

## **Closing the Identity Gap: Handheld biometric identity solutions, paired with Rapid DNA, empower military, law enforcement and humanitarian applications**

**Background.** Over the past several decades, the development and widespread use of biometrics capture (e.g., fingerprint, facial, and iris) has greatly impacted national security, transportation safety, military intelligence and law enforcement operations around the globe. While biometrics industry leaders and vendors are advancing the use of AI frameworks to enhance facial recognition applications, inclusion of Rapid DNA technology as a critical fourth biometric capability warrants more attention. Currently, no single device can capture all four biometrics – fingerprint, face, iris and DNA – simultaneously. For this study, we demonstrate the utility of a fully integrated biometrics solution using the Parsons Biometrics Javelin™ handheld device and Ares Gateway software with the Applied Biosystems RapidHIT ID™ (RHID) System, by Thermo Fisher Scientific, to obtain actionable intelligence for all key biometrics. This solution provides enhanced capabilities for law enforcement, military activities and humanitarian efforts in a single, integrated workflow to advance field operations.

### **Introduction.**

**Adoption of biometrics.** Since the introduction of electronic fingerprint capture in law enforcement in the late 1980's - 1990's, technology advancements have made human biometric identifications faster, easier and with a higher degree of accuracy. Counter terrorism and law enforcement operations in the United States and abroad are advancing the use of mobile fingerprint and iris capture in combination with AI-powered search algorithms for enhanced uses of facial recognition<sup>1</sup>.

While the efficacy of these approaches is not in question, ethical and privacy considerations for facial recognition as a confirmatory biometric are prompting industry leaders to proceed with a degree of caution. As the technology develops, governments around the globe will increase the use of biometric data for security measures aimed at reducing violence and keeping communities safe.

**Fingerprint, iris and facial recognition.** Parsons Corporation, a global identity management vendor in the national security space, provides a suite of products to deliver modern intelligence capabilities, surveillance and reconnaissance solutions, cyber and other advanced technologies to bolster operator efficiency, accuracy, and safety. The Parsons' Javelin™ handheld device and Ares™ Gateway software

provide rapid capture of facial, iris, live and latent fingerprints for secure, centralized storage and comparison to investigative databases. The FBI-certified Ares™ software supports multiple operating systems and features applications for mobile devices, Microsoft™ Windows, and server-based platforms. In the United States, all services of the DOD (Army, Airforce, Navy and USMC) and multiple components in the United States Special Operations Command (USSOCOM) utilize these tools to bring actionable information and intelligence capabilities to field operations. The Solutions are also used by the Federal Bureau of Investigations, Department of Homeland Security, Department of State, NATO and numerous law enforcement and medical examiner offices in the United States and with other global partners.

In addition to military and national security applications, Parsons' Javelin biometrics solution was used to support identifications in the aftermath of Hurricane Helene<sup>3</sup>. The FBI's Criminal Justice Information Services Division's critical humanitarian efforts benefitted from the speed and accuracy of the Parsons' Ares Enterprise solution to identify more than 230 deceased individuals. The team was able to provide immediate support for this critical humanitarian effort, demonstrating the company's ability to advance emergency response initiatives and underscore the critical role biometrics plays in humanitarian efforts for real-world mass fatality incidents.

**Forensic DNA analysis.** Like the adoption of electronic fingerprint capture techniques, forensic DNA analysis gained widespread acceptance in law enforcement, military and humanitarian applications as a confirmatory human biometric dating back to the 1990s. Law enforcement use of the Combined DNA Index System (CODIS) database - which currently holds ~26M DNA profiles – has generated over 761,000 hits as of June 2025<sup>4</sup>. In military field operations, joint expeditionary forensic facilities (JEFF) labs were first established in Iraq in December 2006 to address the high number of sniper attacks throughout the Iraqi theater of operations (ITO). Advanced mitochondrial DNA analysis was introduced by the US Defense POW/MIA Accounting Agency in the mid-1990s, leading to countless identifications of missing soldiers from past US military conflicts (as of 2023, the Armed Forces Repository of Specimen Samples for the Identification of Remains (AFRSSIR) has processed over 7.8M DNA references from service members, DoD civilians, and other personnel; the Armed Forces Medical Examiner System's DNA Identification Laboratory (AFMES-AFDIL) processed over 7,700 skeletal fragments under the federal government Joint Accounting initiative between 1992 and 2009 alone<sup>5</sup>. The New York City Office of the Chief Medical Examiner and others tested ~22,000 remains samples from the 9/11 attacks<sup>6</sup>, and DNA analysis has played a critical role in countless other mass fatality events and forensic identifications to provide closure to families who have lost loved ones.

One limitation of traditional forensic DNA testing in field operations is the requirement to have dedicated laboratory facilities with highly trained forensic scientists. After the passing of the Rapid DNA Act of 2017<sup>7</sup>, Thermo Fisher developed the RapidHIT ID™ System, a fully automated sample-to-answer genetic analysis platform. The system was built upon the widely accepted forensic DNA analysis methods employed over the past 30 years in human identification uses across the globe. As we outline here, the RapidHIT ID™ System removes the obstacle by consolidating DNA testing into a single sample-to-answer platform; the system is designed for use by non-technical end users outside of the brick-and-mortar forensic DNA laboratory.

Over the past five plus years, the RHID System has demonstrated widespread success in processing a range of sample types (e.g., arrestee and other known references, blood, saliva, bone, tissue and contact or ‘touch’ DNA samples) in various testing environments, including DVI emergency management field responses, sheriff’s office booking stations, police department kiosks, overseas territories and military field operations. Table 1 highlights a few Rapid DNA deployments across the globe.

**Table 1.** Examples of Rapid DNA deployments for human identification applications.

Agency	Program Type	Scale	Outcome
<b>U.S. Department of Homeland Security</b>	Human trafficking	>20 RHIDs across 16 sites along US southern border	- 7600 samples processed - 100s of cases aided
<b>Connecticut State Police</b>	Criminal investigations	>10 RHIDs at state and local agencies, including Office of Chief Medical Examiner	- 55% upload rate - 35% hit rate (homicide, burglary, etc.) - >1600 samples processed
<b>Philadelphia, PA Medevac plane crash</b>	Disaster Victim Identification (DVI)	13 RHIDs for 24/7 testing	- >550 human remains tested - All 7 individuals identified
<b>Louisiana State Police</b>	Arrestee DNA enrollment	9 RHIDs for 24/7 booking station operation	- 6,370 runs and 4,808 uploads - 4 interstate hits and 23 intrastate hits
<b>French Gendarmerie</b>	Criminal investigations	8 RHIDs deployed at overseas territories	-736 samples processed with high success rates across trace evidence, human remains, and reference samples

Creating actionable intelligence at the front end of investigations with DNA results in hours versus days to weeks with traditional forensic laboratory testing empowers investigators and informs custodial decision-making. In total, more than 230 RapidHIT ID Systems are part of decentralized Rapid DNA programs in over 18 countries globally.

**Integrated Biometrics Solution: Javelin™, Ares™ and the RapidHIT ID™ System. Javelin™ Mobile Biometric Collection Kit & Ares™ software.** For this effort, a single biometrics workflow was developed using the Javelin™ Mobile Biometric Collection Kit, Ares™ Gateway and Ares™ software with the RapidHIT ID System<sup>8</sup> and RapidLINK™ Direct Match Software to demonstrate the utility of an all-in-one biometrics solution. The Javelin™ Mobile Biometric Collection Kit is a lightweight, modular, Android-based device capable of collecting multi-modal biometrics (fingerprint, face, iris) (Figure 1). The kit runs the award-winning, Ares™ Mobile Biometric Application software and provides a consistent user experience across the Javelin™ line of biometric collection kits. Features of the Javelin™ device include:

- Lightweight and Modular
- Ruggedized Design for Law Enforcement and Military Use, MIL-STD 810g Drop Tested to Six Feet
- Samsung Mobile Devices, including Tactical Edition Smartphones
- Android-Based Operating System
- Optional Vehicle, Chest, and Arm Mounts
- Inductive Charging Capability

Additional components for the Javelin™ Jump Kit include:

- Local Power Adapter
- 26,900mAh External Battery Pack
- International Travel Adapter
- Mini Tripod

**Figure 1.** Handheld Javelin™ device (left) and the ruggedized Javelin™ Jump Kit (right).

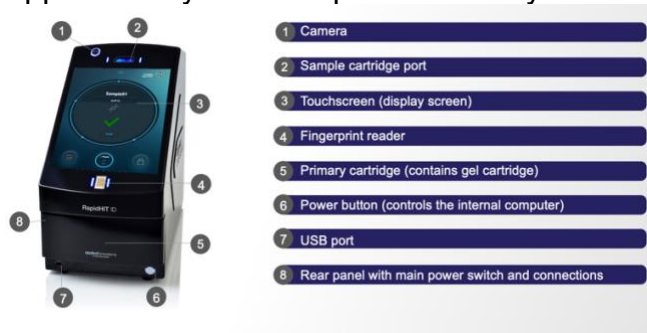


**RapidHIT ID System.** The RapidHIT ID System (Figure 2) is a fast and simple-to-use DNA analysis instrument that produces trusted lab-quality forensic DNA profiles in as little as 90 minutes. The system integrates sample preparation and capillary electrophoresis to generate DNA profiles that are aggregated within Applied Biosystems RapidLINK™ Software for direct upload to the RapidLINK™ Direct Match software.

Features of the RHID System include:

- Sample to answer in as little as 90 minutes
- 1-minute hands-on time with integrated sample cartridges
- Consumables tracking through radio frequency identification (RFID)
- Intuitive touchscreen interface
- Multi-factor authentication (facial recognition, fingerprint reader and/or PIN)
- Up to twelve months of shelf life for both sample and primary cartridges

**Figure 2.** The Applied Biosystems RapidHIT™ ID System



Features of the RapidLINK™ Direct Match Software include:

- Direct integration with RapidLINK for effortless profile intake
- Always-on profile search capabilities for eligible profiles
- Proven search strategies based on CODIS algorithms
- Intuitive configuration and results dashboards
- Compatibility for import and export of common DNA profile formats

Direct Match software brings always-on DNA searching and matching to the RapidHIT ID System. Direct Match centralizes intake, organizes profiles, and automates queries against configurable indices. Direct Match accelerates moving from profile generation to confident, actionable matches.

For mobile Rapid DNA applications, the RapidHIT ID transport case<sup>9</sup> allows the instrument to be relocated to an incident for point-of-collection testing (Figure 3).

Features of the RapidHIT ID Case include:

- Ruggedized, reusable case that delivers protection and flexibility in field operations
- Storage, transport and workstation support
- Protection from shocks and vibrations during transport or shipment
- Sturdy design for hand-carrying or rolling with heavy duty handles and recessed wheels



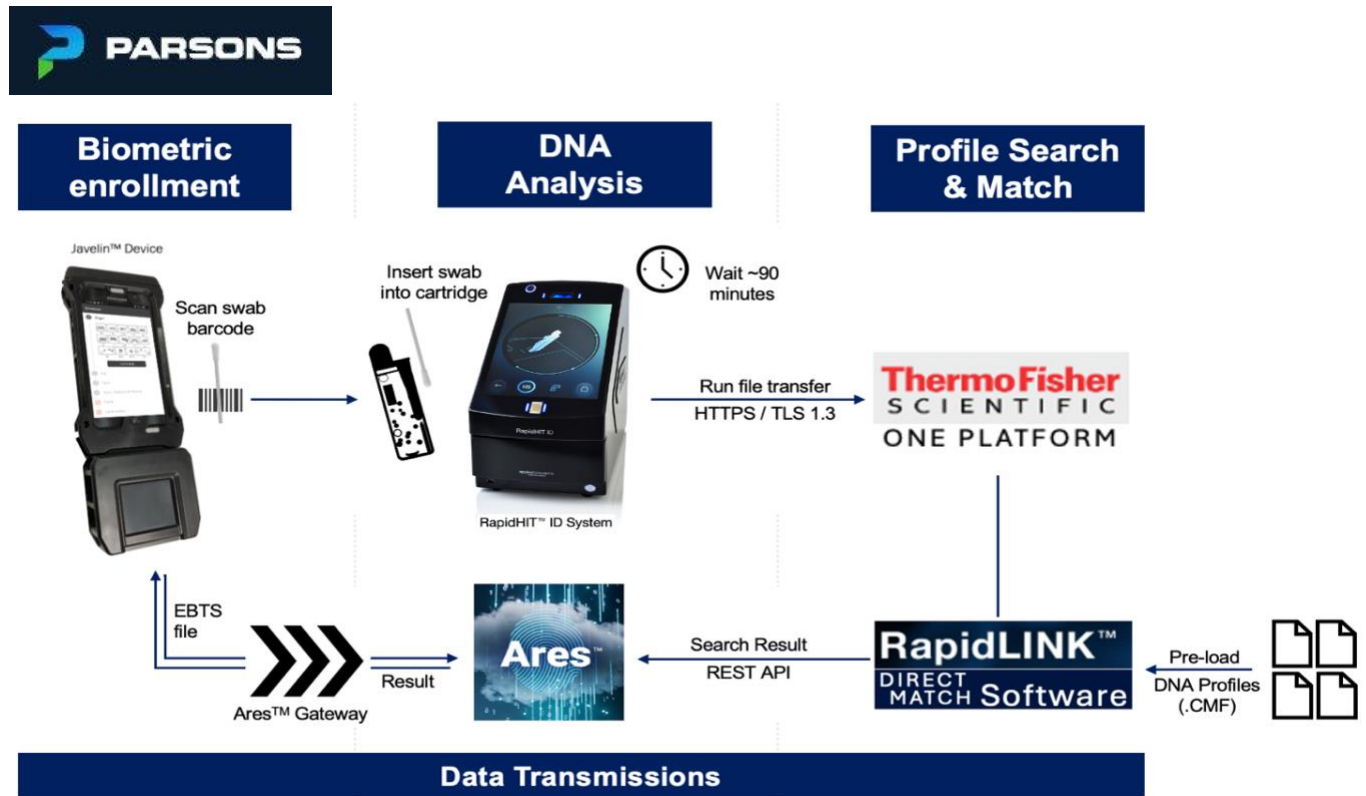
**Figure 3.** The RHID mobile transport case for field operations.

### **Workflow Design.**

We collaborated with the Parsons development team to design a streamlined integration between the systems (Figure 4). To ensure complete chain of custody handling and seamless data transfer, the workflow achieves integrated biometric capture as follows:

1. Biometric enrollment
  - i. Capture biometric identifiers with the Javelin device
  - ii. Store data in Ares
2. DNA sample collection
  - i. Collect DNA sample
  - ii. Scan DNA swab barcode to enroll; biometrics converted to EBTS file
3. DNA analysis
  - i. Insert DNA swab in RHID cartridge
  - ii. Run RHID
4. Profile search and match
  - i. Securely transmit results to Direct Match via HTTPS/TLS 1.3
  - ii. Automatic DNA profile search in Direct Match/TFS One
5. Match output
  - i. Results returned to Ares software via REST API
  - ii. Ares renders final identity verification

**Figure 4.** An integrated solution for biometrics capture (fingerprint, facial, iris and DNA) with automated search capabilities.



**Conclusion.**

**Closing the Identity Gap.** The integrated biometrics solution described herein offers speed, accuracy and reliability to capture key human biometric identifiers in a single workflow. Maximizing actionable investigative intelligence value with the Javelin™, RapidHIT ID System and RapidLINK™ Direct Match Software – an integrated biometrics solution suitable for law enforcement, military and humanitarian efforts – offers a new approach for investigators to make the world safer. Closing the biometrics identity gap by adding DNA to fingerprint, iris, and facial recognition offers robust biometric capabilities to cover a range of intelligence gathering scenarios.

Maintaining operational tempos with technology solutions is a key factor to achieve mission objectives. Biometrics capture with the Javelin™ and Ares solution™ provides real-time, mobile fingerprint, iris and facial recognition; the RapidHIT ID System and RapidLINK™ Direct Match Software benefits from an 85-90% first pass success rate

with high quality DNA results in ~90 minutes. Applications that require temporary detainment or processing of in-custody subjects can benefit from the continuous chain of custody with this solution for high-risk individuals. Lights out processing allows collectors to focus on other custodial tasks while RapidHIT ID testing is in process.

Automatic search and match capabilities in Ares and RapidLINK applications for these biometrics maximizes the forensic investigative intelligence and system integration between these technologies. The association of individuals to probative forensic investigative samples while detained or while in custody offers cost avoidance when detainment/custody decisions are expedited and repeat operations can be avoided.

In terms of technology deployment, co-installation of these systems in a virtual or Windows-based server provides automated aggregation of biometric data, search and match capability and display of match output in the Ares software to deliver reliable investigative resolutions. These capabilities enhance military and law enforcement CONOPS while providing scalability, flexibility and long-term data storage and security. From a throughput standpoint, a single RHID running under 24/7/365 operation can process up to 5,000 samples and requires only a minimal cold-chain footprint (e.g., undercounter refrigeration) compared to a high-cost forensic laboratory facility. Likewise, the ease of use for these systems enhances military and law enforcement investigations in mobile operations in decentralized environments or 'hub and spoke' models to reduce operator burden. As a result, lawful, decisive custody actions and reduced risk to personnel and communities can be more easily achieved.

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<sup>1</sup> [https://pages.nist.gov/frvt/html/frte\\_five.html](https://pages.nist.gov/frvt/html/frte_five.html)

<sup>2</sup> <https://www.parsons.com/products/javelin/>

<sup>3</sup> <https://www.parsons.com/2024/11/supporting-the-fbi-during-hurricane-helene/>

<sup>4</sup> <https://le.fbi.gov/science-and-lab/biometrics-and-fingerprints/codis/codis-ndis-statistics>

<sup>5</sup> <https://dpaa-mil.sites.crmforce.mil/dpaaFamWebAFMES>

<sup>6</sup> <https://pubmed.ncbi.nlm.nih.gov/36150280/>

<sup>7</sup> <https://www.congress.gov/committee-report/115th-congress/house-report/117/1?outputFormat=pdf>

<sup>8</sup> <https://www.thermofisher.com/order/catalog/product/A41810>

<sup>9</sup> <https://www.thermofisher.com/order/catalog/product/A40004464>