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

½ 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

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

AFCEC Director

- **Director of Staff**
  - Public Affairs
  - Mission Support
  - Human Resources
- **Chief Information Office**
- **Chief Financial Office**
- **Staff Judge Advocate Office**

Planning and Integration Directorate

- Strategic enterprise wide planning
- Enterprise-wide output standards
- AFCAMP Investment Plan – IPLS (Budget year) development / integration
- AFAMP Investment Plan (POM) development
- Enterprise Procurement

Facility Engineering Directorate

- Centralized Design & Construction services for MILCON and O&M funded projects
- Standardized designs for similar facility and infrastructure
- Expertise in all facility engineering disciplines

Energy Directorate

- Facility energy and utility rate negotiation support
- Energy clearinghouse
- Renewable energy focal point

Environmental Directorate

- Planning, program and project validation, prioritization, strategy, technical support & execution for:
  - Compliance
  - Restoration
  - Natural and Cultural Resources
- NEPA Center

Operations Directorate

- Facility operations analysis, standardization support & infrastructure assessment
- Military CFM
- Preventative maint. oversight
- Airfield pavement evaluations & CE Maint, Inspection & Repair Teams

Installations Directorate

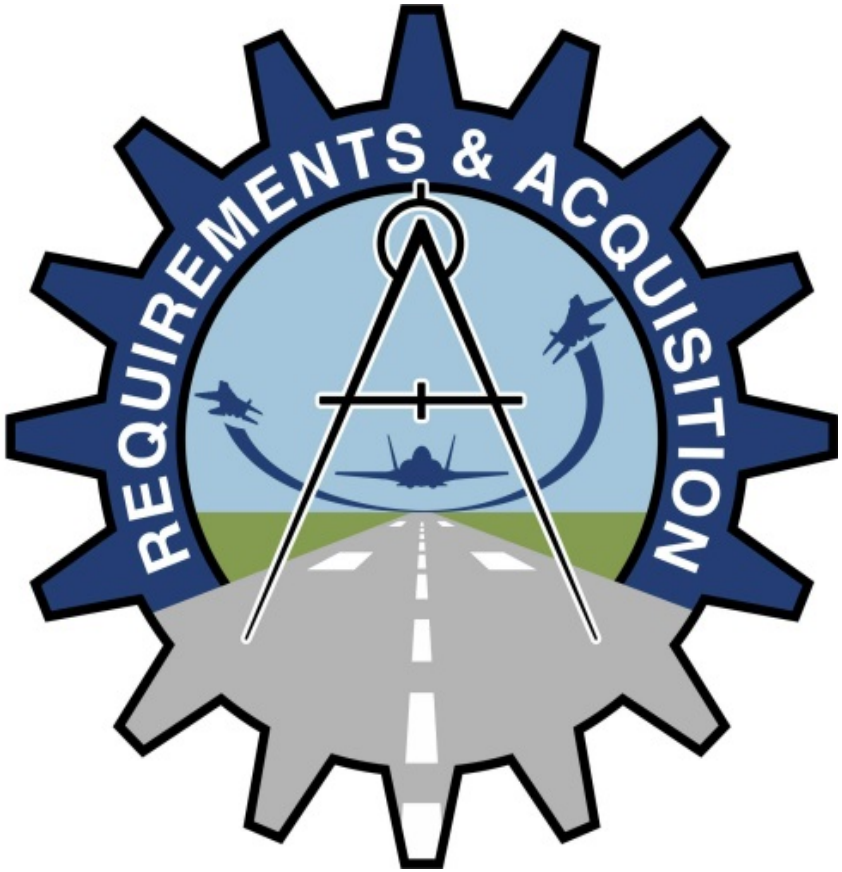
- Active Duty Real Estate Transactions, Real Property Asset Management
- Base Realignment and Closure (BRAC) Program
- Enhanced Use Lease Program
- Housing and utility privatization portfolio management

Readiness Directorate

- PRIME BEEF, RED HORSE, Expeditionary Engineering, Fire, EOD, and Emergency Mgmnt
- AF Contract Augmentation Program (AFCAP) support
- Reach-back center support
- CE RDT&E

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

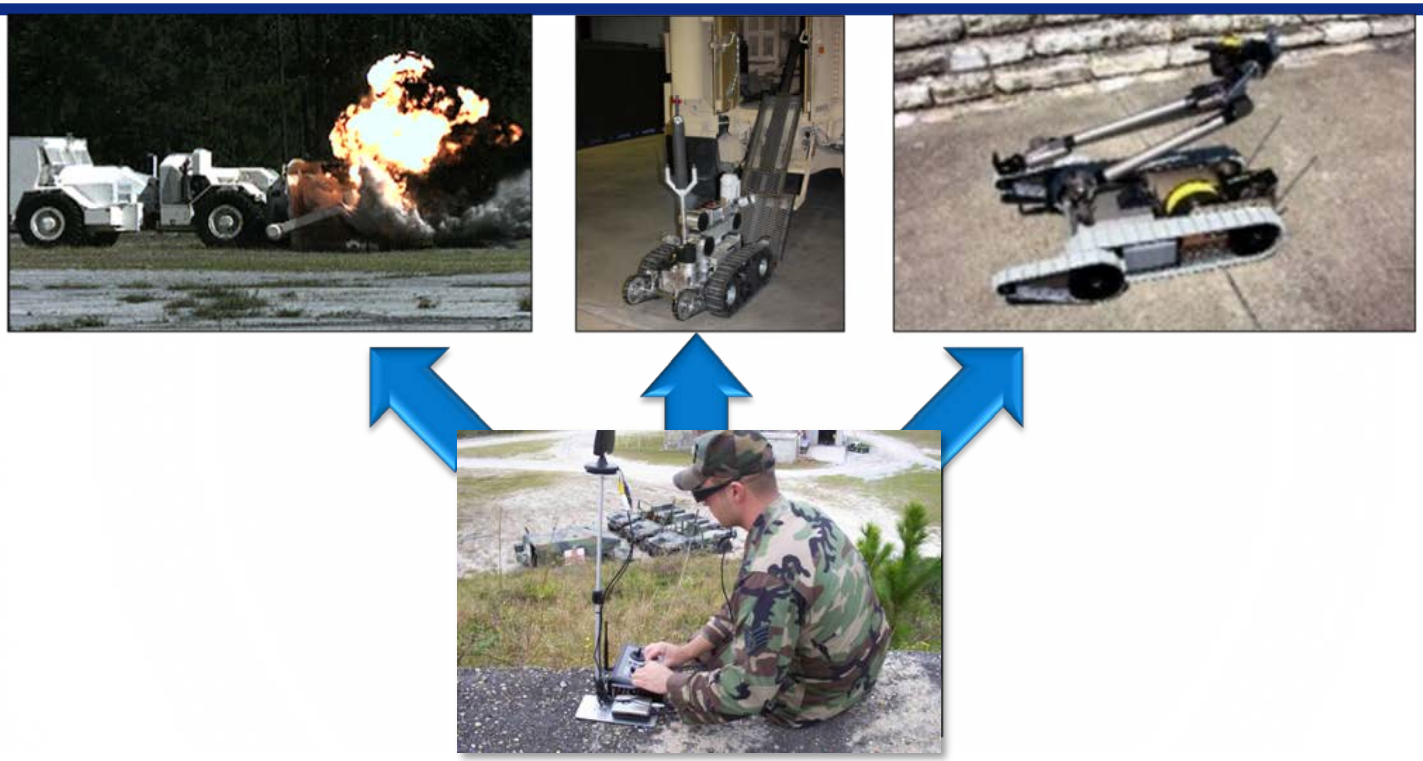
BOMBOT

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

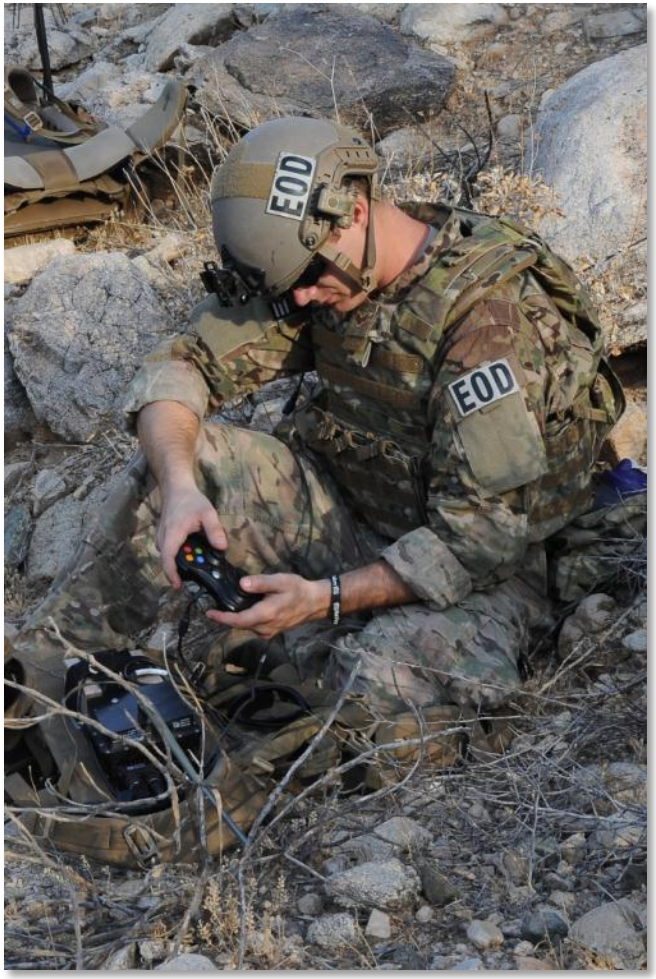
Robotic EOD Technologies



- **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**

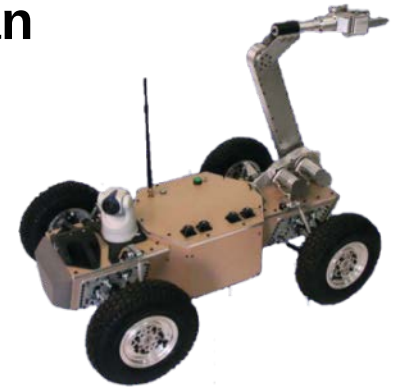
COTS EOD Robot

- **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?