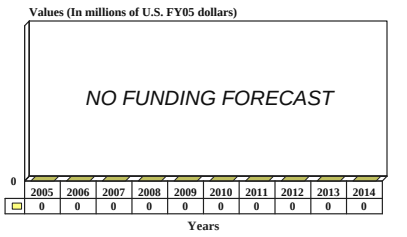
HumanID - Archived 1/2005

Outlook

- Program funding cancelled

Forecast Funding Levels
2005 - 2014



Orientation

Description. Program to develop automated multi-modal, multi-biometric surveillance technology for identifying humans at a distance.

Sponsor
Defense Advanced Research Projects Agency (DARPA)
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Status. In early concept development.

Total Produced. Not applicable at this time.

Application. Human identification technology for sensitive public and infrastructure areas such as airports and nuclear energy plants.

Price Range. Indeterminate. Currently in initial RDT&E stage.

Contractors

Technical Data

Design Features. The HumanID program seeks to improve individual biometric technologies and develop methods for fusing biometric signatures from multiple sensors for multi-range, round-the-clock processing. The focus is on multi-modal fusion of different biometric signatures acquired by video, infrared, and multi-spectral sensors, and configurations of networked cameras.

According to HumanID's developers, people can be recognized at substantial distances by observing their gaits. Upon closer examination, facial appearance and expressions also become identifiers. To turn this information into useful biometrics, algorithms are being developed for extracting static and dynamic body and facial features. To facilitate this evaluation, a multi-feature, multi-view human biometric database of facial expressions and body motions will be constructed. Information from strategically placed video cameras will then be matched with items in the database to determine identity.

Two of the main themes of the HumanID project have been identified: Thermal Facial Screening and Thermal Facial Detection & Recognition in the near infrared band. Thermal Facial Screening seeks to develop a device that can detect psychological state (e.g., anxiety, alertness, or fear). Thermal Facial Detection & Recognition is aimed at creating a system that will detect faces of pedestrians and vehicle occupants even under low light and inclement weather conditions.

Advanced electro-optical technology is at the core of HumanID development, with emphasis on optical-based instrumentation, spectroscopy, holography, lasers, laser-based instrumentation, and smart optical filters.

Variants/Upgrades

Variants and upgrades do not apply at this time, as HumanID is still a development program.

Program Review

Background. In January 2001, the general public was introduced to the realities of facial recognition technology in a rather blunt way. Spectators at that year's Super Bowl game discovered through the news media that their images had been scanned by remote video cameras and matched to a database of wanted criminals. While this incident created a minor controversy, it was evident that a totally new facet of law enforcement had been introduced.

HumanID, a program of the U.S. Defense Advanced Research Projects Agency (DARPA), is an outgrowth of the Image Understanding for Force Protection effort, which was funded under Project ST-11 as early as FY00. Today, the project is funded under the Computing Systems and Communications Technology program, PE#0602301E and the Asymmetric Threat Project ST-28.

The immediate goal of the Asymmetric Threat Project is to develop technological capabilities and a suite of tools to better detect and prevent attacks on critical U.S. Department of Defense (DoD) infrastructures. Besides HumanID, other programs include Evidence Extraction and Link Discovery (EELD), Wargaming the Asymmetric Environment (WAE), and Bio-Surveillance, Endstate and DefenseNet (DNET).

The U.S. DoD identified asymmetric threats as the most serious to the U.S. long before the events of September 11, 2001. As was displayed on that date (and as stated in the RDT&E descriptive summary for the program), such threats are by nature unconventional yet highly lethal attacks by loosely organized groups of transnational terrorists seeking to influence U.S. policy. The need to identify these threats before they are carried out is crucial. One way to prevent such attacks is by developing the capability to automatically recognize and identify humans at a distance and to detect any enemy agent performing surveillance in the U.S. HumanID therefore has a very crucial role to play in combating asymmetric threats.

Of the US$26.8 million budgeted for the Asymmetric Threat Project in FY01, US$11.5 million was dedicated to HumanID. Work in this year included the development of evaluation methodologies and independent evaluations on human identification techniques candidates as well as the demonstration of automated HumanID under outdoor lighting conditions.

With US$15.8 million budgeted in FY02 for HumanID, the program saw the incorporation of additional sensors and biometrics into a pilot force protection system and the demonstration of a prototype system at force protection and homeland defense sites. The program also sought to develop methods for fusing multi-modal biometric technologies and deriving biometric signatures.

The Aviation and Transportation Security Act, signed into law in November 2001, marked a significant step toward integration of biometric technology into actual security systems. Pilot projects were subsequently established at over 80 airports across the U.S. Among the efforts of the Transportation Security Administration (TSA) working group will be the investigation of facial recognition biometrics. Although not specifically reported, aspects of HumanID will most likely be brought into play for these evaluations.

Liar, Liar, Face on Fire. In early 2002 a minor test of heat-sensing technology yielded some interesting results. With the help of U.S. Army soldiers, the Mayo Clinic used a high-resolution thermal camera to detect a faint blushing around the eyes of those subjects who had committed a faked misdeed and then lied about it. While this was a relatively small test, it did seem to indicate the great potential for future facial screening research.

According to a 2002 U.S. General Accounting Office memorandum entitled "Federal Funding for Selected Surveillance Technologies," interest in biometric identification capability, especially facial recognition, has increased in aftermath of 9/11. And according to an Office of Homeland Security report entitled "Action

Plan for Creating a Secure and Smart Border," biometric-based systems are crucial to border security. A Biometrics Management Office was created within the U.S. DoD in 2002.

With the release of the U.S. defense budget in early 2003, a new, follow-on program for HumanID under the Computing Systems and Communications Technology program was introduced. Just as RDT&E funding for the original program is scheduled to stop after 2004, the new program, Next Generation Face Recognition (NGFR), will take over. According to the program description, NGFR will use the experience gathered from HumanID development and move toward the creation of practical systems. (See the Funding section below for the actual dollar amounts.)

Among the planned objectives for the initial years of the program will be the development of three-dimensional, infrared, and multi-spectral imaging technologies, and the testing and evaluation of systems in various environments using an image database of over a million people.

Funding

U.S. FUNDING - R&D

	FY03		FY04		FY05		FY06	
	QTY	AMT	QTY	AMT	QTY	AMT	QTY	AMT
RDT&E (DARPA)								
PE#0602301E Computing Systems and Communications Technology Project Asymmetric Threat ST-28 HumanID	-	11.1	-	4.3	-	0.0	-	0.0
Next Generation Face Recognition (NGFR)	-	0.0	-	0.0	-	7.0	-	10.1

Source: U.S. Department of Defense (DoD) Defense Advanced Research Projects Agency (DARPA) FY2004/2005 RDT&E Program (R-2 Exhibit)

All US$ are in millions.

Recent Contracts

No specific contracts have been identified through public sources at this time.

Timetable

Month	Year	Major Development
	2000	HumanID program arises out of Image Understanding for Force Protection effort
Early	2001	US$11.5 million in funding for HumanID RDT&E
Late	2001	Development and assessment of validity of current and future technologies to meet proposed system needs
Nov	2001	Aviation and Transportation Security Act signed
	2002	Mayo Clinic test of facial recognition technology
	2002	Pentagon establishes Biometric Management Office
	2003	US$14.5 million budgeted by DoD
	2005	RDT&E funding transitions to Next Generation Face Recognition (NGRF) efforts
	2004-2013	Ongoing test and demonstration of HumanID/NGRF

Worldwide Distribution

HumanID is a **U.S.** DARPA development program for U.S. homeland security only.

Forecast Rationale

The somewhat foreboding name Next Generation Face Recognition (NGRF) has been chosen for the next phase of the Human Identification at a Distance (HumanID) program. With the U.S. Department of Defense (DoD) making decisive moves nearly every day to bring the program to fruition, the technology continues to move rapidly from the theoretical to the practical. The planned program transition by mid-decade is intended to bring this transformation about. It is clear that within the very near future most U.S. military sites will be entered only after this most high-tech form of screening.

More basic biometric technology is already used by the U.S. DoD to safeguard certain high priority locations. With the terrorist threat showing little sign of abating, interest in biometrics technology in general and facial recognition technology in particular has continued to rise. Increased military use of the technology is expected to be followed by growing use of the systems by civil law enforcement and security firms charged with safe-guarding sensitive sites.

The goal of the Defense Advanced Research Projects Agency (DARPA)'s HumanID program is to provide automated surveillance technology for the identification of individuals in large groups, at night, and in inclement weather. Research and development for this program is funded under DARPA's Computing Systems and Communications Technology, Asymmetric Threat program. While RDT&E funding has dropped under HumanID from a high of US$16.7 million in FY2002 to a low of US$4.3 million in FY2004, the program transition to NGRF will see a rise in funding to US$10.1 million in FY2005.

The Pentagon has intimated that it expects to have biometric technology widely distributed throughout the military by 2010. The newly formed Biometric Management Office will no doubt ensure that this plan becomes a reality. Future updates to this report will attempt to track procurement plans for the technology.

Estimated funding levels are based on the actual dollar amounts included in the U.S. DoD budget for HumanID and NGRF. As this official listing of annual amounts only goes up to FY2005, the remainder of the funding amounts in the **Ten-Year Outlook** should be viewed as somewhat speculative. However, with the steady interest shown in this technology and the Pentagon's apparent desire to get systems implemented by the end of the decade, these amounts may ultimately prove conservative.

Ten-Year Outlook

Program funding has been cancelled.