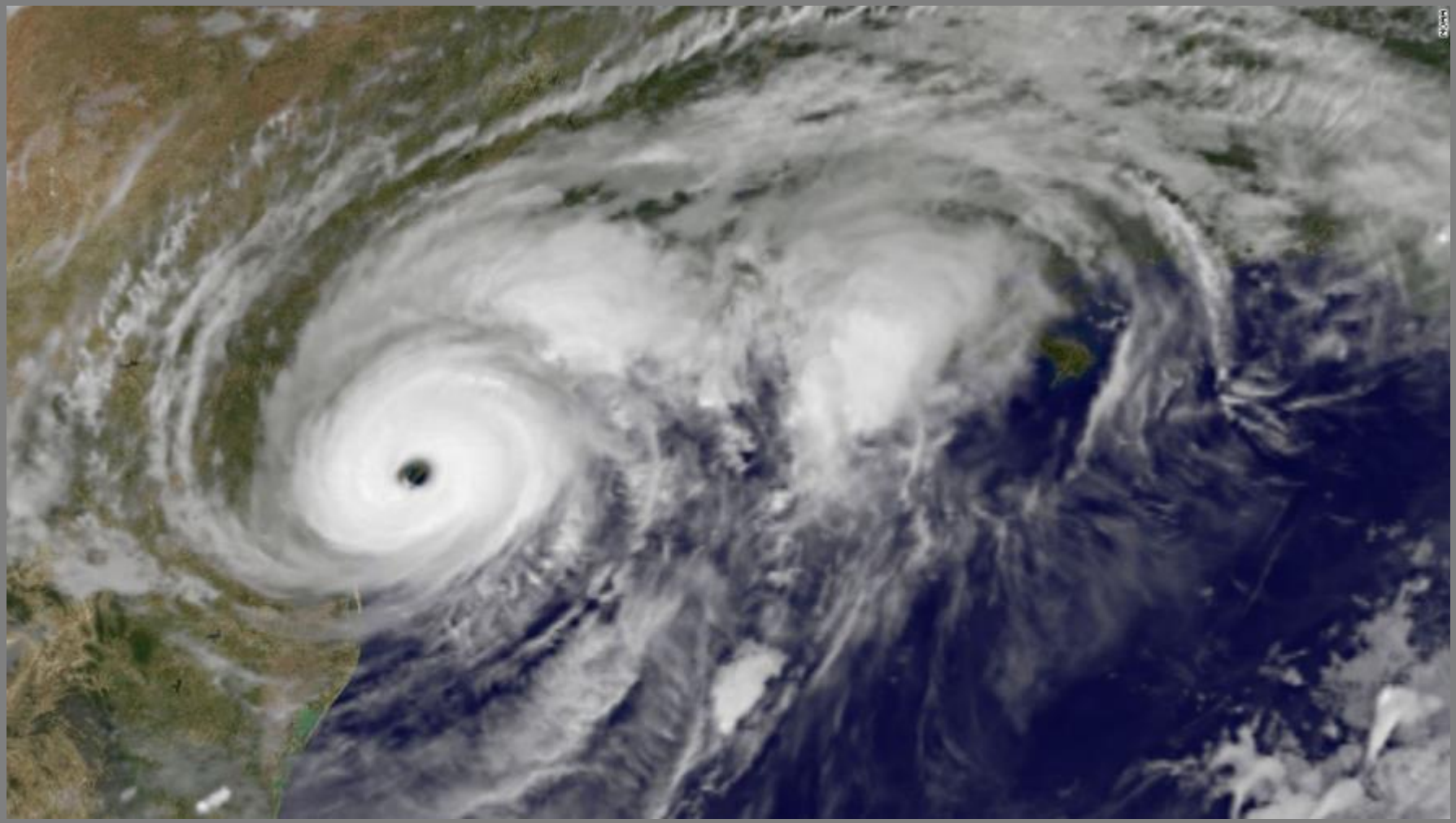
Mapping Technologies After Hurricane Harvey

FEMA

September 2018

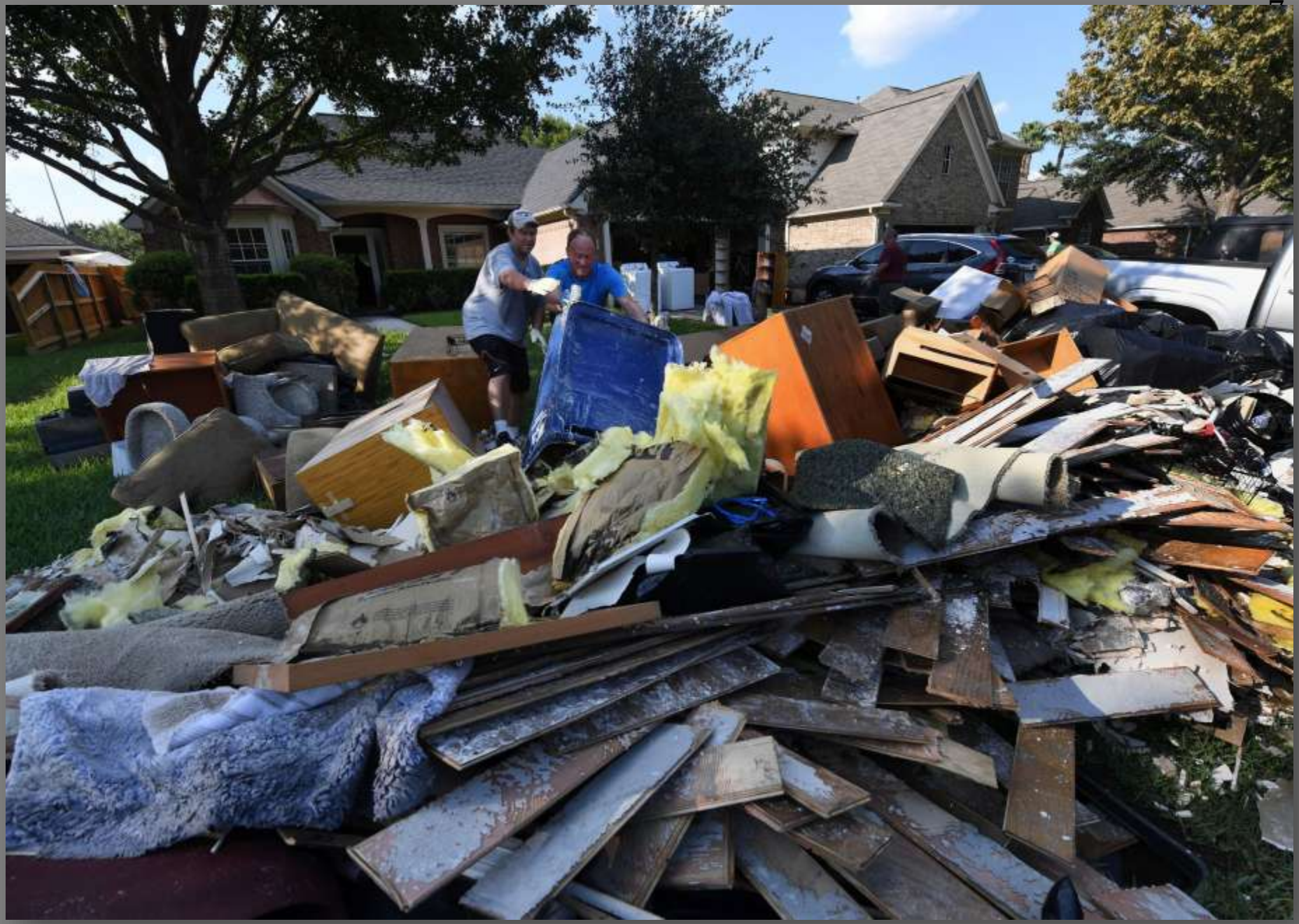
Hurricane Harvey



CNN

Mashable

NPR



Houston Chronicle

NBC

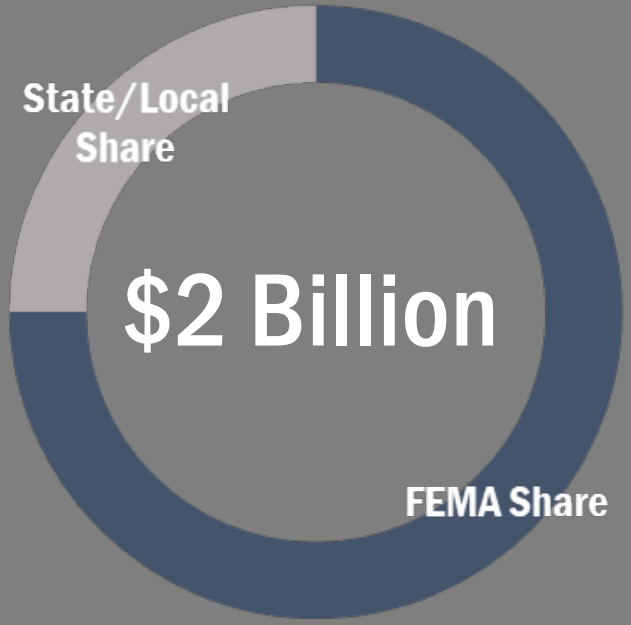
WTOP


200-300 million cubic yards of debris
50-80 football stadiums

Quantify and Classify

Determine Ownership

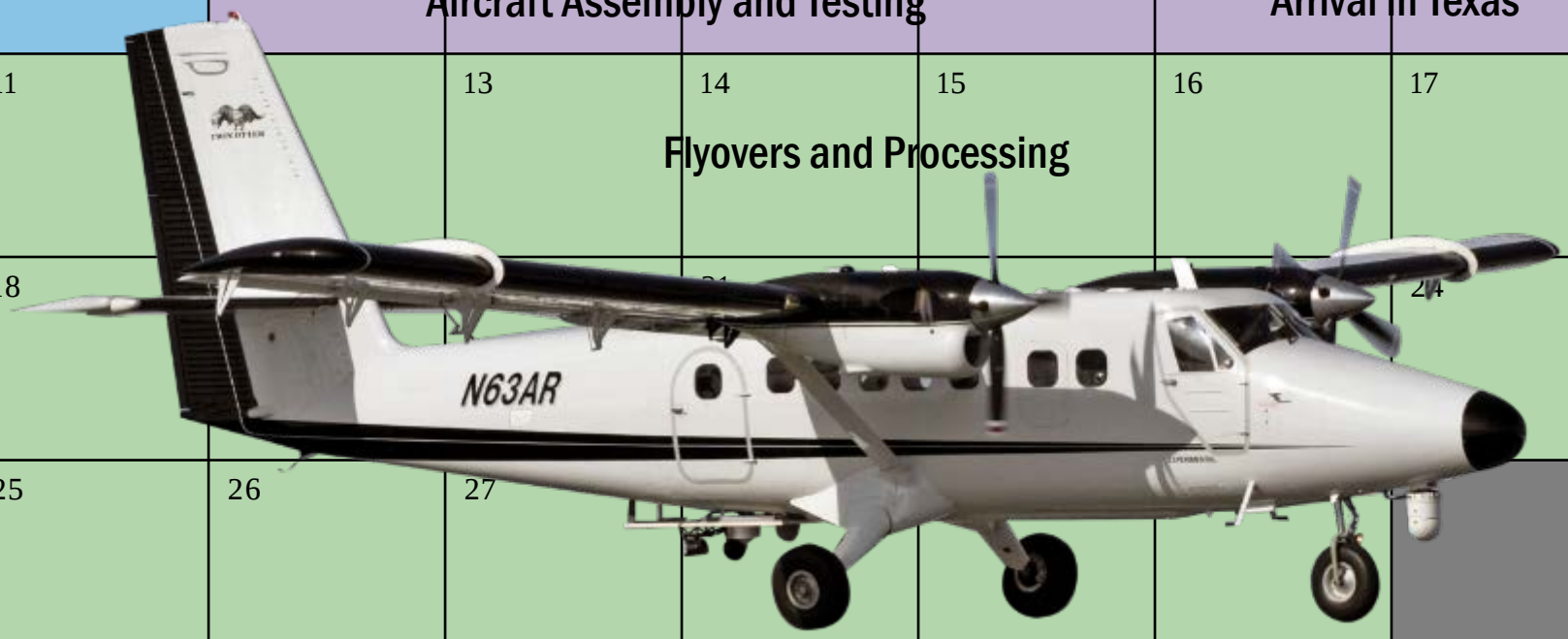
Monitor Removal and Costs



LIDAR Technology After Hurricane Harvey

Application and Testing

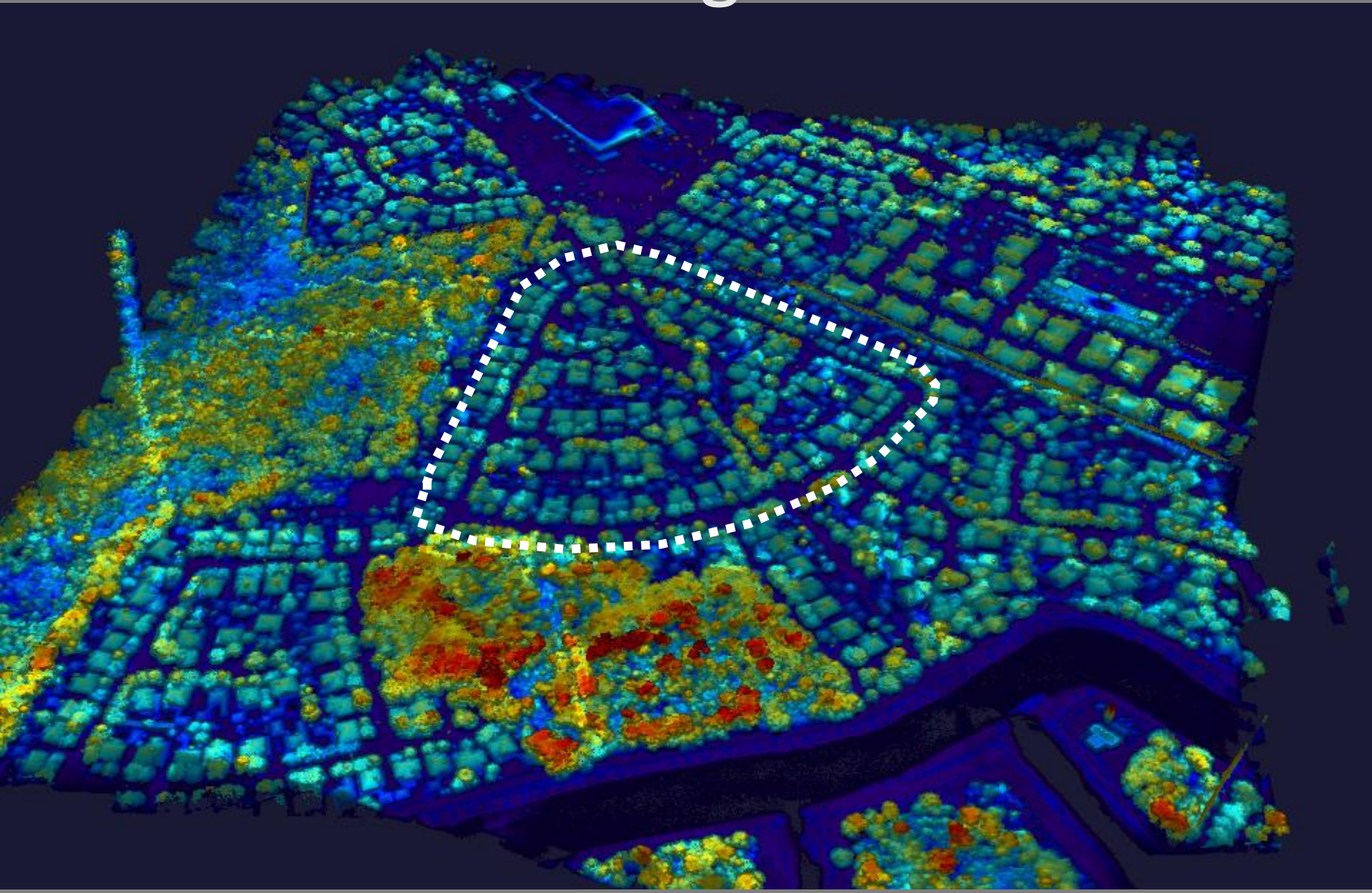
21 August	22	23	24	25 Harvey batters Texas	26	27
28	29 FEMA/MIT LL Coordination	30	31	1 September	2 LIDAR Assembly and Testing	3
4	5 Aircraft Assembly and Testing	6	7	8	9 Arrival in Texas	10
11	13 Flyovers and Processing		14	15	16	17
18						24
25	26	27				



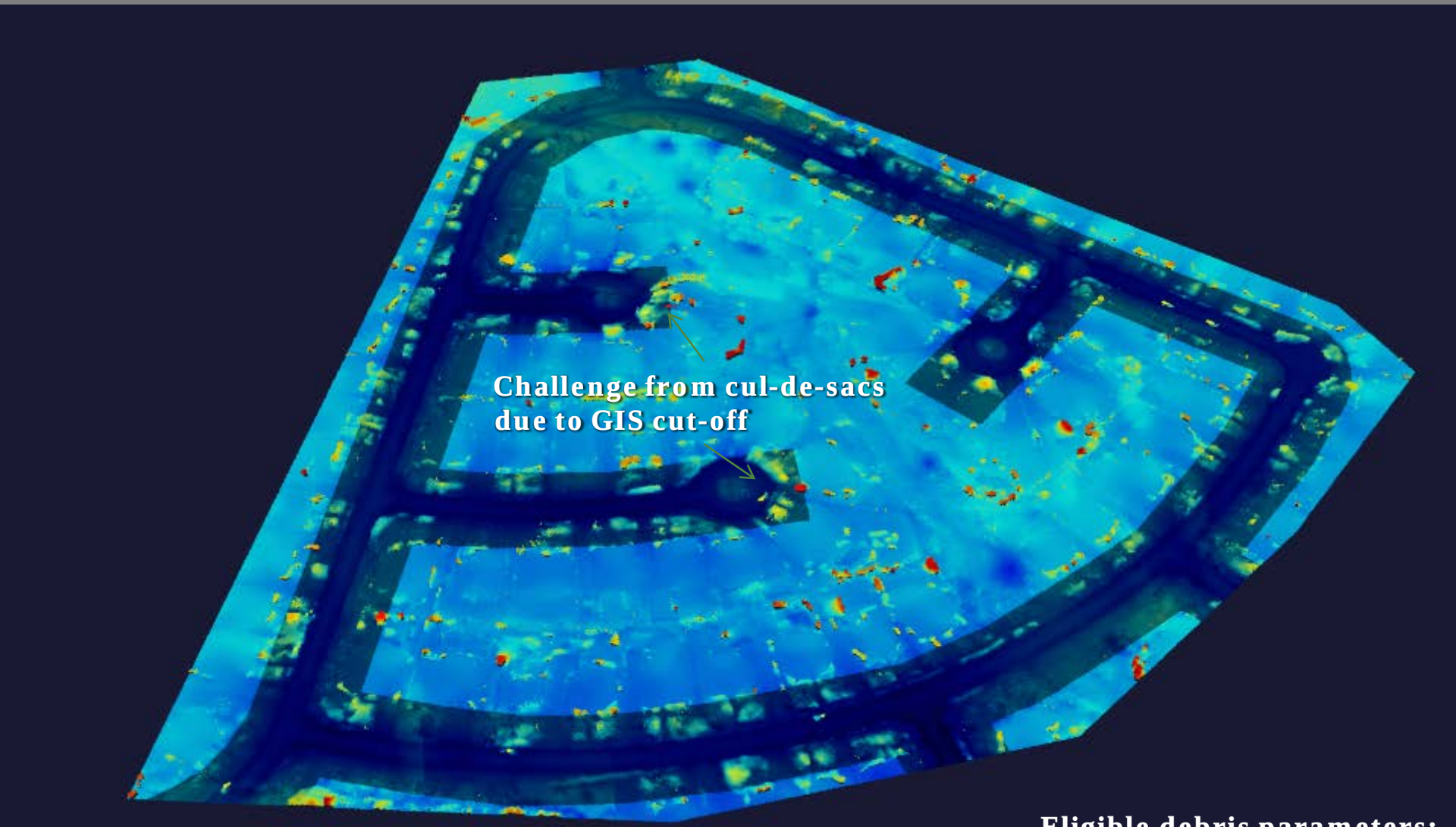
“Windmill Bluff” Neighborhood

Google Earth, August 2017

“Windmill Bluff” Neighborhood



Windmill Bluff Debris

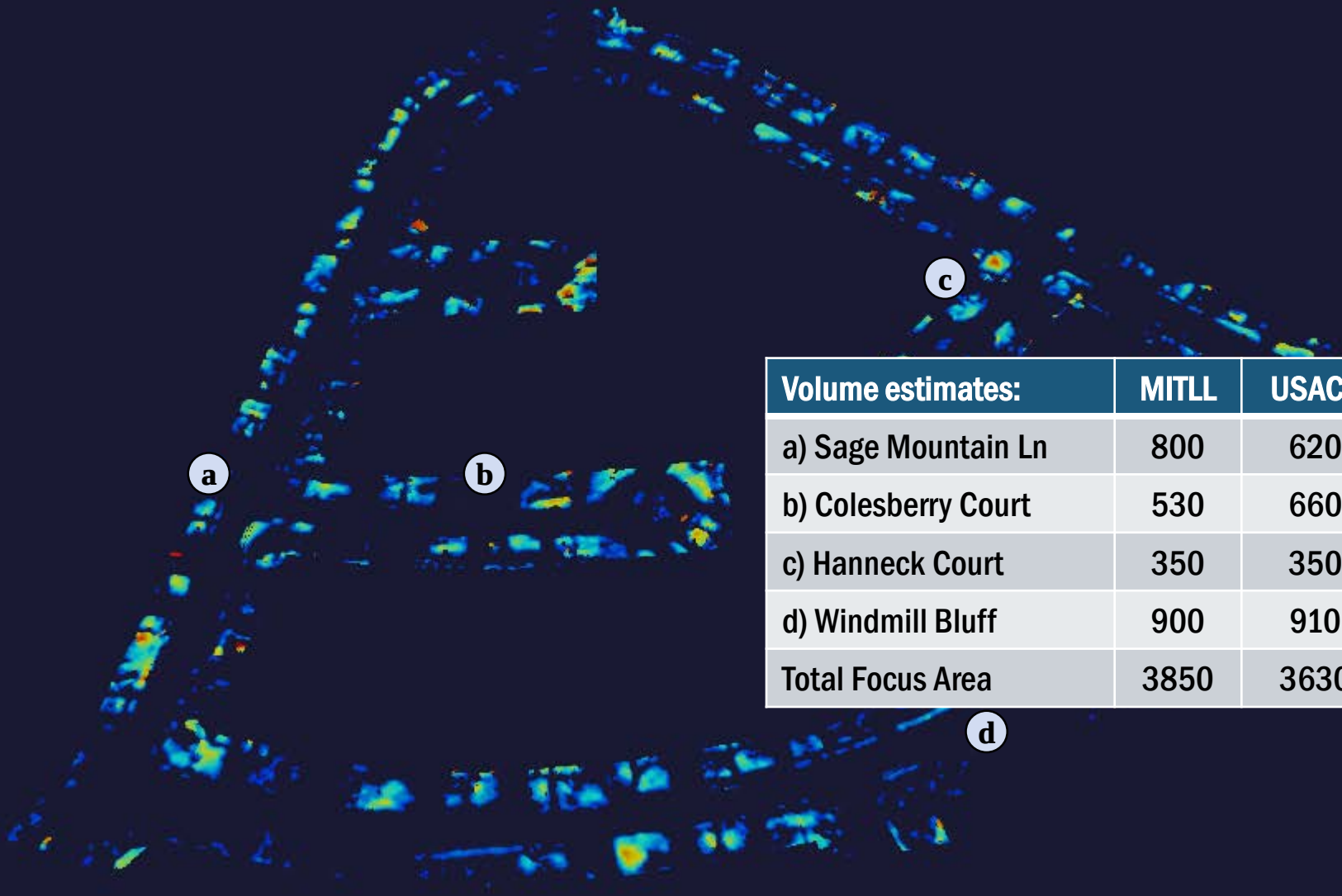


Colored by Elevation & GIS road-mask
Buildings + surrounds removed

Eligible debris parameters:

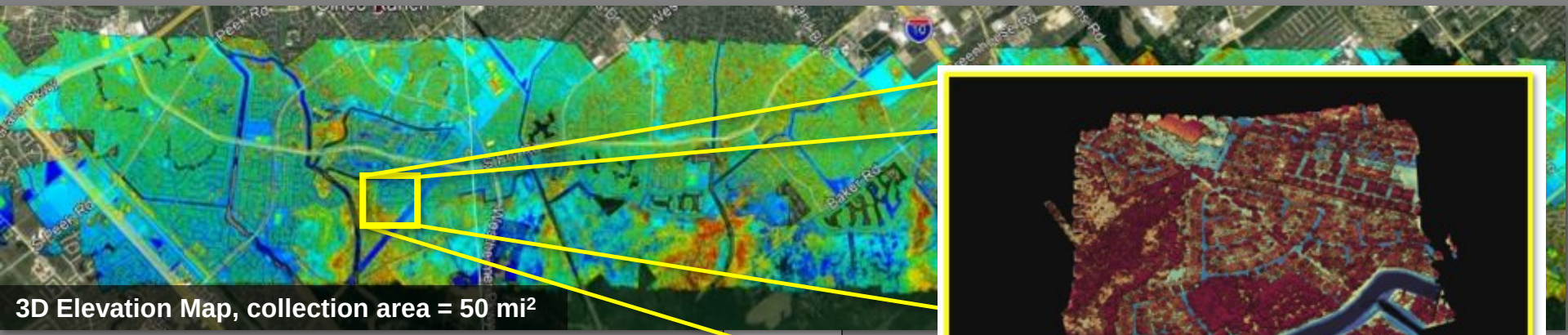
- **Up to ~30 ft from curb**
- **Up to ~6.5 ft in height**

Accuracy of Estimates

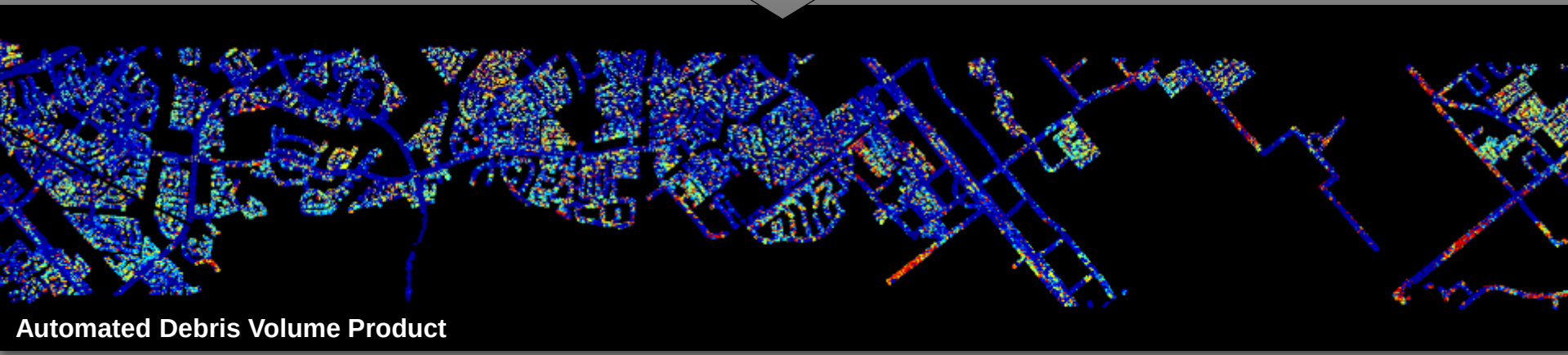


Volume estimates:	MITLL	USACE
a) Sage Mountain Ln	800	620
b) Colesberry Court	530	660
c) Hanneck Court	350	350
d) Windmill Bluff	900	910
Total Focus Area	3850	3630

Wide Area Debris Estimation



Algorithm for automated debris quantification



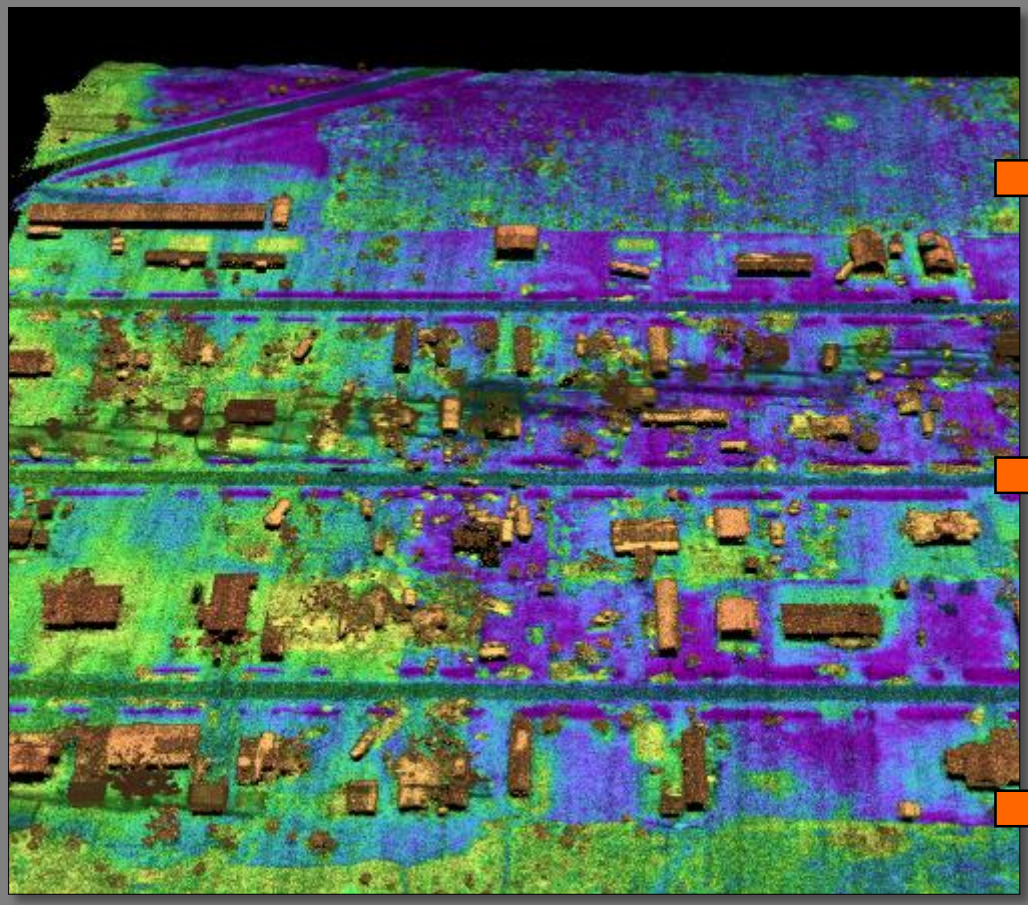
Demonstrated FOPEN debris quantification over wide-areas; USACE validated

FOPEN = Foliage penetration
USACE = U.S. Army Corps of Engineers

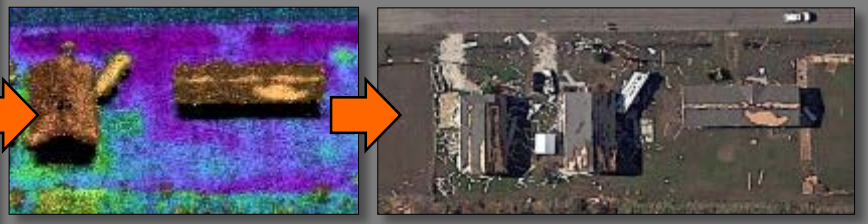
Other Potential Uses

Ongoing and Future

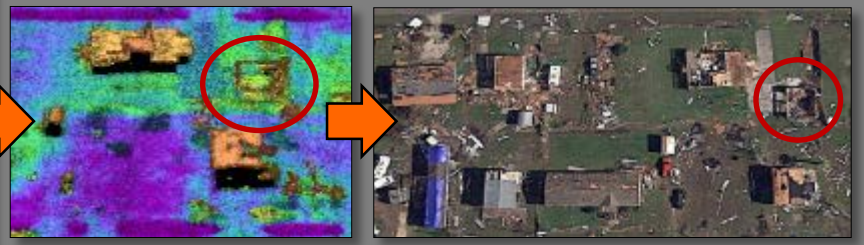
Wide Area Damage Assessment



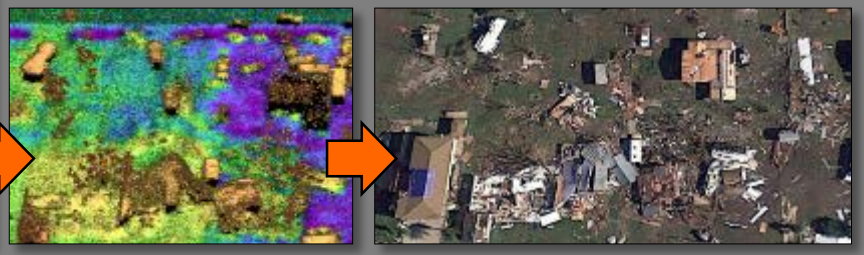
Moderate Damage (Roof)



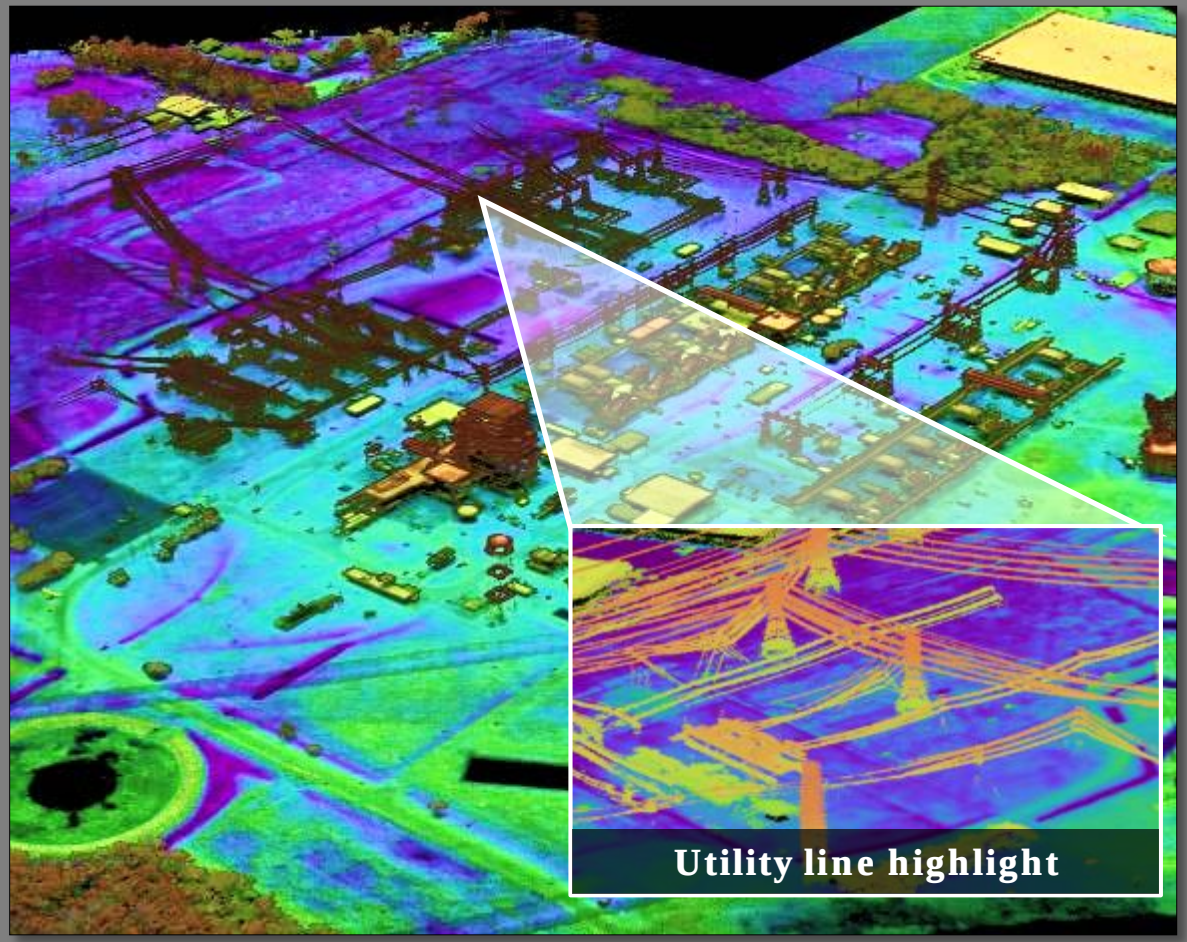
Major Structural Damage:

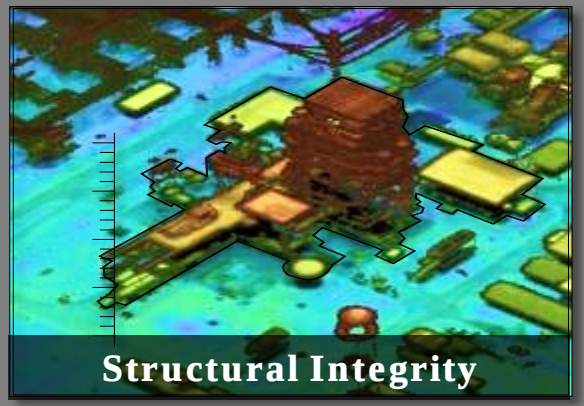


Total Loss:

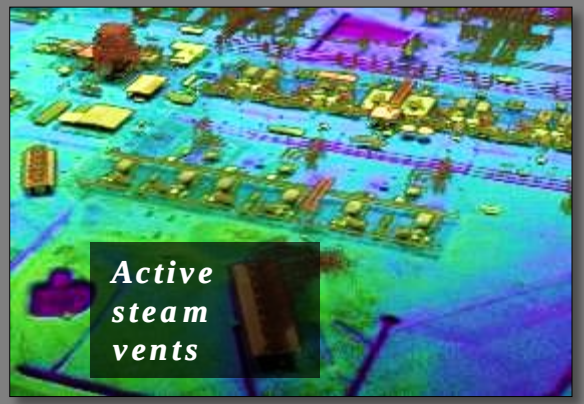


Critical Infrastructure Inspection





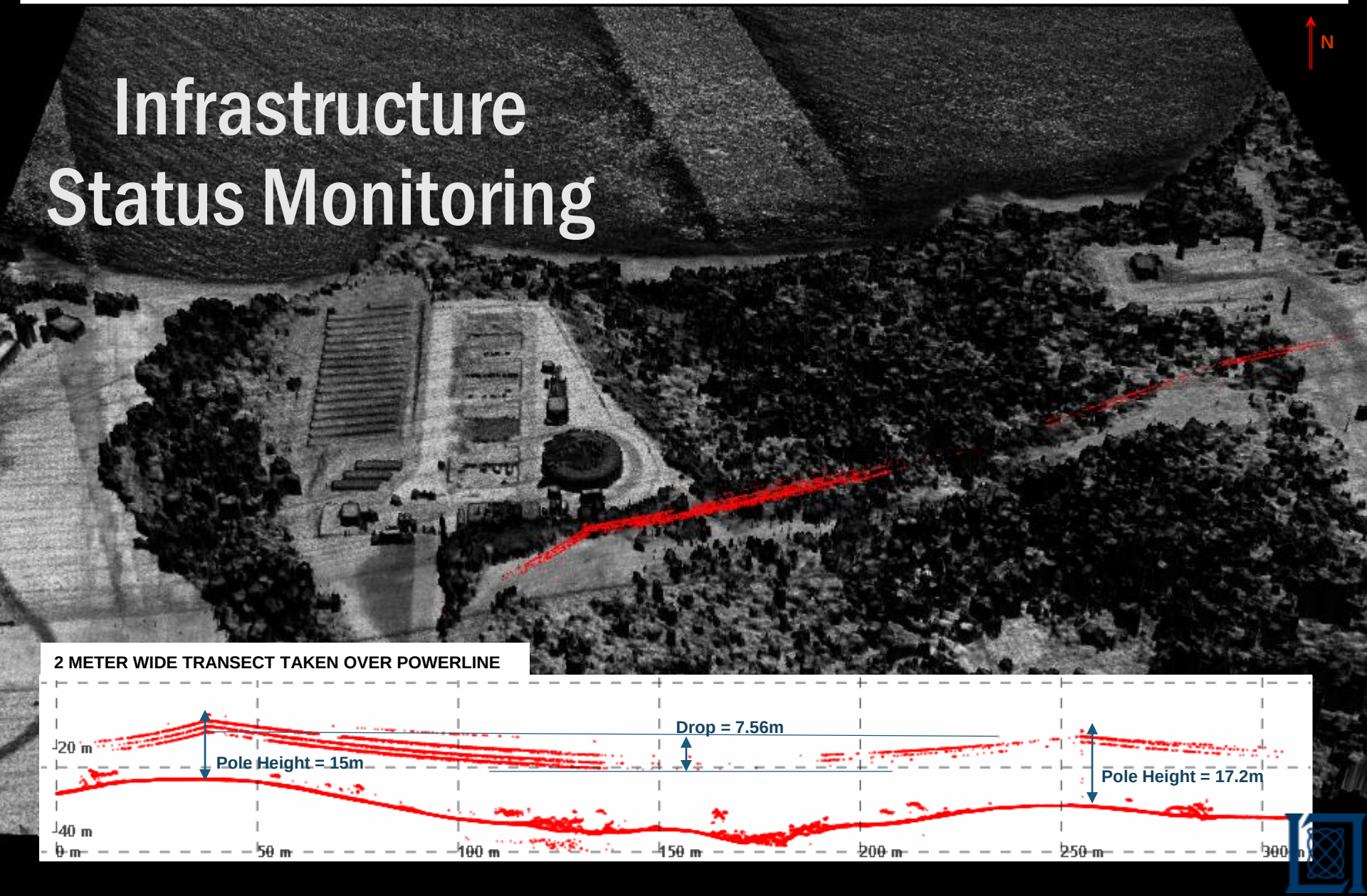
Activity Awareness:



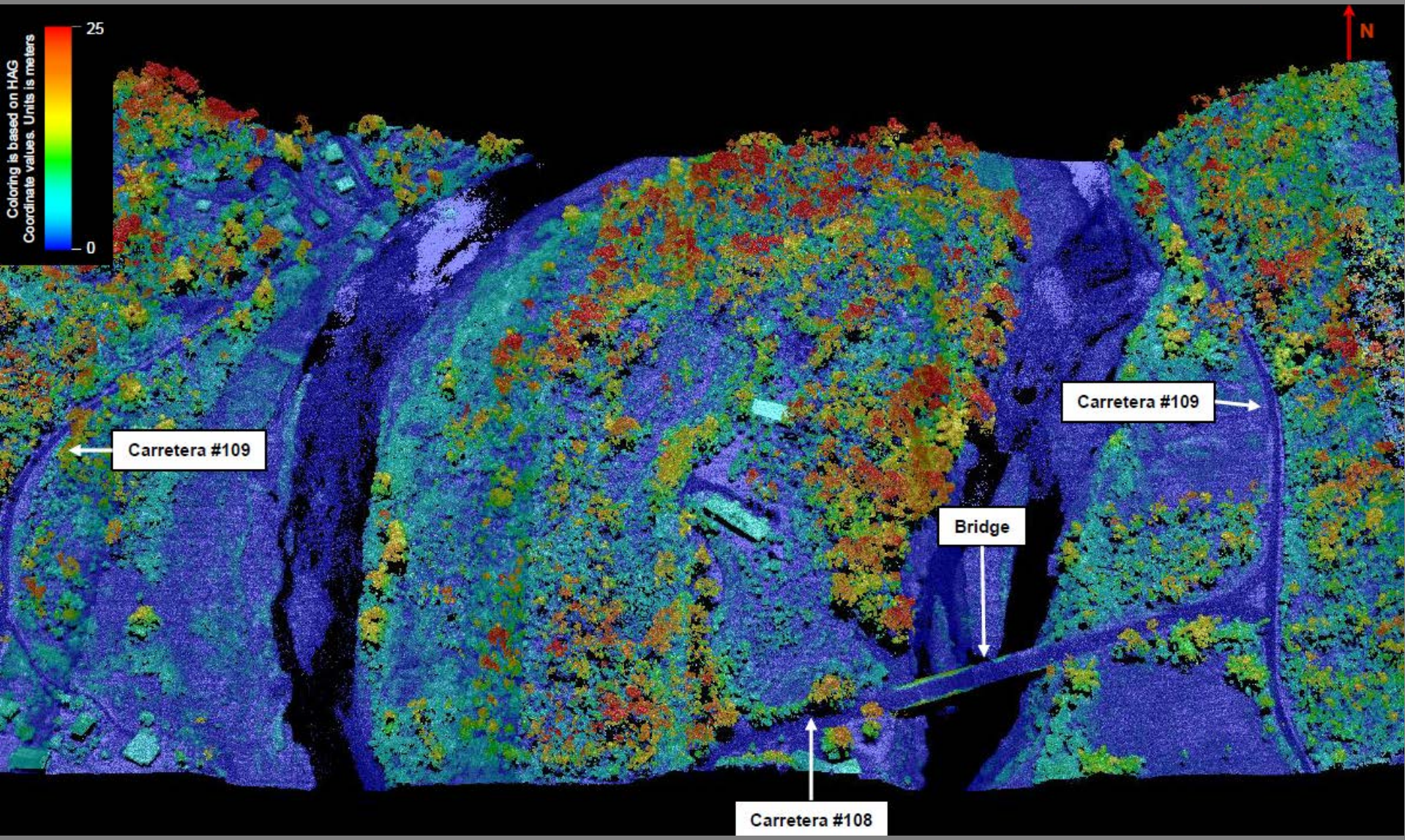
AOSTB Puerto Rico Product Examples

Power Line Details within AOI

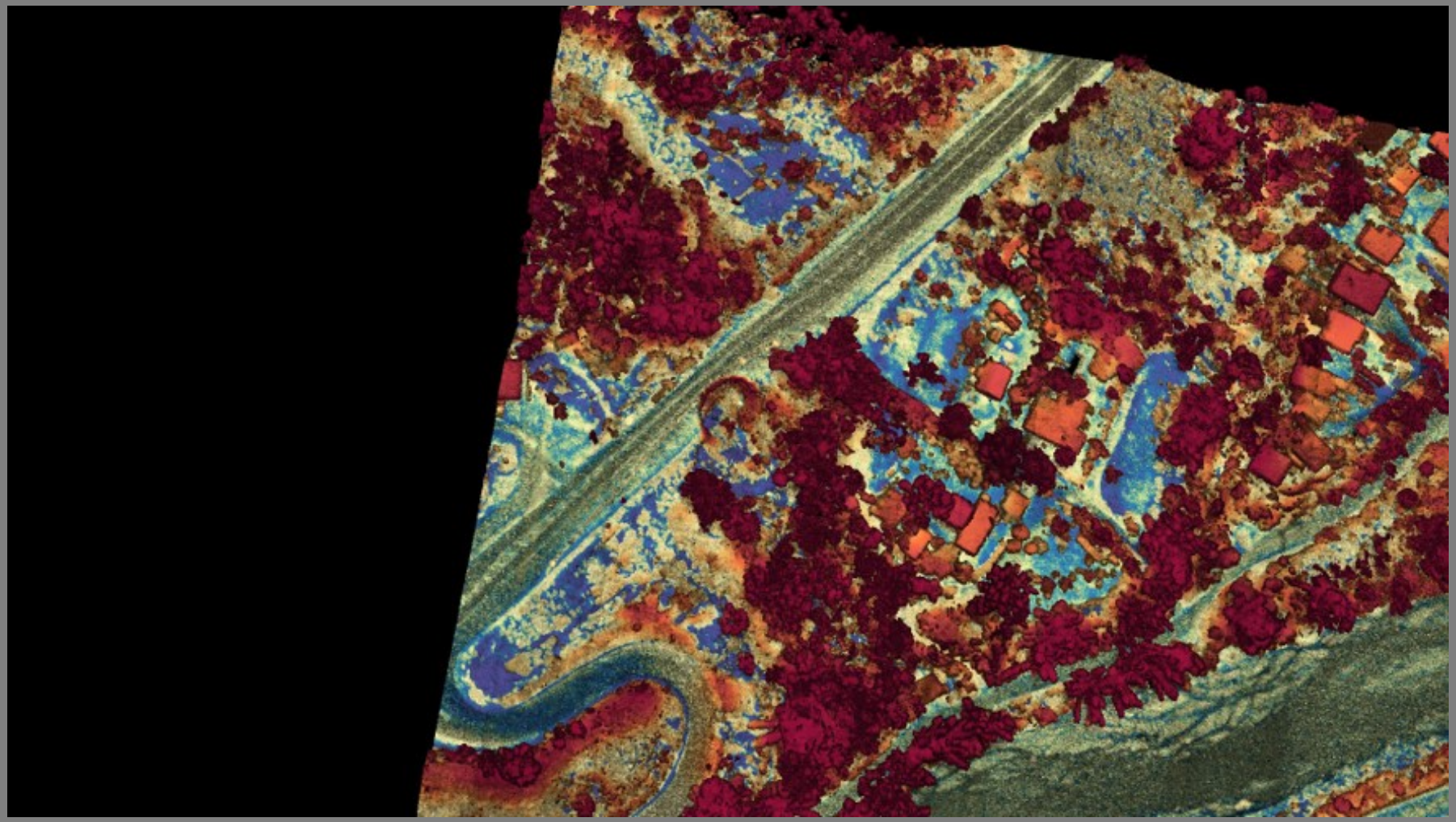
Vieques, Puerto Rico



Modeling Water Heights



Transportation Impacts



Grant Development

Preliminary Damage Assessment Report

New York - Flooding
FEMA-4348-DR

Declared November 14, 2017

On July 6, 201
flooding during
July 31, 2017.
Assistance for
August 3, 2017
(PDAs) were c
damages imme
determining wh
beyond the cap
assistance is ne

On November
New York. Th
state and eligib
basis for emerg
Jefferson, Niag
Hazard Mitigat
mitigation mea

Summary o

Individual Ass

- Total N

Des
Maj
Min
Affe

- Percent
- Percent
- Percent
- Total In

Public Assistance

- Primary Impact: Public parks, recreational facilities, and other facilities.
- Total Public Assistance cost estimate: $33,900,354
- Statewide per capita impact:[7] $1.75
- Statewide per capita impact indicator:[8] $1.46
- Countywide per capita impact: Cayuga County ($2.67), Jefferson County ($69.88), Monroe County ($0.40), Niagara County ($14.57), Orleans County ($23.97), Oswego County ($138.24), St. Lawrence County ($19.68), and Wayne County ($12.46)
- Countywide per capita impact indicator:[9] $3.68

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[1] The Preliminary Damage Assessment (PDA) process is a mechanism used to determine the impact and magnitude of damage and resulting needs of individuals, businesses, public sector, and community as a whole. Information collected is used by the State as a basis for the Governor's request for a major disaster or emergency declaration, and by the President in determining a response to the Governor's request (44 CFR. § 206.33).

[2] When a Governor's request for major disaster assistance under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (*Stafford Act*) is under review, a number of primary factors are considered to determine whether assistance is warranted. These factors are outlined in FEMA's regulations (44 CFR. § 206.48). The President has ultimate discretion and decision making authority to declare major disasters and emergencies under the Stafford Act (42 U.S.C. § 5170 and § 5191).

[3] Degree of damage to impacted residences.
- Destroyed – total loss of structure, structure is not economically feasible to repair, or complete failure to major structural components (e.g., collapse of basement walls/foundation, walls or roof).
- Major Damage – substantial failure to structural elements of residence (e.g., walls, floors, foundation), or damage that will take more than 30 days to repair.
- Minor Damage – home is damaged and uninhabitable, but may be made habitable in short period of time with repairs; and
- Affected – some damage to the structure and contents, but still habitable.

[4] By law, Federal disaster assistance cannot duplicate insurance coverage. 42 U.S.C. § 5155 and 44 C.F.R. § 206.48(b)(5).

[5] Special populations, such as low-income, the elderly, or the unemployed may indicate a greater need for assistance. 44 C.F.R. § 206.48(b)(3).

[6] Ibid. 44 C.F.R. § 206.48(b)(3).

[7] Based on State population in the 2010 Census.

[8] Statewide Per Capita Impact Indicator for FY18, *Federal Register*, October 1, 2017.

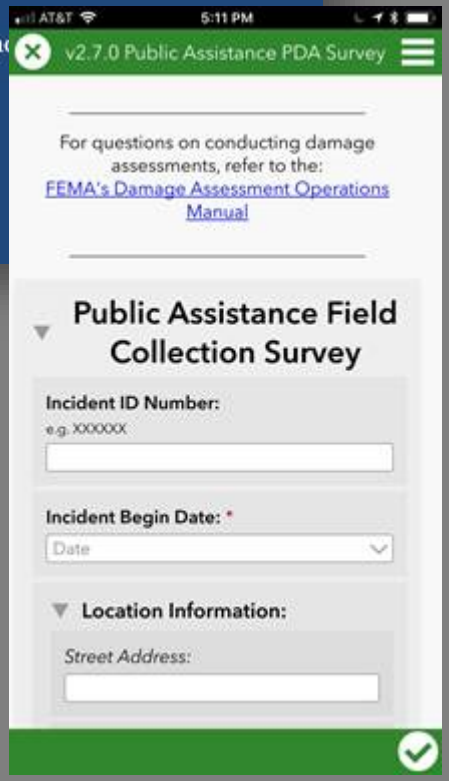
[9] Countywide Per Capita Impact Indicator for FY18, *Federal Register*, October 1, 2017.

Damage Assessment Operations Manual

A Guide to Assessing Damage and

April 5, 2016

Preliminary Damage Assessments

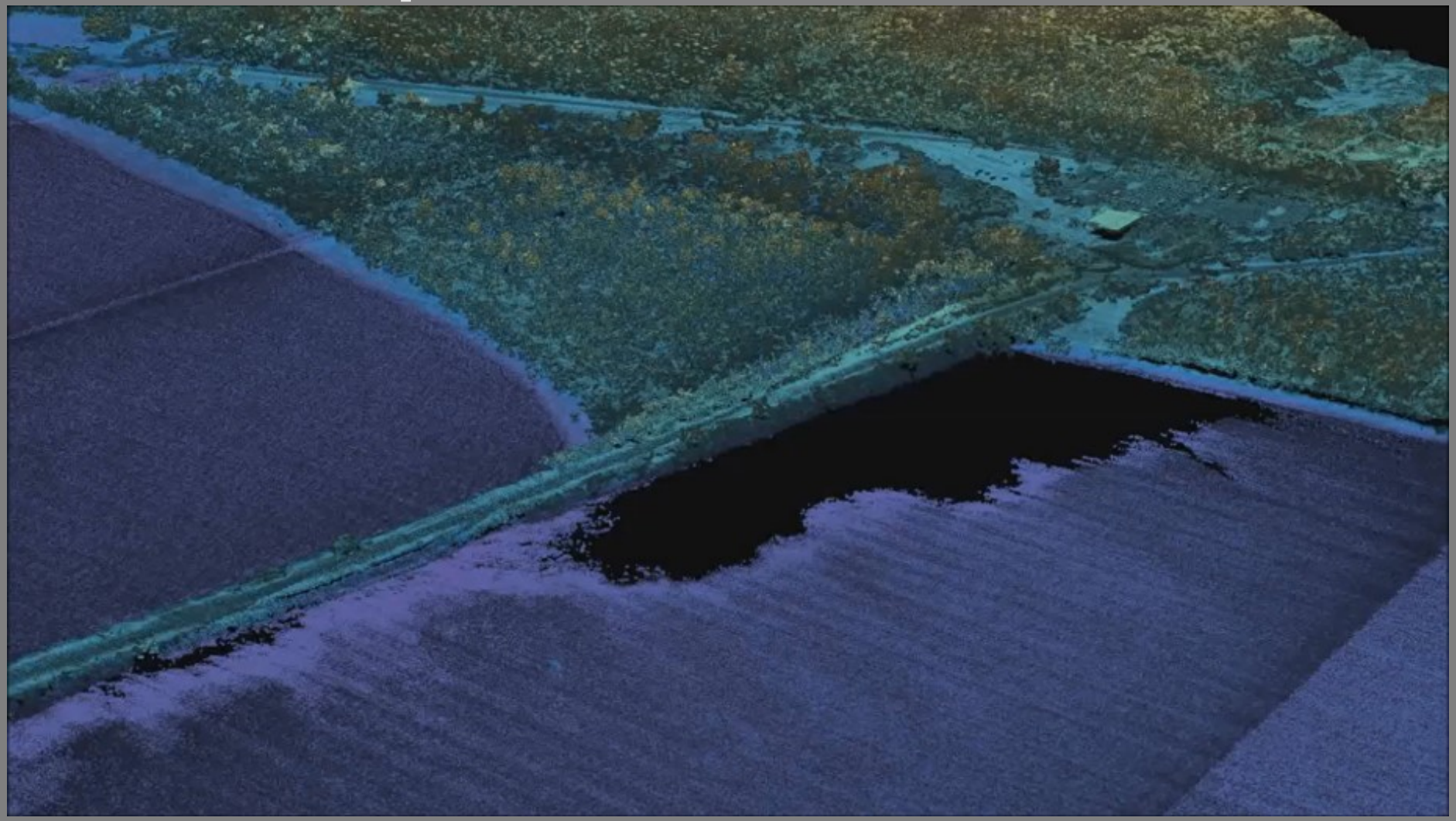


Potential Impacts

- ↑ Speed of assistance
- ↑ Accuracy of estimates
- ↓ Cost of delivering assistance
- ↓ Manpower required

Challenges

Next Steps



Questions?