The 3D Elevation Program Update for NGAC
3D Elevation Program (3DEP) Goal

- Complete acquisition of nationwide lidar (IfSAR in AK) by 2023 to provide the first-ever national baseline of consistent high-resolution elevation data – both bare earth and 3D point clouds – collected in a timeframe of less than a decade
- Address Federal, state and other mission-critical requirements
- Realize ROI 5:1 and potential to generate $13 billion/year
- Leverage the expertise and capacity of private mapping firms
- Achieve a 25% cost efficiency gain
- Completely refresh national data holdings

### Annual Benefits

<table>
<thead>
<tr>
<th>Rank</th>
<th>Business Use</th>
<th>Conservative</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Flood Risk Management</td>
<td>$295M</td>
<td>$502M</td>
</tr>
<tr>
<td>2</td>
<td>Infrastructure and Construction Management</td>
<td>$206M</td>
<td>$942M</td>
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<tr>
<td>3</td>
<td>Natural Resources Conservation</td>
<td>$159M</td>
<td>$335M</td>
</tr>
<tr>
<td>4</td>
<td>Agriculture and Precision Farming</td>
<td>$122M</td>
<td>$2,011M</td>
</tr>
<tr>
<td>5</td>
<td>Water Supply and Quality</td>
<td>$85M</td>
<td>$156M</td>
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<tr>
<td>6</td>
<td>Wildfire Management, Planning and Response</td>
<td>$76M</td>
<td>$159M</td>
</tr>
<tr>
<td>7</td>
<td>Geologic Resource Assessment and Hazard Mitigation</td>
<td>$52M</td>
<td>$1,067M</td>
</tr>
<tr>
<td>8</td>
<td>Forest Resources Management</td>
<td>$44M</td>
<td>$62M</td>
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<tr>
<td>9</td>
<td>River and Stream Resource Management</td>
<td>$38M</td>
<td>$87M</td>
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<tr>
<td>10</td>
<td>Aviation Navigation and Safety</td>
<td>$35M</td>
<td>$56M</td>
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<tr>
<td>20</td>
<td>Land Navigation and Safety</td>
<td>$0.2M</td>
<td>$7,125M</td>
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<tr>
<td></td>
<td><strong>Total for all Business Uses (1 – 27)</strong></td>
<td><strong>$1.2B</strong></td>
<td><strong>$13B</strong></td>
</tr>
</tbody>
</table>
Foundational Data Underpin Administration Priorities

3D Elevation Program Supports…

Climate Science
- Flood forecast and response
- Wildfire management
- Sea-level rise modeling
- Habitat management

Conservation
- Open
- Sparse
- Shorter
- Multistory
- Top Story

Economy

Racial and Economic Equity

Clean Energy Deployment
- 3DEP lidar point cloud used to identify trees, buildings, or terrain that can block broadband signals

Tribal Programs
- Klamath, Kootenai, and Nisqually Tribes: bathymetric lidar data for fish habitat restoration
Foundational Data Underpin Administration Priorities

3D Elevation Program Supports…

Infrastructure
- 3DEP, NHD, and geophysical data are foundational and directly applicable to a broad range of infrastructure applications
- Data acquired have a high ROI for infrastructure as well as a broad range of other applications
- Data are acquired by the private sector, creating jobs
- Data programs are “shovel ready”
- The Federal and industry capacity exist to execute and deliver
- Data acquisition is easily accounted for and auditable
- No new O&M tail is required
- We have shown success before with ARRA – a proven process
3DEP FY20 Summary

Data are available or in progress for ~78% of the Nation

*includes lidar and AK IfSAR

Data acquisition investments by all partners, by fiscal year
Statewide Completion
Alaska IfSAR

- 100% of the State is complete
- Data available for download on The National Map and the state of Alaska elevation portal
# Remaining Areas

## End of FY20

<table>
<thead>
<tr>
<th>Data Acquisition</th>
<th>Cost to Complete</th>
<th>Area (sq. mi.)</th>
<th>% of cost</th>
<th>% of remaining area</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOI</td>
<td>$67.4M</td>
<td>195,395</td>
<td>23%</td>
<td>22%</td>
</tr>
<tr>
<td>Other Fed</td>
<td>$54.4M</td>
<td>124,996</td>
<td>19%</td>
<td>14%</td>
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<tr>
<td>Non-Federal</td>
<td>$171.5M</td>
<td>555,069</td>
<td>59%</td>
<td>63%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$293.2M</strong></td>
<td><strong>875,460</strong></td>
<td>100%</td>
<td>100%</td>
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</tbody>
</table>
3DEP FY21 Partnerships
Status (as of 4/14)

- Completed FY21 Broad Agency Announcement proposals
- Received 27 proposals in 14 states
- Accepted 18, shown in orange

- Working with Federal partners to develop acquisition plan for remaining funding, shown in bright green
Critical Minerals and Energy Collaboration

- FY20 GeoDAWN: Geoscience Data Acquisition for Western Nevada collaboration for lidar and aeromagnetic data collection
- FY21 collaboration focused on California’s Imperial Valley and Salton Sea
  - DOE Geothermal Technologies Office
  - USGS EarthMRI, Earthquake Hazards Program and 3DEP
  - BLM
  - NRCS
  - In collaboration with California Energy Commission and Department of Conservation
- Potential future collaboration for areas of undiscovered hydrothermal

GeoVision Study – Undiscovered Hydrothermal
https://openei.org/apps/geovision/
Over 300 3DEP partners including 18 Federal agencies and >250 state and local governments

(Partial listing)
3D Elevation Program (3DEP)

**Governance**

- USGS and NOAA co-lead the OMB A-16 Elevation Theme
- 3DEP Executive Forum
  - Facilitates executive collaboration on strategies to fund and implement 3DEP for the benefit of all its stakeholders
  - Executive Outreach to Industry Partners and Stakeholder Groups
  - Provides direction to 3DEP Working Group
- 3DEP Working Group - Coordinates implementation of 3DEP

**Member Agencies**

- Bureau of Land Management
- Department of Homeland Security
- Department of Transportation
- Environmental Protection Agency
- Federal Aviation Administration
- Federal Communications Commission
- Federal Emergency Management Agency
- US Forest Service
- US Fish and Wildlife Service
- National Oceanic and Atmospheric Administration
- National Park Service
- Natural Resources Conservation Service
- Office of Surface Mining Reclamation and Enforcement
- US Department of Agriculture
- US Army Corps of Engineers
- US Geological Survey
- American Association of State Geologists
- National States Geographic Information Council
Accelerating the 3DEP Unified Plan

Refining and Strengthening Federal and State Best Practices

3DEP For The Nation Information Hub

3DEP For The Nation (3DEP FTN) is a NSGIC and U.S. Geological Survey (USGS) 3D Elevation Program (3DEP) cooperative effort to address the need for high-quality topographic data and three-dimensional representations of the nation’s natural and constructed features. The project engages the NSGIC network of state geospatial information representatives to explore options and share information about 3DEP data planning, acquisition, management, distribution, and application.

To learn more, view the “3DEP: By The States, For The Nation” webinar and join the 3DEP Interest Group and/or the 3DEP State Team at MyNSGIC.

State 3DEP Profiles

View Dashboard showing both cumulative and individual states 3DEP status.

3DEP Resource Library

Access Federal and State 3DEP resources.

Applications of 3DEP Data

Access 3DEP Case Study and Software resources.

3D Elevation Program—Federal Best Practices

Introduction

The purpose of the 3DEP Program (3DEP) is to compile nationwide data acquisition and data products that support the United States’ needs for geospatial information to make informed decisions. The objectives of the 3DEP Program are to:

- Create a comprehensive set of 3D elevation data across the United States to support a wide range of applications.
- Provide high-quality, high-resolution 3D elevation data that can be used to improve decision-making processes.
- Enable stakeholders to access and use 3D elevation data for a variety of applications.

U.S. Geological Survey (USGS) performed an assessment of the current and potential 3D elevation data needs and found that the United States has a need for more detailed and accurate 3D elevation data to support various applications.

3D Elevation Program Federal Best Practices

3DEP Program’s implementation requirements of understanding:

- Assign program responsibilities to 3DEP Executive Forum and Working Group.
- Acquire data through the 3DEP data acquisition process and provide a comprehensive set of data products.
- Implement an agency policy to work within the United States’ 3DEP plan for data acquisition and sharing.
- Coordinate internally and externally to define roles, responsibilities, and data acquisition procedures.
- Provide input and support to improve the 3DEP process.
- Participate in 3DEP budget initiatives and submit a 3DEP budget line item.
- Report 3DEP progress to budget council (or on-time performance agencies).
- Ensure 3DEP agency contributions to maintain an open and transparent public process.
- Participate in meetings and workshops to understand data needs and work with other agencies to advance national 3DEP goals.
- Monitor and report on each agency’s performance through quarterly 3DEP data quality and completeness reports and field visits.
- Participate in the 3DEP Data Quality and Management Board.
- Ensure effective and efficient coordination and collaboration with other agencies to advance national 3DEP goals.
National Landslides Preparedness Act (P.L. 116-323)

Authorizes the 3D Elevation Program and Establishes Governance

- In addition to the 3DEP Subcommittee under NGAC, the act establishes a 3DEP Federal Interagency Coordinating Committee, chaired by the Secretary of the Interior in coordination with the Secretary of Commerce and the Secretary of Homeland Security including:
  - Agriculture
  - Commerce
  - Homeland Security
  - National Science Foundation
  - Office of Science and Technology Policy
  - Office of Management and Budget
  - The head of any other Federal department or agency, at the request of the Secretary

- Within a year, the coordinating committee will develop a strategic plan and a management plan to implement the strategic plan
National Landslides Preparedness Act (P.L. 116-323)

Goals for 3DEP FICC and NGAC Subcommittee

- Merge/evolve 3DEP Executive Forum with/to the FICC; ensure that the 3DEP Working Group is linked in
- Encourage engagement at highest levels of DOI, DHS and DOC and listed agencies; invite new agencies to participate
- Evolve towards broader coordination for the future direction of the 3D National Topography Model (3DNTM)
- Potential topics for both groups
  - New applications, partnerships
  - Funding
    - What creative funding options should we be looking at to complete nationwide coverage?
    - How can we fund completion of Federal lands where the agencies do not have 3DEP funding?
  - Feedback on products and services delivery
  - Future directions
    - Input on the 3D National Topography Model
    - Recommendations on research and future implementation of the 3D data model
3DEP Future Generation Just Around the Corner

3D Nation Elevation Requirements and Benefits Study

- Working with NOAA to understand inland, nearshore and offshore bathymetric data requirements and benefits
- Plan for the next round of 3DEP when the first-ever national baseline of consistent high-resolution data is in place – what is needed for monitoring, change detection and other new applications?
- Gather technology-agnostic user information to be able to assess new technologies against requirements and identify the tradeoffs between different approaches

- Results will lead to a completely new approach regarding QLs, refresh frequency by geography, products offered, and other changes
3D Nation

Building a modern elevation foundation – from the peaks of our mountains to the depths of our waters – for stronger, more resilient communities and U.S. economy

- To be relevant in the 21st century accurate 3D maps are a requirement for a GPS-enabled Nation
- Maps, including geodetic and elevation data, must be accurate to within centimeters
- A national mapping framework must be continuous
- Our citizens increasingly expect coordinated and integrated products
3DNTM: Next Generation of Integrated Data

Topography is defined by elevation and hydrography; elevation shapes hydrography, and hydrography shapes elevation. To support a broad range of applications, the 3D National Topography Model integrates USGS elevation and hydrography datasets to model the Nation’s topography in 3D.

Next Generation NHD: 3D Hydrography Program (3DHP)

- Operationalize deriving hydrography from lidar/IfSAR
- Enable better accounting of the hydrologic cycle by adding connections to groundwater, engineered hydrologic systems and wetlands
- Fully implement the National Hydrography Infrastructure as the universal mechanism for sharing and discovering water information

Next Generation 3D Elevation Program (3DEP)

- Operationalize inland bathymetry
- Collect new data based on landscape change, evolving user needs and technology, vegetation structure
- Enable monitoring and change detection by comparing baseline with new vintages of data
3DNTM: Supports the Nation’s Critical Applications

Topography is defined by elevation and hydrography; elevation shapes hydrography, and hydrography shapes elevation. To support a broad range of applications, the **3D National Topography Model** integrates USGS elevation and hydrography datasets to model the Nation’s topography in 3D.

- Delivers the terrestrial component of the 3D Nation vision of a continuous data surface from the depths of the oceans to the peaks of the mountains
- Provides foundational data to critical initiatives
  - FEMA Future of Flood Risk Data and Risk Rating 2.0
  - The National Water Model
  - The Clean Water Act
  - National Landslides Preparedness Act
- Underpins a broad range of applications including flood risk management, hazards response and mitigation, infrastructure management, climate change science, and more
- Provides universal discovery and sharing of water information as the geospatial foundation for the Internet of Water
- Enables new and emerging applications
  - Multiple vintages enable change detection
  - Water-related applications move from the neighborhood to the street-level in accuracy

**The National Map**
Your Source for Topographic Information
Bismarck, ND

3D Elevation Program (3DEP)

THANK YOU!