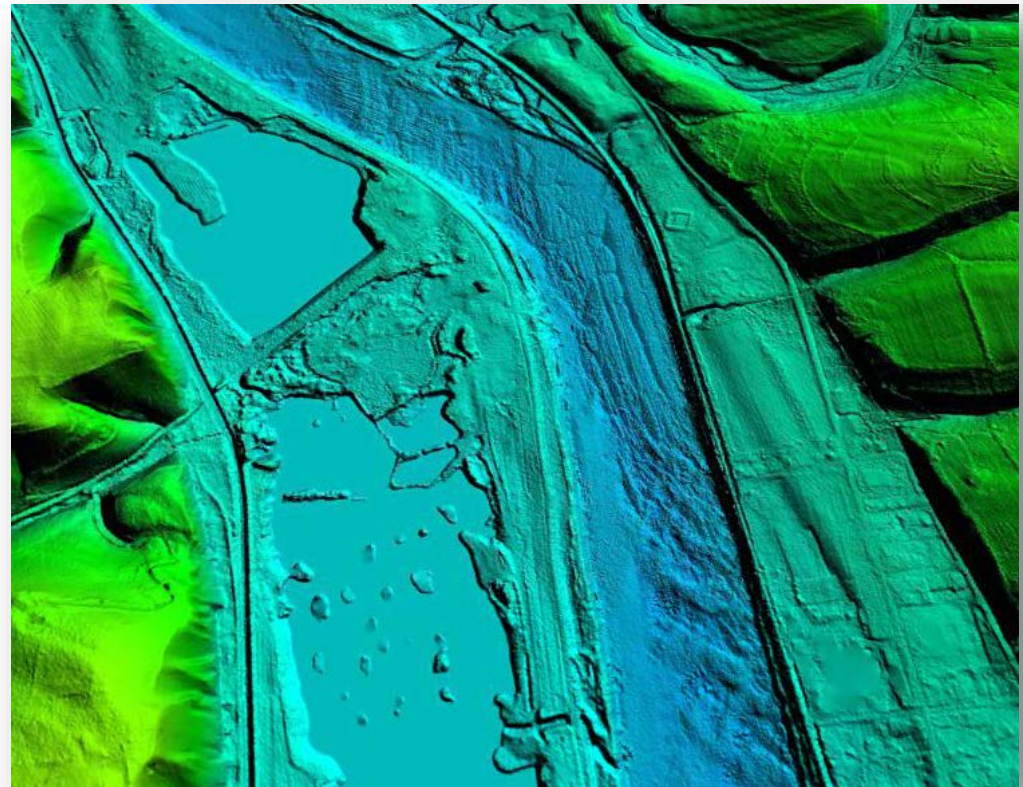
+

# Inland Bathymetry

- Technology proven in coastal areas
- Initial tests by EAARL-B in Delaware River were promising
- Commercial sensors becoming available
- Begin assessments of commercial capabilities in FY17



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Frenchtown Subregion of the Delaware River,  
integrated EAARL-B and topographic lidar



+ Thank you!

17

