



Air Force Civil Engineer Center

Integrity - Service - Excellence

Robotic Needs for the Air Force Civil Engineer



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Overview

- **The Air Force Base**
- **AFCEC Overview/Organization**
- **CXA Mission**
- **Branch Overview**
- **Robotics Capabilities**
- **Upcoming Programs**
- **Questions**



Air Force Physical Plant Profile

161 Air Force Installations

Family Housing



74,500 Homes
3 x Bermuda

Facilities



615M Sq Ft of Buildings
3 x Target
205 x Dallas Cowboys stadium



9M Acres of Land
3 x Connecticut



Plant Replacement Value
\$240B PRV
Revenue of entire
US restaurant industry

Airfields



184M Sq Yds of Pavement
169 x Atlanta
Hartsfield-Jackson Airport
Dormitories



66,300 Dorm Rooms
 $\frac{1}{2}$ total hotel rooms
in Las Vegas

We Fly, Fight and Win in Air, Space and Cyberspace from Installations



Installations Enable

Enduring Air Force Contributions

Installations

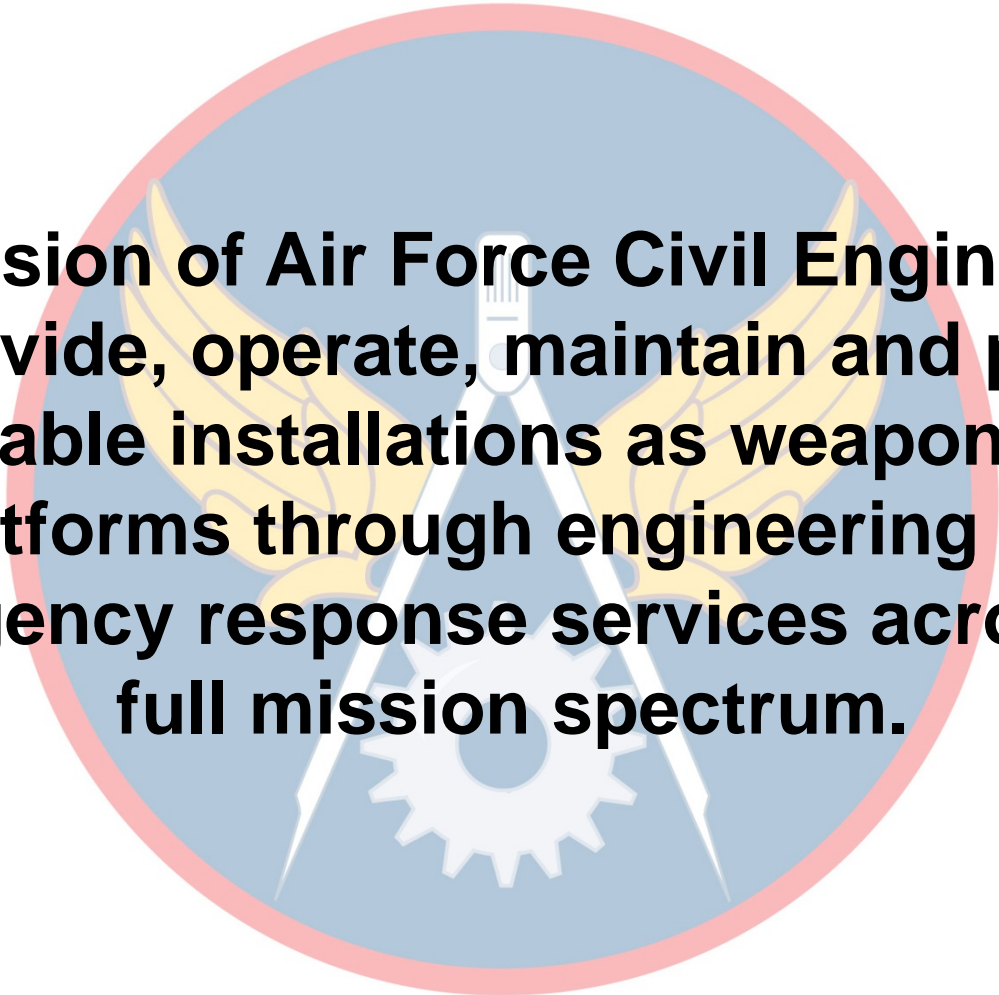
- Power projection platforms -- CONUS, OCONUS, expeditionary
- Enable air & space superiority
- Assure Cyberspace access
- Provide infrastructure necessary to hold targets at risk anywhere across the globe
- Facilitate ISR exploitation
- Host robust C2 networks
- Build partnerships with allies & developing nations by forward basing US forces



“Air bases are a determining factor in the success of air operations. The two-legged stool of men and planes would topple over without this equally important third leg.” General of the Air Force Henry H. “Hap” Arnold



CE Mission

A large, faint circular graphic is centered behind the mission statement text. It features a blue background with a red border. Inside the circle are yellow wings, a white gear, and a white compass rose.

The mission of Air Force Civil Engineering is to provide, operate, maintain and protect sustainable installations as weapon-system platforms through engineering and emergency response services across the full mission spectrum.



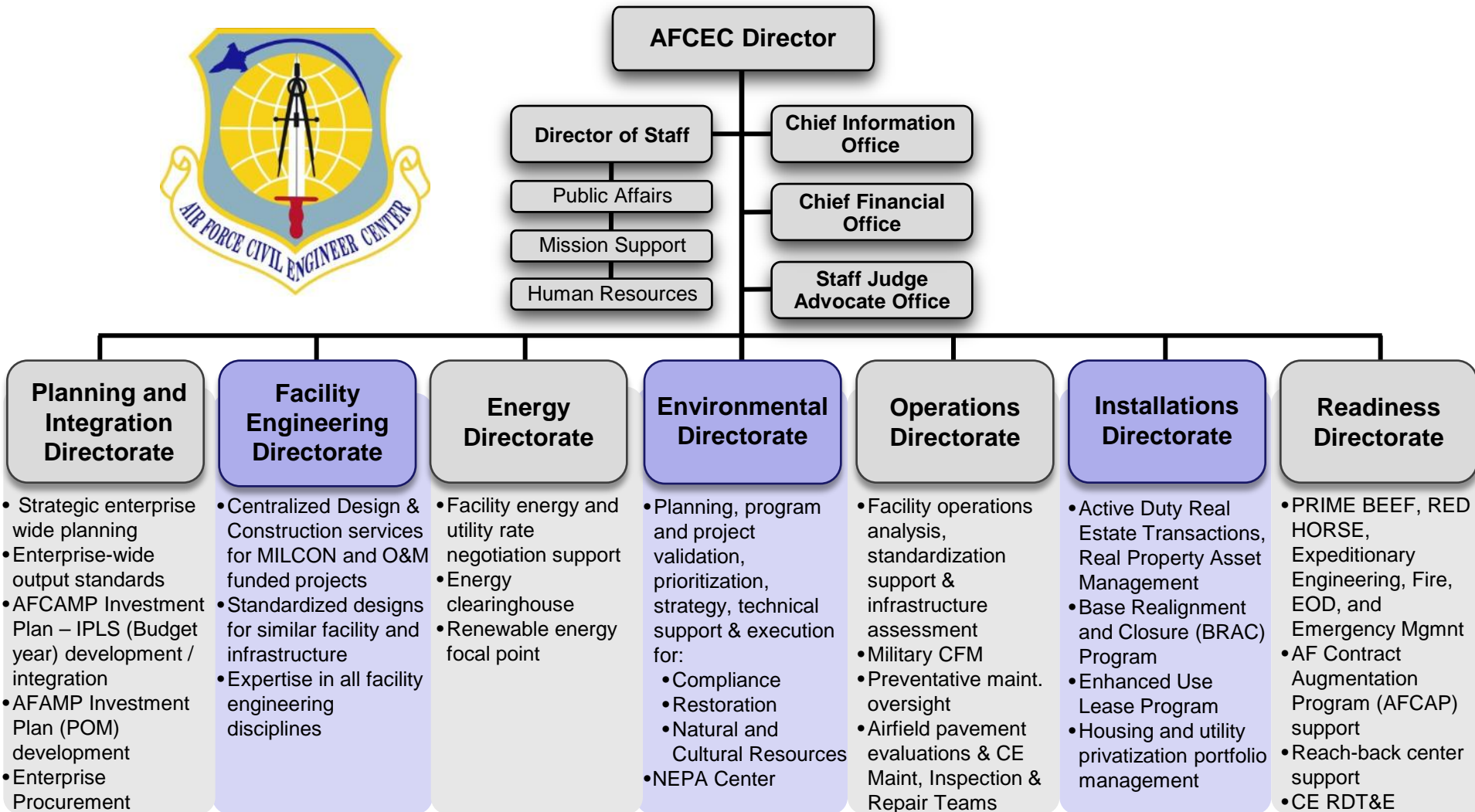
AFCEC BLUF

- AFCEC activated 1 Oct 12
- Cornerstone of Civil Engineering Transformation
 - Merges legacy FOA roles and missions (AFCEE, AFCESA, AFRPA)
 - Further **centralizes** some major command and installation functions
 - Leads AF effort to transform and optimize key civil engineering capabilities and programs





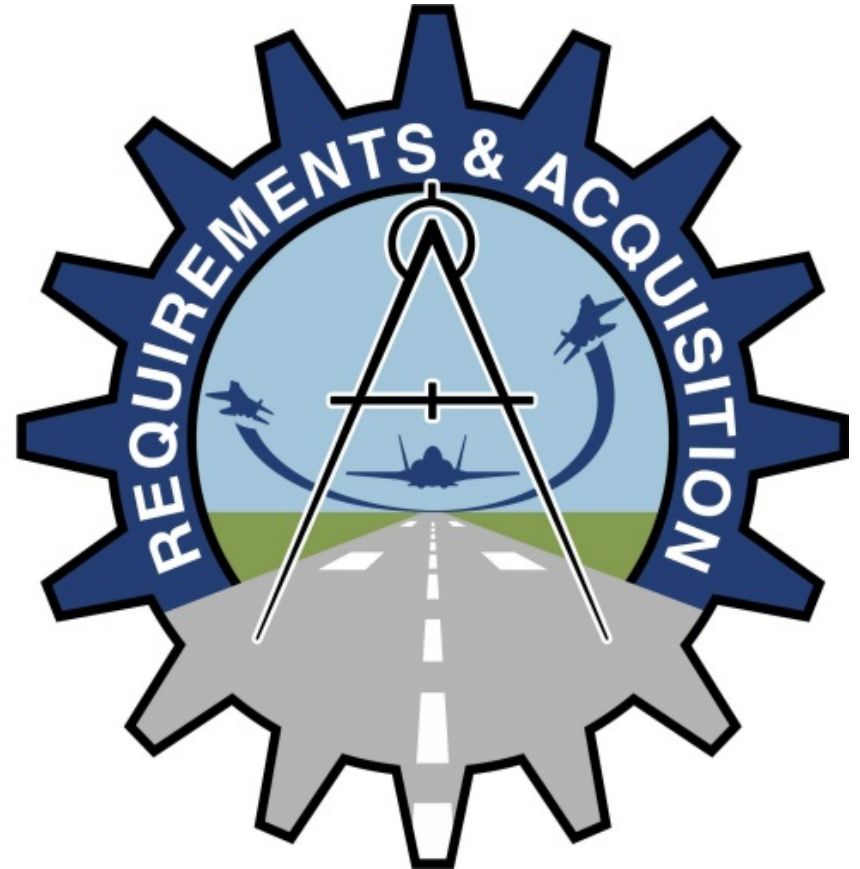
AFCEC Organization





Requirements & Acquisition Division Mission

***Derive requirements, develop
materiel solutions, and provide
contingency support, to enable the
Air Force Civil Engineer mission***





Airbase Acquisition Branch

RDT&E, Procurement, Sustainment (CXAE)

- **Acquisition; develop, evaluate, and field technology**
 - **What AFRL at Tyndall did in the past - *and more***
 - **Develop (RDT&E) and field new technology (including prototypes)**
 - **Provide CE unique test & evaluation facilities/ranges**
 - **Evaluate commercially available technology/equipment (COTS)**
 - **Modify existing equipment**
 - **Procure and sustain material solutions**
 - **Provide expert technical advice and reach back support**
 - **And do the 'HELP ME NOW' items**



Airbase Acquisition Branch

RDT&E, Procurement, Sustainment (CXAE)

- **Personnel**

- Civilian and military engineers and scientists
- Contract technical support
- Onsite technical performers depending on project workload

- **Contract Mechanisms**

- BAA solicitation for RDT&E tasks
- 25 current contracted technical efforts including off-site tasks

- **Facility Overview**

- 4 compounds, 20 buildings, 143 acres
- 12 miles from this facility/lab
- 104,000 square feet of laboratories overall



Robotics & Unmanned Systems

RDT&E, Procurement, Sustainment **(CXAE)**

**Unmanned systems & equipment technologies
to support the full range of CE Missions**





Robotic Technologies

- **Research & Development Areas**
 - Airfield Damage Repair & UXO Response
 - EOD Robotics & Technologies
 - Fire & Emergency Services
 - Robotics for Airbase Operations and Support
- **Benefits to the Warfighter**
 - Reduced manpower/time/cost
 - Increased safety of personnel
 - Technical expertise
 - Reduction of development time with existing systems and new capabilities



AOE
Excavator



MACE



Airborne
ARTS
In theater



BOMBOT





Onsite Capabilities

- **Engineering & Rapid Prototyping Facility**
 - 26,000 square feet
 - Machining
 - Metal fabrication
 - Electrical – Electronics
- **Advanced Robotics Development Facility**
 - High-speed vehicle track
 - All-terrain wooded track
 - UAV operational area
 - Amphibious—open water access
 - Airfield Damage Repair & UXO Response

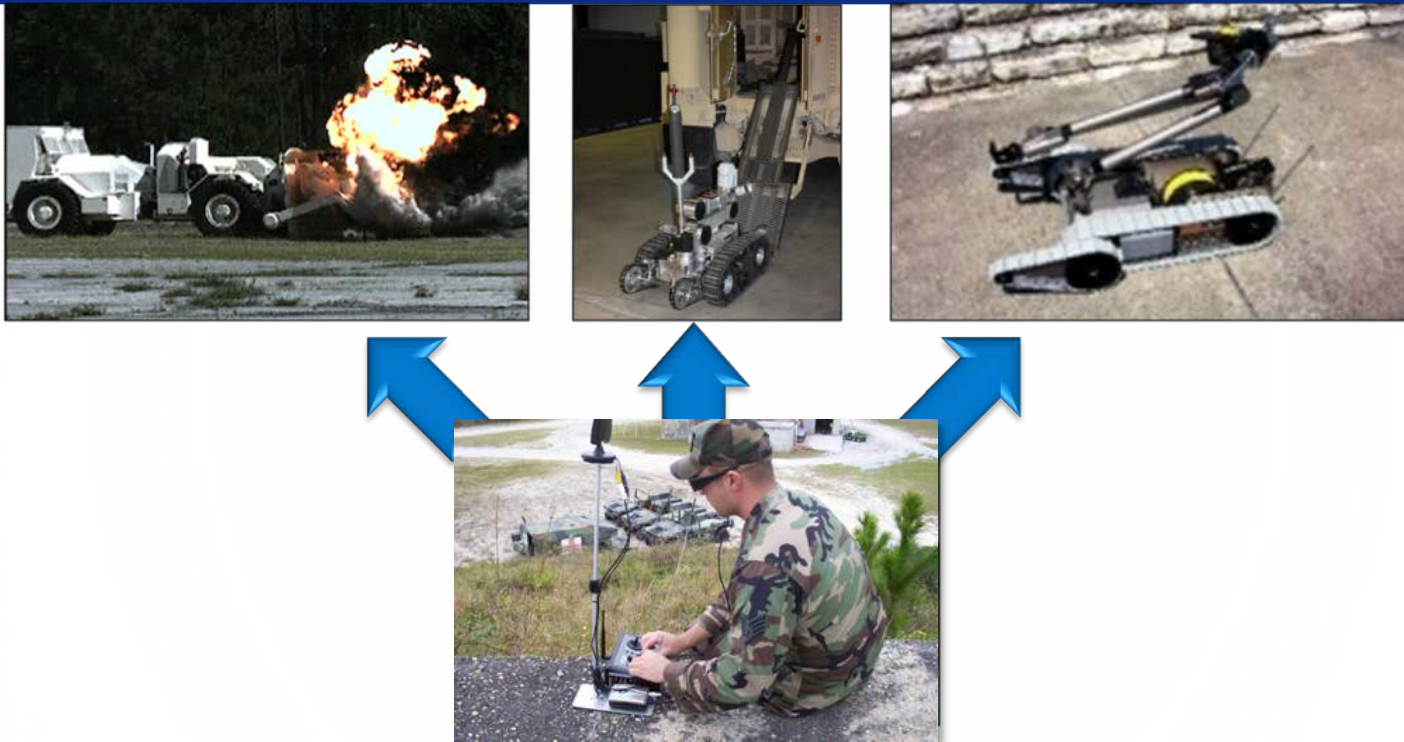




Upcoming Programs



Robotic EOD Technologies



- **Develop technologies for unmanned EOD operations**
- **Focus on detection and neutralization of conventional military munitions**
- **Provide rapid response and neutralization of IEDs**
- **Increase operational capability of EOD personnel by decreasing mission time and increasing stand-off**
- **Employ state-of-the-art sensors on robotic systems**



COTS EOD Robot

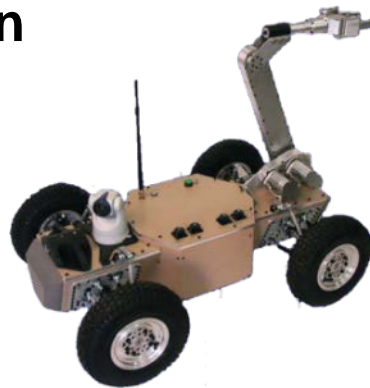
- **Back-Packable system weighing less than 30 lbs**
- **Remotely perform EOD operations - reconnaissance and assessment**
- **Increases capability of EOD personnel against larger threat spectrum**
- **Targeting 160 systems for deployment and training**
- **10 year support requirement**
- **RFP estimated Q1 FY15**





Multiple UXO Removal System

- **System of systems (UGV and UAV) to detect and remove ordnance from airfields**
- **Utilizes a GIS based application utilized to visualize and process airfield damage inputs**
- **Able to identify, remove, and render safe ordnance left on airfield with minimal human interaction**





Airfield Damage Repair

- **Actions required to prepare airfield operating surface to establish or sustain operations at a forward operating location**
- **Recover the airbase in hours instead of days**
- **ADR operations spectrum includes**
 - **Open the airbase**
 - **Establish/robust the airbase**
 - **Operate the airbase**
 - **Repair the airbase**





Automated Airfield Construction and Repair



- **Unmanned ground vehicles automatically performing airfield construction and repair**
 - **Operation at 50-75% manned tempo**
- **Integrate robotic appliques for airfield construction equipment**
- **Implement multi-robot and convoy ops**
 - **Leader/follower**
 - **Coordinated material handling**
 - **Operations sequencing**
- **Develop network of robots that can navigate and repair damaged runways**



Unmanned Civil Engineering Operations



- **Automated ground systems to perform AF Civil Engineer Operations**
 - Aviation firefighting, hazardous incident response, aircraft decontamination, etc.
- **Integrate and control appliques or retrofit systems to existing AF platforms**
- **Demonstrate unmanned systems that minimize exposure to risks associated with hazardous operations**



Fire and Emergency Services

Minimize direct human interaction in hazardous operations

- Develop autonomous capabilities for aircraft firefighting/rescue operations
- Integrate appliques and sensors to provide remote fire detection and fighting ability
- Provide initial firefighting response



- Develop and integrate software and sensors for remote detection of CBRNE materials
- Provide detection of hazardous materials in threat environment or post disaster analysis
- Assessment via multi-spectral imaging and CBRNE sensors



Questions?

