

# Unmanned Aircraft

## Responding to and Recovering from Disasters

State of Texas

November 2020

## Table of Contents

Executive Summary.....	3
Overview.....	4
Authority.....	5
Stakeholders.....	6
Background, Discussion, Recommendations.....	9
Steps to Development and Implementation.....	13

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## Executive Summary

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This document outlines the recommendation from the House Bill 2340 Small Unmanned Aircraft Systems (sUAS) Study Group for a Statewide sUAS Response Team and supporting components. The State of Texas currently has many organizations with well-established sUAS programs with equipment and trained remote pilots. This set of recommendations would allow the State of Texas to request pre-verified sUAS flight teams and equipment for operation during an emergency. This plan would allow for establishing and maintaining accountability of flight teams and equipment that are eligible and certified. Recommendations for changes to state law are also made as required in HB 2340.

The main recommendation will be to create a program to utilize existing sUAS Flight Teams and equipment through a Memorandum of Understanding process between the teams and the Texas Division of Emergency Management under the guidance of TEMAT by:

- 1) Creating a state group to develop and implement the state response team's policy, training, and authority;
- 2) Creating regional groups to evaluate sUAS Flight Teams, equipment, and required training's/certifications; and
- 3) Utilizing a secure software to consolidate a list of sUAS Flight Teams, equipment, certifications, locations and deployment orders. As well as a standard location to stream data.

# Overview

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## Goal

The project intends to provide the guidance and support structures for the further development of the use of Unmanned Aircraft Systems to support the response to and recovery from disasters.

## Objectives

- To develop a mechanism to use existing flight teams and equipment from around the state to meet disaster response and recovery needs.
- To ensure that flight teams and equipment meet required training, certification and standards.
- To establish a statewide group to develop, implement, train, deploy and track flight teams and equipment.

## Audience

- TDEM Leadership
- Local Jurisdictions
- Small Unmanned Aircraft System stakeholders
- The Texas Legislature

# Authority

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House Bill 2340 from the 86<sup>th</sup> Regular Legislative Session

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**For more information:**

Texas Legislature Online

<https://capitol.texas.gov/BillLookup/Text.aspx?LegSess=86R&Bill=HB2340>

## Stakeholders

Agent	Summary
Texas Division of Emergency Management (TDEM)	The Texas Division of Emergency Management is charged with carrying out a comprehensive all-hazard emergency management program for the state and for assisting cities, counties, and state agencies in planning and implementing their emergency management programs.
Texas Department of Public Safety (DPS)	The Department of Public Safety of the State of Texas is an agency of the state to enforce the laws protecting the public safety and provide for the prevention and detection of crime.
Texas A&M University – Corpus Christi	The Lone Star UAS Center of Excellence and Innovation is a global partnership for research, development, testing and evaluation of Unmanned Aircraft Systems (UAS) technologies led by educational institutions Texas A&M University - Corpus Christi and Texas Engineering Experiment Station.
Texas A&M Forest Service	TFS is one of the lead agencies for incident management in the state. From the initial response to ongoing recovery, the agency strives to protect Texas from wildfire and other types of disasters. TFS does this by not only fighting wildfire and responding to incidents, but also by building capacity and increasing public awareness about community protection and wildfire prevention.
Texas A&M Engineering Extension Service	From providing emergency responders to disasters across the state and nation to developing training and practical workforce solutions, TEEX makes a difference worldwide. More than 200,000 people representing every U.S. state and territory and 105 countries are served annually through on-site and online resources for specialties from homeland security to economic development and workforce training.
Center for Robot-Assisted Search and Rescue (CRASAR)	CRASAR is a 501(c)(3) nonprofit corporation organized to foster unmanned systems being effectively used by formal emergency management agencies.
Texas A&M Task Force 1	Texas A&M Task Force 1 (TX-TF1) functions as one of the 28 federal teams under the Federal Emergency Management Agency (FEMA)’s National Urban Search and Rescue (US&R) System and as a statewide urban search and rescue team under direction of the Texas Division of Emergency Management (TDEM). TX-TF1 also coordinates the state’s swiftwater rescue program and the helicopter search and rescue team which works in conjunction with Texas Military Department.
Texas A&M University	Computer Science and Engineering Department
University of Texas at Austin	Center for Transportation Research

Pedernales Electric Cooperative	Regional Electric Cooperative
Texas Parks and Wildlife Department	Our agency mission is to manage and conserve the natural and cultural resources of Texas and to provide hunting, fishing and outdoor recreation opportunities for the use and enjoyment of present and future generations.
Austin Fire Department	The Austin Fire Department sets the standard among public safety agencies, serving the community through innovation and collaboration, while honoring tradition and embracing inclusion, equity, and diversity for all.
Austin Community College	Austin Public Safety Training Center - ACC's Public Safety Training Center (PSTC) supports strong, safe communities by providing state-of-the-art training facilities for first responders and other public safety professionals.
Mansfield Emergency Management	Housed within the Mansfield Fire Department, the Office of Emergency Management (OEM) is responsible for coordinating the emergency management program for the City of Mansfield. Its program goals are to plan for and maintain the public peace, health and safety during an emergency.
Texas Military Department	The Texas Military Department is composed of the three branches of the military in the state of Texas. These branches are the Texas Army National Guard, the Texas Air National Guard, and the Texas State Guard. All three branches are administered by the state Adjutant General, an appointee of the Governor of Texas, and fall under the command of the Governor.
Bastrop County	The Bastrop County Office of Emergency Management seeks to promote a safer, less vulnerable County with the capacity to cope with disasters and emergencies.
Aransas County	The Aransas County Commissioners' Court is the one body with powers and duties which allow it to affect all areas of County operations. It is composed of five Elected Officials: the County Judge who represents the whole County and four County Commissioners who each represent a different geographical area—a precinct.
San Marcos Fire Department	San Marcos Fire Department is dedicated to providing a well-trained, motivated, and diverse team of professionals who deliver excellence in prevention, educational programs, and emergency response services to our community in a safe, responsible, and efficient manner.
City of Houston	Houston offers opportunity for all and celebrates its diversity of people, economy, culture, and places. Houston promotes healthy and resilient communities through smart civic investments, dynamic partnerships, education, and innovation. Houston is the place where anyone can prosper and feel at home.
Bexar Office of Emergency Management	The BCOEM coordinates the Bexar County emergency management efforts in order to prepare, prevent, plan, respond and recover from all-hazard events.

Cumulus Technologies	A UAS Consultancy Company that helps individuals, enterprises and school districts integrate and operate UAS Systems.
Little Elm Emergency Management	The Town of Little Elm Emergency Management Department is tasked with coordinating the Town’s emergency management operations. Duties of the Emergency Management Department include the development of emergency plans, organizing disaster preparedness training, disseminating emergency management educations information to residents and conducting preparedness drills.
Hays County	The Hays County Office of Emergency Management (HCOEM) serves the citizens of Hays County by directing and coordinating emergency management and homeland security programs to prevent/mitigate, prepare for, respond to, and recover from emergencies and disasters.
Granite Defense Technologies	A UAS training and consulting company.
City of Joshua Fire Department	A local, primarily volunteer, fire department.
Texas Department of Transportation	A forward-thinking leader delivering mobility, enabling economic opportunity, and enhancing quality of life for all Texans.
Pearland Police Department	The mission of the Pearland Police Department is to provide professional service to the community and develop citizen partnerships to work together to enforce laws, reduce fear and positively impact the quality of life in Pearland.
Houston Fire Department	HFD will be recognized as a premier public service organization, respected and admired by our peers and the community as the most diverse, innovative, and efficient public safety provider in the world.
Hays County Sherriff	A law enforcement agency serving the citizens of Hays County.



# Background, Discussion and Recommendations

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*Drones played an important role in the immediate aftermath of Hurricane Harvey. Emergency responders, insurance companies, NASA, railway operators, private industry, and state government agencies all were among drone users during Harvey.*

*– Eye of the Storm Report, P. 139*

Unmanned Aircraft Systems or Unmanned Aerial Systems (UAS), also known as drones, flying robots, unmanned aerial vehicles, can serve a significant role in the response to and recovery from disasters. During Hurricane Harvey, UAS were used to locate people in need of rescue, to identify areas of flooding, and to evaluate the damage caused by the hurricane. These efforts identified a clear need to standardize their use and the training required to operate them, as well as a mechanism to increase their availability to emergency responders during disaster events.

## Definitions

To provide clarity in the recommendations, the study group has used the following terms as defined below:

- 1) **Data Specialist:** Data Specialist collects, stores, and disseminates data and intelligence collected for a defined incident. The Data Specialist provides tactical and strategic information for incident command teams.
- 2) **FAA Part 107 Certification:** The [Federal Aviation Administration \(FAA\)](#) rules for small unmanned aircraft (UAS) operations other than model aircraft – [Part 107](#) of FAA regulations – cover a broad spectrum of commercial and government uses for drones weighing less than 55 pounds.
- 3) **Designated Mission Volunteer:** a person or persons designated by Law Enforcement, Emergency Management, Fire Fighter, and/or a ranking official to assist in a mission and to be utilized during a specific mission.
- 4) **Emergency Responder:** A member of law enforcement, emergency management, fire fighter, medical services, or a designated mission volunteer.
- 5) **Mission Ready Packages (MRPs):** Specific response and recovery resource capability that is organized, developed, trained, and exercised prior to an emergency or disaster.
- 6) **Night Operations (Night Ops):** sUAS operations between the end of evening civil twilight and the beginning of morning civil twilight, as published in the American Air Almanac, converted to local time.
- 7) **Remote Pilot in Command (RPIC, Remote PIC or Remote Pilot):** A person who holds a remote pilot certificate with an sUAS rating and has the final authority and responsibility for the operation and safety of an sUAS operation conducted under part 107.
- 8) **Small Unmanned Aircraft system (sUAS):** A small unmanned aircraft (weighing less than 55 pounds) and its associated elements (including communication links and the components that control the small UA) that are required for the safe and efficient operation of the small UA in the National Air Space.
- 9) **sUAS Flight Team (Flight Team):** An aircraft operations team typically consisting of, but not limited to, a Remote Pilot, Visual Observer, and Data Specialist. The UAS Team operates under the Air Operations Branch or designee, as established by Incident Command.

- 10) **Texas Government Code Section 423 – Use of Unmanned Aircraft:** The statute addresses unmanned aircraft being used to capture an “image.”
- 11) **Image:** Any capturing of sound waves, thermal, infrared, ultraviolet, visible light, or other electromagnetic waves, odor, or other conditions existing on or about real property in this state or an individual on that real property.
- 12) **Visual Observer (VO):** Visual Observer (VO). A person acting as a flight crew member who assists the small UA remote PIC and the person manipulating the controls to see and avoid other air traffic or objects aloft or on the ground.

## RECOMMENDATIONS

To provide the level of support and leadership necessary to successfully expand the use of sUAS in disaster response and recovery, the study group has identified three key recommendations: development of a statewide sUAS Council, creation of regional sUAS groups under the statewide council, and development or procurement of software to manage the flight teams, mission ready packages, data obtained, and sUAS airspace.

### Recommendation 1: Statewide sUAS Council

The Statewide sUAS Council would be composed of members of the regional sUAS groups, representatives of the Texas Division of Emergency Management, and such other members as necessary as determined by TDEM. The Council would be responsible for:

- 1) Developing and maintaining the sUAS policy, mandatory training and certification requirements, sUAS eligibility and maintenance requirements, and operational procedures for the program;
- 2) Developing and maintaining the template repository of sUAS program documents for jurisdictions and entities wanting to operate a sUAS program;
- 3) Developing and posting mission assignments for flight teams and Regional Response sUAS Coordinators based upon requests from TDEM through Air Operations Branch of the SOC;

The study group recommends that the Statewide sUAS Council develop policies which would address the following issues:

- 1) That Mission Ready Packages be flexible in order to allow for expansion or reduction as the situation warrants;
- 2) That Mission Ready Packages be developed on a case by case basis;
- 3) That Mission Ready Packages include local an emergency medical services and/or law enforcement component if available and appropriate;
- 4) That a Regional sUAS Coordinator be assigned for radio frequency deconfliction and landing zone coordination when multiple flight teams are assigned to one location;
- 5) That Remote Pilots in Command (RPICs) be certified under Part 107 Remote Pilot requirements;
- 6) That RPICs be required to complete the following Emergency Management Courses:
  - a. IS-100c – Introduction to the Incident Command System;
  - b. IS-200c – Basic Incident Command System for Initial Response;
  - c. IS-700b – An Introduction to the National Incident Management System;
  - d. IS-800c – National Response Framework, An Introduction; and
  - e. IS-2200 – Introduction to FEMA Operational Planning (Suggested).
- 7) That RPICs successfully complete a National Institute of Standards and Technology (NIST) training course once every year;

- 8) That RPICs complete regular flight requirements for each sUAS platform which they will operate including:
  - a. A minimum of 3 take offs and landings within the last 90 days;
  - b. A minimum flight time of no less than 30 minutes or the duration of one battery, whichever is longer, within the last 90 days; and
  - c. Night flights based upon waivers and functional training as needed.
- 9) That sUAS platforms be regularly maintained and the documentation provided to the Regional sUAS Group to be logged in the tracking system;
- 10) That all sUAS flight teams and regional coordinators will communicate within the Texas Statewide Interoperability Channel Plan (TSICP);
- 11) That a data management system be put in place to manage the tracking of the sUAS teams, equipment, training, state missions, and video streaming;
- 12) That any permissions/waivers required by the state or federal government to conduct sUAS operations will be obtained by the council or SOC Air Operations Branch prior to flights;
- 13) That any data obtained by the sUAS operations is not to be disseminated by any individual or entity without the express written permission of the Texas Division of Emergency Management;
- 14) That call signs for Flight Teams be identified in the mission assignment;
- 15) That regional response coordinators should be located at the DDC level and coordinate mission request and airspace when multiple sUAS teams are operating in the area;
- 16) That sUAS flight teams meet mission ready package requirements; and
- 17) That the council considers all potential local, county, state and federal sUAS resources when developing policies.

## **Recommendation 2: Regional sUAS Groups**

To provide greater accessibility and response, the study group has also recommended that the sUAS program include the development of Regional sUAS Groups based upon the six TDEM regions. Each regional group in coordination with the other regions and the Statewide sUAS Council would be responsible for the following items:

- 1) TDEM representatives in each region will coordinate the membership of the regional group with active sUAS entities in the region;
- 2) Each Regional group should consist of an official hierarchy;
- 3) Ensuring Remote Pilots in Command (RPICs) meet standards and training requirements set by the Statewide sUAS Council;
- 4) Evaluating members of the sUAS Flight Team and agency training programs;
- 5) Identify locations for NIST Testing in Region;
- 6) Verify completion of regular flight requirements as determined by the Statewide sUAS Council;
- 7) RPICs successfully complete Regionally Approved NIST Testing Per Year (100% in 25 min testing period);
- 8) Data Management of the members, training, certifications, equipment maintenance, deployments and data archive consistent with standards set by the Statewide sUAS Council;
- 9) At a minimum each region will maintain Standard Operating Procedures and Policies in line with the Texas Statewide sUAS program; and
- 10) Verify local participating sUAS training programs meet minimum training standards which include:
  - a. Knowledge of Texas Government Code Section 423;
  - b. Minimum of 3 take offs and landings within the last 90 days; and

- c. Mapping and Navigation;
- d. Search and Rescue; and
- e. Night Operations for teams with night capabilities.

### Recommendation 3: Resources

To successfully implement the sUAS Statewide Council and begin development of the necessary flight teams and sUAS resources, the following resources will be necessary:

- 1) Currently the state uses DroneSense which can handle the requirements identified. Data requests during a disaster may require additional cost for an enhanced license to meet data capacity loads. With this type of software, the following actions will be possible:
  - a. Tracking of the sUAS teams, equipment, training, and state mission deployments for the program.
  - b. Capturing flight data and telemetry to provide airspace situational awareness for multiple Remote Pilots in Command operating in limited airspace; and
  - c. Video Streaming and data storage to collect and manage the take from multiple sUAS.
- 2) Procurement of a sUAS Command Trailer which could be relocated to sUAS operational areas to manage the tasking of multiple sUAS flight teams or mission ready packages would be essential. From a practical standpoint, having a trailer available in multiple regions would enhance capabilities and improve sUAS support during major disasters, allowing for deployment to multiple areas simultaneously. A sUAS Command Trailer should include an operating space for 4-6 individuals and should be self-sustaining including the following with estimated costs: \$50,000 Trailer; \$10,000 15KW Generator; \$18,000 computer equipment; \$50,000 communications equipment; \$6,000 satellite internet system; \$125,000 mobile sUAS detection system; \$6,000 office furniture and fittings; and \$10,000 cameras, networking and security equipment.
- 3) Personnel time and travel as well as meeting space from supporting agencies for regional and state meetings and deployments.

### Recommendation 4: Legislative Changes

- 1) The task force recommends an amendment to Texas Government Code, Chapter 423, Subsection 423.001 to add a definition for “unmanned aircraft systems” for clarification. The recommended definition is: “a powered, aerial vehicle that: 1) includes aircraft, pilot, and ground control systems; 2) uses aerodynamic forces to provide aircraft lift; 3) can fly autonomously or be piloted remotely; 4) can be expendable or recoverable; and 5) does not carry a human operator.

#### AN ACT

relating to debris management and other disaster recovery efforts.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:

SECTION 1. Chapter 423, Government Code, is amended by amending Subsection 423.001 to read as follows:

Sec. 423.001. DEFINITION(S). In this chapter,;

(1) "Image" means any capturing of sound waves, thermal, infrared, ultraviolet, visible light, or other electromagnetic waves, odor, or other conditions

existing on or about real property in this state or an individual located on that property.

- (2) “Unmanned Aircraft Systems” means a powered, aerial vehicle that:
- a. includes aircraft, pilot, and ground control systems;
  - b. uses aerodynamic forces to provide aircraft lift;
  - c. can fly autonomously or be piloted remotely;
  - d. can be expendable or recoverable; and
  - e. does not carry a human operator.
- (3) “Unmanned aircraft” has the same meaning as “unmanned aircraft systems.”
- 2) The task force recommends amendments to Texas Government Code, Chapter 423, Subsection 423.002(9). This section provides authorization for the capture of images by drones by an individual operating under state or local law enforcement authorities or is acting on behalf of a state authority in certain circumstances. To ensure that the capture of images through the use of drones during disaster response and recovery is authorized at both the state and local levels, the following language could be added: 1) in 423.002(9) add “and local” after “state” and 2) add a new subsection (D) to 423.002(9), “(D) carrying out disaster response and recovery efforts due to a natural or manmade disaster.”

#### AN ACT

relating to debris management and other disaster recovery efforts.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:

SECTION 1. Chapter 423, Government Code, is amended by amending Subsection 423.002(9) to read as follows:

(9) if the image is captured by state or local law enforcement authorities, or a person who is under contract with or otherwise acting under the direction or on behalf of state or local authorities, for the purpose of:

(A) surveying the scene of a catastrophe or other damage to determine whether a state of emergency should be declared;

(B) preserving public safety, protecting property, or surveying damage or contamination during a lawfully declared state of emergency; ~~or~~

(C) conducting routine air quality sampling and monitoring, as provided by state or local law; or

(D) carrying out disaster response and recovery efforts due to a natural or manmade disaster and training or exercise flights to prepare for these efforts.

# Steps to Development and Implementation

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## Detailed next steps

Due Date	Objectives	Team Assignments	Status
October 1, 2020	Initial PMP Review and Approval	Chief Kidd	
NLT November 1, 2020	Submission of the report to each member of the Legislature		

## **For More Information**

For more information, please contact TDEM Division Chief Blair Walsh at [blair.walsh@tdem.texas.gov](mailto:blair.walsh@tdem.texas.gov).