

# National Roundtable

## Emerging Technology for Daily Operations and Crisis Management

December 3, 2018

Dr. David Alexander, Chief Geospatial Scientist, DHS S&T

Peter O'Rourke, Executive Director, NAPSG Foundation

# ***DHS S&T Impact*** **Disaster Resilience Video**

[https://www.youtube.com/watch?v=kHoqHDj\\_aMw](https://www.youtube.com/watch?v=kHoqHDj_aMw)

# Goal and Objectives

## **Goal:**

- ***Building a Culture of Preparedness and Strengthening Community Resilience through continuous innovation an new and emerging technology adoption and development.***

## **Objectives:**

- Explore new and emerging technology areas to enhance Emergency Management and First Responders capabilities
- Identify R&D gaps and requirements to support capacity building for community stakeholders.
- Drive adoption and use of next generation location-enabled technologies in daily and disaster operations.
- Promulgate new knowledge, standards, and best practices across the Homeland Security Enterprise

# Preparedness Agenda

- Overview of Technology-Enabled Preparedness
  - Peter O'Rourke, NAPSG
- PrepToolKit Lightning Brief
  - Kaitlin Tierney and David Blakeman, FEMA Support
- Small Group Discussion Questions
- Large Group Discussion



# Preparedness Toolkit (PrepToolkit)

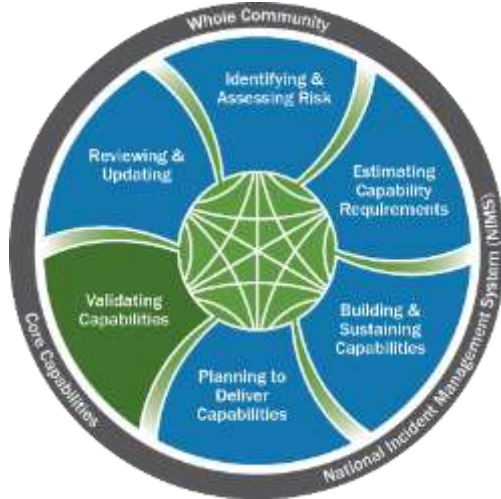
Overview

December 2018



FEMA

# Preparedness Toolkit (PrepToolkit)



- Supports implementation of the National Preparedness System (NPS)
- Web based platform
- Includes content, distributable software, online templates, and data driven user interfaces with robust data models
- PrepToolkit spans mutual aid, exercises, GIS scenario designing, THIRA, and more.

## **PrepToolkit Goal**

*Providing Technology to Build a Culture of Preparedness*



**FEMA**



# Available Tools & Systems (1 of 2)



**HSEEP Resource Page:**  
*Templates & Guidance*



**Exercise Management:**  
*Exercise Data, Scheduling, MSEL Tool, Evaluation*



**Corrective Action:**  
*Tracking & Managing Exercise Corrective Actions*



**Emergency Management Toolkit (EM Toolkit):**  
*Scenario & Threat Specific*



**Hazard Explorer:**  
*GIS enabled*



**FEMA**

# Available Tools & Systems (1 of 2)



**Incident Resource Inventory System (IRIS):**  
*Downloadable Software*



**Resource Typing Library Tool (RTL):**  
*Online data with open data API*

**Coming Soon.....**

- *THIRA data and integration with exercises*
- *Improved data visualization & reporting*



**FEMA**



# Preparedness Toolkit - Highlights

- Over 3,500 whole community users
- PIV Enabled for FEMA employees & contractors
- Used in all National Level Exercises since 2014
- Federated with multi-year ATO
- Single platform for HSEEP and Radiological Exercise Preparedness Program (REPP)
- Resulted in consolidation of 8 separate IT systems
- FEDRAMP/Cloud based
- Open Source platform
- Services Oriented Architecture



**FEMA**

# Preparedness Discussion Questions

- What is your vision for how technology is used in preparedness?
- What challenges have you experienced in using technology to support preparedness activities such as THIRA, exercise planning & conduct, etc.?
- What additional tools and resources would be most useful to your agencies in support of preparedness activities?
- Do you have specific technology, data, or knowledge gaps?
- Have you identified new technology of interest? S&T could assist you in tech scouting that technology.
- Are you experimenting with new and emerging technology? S&T could partner in those experiments.

# Mitigation

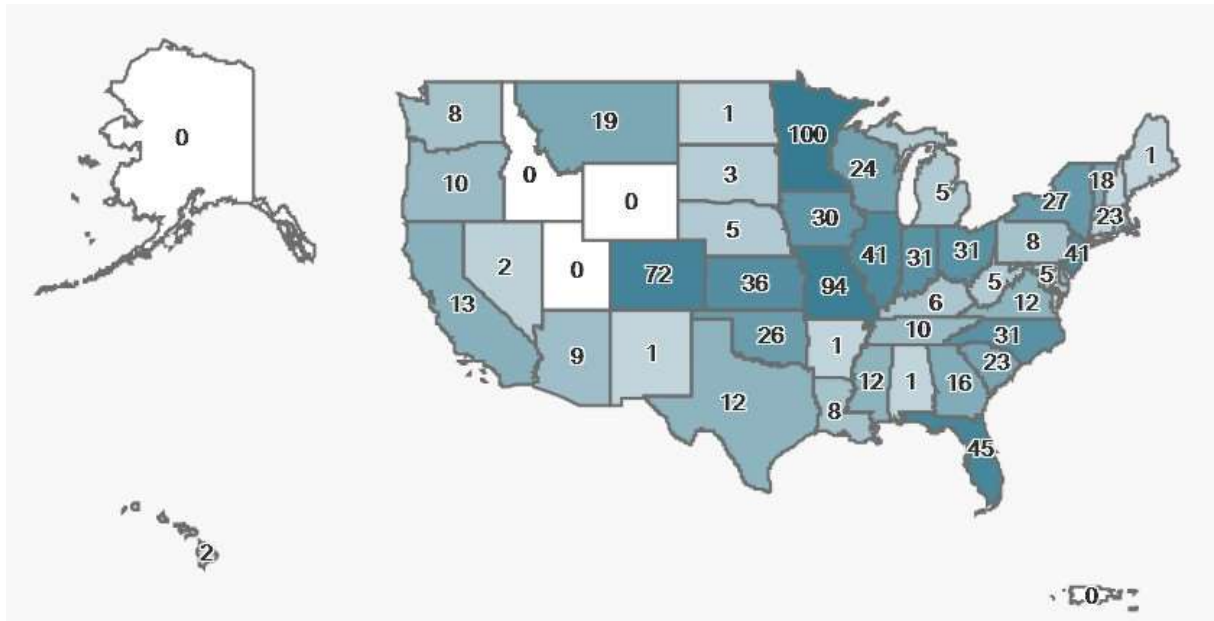
- Lightning Video - <https://www.youtube.com/watch?v=nboC-u2iMTE>
- Results Summary from Survey
  - Dr. David Alexander, DHS S&T
- Small Group Discussion Questions
- Large Group Discussion

# Flood Mitigation and Risk Reduction Use Case

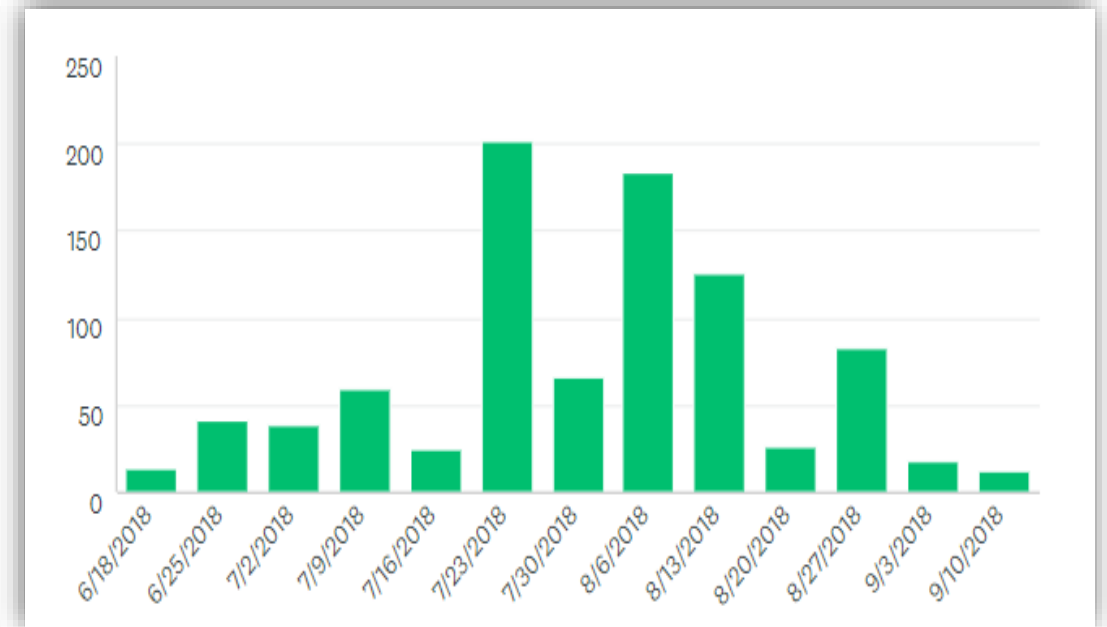
- Moving knowledge out of the domain of scientists and putting it in the hands of innovators, practitioners and policy-makers remains a major stumbling block for the flood management community.
- There is considerable investment in flood science that needs to be unlocked, exploited, leveraged and put to work to reduce flood risk and increase resilience.
- There are untapped and unrealized partnership opportunities available for leveraging shared capital from the public and private sectors to help address global and national concerns with flooding.

# S&T Partnered with Charlotte-Mecklenburg Storm Water Services

- Gather input from communities on flood mitigation and risk reduction to inform R&D
- Received 896 responses from 46 States and the District of Columbia



*Survey Response Totals by State*



*Weekly Survey Response Count*



# Findings from National Survey

U.S. DHS S&T / Charlotte-Mecklenburg Stormwater Services

## Respondents/Likely Users

- **Majority** of respondents have less than **10 years experience** & will have **other job duties**.
- **Over 70%** of respondents manage less than **1,000 buildings** in floodplain.
- **75%** of communities would find a community flood risk tracking system **Useful**.
- Flood hazard **mitigation plans** are common, but **rarely detailed to the building-level**.

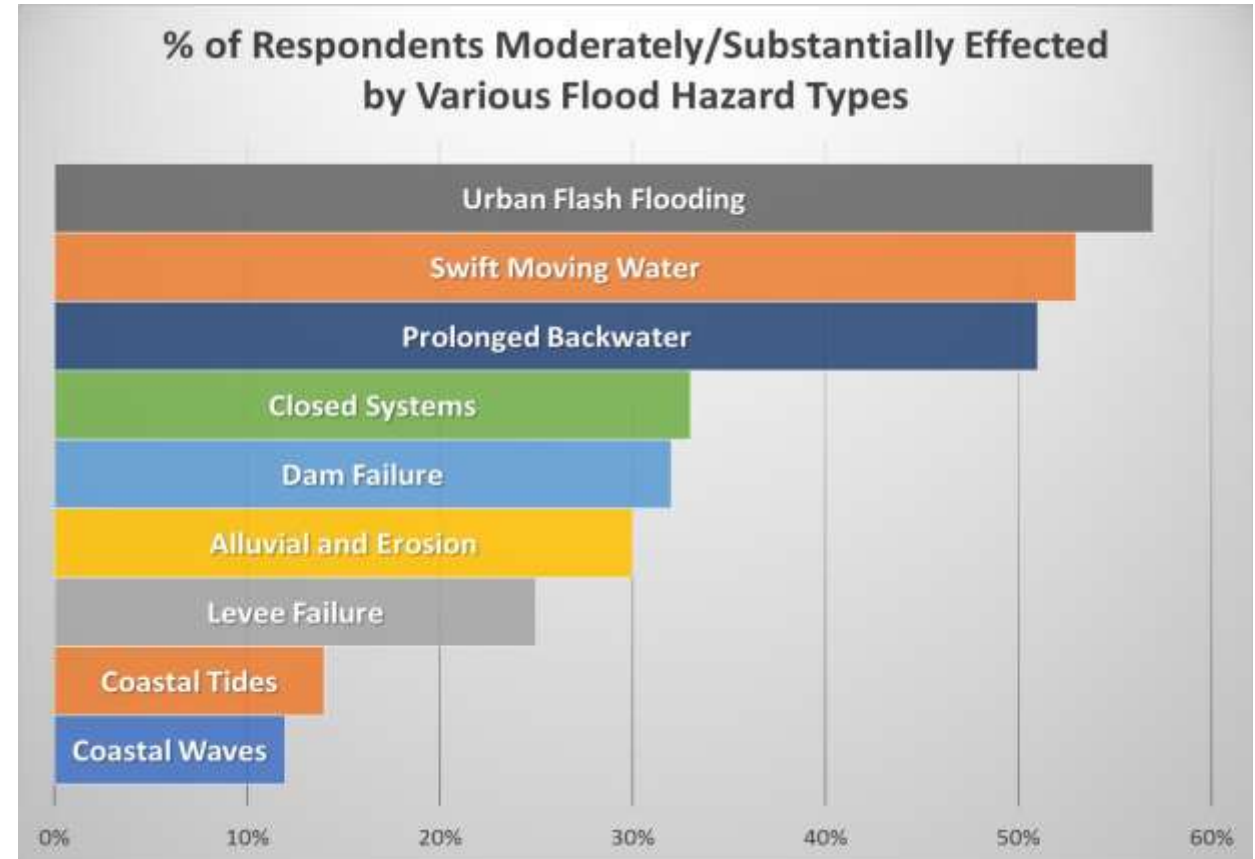




# Findings on Flood Mitigation & Investment

U.S. DHS S&T / Charlotte-Mecklenburg Stormwater Services

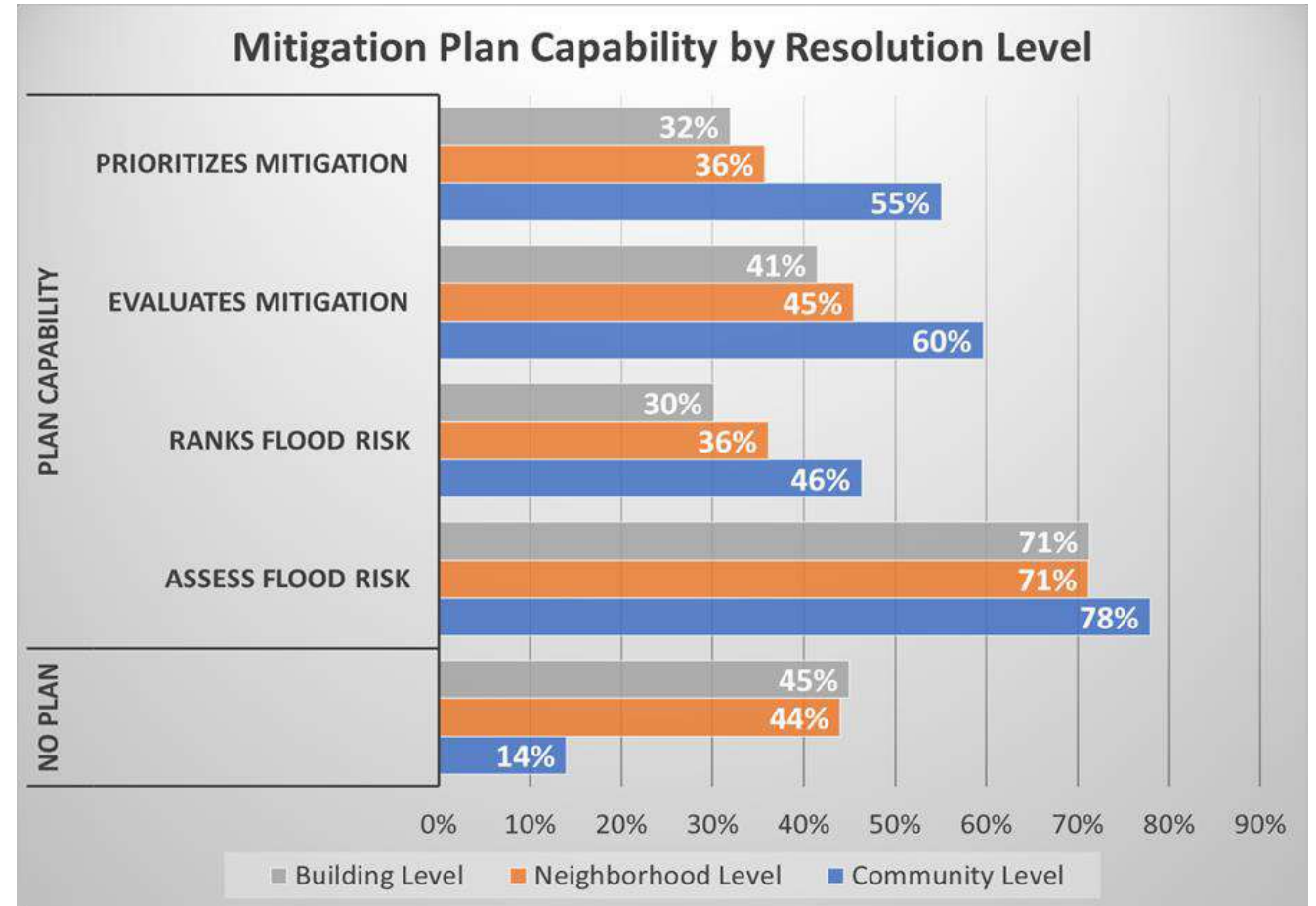
- Majority of respondents from riverine communities with mix of flood hazards
- More than **50%** of respondents say these hazards cause significant damage:
  - Urban flash flooding
  - Swift moving water
  - Prolonged backwater



# Findings on Flood Mitigation & Investment

U.S. DHS S&T / Charlotte-Mecklenburg Storm water Services

- Over **85%** have a mitigation plan at the **community level**
- 30%-45%** have a plan at the **neighborhood or building level**
- Vast majority of the plans do **not rank flood risk** or **prioritize mitigation**

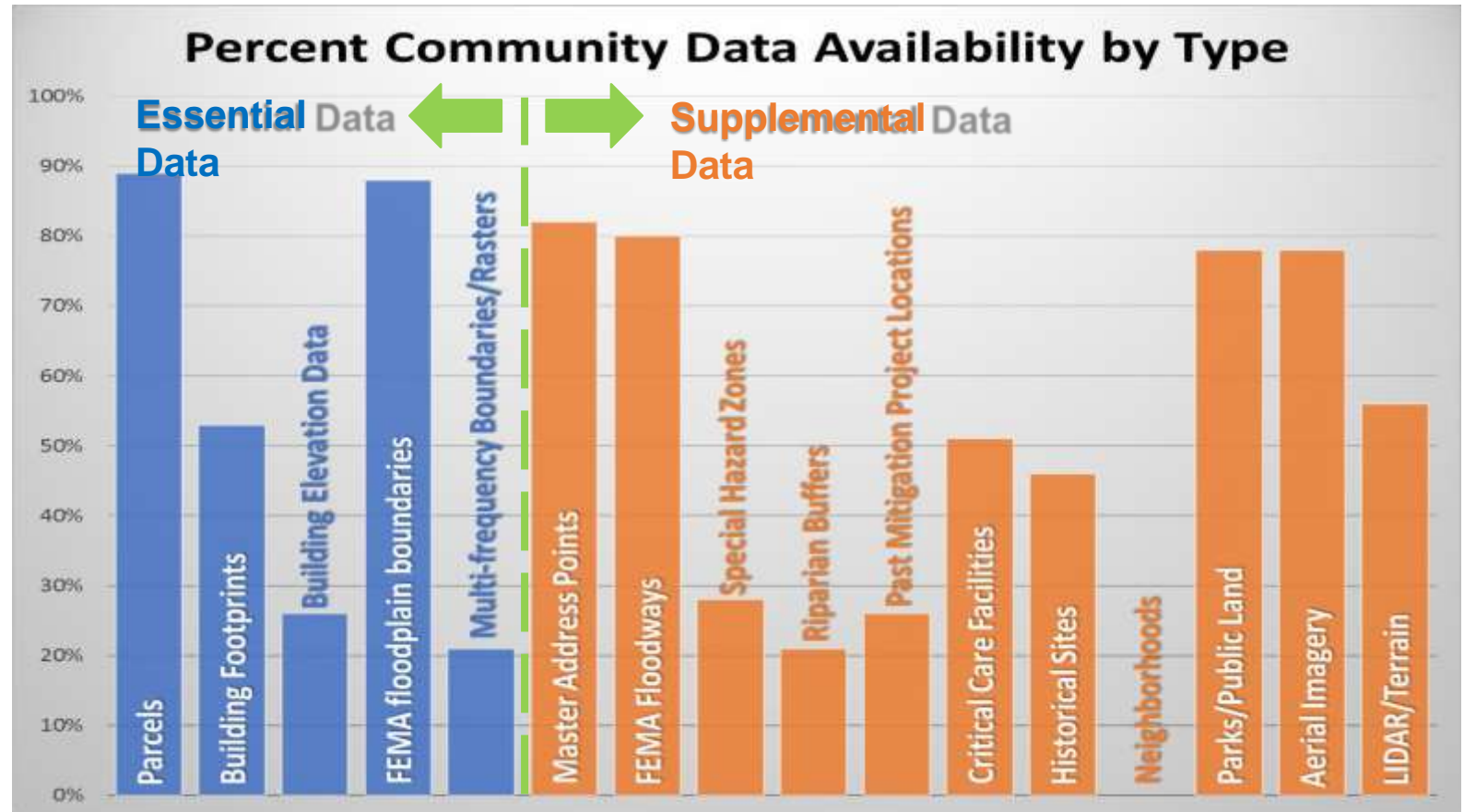


# Findings on Flood Risk Data & Access

U.S. DHS S&T / Charlotte-Mecklenburg Stormwater Services

## Data Needs

- Over **74%** of respondents are **missing 1-2 essential data sets** to manage flood risk at the building level.
- About **33%** of respondents lack Base Flood Elevations in **at least half** their community.
- Nearly **20%** of respondents are **‘not confident’** or don’t have adequate floodplain maps.

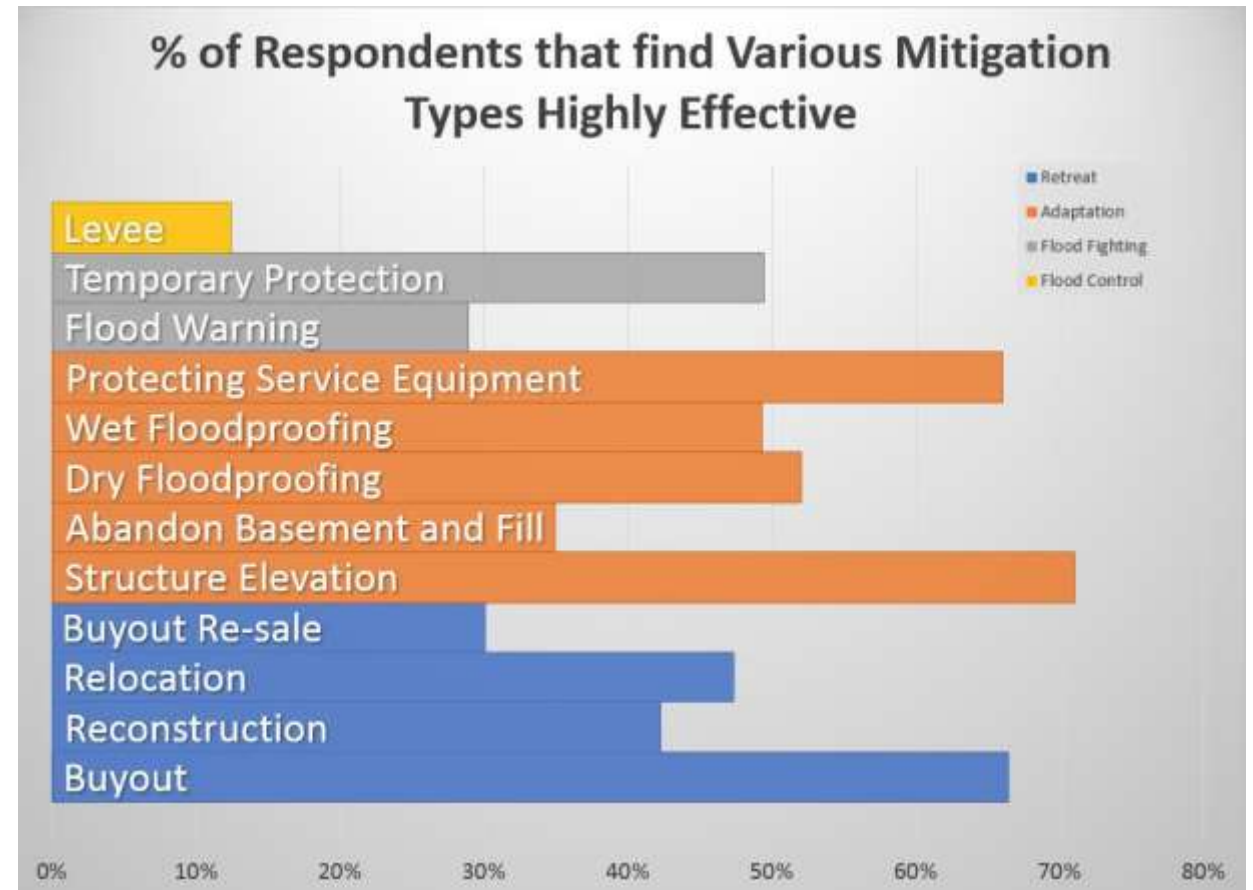
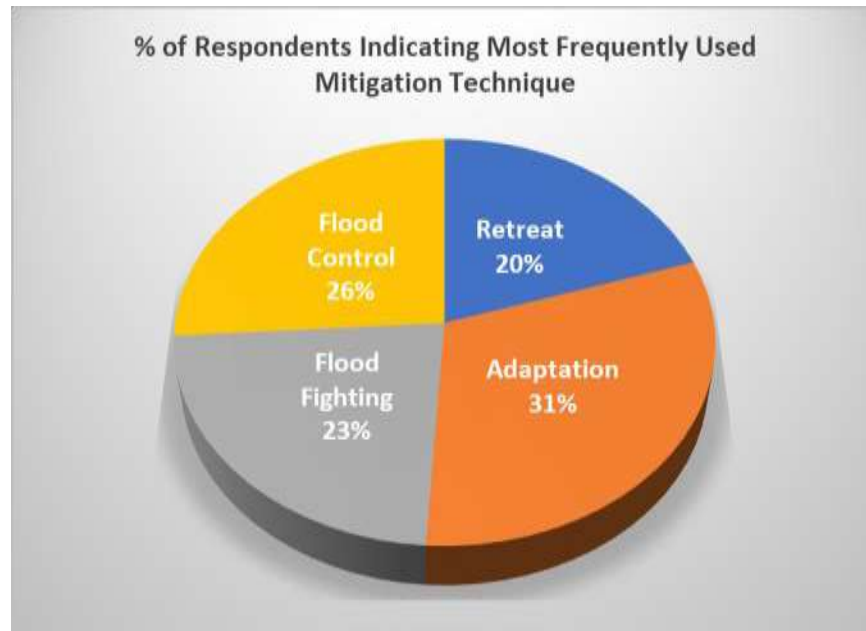


# Findings on Flood Mitigation & Investment

U.S. DHS S&T / Charlotte-Mecklenburg Storm water Services

- **Top 3** most effective actions:

- Structure elevation
- Buyouts
- Protection of service equipment





# U.S. Modeling of Flood Hazards and Risks

**Trend toward use of AI\Machine learning, space/aerial and IoT ground sensors tied into Smart infrastructure**

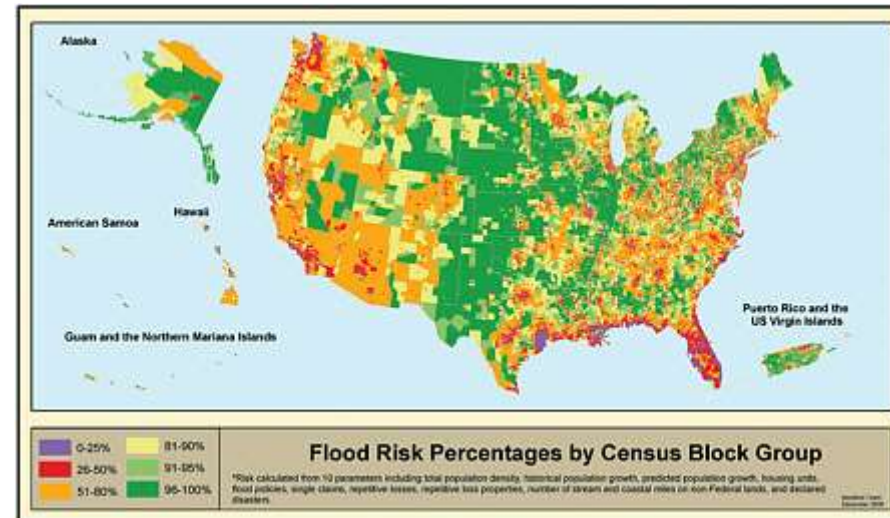
**Two different but complimentary approaches**

**Detailed engineering**



What is the hazard on at my location?

**Generalized / Portfolio / Catastrophic**



What is the exposure of my portfolio?

# Mitigation Discussion Questions

- What is your vision for how technology is used for mitigation?
- What challenges have you experienced in using technology to support mitigation and risk reduction?
- What additional tools and resources would be most useful to your agencies in support of mitigation activities?
- Do you have specific technology, data, or knowledge gaps?
- Have you identified new technology of interest? S&T could assist you in tech scouting that technology.
- Are you experimenting with new and emerging technology? S&T could partner in those experiments.



# First Responder Field Operations

- Overview - Wildland Urban-Interface Fire Use Case
  - Dr. David Alexander, DHS S&T
- NGFR Video - <https://www.youtube.com/watch?v=IBE-DxQwyjw>
- EDGE Video - <https://www.youtube.com/watch?v=Gqu3wD-KOE>
- Small Group Discussion Questions
- Large Group Discussion

# Wildland Urban-Interface Fire Use Case

- DHS S&T—in collaboration with FEMA and USFA to assess how technology can inform decision-making during a WUI fire
- This effort is focused around gaps and requirements for the areas:
  - Detection
  - Evacuation
  - Tracking
  - Public Information and Warning
  - Responder Safety
  - Forecasting
  - Critical Infrastructure

# Wildland Urban-Interface Fire Use case

- DHS S&T will be hosting a series of stakeholder engagements to:
  1. Identify EEs for **firefighters and fire behaviorists** to effectively detect, assess, track, and model fire impacts.
  2. Identify EEs for **command staff and other emergency management officials** to take actions to provide prompt warning or evacuation orders to affected citizens.
  3. Identify other EEs for **other decision makers** to take actions to save lives.
- DHS S&T will use the EEs to conduct an assessment of technologies, tools, and other solutions that support lifesaving decision-making in a WUI fire incident.
- DHS S&T will not be endorsing any specific technology at this time.
- DHS S&T will provide a summary of findings and courses of action to guide immediate technology development and integration efforts.

# Field Operations Discussion Questions

- What is your vision for how technology is used for First Response Field Operations?
- What challenges have you experienced in using technology to support daily and disaster operations: mutual aid, regional/multi-jurisdictional, training, etc.?
- What additional tools and resources would be most useful to your agencies in support of these activities?
- Do you have specific technology, data, or knowledge gaps?
- Have you identified new technology of interest? S&T could assist you in tech scouting that technology.
- Are you experimenting with new and emerging technology? S&T could partner in those experiments.

# EOC Operations

- Overview of Technology Challenges in EOC Management
- Connecting SAR Field Ops to EOC Operations
  - Peter O'Rourke, NAPSG Foundation
- HurreVac Video - <https://www.youtube.com/watch?v=2K1VvYNeCjo>
- Small Group Discussion Questions
- Large Group Discussion

# Connecting Field Operations to EOC Operations

## Use Case: SAR Support in 2018 Hurricane Season

December 3, 2018

National Alliance for Public Safety GIS (NAPSG) Foundation

[napsfoundation.org](http://napsfoundation.org) | [@napsfoundation](https://twitter.com/napsfoundation)



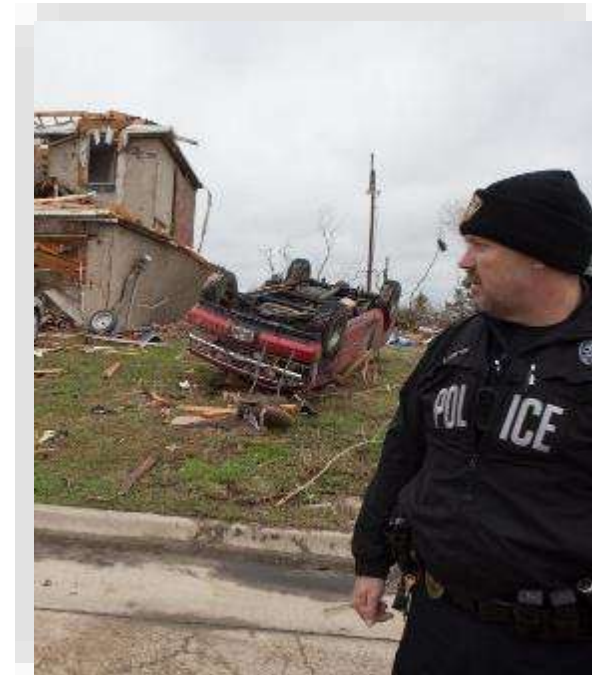
# Information Needs:

- From Readiness through Response and Recovery - Field Teams, Operators, and Decision Makers need the right actionable information at the right time



# Need: First Responders

- First boots on the ground in the early stages of a disaster
- Dealing with life safety calls for service
- Protecting people and the built environment



# Need: Decision Makers

- Have limited visibility to the extent and severity of an incident in the early stages
- Need forecasted data and best available modeled data for safety and operations
- Need to track and anticipate resource needs - and account for their first responders





# Need: Field Teams

## Search and Rescue:

- Teams are deployed as local SAR teams, state SAR and SUSAR, National US&R, USCG, Volunteer Rescues,...
- Use different data models and systems for capturing information in the field.
- Rarely have visibility of other teams (both current or where they have been)
- Capabilities vary widely from real-time to days later
- Can be deployed for any number of duties, can provide immediate help to those impacted and provide unparalleled intel to operators and decision-makers.



# Overview of SAR Tools

NAPSG formed a **SAR Field Data Collection Working Group**, which worked to define a **standard schema** and **priority information collection requirements**.

In partnership with the International Association of Fire Chiefs (IAFC), a suite of SAR decision support and analysis tools were created, forming a standardized toolkit consisting of the following:

## Mobile Application

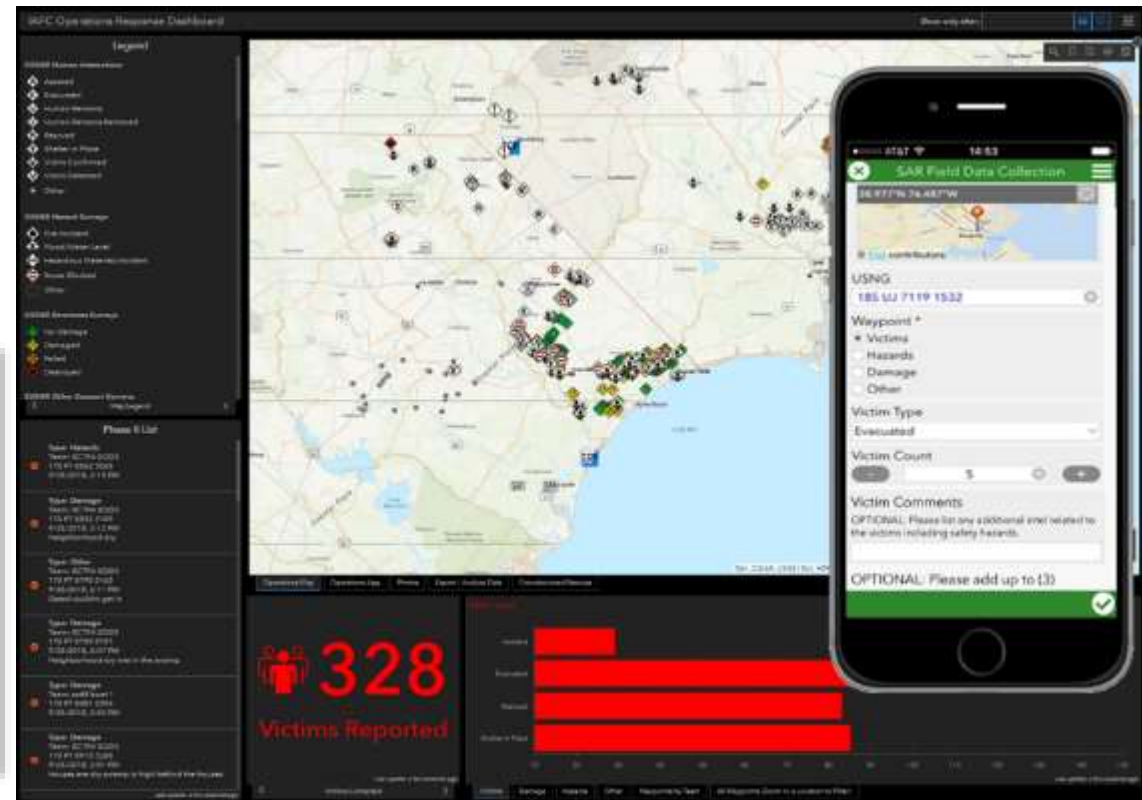
- Standardized mobile form (Survey123), based on schema developed by the SAR Field Data Collection Working Group
- Ability to capture photos
- See where other teams have been

## Command Dashboard

- Consumed, analyzed, and visualized data collected in the field in real-time
- View base data (Infrastructure, base maps)
- View Live data (Traffic, Weather, Flood model predictions)

# 2018 Hurricane Deployment

- In partnership with the IAFC, deployed the suite of SAR decision support and analysis toolkit
  - **Hurricane Michael**
    - 126 SAR Teams from 11 states
    - 51,532 Field Forms Submitted by 400+ Users
  - **Hurricane Florence**
    - 60 SAR Teams from 11 States
    - 2,600 Field Forms Submitted by 340+ Users



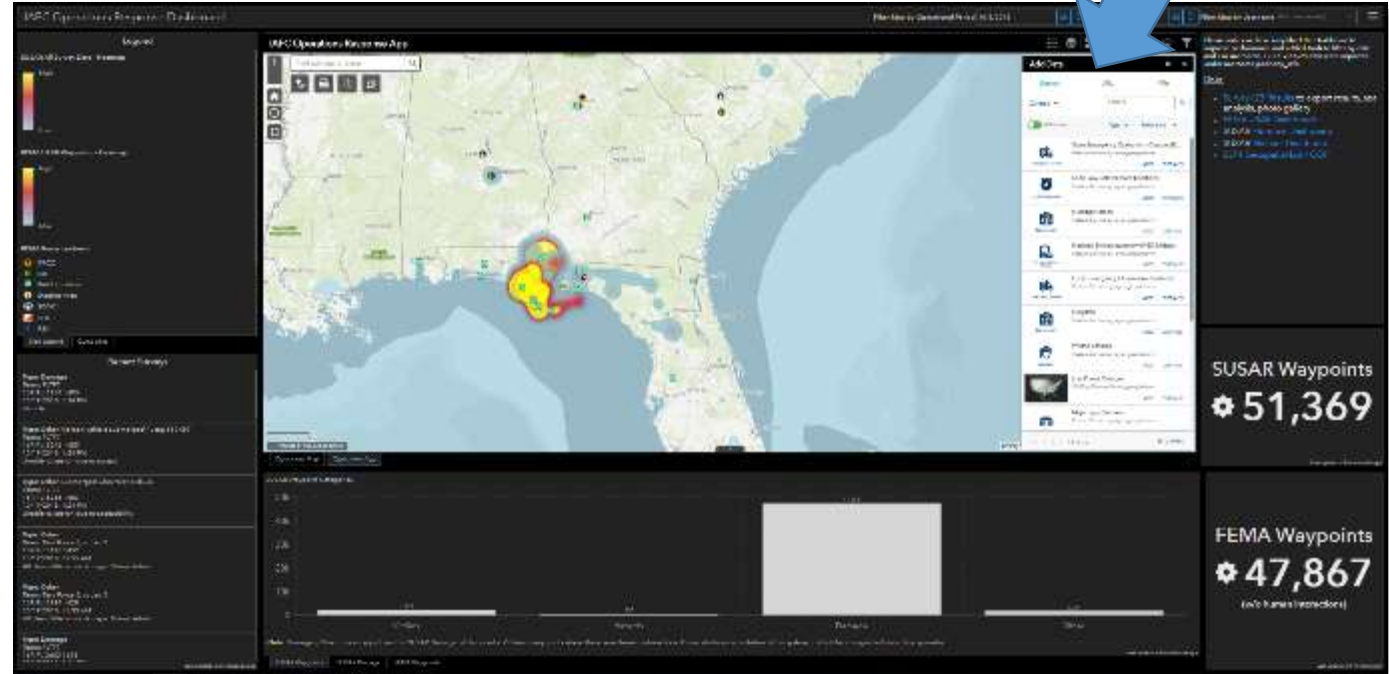
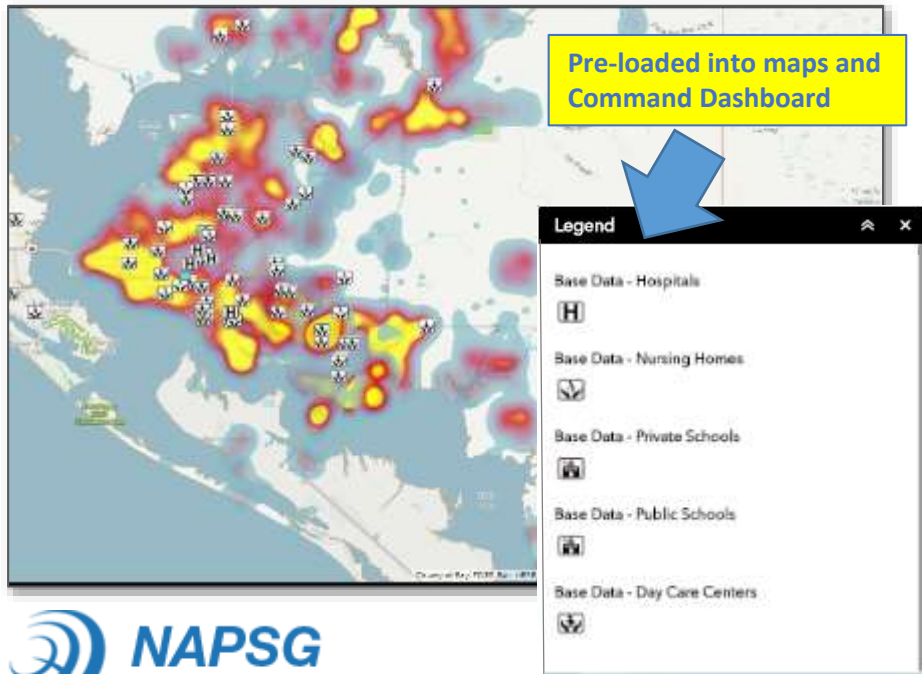


# HIFLD Data for SAR in 2018 Hurricanes

HIFLD data was used in 2018 hurricane response, providing seamless base data for:

- Search & Rescue Teams deploying across the region
- Transitioning tools for implementation across multiple events (Florence and Michael)
- Use of a common and consistent information for decision making

Curated Data includes links to HIFLD to add additional content to Dashboard as needed



# Technology Connecting Field to EOC Operations

## Joint SAR Activity Application - Prototype

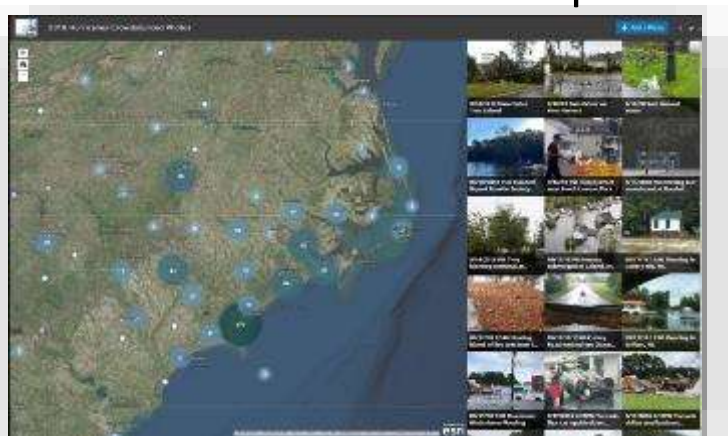


<https://arcg.is/1Wi1GH>

## Hurricane Resources

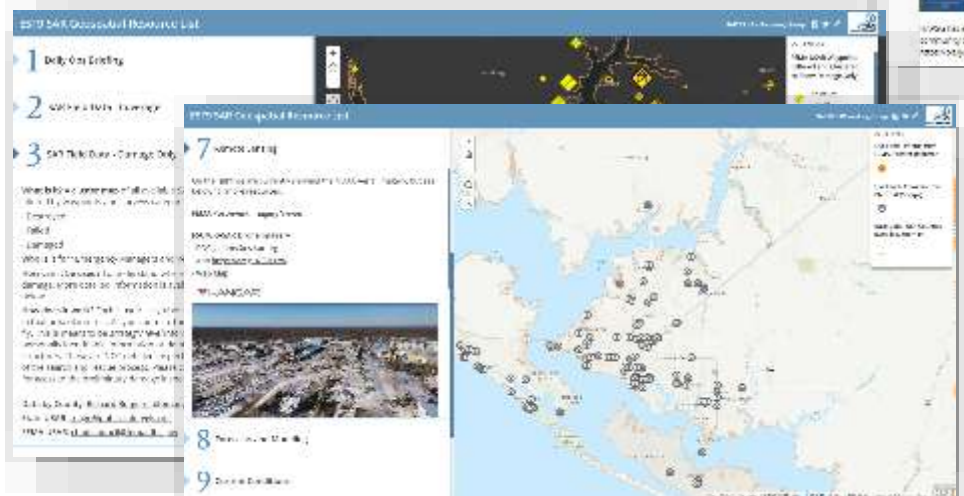


## Crowdsourced Photo Map



<http://bit.ly/2018HurricanePhotos>

## ESF9 – Geospatial Resource



# EOC Operations Discussion Questions

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# Back-Up Slide

- FINDER video - <https://www.youtube.com/watch?v=6KwPZBj4URo>
- Pointer video - <https://www.youtube.com/watch?v=QgskITZQnbo>



# Thank you!