U.S. ARMY RESEARCH, DEVELOPMENT AND ENGINEERING COMMAND

RAPID PROTOTYPING WITHIN THE AVIATION & MISSILE RESEARCH, DEVELOPMENT AND ENGINEERING CENTER (AMRDEC)

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Director (A)
Engineering Directorate

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AMRDEC MISSION

Deliver collaborative and innovative aviation and missile capabilities for responsive and cost-effective research, development and life cycle engineering solutions.
WHO IS AMRDEC?

Core Competencies

- Life Cycle Engineering
- Research, Technology Development and Demonstration
- Design and Modification
- Software Engineering
- Systems Integration
- Test and Evaluation
- Qualification
- Aerodynamics/ Aeromechanics
- Structures
- Propulsion
- Guidance/Navigation
- Autonomy and Teaming
- Radio Frequency (RF) Technology
- Fire Control Radar Technology
- Image Processing
- Models and Simulation
- Cyber Security
**AVIATION DEVELOPMENT DIRECTORATE**
- Aviation S&T supports both the current helicopter and future rotorcraft fleets in improving survivability, performance, and affordability.
- Current efforts are focused on platforms, power, survivability, vehicle management, and operations support and sustainment.
- Future efforts are focused on Future Vertical Lift (FVL) Joint Multi-Role (JMR) Technology Demonstrator (TD).
- Focus on Transition to PEO Aviation.

**AVIATION ENGINEERING DIRECTORATE**
- Delegated Airworthiness (AW) Authority
- Systems Engineering
- Aeromechanics
- Propulsion
- Structures and Materials
- Mission Equipment
- Maintenance/Sustainment Engineering
- Foreign Military AW Authority Recognitions

**ENGINEERING DIRECTORATE**
- Systems Engineering
- Test and Evaluation
- Production Engineering
- Product Assurance
- Configuration Management
- Prototype Integration Facility / Rapid Response
- Logistics Engineering
- Industrial Base Assurance
- Life Cycle Cost Reduction
- Manufacturing Technology
- Reliability and Maintainability Engineering
- Quality Engineering
- Quality Management

**WEAPONS DEVELOPMENT & INTEGRATION DIRECTORATE**
- Life Cycle Management for DoD missile technology
- Conducts research, exploratory and advanced development, technology demonstration and provide engineering and scientific expertise in all aspects of weapon system design, development, improvement and integration for the Army
- Lead Army agent in the execution of the Missile Science and Technology Enterprise

**SYSTEMS SIMULATION, SOFTWARE, & INTEGRATION DIRECTORATE**
- Hardware-In-the-Loop (HWIL) Models and Simulations for Aviation and Missile Systems
- Conduct Performance and Effectiveness Evaluations for Aviation and Missile Systems
- Design and Develop Virtual Prototyping Facilities for User Evaluations of Aviation and Missile Applications
- Define and Develop Modeling and Simulation Methods and Technologies for DoD Applications
- Computer Hardware/Software Technology
- Independent Verification and Validation (IV&V)
- Aviation Flight Safety/Airworthiness Software Assessments
- Software Development and Sustainment
- Information Assurance/Cyber Security
- Interoperability Engineering and Test (IET)
- Software Fielding/New Equipment Training
- Configuration and Data Management
- Software Quality Engineering
STRATEGIC ROADMAP

LINES OF EFFORT

Strategic Readiness
- Provide aviation and missile technology and system solutions to ensure the Soldier victory on the battlefield
- Integrated Tech Development & Engineering Services
- Provide innovative S&T/R&D technologies and valued life cycle engineering expertise across the enterprise

Future Force
- Develop and mature S&T to provide technical capability to our Army’s (and nation’s) aviation and missile systems
- Sustainable/ Materiel Readiness
- Provide aviation and missile technology and systems solutions to ensure victory on the battlefield

Soldiers & People
- Develop the engineering talent to support both S&T and Aviation and Missile materiel enterprise
- Future Force
- Develop and mature S&T to provide technical capability to Army’s aviation and missile systems
- Human Dimension/ Resource Management
- Develop the engineering talent to support S&T and Aviation and Missile materiel enterprise
#1: Readiness

Provide aviation and missile systems solutions to ensure victory on the battlefield today.

#2: Future Force

Develop and mature Science and Technology to provide technical capability to our Army’s (and nation’s) aviation and missile systems.

#3: Soldiers and People

Develop the engineering talent to support both Science and Technology and the aviation and missile materiel enterprise.
TOP AVIATION S&T INITIATIVES

PLATFOMS
- Structures
- Sustainment
- Concept Design & Assessment

MISSION SYSTEMS
- Survivability
- Avionics & Networks

VEHICLE MANAGEMENT & CONTROL AND ROTORS
- Rotors
- Vehicle Management & Control

AUTONOMOUS AND UNMANNED SYSTEMS
- Autonomy & Teaming
- Human System Interface

MAJOR PROGRAM AREAS
- Joint Multi-Role Technology Demonstration
- Degraded Visual Environment – Mitigation
- Next Generation Tactical UAS Technology Demonstration

POWER
- Engines & Other Power Sources
- Drives

BASIC RESEARCH
- Computational Aeromechanics
- Experimental Aeromechanics
MISSION
Serving the Warfighter through World Class Life Cycle Engineering

VISION
Through Mission Excellence and collaboration, be an invaluable customer partner focused on the Warfighter

VALUES
Leadership, Excellence, Responsive, Results Oriented, Integrity, Diversity, Objectivity, Proactive

We are a superior workforce, personally committed to serving the Warfighter and protecting our nation by supplying world class products, employing unique Life Cycle Engineering and indispensable technical capabilities.
Premier Provider of Rapid Response and Integrated Hardware Solutions

A Government Owned and Government Operated (GOGO) contractor supported enterprise established to meet the most compelling and urgent needs of the U.S. Government and our allies-100% customer reimbursable funded

- Government lead/COR on each task
- Collaboration with industry at project onset

PIF Products rapidly delivered to the user

- PIF products protect and save lives and equipment
- Unique streamlined processes developed from lessons learned and best Government and industry practices—discipline with agility to meet customer needs
- Scalable/Flexible business model and contract to meet customer demand and acquisition strategy for each task
- TDP Developed for Government Purpose Rights, and then transitions to industry and/or organic industrial base

Proven 16 Year history as a critical part of the organic industrial base

- ~120 Core Government and ~850 Contractors
- 300+ Subcontractors, 2000+ material vendors
- Assemble best mix of Government and industry for each task
- Very low operating costs and overhead

AS 9100D Registered

Agile, Flexible and Ready for a Nation in Transition!
ONE-STOP-SHOP CAPABILITIES

Program Management
- Govt to Govt Interface
- Acquisition Corp Members
- Experienced TS/SCI PM Team
- On-Site Budget Office
- On-Site Contracting Officers

Engineering
- Design and Analysis
- Circuit Card Design/Layout
- Analysis and Modeling
- 3-D Modeling
- Visualization Based Design
- Test and Documentation
- Obsolescence Mitigation

Operations Support
- Quality Assurance
- Production Planning and Control
- Inventory Control
- Purchasing

Fabrication
- Advanced Composites
- Machining and Sheet Metal
- Cable/Wiring Harness Assembly
- Circuit Assembly and test
- Circuit Board Fabrication and Plating
- Electrical and Mechanical Assembly

Integration
- Ground Platforms
- Aviation Platforms
  - GGFR Assigned for Ground Operations
  - GFR Assigned for Flight Operations
- Test
  - On-Site Airworthiness Coordination
  - ATEC Test Coordination

Documentation
- Technical Data Packages
- Technical Manuals
- Maintenance Work Orders
- Acquisition Packages for Future Acquisitions

RAPIDLY INTEGRATE Core Competencies with other Government and Industry Expertise to get the RIGHT TEAM for EACH PROJECT
CUSTOMER FOCUSED RAPID RESPONSE APPROACH

- OH-58D Common Missile Warning System (CMWS) Integration
  Missile warning and countermeasures for Infrared guided missiles

- ASPI
  Design to Fielding Less than 1 year

- Tandem HUSKY
  Provided improved capabilities for route clearance teams

- UAV CRS - Communication Relay System
  Developed & fielded in 1 year

- RECCE Vehicle
  Fully integrated system in 120 days

- Blue Force Tracker
  150 Configurations
  Less than 5 yrs

- Emergency Egress Lighting System
  120 Kits installed in 3 months

- Naval Autonomous Underwater Vehicle
  Fabricating piece parts within 2 weeks

- FIDO/PackBot
  Remote Explosive Detector
  Initiation to field in 90 days

- Crew Extraction Brackets
  800 fielded in 2 weeks

- OH-58D Common Missile Warning System (CMWS) Integration
  Missile warning and countermeasures for Infrared guided missiles

- Mi-17 Ballistic Prototype System & Dillon Gun Kit Install

- Modular Airborne Fire Fighting System
  Develop 2 new MAFFS for the C-130J/H in support of the USFS and NGB

- Iraqi Armed 407
  Concept to delivery – less than 2 years

- Modular Airborne Fire Fighting System
  Develop 2 new MAFFS for the C-130J/H in support of the USFS and NGB

- EMRAID Vehicle
  mobile armored platform

- UH-60 M/L US Customs & Border Protection Mission Packages

- A-10 Heads Up Display Obsolescence upgrade

- HUMS Crew Chief Restraint
  Over 400 kits
  Design to install – less than 18 months

- GMD Rocket Restraint
  Enabled Largest Rocket test in DOD history, 6 months

- SLAMRAAM on HIMARS DEMO
  Concept to Test – 8 Months

- EMRAID Vehicle
  mobile armored platform

- “Army’s Greatest Invention”

WIDE RANGE of INNOVATION with a sense of URGENCY
PIF Gov PM Team Defines Requirements with Customer

PIF Gov PM Team Defines Execution Strategy

Dedicate internal staff or develop teaming arrangements

Procure Materials

Procure Materials

PIF Gov PM Team Creates SOW for Contract

Prime Contractor Determines Execution Strategy

Dedicate internal staff or develop teaming arrangements

Prime selects subs and submits execution Strategy to Gov

Best Value Selection of Subs and Material Vendors

Teaming Required w/Subs

Prime Develops SOW(s) for Subs

Prime Requests Proposals from Subs

Sub(s) Draft Proposal(s)

LEGEND

- Government Action
- Prime Contractor Action
- Sub-Contractor(s) Action

Project is Executed through TEAMING

- Right team rapidly responding to the Warfighter
- Different teams assembled for each task
- Automated tool for contracted activity
U.S. ARMY RESEARCH, DEVELOPMENT AND ENGINEERING COMMAND

WEAPONS DEVELOPMENT & INTEGRATION DIRECTORATE OVERVIEW

James C. Kirsch
Deputy Director
Weapons Development & Integration Directorate

8 NOV 2018
WDI OVERVIEW

What We Do

- WDI provides Life Cycle Management for DoD missile technology
- Conducts research, exploratory and advanced development, technology demonstration and provide engineering and scientific expertise in all aspects of weapon system design, development, improvement and integration for the Army

Specific areas include:

- Sensors
- Terminal Guidance
- Advanced Materials
- Lethal Mechanisms
- Navigation & Control

- Data Links
- Fire Control
- Propulsion
- System Design, Demonstration & Integration

- Lead Army agent in the execution of the Missile Science and Technology Enterprise

WDI Demographics

PERSONNEL
Government: 373
Contractor: 585

EDUCATION
Master’s Degrees: 164
Doctorate Degrees: 39
Facilities: 159
RDECOM AVIATION AND MISSILE CENTER TECHNOLOGY AREAS

- Cyber
- Sensor
- Missile Electronics
- Guidance
- Lethality
- Radar
- Propulsion
- Reliability/Maintainability
- Affordability/Manufacturing Technology
- Materials & Structures
- Launcher
- Power
- Aerodynamics
- Warhead/Fuze
- Navigation Systems
- Control Systems
- Model & Simulation
- Datalink & Communication
- Power
- Aerodynamics
- Warhead/Fuze
- Navigation Systems
- Control Systems
- Model & Simulation
- Datalink & Communication
MISSILE S&T ADDRESSING THE MODERNIZATION PRIORITIES

- Engage First [Long Range Fires]
- Expanding the Dome [Air & Missile Defense]
- On the Move [LRF & AMD]
RDECOM AVIATION AND MISSILE CENTER
MISSILE S&T ALIGNMENT TO ARMY MODERNIZATION PRIORITIES

**Army Modernization Priorities**

**Long Range Fires**
Technologies for the development, integration and delivery of long range fires at the tactical, operational, and strategic echelons to restore overmatch, improve deterrence, and disrupt A2AD on a complex, contested and expanded battlefield.

**Air & Missile Defense**
Technologies for the development of mobile air defense systems that reduce the cost curve of missile defense, restore overmatch, survive volley-fire attacks, and operate within sophisticated A2AD and contested domains.

**Future Vertical Lift**
Technologies for active protection systems and enhanced lethal effects that will increase our ability to survive and win in the complex and densely urbanized terrain of an intensely lethal and distributed battlefield where all domains are continually contested.

**Next Generation Combat Vehicle**
Technologies for the development, integration, and delivery of aviation launched air-to-ground and air-to-air missile systems to restore overmatch within sophisticated A2AD and contested domains.

**Engage First**

**Expand the Dome**

**On the Move**
AIR DEFENSE/STRIKE CAPABILITIES ON THE MOVE

PROVIDE CAPABILITY TO ENGAGE TARGETS AT EXTENDED RANGE
SUCCESSFUL TRANSITIONS (2005-2016)
AMTC is:

- An enterprise that allows the AMRDEC Community, industry and academia to work collaboratively in developing prototype solutions for earlier transition to System Development and Demonstration or Production Programs
- An enterprise that reduces acquisition lead time, cost and risk in a competitive environment in parallel with establishing FAR-based System Development and Demonstration or Production Program contracts, which reduces significantly the overall time from R&D to fielding
- A way to leverage resources and assets within the Guided Missile, Manufacturing, and Aviation Technology Base (DoD, Industry, and Academia)
- A way to expand the Guided Missile, Manufacturing, and Aviation Technology Base by competitively engaging non-traditional defense companies (primarily small businesses) possessing innovative ideas and technologies

AMTC is not:

- Just another contract vehicle
- A way to get sole source contracts
- A way to avoid Federal Acquisition Regulation requirements
AMTC CAPABILITIES

AMRDEC’s AMTC will:

– Increase the organic contracting capabilities of the ACC-RSA.
– Increase the efficiency and expedite technical proposal submissions in support of the Army Futures Command.
– Ensure system of system level integrations, such as missile technologies on aviation platforms and fully integrated air and missile defense solutions.
– Strengthen the inclusive link between AMRDEC Science & Technology (S&T) and Industry/Academia, and optimize AMRDEC’s ability to quickly, efficiently, and effectively develop aviation and missile system technology for the 6 Army Modernization Priorities.
AMTC PUBLIC SITE

www.AMTCEnterprise.org

TECHNOLOGY AREAS

Guided Missiles
Manufacturing & Enabling/Disruptive Technologies
Aviation

NAC
Current Members: http://www.nac-dotc.org/NAC_Current_Members.html
How to Join: http://www.nac-dotc.org/How_to_Join.html

VLC
Current Members: http://www.verticalliftconsortium.org/current-members.html
How to Join: http://www.verticalliftconsortium.org/application.html
RDECOM AVIATION AND MISSILE CENTER COLLABORATIVE INCUBATION OF IDEAS

TEST AGREEMENTS

CRADAs

SBIR

Basic Research ILIR

ILIR

Applied Research 6.2

STTR

Advanced Technology Development 6.3

PEOs

BAAs/RFPs

IRAD

CAPABILITY
AMRDEC Web Site
www.amrdec.army.mil

Facebook
www.facebook.com/rdecom.amrdec

Instagram
www.instagram.com/USARMYAMRDEC

Twitter
@usarmyamrdec

Public Affairs
usarmy.redstone.rdecom-amrdec.mbx.pao@mail.mil