



Converting Legacy Systems to the GCSS-AF Integrated Framework

Mike Whitaker

Advanced Systems Division

- **Objective**
- **GCSS-AF Integrated Framework**
 - THEN (2001)
 - NOW (2007)
- **Reengineering Methodology**
- **Combat Ammunition System (CAS)**
- **Enterprise Environmental, Safety, and Occupational Health – Management Information System (EESOH)**
- **Summary**
- **Discussion**



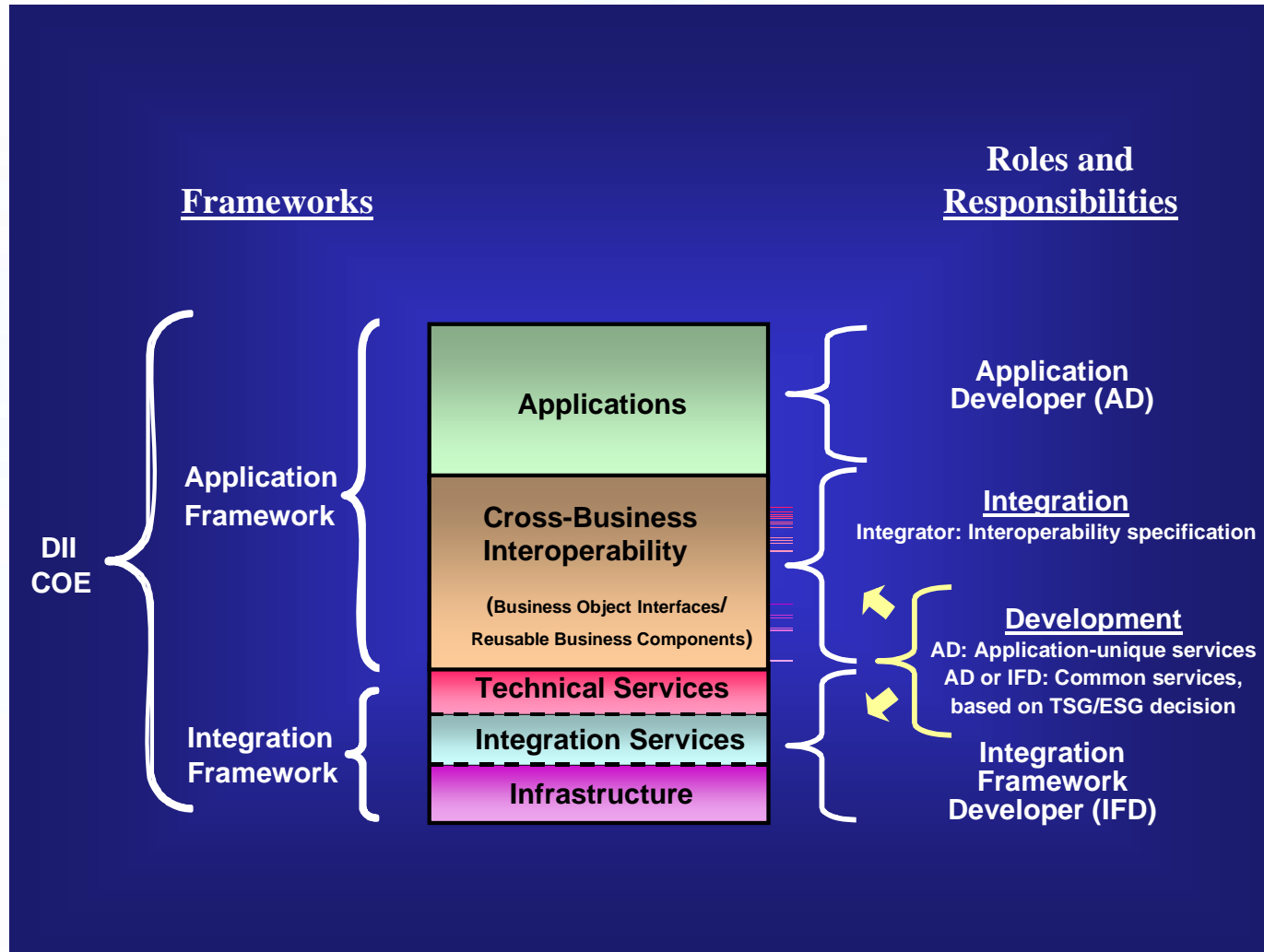
Objectives

- **Provide an insight into techniques and processes used for successfully reengineering the Air Force Combat Ammunition System to be the first Level 4 compliant application on the GCSS-AF IF**
- **Provide lessons learned in reengineering applications to the GCSS-AF Integration Framework**



GCSS-AF Integrated Framework

THEN



- **Guide to Developing with the GCSS-AF Integration Framework – Version 3.1, July 28, 2000**



GCSS-AF Integrated Framework

THEN

- **Infrastructure**

- Platforms

- Sun, HP, Intel and Network Devices

- Operating Systems and Services

- Solaris, HP/UX, Windows NT, Windows 95/98 and 2000

- Database Engines

- Oracle, IBM DB2

- Java Virtual Machine

- IBM's JVM, Sun Microsystems' JVM



THEN

- **Integration Services Layer**
 - Distributed Control
 - CORBA, Enterprise Java Platform, IBM WebSphere Application Server
 - Messaging
 - IBM's MQSeries
 - Distributed Data Access
 - JDBC
 - Distributed Communication Protocols
 - TCP/IP, UDP, FTP, HTTP, IIOP and RMI



THEN

- **Technical Services Layer**

- Event (and Notification) Service (IBM WebSphere)
- Naming (IBM WebSphere)
- Life Cycle Service (IBM WebSphere)
- Time Service (Operating System's time)
- Externalization Service (IBM WebSphere)
- Persistence Service (IBM WebSphere)
- Transaction Service (IBM WebSphere)
- Query Service (IBM WebSphere)
- Concurrency Service (IBM WebSphere)
- Relationship Service (IBM WebSphere)
- Security Services



THEN

- **Design and Development Factors**
 - Technical Factors
 - Servlets utilizing doPost, doGet
 - Applets were not allowed
 - EJB's were "in"
 - No solution for legacy interface partners
 - SQL embedded in Servlets and EJBs
 - Functional Factors
 - Security removed from application and use GCSS-AF IF security services
 - Existing functionality of CAS-B and CAS-D to be retained except for specific processes



GCSS-AF Integrated Framework NOW



GCSS-AF Integrated Framework NOW

- **Application Services**

- Oracle Database
- Microsoft Enterprise Architecture
 - SQL Database Server, SQL 2005 Service Pack 2,
 - Windows 2003 IIS Server 6 Enterprise Edition, Microsoft Operations Manager 2000
 - BizTalk 2004 w/ SQL 2000 DB, BizTalk 2006 w/ SQL 2005
 - .NET 1.1, 2.0 and 3.0 Frameworks
 - SharePoint MOSS 2007
 - MS ODP.net for Oracle DB 10GR2 connectivity
 - SQL 2005 Reporting Service
- ColdFusion MX and ColdFusion 8
- Oracle Application Server
- WebSphere Application Server

- **Collaboration Services**

- IBM DB2 Document Manager and Records Manager
- Content Manager for Multiplatforms
- Sametime
- IBM MQWorkFlow
- IBM Lotus Workplace Web Content Management
- Bantu – Instant Messenger
- Alerts Hub
- Sun WebMail – Messaging Server
- Laszlo WebMail – AF WebMail



GCSS-AF Integrated Framework NOW

- **Discovery - MDE**
 - Services Repository, Metadata Data Repository, Cognos 7
- **Data Services**
 - Data Warehouse
 - TERADATA RDBMS, Tools and Utilities, Manager Server
 - System Metrics & Monitoring DB
 - CA AILFUSION ERWIN
 - Business Intelligence
 - Cognos Report NET and Transformer
 - Business Objects and Zabo
 - Extract Transform Load (ETL)
 - Informatica PowerCenter and PowerExchange
 - GoldenGate
- **ESB**
 - MQ on BizTalk
 - IBM WebSphere MQ, MQ Message Broker and TAM BI
 - LM ESB, Interface Gateway and Deployment Messaging Service
 - MetaStorm PM4Data
 - SSH for Solaris



GCSS-AF Integrated Framework NOW

- **Mission Capabilities**
 - Oracle eBusiness Suite
 - HP ITG
 - PPM
- **Operations and Support**
 - Help Desk, eHealth, Team Quest and Tivoli Storage Management Tools
- **Platform Services**
 - Sun Solaris
 - Microsoft Windows 2000 and 2003
- **Portal**
 - Broadvision, Autonomy, Verity Search Engine, Self Registration (NIPRNET and SPRNET), Metrics Enhancement, AFCOP, WebLink Validator, GeoBase, Spring Framework, Hibernate, rsync



GCSS-AF Integrated Framework NOW

- **Security**
 - Authentication and Authorization
 - IBM - HTTP Server, Datapower X150, Trust Association Interceptor
 - Apache - Web Server
 - LM - CAC EAI, CAC CDAS
 - AKAMAI - CAC Verification
 - Identity Management
 - LM
 - IDWeb, User Data Web Service, Form 41, Role Request, DD 2875, Self Registration, Password Reset and Challenge Response Questions, OIDSync and NDSsync
 - IBM
 - Tivoli Identity Manager, Tivoli Directory Integrator
 - Authentication and Authorization, Identity Management
 - IBM
 - DB2 Universal DB, Tivoli Directory Service, Global Security Kit, WebSphere Application Server and Network Deployment, and Tivoli Federated Identity Manager
 - Authentication and Authorization, Audit Services
 - IBM – Tivoli Access Manager for eBusiness
 - Integrity and Confidentiality
 - Silanis – XHTML Server



Reengineering Approach used for CAS because...

- ***Used to address enterprise IT problems***
 - *Revitalize aging legacy systems*

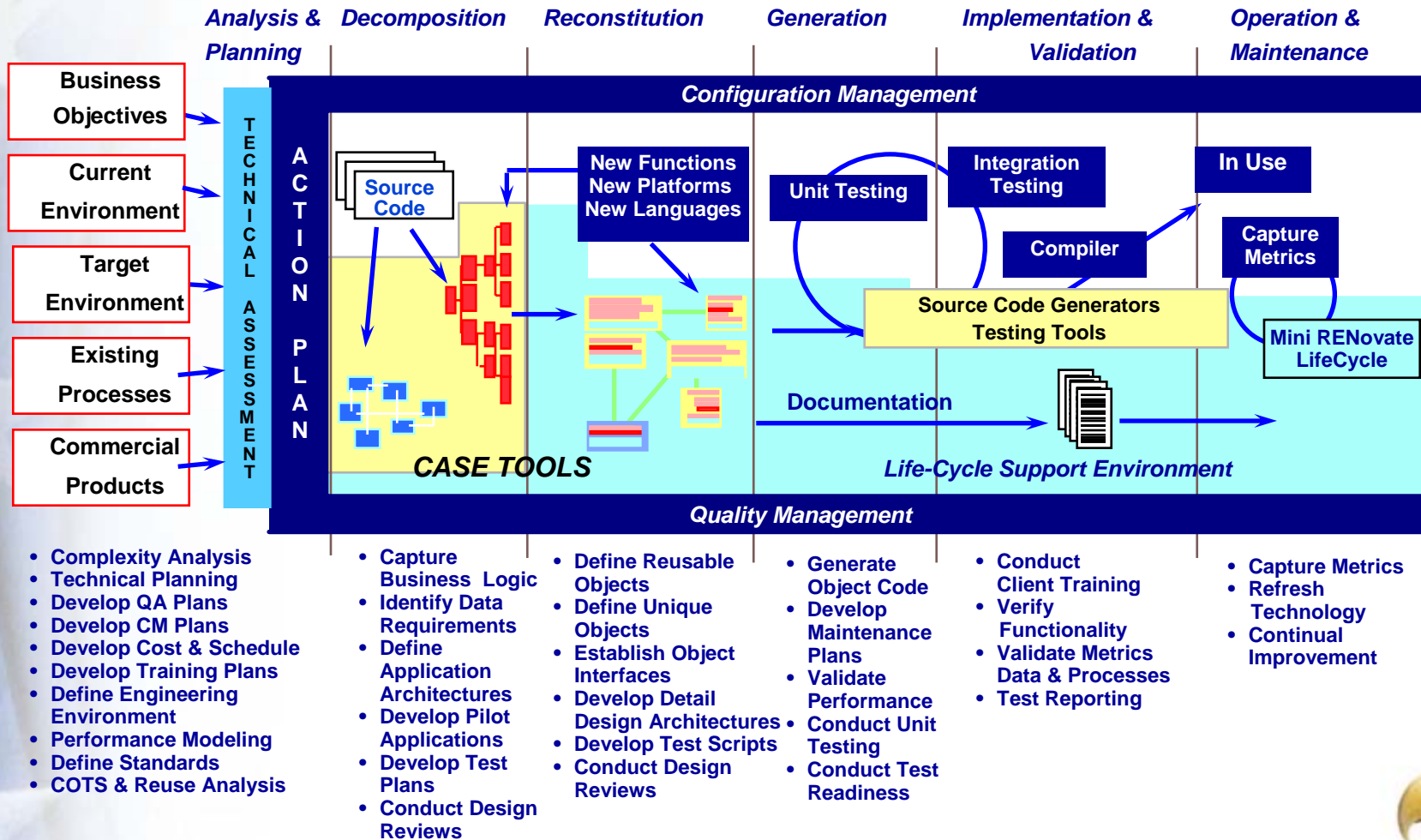
Preserves critical business logic and improves system performance and effectiveness
 - *Incorporate business process changes*

Process redesign tools and techniques to drive new business requirements and performance measurements
 - *Integrate commercial products*

Modeling, simulating, mapping, and integrating commercial product functionality (including ERP products)
- ***Applied incrementally to get intermediate benefits and reduce risk***



RENovateSM Process Overview



Combat Ammunition System (CAS)

- **Contract Awarded March 2001**
 - The Team
 - Functional - HQ SSG/ILW with contractor support from Titan and EDS
 - Development - HQ SSG/SWF with contractor support from General Dynamics/CACI
 - CAS 1.0 – Reengineer CAS-B (retail) and CAS-D (deployable)
 - TRR conducted 6 June 2002
 - Integration Testing along with introduction of New Requirements
 - Operational Test and Evaluation at Eglin AFB June 2003
 - Fielded for production to GCSS-AF IF – August 2003
 - All retail sites converted – 27 January 2004
 - CAS 2.0 – Reengineer CAS-A/C (Wholesale)
 - TRR conducted September 2005
 - Fielded to GCSS-AF IF – November 2005

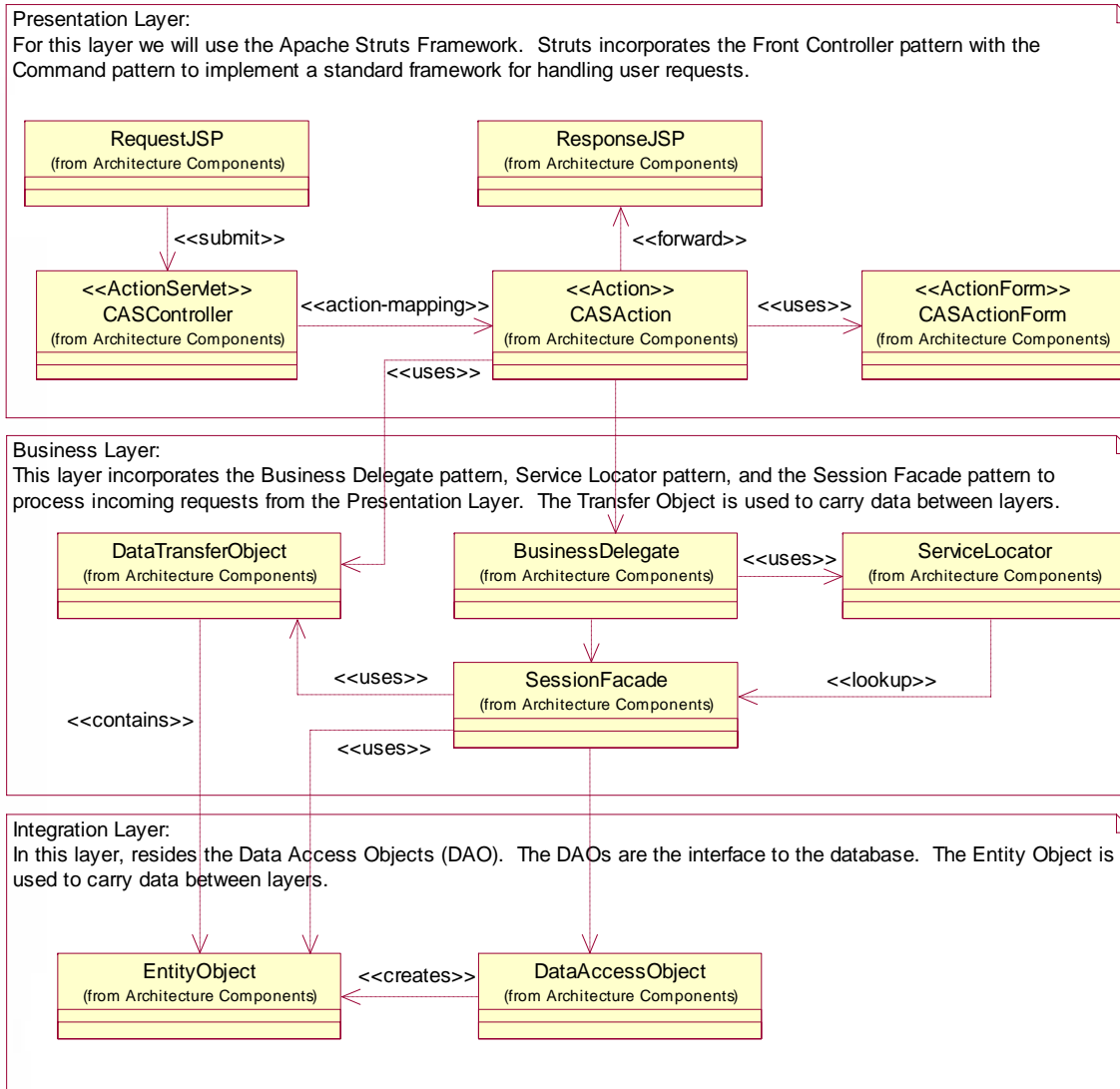


Combat Ammunition System (CAS)

- **CAS 1.0 developed using Five Builds**
 - Developed using Servlets, IBM WebSphere, Oracle database and FTP to interface to CAS-A server
- **CAS 2.0 changed to include AMST functionality**
 - Developed using STRUTs templates, IBM WebSphere, Oracle database and MQSeries for interface requirements
 - Required some CAS 1.0 functions to be rewritten in the STRUTs templates



CAS 2.0 Architecture



Enterprise Environmental, Safety, and Occupational Health – Management Information System (EESOH)

- **Contract Awarded July 2006**
 - The Team
 - Functional - AFCESA with contractor support from NG
 - Development - CACI
 - EESOH-MIS Operations and Sustainment
 - Limited Maintenance Support – critical production problems
 - Convert Requirements to System Design
 - EESOH-MIS Software Consolidation
 - Development of new software modules and major maintenance releases
 - HazWaste module currently under development
 - Testing scheduled for February 2008



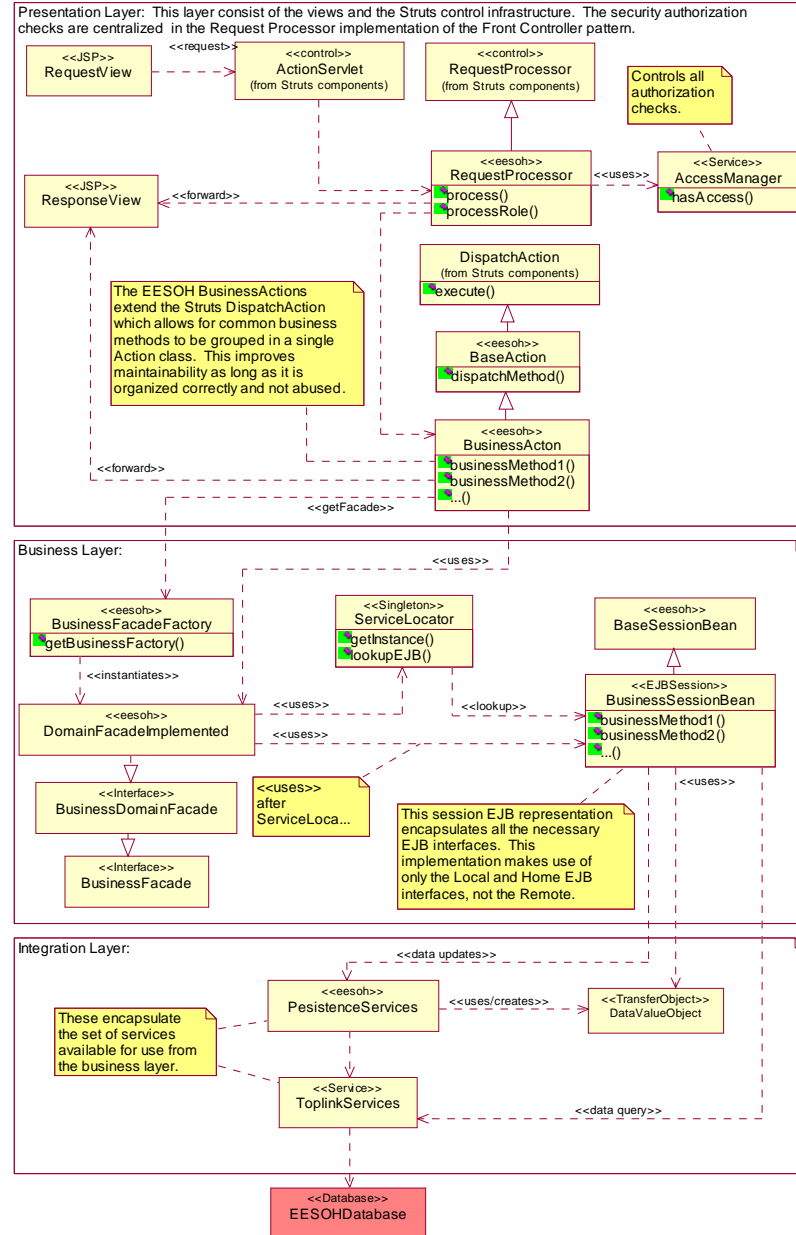
Enterprise Environmental, Safety, and Occupational Health – Management Information System (EESOH)

- **EESOH 1.2.2 (latest release)**
 - Developed using STRUTs, Oracle 9i App Server, Oracle 9i database, Oracle TopLink, Jasper reports and Discoverer
- **EESOH is currently changing**
 - Upgrade to Oracle 10g Application Server and database
 - Converting from Discoverer to use AF Data Services



EESOH Architecture

EESOH Application Architecture



- **GCSS-AF Integrated Framework has evolved over time and continues to offer new tools and services**
- **Repeatable, Defined processes are key to the success of the project**
 - Proven repeatable and documented approaches should be taken
- **Focus must be maintained on the end user**
 - CAS from a functional standpoint:
 - Performance is good, better integration and lower maintenance cost
 - CAS User Quotes
 - “CAS 1.0 will greatly enhance the way Ammo does its day to day operations and everyone from HQ USAF down to the unit level will have better visibility of all assets in their units and Air Force wide.”
 - “Very informative and 100% improvement over CAS-B we’re currently using.”
 - “The system appears to be relatively simple to operate and along with the capabilities of supporting worldwide contingencies.”
 - “CAS 1.0 seems to be putting us in the 21st century – Finally!”



Discussion

