

Joint Trauma Analysis and Prevention of Injury in Combat (JTAPIC) Program

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The Biomedicine Business Area is developing a data management system for the Joint Trauma Analysis and Prevention of Injury in Combat (JTAPIC) program, whose mission is to collect and analyze theater operational data to improve warfighter survivability. APL has analyzed and documented the current JTAPIC business processes and, from this review, has begun the initial conceptual design of a web-based information system known as the JTAPIC Data Management System (JDMS). The JDMS will capture and process data from JTAPIC's customers and partners, maintain the information for future and subsequent analysis, provide analysis tools, and track the progress of the analysis. The JDMS ensures information security, assurance, and management through the implementation of a unidirectional data guard and a dynamic dashboard. The JDMS will significantly assist JTAPIC in reducing the effects of warfighter traumatic injuries by improving the analysis of theater data.

INTRODUCTION

The Joint Trauma Analysis and Prevention of Injury in Combat (JTAPIC) program at U.S. Army Medical Research and Materiel Command (USAMRMC) has engaged APL's Biomedicine Business Area to positively influence the efficiency and effectiveness of their mission to reduce the impact of warfighter traumatic injuries. The role of APL was to analyze and document USAMRMC's business processes and subsequently design a web-based information system that would allow JTAPIC to collect the necessary data from their partners, analyze the data, retain the data for future and subsequent analysis, and track the progress of the analysis.

BACKGROUND

The JTAPIC program is a formal partnership among the DoD intelligence, operational, personnel, materiel, and medical communities with the goal of establishing a single point of contact to address inquiries that require the integration of information and analyses across those communities. The mission of JTAPIC is to facilitate the collection and integration of information to improve the understanding of vulnerabilities to threats and enable the development of improved tactics, techniques, and procedures; requirements; materiel solutions; medical treatments; and models in order to prevent/mitigate traumatic injuries. JTAPIC was established at

USAMRMC in Fort Detrick, Maryland, in July 2006 to fulfill the joint database and information sharing intent outlined in Refs. 1 and 2.

STORYBOARD ANALYSIS

In February 2008, APL began supporting the JTAPIC Program Office by reviewing the current JTAPIC procedures behind their forensic storyboard process. This process collects and analyzes data to provide visualization of an incident. The tasks were to perform an initial assessment of the process, report on a path forward to developing and recommending modifications to the analysis process, establish written procedures, and coordinate a sample detailed forensic storyboard. The storyboard process review identified a critical need for a comprehensive system to support the collection, protection, and integration of the classified and unclassified operational and sensitive health information and to reduce the time from request to product. This system would provide traceability of warfighter-critical requests for information (RFIs) related to combat engagements and support the forensic analysis of protection performance. It would also maintain accountability from RFI initiation through results-driven improvements in protection systems with an emphasis on quality fusion of cross domain data elements and integration of multiorganization analyses.

NEEDS ANALYSIS

In response to this critical need, APL conducted a needs analysis of current JTAPIC business practices along with a preliminary requirements development effort for a comprehensive data management system. The initial step in assessing the JTAPIC needs was to capture the current business processes. Through numerous one-on-one and group meetings with the JTAPIC staff and management, a clear understanding of their processes was documented. Three separate process flows were identified. The primary business process is the RFI from field and command leadership (Fig. 1). The other two business processes focus on data retrieval and analysis and are separated between mounted (incidents related to warfighters in vehicles) (Fig. 2) and unmounted (incidents related to warfighters on foot) (Fig. 3).

Current JTAPIC RFI Business Process

The RFI business process begins when a customer submits an information request to JTAPIC. This RFI can be as simple as a request for troop injury rates or more complicated to include relational queries regarding associations between materiel and threats. Additionally, RFIs may have any level of classification. Upon reviewing the RFI, the Project Area Manager (PAM) notifies the JTAPIC Medical Integration staff and the JTAPIC Analyst staff about the RFI so that they can begin their

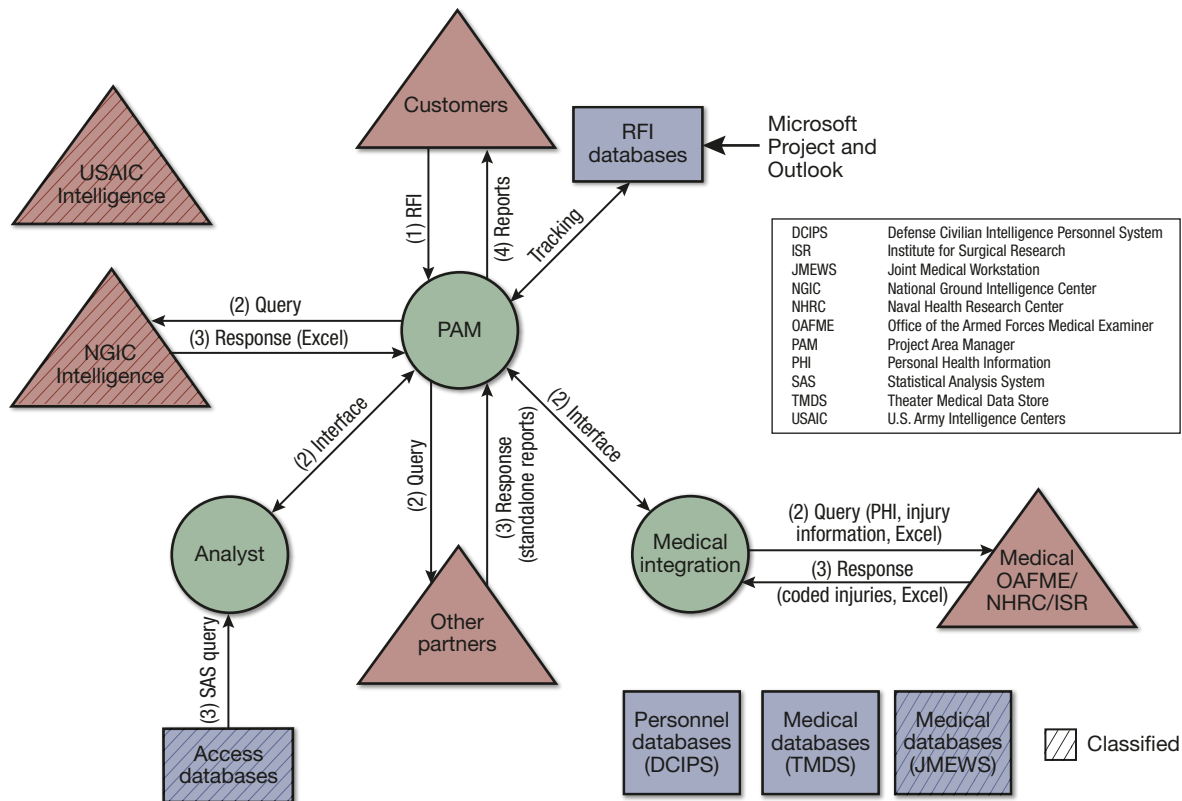


Figure 1. RFI business process flow.

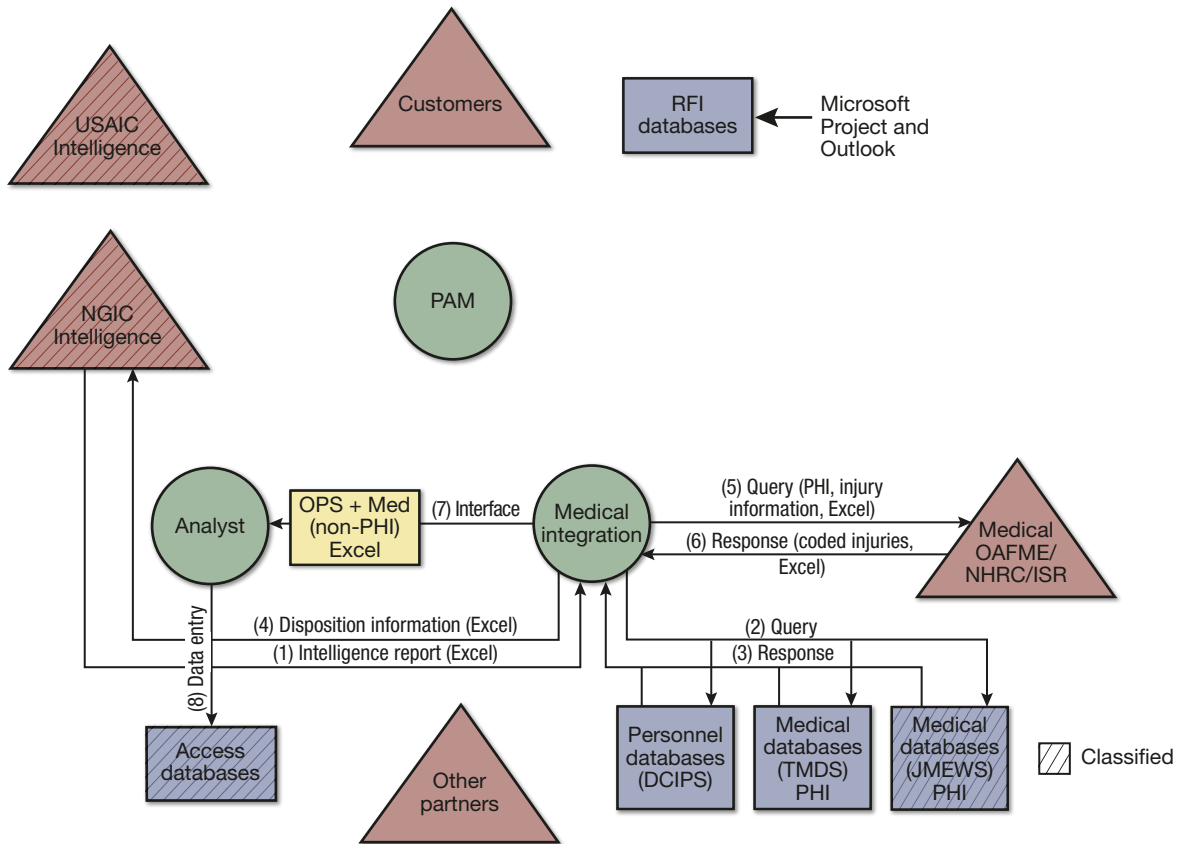


Figure 2. JTAPIC mounted business process flow. OPS, operations information; Med, medical information.

data collection. The JTAPIC Medical Integration staff contacts the appropriate military medical partner(s) (OAFME, NHRC, and ISR) and provides the PAM with coded injury information.

The JTAPIC Analyst staff collects classified and unclassified data from the National Ground Intelligence Center (NGIC) and other partners. All of the collected data are stored in a combination of Microsoft Excel spreadsheets, e-mails, notes from phone calls, and a Microsoft Access database. All JTAPIC activities are tracked in Microsoft Project and Outlook. Data are transferred between the various partners using Excel, e-mail, or text files. The data transfers and activity tracking are the primary concerns of the JTAPIC team. Once the necessary data are collected, stored, and analyzed, a response is generated for the requestor. Regardless of whether the RFI was classified or not, the resulting report must be evaluated for any security issues by JTAPIC staff before final delivery.

JTAPIC Mounted Business Process

In the mounted process, NGIC provides intelligence, which is cross-referenced to various personnel, unclassified and classified medical databases, and medical partners by the JTAPIC Medical Integration staff. These data are pruned of personal health information (PHI), analyzed, and stored in the JTAPIC Access database. Finally, an Excel report is issued back to NGIC.

JTAPIC Unmounted Business Process

In the unmounted process, U.S. Army Intelligence Centers (USAIC) provides intelligence, which is cross-referenced to various personnel, unclassified and classified medical databases, and medical partners by the PAM and JTAPIC Medical Integration staff (DCIPS, TMDS, JMEWS, OAFME, NHRC, and ISR). These data are pruned of PHI, analyzed, and stored in the JTAPIC Access database. Finally, a report is issued back to USAIC.

JTAPIC DATA MANAGEMENT SYSTEM

On the basis of the results of the needs analysis, APL conducted a gap analysis of the current practices culminating in a proposed concept of operations (CONOPS) diagram (Fig. 4) detailing the proposed new comprehensive JTAPIC Data Management System (JDMS).

Throughout the needs analysis and CONOPS phases, the JTAPIC goals were kept at the forefront of the system design. These goals were to ensure data integrity while maintaining the efficient transfer and analysis of sensitive operational and health information in a data management system that provides the following:

- **Information security**—to protect the information from unauthorized access, use, disclosure, disruption, modification, or destruction

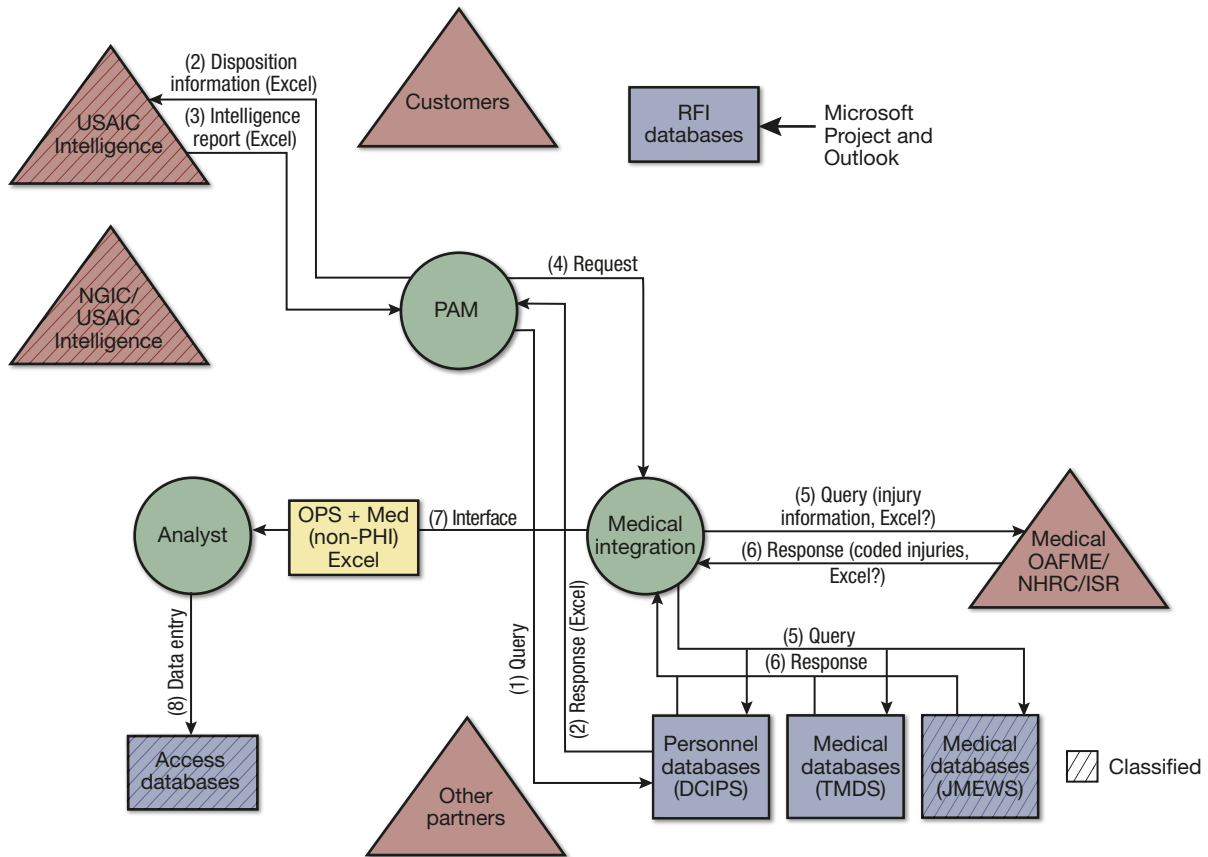


Figure 3. JTAPIC unmounted business process flow.

- **Information assurance**—to ensure protection of proprietary information, data integrity, data availability, and nonrepudiation
- **Information management**—to manage information distribution and facilitate the transfer of information

The JDMS will support the JTAPIC Program Office in the following areas:

- **Rapid analyses**—decrease the time from request to product
- **Accessibility of analyses**—improve request submission, tracking, and validation processes
- **Traceability and tracking**—provide accountability for RFIs, data, and products
- **Automation**—reduce time spent formatting and compiling data
- **Analysis**—provide integrated analysis capabilities

The JDMS was mapped to the identified JTAPIC business processes to ensure that all aspects were captured. In particular, attention was devoted to the various partners and customers, JTAPIC roles and responsibilities, data flows and types, and security classifications. The original responsibilities of the JTAPIC team were clarified into specific role assignments.

A major issue was the coordination of data transfers between classified (SIPRNet, Secret Internet Protocol Router Network) and unclassified (NIPRNet, Nonsecure Internet Protocol Router Network) areas. The JDMS proposes using a data guard to guarantee unidirectional data flow from NIPRNet to SIPRNet. To transfer status and system information from SIPRNet to NIPRNet, physical couriering of removable media and/or hardcopy transfer would be utilized (“sneaker-net”). A database resides on NIPRNet to mirror unclassified data on the classified SIPRNet. All reports destined for the unclassified environment are processed by a security representative with “eyes on” assessment. The major feature of the JDMS to address the sponsor’s primary need was the implementation of a dashboard that would allow the JTAPIC staff to continuously monitor the status of a RFI, including its outstanding external requests, report status, and operational issues. It also allows the PAM to instantly change priorities, tasks, and the resulting assignments. The dashboard allows quantitative monitoring of every aspect of the JTAPIC operations and exchanges with their partners, sponsor, and customers. Quantitative assessment allows JTAPIC to perform internal and external improvements to communications, analysis, and management. The JDMS CONOPS was briefed to the JTAPIC Program Office and resulted in a decision to develop a task

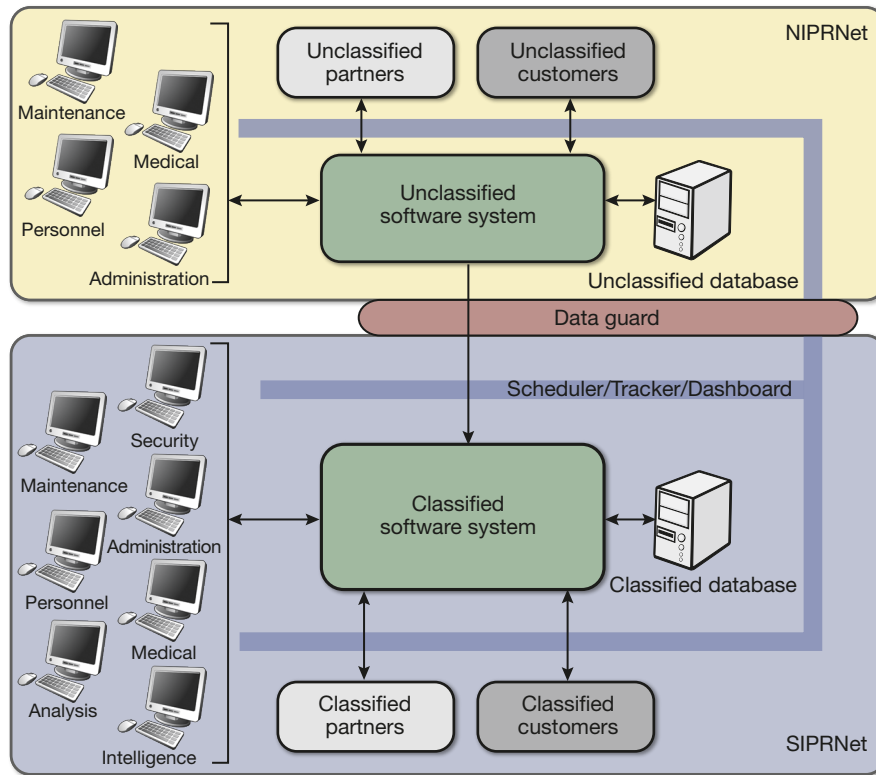


Figure 4. JDMS.

execution plan for system development and implementation. APL plans to undertake an incremental approach to the development of the JDMS, consisting of multiple development spirals. Each spiral would commence with a functional architecture definition task that establishes the incremental functionality for that spiral. This hybrid approach would provide the JTAPIC Program Office with critical JDMS capabilities at the end of the first spiral. It allows design modifications identified through user experience

with systems delivered in preceding spirals.

CONCLUSION

The JTAPIC at USAMRMC engaged the APL Biomedicine Business Area to improve the operation of their mission to decrease the effects of warfighter traumatic injuries. The JDMS was designed on the basis of a thorough analysis of the JTAPIC business processes and the subsequent needs analysis. It addressed the sponsor's primary needs of information security, assurance, and management through the implementation of a unidirectional data guard and a dynamic dashboard. The JDMS system will vastly reduce the impact of warfighter traumatic injuries through the improved management of, and subsequent concurrent analysis of, health and operational data.

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