**USFS – NASA Virtual Pitch Fest / June 2, 2020**

*National Canopy Height Layer (1m) and Dataset of Individual Tree Objects*
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# About Me

National Program Lead – Monitoring, Remote Sensing, and Geospatial Analysis Research
USFS R&D Inventory, Monitoring, and Assessment Research

2018 Farm Bill – "continue to find efficiencies in the operations of the forest inventory and analysis program … through the improved use and integration of advanced remote sensing technologies to provide estimates for State and national-level inventories, where appropriate; and partner with States and other interested stakeholders …"

USFS R&D scientists
GTAC
NRCS
MRLC – USGS/NOAA/USDA
NASA
Univ. of Vermont, Virginia Tech, Colorado State University, Univ. Washington

# The Idea

- **National Canopy Height Layer (1m) and**
- **Dataset of Individual Tree Objects**

Image courtesy of Jarlath O'Neil-Dunne, Univ. of Vermont

# The Idea

- **Create and maintain a nation-wide one-meter multi-temporal canopy height model layer based upon available:**
  - Lidar data (airborne and satellite),
  - Digital stereo high-resolution imagery
  - Radar
- **Build individual tree objects – manage objects rather than pixels.**

Image courtesy of Jarlath O'Neil-Dunne, Univ. of Vermont

# Issues being addressed

- **Carbon sequestration and flux**
- **Forest health**
- **Forest stand management**
- **Fuel loading**
- **Urban tree canopy management**
- **Vegetation mapping and assessment**
- **Watershed restoration**
- **Wildfire impacts**
- **Wildlife habitat**

**The Idea**
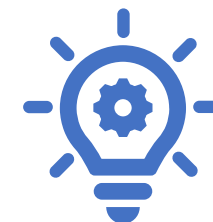
Issues Addressed

# What EO data does your idea utilize?

- **LiDAR**
- **High spatial resolution stereo R-G-B-NIR**
- **NAIP**
- **G-LiHT**
- **ICESat-2**
- **UAVSAR**
- **SRTM**
- Uncertain - looking for guidance

## The Idea

Earth Observation Tools

Image courtesy of Jarlath O'Neil-Dunne, Univ. of Vermont

# The Idea – Outcomes / Societal Benefits

- Better forest estimates for State and national-level inventories leading to better resource management decisions.

- Specifically, for the Forest Service this will support: small area estimation, enhance timber products monitoring, improve carbon and biomass estimates, allow for more precise land cover and change estimates, allow for more precise urban inventory, and recovery assessments.

- Using tree-objects the potential exists to change from a predominantly pixel-based paradigm to an object-based paradigm for focusing new analytical techniques – 380 billion trees vs 40 terapixels

Image courtesy of Jarlath O'Neil-Dunne, Univ. of Vermont

Thank You!

NAIP Lidar Hybrid data courtesy of Jason Stoker USGS