



LONE STAR UAS
CENTER OF EXCELLENCE & INNOVATION

Type B Proposal Presentation

TEXAS A&M UNIVERSITY-CORPUS CHRISTI

Lone Star Unmanned Aircraft Center of Excellence



Began in 2013 with \$600k investment from the
City of Corpus Christi through
Type A Board funding

Funding & Investments Results to Date

Estimated Funding Received to Date: \$22.4M

Examples include:

- State of Texas Legislature to expand program in general and then additional funding to expand statewide emergency management support
- Funding for operations supporting the NASA Urban Air Mobility UAS Traffic Management (UTM) project in Corpus Christi, TX
- A multi-year sub agreement with Embry-Riddle Aeronautics University (ERAU) to support the transformation of the Federal Aviation Administration (FAA) Next Generation Air Transportation System
- Engagement with a leading oil industry partner to support efforts to develop a strategy to conduct a Beyond Visual Line-of-Sight (BVLOS) program for fixed linear and other asset inspections
- Executed Master Research Agreement (MRA) with the HSU Educational Foundation of northwest Florida to develop and extend LSUASC training, education, and aeronautical research model



Jobs Created Working Directly for LSUASC

- Full time positions: 30 in various levels of aviation maintenance, research engineering, avionics, business management, aviation, grant administration, IT systems technology, software applications development, logistics, operations, and project management
- FTE's are expected to reach 50 by FY23
- This does not take into account any indirect economic benefit or job creation

Selected Community-Related Accomplishments

- May-June 2015: Damage assessment and infrastructure inspection, Blanco River flooding, Wimberley, TX
- September-October 2017: Hurricane Harvey recovery
 - Damage assessment and infrastructure inspection, Port of Corpus Christi, Corpus Christi, TX
 - Critical infrastructure assessment-oil rigs and transfer stations, Texas Intracoastal Waterway
 - Damage assessment of the Holiday Beach and Rockport/Fulton Airport, Rockport/Fulton, TX
 - Bridge and critical infrastructure, Fort Bend, TX
 - Vessel damage assessment, Port Mansfield, TX
- June-July 2019, NASA Technical Capability Level (TCL) 4 demonstration, Downtown, Corpus Christi, TX
- April-July 2020: Support to Nueces County on beach closure reporting during pandemic
- July 2020: Post Hurricane Hanna assessment of Bob Hall Pier damages



Current Areas of Research and Expertise

- Disaster response
- Infrastructure inspection
- Environmental monitoring
- Precision agriculture
- Oil and gas industry support
- Port development and innovation
- Aerial mapping
- Package Delivery

Examples of major LSUASC partners include:

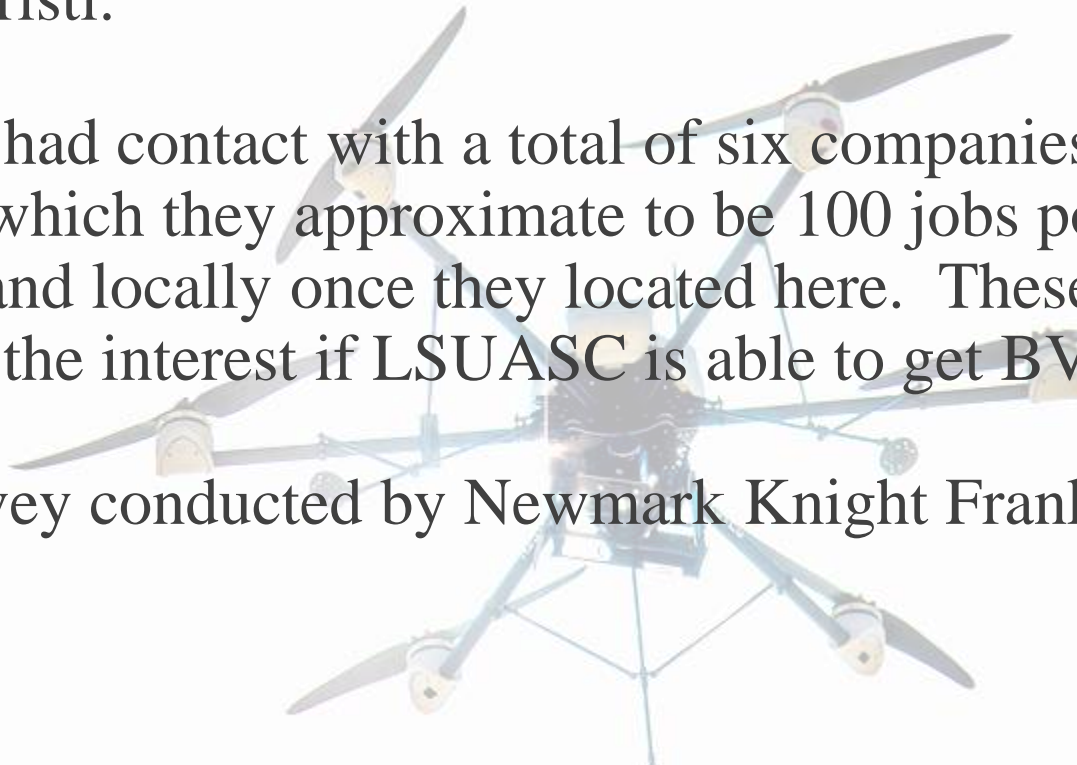
- Fortune Top 5 Retail Corporation (Package Delivery)
- Fortune Top 10 Oil and Gas Partner (Fixed Linear Asset Inspection)
- Fortune Top 75 Enterprise Software & Retail Services (Package Delivery)
- Fortune 500 Aerospace and Aircraft Manufacturer
- Fortune 500 Railroad Company (Fixed Linear Asset Inspection)
- Various UAS Startup Companies (Various Business Cases)
- The Federal Aviation Administration (FAA)
- The National Aeronautics and Space Administration (NASA)
- Texas State Agencies (AgriLife, TDEM, TEEX, TEES)

Educating the Workforce/Student Participation

- Student Participation at the undergraduate and graduate level has seen an average of 5 positions per year since inception; highest number at 12 in 2019 immediately before the pandemic
- The plan is to onboard 10 or more student positions in FY22
- Student interns take part in Engineering, Operations, Technical Writing, Marketing, Media, Human Factors, Administrative, and Software Development opportunities
- LSUASC internship program moves students toward incredible opportunities with Texas corporations and agencies and Federal agencies who looking for UAS expertise
- This request would allow TAMU-CC to greatly expand these internship opportunities.

Working with CCREDC for Corpus Christi

- LSUASC works side-by-side with the CCREDC attending industry shows and presenting to groups like the United States Department of Commerce to attract business to Corpus Christi.
- CCREDC has thus far had contact with a total of six companies with employees ranging from 5 to 25, which they approximate to be 100 jobs possible. Those companies would expand locally once they located here. These are not promises but are a good estimate of the interest if LSUASC is able to get BVLOS corridor.
- Targeted Industry Survey conducted by Newmark Knight Frank lists drones as the top industry to pursue.





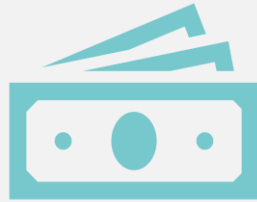
Future Opportunity

- In the mid-2010s, the FAA began allowing commercial drone flights in the U.S.
- Since then, the commercial drone market, including drone manufacturers and tech suppliers, has taken off alongside the consumer drone market.
- Growing demand for drones from the commercial and government sectors helped expand the total U.S. drone market size to \$100B in 2020, according to Goldman Sachs.
- The global sale of commercial drone units is expected to more than double between 2020 and 2025.

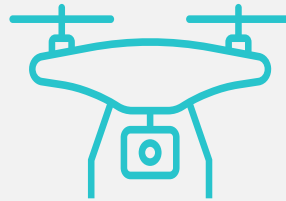
Benefits of This Request

- This request will provide the missing pieces needed to attract UAS businesses to Corpus Christi; thereby, maximizing our status as the home of only 1 of 7 UAS FAA test sites in the nation, the only one in Texas.
- This request will support efforts to diversify Corpus Christi's economy.
- This request will support innovation and drone integration into local industries, like port industries.
- This request will position Corpus Christi as a leader in UAS related emergency management locally and nationally.
- This request will enhance educational and research opportunities for TAMU-CC students.

Lone Star UAS Center of Excellence & Innovation (LSUASC)



\$4 million to expand LSUASC capabilities and grow economic development opportunities related to drones in Corpus Christi



Beyond-Visual-Line-Of-Sight (BVLOS) Study

Second Mission Control Center

Supporting Centers with Drone-Related Activities



Beyond-Visual-Line-Of-Sight (BVLOS) Study



Beyond-Visual-Line-of-Sight (BVLOS) Study

- Goal: to make Corpus Christi an approved BVLOS site in order to attract more drone-related businesses
- Airspace study to identify airspace that can be accessed for public or commercial use
- \$250,000 includes partial cost of staff time and one new position (Aviation Safety Officer)



Personnel

Aviation Safety Officer – critical component of the airspace analysis and safety case development for the BVLOS study. A new, full-time position located downtown within the Operations Center

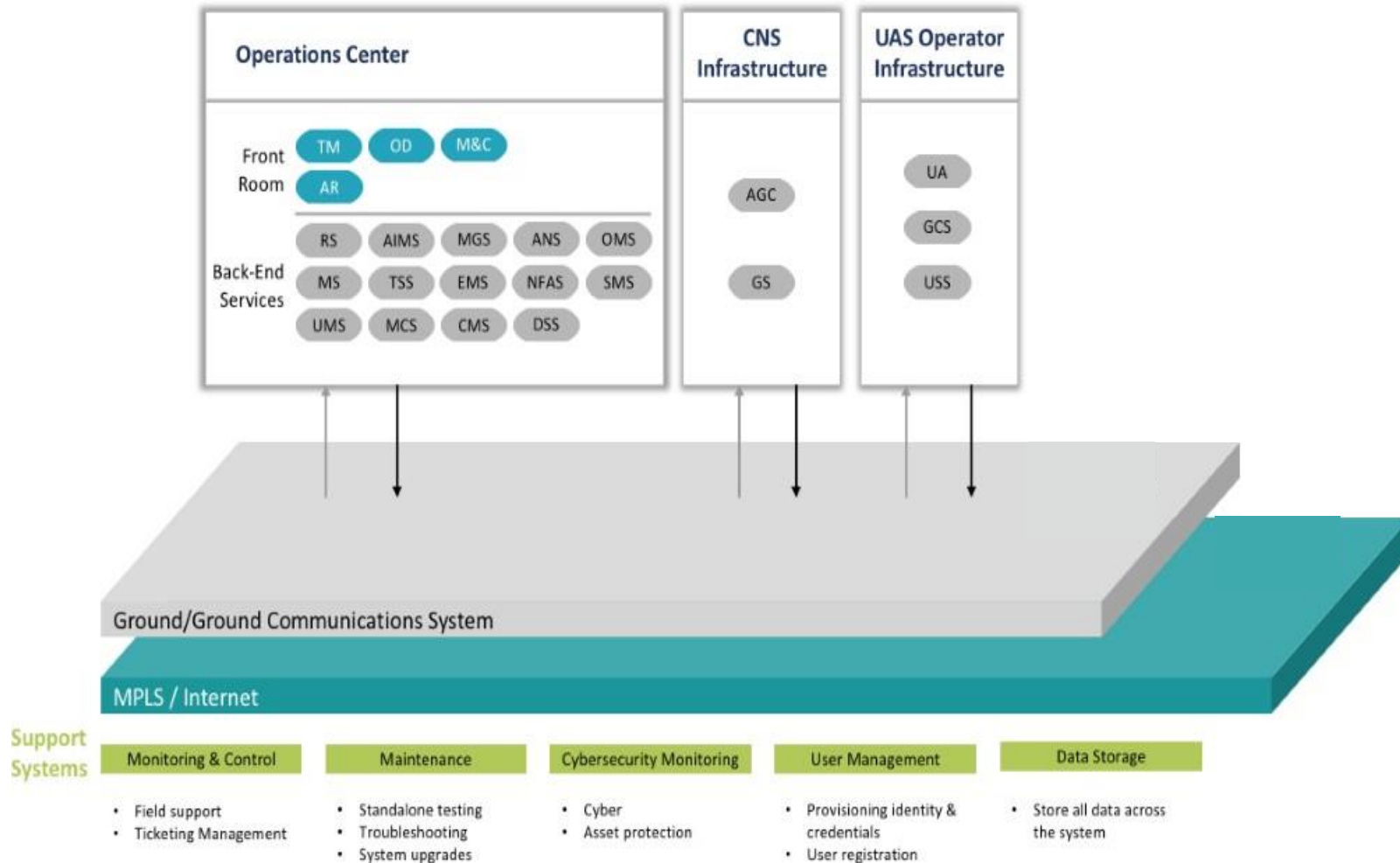
Economic Impacts

- The BVLOS study would act as a springboard for an FAA Certificate of Authorization (COA) to conduct BVLOS operations in Nueces County. Drawing on LSUASC's current flight operations at Port Mansfield, a successful FAA certification would generate approximately **\$2 million annually** in federal awards, supporting a staff of 24 personnel.
- In addition, drawing on a **\$2.1 million** NASA award for UAS Traffic Management's (UTM) Technical Capabilities Level (TCL) 4 testing activities in 2019, a BVLOS COA approval would potentially generate similar UAS testing exercises annually:
 - One major exercise, involving about 36 participants for 4 weeks (about \$1.5 million award)
 - Up to four smaller exercises, each involving about 6 participants for one week (about \$0.5 million total awards)



Second Mission Control Center

Second Mission Control Center



- Located in University's downtown building
- Training and development catalyst for technologies and drone operations processes
- \$2.13M includes system architecture and support services, hardware & software, one new position (Senior Software Developer) and space renovation and buildout

Why do we need a second Mission Control Center?

- Demand already exists between the Mission Control Center at Flour Bluff (MCC-FB) and the Mobile Mission Control Center housed in Port Mansfield
- Downtown building has survived many hurricanes and will be equipped to function as a continuity site/emergency operations center
 - Emergency power supply
 - Capable of functioning during weather event
- MCC-FB is not hardened to support operations during extreme weather
- With the projected growth in UAS activities, the two MCCs will be able to simultaneously handle multiple flight missions for improved throughput and efficiency



Operations Center Support –Thales

- Thales is a world leader in Air Traffic Management services and is a desirable UAS innovation and technology partner for TAMU-CC and South Texas
- Thales' Operations Center design is predicated on deployed, operationally proven components engineered to provide advanced autonomous services, systems monitoring, test and validation, and BVLOS operations support



Personnel

Senior Software Developer – responsible for supervising the installation of hardware and software components of the new Operations Center. Leads software development team in the integration of new UAS technologies. A new, full-time position located downtown within the Operations Center



Supporting Centers for Drone Related Activity

Support for Centers with Drone-Related Activities

- Supporting centers with drone-related activities in the downtown building
- \$1.62M to renovate and buildout space based on a prorated portion of anticipated square footage of space
- Will allow Flour Bluff building to be dedicated to drone-related business incubation





Office of Economic Development and Industry Partnerships

- Catalyst for economic development with a focus on drones and autonomous systems
- Innovation and technology transfer hub for South Texas
- Facilitate partnerships with private sector and complement LSUASC's efforts to attract drone-centered businesses to Corpus Christi
- Impetus for drone innovation district, working closely with regional economic development agencies to accelerate job creation and help small businesses

Innovation in Port Studies (iPORTs)

- Mission: promote economic development of the region around port-related industries and development of a skilled workforce
- LSUASC and iPORTs will work jointly on developing and deploying drone-related technologies for relevant industries
- Will advance, develop and disseminate knowledge in port-related sciences and technologies





Center of Innovation in Emergency Management (CIEM)

- Emergency Operations Center and research and development center for emergency management
- LSUASC actively participates in emergency response and recovery efforts, including drone missions, and trains with Texas Task Force One for future emergencies
- Provides training and development space for innovative technologies, best practices and effective & efficient processes for emergency management

Awarded State Funding for Lone Star Unmanned Aircraft System Emergency Management – \$3M for the biennium

This fund enhances LSUASC's ability to provide Unmanned Aircraft Systems (UAS) public service to the State of Texas by supporting critical emergency response and disaster relief demands. Some expected outcomes include:

- Development and publication of a communications plan, along with requisite procurement of communication assets, to allow further integration with first responder and disaster response personnel in a post-disaster degraded environment, including prepositioning of communications assets.
- Partnership between the FCC, the FAA, and Lone Star for state-wide authorization(s) for technologies and communications designed to supplement disaster response efforts.
- Development and procurement of prototype UAS technologies to complement current disaster missions where risk to first responder personnel is deemed high, i.e. HAZMAT, Swiftwater, etc.
- Research and development of growing sensor technologies that enable detection of people and animals, fires, and leaks of gases and other hazardous materials that enable UAS to identify, alert, and dispatch an appropriate emergency response team to rescue and/or remedy the situation.
- Research and development of airborne detection and avoidance systems that enable multiple aircraft to safely and simultaneously operate in a congested environment in order to maximize search and rescue efforts.

Investment in Downtown Building

Purchase Cost	\$2.3M
Building Core (Basic building system replacement)	
Roof replacement with roof top entertainment area	\$1M
Elevator replacement (replacing 2 elevators, freight elevator)	\$700K
Structural	\$500K
Mechanical	\$2M
Plumbing	\$850K
Electrical	\$1M
IT/AV	\$750K
Building Core Total Cost	\$6.8M
Architectural Buildout (cost dependent on buildout type and number of rooms and walls constructed)	
5 Levels 1 (78,000 gsf)	\$11.3M
TOTAL INVESTMENT IN DOWNTOWN	\$20.4M
Renovation request from Type B	\$2M
<ul style="list-style-type: none"> 9.8% of total expenditure into downtown to support Innovation Growth 	

Estimate Staff & Guests in Downtown Building

Staff	
Mission Control	6 – 8
Office of Economic Development	5
iPORTS	13 – 16
Emergency Management Center	7
Archives	2 – 4
Center for Economy & Environment	14
Gallery	2 – 4
Business Incubator	6 – 8
Total Staff	55 – 66
Guests	
All spaces will regularly host individual visitors and small groups	
Business Incubator Clients	10 – 15
Gallery, archives, and rooftop space will all host groups/events	
Archives – visitors doing research, for example a high school senior class	20 – 30
Gallery lecture	50 +
Rooftop Event	100 +

Timeline

		Year 1	Year 2	Year 3	Year 4	
BVLOS Study						
	Salary-Aviation Safety Officer	\$ 116,000				
	Study	\$ 67,000	\$ 67,000			
2nd Mission Control Center						
	Thales Support	\$ 790,000	\$ 710,000			
	Hardware		\$ 120,000			
	Salary-Senior Software Developer	\$ 130,000				
	Renovations (timeline flexible)		\$ 380,000			
Supporting Centers in Downtown Building						
	Renovations (timeline flexible)			\$ 1,620,000		
TOTAL		\$ 1,103,000	\$ 1,277,000	\$ 1,620,000		\$ 4,000,000

