

PROJECT PROFILE / ADVANCED MUNITIONS TECHNOLOGY COMPLEX (AMTC) NEW FACILITIES IMPROVE MUNITIONS TESTING AND DEVELOPMENT

Modern facilities for advanced capabilities are paramount to the mission of the U.S. Air Force. The new Advanced Munitions Technology Complex will support advanced technology for research on the next generation of military munitions across 18 safe and sustainably designed laboratory facilities.



EXPANSIVE COMPLEX WILL ENABLE EXPANDED MUNITIONS RESEARCH

Unique new facilities require significant blast engineering, structural design to mitigate vibrations, and substantial site infrastructure improvements.

PROJECT STATS

CLIENT

U.S. Army Corps of Engineers (Mobile District) and Air Force Civil Engineer Center

LOCATION Eglin Air Force Base, Florida

ANTICIPATED COMPLETION

2022 (construction of first phase)

18 LABORATORY FACILITIES FOR RESEARCH AND DEVELOPMENT

> **90K** SQUARE FEET IN NEW FACILITIES

30+ BLAST DOORS PROTECTING LABORATORIES

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CHALLENGE

At Eglin Air Force Base, the Air Force Research Lab (AFRL) is developing technologies to prototype and create advanced munitions. Specifically, AFRL is developing nanoenergetic technologies, which are considered a promising new direction for modern ordnance because nanoparticles have the potential to achieve a higher energy release, leading to more powerful explosions.

To provide suitable facilities for development of the next generation of explosives formulations, AFRL is adding the Advanced Munitions Technology Complex (AMTC). The new complex comprises 18 new facilities supporting seven laboratories on the 100-acre High Explosive Research & Development (HERD) campus.

SOLUTION

AFRL turned to the Mobile District of the U.S. Army Corps of Engineers and Burns & McDonnell to provide complete design services, including the development of contract drawings, technical specifications and engineering calculations, as well as construction phase services. We conducted on-site design charrettes and offered numerous design options to guide discussions around site development and facility concepts. The explosive nature of the materials to be handled in the new facilities had a significant impact on design. In one of the most unique aspects of this project, blast effect loads and designs had to be carefully reviewed and incorporated by our team alongside our team of subcontractors. More than 30 blast doors will protect the laboratories. Also, the main blast door of the Advanced Dynamics Laboratory is designed to sustain repeated intentional detonations of up to 50 pounds of net explosive weight in a controlled environment. Facility labs and spaces were configured to account for both intentional testing and accidental detonations. In addition to blast effects, we evaluated wall and roof construction for fragmentation from detonations. Fragment shields were detailed and designed between spaces for personnel protection.

Throughout the design process, safety has remained a top priority. In addition to the blast engineering, the AMTC complies with all applicable U.S. Department of Defense antiterrorism and force protection requirements.

The new facilities will have one-of-akind laboratory testing equipment. To improve munitions testing and development, the design required acoustical analysis and mitigation of vibrations from low-flying,



Rendering of the Revolutionary Ordnance Characterization Center, with the Complex for Agile Processing of Energetics visible in the background.

low-frequency-emitting aircraft. To reduce the impact of vibrations, the structures will utilize heavy mass walls and roof construction. Large inertia slabs were designed to isolate equipment from the foundation using resilient pad material. Extremely sensitive equipment was isolated using environmentally controlled enclosures to mitigate vibrations, acoustics and electromagnetic interference.

Other site development plans across the large HERD campus included a standard storage bunker and site improvements, such as security perimeter fences, roads and parking lots. Expansion of the existing water distribution system is designed to provide adequate fire protection for each new facility in the complex.

PROJECTED RESULTS

We are collaborating with ARFL to achieve LEED Silver certification for the campus. The design addresses sustainable goals by focusing on water savings, energy efficiency, and materials and resources selection. The entire AMTC was designed using building information modeling (BIM) to integrate models for near-realtime coordination and to resolve potential design conflicts before the construction phase.

We will also provide commissioning of the individual buildings within the complex, focusing on optimizing building performance, reducing energy use and improving indoor air quality. The HERD campus must remain operational during construction. Since the AMTC is in the center of the HERD campus, we developed detailed construction phasing plans to avoid impacting ongoing operations. The design plans included staging and laydown areas to limit disruption of the HERD campus.

Upon completion, the AMTC will give researchers and operators appropriate facilities to safely test and examine the potential benefits of nanoenergetic technology. The long-term result will be weapons systems with more precise delivery capabilities and the potential to minimize risk of collateral damage.

