Jefferson County
Drainage District No.6

ALERT Systems

Presented by: Craig Cormier
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A.L.E.R.T.

- Automated Local Evaluation in Real Time

- Established at DD6 since the 90's

- Consists of 76 sites with over 265 sensors

- One site Base Station

- Two Repeater Sites (Winnie & Nome)

Benefits

- Monitors drainage and mitigation performance

- Future Improvements

- New Projects & Funding

- Other Entities:
  - NOAA, USGS, National Weather Service
  - Emergency Responders
  - Local & National Meteorologists
  - Farmers
  - Fishing & Game

- Future Improved Collaboration
  - UT, USGS, & TXDOT project
    - (Flow & Discharge)

Streamflow I: Radar Stream Gauging

Tropical Storm Imelda: Hillebrandt Bayou at TX-124
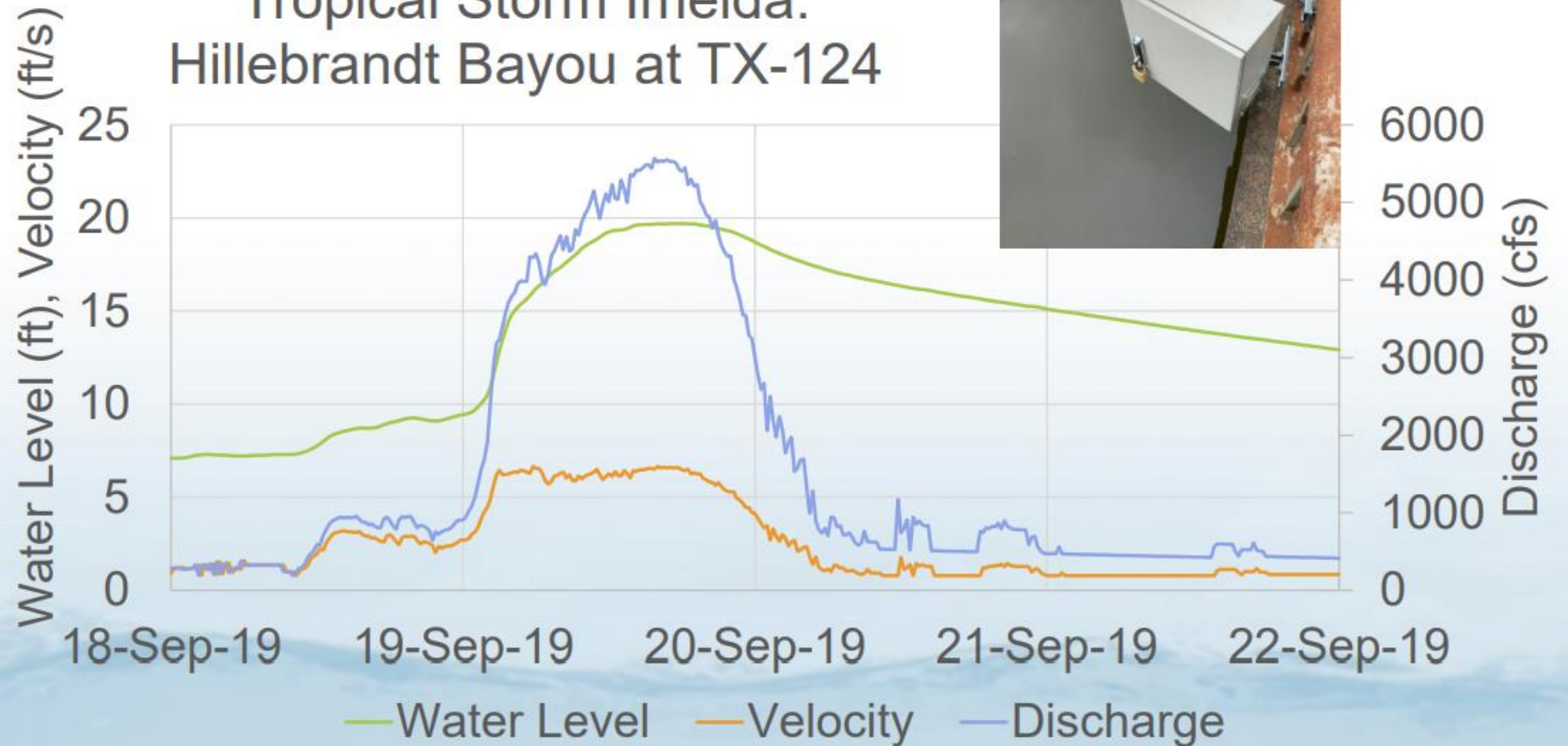
Transmitter

Current

- Programed through code commands and outdated

- Metal Cylinder design for potential floating

- Military connections (additional failure points)

- Outdated not Upgraded tec.
  - Added components for performance to old equipment instead of advancing technology

- Difficult to repair and work on
  - Weather and exposer to elements
  - Wire management
 - Circuit board repair and soldering

Transmitter

Update

- Program through drop down menu on software, then uploaded to unit

- Savable preset profiles

- Panel design
  - Easier maintenance
  - Modular components
  - Swap in/out for repair on parts or unit

- Uniform throughout all sites

- New components from leading innovators
  - with continued support, education, and advancements in tech.

Stations   Current

Standpipe

- Aluminum Housing installed in the ground or mounted to a structure.

- Designed to house all equipment and allow the transmitter to float if the standpipe takes on water. (perfect for west coast NOT southeast Texas)

- Purchase as a all-in-one setup from old providers at a marked up cost

- Several different versions in the field over time

- Durability degrades over time
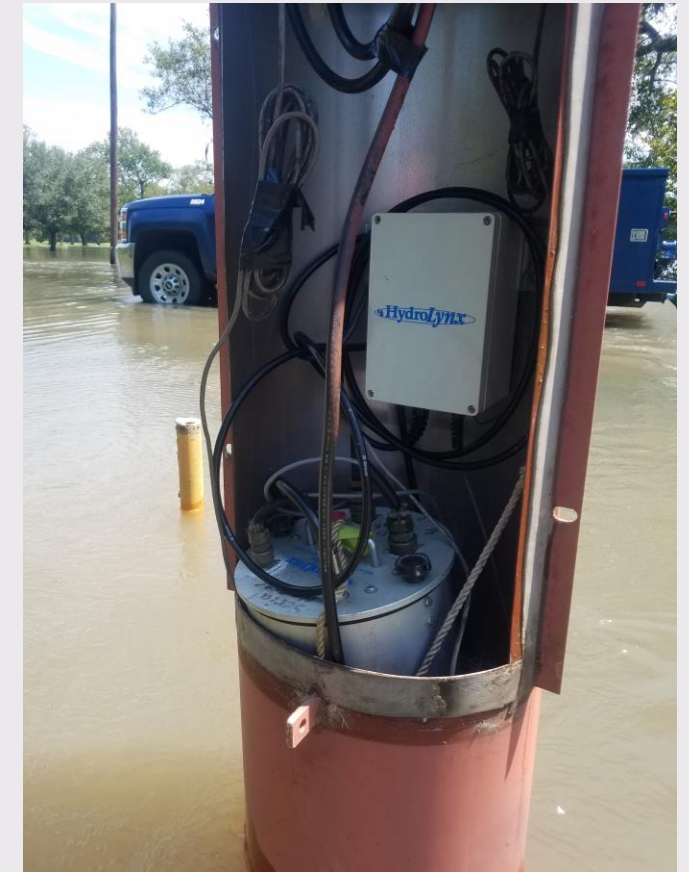
Stations Upgrade

Pole Style

- Easy to install and adjust in various locations and conditions

Platform Style

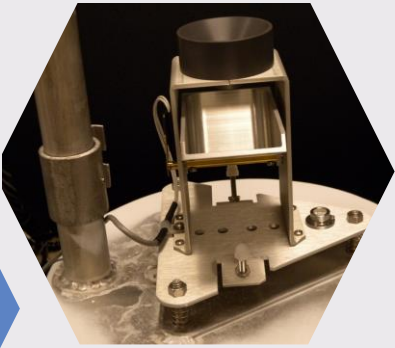- Elevated to prevent future damages and loss of critical data

- NEMA Enclosure
- Transmitter
- Antennas & GPS
- Cables
- Rain Gauges
- Stage Sensors
  - PT
  - Radar
  - Bubblers

Current Sensors

Tipping Bucket

Measures precipitation by tips (.04 of an inch)

Pressure Transducer

Measures water level by pressure

(inexpensive, durable, added box more susceptible to malfunctions)

Sonic

Measures water level by sonic pulse

(fairly accurate (heat) and reliable)

Wind

Measures wind speed and direction

(eliminated the need for two separate sensors, more movable components means more malfunctions)

Temperature

Measures temperature and relative humidity

(fairly accurate sensor, easily damaged by common insects that like to nest inside the build)

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Upgrade Sensors

Tipping Bucket

Measures precipitation by tips (.01 of an inch)

(higher accuracy during major rain events)

SDI-12 Pressure Transducer

Measures water level by pressure

(inexpensive, durable)

Radar

Measures water level by radar pulse

(Accurate, reliable)

Bubbler

Measures water level by air pressure

(Perfect for Problem areas with high sediment and potential damage)

Full Weather

Measures multiple elements such as:

Temperature, wind speed and direction and humidity

(Less moving parts, low maintenance)

Maintenance

- Current Issues
  - Outdated Equipment
  - Repairing existing NOT Replacing
  - Damages

- Monthly Site inspections
  - Primary day to day operation to visit all locations once a month
  - Assess site conditions
  - Clean sensors
  - Manual readings
  - Make any necessary repairs

- Quarterly Calibrations
  - Run sensor tests to evaluate Equipment accuracy.
  - Make necessary corrections

Upgrade to ALERT II

- Started the process after Hurricane Harvey (30% data corruption)

- ALERT II protocol (2% or less)

- Upgrading system in 3 phases
    - Infrastructure (software/network/TDMA plan)
    - Hardware (stations & Sensors)
    - Operation (future growth)

- Website update
    - OneRain
        - Rainfall Summary
        - Water Level Map
        - Site Profile page
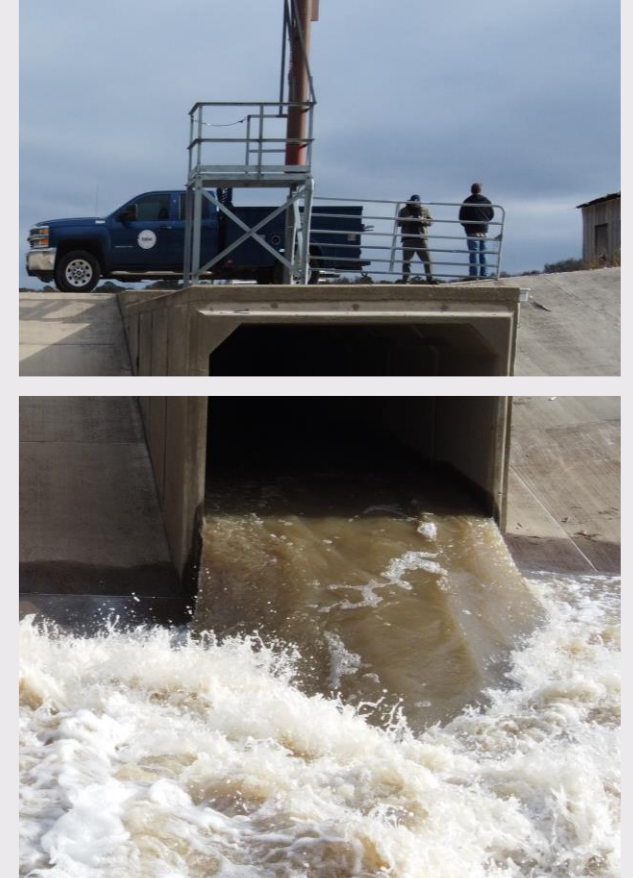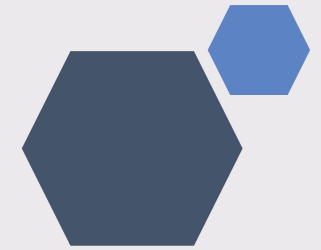
Timeline

Q1

Nov Dec Jan

Q2

Feb Mar Apr

Q3

May Jun Jul

Q4

Aug Sep

Training, fabrication & Demo

Acquire new equipment, building stations, and necessary training for new hardware

Installations & Operation

Two crews working simultaneously to install all new stations & remove the old equipment. Install all hardware, sensors, and necessary equipment for the new ALERT II System.
Program, test, and put the new ALERT II system in operation.

- Major labor first (Concrete & Equipment)
- Components after
- Two Crews (3 man crews)
- 5-day 10hr schedule

Completion

Finish all remaining installations and evaluations before completing upgrade
NOTE- extension approved to 9/30/2021

Future Projects to follow such as improved public website features and other beneficial equipment

Conclusion

Once this project is complete the District will able to provide quality data for our needs as well as Jefferson County as a whole.

Future ability to implement new technology and equipment to aid in our ongoing efforts. Examples (water Flow, velocity, and discharge, as well as cameras, crest gauges, and more. Software Developments and improvements such as dashboards and visual diagrams)

Harris County Flood Control

- Cross sections & B.M. necessary

- Custom web design required