

From Stove-pipe to Network Centric Leveraging Technology to Present a Unified View

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Abstract

In today's Command and Control (C2) environment critical information is located in many disparate data sources. C2 decision-making can be adversely affected by insufficient or unavailable access to information located in these disparate data sources. This paper will provide an overview of the problems surrounding this issue, a real-world scenario representing the problem, and how the problem was overcome using a network centric approach. The paper will also demonstrate how the application of current technology can be leveraged to present a unified view of data from disparate data sources, and how our organization is leveraging technology to help the Warfighter eliminate the stove-piping of information to increase network centricity. The objective of this paper is to present the reader with insight on how to utilize today's technology to allow leaders to make well-informed decisions, thus increasing their effectiveness in fighting the Global War on Terrorism (GWOT). By understanding our use of technology in support of the Warfighter, the reader will gain key insights on how to improve their own organization's capabilities to support C2 decision-making.

1.0 Introduction

In a recent article in National Defense magazine, Lawrence P. Farrell Jr. stated:

... new agencies—as well as existing ones with new missions—tend to stove-pipe their activities, especially with respect to information. It is important to counter this tendency and to promote collaborative sharing of information.

(Farrell, 2002)

The introduction of technology to the battlefield has been both boom and bust. For the Army, the transition from intelligence spot reports called in over the command net to an automated intelligence feed—directly from intelligence collectors and sensors to the intelligence analyst—has led to significant advances in situational awareness. One major challenge that the Army still faces is the stove-piping of information. With stove-piping, information travels up and down in an organization, with little sharing horizontally

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between organizations. Many advances have been made in tactical information sharing; however, with each new mission there is a recurring tendency to stove-pipe information.

2.0 Background

The U.S. Army Communications-Electronics Command (CECOM) Software Engineering Center (SEC) Battlespace Systems Support Directorate (BSSD), Intelligence Fusion Systems (IFS) Division at Fort Huachuca, Arizona, is a recognized Department of Defense (DoD) leader in software development, maintenance, enhancement, integration, configuration management, test services, and field support for U.S. Army tactical systems. Our goal is to provide timely, reliable and maintainable software support services and products to the U.S. Army Military Intelligence, Terrain and Weather communities worldwide and to multiple Program Executive Office (PEO) and Program Manager (PM)'s in support of their systems' development, training and fieldings.

The IFS mission is to:

Provide life-cycle software products and services that enhance Army/Joint warfighting, management, and support capabilities, to ensure that America's warfighters continue to own the decisive edge from the battlespace through the sustaining base.

During Operation Iraqi Freedom (OIF), CECOM SEC had in excess of seventy engineers embedded with Army units in the Area of Operations (AO). These engineers provided direct and timely support to the Warfighter. The CECOM SEC engineers investigated, isolated, repaired, and reported software anomalies. They also assisted the Warfighter with rapidly adapting the intelligence architecture to meet new mission demands.

3.0 Scenario

Intelligence analysts operating in geographically distributed locations have a limited capability to interact and collaborate on intelligence products. Stove-piped intelligence dissemination systems limit access to intelligence products and provide a limited capability to search or browse databases and perform comparative analysis.

(Alberts, 1999, p. 114)

The All Source Analysis System-Light (ASAS-L) is a U.S Army automation solution for tracking tactical intelligence data. The ASAS-L consists of a robust set of tools that allow the intelligence analyst to track enemy units, equipment, facilities, individuals, events and organizations as well as the relationships among them. The system can receive data from multiple sources using various communications mediums: Tactical Local Area Networks (TACLAN), Wide Area Networks (WAN) and tactical radio communications. The intelligence information that is received is stored in various databases within the ASAS-L. One of these databases, called the Stability and Support Operations Integrated Database (SASOIDB), stores Stability and Support Operations (SASO) entity data such as information about Individuals, Events, and Organizations (IE&O) and their

relationships.

Prior to the commencement of combat operations in OIF U.S. Army V Corps intelligence personnel began to use the ASAS-L and the SASOIDB database to track enemy SASO data. As the operation progressed, the database continued to grow, and after the completion of major combat operations in Iraq the database became even more important as OIF switched in earnest to tracking SASO data within the country.

With the commencement of the SASO phase, and to some extent during the combat phase, the intelligence analysts were presented with a new challenge—how to track enemy detainees. They also quickly realized that they had a large and rapidly growing SASO database from which they could not easily share information to other units. The only person that could directly view or query information in the database was the analyst who was actually sitting behind the keyboard. Once again, as in previous operations, they were stove-piping information, which was unacceptable to the senior leadership. To remedy the problem a decision was made to create a web application that would provide access to the data utilizing a standard web browser.

CECOM SEC personnel were embedded with the unit to provide software support for the ASAS-L and other ASAS systems. Some of the CECOM SEC personnel had experience with creating web applications using Macromedia ColdFusion. ColdFusion is a scalable web application server that allows users to rapidly develop web-based products. It runs on a variety of platforms such as Windows, Linux, and Unix, and supports all of the major standards including Extensible Mark-up Language (XML), web services, Java, and Microsoft .NET, and is easily integrated into an existing infostructure. ColdFusion was selected as the weapon of choice to rapidly create a web-based interface to provide access to the SASO data on the ASAS-L giving the Warfighter a complete historical record on individuals and affiliations, providing timely, actionable, and vetted intelligence to the commander.

CECOM SEC engineers created an initial capability, using ColdFusion, to allow web users to view lists of each of the three main SASO entity types: IE&O, along with the ability to view most of the details about each selected entity type. The application also provided the capability to perform limited keyword searches against the SASO data, or view data within predefined geographical areas. To track detainee information the intelligence analysts added metadata to an existing subject field in the ASAS-L SASOIDB. The ColdFusion application could then query against this data to track detainees within the web interface.

The ColdFusion application resided on a separate server, which connected to the ASAS-L and retrieved SASO data at regularly defined intervals, and stored the data on the ColdFusion Server in what Macromedia calls a Collection. The use of Collections reduced the load on the ASAS-L while keeping the information displayed relevant for the web users.

As operations progressed in the theater, the same capability was implemented at the Combined Joint Task Force-7 (CJTF-7) headquarters. The C2 CJTF-7 gave a high

priority to the implementation and enhancement of the ColdFusion application to support the CJTF-7 mission. In addition to the ability to store textual data about SASO entity types, the ASAS-L can store multimedia data as well, i.e., images, audio files, Microsoft Word documents, etc., to which the Warfighter wanted access. In response to these new requirements our organization utilized its Rapid Application Development (RAD) Team to create an enhanced version of the ColdFusion application, in order to meet the Warfighter's needs.

4.0 Leveraging Technology

CECOM SEC solicited requirements from the theater commanders and intelligence personnel, and began the development of an enhanced ColdFusion application. This enhanced version was completed and delivered in a 30-day period, meeting a critical February 2004 deadline for CJTF-7. The enhanced ColdFusion Application included the following capabilities:

- Integrate display of relationships between IE&O
- Ability to view all details of a record
- Link to any multimedia data associated with an entity
- Display the source of the information for each entity
- Make query results exportable as a Microsoft Excel spreadsheet or Comma Delimited text
- Ability to track detained and detained/subsequently released individuals

The enhanced ColdFusion application also included the ability to track detainees within a separate database that was synchronized with the SASOIDB individual data on the ASAS-L. The application was optimized for low-bandwidth applications, by limiting the number of images on a page, and providing paged views of the lists of entity data and query results. Several predefined queries were created to quickly access information that analysts wished to view on a frequent basis. The enhanced application included the ability to view all SASO entity types in a common format, providing a consistent user-friendly interface.

5.0 Conclusion

Much of the success in tracking SASO entities within the OIF AO can be attributed to the successful application of technology to eliminate the stove-piping of information in theater. By creating a web-based application that meets the demands of the Warfighter, CECOM SEC has created a powerful tool to aid the commander in C2 decision-making, simplifying the process, and virtually eliminating the stove-piping of SASO information. The addition of the ColdFusion enhanced web interface to the intelligence architecture quickly and efficiently transformed SASO tracking in theater from a stove-piped, limited capability to a network centric enabler. The use of the enhanced ColdFusion application has significantly improved the situational awareness of the Warfighter in the continued fight of the Global War on Terrorism.

References

1. Farrell Jr., L. P (2002, October). Information sharing key to homeland security. Retrieved Mar 21, 2004, from <http://www.nationaldefensemagazine.org/article.cfm?Id=902>
2. Alberts, D., J. Garstka, & F. Stein. (1999). *Network centric warfare : developing and leveraging information superiority*. 2nd ed. Washington, DC: DoD C4ISR Cooperative Research Program.

Intelligence Fusion Systems



CECOM Bottom Line: THE WARFIGHTER



Track 12 – Shared Awareness From Stove-pipe to Network Centric (171) Leveraging Technology to Present a Unified View June 16,2004

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Agenda



- **SEC Organization and Mission Overview**
- **Introduction on Stove-pipe**
- **Background**
- **Scenario**
- **Leveraging Technology**
- **Conclusion**



CECOM SEC Organization



Ft. Huachuca, AZ

- Chief: Medhat Abuhantash
- Business Focus:
 - Post Production Software Support
 - Worldwide Field Software Engineering
 - Engineering Support Services
 - Technical Software Support to Intelligence Training Systems
 - Training and Training Development

Ft. Monmouth, NJ

- Director: Ed Thomas
- Business Focus:
 - Software Engineering for Communications and Intelligence Electronic Warfare Systems



Warfighter Support Structure



**Software Engineering
Depot**



**Global
Operations Center**

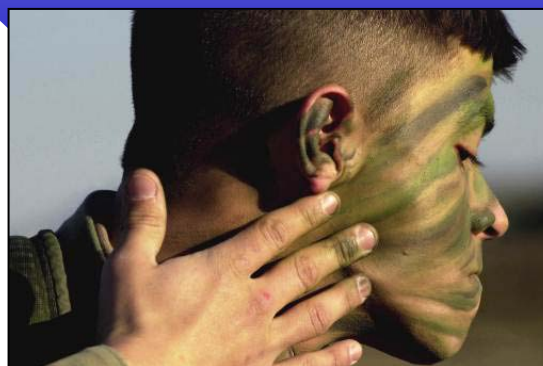


**Regional Field Support
(Subject Matter Experts)**



**On-Site
Support**

THE WARFIGHTER





Introduction

In a Recent Article in National Defense Magazine, Lawrence P. Farrell Jr. Stated:

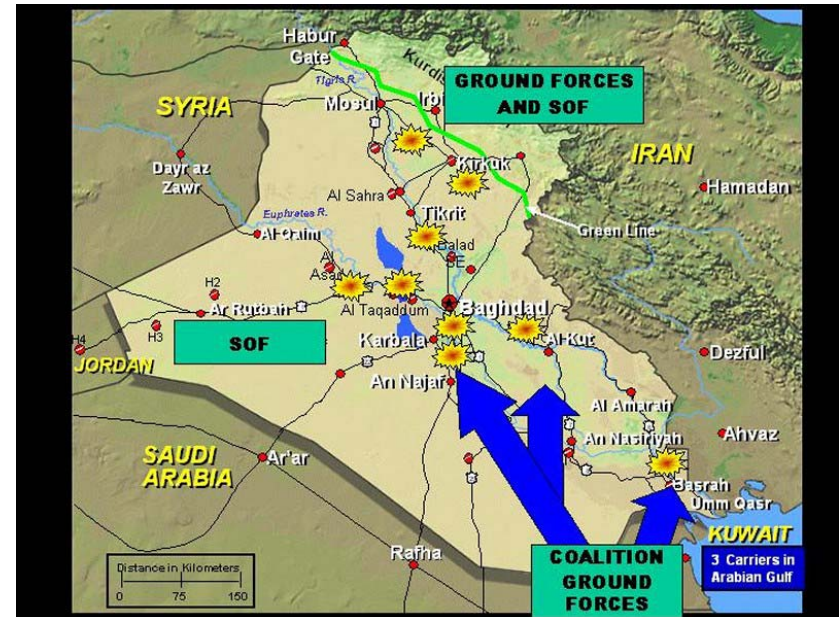
“. . . new agencies—as well as existing ones with new missions—tend to stove-pipe their activities, especially with respect to information. It is important to counter this tendency and to promote collaborative sharing of information.”

(Farrell, 2002)



Background

- Engineers Embedded With Army Units
- Direct And Timely Support To The Warfighter
- Investigate, Isolate, Repair, And Report Software Anomalies
- Rapidly Adapt The Intelligence Architecture





Scenario

“Intelligence analysts operating in geographically distributed locations have a limited capability to interact and collaborate on intelligence products. Stove-piped intelligence dissemination systems limit access to intelligence products and provide a limited capability to search or browse databases and perform comparative analysis.”

(Alberts, 1999, p. 114)



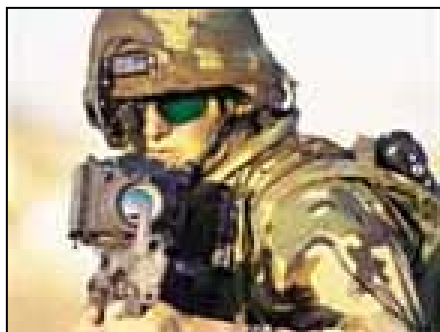
Scenario

- How to Track Detainees
- Large SASO Database
- Could Not Easily Share Information
- Stove-Piping Information
- Web Application Needed





Leveraging Technology



- **ColdFusion™**
- **Rapid Application Development**





Leveraging Technology

ColdFusion/Detainee Database Enhancements to All Source Analysis System – Light (ASAS-Light)

Relationship Tracking

Security Policy

UNCLASSIFIED

Combined Joint Task Force 7

Currently logged in as: guest Logout

Main Menu

- Home
- Detainees
- Entities
- Individuals
 - List All Individuals
 - List Captured
 - List Not Captured
 - List Released
- Events
- Organizations
- Relationships
- Search Forms

Database Counts

■ Individuals : 5000
■ Events : 4999
■ Organizations : 1004
■ Relationships : 2043
■ Multimedia : 41

Quick Search

Organizations

Displaying 1 to 25 of 1004 Records

Export Options: [Next](#)

Organization Name	Relationships	Source	Classification
Al-Gama'a al-Islamiyya (Islamic Group)	1	CAMG2FSE0Vadministrator	UNCLASSIFIED
Brotherhood for Islam UNITED Cell A	25	CAMG2FSE0Vadministrator	UNCLASSIFIED
Brotherhood for Islam UNITED Cell B	1	CAMG2FSE0Vadministrator	UNCLASSIFIED
Brotherhood for Islam UNITED Cell C	1	CAMG2FSE0Vadministrator	UNCLASSIFIED
Brotherhood for Islam UNITED Cell D	2	CAMG2FSE0Vadministrator	UNCLASSIFIED
Brotherhood for Islam UNITED Cell E	1	CAMG2FSE0Vadministrator	UNCLASSIFIED
Brotherhood for Islam UNITED Cell F	2	CAMG2FSE0Vadministrator	UNCLASSIFIED
Front for Islamic Jihad Liberation	0	CAMG2FSE0Vadministrator	UNCLASSIFIED
Front for Islamic Peoples Independence	0	CAMG2FSE0Vadministrator	UNCLASSIFIED
Islamic Alliance for United Arab States	1	CAMG2FSE0Vadministrator	UNCLASSIFIED
Islamic Alliance of Power	0	CAMG2FSE0Vadministrator	UNCLASSIFIED
Islamic Alliance of Universal Power	0	CAMG2FSE0Vadministrator	UNCLASSIFIED
Stronghold for SUni Dominance	2	CAMG2FSE0Vadministrator	UNCLASSIFIED
Stronghold for Shiite Dominance	0	CAMG2FSE0Vadministrator	UNCLASSIFIED
Stronghold for a Islamic Power	0	CAMG2FSE0Vadministrator	UNCLASSIFIED
Stronghold for a United Islam	0	CAMG2FSE0Vadministrator	UNCLASSIFIED
Suni Alliance of Power	2	CAMG2FSE0Vadministrator	UNCLASSIFIED
United Brotherhood of Islam Group A	5	CAMG2FSE0Vadministrator	UNCLASSIFIED
United Brotherhood of Islam Group B	1	CAMG2FSE0Vadministrator	UNCLASSIFIED
United Brotherhood of Islam Group C	1	CAMG2FSE0Vadministrator	UNCLASSIFIED
United Brotherhood of Islam Group D	1	CAMG2FSE0Vadministrator	UNCLASSIFIED
United Brotherhood of Islam Group E	1	CAMG2FSE0Vadministrator	UNCLASSIFIED
United Brotherhood of Islam Group F	1	CAMG2FSE0Vadministrator	UNCLASSIFIED
Abu Ghunaym Squad of the Hizballah Bayt Al-Maqdis	0	CAMG2FSE0Vadministrator	UNCLASSIFIED
Abu Ghunaym Squad of the Hizballah Bayt Al-Maqdis	0	CAMG2FSE0Vadministrator	UNCLASSIFIED

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UNCLASSIFIED

*Notional Data



Leveraging Technology

ColdFusion/Detainee Database Enhancements to All Source Analysis System – Light (ASAS-Light)



SASO Entity Tracking

Security Policy

UNCLASSIFIED

Combined Joint Task Force 7

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Main Menu

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- Detainees
- Entities
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 - List All Individuals
 - List Captured
 - List Not Captured
 - List Released
- Events
- Organizations
- Relationships
- Search Forms

Database Counts

Individuals : 5000
Events : 4999
Organizations : 1004
Relationships : 2043
Multimedia : 41

Quick Search

Entity Attributes

 **Name:** Mrs. Afaf, Abeer
DOP Status: UNKNOWN/Unknown
Birth Place:
Death Place:
Birth Date: Unknown
Death Date: Unknown
Subject:

(Click the links below to open or close the associated report.)

Open All Close All

[ALL_ENTITY_QUARTERS](#)
[ALL_ENTITY_MULTIMEDIA](#)
[ALL_ENTITY_MULTIMEDIA](#)
[ALL_INDIVIDUAL_VITALS](#)
[ALL_INDIVIDUAL_APPEARANCE](#)
[ALL_ENTITY_DETAILS](#)

ALL ENTITY MULTIMEDIA	
DATE AS OF	200401301624
DATE BEGIN	
DATE END	
DATE LAST MODIFIED	2004-01-30 16:24:14.107
ENTITY NAME	Afaf, Abeer
MASTER KEY	247a34b3-2fdd-4607-a4d7-3825eb8ec342
MULTIMEDIA TYPE	2
SECURITY ID	UNCLASSIFIED
SOURCE ID	CAMG2FSE0VAdministrator
URL	View Multimedia Popup Multimedia

Relationships

Displaying 1 to 6 of 6 Records

Export Options:   

Entity Name	Entity Type	Relationship Type	Entity Name	Entity Type
Afaf, Abeer	Individual	Confirmed	Warrior Tribes of Islam Cell Q	Organization
Afaf, Abeer	Individual	Confirmed	Zeelas Islamic Coalition	Organization
Afaf, Abeer	Individual	Confirmed	Warrior Tribes of Islam Cell P	Organization
Afaf, Abeer	Individual	Confirmed	New Babylon	Organization
National Liberation Army (ELN) - Bolivia / Nestor	Organization	Confirmed	Afaf, Abeer	Individual
Warrior Tribes of Islam Cell Q	Organization	Confirmed	Afaf, Abeer	Individual

UNCLASSIFIED

*Notional Data



Leveraging Technology

ColdFusion/Detainee Database Enhancements to All Source Analysis System – Light (ASAS-Light)



Detainee Database

Security Policy

UNCLASSIFIED

Combined Joint Task Force 7

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Main Menu

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 - Detainee Search
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 - List Not Captured
 - List Released
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- Organizations
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- Search Forms

Database Counts

Individuals : 5000
Events : 4999
Organizations : 1004
Relationships : 2043
Multimedia : 41

Quick Search

Detainees

Displaying 1 to 25 of 41 Records

Export Options:

Next ▶

Entity Name	Capture Tag	Capturing Unit	Place Held	Gender	Detainee Status	Capture Date	Estimated Release Date	Source	Classification
	456	4ID	Baghdad		DETAINED	2004-01-29	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Aadab, Abeer	1	1-327, 101st	iraq	M	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Aadil, Bishir	999999999	Not Entered	Not Entered	M	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Aagney, Abdul-Hameed	8980	101st	Baghdad	M	DETAINED	2004-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Aagney, Amalendu-Hamed	2	3-187, 101st	Ft Campbell	M	DETAINED	2003-01-22	2004-01-22	CAMG2FSE0Administrator	UNCLASSIFIED
Aagney, Omar-Kareem	245	4ID	Baghdad	M	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Aalee, Abdul	3343	10th Mtn Div	Al-Jafar	M	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Aalla, Abdul	999999999	Not Entered	Not Entered	M	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Aamaal, Abeer	999999999	Not Entered	Not Entered	F	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Abaan, Abdul	999999999	Not Entered	Not Entered	M	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Abaan, Abed	3	1-327, 101st	Ft Campbell	M	DETAINED	2004-01-02	2010-12-01	CAMG2FSE0Administrator	UNCLASSIFIED
Abaan, Abu	34	Not Entered	Not Entered	M	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Abaan, Al	999999999	Not Entered	Not Entered	M	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Abaan, Aleem	5	101	fallujah	M	RELEASED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Abaan, Ataa	4	Not Entered	Not Entered	M	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Abaan, Azhar	6	Not Entered	Not Entered	M	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Abaan, Dasel	8	101	Not Entered	M	RELEASED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Abaan, Dawoud	9	Not Entered	Not Entered	M	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Abaan, Fawaqaz	10	Not Entered	Not Entered	M	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Abaan, Ghaalib	11	Not Entered	Not Entered	M	DETAINED	2004-01-09	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Abaan, Haatim	999999999	Not Entered	Not Entered	M	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Abaan, Hamza	999999999	Not Entered	Not Entered	M	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Abaan, Izz udeen	7	Not Entered	Not Entered	M	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Abba, Abdul	999999999	Not Entered	Not Entered	M	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED
Abdul-Hansaraj, Gangadutt	12	Not Entered	Not Entered	M	DETAINED	1999-01-20	2010-12-31	CAMG2FSE0Administrator	UNCLASSIFIED

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Show All Next ▶

UNCLASSIFIED

*Notional Data



Conclusion



- **Successful Application Of Technology To Eliminate The Stove-piping Of Information**
- **Powerful Tool for C2 Decision Making**
- **Improved Situational Awareness**



QUESTIONS?



CECOM Bottom Line: THE WARFIGHTER



Backup Material





All Source Analysis System Light



ColdFusion/Detainee Database Enhancements

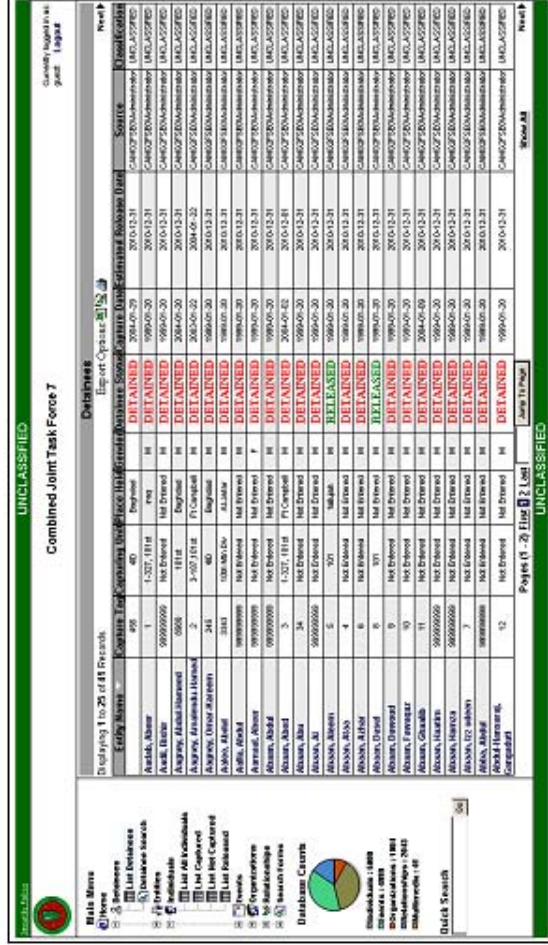
ColdFusion/Detainee Database Enhancements to All Source Analysis System-Light (ASAS-L) United States Army personnel deployed to Southwest Asia (SWA) are currently employing a capability developed in Macromedia ColdFusion™ to display Stability and Support Operations (SASO) information stored in the ASAS-L database in a standard web browser. This capability was initially developed by U.S. Army Communications-Electronics Command (CECOM), Software Engineering Center (SEC), Intelligence Fusion Systems (IFS) Field Software Engineers (FSE), and further refined by the CECOM SEC IFS Rapid Application Development (RAD) Team based upon requirements provided by Intelligence Office(r) (G-2) and Intelligence personnel within the Area of Operations (AO).



SASO Entity Tracking: The ColdFusion Enhancements (ENH) provide a consistent, comprehensive view of Individuals, Events, and Organizations (IE & O) entity types within the SASO Database on the ASAS-L. All displays of information for a particular entity include links to associated entities, multimedia, and relationships.

Relationship Tracking: The ENHs provide a list of relationships and relationship types between each of the tracked entity types: IE&O within the SASO Database on the ASAS-L.

Export Capability: Entity lists, query results, or search results can be exported and saved on the user's local system as a Microsoft Excel™ spreadsheet, comma separated list, or in a printer-friendly text format.



*National Data

Detainee Database: Incorporated with the addition of the ColdFusion ENHs is the ability to track individuals that have been detained, or detained and then subsequently released. The Detainee Database is a Microsoft SQL Server™ database that is resident on the ASAS-L, and contains additional information about an individual that has been detained or released such as: Capture Tag, Date of Capture, Expected Release Date, Capturing Unit, and Place Held.

Government Point of Contact (POC):
CECOM Software Engineering Center (SEC)
Intelligence Fusion Systems (IFS)
DSN: 879- 6388 COM: (520) 538-6388
<https://cecomifs-www.hua.army.mil>
Updated: 032204