



THE UNIVERSITY OF TEXAS AT EL PASO
NASA MIRO CENTER FOR SPACE EXPLORATION AND TECHNOLOGY RESEARCH

cSETR Facilities

On Campus Capability

- Goddard's Combustion & Propulsion Research Facility | 4,280 sq. ft.
 - Including 600 sq. ft. Ultra-high velocity projectile resistance combustion bunker
- Challenger-Columbia Structures & Materials Research Facility | 3,340 sq. ft.
- Spacecraft Design & Engineering Facility | 3,960 sq. ft.
- Computational Laboratory | 735 sq. ft.
- Secured Research Facility
 - High Security Area including (5) Program Spaces, Data Center, & Conference Room | 4,000 sq. ft.
 - (8) Collaborative workspaces | 200 sq. ft. each
 - FSO & Security Administrative Spaces | 800 sq. ft.
- Aerospace Education Lab | Outreach Facility | 1210 sq. ft.

Off Campus Facilities

- Technology Research & Innovation Acceleration Park | Fabens, TX
 - General Aviation Airport | 4200 ft. & 2300 ft. Runways | 400 acres
 - HQ Site | Integration Facility | 10,200 sq. ft.
 - Alpha Site | Pilot Scale Testing Facility | 18 Acres
 - Aeronautics Research & Learning Facility (*Planned*) | 10,000 sq. ft.
- Tornillo Unmanned Aerial System Flight Test Range | Tornillo, TX | 600 acres
 - 400 ft. Runways | Test Support Facility
 - LSTAR Radar | 100 KW Power Trailer
- Spacecraft Design and Engineering Facility | Francis St, El Paso, TX | 8,840 sq. ft.
 - Including | Satellite Ground Station | 2.4 m S-b& antenna | 436 MHz UHF antenna
 - (9) Training Rooms, (10) Office Spaces, & Student Collaborative Space

Partner Facilities

- Horizon City Aerospace & Defense Accelerator | Horizon City, TX | 2,400 sq. ft.
 - Small Business Incubator
- TMD Space & Defense | Horizon City, TX | 350 acres
 - Administrative Area, 21,000 sq. ft. warehouse, Hazardous Material Assembly Area with (10) Missile Assembly Cells, (7) Storage Magazines, Firefighting Support Building with 2,000 gal/min pump capacity & 250,000-gal water storage
- Lockheed Martin Missile & Fire Control Store Front (*underdevelopment*) | University Towers at El Paso, TX | 1800 sq. ft.

Combustion/Propulsion Systems & Equipment

- | | |
|---|--|
| <ul style="list-style-type: none"> • Ultra-high velocity projectile resistance combustion bunker • Strand Burner System • Cryogenic Methane • Delivery System • Cryogenic Oxygen Delivery System • Multi-Fuel Manifolds & Feed Systems for Liquid & Gaseous Fuels • Multistage Compressors • Intermediate Pressure Turbine Combustor (IPTC) • Multipurpose Optically Accessible Rocket Combustor (MOAC) • High Speed Combustion Test Facility (SCT) • Low Pressure Combustor • Flat-Flame Burner • Twin-Flame Counter Flow Burner • Oxy-Fuel Burner • High speed particle Image Velocimetry (PIV) • Stereo-Particle Image Velocimetry | <ul style="list-style-type: none"> • Instrumented Rocket Thrust St& • Laser Doppler Velocimetry • Phase Doppler Particle Analyzer • Planar Laser Induced Fluorescence (PLIF) • TR PIV-PLIF Systems • Color Schlieren Deflectometry • Ultra-High-Speed Intensified Imaging • Emission Analyzers • Gas Chromatograph • Laser ignition facility equipped with a CO2 laser (Synrad Firestar ti-60) & mass spectrometer (Pfeiffer Omnistar GSD320) • Hot-wire ignition facility • High-speed video camera (Vision Research Phantom v1210) • High-resolution video camera (Sony XCD-SX90CR) • Infrared video camera (FLIR SC7650E) |
|---|--|

Environmental Testing Equipment

- | | |
|--|--|
| <ul style="list-style-type: none"> • Vibration testing up to (max.11G, 40 lb load) test article (Shaker: LW127.123-500D12) with testing Random: 350 lbs rms, Sine force: 500lbs force pk, & Shock: 1000lbs pk | <ul style="list-style-type: none"> • Vacuum chamber reaches 1.4 10⁻⁶ torr & 5 thermocouples (K-type) |
|--|--|



THE UNIVERSITY OF TEXAS AT EL PASO

NASA MIRO CENTER FOR SPACE EXPLORATION AND TECHNOLOGY RESEARCH

Mechanical Testing

Materials testing systems

- o Instron Corporation, Model 5866, with 10kN & 0.5kN load cells, for tension, compression & flexural testing
- o MTS Systems Corporation, Model 370 servohydraulic system, with 100kN load cell, for static & dynamic testing including durability, fatigue crack growth, high & low cycle fatigue, fracture toughness, tension, compression)
- o MTS Corporation, Model 370.02 Axial-torsional Servohydraulic system, with 25kN load cell, 200N-m torque rating for static & dynamic testing including durability, fatigue crack growth, high & low cycle fatigue, fracture toughness, tension, compression

Equipment for Preparation of Powder Mixtures

- Stainless steel glovebox isolator (Terra Universal S-300)
- Planetary ball mill (Fritsch Pulverisette 7 Premium Line)
- Shaker ball mill (SPEX SamplePrep 8000D)
- Roller ball mill (Labmill-8000)
- Three-dimensional inversion kinematics tumbler mixer (Bioengineering Inversina 2L)
- Acoustic mixer (Resodyn LabRAM)
- Sieve-shaker (Octagon 2000)
- Hydraulic press (Carver)
- Ultrasonic cleaner (Branson 1510)
- Digital hot plate stirrer (Scilogex MS7-H550-Pro)
- Precision balance (Mettler Toledo ML 303E)

CNC Machining & Tooling

CNCs

- o Mill: MAZAK Nexus 410A-II, HAAS, & BRIDGEPOINT Interact 412
- o Lathe: KENTOCN KLR-12
- Welders: Tig Welder & Mig Welder
- Grinding Stations
- Saw: Vertical saw [GROB INC] & Horizontal saw [DM 10- HYD MECH]
- Conventional Machines
 - o Mill: 2 SHARP-precision machine tools
 - o Lathe: 2 Leblond Regal & 1 Delta Rockwell

Electronics

- Cadence OrCAD Allegro Schematic/PCB Layout Software Suite
- cSETR HPC & MICIT DAQ System – NI LabVIEW Based, modular, ethernet enabled, real-time Data acquisition & control system for High Pressure Combustor & Propulsion systems
- Function generators, Power supplies, Sourcemeters, Logic analyzers, Oscilloscopes
- Texas Instruments DSP development platform & Code Composer Studio Platinum
- Microprocessor development kits
- SMTMax QM1500 Pick & Place Machine
- SMTMax AE-F600C ReFlow Oven
- NI USRP Software Defined Radio Device packages: ethernet enabled, real-time software controlled, 70Mhz – 6Ghz frequency ranges, up to 56Mhz instantaneous bandwidth.
- Library of passive & active components
- Software: Code Composer Studio
- Arduino development boards
- Laser microwelder (Miyachi LW5AG)

Unmanned Aerial Systems

- Unmanned Traffic Management (UTM) systems
- 28 Autonomous Long Range/Long Endurance aircrafts; fixed & rotary wing
- Autonomous SLAM aircraft able to navigate in confined GPS-denied environments
- Advanced Sensors & applications, to include: EO, Multispectral, IR, UV
- Advanced post-processing capability to produce a range of research-grade data products
- UAV ground & flight academics

Software

CAD & Design

- CAD: Pro-E (Creo), NX 10 UGS (Siemens), & SolidWorks
- Manufacturing: SurfCAM & FeatureCAM

Analysis Software

- CHEMKIN | ASPEN-HYSYS | ANSYS | Nastran MD (MSC)

Schematic Capture, SPICE, & PCB Design Software

- Proteus Design Suite 7.9 Release
 - o ISIS Profession Release Schematic Capture | Spice Advance Simulation | ARES Professional Release PCB Capture
- Cadence Design Systems 16.6 Full Suite
 - o Allegro Design Entry CIS | PSpice AD | PCB Editor

Outreach Equipment

- Two Flight Simulators
- Wind Tunnel
- Ozobots Color Sensory Detectors
- Lego Mindstorms Workstations
- 3D Pens
- 10 Computer stations (two students per station)
- Little Bits-Space Kits
- Zero gravity drop box