

Horizontal Fusion Portfolio 2003 Year-end Report



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1 INTRODUCTION

1.1 Purpose

The purpose of this report is to document the performance of the Horizontal Fusion Portfolio in Fiscal Year (FY) 03 that included the first Quantum Leap Demonstration. Specifically, the report will:

- Inform sponsors and stakeholders of the portfolio status and performance in FY 03
- Provide a high level FY 04 outlook

1.2 Scope

The scope of this document is to provide:

- An overview of the FY 03 Portfolio
- The products and services of the FY 03 Portfolio
- An overview of the Quantum Leap-1 Demonstration
- A performance assessment of the FY 03 Portfolio
- The direction and focus for the FY 04 Portfolio and beyond

1.3 Mission of Horizontal Fusion

The Horizontal Fusion mission is:

- To encourage the Portfolio Initiatives to make the “Quantum Leap” to Net-Centric operations
- To assist the Department of Defense (DoD) in achieving decision-making superiority in the transformed battlespace
- To be one of the primary enabler of the DoD vision for force transformation



1.4 Background

1.4.1 Horizontal Fusion

The Horizontal Fusion Portfolio Initiative, together with the Net-Centric Enterprise Services (NCES), Global Information Grid Bandwidth Expansion (GIG-BE), Joint Tactical Radio System (JTRS), and Transformational Communications Satellite (TSAT) are the basic building blocks of Net-Centric Transformation.

The DoD concept of Force Transformation is focused on delivering Net-Centric warfare capabilities to military operations. Net-Centric Warfare can be defined as an “information superiority-enabled concept of operations that generates increased combat power by networking sensors, decision-makers, and shooters to achieve shared awareness, increased speed of command, higher tempo of operations, greater lethality, increased survivability, and degree of self-synchronization. In essence, Net-Centric Warfare translates information superiority into combat power by effectively linking knowledgeable entities in the battlespace.”¹ The role of Horizontal Fusion is to provide a common set of information capabilities to access, collect, store, disseminate, and manage information on demand in a web-based environment.

Horizontal Fusion is not a system but a collection of Net-Centric capabilities providing web-based services, applications, and data stores to all DoD users, with particular emphasis on the Edge User. Users pull required data from SIPRNet Collateral (information) Space. Warfighters also have browser-based access to “sense-making” tools, allowing them to tailor data to fit mission information needs. State-of-the-art discovery tools search virtually federated data stores and retrieve in a single search all available data (multiple data types/formats across operations, intelligence, and ultimately business/support databases) on a designated topic. Users are able to configure subscription profiles (by topic and/ or feed) to receive notifications/alerts on newly posted data that fit their identified information needs.

1.4.2 Horizontal Fusion Portfolio

The Horizontal Fusion Portfolio is a management process with an emphasis on outcome-based performance and results intended to accelerate the transition of Net-Centric warfighting capabilities.

The Horizontal Fusion FY 03 Portfolio was a collection of 13 initiatives. Each Initiative represented a strategic investment in future Net-Centric capabilities that empowered DoD Edge Users. The FY 03 Horizontal Fusion Net-Centric objectives were directed at

¹ Net-Centric Warfare-Developing and Leveraging Superiority, p. 2, Alberts, Gartska and Stein



enhancing battlespace situational awareness thus enabling superior decision-making and speed of command.

1.4.3 Quantum Leap-1

Quantum Leap-1 was a demonstration of the Net-Centric capabilities provided by the FY 03 Horizontal Fusion Portfolio Initiative. It also established a baseline for future Quantum Leap activities.



2 HORIZONTAL FUSION PORTFOLIO OVERVIEW

A Horizontal Fusion Portfolio is a set of technologies and processes selected to demonstrate their interoperability with other members of the Portfolio and their contribution to the overall concepts of Net-Centricity. Portfolio goals are closely aligned with the DoD vision of Transformation to Net-Centricity, as DoD CIO John Stenbit stated,

“True transformation can only be achieved by transforming the way we communicate, by making the network work for us, and by taking full advantage of Information Age Technologies to ensure that our Warfighters have immediate and direct access to the information they need.”

Source: “Moving Power to the Edge,” by John P. Stenbit, CHIPS Magazine, Summer 2003, published by the Space and Naval Warfare Systems Center, Charleston, SC.

2.1 Key Elements of Horizontal Fusion

The following key elements are essential to meet the goals of the Horizontal Fusion Portfolio:

- **Sense-making:** The organizational, process, and technical elements, which allow users to access relevant data and information, develop knowledge, and apply insights
- **Collaboration:** Real-time human interaction supported by configurations of connectivity while preserving security of multiple systems and sources across geographically dispersed sites and organizations, e.g., generation of dynamically specified Community(ies) of Interest (COI)
- **Discovery:** All processes of knowledge and data resource identification for and by the user, e.g., user profiles, which allow relevant information migration to the user
- **Interoperability Framework:** The ability to enable systems with different standards to share data through open web services and exposed data standards
- **Posting:** The process of publishing meta-tagged data and information
- **Resources/Cataloging:** The ability to create a virtual catalog of relevant reference and real time data for quick access
- **Security:** Role-based access to information based upon security clearance and mission requirements



2.2 Philosophy

The guiding principles on which the management of the Portfolio operates to ensure the Initiative's success are discussed in the following sections.

2.2.1 Build Portfolio Based on Criteria of Fit, Balance, and Impact

The Horizontal Fusion Portfolio management team evaluates proposed Initiatives for participation in the Portfolio on the basis of three criteria—"fit", "balance", and "impact". In this outcome-based environment, the Horizontal Fusion Portfolio strategic investment is to ensure that an Initiative's program or project can be extended to a net-centric environment relatively quickly, advances the realization of Net-Centricity, improves decision support capabilities, and aligns with the user objectives and GIG implementation priority.

This strategy is also being used to evaluate the programs or projects for inclusion in the FY 04 Portfolio.

2.2.2 Manage the Portfolio, not the Projects

Each Initiative manages its own program. An Initiative retains its own program or project management structure with its own leadership and cost accountability. Likewise, each Initiative retains its own program or project requirements. The Portfolio Manager provides requirements for Net-Centric operations with the web enabled Collateral Space.

The inclusion of an Initiative in the Portfolio is based on its potential contribution with respect to fit, balance, and impact. Some Portfolio Initiatives are high risk and others are low. Poor performers (those unable to achieve identified Net-Centric goals) are removed from the Portfolio. Each Horizontal Fusion Portfolio Initiative must ensure that future funding sustains its Net-Centric capabilities. Failure to achieve Horizontal Fusion Net-Centric goals has no direct impact on an Initiative's existing programmatic baseline.

2.2.3 Establish Key Partnership and Trust with Participating Organizations

The Portfolio Manager encourages establishment of a collaborative environment by seeking partnership with intelligence operations and service and infrastructure providers, which contributes to the acceleration of Net-Centric Transformation capabilities. The key to success is creating an environment of trust and team spirit where each participant works toward achieving Portfolio mission objectives.

2.2.4 Deliver Key Elements to the Stakeholders



At the completion of Quantum Leap-1, the Horizontal Fusion Portfolio delivered web-based access to data, services, and tools from the Initiatives to DoD Edge Users. Web-based access is provided via the Portal (*Mars*). An acquisition model, which emphasized outcome-based performance, was selected for use with the Portfolio. The validity of this management model in the Portfolio was demonstrated by the success of Quantum Leap-1. The Portfolio has successfully delivered the key elements stated earlier.

2.3 FY 03 Investments

The Initiatives selected for the FY 03 Portfolio provided the tools and data that would prove the concepts of sense-making, transformation, data sharing, and data publication. Each of these Initiatives worked together as a team, which improved the decision support, knowledge sharing, and information sense-making capabilities to the Communities of Interest spanning across the intelligence and operations areas.

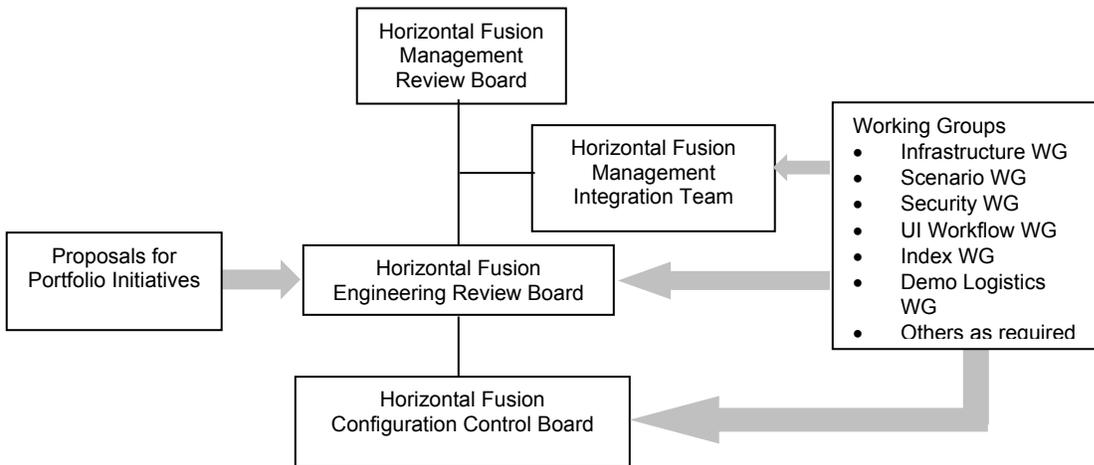
Name	Provided	Sponsor (Industry team)
C2&I Pilot-Horizontal Fusion Enterprise Services (HFES)	Architectural Framework and Enterprise Services	DISA in Partnership with DIA
System Engineering & Integration	Demo Logistics, Communications, and System-Level Integration	SPAWAR/Charleston
C2&I Pilot-Collateral [Information] Space	VKB- accessible Data Stores and Enterprise Services	DIA in Partnership with DISA
Information Dissemination Management (IDM)	DoD Information Content Management	DISA
Net-Centric Geospatial Intelligence Services (NGIS)	Maps, Photos, and Specialized Visualization Services	NIMA
Global Net-Centric Surveillance and Targeting (GNCST)	Automated fusion of Sensor data	NIMA (APL/JHU)
P3-Orion	Multi-sensor Airborne Platform	NAVY (NRL)
Cooperative Engagement Capability (CEC)	Air Picture	NAVY (APL/JHU)
Basic Language Translation System (BLTS)	Document Translation & Exploitation	ARMY G2 (ARL)
Warrior's Edge (WE)	Digital C2 products for Brigade & below	ARMY G2 (ARL)
Non-Obvious Relationships Awareness (NORA)	Commercial Product providing Entity Resolution and Complex Relationship Recognition	SPAWAR (SRD)
Ubiquitous-Automated Information Manager (U-AIM)	Automated personalized assessments of multiple NRT data sources	Penn State University (Applied Research Lab)

2.4 Management Processes

The concept of Portfolio management is new to the Department. The Portfolio management model, organization, and approach are being instituted to safeguard failure and to meet the performance objectives of the Portfolio. A core management team

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supports the Portfolio Manager. Review boards and working groups are established to provide management and technical guidance to the Portfolio Manager in a timely manner to minimize the performance and schedule risks. The working groups are encouraged to interact with each other and to ensure timely exchange of information on interdependencies and cross-fertilization among the groups. The following diagram shows the functional relationship of the various review boards and working groups that was used in FY 03.



2.5 Portfolio Engineering

2.5.1 Review the Utility of Command, Control, Communications, and Intelligence, Surveillance, and Reconnaissance (C4ISR) Architecture Framework in Net-Centricity

The challenge to the Portfolio was to develop architecture in a Net-Centric environment with the number of Initiatives involved. The team made efforts to design a Net-Centric view of the Portfolio using traditional methods such as the C4ISR technical and operational view frameworks.

Pieces of these frameworks worked for focused individual programs, but did not work well for an endeavor that encompassed a number of programs that differed in concept, scope, and development methodologies. Horizontal Fusion may consider studying the use of newer approaches such as object-oriented engineering or using use case techniques that consider each Initiative as its own entity. Some of the templates in the C4ISR framework were found to be inconsistent within the concept of Net-Centric operations. In FY 04 the Horizontal Fusion Portfolio management team will evaluate these templates and may modify or eliminate some, e.g., SV-6 as a required template, in the C4ISR framework.



2.5.2 Focus on Net-Centric Standards

Horizontal Fusion Portfolio standards were derived from:

- Industry and international standards
- Joint Technical Architecture (JTA) version 4.0, 17 July 2002
- Defense Intelligence Agency Joint Intelligence Virtual Architecture (JIVA) version 1.0, 7 August 2002
- Application Security Developer's Guide, version 1.0, 4 October 2002

These standards provided baseline technical standards in the area of Information Processing Standards, Information Transfer Standards, Information Modeling, Metadata and Information Exchange Standards, Human/Computer Interface Standards, and Information Security Standards. They were used to develop *Mars*, the embedded portlets, and the Collateral Space for Quantum Leap-1.

2.5.3 Establish Expected Outcomes for the Evaluation of Net-Centric Transformation

The Horizontal Fusion Portfolio developed the key qualitative measures that defined Net-Centricity and transformation to Net-Centric warfighting. The expected outcomes are:

- The ability of the Collateral Space via web access to support the task, post, process, and use (TPPU) paradigm in near real-time
- To improve content management to ensure reliability and usability of data
- To improve decision superiority using sense-making tools
- To determine the ability of existing network infrastructure to support web enabled Net-Centric operations



3 HORIZONTAL FUSION PORTFOLIO PRODUCTS AND SERVICES

3.1 *Mars*

The product at the end of FY 03 is *Mars*, the Horizontal Fusion gateway to the Collateral Space. Via *Mars*, Horizontal Fusion provides enhanced situational awareness minimizing information latency. Horizontal Fusion makes available to DoD Edge Users the right information, in the right format, at the right time. Quantum Leap-1 demonstrated that the DoD concept of Net-Centric capabilities and Transformation is sound. In a single search, Collateral Space users can retrieve operational and intelligence data via a federation of physically dispersed data stores. Users can also access a number of browser-based “sense-making” tools to mission-tailor data to meet operational information needs.

As the Net-Centric Horizontal Fusion capabilities mature and expand in FY 04 and beyond, they will be available to DoD users through *Mars*. Annual Quantum Leap demonstrations will showcase Net-Centric capabilities available via *Mars*.

3.2 Quantum Leap-1

Quantum Leap-1 was the FY 03 Horizontal Fusion Portfolio demonstration of Net-Centric capabilities available to the users via *Mars*. This was a 12-hour demonstration using the SIPRNet by participants at diverse geographical sites.

3.2.1 Demonstrated Contributions to Net-Centric Operations

Pre-demonstration and demonstration activities proved that the system was capable of scaling up to a 24X7 availability of the Collateral Space to perform TPPU data in a timely manner.

Users accessed the Collateral Space through a common set of collaboration tools and services. Initiatives implemented content management standards to ensure information posted in the Collateral Space was reliable and usable.

Quantum Leap-1 provided a robust Collateral Space and network infrastructure. This eliminated the need to manually assemble data from multiple stovepipe systems and task/coordinate through point-to-point transactions. The results included a reduced decision cycle time for a range of tactical operations.



3.2.2 Demonstrated Contributions to Transformation Process

The demonstration contributed to a changed concept of warfighting methods. It showed alternative Net-Centric options available to the commanders and troops by providing timely data fusion and contributing to an accelerated decision-making process by networking ISR, Command and Control, and shooters. In essence, the Portfolio demonstrated the sense-making of data. Quantum Leap-1 focused on Net-Centric transformation by:

- Increasing the availability of information critical to combat decision-making
- Augmenting the collaborative command and control processes
- Improving situational awareness
- Reducing the decision-making cycle time
- Providing the ability to simultaneously analyze the same data by different users in disparate locations

The successful completion of the scenario used during Quantum Leap-1 showed:

- Edge users relied on the quality of the data
- *Mars* was available when needed
- *Mars* was adaptable to suit unique Edge User requirements
- *Mars* supported operational tempo requirements

3.2.3 Demonstrated Contributions to Interoperability Framework

The Portfolio mitigated interoperability by using the existing market-driven, standards-based information technology and by developing open architecture standards (e.g. Web Services, portlets, Universal Description and Discovery Interface, and metadata tagging). Interoperability was also achieved at the system level via Application Program Interface (API) standards and at the network level via *Mars*.



3.3 Intellectual Capital

The Horizontal Fusion Portfolio Initiative members collectively demonstrated the success of meeting the mission in FY 03 by implementing a concept in management and acquisition different from traditional DoD program management approaches. The success in FY 04 and beyond is dependent on leveraging this newly acquired knowledge-base. Specifically:

- Acquiring unique and valuable knowledge as a pathfinder for future Portfolio management within DoD
- Establishing a foundation for future Portfolio expansion
- Generating support for policy review and assessment within the DoD acquisition process
- Creating the mindset that the user is now both a data consumer and a data provider



4 HORIZONTAL FUSION PORTFOLIO YEAR END REPORT CARD

4.1 Accomplishments

4.1.1 Quantum Leap-1 Demonstration

Quantum Leap-1 demonstrated that the Horizontal Fusion Portfolio exceeded the expected performance and met the defined success criteria.

Quantum Leap-1 showed Edge Computing Power by enabling web access to the Collateral Space. Access was achieved for all echelons (field soldiers, analysts, staff operators and commanders). Data was accessed through *Mars* on the Edge User's laptop or hand-held device.

In Quantum Leap-1 information was posted to the Collateral Space before processing. This translated to the use of TPPU instead of task, process, exploit, and disseminate (TPED). This transformation from TPED to TPPU is a major shift that will assure that all Edge Users with the proper permissions and a need to know can access data targeted to their specific needs, when they need it. Users could subscribe to receive alerts regarding new postings of interest to them and view when convenient. Mission-focused Communities of Interest, standing or ad hoc, were organized around a temporary crisis and disbanded once the crisis was resolved.

Users could share ISR data by exploiting diverse data sources included in the Collateral Space regardless of the origin of the data.

Quantum Leap-1 also showed that the Core Enterprise Services (CES) can be used by creating and maintaining a "trusted network" that provides an infrastructure to share common services across *Mars*.

4.1.2 Horizontal Fusion Portfolio

The following describes the highlights of the Horizontal Fusion Portfolio accomplishments.



4.1.2.1 Management Process

The Portfolio Manager selected Initiatives based on the fit, balance, and impact philosophy of Horizontal Fusion at the beginning of FY 03. The Initiatives fit together by providing methods for the user to post and retrieve data, as well as the ability to collaborate and leverage others with the same area of interest.

This effort used a blend of traditional management tools to encourage transformation in acquisition and engineering. Office of the Secretary of Defense (OSD) funds were targeted as strategic investments to mature Initiatives with either proven track records to accelerate fielding, or those deemed high risk and high pay-off. These investments were managed as a Portfolio where decisions on what Initiative investments to make were based on the Horizontal Fusion Portfolio Initiative goals, architecture, risk tolerance levels, and outcome goals.

The Portfolio management process comprised certain core activities.

- Analyze Portfolio mission to identify and correct gaps and keep the mission aligned with DoD vision and priorities on Net-Centric transformation
- Manage cost, schedule, technical performance, and risk
- Measure the contributions of each Initiative, taking corrective measures, and supporting adjustments to the mix of Initiatives in the Portfolio

The initial experience of managing the Portfolio demonstrated the need for implementing a formal configuration management and progress tracking process. The Portfolio Management team initiated schedule control by tracking progress of Initiatives through an Integrated Master Schedule (IMS) and taking corrective actions when necessary. The IMS was baselined in accordance with the Portfolio Configuration Management Plan. Configuration Control was adhered to for any changes to IMS. This suggests that IMS is an effective tool for portfolio management and should be implemented from the start of the FY 04 Horizontal Fusion Portfolio.

The Horizontal Fusion Portfolio management process succeeded in challenging traditional management approaches where groups work in “stovepipe” without frequent interactions. The Horizontal Fusion Portfolio Manager established permanent and ad hoc working groups and challenged these groups to work together. The working groups encouraged Initiatives to leverage other Initiatives that they would not have known about otherwise. This synergistic approach proved that collectively the Horizontal Fusion Portfolio performed better than each Initiative working alone.

Final proof of the concept of a portfolio management ended in a successful Quantum Leap-1 Demonstration, laying the foundation for future Quantum Leap efforts.



4.1.2.2 Standards for Horizontal Fusion

In the space of only four months, the Portfolio members developed and promulgated a coordinated set of standards to be used in the development of Net-Centric capabilities. The document addresses standards in four categories—Service/Data providers, Core Infrastructure providers, Portal/Portlet Builders, and End-Users. The standards were derived from a set of Industry and International standards, JTA version 4.0, and Horizontal Fusion application-specific standards. The development of the Standards Document enabled the simultaneous and independent development of the Portfolio capabilities.

4.1.2.3 Collateral Space

The Collateral Space is where the Edge User obtains information for mission planning and accomplishment and also where he places information for other Edge Users. The information supporting the Collateral Space resides on multiple geographically dispersed processors and is integrated through a common taxonomy which enables users to access all related data through a single query. This capability reduces search time, ensures that all relevant information is available for consideration in developing alternatives, and therefore, reduces the decision cycle.

4.2 VIP Visitors Comments

VIP visitors were invited to DISA Skyline 7, Falls Church, Virginia, SPAWAR Systems Center, Charleston, South Carolina, and McKenna Military Operations in Urban Terrain (MOUT) site, Ft. Benning, Georgia, during Quantum Leap-1. The comments that were received from the VIPs validate the importance of the Horizontal Fusion Portfolio to the Department's goal of Force Transformation. Some of those comments follow.

- We need this capability in the field now. What is now important is that our security policy is archaic and must be changed to support this Net-Centric form of operations.
- We need to consider the perishable nature of information on the battlefield and make relevant information available to the Edge User so that he can accomplish the mission without breaching security guidelines.
- The capabilities demonstrated are essential to implementation of Net-Centricity and achieving DoD's goal in Force Transformation.
- Horizontal Fusion gave us the opportunity to leverage programs we would never had known of otherwise.
- You hit a home run!
- When will this capability be available for us to use?
- When can it be used in Iraq?



5 HORIZONTAL FUSION PORTFOLIO FY 03 LESSONS LEARNED

The lessons learned from the FY 03 Portfolio management are presented to help identify the opportunities to better accomplish the goals for the FY 04 Horizontal Fusion Portfolio and successfully manage the Portfolio.

5.1 Collaboration Tools and Services

Horizontal Fusion provided a collaborative environment through a common set of tools and services that allowed users at all echelons to collaborate. The collaborative environment provided the ability for subject matter experts to work in the same virtual space shortening the decision cycle. Quantum Leap-1 proved that the collaborative environment provided enhanced situational awareness by providing access to additional data sources, enterprise capabilities, and subject matter experts.

Although the collaboration environment used in Quantum Leap-1 supported the required capabilities, the need exists to support multiple interoperable web-based collaboration tools. This will enable the Edge Users to work with any tools at their disposal. All collaborative tools should provide chat (voice and written), enterprise search, enterprise alerts, etc.

5.2 Discovery/Standards/Data Management

Horizontal Fusion provided enterprise capabilities that were standards-based. In FY 03, federated search was implemented by 33% of the portfolio members providing direct access to 67% of the available data. The search capability leveraged metadata tagging concepts to discern like terms, e.g. tank of gas vs. a military tank. In addition, the enterprise alerts capability was implemented by 75% of the portfolio members. This alert capability allowed a user to subscribe to information and then returned relevant data via a single pop-up within *Mars*.

From the perspective of XML data standards, the portfolio members that populated the operational picture with near real-time tracks via message traffic worked together to develop an alpha version of a system independent XML schema track standard. This standard was implemented by 50-67% of those members involved in creation of the near real-time picture.

In implementing the federated search, the DoD Discovery Metadata Standard (DDMS) was evaluated. Due to immaturity of vendor products to support full XML constructs, the decision was made to use the DDMS as a guide for the federated search for Quantum Leap-1. Horizontal Fusion will revisit direct inclusion of the DDMS into the next version



of the Intelligence Federated Index Search Web Service specification after Quantum Leap-1 in August 2003. As a reference, the DDMS was invaluable in presenting a strong definition for many data types needed by the federated search web services. However, the Horizontal Fusion Portfolio was not able to determine if the fields represented are the correct ones to ensure the user gets the right information.

The federated search implemented a preliminary version of a DoD "Ontology." Ontology defines relationships between different cataloging systems. Each Initiative provided information about the types of data they contain that was mapped into the ontology. The ontology was then used to determine where the refined query statement was to be routed. A single user search could be routed to one or more catalogs, databases, or other data sources based on the ontology. All results were returned to a single window.

The DoD Net-Centric Strategy, 9 May 2003, provided guidance on the data management strategy. The guidance called for tagging all data, intelligence or non-intelligence, with metadata to enable data discovery. The strategy also called for data management standards within communities of interest. In today's environment, each program within a community of interest creates its own taxonomy. Currently, a DoD-wide or Community of Interest-based taxonomy guideline does not exist. Therefore, the Horizontal Fusion Portfolio took the first step to map ontology to a common taxonomy.

The proposed federated search engine guideline is an initial attempt to establish a DoD/commercial benchmark. This will be proposed as the beginning of a worldwide standard in how Internet searches are conducted since no such criteria currently exists. The proposed standard requires further definition in several areas prior to addressing it at the World Wide Web Consortium.

The Portfolio management team will continue to review and evolve the standards and register all standards within the DoD registry.

5.3 Security

The Horizontal Fusion Portfolio Initiative developed *Mars*, which provided access to information in both the Command and Control and Intelligence communities of interest and other Edge Users within SIPRNet. Public Key Infrastructure (PKI) certificates were required for access to *Mars*. Certificates allowed a single sign-on to the system and access to all data and capabilities in the environment. In addition, certificates defined the basic user profile, e.g. intelligence analysts vs. command and control operators.

The Designated Approving Authority (DAA) certification approach at the Initiative level to operate in SIPRNet and the formal signing of a Memorandum of Agreement (MOA) by each Initiative is highly inefficient for operating in a Net-Centric environment. Due to lack of time to develop a new process and procedure for the Net-Centric environment, the



DAA certification approach was used. When only a few enclaves are connecting to one another for the purpose of exchanging data, a Memorandum Of Agreement (MOA) is the prescribed accountability document that outlines the functionality and responsibilities of each enclave. However, as the number of enclaves will increase for the Portfolio in future years, this approach is inefficient.

To develop a security accreditation policy and procedures and to authorize accreditation for *Mars* in a Net-centric environment, the Horizontal Fusion Portfolio Manager would establish a Security Accreditation Task Force. The FY 04 Net-Centric environment that will include cross-domain information sharing (to include a coalition environment) and multi-level security requires membership from agencies and departments such as OSD for policy issues per DoDD 8500.1, DoD Information Technology Security Certification and Accreditation Process, NSA for cross domain security guidance, and DIA for TS-SCI knowledge. The recommendations from the task force would establish the requirements to reengineer the network accreditation process and procedures.

5.4 Network Monitoring/SIPRNet/Secure Wireless Communications

Horizontal Fusion utilized network-monitoring tools between the Horizontal Fusion Partners to aid in collection of metrics and identification of system problems. This was the first time that a portfolio model was used which involved collaborative interactions between agencies and other facilities. Due to identification of weaknesses in the transport layer prior to Quantum Leap-1, several sites upgraded the available internal and external bandwidth.

In order to better assess the impact of Net-Centric capabilities and XML overhead on the network, the Portfolio management team would simulate load testing to acquire a better understanding of bandwidth requirements, software development requirements, and server requirements. In addition, the management team will analyze the feasibility to build in redundancy in network topology and to provide dynamic routing through the network.

Quantum Leap-1 validated the assumption that the SIPRNet is insufficient to support real-time Net-Centric operations. The SIPRNet architecture requires that node-to-node data transfer follow a single-threaded path. The architecture is not suitable for adaptive dynamic routing between the nodes. The network monitoring that was performed in preparation for and during Quantum Leap-1 indicated that a message path to reach the destination node was fixed and that the route was not dynamically selected based on bandwidth availability, network latency, or point-to-point throughput. SIPRNet architecture is prone to single point of failure. The limitations of SIPRNet discussed validated a need for GIG-BE expansion.

Quantum Leap-1 utilized secure wireless communications between SPAWAR Systems Center Charleston, South Carolina and McKenna MOUT site Ft. Benning, Georgia. By



using the secure wireless communications, it was demonstrated that the Collateral Space is available to the Edge Users in the field. Without robust secure wireless communications Net-Centric warfare at the edge, i.e., the battlefield, cannot be accomplished. By making secure wireless communications part of SIPRNet resources, the environment for Net-Centric warfare capabilities can be provided at the field.

5.5 Portfolio Management

No Portfolio model existed for Information Technology Portfolio management within DoD at the start of this effort. The Horizontal Fusion Portfolio Manager instituted a unique management structure and process to minimize risk and to meet the performance objectives of the FY 03 Portfolio within the time period available. The management approach was to focus on managing the Portfolio to meet or exceed the operational objectives. Initiatives concentrated on their baseline performance, cost, and schedule issues. This outcome-based approach contributed to a strong collaborative environment that resulted in a highly successful effort.

The highlights of the lessons learned from our Portfolio management process are:

- **Schedule**—Institute a formal schedule control method from the start. IMS is a necessary tool, however, the granularity and the level of delineation of activities in IMS should be designed to optimize its use for tracking, controlling, and mitigating risks.
- **Meetings and Communications**—Scheduled team meetings, including the working groups, should be conducted with a clear agenda followed up with minutes and action items. The working group membership was often too large and lacked sufficient accountability. The Horizontal Fusion management team should lead each working group.
- **Collaborative Tools**—The capabilities of the collaboration tool used during Quantum Leap-1 could not be fully exploited due to network constraints. The goal is to implement collaborative tools that allow better communication, document tracking, and user friendliness.
- **Accountability**—The need exists to clearly define the accountability including the roles and responsibilities of the Initiatives. The Portfolio management was structured to allow Initiatives to retain their own program or project management structure with their own leadership and cost accountability. However, they are accountable to the Portfolio Manager for cost and performance to meet the requirements for the Collateral Space for Net-Centric operations.
- **Team Building**—The Portfolio management process was structured to encourage team building, communications, and focused on the end products. The process will continue. The Portfolio objectives will be clearly stated; the Initiatives and individual roles and responsibilities will be clearly defined. Team building will become a natural

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evolution, so long as the objectives are clearly understood. The initial working groups and monthly conferences will emphasize the need for team collaboration.

The lessons learned will be used to further improve the management approach. The Portfolio Management will continue to be proactive to minimize risk and seek expert opinions through ad hoc or permanent advisory boards. The Portfolio Manager will continue to be supported by a management team.



6 HORIZONTAL FUSION PORTFOLIO OUTLOOK FOR FY 04

In FY 04, the Horizontal Fusion Portfolio will continue to expand and improve upon the Net-Centric capabilities available to DoD. Specific focus areas for the next year are to operationalize and expand the Collateral Space, cross-domain information sharing, and tactical secure wireless communications. The Horizontal Fusion Portfolio will increase the number of web-enabled data sources and add additional browser-based “sense-making” tools. While the Horizontal Fusion FY 04 Portfolio members have yet to be finalized, it is believed that the Horizontal Fusion Portfolio will contain 25 or 30 Initiatives, each bringing web-enabled data or contributing tools and services needed to support Net-Centric operations. Additionally, Horizontal Fusion will work with US-Coalition partners to show that data can be shared between Coalition networks and the Collateral Space. Another important aspect of cross-domain information sharing will be information assurance. Users will have access to data that they need to perform their mission. Finally, information will be pushed to the farthest edge through the use of tactical secure wireless communication devices. Several wireless, hand-held data devices may be tested by Edge Users in the field to show that information can flow to and from the Collateral Space.

The Collateral Space will be extended to other Communities of Interest, which in turn will increase *Mars* user base and contribute additional data sources. Specifically, Horizontal Fusion will look at adding services and tools designed to aid the Command and Control communities and add government agencies outside of DoD who will benefit from direct involvement with the Edge Users. In addition, there are plans to deliver additional Net-Centric CES to the Collateral Space in the FY 04 timeframe.

The integration and interoperability of all these improvements and additions will be demonstrated at Quantum Leap-2, scheduled for August 2004.