

# AERIAL IMAGERY AND 3D MODEL GENERATION



Creating Neighborhood-Scale Data for Flood Planning

## WHY NOW?

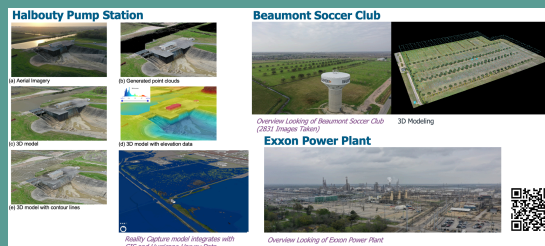
Public-access datasets such as USGS datasets do not accurately represent present-day landscape and infrastructure conditions, as they are typically updated only quarterly and do not provide sufficient high-resolution detail for potential flood analysis. In particular, this becomes challenging at the neighborhood scale, where planning decisions rely on fine-grained details (e.g., small elevation variations or drainage paths) that broader regional datasets frequently do not capture.

## WHAT WE DID

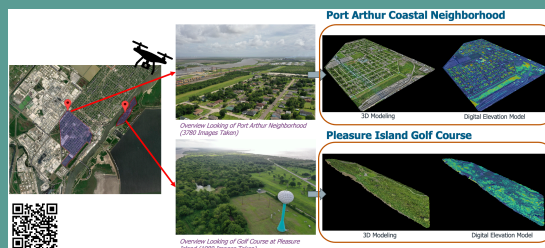
To address this gap, the SETx-UIFL collected high-resolution site data in targeted Southeast Texas neighborhoods using drone flights to capture overlapping aerial imagery. The research team then applied photogrammetry workflows to reconstruct detailed 3D surface models and generate fine-resolution digital elevation models (DEMs). These products provide up-to-date neighborhood-scale representations of local topography and "as-is" conditions, thereby enhancing data resources for targeted neighborhoods in Southeast Texas.

## WHO WAS INVOLVED?

Lamar University coordinated meetings and logistics with local agencies and stakeholders, including Drainage District No. 7 (DD7), to align the survey plan with local priorities and operational constraints. This coordination ensured that the data products reflected on-the-ground needs and could be readily used in ongoing planning and resilience efforts. Local partners also supported the site access and helped secure aerial flight permissions for the targeted areas.



*Aerial Captured Data and Processed Models in the Beaumont-Port Arthur Region in Oct, 2023.*  
*doi:10.15485/1971120*



*Aerial Data and Processed Models of Port Arthur Coastal Neighborhood and Pleasure Island Golf Course, June 2024.*  
*doi:10.15485/2406464*

## FINDINGS

In total, more than 10,000 aerial photographs were collected across five sites in Southeast Texas, all of which are available for public viewing and download via the QR Codes and DOI links provided in this document. These images are also accompanied by point clouds to create 3D representations of the real world.

The collected data have supported the creation of a shared foundation for research and local decision support in Southeast Texas. For the research team, these products provided neighborhood-scale data on topography and existing conditions for flood modeling and analysis. Additionally, the data provided authentic and place-based materials for academic design instruction: Lamar University and Texas A&M University worked with design courses focused on Pleasure Island. Working with a real site helps students connect technical methods to community context, while course outcomes elevate local voices and generate ideas. Beyond this, these insights may help inspire stakeholders and city planners as they consider future development.



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## MORE ABOUT SETX-UIFL

The Southeast Texas Urban Integrated Field Lab (SETx-UIFL) is one of four projects funded in 2022 by the U.S. Department of Energy to study how climate, environment, and urban changes affect cities. A team of over 80 researchers from UT, Lamar University, Texas A&M, Prairie View A&M, Oak Ridge National Lab, and Los Alamos National Lab has collected data and conducted modeling across hazards including flooding, hurricanes, heat stress, and air quality. Our Why: Southeast Texas faces numerous hazards, yet smaller communities like this one have often felt forgotten compared to larger cities. The SETx-UIFL was designed to explore the complex dynamics of disaster vulnerability for this economically and culturally vibrant region. We believe Southeast Texas is a bellwether for the entire Gulf Coast, and an exemplar for strategies that protect people and places. We hope this effort supports your path toward lasting resilience.



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