



# Pathfinder Systems, Inc.

## *Engineering for the Warfighter*

A Certified, Woman-Owned, Veteran-Owned, Small Disadvantaged Business (SDB)  
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(303) 763-8660, FAX (303) 763-8902

## **Company Overview**


### **1. Introduction**

Pathfinder Systems, Inc. is a small woman-owned business founded in 1985. Our firm provides a variety of technical services to the Department of Defense, other US Government agencies and commercial entities. Our expertise covers the entire range of services necessary for the successful performance of complex programs. We are organized to provide a full array of engineering services for our clients that range from research and development to hardware/software systems design, system implementation and systems engineering. We also provide a wide array of program management and consulting services.

Our offices are located in Lakewood, Colorado and Patuxent River, Maryland. We are knowledgeable in the management and performance of US Government contracts and possess a Defense Contract Audit Agency (DCAA) approved accounting system. The firm was certified as a Section 8(a) firm, by the US Small Business Administration on July of 1999. We are a 100% veteran-owned firm.

### **2. Capabilities**

We provide all of the services needed to execute complex programs and software intensive efforts. In today's fast-paced environment, state-of-the-art solutions can change rapidly. To cope with this volatile environment, we maintain our core expertise through the execution of a rigorous internal research and development (R&D) program. Our IR&D program has produced a number of innovative and unique technologies that have been used to benefit Pathfinder's US Government and Industry partners. These technologies include; 1) High-speed Artificial Neural Nets (ANNs) for information fusion and behavioral emulation, 2) Augmented Reality technologies to support military training, navigation and command and control, and 3) Techniques and technologies to significantly enhance the state-of-the-art in High Altitude Long Endurance (HALE) Unmanned Air Vehicles (UAVs).



Our senior engineering and program management personnel possess a wealth of experience in the performance of highly technical programs. We maintain working relationships with the University of Colorado and the Colorado School of Mines to additional engineering expertise as necessary to support our contracts. We provide educational benefits to our personnel as they pursue advanced degrees. When grouped together, all of these assets are used to provide superior products and services to our customers.

### 3. Contract Vehicles

For our customer's convenience, we provide several ways to procure our products and services:

- GSA Professional Engineering Services Schedule, Contract # GS-23F-044N.  
You can view Pathfinder's General Services Administration (GSA) schedule at the GSA web site: <http://www.GSAAdvantage.gov>.
- Program Management Multiple Award Contract (PMMAC) through Naval Air Warfare Center AD (PAX) Contract # N00421-04-D-0041.
- We are a subcontractor under VSE's CECOM R2 effort. Contract # DAAB-07-03-D-B012. Point of contact is Charley J. Borns, e-mail: [CJBorns@VSECORP.com](mailto:CJBorns@VSECORP.com)
- Seaport-e Engineering Services Contract # N00178-05-D-4488
- SE Support Services Basic Purchase Agreement (BPA) through NAVAIR-Lakehurst, NJ Contract # N68335-05-A-0138, Contract # N68335-05-A-0139 and Contract # N68335-05-A-0140
- 8(a) Sole Source Procurements

### 4. Past Performance

Examples of our current and past contracts are summarized here. Please contact us if you would like to receive more detailed information on our work:


***Future Combat Systems (FCS) Switchable Vision Block Study*** – This six month effort developed the requirements and conceptual design for a combat vehicle vision block that can provide both fully virtual and real-world views for the US Army's next generation of combat systems. (Customer: Boeing - Boeing Supplier # 683956)

***Intelligent Information Management System (IMAN)*** – Developed a preliminary design and feasibility demonstrator for artificial intelligence-based software agents to reduce information overload for US Naval Personnel (Customer: NAVSEA TWSG)

***SOFTRAK*** – We are currently developing a route-planning system for US Special Forces A-Teams and US Navy SEALs to minimize energy expenditures for personnel while maximizing stealth during ground movement. (Customer: US SOCOM, US Navy)

***VTAGS*** – This “Virtual Target Gunnery System” is developing a low cost technology to provide military personnel with a strap-on gunnery training system, that allows trainees to engage virtual targets in real-world settings in either the live-fire or dry-fire mode. The initial application being developed will support the Mark 38, 25mm machine gun. Initial live fire against virtual targets was demonstrated in September of 2002. (Customer: OSD – Live Fire Test and Evaluation Directorate)

***OneSAF Engineering Effort*** – Provided subject matter expertise and domain engineering for the US Army's next generation Brigade level training simulation (Customer AT&T Government Services)



***Obstacle Marking and Vehicle Guidance System (OMVG) STO*** – This work is using augmented reality to inject computer generated C4I information into the real-time, real-world views of military vehicle crews to aid in obstacle avoidance and C2 coordination under all environmental conditions (Customer: US Army TACOM)

***INVEST STO*** – Developed a preliminary design for a system to inject virtual targets into real world views using the various sights of the M1A2 SEP Main Battle Tank. (Customer: US Army STRICOM)

***Glass Turret Visualization System (GTVS)*** – In this effort we developed a feasibility demonstrator to inject C4I information into the real-world, real-time views of combat vehicle crews to enhance their situational awareness and cooperative decision-making capabilities. (Customer: DARPA)


***Army Combat Simulation Analysis*** – In this effort we conducted an in depth study of the major training simulations available throughout the US Army. The work also included determining the ability of these simulations to interface to High Level Architecture (HLA) compliant systems.

***Non-rated Crewmember Trainer (NCMT)*** – In this effort we created a low-cost aircrew simulator to support the UH-60 and the CH-47 helicopters. This effort produced a fully deployable system consisting of two aircrew trainers in a single 53' foot expandable tractor trailer. The trainer will support gunnery training, crew coordination, multi-ship training and mission rehearsal as well as training for cargo hook operations. The system was delivered in its Initial Operating Capability (IOC) in March of 2007. (Customer: US Army PEO STRI)

***ATLAS*** – This Small Business Innovative Research (SBIR) effort developed a set of complimentary technologies to extend the range and endurance of High Altitude Long Endurance (HALE) Unmanned Air Vehicles (UAVs). The technologies were validated in a series of flight tests in FY 2007. The technologies may be used to develop a new HALE UAV platform that can greatly decrease the cost of current HALE systems. The technologies may also be individually integrated into current and evolving UAV programs. (Customer: Air Force Research Laboratory – Air Vehicles Division)

## **5. Current Programs**

***MCAT-P*** – Pathfinder Systems has developed an innovative prototype for a gunnery, crew coordination and external load trainer prototype for rotary wing aircraft in a full-flight motion base simulator. The prototype has a convertible cabin representing multiple aircraft types, realistic gun systems compatible with the aircraft, a visual system configuration compatible with training in the crew's own equipment, and is capable of being mounted on a motion base. The prototype uses high-performance, low-cost commercial projectors and PC image generators and a near-spherical dome-like screen system and existing Marine Corps visual databases to create an immersive training environment.



**C-130 Load Master Trainer** – The CLT project will develop an Augmented Reality (AR) procedural trainer for loadmaster students that will significantly reduce the number of actual flying sorties currently required. The CLT device will provide the loadmaster student with the ability to perform and be graded at defined levels of proficiency without expending aircraft sorties. The scenarios will mimic actual flying training missions and will be performed in real time. The CLT will also allow the student to practice and prepare for emergencies rarely experienced during the flight training program.

**U.S. Coast Guard Aerial Gunnery Trainer** – The AGT will be a small motion-based gunnery trainer supporting USCG sniper training. It expands upon the Pathfinder repertoire of simulator capabilities. A second version, contained within a trailer and lacking a motion base is scheduled to be ordered in the 2009 fiscal year. This trainer will be easy to modify to accommodate other services and/or weapons and will support HH-65C and HH-60J aircraft.

**DARTS** – By extending Land Warrior (LW) soldier computer systems with augmented reality, we can provide an infrastructure free training device that soldiers can use to train basic tasks as well as conduct mission rehearsals. DARTS will solve many of the challenges associated with this technology, and provide innovative solutions for image generation and training. DARTS will allow soldiers to train both as individuals and as part of a unit any time and any place, without the need for complex infrastructure or setup.

## **6. Pathfinder Systems, Inc. Contacts**

If you have a requirement for any of our services, please let us know. We will be happy to put together a quote, white paper or proposal to address your unique needs. Simply contact Ms. Sheila Jaszlics, through one of the methods listed below. We guarantee a complete, timely, quality, response to your inquiry:

**Sheila L. Jaszlics**

Pathfinder Systems, Inc., 200 Union Blvd., Suite 300, Lakewood, CO 80228

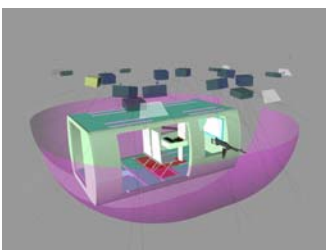
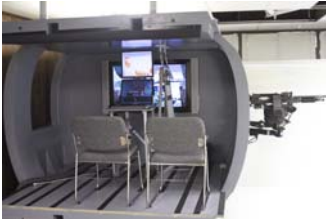
**Phone:** (303) 763-8660, **FAX:** (303) 763-8902

**e-mail:** [sheila@pathfindersystems.com](mailto:sheila@pathfindersystems.com)

Or, contact us through our **web site** at <http://www.PathfinderSystems.com/>

## **7. Project Pages**

The following pages contain additional information on our products. Please feel free to contact us for any questions you may have.



# NCMT

## NON-RATED CREW MEMBER TRAINER



**Background:** There is an urgent need to provide training to non-rated crew members that serve across the DOD in a variety of rotary wing aircraft from the UH-60 and CH-47 to the MH-60S, CH-53, UH-1 and the MV-22. The current high operational tempo does not provide non-rated crew members with the air time they require to become fully trained before they are deployed. The NCMT will provide a platform in which this required training can be achieved.

**Summary:** The NCMT system is a family of training systems for non-rated aircrew members. Our reconfigurable system concept can support multiple training missions to include; Gunnery Training, Crew Coordination, Mission Rehearsal, Multi-ship Operations and Cargo Hook Operations. Future, near term enhancements will address training for Hoist Operations, Shoulder Fired Weapons and unique training scenarios for USCG and USMC.

The NCMT system can be delivered to our customers in a variety of configurations that range from a partial UH-60 cabin to support gunnery training to a full UH-60 cabin to support multi-ship operations and crew coordination. We also offer a configurable cabin that can be changed from a short UH-60 gunnery training platform to a full UH-60 cabin. Or the training cabin can be converted to a CH-47 gunnery trainer.

Our systems can be deployed in regular office space as stand alone static trainers. Our system can also be delivered as a deployable trainer, housed in an expandable tractor trailer or in a set of ISO containers. We are currently building a system for the US Army which will hold two NCMT trainers in a 53' self-leveling expandable tractor trailer. NCMT is motion-base compatible.

Our NCMT system features an innovative Onboard Instructor Operator Station (OBIOS) that provides the Trainer with easy access to scenarios, aircraft course, attitude, position and speed. Trainers can also use a commercial Xbox interface from anywhere in the cabin to conduct training.

Our Training Weapon Systems use actual demilitarized weapons to provide the precise look and feel of actual weapon behavior. Our training weapon system instrumentation is accurate to within 0.2 milliradians.

### **Benefits:**

We anticipate that when fully fielded the NCMT system will provide greater non-rated aircrew proficiency. NCMT can be used to conduct individual, crew and collective training at fixed site training locations or it can be collocated with units in the field. We anticipate that NCMT will be used to increase unit proficiency by providing mission rehearsal and training for multi-ship operations

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# DARTS

## DISMOUNTED AUGMENTED REALITY TRAINING SYSTEM

**Background:** Today's soldiers are deployed globally. In many cases they do not have access to training ranges, nor do they have large slots of time to prepare for training events. They must continuously prepare to counter enemy tactics that perpetually change. The soldiers must conduct operations in environments as diverse as our world. Many are in urban settings where coordinated movements of small units are critical to mission success, while many other operations which must be conducted in a field (rural) environment.

**Objective:** By extending Land Warrior (LW) soldier computer systems with augmented reality, we can provide an infrastructure free training device that soldiers can use to train basic tasks as well as conduct mission rehearsals.

Much of the basic technology to achieve this, has been demonstrated. However there are still several challenges to solve. DARTS will solve many of these challenges:

- Generate stable, believable, real-time AR images that appear in the soldier's view/environment.
- Development of an "infrastructure free" approach that will allow the dismounted soldier to train anywhere, anytime without the need for a "range infrastructure" or time consuming pre-processing of the environment
- Use real-time occlusion to accommodate real objects in the soldier's environment. This allows the soldier to operate in the AR training mode exactly as he would during actual operations
- Create a small and non-intrusive device that does not negatively impact soldier movement, sight, hearing or stamina

**Benefits:** DARTS is a training system that:

- Allow soldiers to train alone with virtual unit members to rehearse their unique mission roles
- Allow units to train together against a virtual threat
- Train within virtual infrastructure as individuals or as part of a unit
- Dismounted soldiers can refine their tactics, techniques and procedures by performing training and mission rehearsal with a variety of virtual combat vehicles and weapon systems
- Inject command and control graphics into real-worlds, real-time views to expedite decision-making and coordinate actions.

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# VTAGS

## VIRTUAL TARGET GUNNERY SYSTEM



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**Background:** Training and test activities require targets that are realistic in appearance and behavior. Great advances have been made over the last decade in the modeling of targets to support training, test and analysis in the virtual domain. However, targets in the live domain, used to support gunnery training, live fire test and maneuver training have generally not advanced at the same pace.

**Objective:** The objectives of the VTAGS effort will be to significantly enhance the current state-of-the-art in live domain target technology. The program will demonstrate an enhanced live domain target technology by presenting intelligent, virtual targets to trainees learning to use the Mark 38 25 mm machine gun. These targets will be presented to the trainee in a real world setting, with the targets integrated in real time, into the trainee's real world view. We anticipate that the program will support Mark 38 training in both the live fire and dry fire modes. Secondly, we will show that the use of virtual targets can provide more realistic and challenging training as well as support more thorough analyses of weapon systems, munitions and platforms than can be obtained using current target technology. We intend that the resulting VTAGS system will serve as a baseline design for a whole family of direct-fire weapon system trainers that use virtual targets, providing a set of common software and hardware components.

**Benefits:** We anticipate that the use of virtual targets in the live domain will reduce training and test costs as well as achieve the following benefits for the training and test communities:

- Provide more realistic signatures (visual, thermal, infrared, etc.)
- Provide enhanced situational awareness and increased mobility by embedding command and control information into real world views
- Represent a wide range of sea, air and land-based target platforms
- Simulate friendly, hostile and non-combatant personnel and platforms
- Replicate buildings, bunkers and other infrastructure
- Realistically represent threat, friendly, non-combatant and neutral behaviors
- Realistically simulate target vulnerability across a wide range of effects (electronic, non-lethal, lethal, etc.)