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# The role of Geospatial data analysis in hurricane resiliency

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Toa Alta, Puerto Rico on Sept. 24, 2017,  
4 days after hurricane Maria.  
AFP photographer Ricardo Arduengo.



Source: National Geodetic Survey

# Land Surveyor: a complete geospatial professional

The professional skills and knowledge of the land surveyor can be leveraged to help the global community as it grapples with issues regarding infrastructure resilience.







# Let's share

4 important questions need to be answered.

- What do we need from data models to help with utility resiliency and critical infrastructure response?
- What type of data is needed for each objective?
- What data/modelling already exists?
- What data/modelling is needed?

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**Spatial monitoring and measuring.** Precise spatial measurement assists not only in monitoring the impacts of natural disasters but is also an essential element in adaptation strategies.



# Land Surveying role in Utility Resilience

Photo by Topographic Engineer  
Rigoberto Moreno, Mexico





# Utility Resilience: Electricity

Land Surveyors can ensure the exact and precise position (location) and layout of all the design and reconstruction elements regarding the construction or restoration of transmission and distribution lines that provide electric power.

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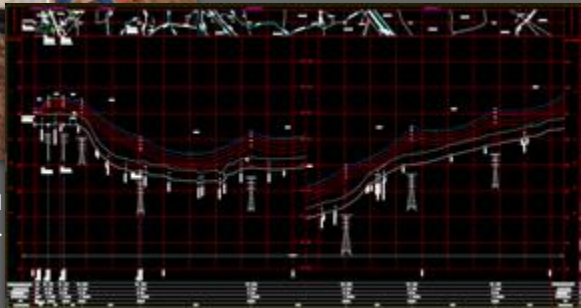
Transmission structure damage assessment.



Field data acquisition for new line design.



New route establishment.



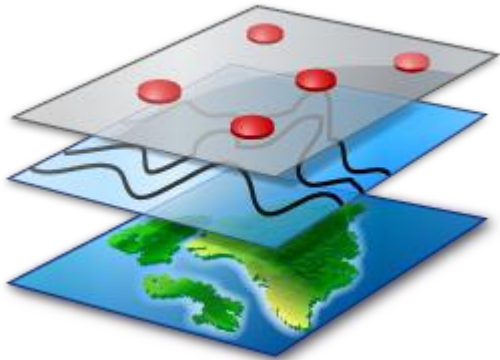
Topographic and electrical lines plat.

## Types of Geospatial data needed:


- Possible hurricane path
- Damage lines
- Access routes
- Parcels
- Communities
- Satellite images
- UAV images



# Geospatial data platform



- A one-stop place that delivers trusted, consistent data and services.
- Authoritative data to support informed decision making.
- Reusable applications and services for governmental and nongovernmental use.
- A shared infrastructure that can host your data and applications.
- A focal point where governmental, academic, private, and public data can be visualized together to inform \_\_\_\_\_ national and regional issues.



# Land Surveying role in Critical Infrastructure Response

Photo by Land Surveyor Vladimir Toledo,  
Puerto Rico





# Critical Infrastructure response: Water

When it comes to constructing the infrastructure required to conserve and deliver water to where it is needed (e.g., dams, canals and pipelines) it is the land surveyor who provides the precise measurement data needed to ensure the success of such projects.



# Guajataca Dam after hurricane Maria

Water accumulation  
Spillway failure

Land surveying techniques:  
Topography - As-built -  
Monitoring - UAVs

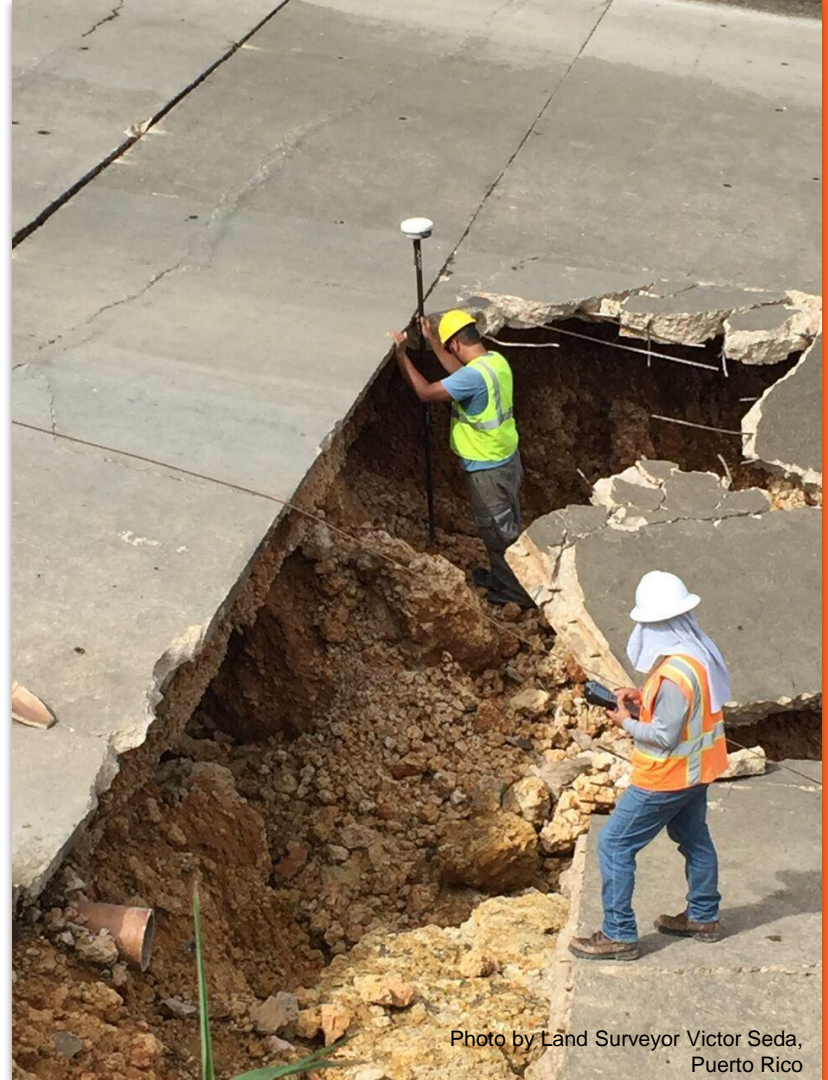


Photo by Land Surveyor Victor Seda,  
Puerto Rico

# What do we need from this data?

**Precision**

**Availability**

**Spatial database  
systems  
Frameworks**

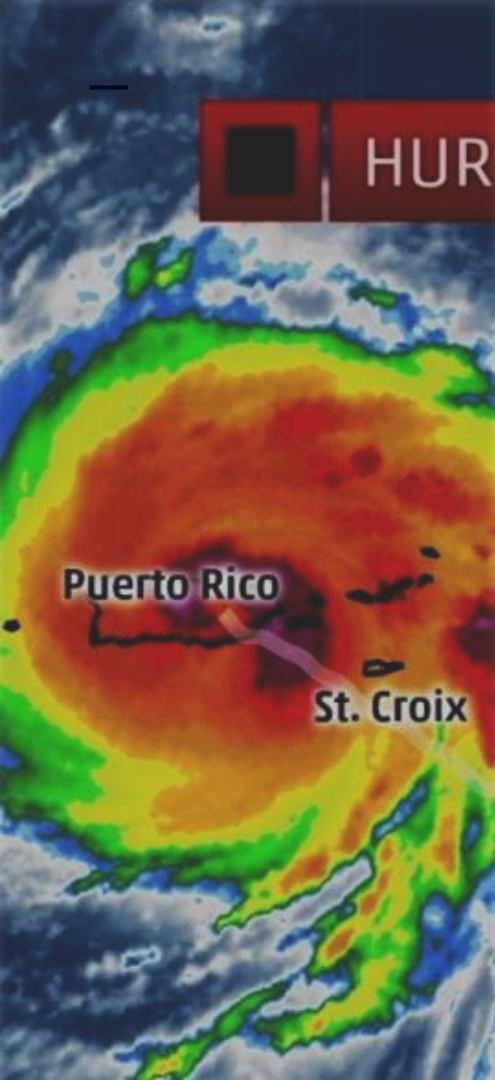
# What type of data is needed?

- Updated data
- FGDC compliance

- Land management platform
- Spatial information management

- Data modelling systems for managing spatial data





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## What do we *have* vs. What do we *need*

1. Gap between the core data and the information needed by decision makers.
  2. Geospatial data outdated, under no standards, not available, managed by anyone.
  3. Data not centralized, no sharing culture.
1. A geospatial platform that will provide a land information system to be used in assisting the government in developing policies.
  2. Multi-level collaboration.
  3. Allow the experts to be in charge of data collection, management, and interpretation.
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**“Good coordination  
begins with good  
coordinates.”**

**- D. Doyle**