

**ECBC ENGINEERING**  
Design→Build→Test→Support

# ENGINEERING DESIGN CAPABILITIES





# INTRODUCTION

Edgewood Chemical Biological Center (ECBC) Engineering designs its products to protect Warfighters and First Responders. The ECBC Advanced Design and Manufacturing (ADM) facilities provide customers with comprehensive design, analysis and prototyping services. Our design and prototyping facilities and personnel are dedicated to the cradle-to-grave development and support of Chemical Biological (CB) defense products.

ECBC Engineering integrated teams design for lifecycle engineering support, ensuring the accuracy of technical data (e.g., drawings, specifications and technical manuals). In addition, Engineering personnel redesign fielded items to meet new technical and operational challenges. Integrated design teams address all aspects of systems engineering to include maintainability, reliability and supportability.

ECBC Engineering specializes in rapid product development and accelerated evolution of fielded items to meet new technical and operational challenges.



# ADVANCED DESIGN AND MANUFACTURING

## ENGINEERING DESIGN AND ANALYSIS

ECBC Engineering maintains the latest technologies and qualified personnel to rapidly execute complex projects covering all aspects of design and development.



ECBC Engineering combines expertise in engineering, physical science and computational analysis.

### Capabilities

- Conceptual design
- Forty engineers, scientists and technicians
- Organized structure for rapid response ramp-up, as required
- Lifecycle support for custom low density items
- Integrated concept through product environment

### Equipment

- Certified SolidWorks© professional software and hardware
- SolidWorks©/Autocad©/ProEngineer©
- CosmosWorks© Finite Element Analysis (FEA)
- CosmosFlo© Computational Fluid Dynamics (CFD)
- Over 50 engineering design workstations
- 16,000 square foot design laboratory

## CONCEPTUAL MODELING AND ANIMATION

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ECBC Engineering supports interdisciplinary groups combining expertise in computer science, industrial design and digital animation.



ECBC Engineering emphasizes the creation of precise virtual and constructive models and realistic animations for concept development, capabilities demonstration, interactive training aids and informative multimedia.

### Capabilities

- Concept illustrations
- Engineering concept design
- Photorealistic images and proposals
- Multimedia training aids
- Microbiological and chemical renderings and animations
- Concept of operations presentation through animation and digital effects

### Equipment

- Torque 3D game engine for interactive multimedia
- SolidWorks©
- 3D Studio Max©
- Fume FX©
- Cubase© music production software
- Adobe Suite
- WACOM interactive pen displays

## RAPID TECHNOLOGIES

ECBC Engineering maintains the latest technologies and qualified personnel to rapidly execute complex projects covering all aspects of interdisciplinary design and development.



ECBC Engineering offers a state-of-the-art facility and provides rapid response concept-to-product solutions.

### Capabilities

- Rapid prototyping and 3D printing
- Reverse modeling, 3D data imaging and part inspection
- Room Temperature Vulcanization (RTV) tooling and urethane casting
- Scaled model making and part finishing

### Equipment

- Large multi-lab facility
- Sub-millimeter non contact laser scanners
- Touch probe portable coordinate measuring machine
- Three post processing rooms and paint booth/finishing lab
- Stratasys FDM Fortus
- 3DSystems SLA Viper, 3500 and 7000
- 3DSystems SLS Vanguard HS with stable temperature
- Objet Connex 500 multi-material 3D printer
- Z Corp. Spectrum Z 510 full color 3D printer
- MK systems vacuum casting machine

## ELECTRONIC DESIGN AND INTEGRATION

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### Capabilities

- Conceptual design
- Integrated electro-mechanical design
- Electronic circuit design, circuit board layout design, analysis and simulation
- Automated data acquisition
- Electronic module and cable assembly
- Real time software development
- Detector design leveraging current chemical biological detection technology and integration
- System integration software and hardware
- Personal computer board layout design
- FPGA design software
- SolidWorks©
- Analysis and circuit simulation



### Facilities

- Unmanned technology and robotics lab
- Two electronic prototyping labs
- Electrical integration high bay

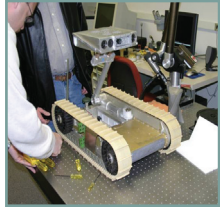
### Features

- IPC/EIA J-STD-001S soldering certification
- Altium personal computer board design software
- Integrated system design approach
- SPICE circuit simulation



## ROBOTICS LAB

ECBC Engineering provides customers with integrated design and development services for robotic, unmanned vehicle and hazardous material handling manipulator systems. Specializing in sensor integration and high performance robotic arms, ECBC Engineering can provide accelerated system deployment utilizing the combined assets of the ECBC Prototype Integration Facility.



### Capabilities

- Unmanned ground and aerial system integration
- Sensor and sub-system integration
- Anthropomorphic controller development
- Master/slave manipulator systems
- Specialized end effector development
- Haptics
- Toxic and hazardous material handling/interrogation

### Resources

- Robotic/Unmanned Aerial Vehicle/Unmanned Ground Vehicle (UAV/UGV) integration laboratory
- Integrated design, prototyping and fabrication
- Robotic and real time control programming assets
- Simulation and training tools

# ADVANCED TECHNOLOGIES PROGRAM MANAGEMENT

## ADVANCED CONCEPT TECHNICAL DEMONSTRATION JOINT CONTAMINATED SURFACE DETECTOR

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ECBC Engineering manages the Chemical, Biological, Radiological, and Nuclear (CBRN) Unmanned Ground Reconnaissance (CUGR) Advanced Concept Technology Demonstration (ACTD).



Upon Transition to the Joint Project Manager Nuclear, Biological Chemical Contamination Avoidance (JPM NBCCA), the Joint Contaminated Surface Detector (JCSD) will be integrated into the Stryker Recon Vehicle.

Already transitioned to JPM NBCCA, the CBRN Unmanned Ground Vehicle (CUGV) uses a robotic platform in limited access areas for chemical and radiological detection and to collect chemical vapor samples.

### Capabilities

- Will improve the detection speed of manned Nuclear, Biological, Chemical (NBC) reconnaissance (mounted) systems
- Can detect both liquid and solid contamination on the ground at maximum vehicle speeds
- Replaces the double wheeled sampling system with ultra violet raman surface detection

### Equipment

- JCSD
- CUGV

### ADVANCED CONCEPT TECHNOLOGY DEMONSTRATION CBRN UNMANNED GROUND VEHICLES

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ECBC Engineering conducts market research and trade off analysis to identify and acquire chemical and radiological detectors and unmanned robotics platforms to meet operational capability requirements.



ECBC Engineering configures integration packages consisting of detector hardware mounts and power/data cables, command/control and display software and firmware, chemical aerosol collection system, temperature and humidity sensors, and detector interfaces.

#### Capabilities

- Provides capability to conduct remote CBRN reconnaissance in restricted terrain and hazardous environments
- Stand-off assessment and detection (SSA/SSE)
- Detects Chemical Warfare Agents, Toxic Industrial Chemicals, gamma radiation, Volatile Organic Chemical Lower Exposure Limit and O<sub>2</sub> levels

#### Equipment

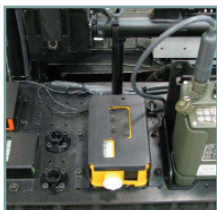
- Robotic Platform: iRobot PackBot EOD
- Multi RAE, LCD 3.2E, AN/UDR14 sensor and temperature/humidity sensor
- Sorbent tube sampler sensor

## ADVANCED TECHNOLOGIES PROGRAM MANAGEMENT

### ADVANCED CONCEPT TECHNOLOGY DEMONSTRATION CBRN PACKAGE FOR UNMANNED GROUND VEHICLES (UGVS)

#### Capabilities

- Will provide a Joint Architecture for Unmanned Systems (JAUS)-compliant sensor package which can be used by any unmanned vehicle with the capability to incorporate new sensors

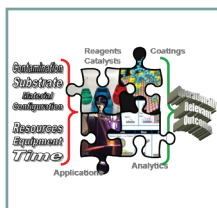


#### Equipment

- Sensors: Radiac Set AN/UDR-14, Joint Chemical Agent Detector, MultiRAE Plus, Ahura FirstDefender
- Platforms: TALON, ARES, Defender
- Warfare Agent (CWA) simulants

## ADVANCED TECHNOLOGY DEMONSTRATION - HaMMER ATD

ECBC Engineering manages the Hazard Mitigation, Material and Equipment Restoration (HaMMER) Advanced Technology Demonstration (ATD).



The HaMMER ATD will demonstrate an approach for a comprehensive response matrix for mitigating hazards associated with chemical and biological warfare agents.

### Capabilities

- Provide flexible systems that complementarily leverage individual technology element strengths to synergistically address hazard mitigation
- Provide a test bed to introduce new test protocols and measures of effectiveness

### Equipment

- Sealants and strippable coatings
- Decontaminants
- Agent disclosure spray technologies

# ACQUISITION PROGRAM MANAGEMENT

## INDIVIDUAL PROTECTION

ECBC Engineering provides timely, effective, technical and operational support for Joint Project Managers - Individual Protection (JPM-IP) hardware to champion quality improvements and to enhance equipment capabilities while reducing cost of ownership of IP items.



### Capabilities

- Support the M40/M42/M45/M48 series mask program sustainment and production efforts
- Monitor the M40/M42/M45/M48 series mask production at Pine Bluff Arsenal, AR to assist the program manager in preventing potential sustainment issues by minimizing disruptions
- Investigate and analyze logistical and technical improvements to the M40/M42/M45/M48 Protective Masks
- Support the Joint Equipment Assessment Program (JEAP) and the Chemical Biological Equipment Repair Team (CBERT)
- Develop knowledge of the M40/M42/M45/M48 mask systems and their associated defect categories used in field assessments
- Maintain knowledge of mask degradation trends through the JEAP and CBERT and provide support to the field and the program management office through briefings and other updates
- Travel to various sites to assess the M40/M42/M45 series mask program, as well as the JEAP and CBERT

### Equipment

- M40A1/M42A2 series protective mask
- M45 protective mask and M48 Apache aviator mask
- Joint Equipment Assessment Unit (JEAU) Edgewood
- Defensive Chemical Test Equipment (DCTE)
- Joint Service General Purpose Mask (M50/51)
- Joint Service Chemical Environment Survivability Mask (M52)
- M53 Chemical Biological Mask

## INDIVIDUAL PROTECTION - AIRCREW MASKS

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ECBC Engineering maintains the latest technologies and qualified personnel to rapidly execute complex projects covering all aspects of interdisciplinary design and development.



### Capabilities

- Ocular, oronasal and percutaneous above the neck CB protection
- Don/Doff in-flight
- Compatible with:
  - Integrated helmet and display sight system
  - Night vision goggles
  - All services life support equipment and systems

### Equipment

- Protective mask and hood
- Body-mounted blower

## INDIVIDUAL PROTECTION - RESPIRATOR ENGINEERING

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ECBC Engineering leverages extensive experience in the management, systems engineering, logistics and test of respiratory protective equipment to include:



- Market surveys
- Design
- Training
- Test execution
- Engineering studies
- Inspection

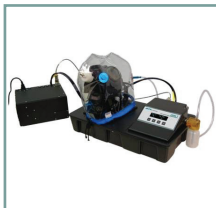


## INDIVIDUAL PROTECTION - TEST TECHNOLOGY

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### Capabilities

- Provide scientific, engineering and practical analysis of test systems that support IP hardware with respect to principally mask fit and serviceability
- Provides subject matter experts who solve complex engineering problems in support of urgent JPM-IP and Joint Program Executive Office (JPEO) needs



### Equipment

- M41 Protective Assessment Test System (PATS)
- Joint Service Mask Leakage Tester (JSMLT)

## COLLECTIVE PROTECTION

ECBC Engineering provides engineering support to the JPM for Collective Protection to facilitate the development, test, evaluation, procurement, fielding, sustainment and disposal of components and systems that collectively protect personnel and equipment from chemical, biological, radiological and toxic industrial chemical contamination.



### Capabilities

- Configuration management, engineering support, product improvement, design, prototyping, testing, technical analyses, acquisition expertise, lifecycle and sustainment support.

### Equipment

- Variable Speed Fan Filter Assembly, FFA400
- M49 Fixed Installation Filters (FIF)
- M13A1 and M8A3 vehicle mounted filtration systems
- M20A1 Simplified Collective Protection Equipment (SCPE)
- M28 Collective Protection Equipment (CPE)
- M48A1 gas-particulate filter, 100 CFM
- M93 gas-particulate filter unit, 100 CFM
- M98 gas-particulate filter set, 200 CFM
- Modular Collective Protection Equipment (MCPE)
- M20A1/M28 lightweight recirculation filter unit

## COLLECTIVE PROTECTION (CONTINUED)

ECBC Engineering has more than 70 years of experience in development, testing and application of collective protection systems. Building protection projects have involved applying collective protection to more than 100 facilities in the United States and abroad.



### Capabilities

- Collective Protection (CP) application assessments
- CP system certification
- System specifications and design assistance
- System procurement and installation
- System upgrades
- Contract administration/rapid response contracting
- Mobile asset protection
- System maintenance and surveillance
- Operating and maintenance manuals
- Vulnerability assessments

### Equipment

- M98 and M49 gas-particulate filters
- Housings: multi-cell radial flow, Filter Fan Assembly (FFA), Navy STD, M49 Fixed Installation Filter (FIF)

## DECONTAMINATION

ECBC Engineering manages the M12A1 Modernization Program. The M12A1 Modernization Program consisted of multiple design improvements as well as extensive system retrofitting.



The central accomplishment of the program involved replacing the gasoline engine with a diesel engine to bring the M12A1 compliant with Department of Defense (DoD) Directive 4140.43 on fuels standardization.

Other major accomplishments included implementing a single source fuel system for the pump and heater unit, upgrading outdated components and improving user interfaces.

### Capabilities

- System and subsystem design
- Product improvements
- Field upgrades and retrofitting
- Special and unique system modification projects

### Products

- M12A1 modernization program
- Unique test support equipment
- Terrain decontamination spray bar prototypes

### INNOVATIVE DEVELOPMENT ENGINEERING ACQUISITION

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ECBC Engineering is home to the Innovative Development Engineering Acquisition (IDEA) Team.



#### Capabilities

- Technology mining and new concept networking
- Rapid prototyping and fielding of novel CB detectors
- Novel approaches to innovation and problem solving

#### Services

- Low volatility detection
- FY09 fielding of the P3I of the M256A2
- Threat vulnerability assessments of emerging threats
- Advanced monitor of multiple hazards in water - M256A3
- RAIDON - nerve agent discriminator
- Chemical Agent Simulant Training Kit (CASTK)
- Advanced persistent agent sampling and concentration
- Special concepts training

# ACQUISITION PROGRAM SUPPORT

## INTEGRATED LOGISTICS SUPPORT

ECBC Engineering has a cadre of qualified personnel who assist project and logistics team leaders in acquiring and producing high-quality logistics planning and products, from concept through engineering development to production and fielding.



### Capabilities

Acquisition Logistic Support, Maintenance Engineering, technical publications and initial provisioning expertise authentication and publication of DA technical manuals assistance in preparing/refining:

- Supportability strategy and materiel fielding plan
- Logistics Statement of Work (SOW) for all lifecycle phases
- Level of repair analysis and maintenance planning
- Logistics and maintainability demonstration and report
- Operations and support cost analysis
- Diminishing Manufacturing Sources and Material Shortages (DMSMS)/Obsolescence studies and Unique Identification (UID) planning support
- Integrated Logistic Systems (ILS) documentation database input and tracking
- Joint Independent Logistics Assessment (JILA) leadership and membership

### PACKAGING

ECBC Engineering's Packaging Team stands ready to support Department of Defense (DoD) and Homeland Defense packaging issues. The team offers expertise in multiple areas of design, build, test and support, including legacy items and Program Manager (PM) programs, as well as on-site support for unique needs of the Warfighter.



#### Capabilities

- Design, build, test and support needs are addressed through team representatives on each program
- Training in blocking and bracing; packaging techniques; urgent requirements
- Army Packaging Policy Group representation
- Policy support to chair (G-4) and co-chair USAMC Logistic Support Activity (LOGSA) Packaging, Storage and Containerization Center (PSCC)
- Membership in standardization organizations
- Certified Military Packaging Professionals (MPPs)

#### Services:

- Configuration Management of packaging tech data
- Contract requirements development
- Monitoring and consulting
- Boots-on-the-ground support
- Hazardous material expertise for transportation
- General consultation for unique packaging needs

### STANDARDS AND SPECIFICATIONS

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ECBC Engineering provides specifications, standards and standardization services that enable program managers to develop, acquire and sustain the most technologically advanced chemical and biological defense equipment in support of the Warfighter and the Homeland.



#### Capabilities

- System performance specifications
- Program-unique item specifications
- Performance and detail defense specifications
- Commercial item descriptions
- Defense standards and handbooks
- Qualified products lists
- Standardization support
- Use and adoption of non-government standards
- Quality assurance provisions



### PRODUCT DATA MANAGEMENT

ECBC Engineering provides an online repository of Engineering data in support of the Center's overall mission and automates the ECBC Engineering data process to improve availability and reduce operating costs.



#### Capabilities

- Provides configuration management support for technical managers and maintains online Engineering Change Proposal (ECP) and other Change Management (CM) processes
- Prepares procurement package input workflows for all DLA managed items supported by ECBC
- Certifies Technical Data Packages (TDP)
- Provides Helpdesk support to all Product Data Management System Users
- Provides Notice of Revision (NOR) Incorporation workflow support for Advanced Design and Manufacturing (ADM), packaging, specification, and standards and safety teams



# ENGINEERING DIRECTORATE

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The Engineering Directorate operates under the auspices of the Edgewood Chemical Biological Center (ECBC). The Directorate has over 600 people with the main offices located on the Edgewood Area of Aberdeen Proving Ground, Md. with additional personnel stationed at Rock Island, Il. Additionally, Engineering Directorate personnel directly support the Joint Project Managers under the Joint Program Executive Office for Chemical and Biological Defense (JPEO CBD), as well as numerous other government organizations.

Our Engineering Team drives technology transition from research to engineering development and transitions materiel from engineering development through production, fielding and sustainment. Our highly trained workforce is committed to responsive customer service and is knowledgeable about current and evolving technology and capabilities worldwide. **We use our unique infrastructure, engineering expertise and lifecycle services to solve chemical and biological (CB) defense challenges for the Warfighter and Homeland.**

## MISSION

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Provide unique infrastructure, engineering expertise and lifecycle services to solve Chemical and Biological challenges for the Warfighter and the Homeland.

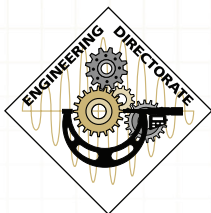
## VISION

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First Stop for Chemical and Biological Defense Solutions.



ECBC is the principal research, development and engineering center for non-medical chemical and biological defense. ECBC is an organizational element of the Army's Research, Development and Engineering Command, which reports to the Army Materiel Command. ECBC develops technology in the areas of detection, protection and decontamination and provides support over the entire materiel lifecycle—from basic research through technology development, engineering design, equipment evaluation, product support, sustainment, field operations and disposal.



## **ECBC ENGINEERING**

Design→Build→Test→Support

The Edgewood Chemical Biological Center Engineering Directorate is here and available to assist you with Design, Build, Test & Support Solutions for Chemical and Biological Defense Needs.

Please call 410.436.5600 or e-mail  
[ecbc.engineering.directorate@conus.army.mil](mailto:ecbc.engineering.directorate@conus.army.mil)

