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
- 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
- Tornillo Unmanned Arial 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-band 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

- 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

Environmental Testing Equipment

- 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
- 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)
- Vacuum chamber reaches 1.4 10-6 torr & 5 thermocouples (K-type)
Mechanical Testing
Materials testing systems
- Instron Corporation, Model 5866, with 10kN & 0.5kN load cells, for tension, compression & flexural testing
- 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
- 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
- Mill: MAZAK Nexus 410A-II, HAAS, & BRIDGEPOINT Interact 412
- Lathe: KENTOCN KLR-12
- Welders: Tig Welder & Mig Welder
- Grinding Stations
- Saw: Vertical saw [GROB INC] & Horizontal saw [ DM 10- HYD MECH]
- Conventional Machines
  - Mill: 2 SHARP-precision machine tools
  - 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
- 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)
- Proteus Design Suite 7.9 Release
  - ISIS Profession Release Schematic Capture | Spice Advance Simulation | ARES Professional Release PCB Capture
- Cadence Design Systems 16.6 Full Suite
  - Allegro Design Entry CIS | PSpice AD | PCB Editor

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