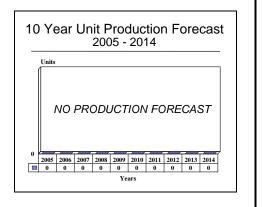---

ARCHIVED REPORT

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ICIDS (Individual Combat Identification System) - Archived 2/2006

Outlook

- Anti-fratricide protection for the foot soldier

- Development contract nearing an end

- Became part of Future Combat System program in FY04

- Last funding for this project in FY04

10 Year Unit Production Forecast
2005 - 2014

Units

NO PRODUCTION FORECAST

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
	0	0	0	0	0	0	0	0	0	0

Years

Orientation

Description. The Individual Combat Identification System (ICIDS) is a rifle/helmet-mounted anti-fratricide device to help distinguish between friendly and unfriendly soldiers on the battlefield. This program was formerly the CIDDS (Combat Identification – Dismounted Soldier System) program.

Sponsor
U.S. Army
   Army Communications-Electronics Command (PM CI)
   Ft. Monmouth, New Jersey (NJ) 07703-5000
   USA
   Tel: +1 201 532 2534
   Web site: http://www.monmouth.army.mil

Status. Initial development and LRIP contracts awarded.

Total Produced. An estimated 130 developmental/test systems were produced under this effort.

Application. Dismounted soldiers.

Price Range. The cost goal was $3,500 per unit (at full production rate). Component cost for the new systems is to be determined.

Contractors

General Dynamics C4 Systems, GD Decision Systems, http://www.gdc4s.com, 8201 E McDowell Rd, Scottsdale, AZ 85252-3812 United States, Tel: 1 (877) 449-0600, Fax: 1 (877) 449-0599, Email: info@gdc4s.com, Prime

Technical Data

	Metric	U.S.

Dimensions
Weapon System Array

Weight (goal)	311.8 g	11 oz
Size	8.9 x 7.6 x 3.8 cm	3.5 x 3 x 1.5 in

Characteristics

Laser Power	25 W (eye-safe)
Frequency Bandwidth	1.8 GHz
Range	1.1 km (clear weather), exceeds soldier's target acquisition ability in degraded atmospheric conditions
PcID (Probability of correct ID)	0.975 between prone soldiers (5 to 500 m)
	0.95 between standing soldiers (500 to 1,000 m)
Battery Operation	48 hr (threshold)
	96 hr (desired)
Battery Life	40 days (helmet unit)
	100+ days (weapon unit)
Query	Laser
Response	RF (optical and/or acoustic notification of friendly)
Mount on	M16, M4, M249, M240

Design Features. Survivability has become one of the seven tenets of the Army Transformation Strategy. Combat identification technologies are an integral part of that strategy because they work to reduce incidents of fratricide. A key survivability enabler is the rapid, reliable identification of friends, foes, and neutrals. Project 902, Program Element 0604817A, Combat Identification, addresses individual soldier-to-soldier combat identification. It is a critical link to ensuring compatibility and interoperability to the Future Combat System and to the Objective Warrior System.

This system supports the Objective Transformation path of the Transformation Campaign Plan (TCP).

The identification of friendly forces on future battlefields will be more complex due to the highly mobile, dispersed, non-linear formations found in unconventional warfare.

The Individual Combat Identification System program was terminated by the Army. The decision to cancel the program in FY02 was precipitated by the need to fund other high priority programs supporting Army Transformation.

The Army recognized the need to protect soldiers on the battlefield and transferred the funding and technology from the ICIDS program to the Land Warrior program in order to integrate this capability into the Land Warrior System. The ICIDS Milestone Decision Authority and Program Executive Office Soldier approved a transition plan detailing the transfer of technology, and PM Land Warrior is using these funds to integrate this capability and the technologies into the Land Warrior System.

The existing program was restructured to produce ICIDS/Land Warrior compatible equipment, with technology to support the Objective Force. It will fulfill requirements set forth in the Operational Requirements Document (ORD) for use by Army, Marine, and Special Operations forces. The Integrated Battlefield Combat Identification Situation Awareness System (IBCSAS) is an alternative technology approach to providing soldier-to-soldier combat identification functionality into the Land Warrior System.

The contractor would provide a full-scale system demonstration 16 months after contract award, allowing the technology to be evaluated for potential integration into LW-SI (Land Warrior - Stryker Integration). The system is made up of three parts:

1. Man-worn combat ID system - IR Laser interrogation, RF response which meets or exceeds CIDDS ORD requirements;

2. A communications and remote situation awareness device, a radio that provides C2 and SA (moving map display, GPS, and links to man-worn CID system, aircraft SA systems, and ground vehicle SA systems);

3. An airborne UAV for surveillance that provides communications networking capability and allows SA links to other vehicles.

ICIDS represents an integral part of that strategy as it works to reduce incidents of fratricide and increase combat effectiveness. This system provides a critical link to ensuring compatibility and interoperability to the Objective Warrior System.

The identification of friendly forces on future battlefields will be more complex due to the highly mobile, dispersed, non-linear formations found in unconventional warfare.

FY04 funds support the transition of Combat Identification programs to Future Combat System

(FCS). The $3.0 million increase is for the transition of Combat Identification technology to the FCS and Objective Force.

Operational Characteristics. ICIDS was developed to solve a problem that has plagued battlefield commanders for centuries: how to distinguish between friendly and unfriendly forces during battle. This situation has become even more critical in modern times as the increased accuracy, range, and lethality of modern weapons exceeds the ability to identify potential targets and distinguish between friend and foe.

ICIDS may eventually be adopted by dismounted forces from the Army, Navy, Air Force, and Marines. ICIDS-equipped units will conduct missions throughout the continuum of military operations. When combined with other survivability-enhancing innovations, ICIDS will fill the identification gap for dismounted troops, thereby increasing force survivability and reducing the possibility of fratricide.

Variants/Upgrades

There will likely be two types of ICIDS: one with a stand-alone combat identification capability and the other with a combat identification capability integrated into the Land Warrior system.

Program Review

Background. Operation Desert Storm saw high rates of ground-to-ground fratricide. The U.S. Department of Defense and allies have been working to create a more effective way to sort the good guys from the bad guys in the heat of battle. A variety of techniques, from special infrared markings to flashing non-visible signals detectable with night vision equipment, have been marginally effective in reducing such incidents.

The U.S. Army centralized management of the service's Combat Identification programs in the Product Manager Combat Identification (PM CI). In addition, the PM CI is the Army's key player in International and Joint Service Combat Identification programs.

The development of an architecture that covers all battlespaces is needed to ensure that affordable systems meeting the requirements are fielded. The PM CI office focused on the development of identification systems with a high level of accuracy that increase the soldier's confidence in engagement decisions. Confidence in his targeting and ID equipment enables the soldier to respond to target opportunities more quickly and use less ammunition per target attack, thereby increasing his combat effectiveness.

CIDDS prototypes were field tested in mid-1999 at Ft. Benning, Georgia. They were able to identify unknown standing targets at a range of 1,100 meters and prone targets from 900 meters in daylight to 700 meters at night.

Acquisition Strategy. A competitive cost-plus- incentive-fee (CPIF) contract for the design, fabrication, and testing of 50 units was awarded in July 1997. A follow-on fixed price, sole source, Low Rate Initial Production (LRIP) contract based on demonstrated technical test results was awarded in September 2001 for 80 systems to provide an orderly ramp-up to production. This program was restructured to produce ICIDS/Land Warrior (LW) interoperable systems.

An engineering design proposal (ECP) to the basic design will be awarded to meet LW Initial Capability (LW-IC), which was evaluated with a feasibility demonstration scheduled for FY03. Post-demonstration fixes will be made with the Land Warrior contractor, which will provide nine LW/ICIDS systems.

The system will also have a migration path for interoperability and commonality with the combat identification functions to be embedded in the Land Warrior equipment suite. The Integrated Battlefield Combat Identification Situation Awareness System (IBCSAS) is an alternative technology approach to providing soldier-to-soldier combat identification functionality for the Land Warrior System. The contractor will provide a full-scale system demonstration 16 months after contract award. This would allow this technology to be evaluated for potential integration into LW-SI.

Program Element 0604817A, Combat Identification EMD, Project 902 Dismounted Soldier CID. The identification of friendly forces on future battlefields will be more complex due to the highly mobile, dispersed, non-linear formations found in unconventional warfare. The Individual Combat Identification System (ICIDS) program was terminated by the Army in FY02, precipitated by the need to fund other high-priority programs supporting Army transformation. The Army recognizes the need to protect soldiers on the battlefield and has transferred the funding and technology from the ICIDS program to the Land Warrior program in order to integrate this capability into the Land Warrior System.

The ICIDS Milestone Decision Authority and Program Executive Office Soldier approved a transition plan detailing the transfer of technology, and PM Land Warrior is using these funds to integrate this capability and the technologies into the Land Warrior System. The existing program was restructured to produce ICIDS/Land Warrior compatible equipment, with technology to support the Objective Force.

The system will fulfill requirements in the Operational Requirements Document (ORD) for use by Army, Marine and Special Operations Forces. Combat Identification (CID) is a combination of Target Identification (TI), Situation Awareness (SA) and Tactics, Techniques and Procedures.

The Integrated Battlespace Combat Situation Awareness System (IBCSAS) is focused on the SA piece of Combat Identification, and is an alternative technology approach to providing soldier-to-soldier combat identification functionality into the Land Warrior System. This is in line with the goal of Network Centric Warfare for the Future Force. By enhancing situation awareness at the soldier level and providing the capability to report position, location and tracking (PLT) information in a network centric environment, identification of friendly forces will be enhanced.

The Land Warrior System provides PLT and SA via the Navigation Subsystem and Global Positioning System (GPS), and the Communication Subsystem. IB-CSAS technologies under investigation will provide PLT in GPS-denied areas such as urban terrain, and offer beyond-line-of-sight tracking and targeting capabilities.

In FY03, designers developed Ultra Wide Band and Geometric Pairing algorithms and software hosted on man-portable platforms for demonstration in a Military Operations on Urbanized Terrain (MOUT) environment. FY04 work enhanced performance, accuracy, and range of Ultra Wide Band and Geometric Pairing. Planners demonstrated enhanced UWB and GP as well as RF-Tag technologies on man-portable platforms in a MOUT environment.

Acquisition Strategy. The Individual Combat Identification System (ICIDS) program was terminated by the Army in FY02, precipitated by the need to fund other high priority programs supporting Army Transformation. The Integrated Battlespace Combat Situation Awareness System (IBCSAS) is an alternative technology approach to providing soldier-to-soldier combat identification functionality into the Land Warrior System.

Report of the Defense Science Board Task Force on Integrated Fire Support in the Battlespace.

This October 2004 report included the following section in the chapter on "Tactical ISR: Sensors and Targeting Systems."

Combat Identification (CID) and Blue Force Situational Awareness

After decades of effort and billions spent on both cooperative identification friend or foe (IFF) systems and non-cooperative target recognition (NCTR) approaches, we have only a marginal theater-wide CID capability. Recent fratricide incidents in OIF are tragic examples of this deficiency and are but a small fraction of what could happen under less favorable circumstances against a more capable adversary.

Cooperative systems have historically been plagued with a fundamental issue: if the IFF system is inoperative due to a malfunction or an operator intentionally turns it off, there is no inherent method for a "shooter" to distinguish the resulting lack of response from that of an enemy (red) target. Also, many friendly (gray) targets are not equipped with IFF gear, making a response to a "shooter's" interrogation impossible. Recently, urban targets and individual enemy personnel—often in close proximity and intermingled with gray components—have become frequent and high priority targets, where complex and expensive cooperative IFF systems are totally impractical.

Non-cooperative target recognition systems are useful against expensive aircraft and certain vehicular targets, but in general are not effective against the majority of other target candidates. This situation is exacerbated with the emergence of urban warfare as a frequent and high priority occurrence. From this it is clear that another approach is required if we are to make a significant improvement in this complex but critical area. As mentioned above, there are three components to the "target" population:

1. "Red" (enemy forces, vehicles, or individuals);
2. "Gray" (friendly or neutral target candidates); and
3. "Blue" (U.S. or coalition forces, vehicles, or individuals).

True combat ID requires situational awareness (i.e., location and identity) of each one of these three target candidate categories, but the location and identity of red and gray are quite often unknown most of the time. However, recent deployment of blue-force tracking capability proved to be of major benefit in OIF for at least removing the uncertainty associated with our own forces. This suggests that a more comprehensive deployment of this approach, with guaranteed low latency and employed on essentially all blue elements, would provide a quantum improvement in the CID arena.

The concept of BFT was recently introduced very successfully in Operation Iraqi Freedom through employment of the Force XXI Battle Command Brigade and Below (FBCB2) system, where at the end of formal hostilities, ground elements in various parts of the entire theater were using it. By and large, FBCB2 was received enthusiastically by the troops and has been credited with preventing more than one incident of potentially very serious fratricide. It makes use of existing communications

and satellite links and was available down to elements such as individual tank commanders. BFT employs modern network technology and demonstrated an impressive capability to adapt to rapidly changing situations.

The unfolding expansion of DoD global communications capability through programs such as the Transformational Communications System, Joint Tactical Radio System, and the Global Information Grid, along with the availability of small, low-cost GPS transceivers, now makes it feasible to expand the existing blue force tracking concept to the entire friendly force. With essentially all elements of the force precisely reporting their up-to-date position on a timely basis, the ability to minimize fratricide can be reduced by a very large amount while simultaneously enhancing the warfighter's offensive effectiveness.

The construct for an improved and significantly expanded blue force situational awareness (BFSA) approach would have the following cardinal attributes:

- Ubiquitous deployment of accurate GPS/self-location transceivers that aperiodically report precise present location. Like the current BFT system, the reporting rate would vary from a minimum of, say, once per 5 minutes for a stationary location to appropriately more frequently on a moving location, such that the reported location did not differ from the actual by more than a prescribed amount (e.g., 50 m).

- In the objective system, these GPS/transceivers would be deployed on every blue force asset (possibly down to the individual foot soldier).

- This blue force position information from each individual report would be received and assimilated by a local hub and forwarded up the hierarchal chain.

This composite local picture would be transmitted periodically back to each local site with a need to know to provide them SA on their local area. The next level in the hierarchy would aggregate information from several local sites and pass along the composite picture both to higher as well as lower echelons.

- Higher-level hubs would mosaic multiple local area BFSA "pictures," forming a composite BFSA view of increasingly larger areas, and then transmit this up and down the network hierarchy. This composite information would be available to all on the network with an appropriate need-to-know.

Although BFSA is in broad terms a cooperative system, it has several characteristics that avoid most of the pitfalls associated with conventional IFF systems. In particular, an individual node in the system is able to see itself in its local picture; absence or error in this position can thus be self-detected and reported through other communication channels in most cases. Further, if a friendly strike aircraft or other source of fires plans to launch a weapon against a specific target location, for example, a friendly located at or near that location can send a "don't shoot" priority message to avoid a fratricide incident. This of course requires a good multi-level access encryption process built into the BFSA system to avoid exploitation by an adversary, which suggests the need for inclusion of a robust over-the-air key transmission process, etc. Additional techniques for attaining one's own coordinates precisely (supplementary to GPS, especially in urban environments) – such as the "Network Assisted GPS" technique now employed by the cell phone industry – should be explored.

Funding

	U.S. FUNDING							
	FY03		FY04		FY05(Req)		FY06(Req)	
	QTY	AMT	QTY	AMT	QTY	AMT	QTY	AMT
RDT&E (USA)								
PE#0604817A								
902 ICIDS	–	5.0	–	8.3	–	0.0	–	0.0

All $ are in millions.

Recent Contracts

(Contracts over $5 million.)

Contractor	Award ($ millions)	Date/Description
Motorola	7.1	Jul 1997 – CPIF contract ($900,000 increment) for 148 Combat Identification Dismounted Soldier Systems (CIDDS). Expected completion date July 31, 2000. (DAAB07-97-C-S828)
Motorola	9.8	Sep 2001 – Awarded as part of a $49,800,000 firm fixed-price incentive and time and materials contract. This is a one-year base contract with four

Contractor	Award ($ millions)	Date/Description
		one-year options. As a result of numerous fratricide incidents during recent military engagements, the Army established rigid schedules to implement combat identification devices to minimize fratricide while maximizing combat effectiveness. Individual Combat Identification Systems (ICIDS), through a millimeter wave, point-of-engagement, question and answer technological capability, accomplish this and are an integral part of the Army's digitization effort for combat identification. Complete December 31, 2005. (DAAB07-01-C-J010)

Timetable

Month	Year	Major Development
Mar	1997	Solicitation, Draft RFP
3Q	FY97	MSII decision
Jul	1997	EMD award, 50 units
2Q	FY99	Hardware build begins
4Q	FY99	Hardware build completed
	FY99	Integration with Land Warrior begins
Mid	1999	CIDDS demonstrated under field conditions
4Q	FY00	Gov't Development Test, Phase I
1Q	FY01	Complete fabrication of 50 hardware systems
1Q-2Q	FY01	Development Test, Phase II
3Q	FY01	Airborne certification, LRIP IPR, LRIP award
4Q	FY01	DARI
Sep	FY01	LRIP IPR, LRIP award
4Q	FY02	IOT&E
2Q	FY03	Feasibility demonstration
4Q	FY03	IBCSAS Contract Award, MOUT site Survey/Select man-portable hardware
3Q	FY04	Phase I demo
4Q	FY04	Phase II demo

Worldwide Distribution

Currently a **U.S.**-only program.

Forecast Rationale

Fratricide has always been a combat risk because the fog of war creates situations where mistakes are not only possible, but probable. As the lethality of weapons increased, so did the danger. Today's weapons can hit targets too far away for positive identification by the shooter.

As a result of the Persian Gulf War, the U.S. and its allies have been pushing to develop technological solutions to this problem.

As a result there has been major program restructuring, terminating ICIDS and making the anti-fratricide effort part of Land Warrior. Original estimates had up to 80,000 units being purchased, but this is uncertain and will depend on Land Warrior plans.

The Defense Science Board report cast doubt on the enthusiasm planners still have for this sort of combat identification system. The equipment has not proven sufficiently reliable and workable so far. In combat operations in Iraq, urban fighting has been relying on simple night vision flashers to identify friendly forces to other Marines and soldiers equipped with NVGs. One though seems to be that overall situational awareness, rather than individual soldier identification, may be a more productive approach, given the increasing experience with Blue Force Tracking on the battlefield.

Ten-Year Outlook

Effort moved to Land Warrior program.

*   *   *