Pin2Flood App – Real-Time Flood Inundation Mapping for First Responders

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Breakout Session
Real-Time Flood Mapping for First Responders

Presented by Harry Evans & Christine Thies
Center for Water and Environment
University of Texas at Austin

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Historical Approach to Flood Mapping
Problem

2013

- Difficult for Fire Chiefs and EMs to interpret which homes/roads were impacted by flood
- Fire Chiefs and EMs needed a ‘common language’ to communicate situation and impact
Flood Emergency Response

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**2015**
- Maps were produced to be the ‘common language’
- Helped significantly, but lacked the ability to communicate current & future inundation without discussion
- Not interactive

Initial Solution

*Onion Creek @ HWY 183 – ATIT2 – River Gauge*

*Williamson Creek, Westgate*
Flood Emergency Response

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2019
• Interactive – web based
• Able to communicate/log what the field personnel are ‘seeing’ during the event
• Able to identify impacted infrastructure (homes, roads)
• Future goal - communicate predicted inundation from NWS

Next Generation Solution
Flood Forecast

What a forecast map can do for us
Pre-Event – Getting Ready for the Flood

General Notification:
Weather Service is predicting significant rain, with localized major flooding.

City X and Counties X, Y, Z are under a flood watch.

Could potentially impact Creek A, Creek B, and River C.

Be prepared!

Source: Derek Giardino, WGRFC
Pre-Event – Getting Ready for the Flood

**When** will the rain hit?  
**What neighborhoods** will flood?

Do we **evacuate or protect in place**?  
**How much** flooding will occur?

Where do I **pre-stage response crews**?  
**How much** do we “**over-staff**” and when?

How many **homes/people** do we have to **evacuate**?  
Do we have enough **reaction time** to evacuate?

If we evacuate, **where do the evacuees go**?  
**What is the evacuation route**?

Who cannot evacuate and needs **special transport**?  
**When and how do we alert the public**?  
**Where are the shelter locations**?
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Source: Derek Giardino, WGRFC
Why Water Depth Matters

“How many helicopters, boats, and high profile vehicles and where to send them”
– Texas State Operations Center

~1 Foot
Response focused on those who need additional assistance

~3 Feet
Near the limit to use High Profile Vehicles to perform high water rescues

~6 Feet
Boats and helicopters now required to perform high water rescues

~9 Feet
1st Floors completely inundated

Source: Derek Giardino, WGRFC
Flood Response

*What Pin2Flood can do for us*
During Flood – Common Operating Picture
The first responder knows the scope and extent of the flood before them!

Emergency Managers can support and resource the response.

During Flood – Common Operating Picture
Pin2Flood Vision

Arrival of On-Scene Units
Flood calls start coming in..
Flood calls start coming in..

Units Arrive on-scene
Flood calls start coming in.
Units Arrive on-scene
Pin dropped at water’s edge
Flood calls start coming in..
Units Arrive on-scene
Pin dropped at water’s edge
Flood inundation calculated

02:09
Flood calls start coming in..
Units Arrive on-scene
Pin dropped at water’s edge
Flood inundation calculated

Able to identify....
• Homes Impacted
Flood calls start coming in.
Units Arrive on-scene
Pin dropped at water’s edge
Flood inundation calculated

Able to identify....
- Homes Impacted
- Population
Flood calls start coming in...
Units Arrive on-scene
Pin dropped at water’s edge
Flood inundation calculated
Able to identify:
- Homes Impacted
- Population
- Flooded Roads
Flood calls start coming in..
Units Arrive on-scene
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Flood inundation calculated
Able to identify:
• Homes Impacted
• Population
• Flooded Roads

Able to access map and data:
• In Field
• At EOC
Pin2Flood

Where do we go from here?
Testing

- Homeland Security Exercise and Evaluation Program (HSEEP) Functional Exercise with Travis County and City of Austin Fire Department
  - Testing outside Travis County
  - Testing with larger/smaller departments
  - Testing with Emergency Operation Centers

Data

- Automation of data processing for Texas
  - Automation of data processing outside Texas
  - Work closely with Federal Agencies (NOAA, National Water Center) on incorporating predictions
  - Work with FEMA nationally to implement Pin2Flood in other regions of the country

Implementation

- Work with State & Federal groups to identify implementation process
- Work to identify management and maintenance ownership
Stakeholders

‘Testing Team’

Texas Division of Emergency Management (TDEM)

Univ of Texas Center for Water & the Environment

National Weather Service West Gulf River Forecast Center

City of Austin Homeland Security Emergency Management (HSEM)

National Weather Service New Braunfels WFO

Travis County Emergency Service Districts

City of Austin Fire Department (AFD)

Travis County Emergency Management
Conclusion

Map Based Approach

✓ Pin2Flood can move a field observation from a single person, all the way up to FEMA.

✓ Pin2Flood can inform action on flooding in real-time.

✓ Pin2Flood can show the vision of how a national, multi-jurisdictional infrastructure works in a real world scenario.
Questions?