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Response for:

United States Visitor and Immigrant Status Indicator Technology (US-VISIT) Program Prime Contractor Acquisition

Volume 4, Part D
Capability Maturity

December 19, 2003

Submitted to:

US-VISIT Program Office
Department of Homeland Security
1616 N. Fort Myer Drive
Rosslyn, VA 22209
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Submitted by:

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In Response to Solicitation No.

HSSCHQ-04-R-0096

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1.0 PROOF OF CAPABILITY MATURITY - ACCENTURE

Process improvement and a commitment to quality are a core part of Accenture's culture and include sponsorship at the executive level, external quality reviews of our standard methods, and dedicated process improvement professionals.

Structure of Capability Maturity Volume – The first part of each section (1.0, 2.0, 3.0, and 4.0) provides the proof of capability maturity of the business units of the Offeror and Teaming Partners that will be performing software engineering and has no page limit. It is followed by several significant process improvement areas of each organization. Each process improvement area complies with the five-page limit. In section 1.0, paragraphs 1.2, 1.3, 1.4, 1.5, and 1.6 address Accenture's Process Improvements.

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Quality is integrated into Accenture's corporate culture and is instilled in the Smart Border Alliance

- Accenture's USA Government Operating Unit assessed at CMMI Level 3 maturity in May 2002 by an independent external assessment organization
- All projects in our organization follow quality principles, improvement methods, tools, and techniques
- Our methodology is based on 30 years of experience and is continuously improved
- Accenture's QPI Team retains responsibility for oversight of all Alliance processes
- All Team Members and subcontractors follow Alliance defined processes

USVQ 050

1.1 Corporate Commitment to Quality

At Accenture, a holistic approach to quality is supported by strong management commitment. Figure 1-1 describes our corporate quality approach. Quality improvement methods, principles, tools, and techniques institutionalize quality across our culture. The three main components of our approach, [redacted] enabled by a solid infrastructure support our business goals.

[redacted]

[redacted]

USVQ-063

Figure 1-1. Our quality approach infrastructure supports [redacted] efforts to support business goals

[redacted] The support infrastructure enables the quality and process improvement efforts.

Our software and system engineering methodology is based on over 30 years of experience. Process improvement on the methodology is shown in Figure 1-2. We were one of the first consulting organizations to formalize our methodology and have continually improved it based on over 5,000 project experiences.

We pursue process improvement in order to improve the way we deliver results to our clients. The Capability Maturity Models (CMM) [redacted] The USA Government Operating Unit (GOU) Capability Maturity Model Integration (CMMI) Level 3 maturity confirms our local and corporate commitment to quality.

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The USA GOU is the Offeror's business unit performing software engineering on US-VISIT.

1.1.1 Government Operating Unit (GOU) Quality Initiatives

[redacted]

The [redacted] team is a core part of each of our projects and has been supporting project's process improvement efforts for 10 years. The team tailors our corporate methodology, Accenture Delivery Methods (ADM), to incorporate standard CMMI processes, procedures, and templates. The resulting process improvement tool, [redacted] is utilized to jump-start projects and guide the management of their processes.

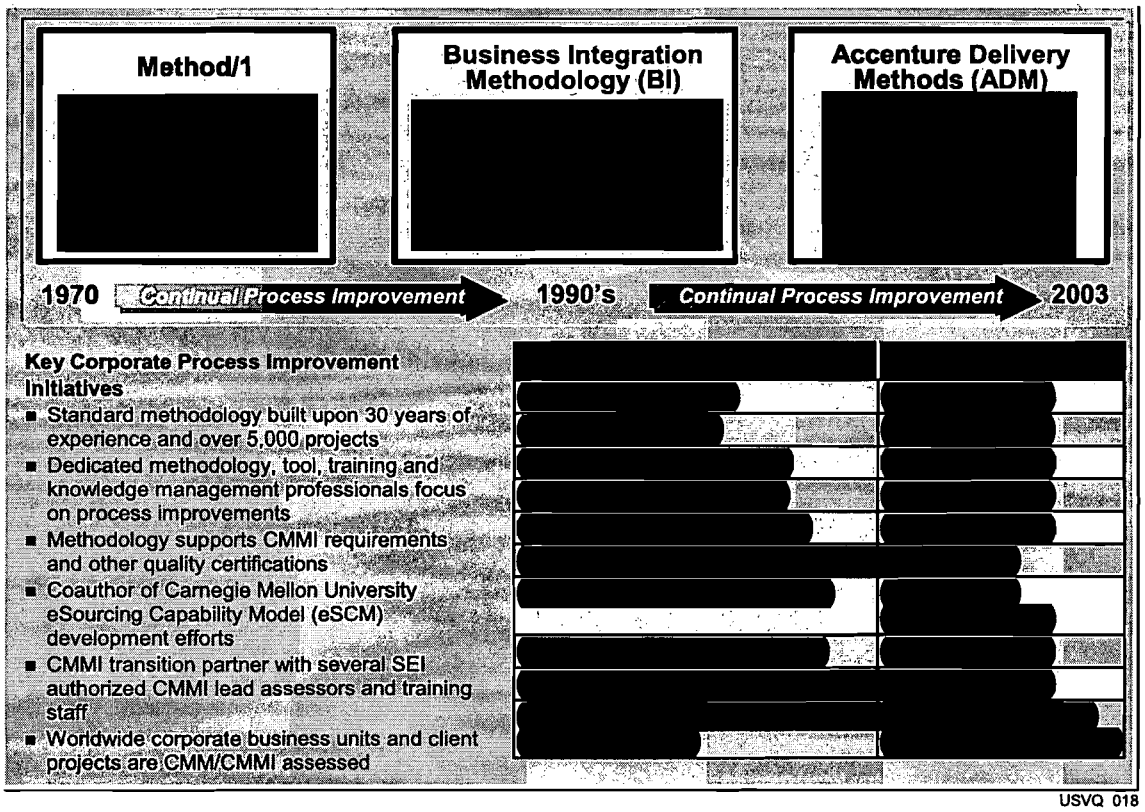

Figure 1-2. A long history of corporate commitment to continual Process Improvement enhances our ability to delivery quality products that meet program goals

[redacted] Global Accenture methods and tools that are part of the Accenture Delivery Suite (ADS) augment [redacted] the Standard CMMI Appraisal Method for Process Improvement (SCAMPI) and Mini Appraisal efforts to assess the maturity of the GOU. Accenture's GOU has attained CMMI Systems Engineering / Software Engineering / Integrated Product and Process Development (SE/SW/IPPD) Level 3 Maturity as demonstrated by our performance in the SCAMPI of May 2002, conducted by a fully external appraisal by an independent party, Integrated System Diagnostics (ISD), Inc. Since the SCAMPI, we have updated our processes, templates, tools, and procedures to achieve Level 4 maturity. Our projects, currently operating at Level 4 maturity, will be appraised through a formal SCAMPI in May 2004.

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[redacted]

USVQ 039

Figure 1-3. The [redacted] Team provides centralized Process Improvement guidance to projects to promote CMMI best practices

Figure 1-4 outlines our CMMI Level 4 timeline and approach. We treat this as an independent project and utilize project management techniques for the duration of the effort. Communication and sponsorship at the highest levels enable acceptance by our projects and a successful outcome. [redacted] Ongoing training of the assets supports the institutionalization of Level 4.

Based on our own experience completing the Level 3 SCAMPI, we developed the Accelerated Process Improvement Framework (APIF) to assist our clients in jump-starting a process improvement program. APIF provides a cost-effective, easy-to-use, Web-based process navigation tool. The tool is quick to implement but flexible enough to meet customized needs. The framework, developed with CMMI in mind, includes a series of process flows, templates, and tools that reflect CMMI Level 2 and Level 3 process areas.

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[redacted] They recognize the applicability of CMMI to their organization and all of their transformed processes are CMMI compliant. The client is working towards the goal of pursuing a formal maturity assessment using APIF as their framework.

1.1.2 May 2002 SCAMPI Results

[redacted]

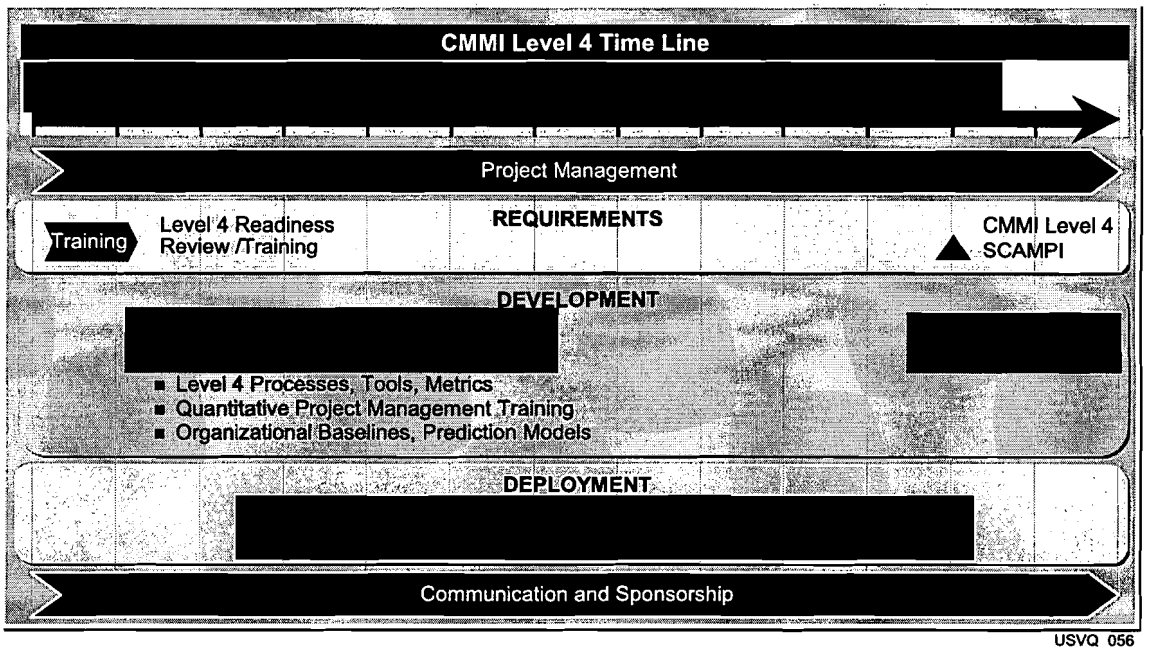

Figure 1-4. Our CMMI Level 4 processes, currently used by our projects will be appraised by a formal SCAMPI in May 2004

Our Final Report is contained in Appendix 1 and our resulting Action Plan is contained in Appendix 2.

Global strengths of the GOU, outlined in the Final Report include a formal corporate policy governing implementation of established processes, a multi-tier process to ensure product quality and process implementation, and a strong training and project orientation focus for new team members. Another recognized global strength is our status reporting and review process. Our efforts to elicit, understand, and balance client needs, expectations, constraints, and interfaces are recognized against several process areas. It is noted that we continue to involve the client, end user, and other affected stakeholders throughout the lifecycle to produce clear requirements and technical solutions that achieve the business goals.

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Figure 1-5 outlines the Action Plan items that map to weaknesses identified in the Final Report. The corresponding process improvements that address the weaknesses and have been implemented are also listed.

[redacted] All of which are key strengths needed for US-VISIT.

[redacted]

[redacted]

Our Action Plan addresses not only weaknesses from the SCAMPI, but also process improvement areas. For example, we met 16 out of 20 Process Areas with no weaknesses and the other four areas identified only minor weaknesses. Often, we are strong in areas because we continually improve those processes.

1.1.3 Requested information

Figure 1-6 outlines the information requested in L.15.4 of the RFP. A copy of our Final Report is contained in Appendix 1 and a copy of our Action Plan is contained in Appendix 2. The summary of all significant process improvement areas we will be discussing are contained in paragraphs 1.2 through 1.6. The improvement areas addressed are

Action Plan Item Related to Weaknesses	Corresponding Process Improvement
[redacted]	

USVQ-085

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Figure 1-5. We have addressed the weaknesses identified in our SCAMPI Final Report to strengthen our processes

Integrated Teaming, Acquisition Management, Business Process Reengineering/Organizational Change Management, Quality Reviews, and Performance Measurements and Metrics.

1.1.4 Responsibility of Primary Offeror on US-VISIT

As the Offeror in the Smart Border Alliance, we are responsible for the governance of the Alliance processes and procedures. As an integrated team, all of our teaming partners, subcontractors, and small businesses follow the defined Alliance processes and procedures and utilize a common toolset to support the processes. [redacted] All of our team members are trained on the Alliance quality initiatives.

Our teaming partners who are CMM or CMMI Level 3 certified bring best practices to the table that may be adopted

Item	Requested SCAMPI Information
(a) Identification of the Company and business unit that was appraised	■ Accenture ■ USA Government Operating Unit (GOU) ■ Headquartered in Reston, VA
(b) Date of the assessment	■ 4/29/02 - 5/10/02
(c) Identification of the model, type of appraisal, and whether the appraisal was against a staged or continuous model; if against a staged model, the model that was assessed	■ CMMI for Systems Engineering/Software Engineering/Integrated Product and Process Development (CMMI-SE/SW/IPPD) (v1.02) ■ SCAMPI (v1.1) appraisal ■ Staged Representation of CMMI, SE/SW/IPPD Level 2 and 3 process areas ■ Also assessed and achieved SW-CMM (v.1) level 3 maturity
(d) Identification of the assessment team lead and contact information for this person	■ Integrated System Diagnostics, Inc (ISD) ■ Assessment Team Lead: [redacted]
(e) Copy of the final report	■ Contained in Appendix 1
(g) Copy of the action plan	■ Contained in Appendix 2
(h) Summary of all significant process improvements that have occurred in the Offeror's business unit since the SCAMPI appraisal	■ Contained in paragraph 1.2 - 1.6

USVQ 022

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Figure 1-6. Our CMMI Level 3 Assessment was conducted by an independent organization, ISD, Inc. to provide an objective view of our quality processes

by the Alliance. [redacted] assesses that these processes comply with the CMMI maturity goals of the project. Since our Teaming Partners who are doing software engineering are all at SW-CMM or CMMI Level 3 maturity level, the transition to the Alliance's processes will be straightforward.

1.2 Process Improvement #1 - Integrated Teaming

Our Integrated Teaming approach focuses on integrating organizational change management, business processes, and technology teams to implement a strategy and solution to a business problem.

This process improvement area ties to the following action plan items 10, 12 -15, 17, 33, 35, 36, 40, 44 - 46, 51 and 56.

1.2.1 Our Integrated Teaming Processes

Our integrated teaming environment supports our quality approach and provides a common vision developed in cooperation with our teaming partners and relevant stakeholders. Communication alone is not enough to successfully implement quality management and vision, as demonstrated in Figure 1-7. Effective communication is backed up by coordination of our integrated processes, tools, and organizational structure into day-to-day activities. Because of this, our project's vision and quality management are consistently carried across all teams and embedded within all our work products.

Integrated teaming focuses a systematic approach and solution to product development with key stakeholder involvement

- An integrated work environment enables common mission/vision for our integrated teams
- We consistently involve relevant stakeholders throughout the developmental lifecycle through integrated teaming
- Stakeholders, teaming partners, and subcontractors equal "one team with one vision"
- Our integrated teaming processes are validated by our CMMI (SW/SE/IPPD) maturity appraisals

USVQ 098

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To continuously improve and add value

[redacted]

[redacted]

USVQ-069

Figure 1-7. Our Integrated Team implements quality and process improvement per Accenture's quality management approach and common vision

[redacted]

[redacted]

1.2.2 Relevance to US-VISIT

Applying Integrated Teaming practices on US-VISIT provides the ability to consistently use common processes, tools, and practices agreed upon with each teaming partner and relevant stakeholder while adhering to US-VISIT guidelines.

[redacted]

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This management approach provides a common language and methodology that enables US-VISIT project teams to achieve superior business performance by leveraging each other's skills. Quality and Process Initiatives are directed from the

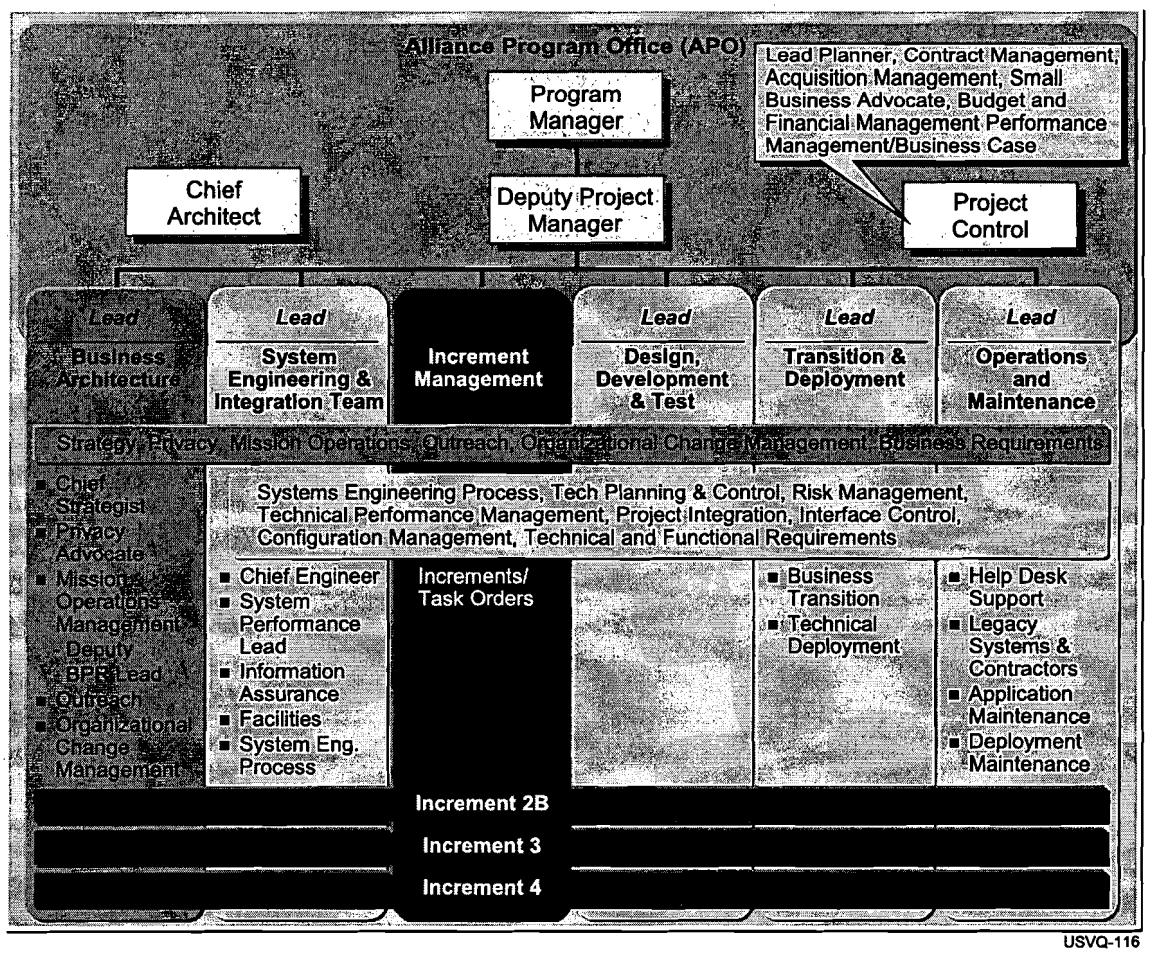

Figure 1-8. Expertise and capability rather than organizational affiliation form our cohesive integrated teams

System Engineering and Integration Team. [redacted]

A proven combination of management methods and tools results in high quality client services while fostering a partnering spirit.

1.2.3 Ongoing Process Improvement Efforts

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We deliver quality client services across the teaming environments by developing, maintaining and deploying best practices, methodologies, tools and knowledge capital using the CMMI (SW/SE/IPPD) framework for process improvement. Figure 1-9 illustrates the components of our teaming approach.

[redacted] We have established organizational processes, guidelines, and tools and placed them in our process repository [redacted] so that our integrated teams can benefit

[redacted]

USVQ 080

Figure 1-9. Teaming with our client's personnel using a flexible integrated model provides a distinctive ability to formulate and deliver on large-scale complex programs

from the SCAMPI. In turn, our teams are responsible for implementing processes and procedures for managing tasks, such as communications, risks and issues, and change management then report to their program office. As a result, the program office shares the knowledge capital gained on one team/project with other teams/projects seeking to implement similar solutions.

[redacted]

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1.3 Process Improvement #2 - Acquisition Management

Acquisition management in an integrated teaming environment establishes formal agreements with suppliers and translates into lower costs and risk for the program.

This process improvement area ties to the following action plan items 10, 15, 16, and 33.

1.3.1 Our Acquisition Management Processes

Structuring an integrated team is dependent on several variables, some of which are skilled resources, product components, and established services.

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We illustrate our approach in Figure 1-10. To further compliment our acquisition approach in an integrated environment

[redacted]

[redacted]

1.3.2 Relevance to US-VISIT

Applying our proven acquisition management approach at US-VISIT provides consistency, quality and value across projects when planning partnerships, product, and service acquisitions. Figure 1-11 illustrates our acquisition management approach.

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[redacted]

Our methods, processes, and templates for acquisition management are defined in our process repository tool, [redacted] This tool, along with similar stakeholder project methods and processes enhance the integrated development process. It enables our effort, cost, and schedule estimates, and assists in the definition of project specific plans.

Awareness sessions are delivered to projects to orient them to our acquisition management approach and provide the tools and resources to follow through on the training.

1.3.3 Ongoing Process Improvement Efforts

Acquisition management processes defined in our process repository tool are regularly evaluated to provide consistent data and control for analysis, monitoring, and process improvement to our teams. The acquisition processes and templates

[redacted]

USVQ 099

Figure 1-11. Accenture's Acquisition Management Guidelines provide consistency across the integrated team by building an alliance that provides the best commercial and government business practices

are maintained in [redacted] and are illustrated in Figure 1-12.

Our rigorous process improvement and best practice reviews drive our System Acquisition practices to be in line with System Development goals. [redacted]

[redacted]

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[redacted]

USVQ 037

Figure 1-12. [redacted]

1.4 Process Improvement #3 – Business Process Reengineering and Organizational Change Management (BPR/OCM)

Actively owning and managing organizational change resulting from business process reengineering enables US-VISIT to achieve mission success.

This process improvement area ties to the following action plan items 36, 39, 44, 46, and 51.

1.4.1 Our BPR/OCM Processes

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Our Business Process Reengineering (BPR) and Organizational Change Management (OCM) approach implements quality and process improvement through fundamentally examining, redesigning, and implementing business processes and managing the resulting organizational changes. It goes beyond departmental or functional streamlining to rethink the way a program operates. We look for ways to maximize the value-creation potential of entire end-to-end processes.

Our BPR approach, depicted in Figure 1-13, helps organizations bring together their technology, people, processes, and strategies to achieve dramatic performance improvements. It provides a set of integrated processes for understanding, planning and executing change. The processes keep the many elements of an initiative working together, continuously focused on outcomes, results, and value.

Business process reengineering and organizational change management improve DHS operational efficiency

- Our approach is based on Accenture delivery methods which brings together technology, people, processes, and strategies to achieve dramatic performance improvements
- Our business process reengineering focuses on business outcomes, value, and the entire supply chain
- Our operational preparedness helps the organization prepare for change and is trained to operate in the new environment
- Continuous stakeholder management aligns both internal and external stakeholders with the projects vision and is critical to project success

USVQ 095

[redacted]

[redacted]

USVQ 124

Figure 1-13. [redacted]

framework, aligned to business outcomes, [redacted]

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Business Process Reengineering is not successful without a well-planned Organizational Change Management effort. On projects of large size and complexity, change will affect a myriad of internal and external stakeholders. Keen management skills are required for success. Accenture is a recognized leader in facilitating Business Process Reengineering through training, communication, usability, operational support, and most importantly stakeholder management.

1.4.2 Relevance to US-VISIT

BPR and OCM are required to effectively streamline the key IT systems supporting US-VISIT while meeting the needs and requirements of the dozens of governmental agencies, numerous other communities of interest, and the major US-VISIT related legislative deadlines. Given the complex stakeholder environment for US-VISIT, effective OCM, BPR, and Stakeholder management are paramount to the program's success. Our experience and ability to drive successful, enterprise-wide change enhances the team's ability to make the vision of a "virtual border" a fast reality. Figure 1-15 depicts how our approach toward Organizational Change Management can make the project successful.

Because the US-VISIT program consists of both human and technological issues, our approach uses multiple strategies to achieve the coordination objective. [redacted] Collaboration tools can help. [redacted]

[redacted]

USVQ 125

Figure 1-14. [redacted]

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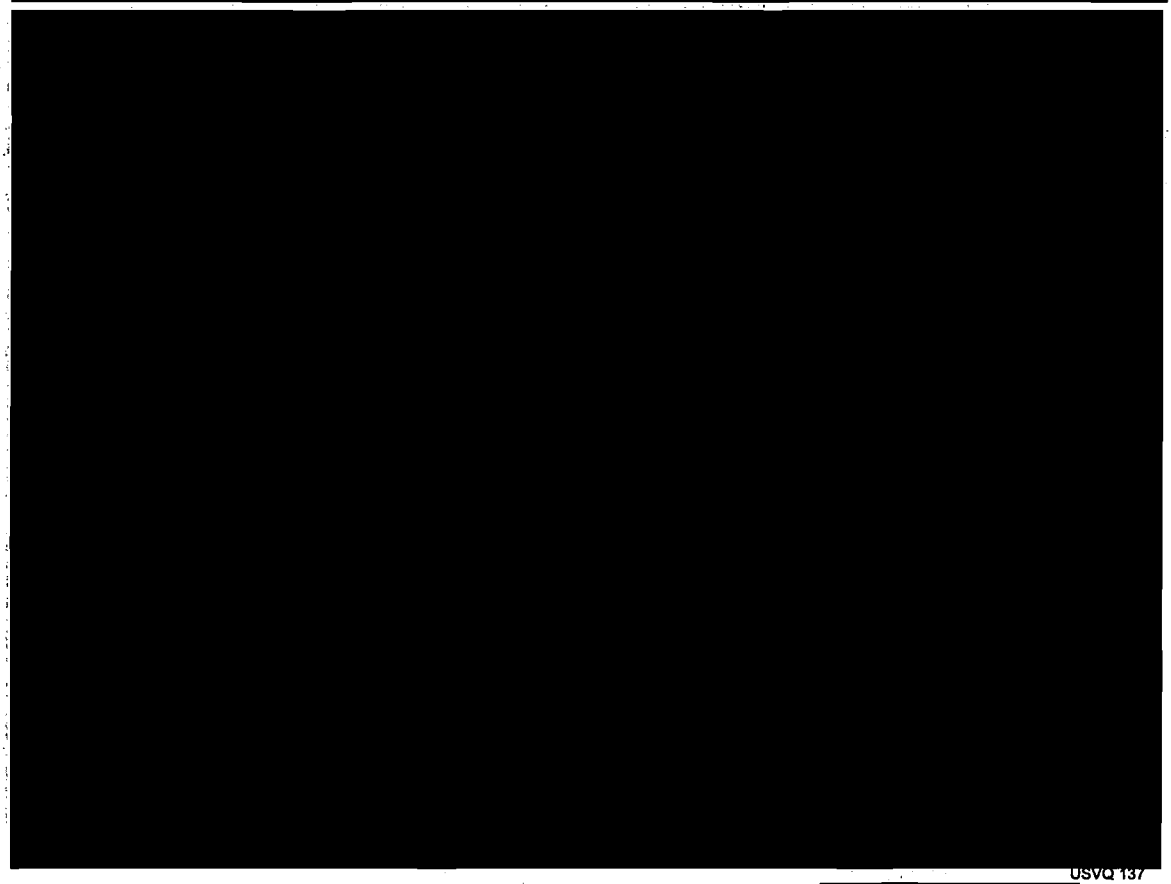

USVQ 137

Figure 1-15. Organizational change management involves US-VISIT stakeholders

Based on our experience managing large complex client engagements with multiple stakeholders, engaging stakeholders early in the change process increases the likelihood of success.

Successful system deployment extends far beyond technology, and through our

strong Business Process Reengineering and organization change management workforces, we are able to help our clients achieve true business results.

1.4.3 Ongoing Process Improvement Efforts

Internal process improvements within our BPR and OCM areas are lead via training for both. This training is continually updated with the latest knowledge and trends to provide our people with cutting-edge skills.

Accenture makes a significant investment in its people by continuous training for each individual. A commitment by Accenture has been made to provide [redacted] The training curriculum is continuously updated to provide the latest in learning to enable our people with the latest skills. Within the Government Operating Unit (GOU), training has been formalized [redacted]

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Team members are engaged in process improvement activities and are provided with formal opportunities to have mentors provide guidance and advice. Our Business Process Reengineering and Organizational Change Management efforts are staffed with highly trained professionals specializing in organizational change. Accenture's Human Performance Service Line includes [redacted] skilled professionals specializing in process improvement and Organizational Change Management. We specialize in performance improvement and process simulation to prototype new business processes in a risk-free environment.

[redacted] By providing our people with the latest knowledge and skills, they are able to execute to our vision.

1.5 Process Improvement #4 - Quality Review

Our quality review process is continuously monitoring and improving our work products and processes to reduce cost, increase product quality and minimize rework.

This process improvement area ties to the following action plan items 16, 19, 20, 40, and 41.

1.5.1 Our Quality Review Processes

Our quality review process focuses on client satisfaction, process excellence, and product quality. We use the process in Figure 1-16 for all three types of quality reviews: [redacted]

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The primary purpose of the review is to verify that the project is progressing based on client expectations, bringing business value to the client, and delivering the solution on time and within budget.

[redacted] Subject Matter Experts (SME) conduct [redacted] to assess compliance to documented processes and standards. [redacted]

Through quality reviews we focus on quality and delivery excellence

- [redacted] and executive management perform independent quality reviews
- Projects follow standard review process to review work products for inconsistencies, errors, or problems
- Quality Review metrics provide projects early insight into product quality
- Peer review results are quantitatively managed to predict the quality of the final product
- Errors found during peer reviews reduce rework time by a factor of ten

USVQ 012

[redacted] is conducting monthly Best Practices reviews to assess compliance to documented processes using the CMMI framework. SMEs with functional knowledge also review critical work products.

Peer reviews, a structured review of work products by a project team member, to identifies problems and improvement areas. The primary purpose is to find and eliminate problems early in the project lifecycle.

[redacted] approach shown in Figure 1-17 to perform verification and validation activities throughout the project lifecycle. Verification and validation checkpoints are embedded in our methodology and are performed as the final step of key tasks and activities.

The [redacted] review process is

[redacted]

USVQ 034

Figure 1-16. The Accenture Team increases process and product quality through continuous quality reviews

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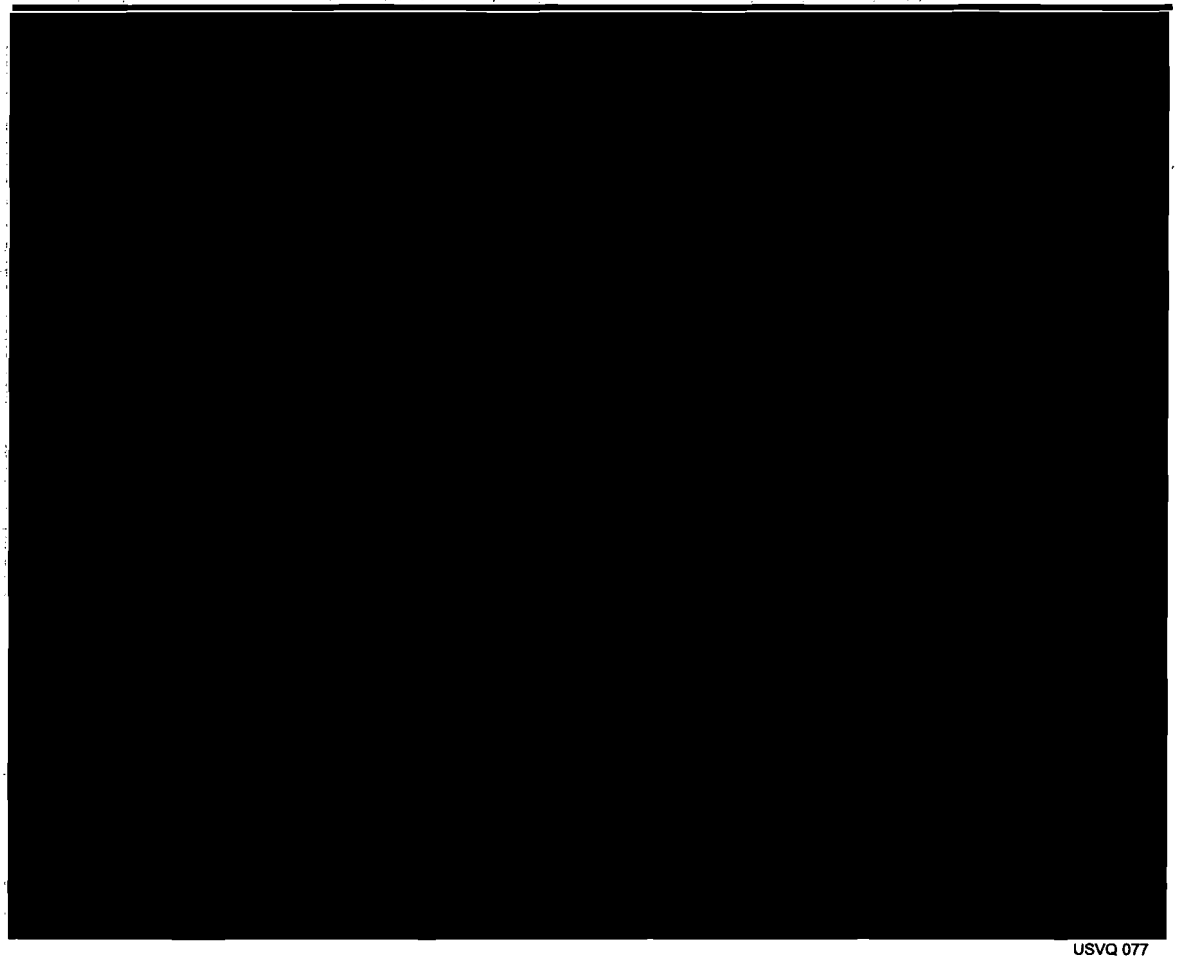

USVQ 077

Figure 1-17. Continuous quality reviews verify compliance with US-VISIT requirements and enable stage containment to reduce rework and improve quality

documented and provides consistent standards and common approaches for executing reviews. It emphasizes proactive follow-up and corrective action to efficiently and effectively resolve issues and implement improvements for our clients.

[redacted] conduct Best Practices reviews. This review confirms that projects deliver high quality client service by developing, maintaining and deploying best practice, methodologies, tools and knowledge capital using the CMMI framework. Best Practices reviews improve organizational processes and product quality.

[redacted] Client satisfaction is one of our key operating metrics.

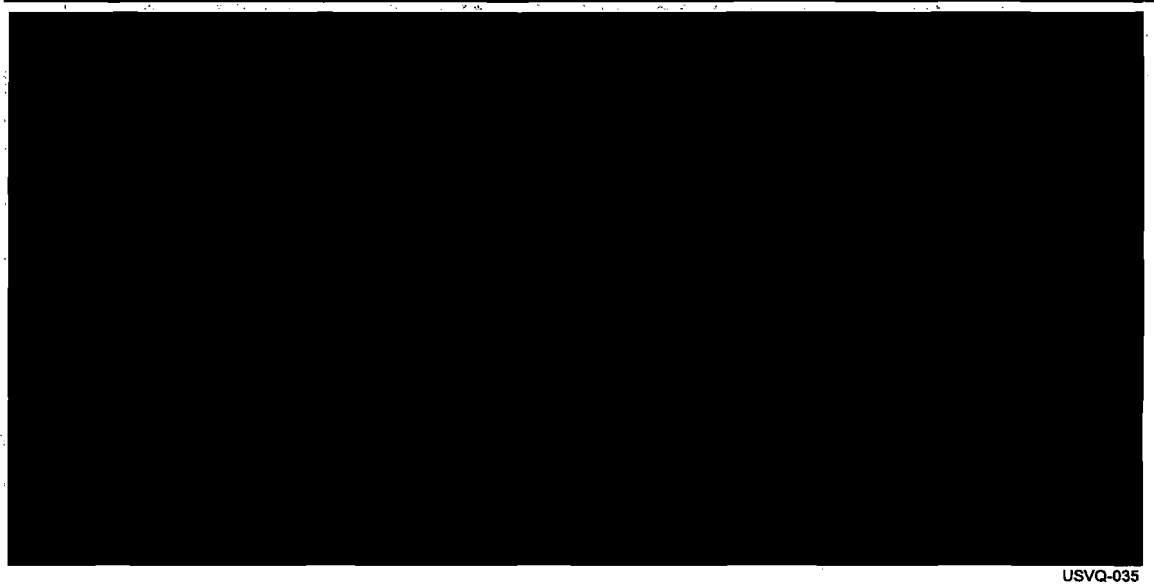

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Figure 1-18. Our standard peer review criteria template shows the review criteria that provides consistent standards for work products across projects

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1.5.2 Relevance to US-VISIT

All quality reviews on the US-VISIT project are conducted in accordance to Accenture's policies. Senior Accenture Partners with extensive government experience will conduct [redacted] reviews [redacted] The reviews verify that the US-VISIT project progresses according to plan and that we meet client expectations.

1.5.3 Ongoing Process Improvement Efforts

The peer review metrics are indicators of product quality. [redacted]

[redacted]

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[redacted]

USVQ-055

Figure 1-19. [redacted]

1.6 Process Improvement #5 - Performance Measurement and Metrics

We quantitatively manage key processes to improve project performance and meet process improvement goals.

This process improvement area ties to the following action plan items 1-4, 6-10, 12-20, 22, 27-39, 42, 47, 49, and 52.

1.6.1 Our Performance Measurement and Metrics Processes

Quality project management improves our project performance

- A balanced scorecard of metrics align stakeholder objectives with performance measures
- We quantitatively manage quality, cost and schedule through metrics as we focus on Level 4 maturity
- The [redacted] Team provides training, analysis and guidance to our projects to institutionalize our metrics program

USVQ-057

Our measurement approach as outlined in Figure 1-20 supports our quality, budget, and schedule goals. All projects in the Government Operating Unit (GOU) participate in the measurement program and submit monthly metrics [redacted] The goal of this program is to assist management in making informed decisions that promote quality, productivity, and process improvement. [redacted] Metrics defined on both a project and organizational levels are aligned with business objectives.

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[redacted]

USVQ 040

Figure 1-20. [redacted]

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[redacted] The GOU has the highest Client Satisfaction results in the company.

[redacted] The GOU also has the highest People Satisfaction results in the company.

All GOU projects are required to collect a set of standard metrics to manage their projects. Projects also create project specific metrics that are developed in partnership with the stakeholders.

1.6.2 Relevance to US-VISIT

Projects collect the standard key metrics listed in Figure 1-21 and report them [redacted]

1.6.3 Ongoing Process Improvement Efforts

Quantitative management of our organization drives our process improvement efforts surrounding metrics. The majority of the items in our Action Plan address the quantitative management of our processes. Initially, this phase of our improvement effort focuses on quantitatively managing metrics surrounding quality, cost, and schedule. The techniques we are using meet CMMI Level 4 maturity requirements. Our

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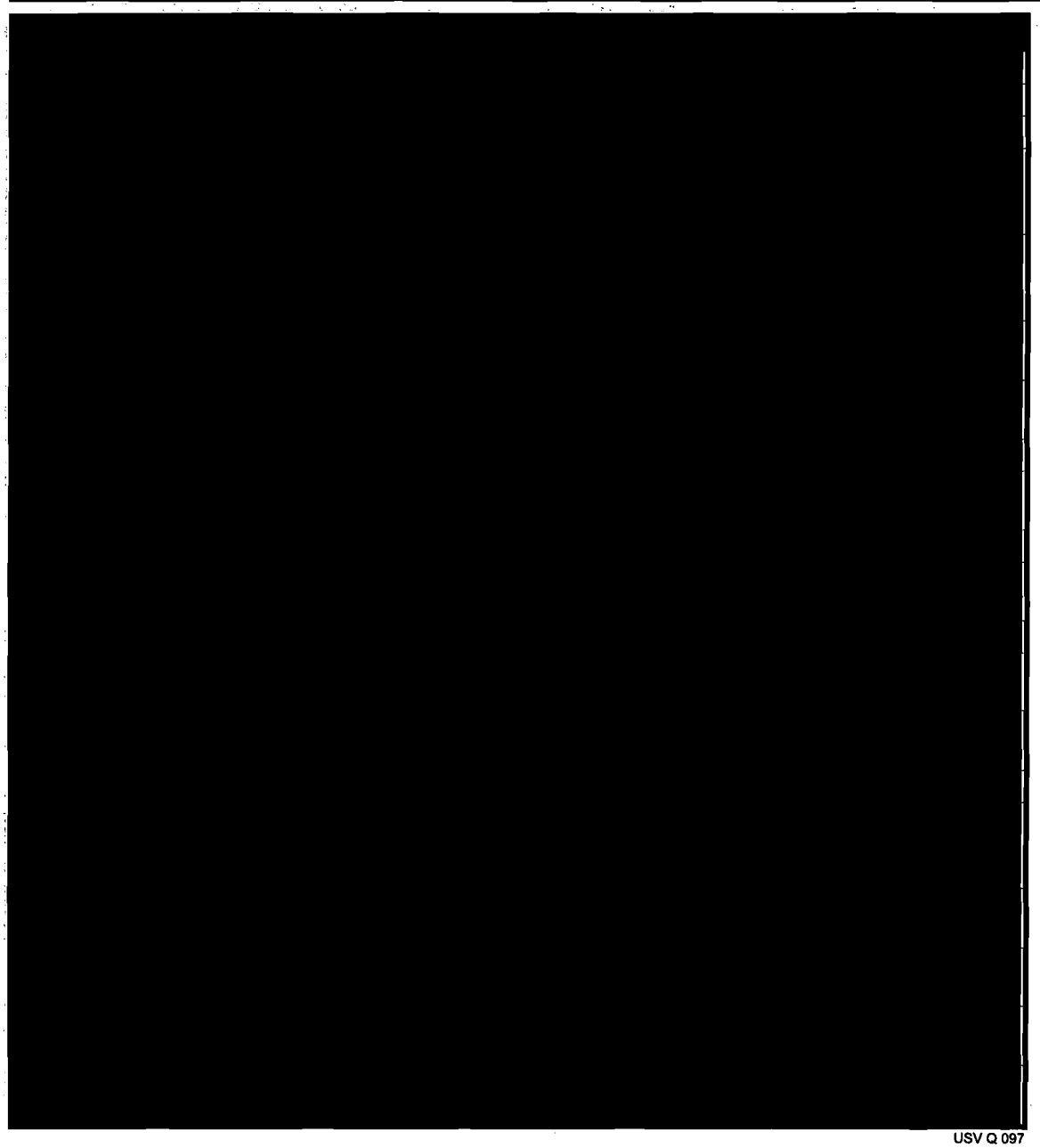

USV Q 097

Figure 1-21. A standard set of key metrics ties project performance to process improvement initiatives and core goals of high quality delivered on time and on budget

intent is to add additional process areas to the quantitative management approach as process improvement goals merit.

Figure 1-22 describes the improvements our metrics program has undergone.

This supports our overall holistic goal of improving quality through process

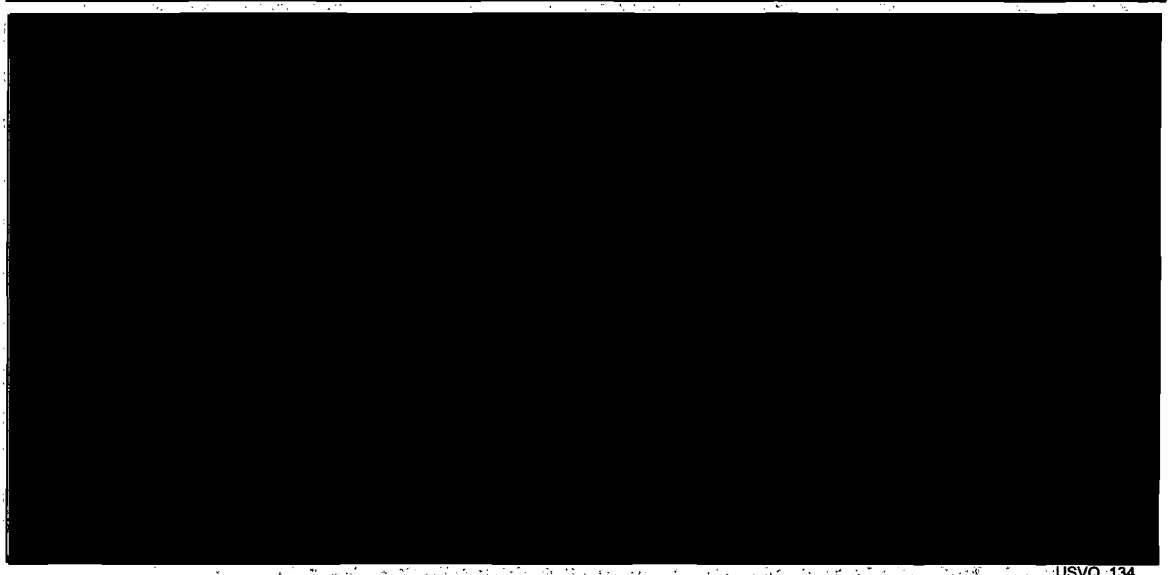

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Figure 1-22.

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improvement.

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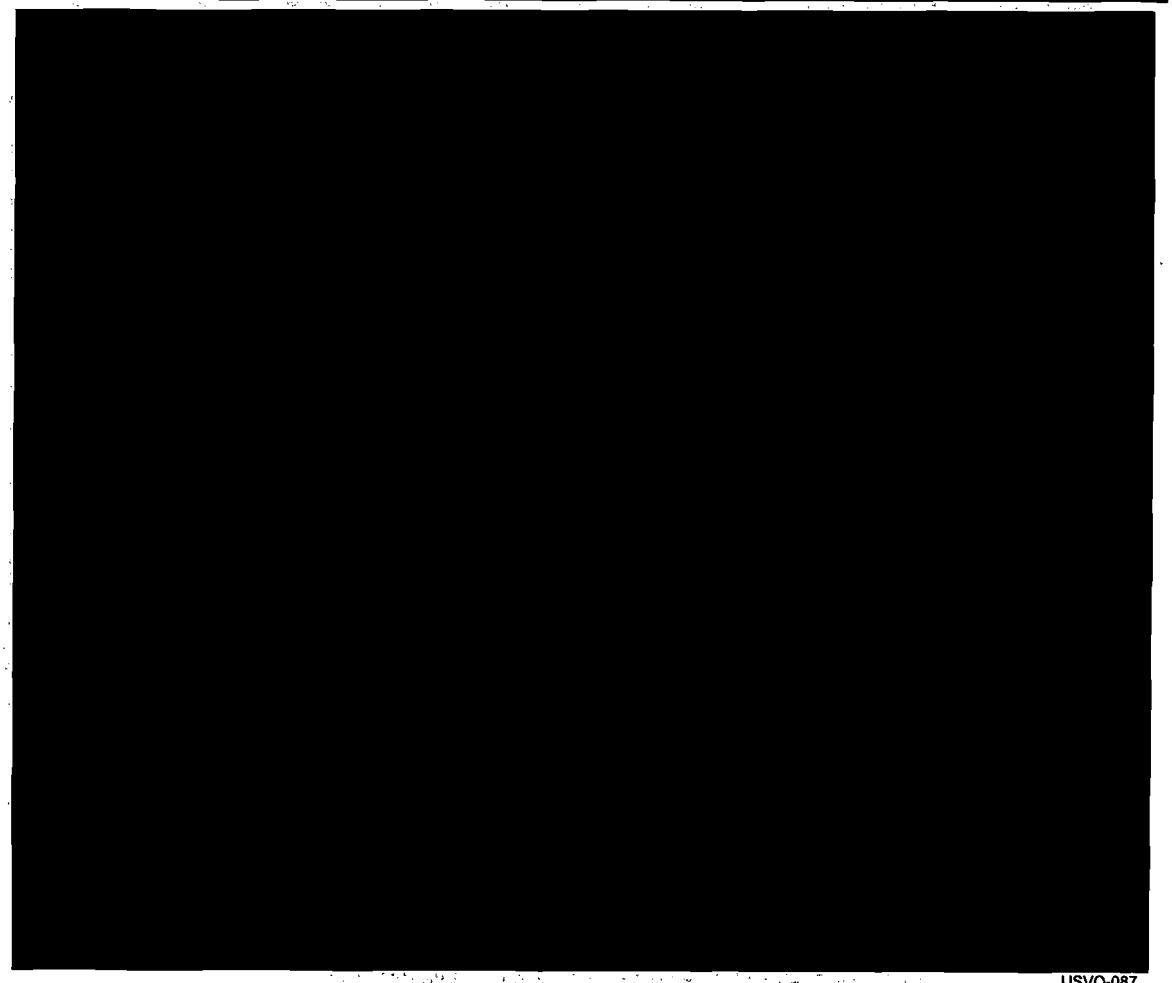

USVQ-087

Figure 1-23.

2.0 PROOF OF CAPABILITY MATURITY MODEL – RAYTHEON

Process improvement and a commitment to quality are a core part of Raytheon's culture and include corporate level policies and goals, external reviews, a six sigma process, and a documented corporate-wide integrated core process.

Structure of Section 2.0. The first part of this section provides the proof of capability maturity that has no page limit. It is followed by five significant process improvements (paragraphs 2.2, 2.3, 2.4, 2.5, and 2.6). Each process improvement complies with the five page limit.

2.1 Corporate Commitment to Quality

At Raytheon quality principles, improvement methods, tools, and processes institutionalize quality across all business units. Key to quality and process institutionalization is the use of the Integrated Product Development System (IPDS), shown in Figure 2-1. IPDS provides an enterprise solution capability through its system of processes, tools, infrastructure, training, and measurement. This supports communication, measurement, execution, and continual improvement. By reducing variation, we achieve cost-saving goals, improve our quality, and provide the foundation for product development standardization and re-use. This process emphasis is key to achieving customer satisfaction, our primary focus. IPDS is a structured, tailorable process used on all programs. It provides an extensive set of common processes, standard tools, and knowledge sharing. IPDS is a seamless integration of engineering, modeling, and supply chain management. It is supported by Raytheon Six Sigma, a combination of classical Six Sigma and Lean techniques. Classical Six Sigma focuses on products, product quality, and product cost. Classical Lean techniques focus on processes, process cycle time, and process cost. Combining these provides the best of both worlds, and enhances processes and products by reducing cost, reducing time to delivery, and increasing quality.

Raytheon is committed to continuous process improvement

- Over 10 years of initiatives in process improvement in Systems Engineering, Software Engineering, Quality and Supply Chain Management
- CMMI-SE/SW Level 3, June 2003
- ISO 9001:2000 Registered
- All levels use Raytheon Six Sigma process

USVQ 106

IPDS documents processes using hierarchically, web-linked flowcharts with detailed process descriptors at the lowest level. The task descriptors describe the inputs, outputs, task narratives, methods, metrics, tools, references, and links to related processes involved in the process step. At the center of IPDS is the Integrated Product Development Process (IPDP). It is the top-level unifying process within IPDS and contains our core processes and integrated activities. Below the IPDP are the product and discipline sub processes, such as software, systems engineering, and configuration management. IPDS is available to users via a web-based interface, providing easy navigation to all process levels as shown in Figure 2-2. This same web-based interface also provides associated tools and task enablers including checklists, examples, and detailed guides. A core of subject matter experts maintains IPDS, which is updated and released twice annually based on program performance, lessons learned, and process improvement initiatives. A corporate policy requires use of IPDS on all programs.

USVQ 143

Figure 2-1. Raytheon's Integrated Product Development System (IPDS) provides a mission solution capability through its system of processes, tools, infrastructure, training, and measurement that helps us communicate, measure, execute, and continually improve our core business processes

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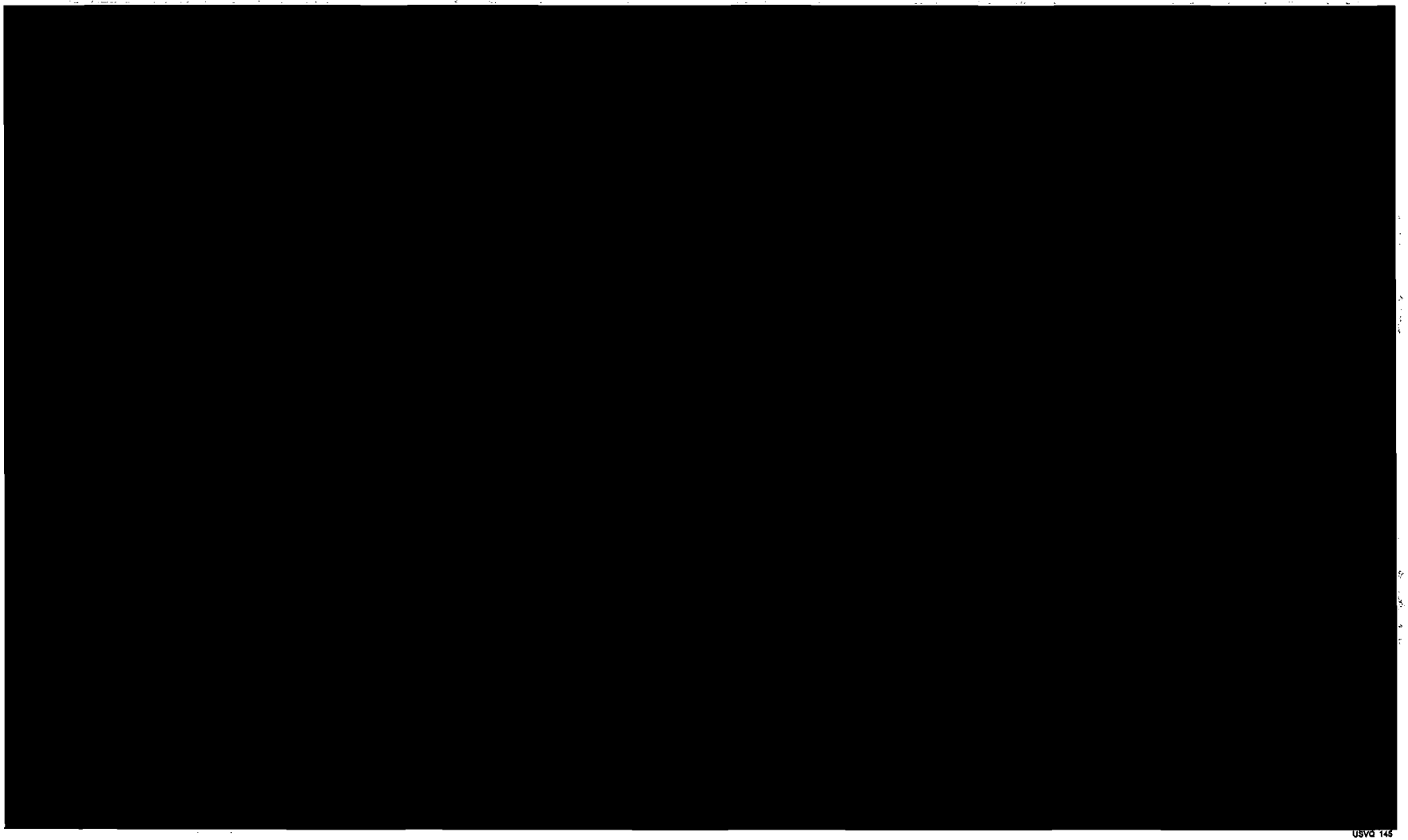

USVQ 145

Figure 2-2. A web-based interface provides easy access to IPDS

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Raytheon Six Sigma, shown in Figure 2-3, is a business strategy designed to maximize customer value and productivity and has transformed our work force into a single culture. Launched in January 1999, it is implemented across the company. Raytheon Six Sigma expands on traditional six sigma methods, creating a business strategy that incorporates elements of traditional statistical process control, adds lean enterprise techniques, and places a strong emphasis on customer value and cultural transformation. Raytheon Six Sigma affects every aspect of work performed by every employee in the company. The underlying philosophy of Raytheon Six Sigma is customer focus and the elimination of anything that does not add value to the customer. Raytheon Six Sigma is driven by the collection and analysis of data and facts. Figure 2-4 depicts how this disciplined process transforms the organization to maximize customer value. This process applies the right tool, from a variety of analytical tools shown in Figure 2-5, at the right time. Corporate Raytheon Six Sigma drives annual cost saving and customer satisfaction goals at the business unit.

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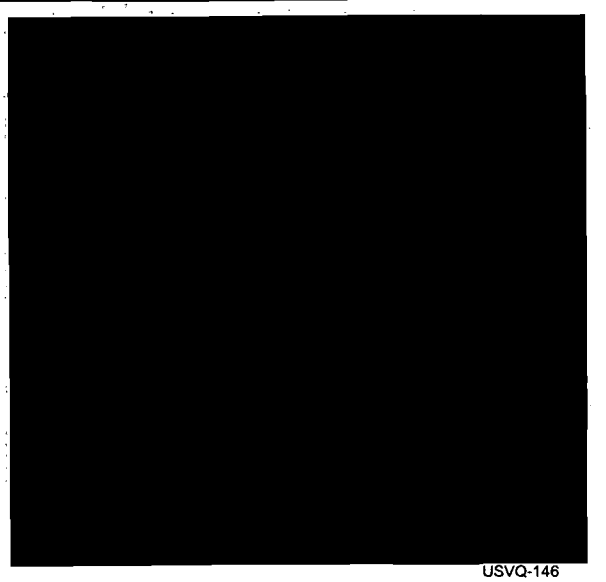
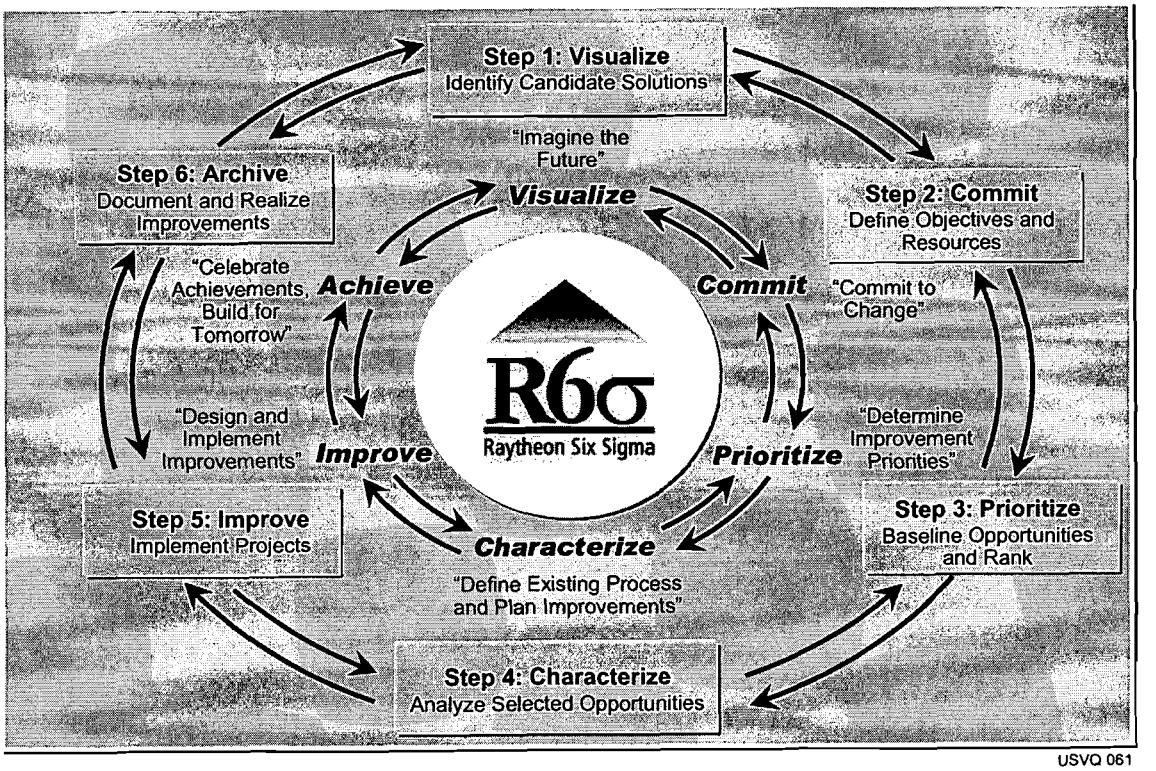


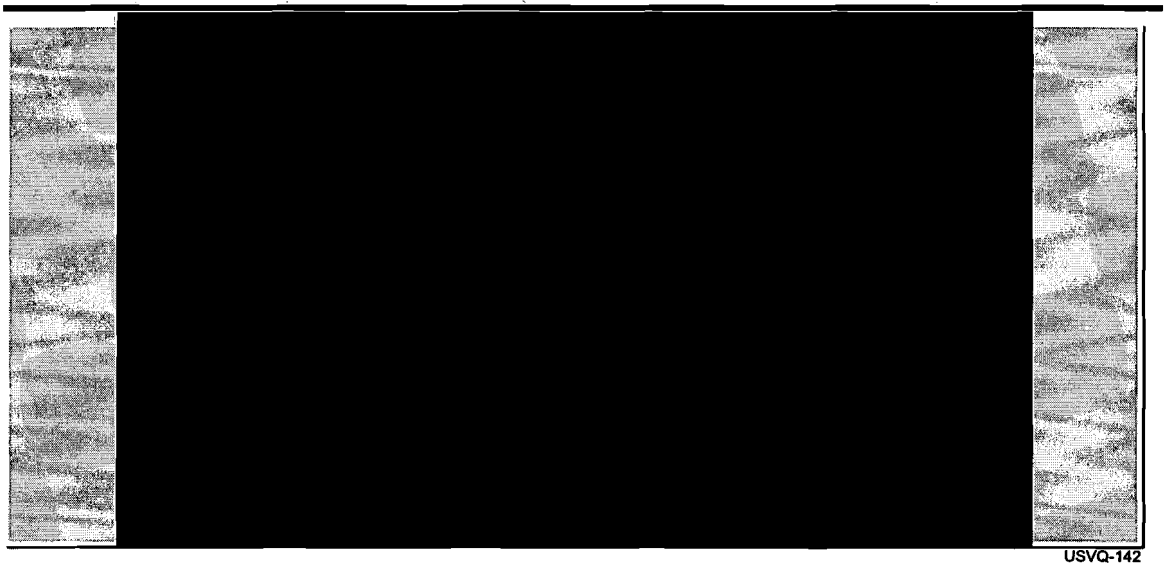
USVQ-146

Figure 2-3. Raytheon Six Sigma spans the entire value chain



USVQ 061

Figure 2-4. A disciplined, fact-based approach is used to generate value for our customers



USVQ-142

Figure 2-5. Raytheon Six Sigma Experts, trained in the use of the use of these tools, are available to support the US-VISIT program to maximize customer value and productivity

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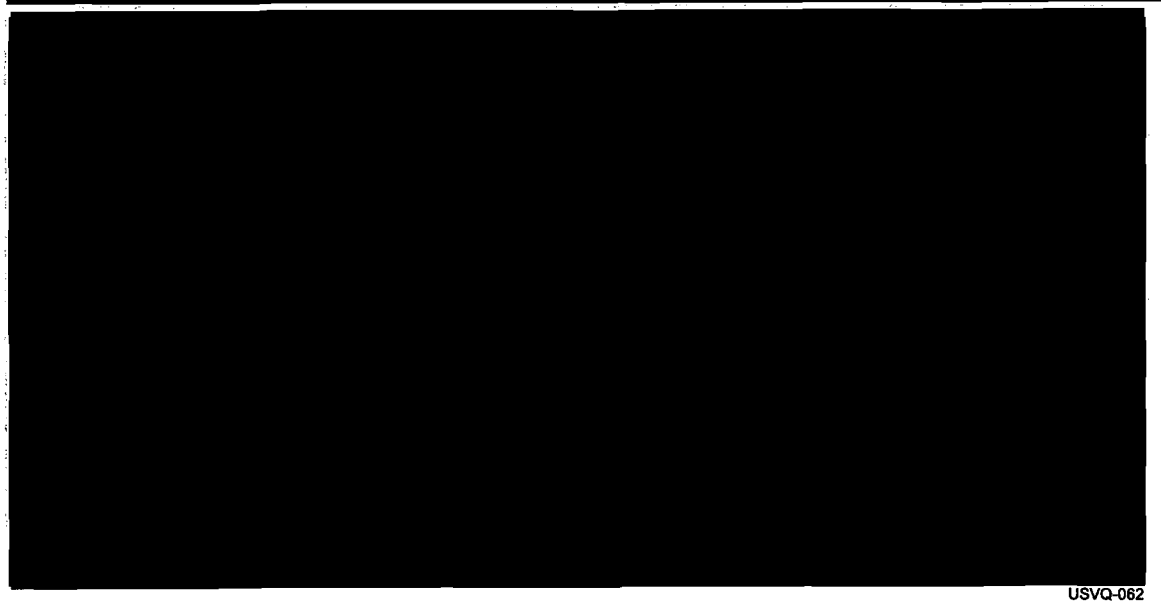
2.1.1

USVQ 159

Figure 2-6. IPDS and Raytheon Six Sigma worked together with CMMI to bring value to the customer



USVQ-062

Figure 2-7. Regular evaluations using industry standards promotes continuous process improvement

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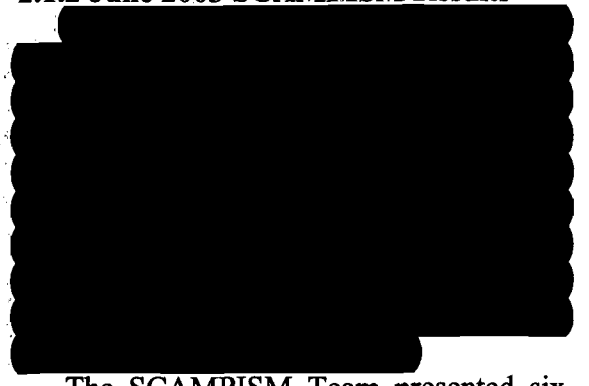
Process improvement efforts use the Raytheon Six Sigma process to facilitate the resolution of problems at their root cause. Employees at all levels use Raytheon Six Sigma to enable continuous process improvement.

Built into our Integrated Product Development Process (IPDP), is a series of program gates. These gates, as shown in Figure 2-8, are program reviews by subject matter experts external to the program. Gates are performed at the end of each lifecycle phase to make sure the program is ready to progress into the next phase.

2.1.2 June 2003 SCAMPISM Results



The SCAMPISM Team presented six strengths in the Final Findings Presentation, with the comment that these strengths represent a best practice or "an exemplary or noteworthy implementation of a CMMI® model practice."

The SCAMPISM Team identified one strength as follows: "One program has closely integrated its plans into a single cohesive, comprehensive document that ties program planning and execution together across engineering and management domains." In response to this best practice in our Integrated Project Management process, we have highlighted the program plans in our Process Asset Library for review and use on other

USVQ-073

Figure 2-8. A disciplined Gating process within Raytheon's Integrated Product Development Process promotes program success through independent subject matter expert insight into program health

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programs as a best practice. Our Process Asset Library is a collection of plans, tailored procedures, and enablers.

The SCAMPI[SM] team identified the strengt

[redacted]. Some immediate actions have been taken [redacted] Paragraphs 2.2-2.5 provide more detailed information on the Architecture Definition, Systems Engineering attribute based costing, Requirements Management, Quality process, and Optimization improvement projects.

As shown in Figure 2-9, [redacted]

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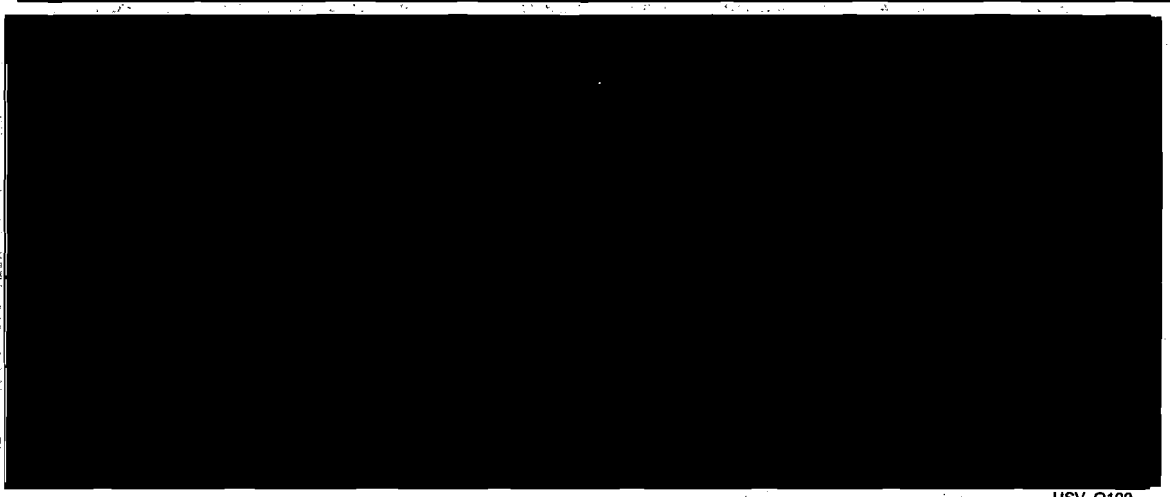
USV_Q100

Figure 2-9. Raytheon is applying the Raytheon Six Sigma process [redacted] Sheet 1 of 2



USV Q100

Figure 2-9. Raytheon is applying the Raytheon Six Sigma process [redacted] Sheet 2 of 2

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2.1.3 Requested SCAMPISM Information

Figure 2-10 provides the requested SCAMPISM information on the Raytheon [redacted] The Final Briefing and certificate are in Appendix 3. Our Action Plan is in Appendix 4.

2.1.4 Summary

Raytheon [redacted]

Item	Requested SCAMPI Information
(a) Identification of the Company and business unit that was appraised	■ Raytheon ■ [redacted]
(b) Date of the assessment	■ 6/2/03 - 6/27/03
(c) Identification of the model, type of appraisal, and whether the appraisal was against a staged or continuous model; if against a staged model, the model that was assessed	■ CMMI for Systems Engineering/Software Engineering (v1.1) ■ SCAMPI appraisal (ARC, v1.1) ■ Staged Representation of CMMI, Level 2 and 3 process areas
(d) Identification of the assessment team lead and contact information for this person	■ Assessment Team Lead: [redacted] ■ Lead Appraiser [redacted] ■ Software Engineering Institute, ■ Carnegie Mellon University ■ Pittsburgh, PA 15312-3890 ■ Phone: [redacted] ■ [redacted]
(e) Copy of the final report	■ Final Briefing contained in Appendix 3
(g) Copy of the action plan	■ Contained in Appendix 4
(h) Summary of all significant process improvements that have occurred in the Teaming Partner's business unit since the SCAMPI appraisal	■ Contained in section 2.2-2.6

USVQ 060

Figure 2-10. Our CMMI Level 3 Assessment, conducted by the SEI, provided an objective view of our quality processes

2.2 Process Improvement #1 – Architecture Definition

Raytheon's state of the art architecture definition process, designed around the inclusion of COTS, reduces cost and program risk.

This process improvement area ties to action plan item 9.

2.2.1 Our Architecture Definition Process

Our state of the art, Architecture Definition process is shown in Figure 2-11. This process was the basis of two industry papers written by Raytheon and published by IEEE. The architecture process flowchart has been annotated with some of the key features

Raytheon's Architecture Definition process reduces cost and risk

- State of the art process, published in IEEE journal
- Designed specifically to address COTS - provides maximum COTS usage
- Requirements based on business goals so that all business goals are met
- Imbedded Modeling reduces risk and improves operational performance
- Provides accurate cost/schedule bids
- Minimal throwaway reduces overall cost and schedule

USVQ-152

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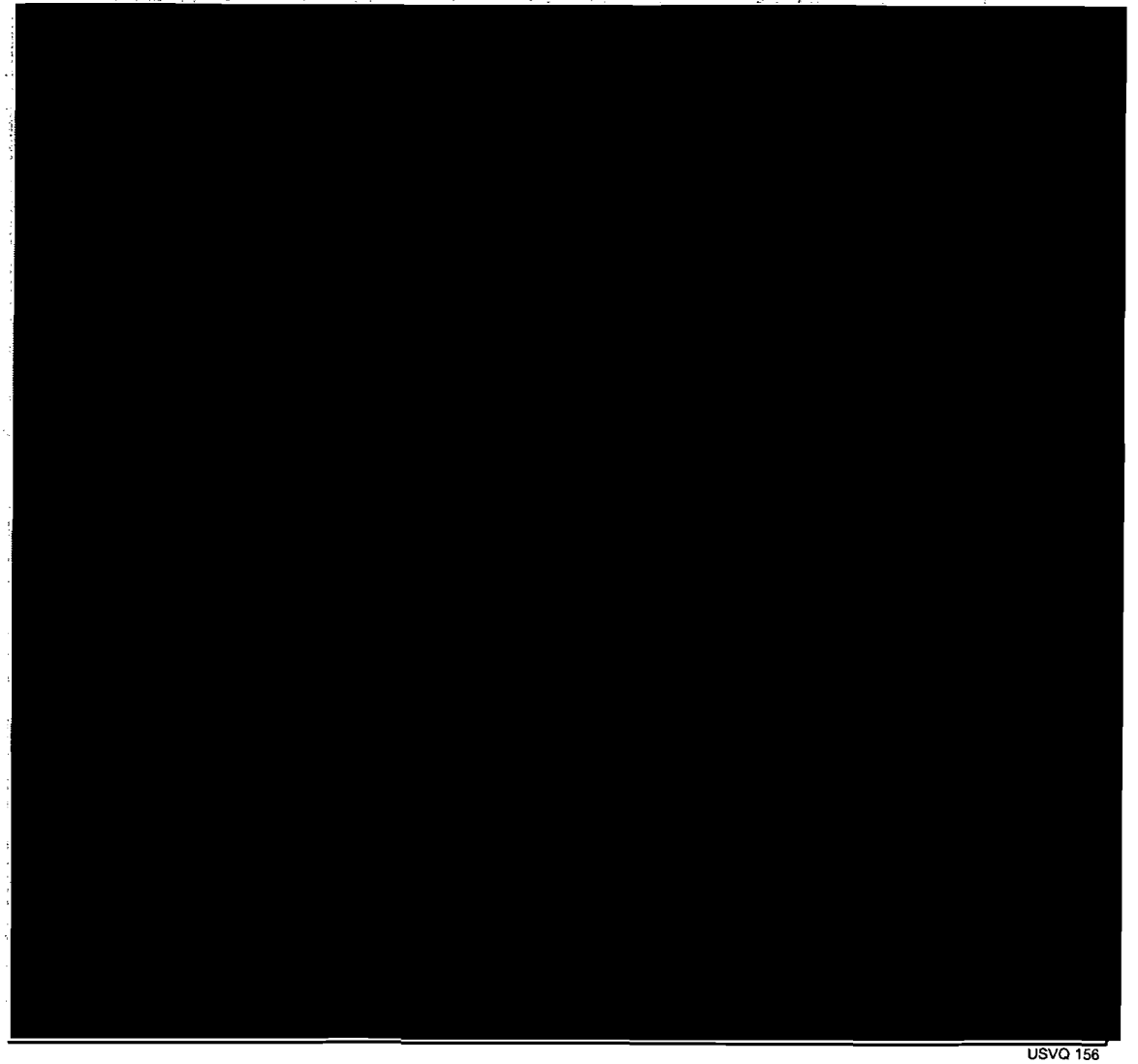

USVQ 156

Figure 2-11. Developing the system architecture by iterating requirements against COTS availability leads to a lower cost low-risk solution

and benefits of the process.

Each box on the process flowchart is backed up by Raytheon Corporate wide CMMI Level 5 compliant processes defined in the Raytheon Integrated Product Development System (IPDS). While our SCAMPI only looked at Level 2 and Level 3 processes, other Raytheon business units used the same corporate wide IPDS processes to achieve a CMMI Level 5 rating.

2.2.2 Relevance to US-VISIT

The architecture definition process is used in the Architecture Definition Phase of large multi-release programs. Figure 2-12 shows where architecture definition is performed in a typical end-to-end system lifecycle model.

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This state of the art process for requirements definition and architecture development is used to maximize the use of COTS, to ensure all business goals are met and to significantly reduce cost schedule and risk.

As shown in the lifecycle model, the Architecture Definition Phase follows the Business Model Definition Phase. So, the enterprise architecture has been developed and the value chains have been defined. This ordering allows the requirements to be defined based on business goals. It also allows the business process models to be developed in support of business process modeling.

The Architecture Definition Phase precedes all of the development spirals. This approach is used to make sure that even the first spiral is aligned with the Enterprise Architecture and each release is one step in transitioning from the present "as is" operational system to the end-vision target architecture. This architecture definition process is available as part of the Smart Border Alliance capabilities.

2.2.3 Ongoing Process Improvement Efforts

While addressing the process weaknesses identified in the SCAMPI related to requirements definition, additional analysis was performed. [redacted] An integrated product team of systems architects, requirements engineers and process experts, following the recommended

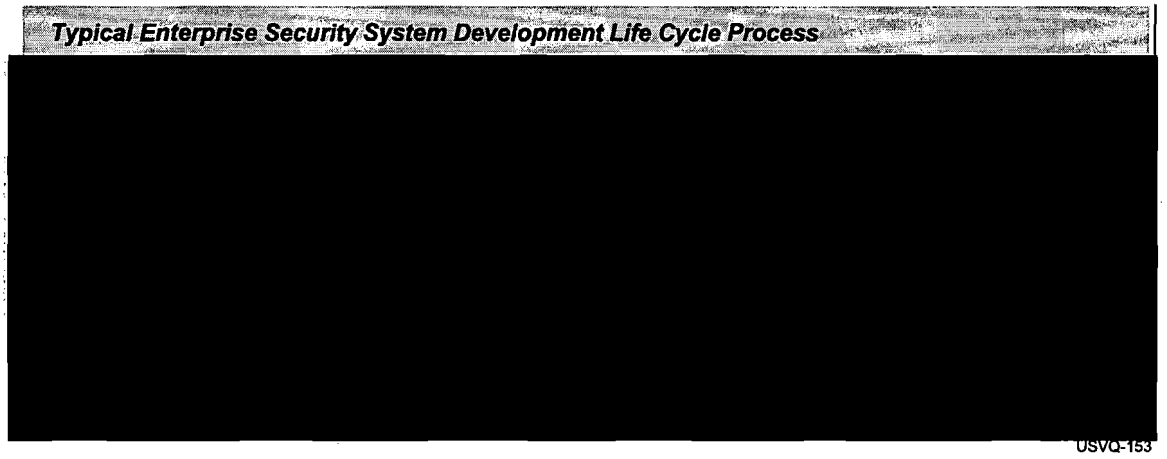

Figure 2-12. Defining the systems architecture early in the program lifecycle reduces cost and risk

approaches developed our Architecture Definition process.

[redacted] significant effort was put forth in developing training to support requirements definition. Process training is now required for all systems engineers involved in requirements definition.

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[redacted]

USVQ 151

Figure 2-13. [redacted]

2.3 Process Improvement #2 – Systems Engineering Attribute Based Costing

Raytheon, together with the University of Southern California, leads in the development of a Systems Engineering Attribute Based Costing Model.

This process improvement area ties to Action Plan item number four in Appendix 4.

2.3.1 Our Engineering Attribute Based Costing Processes

Over the last twenty plus years, the industry has recognized the need for insight into the factors affecting software and systems engineering costs. [redacted]

information on this page is withheld under Exemption (b)(4)

Raytheon leads advances in attribute based cost modeling for Systems Engineering

- Leverages 20-year history in software cost modeling
- Acknowledges multiple factors that impact systems engineering efforts
- Partners with Industry, Government and Academia

USVQ 117

[redacted]

2.3.2 Relevance to US-VISIT

Systems engineering is a large portion of the effort on US-VISIT. With the goal of reduced cost and risk, accurate insight into the factors affecting systems engineering efforts is critical. Our experience with improved systems engineering costing assists the Smart Border Alliance [redacted]

[redacted]

USVQ-140

Figure 2-14. Model development and refinement gives increased insight and accuracy for software and systems engineering effort estimation

Software and Systems Engineering Attribute Costing History
■ 1995 – Raytheon partners (through the USC/CSE Industrial Affiliates program) in development of the most widely used software cost attribute model: COCOMO II
■ 1995 – Forms Parametrics group to support Raytheon parametric estimation for all disciplines – SW, HW, SE, and PM
■ 1997, 2000, 2003 – Raytheon provides software project data to COCOMO II industrial database
■ 1998 – Raytheon develops proprietary SWCOST tool to use COCOMO II as a base engine
■ 1999 – 2002 – Raytheon engineer leads the International Society for Parametric Analysts (ISPA)
■ 1999 – Software Costing Attributes developed
■ 2000 – 2003 – Initial Systems Engineering Costing Attributes
■ June 2000 – Raytheon acknowledged in Software Cost Estimation with COCOMO II, Boehm, etal; for their support and review
■ Oct 2000 – At COCOMO II Forum, Raytheon suggests the need for a Systems Engineering cost attribute model to be based upon the same process and lessons learned developed from the successful COCOMO II project
■ February 2001 – USC/CSE COSYSMO cost attribute model project started with Raytheon engineers in key roles
■ April 2001 – Raytheon develops a COSYSMO prototype which is adopted by USC/CSE
■ 2001-2003 – Raytheon collects Systems Engineering Cost Attribute data for recent local projects
■ 1st Quarter 2004 – Raytheon develops a local COSYSMO calibration for local "second opinion" usage based upon the prototype
■ 3rd Quarter 2004 – USC/CSE collates and normalizes industrial data (including Raytheon's) and provide an initial, trial COSYSMO model for industrial usage and comment
■ 4th Quarter 2004 – Raytheon creates SECOST (reusing their proprietary SWCOST framework and the COSYSMO prototype tool as a basis)
■ [redacted]

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USVQ 079

Figure 2-15. Raytheon's leadership in engineering attribute based costing demonstrates its commitment to process improvement

2.3.3 Ongoing Process Improvement Efforts

[redacted]

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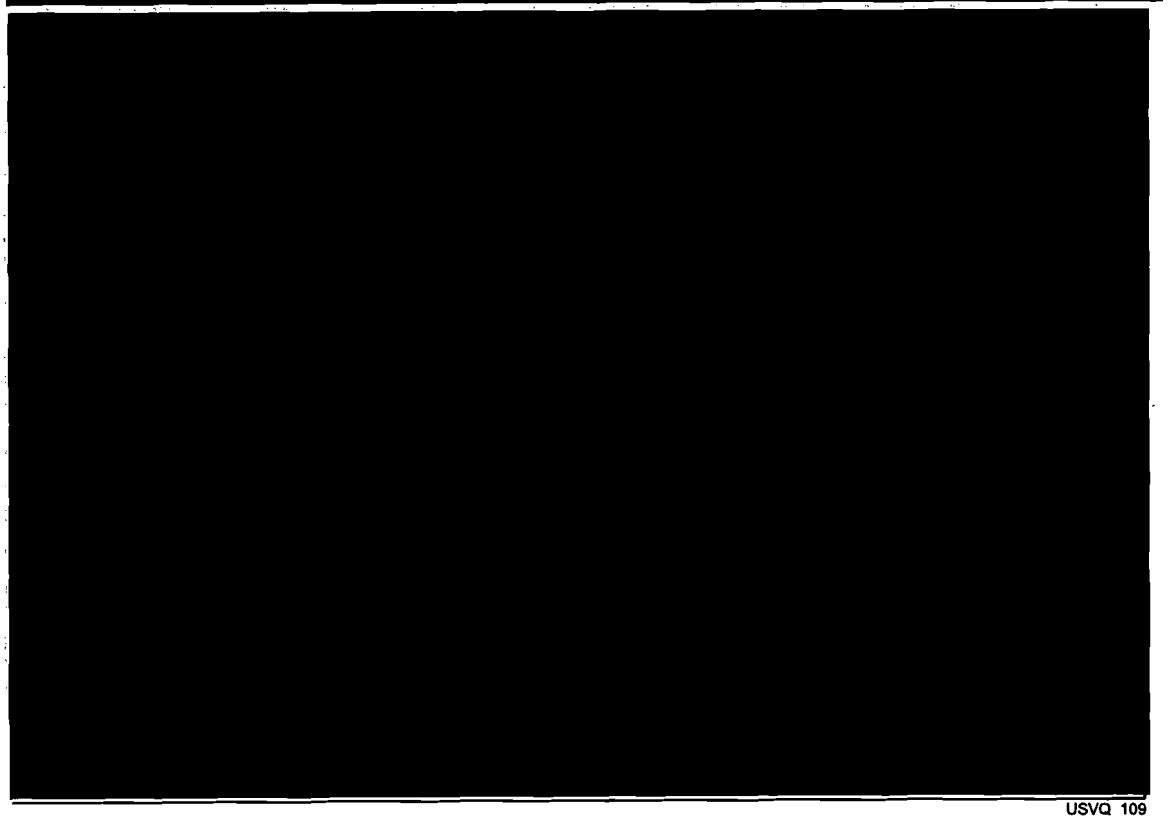
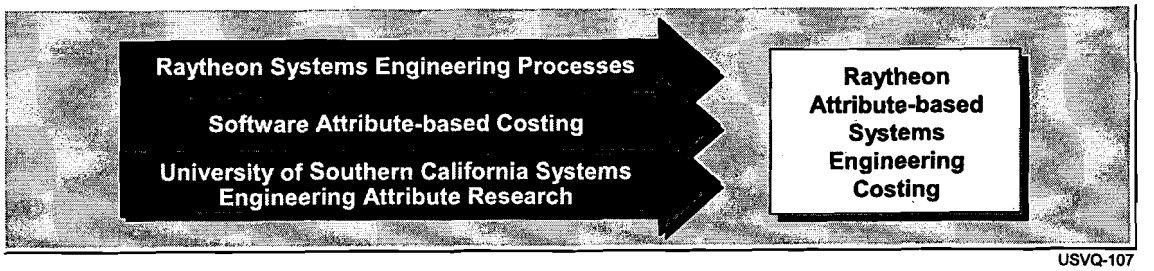


USVQ 109

Figure 2-16. Raytheon's Systems Engineering attribute based costing provides greater insight into cost factors

[redacted] A Raytheon engineer developed the first COSYSMO model prototype that has been distributed by USC/Center for Software Engineering as characterizing the current state of COSYSMO model development. For more information, see http://valerdi.com/cosysmo/. [redacted]

[redacted] Within our company, more precise attribute definitions are being developed to facilitate routine collection of the effort cost attributes through our time keeping system and reporting of the data for ongoing projects.



USVQ-107

Figure 2-17. Raytheon is a leader in Systems Engineering attribute-based costing

2.4 Process Improvement #3 – Requirements Management

Raytheon's Requirements Management process provides business goal traceability from end user development through certification and validation, to reduce risk and improve change management.

This process improvement area ties to action plan items 1 and 2.

2.4.1 Our Requirements Management Process

Raytheon's requirement management process supports system development based on Enterprise Architectures. Specifically, the requirements management process has been expanded to provide the traceability shown in Figure 2-18.

information on this page is withheld under Exemption (b)(4)

Raytheon's Requirements Management process facilitates the achievement of business goals

- Traceability to Enterprise Architecture artifacts reduce risk
- Business goals based requirements and testing
- Process supports multiple releases
- Component and pattern reuse supported
- Traceability supports change management analysis reducing cost and risk

USVQ-154

[redacted]

USVQ-150

Figure 2-18. Requirements management expanded to cover Enterprise Architecture and Business goals reduces program risk

[redacted]

2.4.2 Relevance to US-VISIT

Because of the size and complexity of US-VISIT, an expanded requirements management process is required. US-VISIT must link to the Homeland Security (HLS) Enterprise Architecture artifacts defined by DHS. [redacted]

information on this page is withheld under Exemption (b)(4)

[redacted]

US-VISIT is not about deploying technology; it is about meeting the DHS business goals. [redacted]

2.4.3 Ongoing Process Improvement Efforts

Besides just addressing the identified weakness, the Raytheon Six Sigma process improvement team evaluated the state of the art in requirements management and identified limitations and issues related to support for Enterprise Architectures. Figure 2-19 identifies the issues, the recommended approach for addressing the issues, and lists the benefits of using the recommended approach.

Process improvements in this area center around the recommended approaches identified by the Six Sigma team. [redacted]

To institutionalize this process, significant effort was put forth in developing training to support requirements management. Process training is now required for all systems engineers involved in requirements management.

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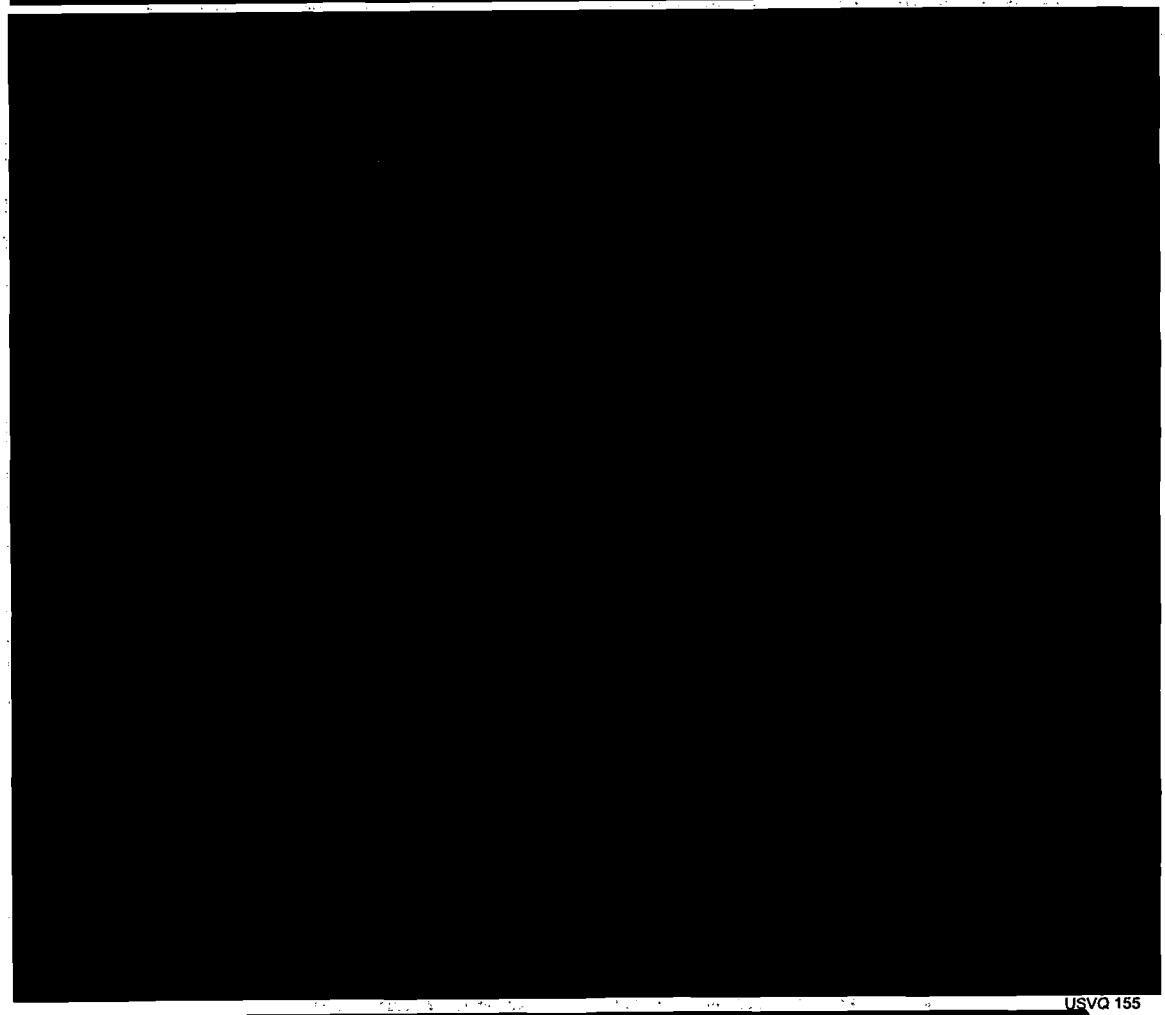

USVQ 155

Figure 2-19.

2.5 Process Improvement #4 – Quality

The vision of Raytheon IIS Product Assurance is to be a technically competent, results oriented, customer advocate organization, viewed by both our customers and our partners as the best practices team for achieving excellence in product and process quality.

This process improvement area ties to Action Plan item numbers two and seven in Appendix 4.

2.5.1 Quality Processes

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The Raytheon IIS Product Assurance Mission is to achieve customer satisfaction by employing Raytheon Six Sigma principles in the execution of problem prevention, process compliance, early warning, solution facilitation, continuous improvement, and quality engineering services throughout the lifecycle of our programs and products. As shown in Figure 2-20, this approach focuses on the program team, suppliers, and customers. Raytheon Six Sigma principles are embodied in all aspects of our quality emphasis in order to drive improvement and customer focused results.

Our Product Assurance team develops and champions business quality strategies such as ISO 9001:2000 and AS9100 certification to assure customer satisfaction, continuous product and process improvements, and maximum development and utilization of people and assets. We are certified to ISO 9001:2000 at the Enterprise level, which includes multiple businesses. This certification was achieved in June 2002. Before this, Raytheon held an Enterprise certificate to ISO 9001:1994.

Raytheon's IIS Product Assurance focuses on program quality through early involvement with customer, suppliers, and the program team

- Quality throughout the program lifecycle is key to customer satisfaction
- Program manager and the product assurance manager lead the team to achieve success
- Supplier quality is critical
- Key predictive and historical quality indicators help achieve program success (prevention)
- Quality is everyone's responsibility

USVQ 105

2.5.2 Relevance to US-VISIT

The discipline instilled into our processes to maintain our various standard certifications contributes significantly to the quality of our products. Product Assurance engineers, trained in Raytheon Six Sigma techniques, are available to support the Smart Border Alliance on quality initiatives.

USVQ 104

Figure 2-20. We focus our quality on the program team, suppliers and customers

2.5.3 Ongoing Process Improvements Efforts

[redacted] The goal of the transition team is to establish common requirements that result in improved quality and safety, and decreased cost due to the elimination or reduction of organization unique requirements and the associated variation in results.

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[redacted]

A Raytheon Six Sigma process improvement project is underway. [redacted]

[redacted]

USV Q103

Figure 2-21. The IIS Product Assurance and Program Management Team ensures quality and continual improvement through early involvement of the quality team in the tailoring of program processes

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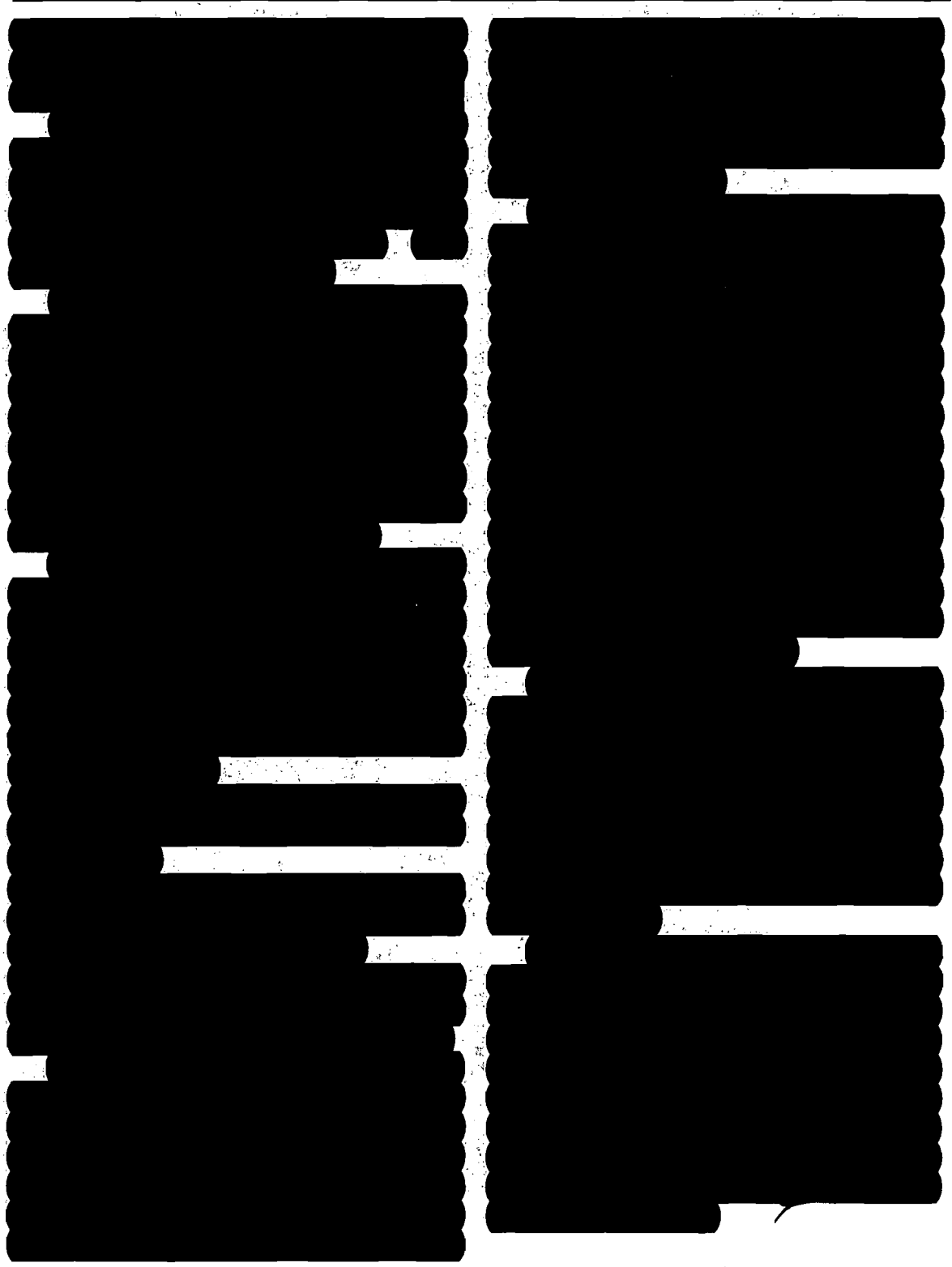

2.6 Process Improvement #5 – Optimization

Raytheon continues to demonstrate its commitment to process improvement by embracing the full CMMI®-SE/SW/SS model.

2.6.1 Our Process Improvement Process

Raytheon manages major process improvement projects, such as the CMMI® Optimization Project, as a development project with appropriate tailoring of the Integrated Product Development System (IPDS), as previously shown in the figure of IPDS in paragraph 2.1. [redacted] Process Action teams conduct Raytheon Six Sigma projects to analyze, plan, prioritize, execute, and validate the process improvements. These teams are composed of program personnel, discipline subject matter experts, process improvement personnel, management, and other relevant stakeholders.

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2.6.3 Relevance to US-VISIT

Process improvement projects are prioritized [redacted] We bring the experience of our process engineers to the Smart Border Alliance. The Alliance benefits from our environment of continuous process improvement. Our personnel are committed to quality and understand the value of processes and the return on investment of improvement efforts.

2.6.3 Ongoing Process Improvement Efforts

Figure 2-22 illustrates the planned milestones and major tasks for the Optimization project. Progress toward achieving full CMMI® compliance to all levels of the CMMI®-SE/SW/SS has begun. A workshop was conducted to establish a basic understanding of model requirements [redacted] Members of the Engineering Process Group, Tools Group, Discipline Directors, and Discipline Section Managers participated in the workshop. Multiple group exercises reviewed the current state, desired future state, barriers, and risks. [redacted] Those

Raytheon committed to achieving CMMI-SE/SW/SS Level 5

- Achievement of CMMI-SE/SW provides a solid foundation
- Best Practices identified in the SCAMPI incorporated into standard processes
- Process Improvement focus includes Systems, Software and Hardware Engineering, Product Assurance/Quality, Supply Chain Management, and Program Management
- Preference given to integrated processes over independent discipline specific processes

USVQ 118

[redacted]

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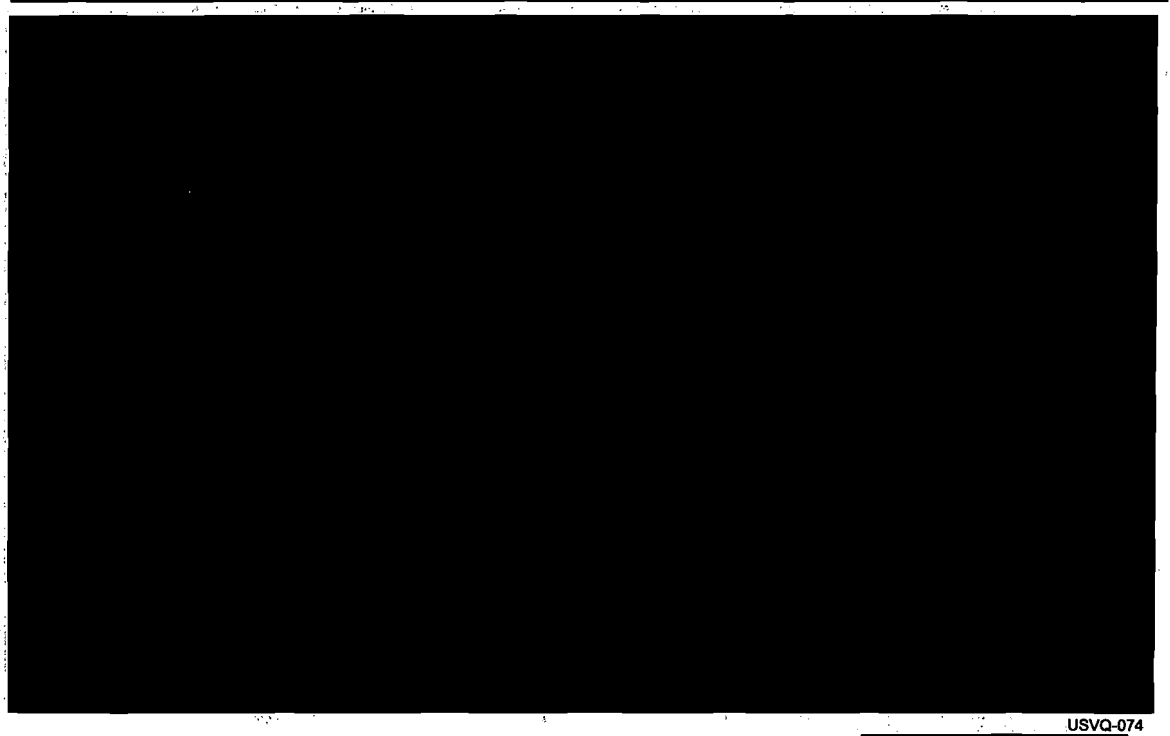
processes and tools have been reviewed and selected for implementation. [redacted] The processes and tools have already been tested and proven effective, and are being added to our existing CMMI® Level 3 processes.

[redacted] A Process Action Team uses the Raytheon Six Sigma process to develop each product. This team defines the requirements, develops the product, and pilots the product before implementation. [redacted] This approach proved effective at the previously mentioned sister organization, which has already achieved Level 5, and is expected to result in rapid deployment of behaviors needed for full compliance [redacted]



USVQ-074

Figure 2-23. Each process improvement is rolled out as a product

3.0 PROOF OF CAPABILITY MATURITY – SRA INTERNATIONAL

Process improvement is an essential part of our quality culture, and has the strong commitment and involvement of our executive team, validation by external CMM evaluators, and the respect of our customers.

Structure of Section 3.0. The first part of this section provides the proof of capability maturity and has no page limit. The rest of the section describes three significant process improvements (paragraphs 3.2, 3.3, and 3.4.) Each process improvement complies with the five-page limit.

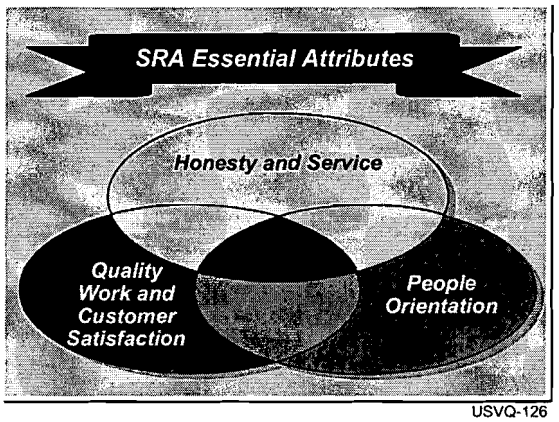
SRA's reputation for high-quality products and services stems from our strong culture and ethics

- Our managers and engineers demonstrate strong commitment to quality and continuous process improvement
- Our SW-CMM Level 3 rating, earned in December 2002, applies to the entire company – we all use the same set of standard processes
- Based on our experience using similar CMM based processes and tools, our employees can rapidly learn and effectively use the Smart Border Alliances' processes
- Our practical and innovative processes and tools are adaptable to a wide range of programs, and available to the program

USVQ-149

3.1 Corporate Commitment to Quality

SRA is committed to continuous process improvement as an integral part of our business. We view process improvement as a long-term strategic investment that pays off in high quality products, productive project teams, and satisfied customers. Process improvement is a natural outgrowth of our corporate culture and essential attributes, which are shown in Figure 3-1. These essential attributes reflect the personal integrity of our executive management team and permeate everything we do. They also explain why Fortune Magazine named SRA as one of the "100 best companies to work for" for the fourth consecutive year in January 2003.



USVQ-126

Figure 3-1. SRA's Essential Attributes reflect the commitment of our Executive leaders to quality and process improvement

We have made enduring commitments of resources, people, and time to process improvement. Our executives personally guide and direct the improvements through the Process Improvement Executive Steering Committee, chaired by Renny DiPentima, President of our Consulting and Systems Integration (C&SI) group. Our Process Management Group (PMG) defines and improves our standard management and engineering processes, and provides training and assistance to project teams for process tailoring and implementation. Finally, our Quality Assurance (QA) Group reviews and audits all projects for compliance with our standard processes, and identifies deficiencies that require management attention.

3.1.1 SRA Quality Initiatives

Management commitment to continuous process improvement is at the heart of our corporate culture. From the very beginning, our process improvement program has been blessed with enduring commitments of budget, people, and time, as well as the personal involvement of

senior management. This ongoing commitment has resulted in project teams having a similar commitment to quality, schedule, and budget.

[redacted] To achieve this goal, we seek out and adopt best practices from many sources, including the various Capability Maturity Models (CMM[redacted]

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[redacted] In 1989, we published the first edition of the Project Management Handbook (PMH), which details the procedures, work products, roles, and responsibilities of project managers and other personnel.

[redacted] SRA used the findings and recommendations from this assessment as the basis for implementing a number of improvement activities.

Our management team established a goal to achieve CMM Level 2 rating on two of our largest software projects, [redacted] We achieved these goals

[redacted]

USVQ-127

Figure 3-2. SRA's process improvement program follows a proven approach to strengthening our technical and management effectiveness as evidenced by our successful external evaluations

in June and July of 1992 respectively. [redacted]

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In February 1997, the Internal Revenue Service conducted an evaluation of our CMM Level 2 processes for the TIPSS program using Phase III of their Process Analysis Review Methodology (PARM). The PARM assessment team found SRA to be fully Level 2 compliant with the Software CMM.

We also hosted a Software CMM Level 2 SCE in October 1999. ISD performed the SCE and found SRA to be compliant with five Key Process Areas (KPA) (Subcontract Management was not examined). Since 1999, ISD (2001 and 2002) has conducted two Level 3 Software CMM SCEs (including the Subcontract Management KPA) and found SRA to be fully compliant.

Our commitment to CPI not only benefits SRA, it benefits our customers as well. Customers expect high quality products and they want them delivered on time. CPI has enabled us to meet these expectations. Management has provided tools, training, processes, and a dedicated senior staff to assist project teams in tailoring their processes, producing project plans, and tracking progress. [redacted]

3.1.2 December 2002 SCE Results

[redacted]

The SCE Final Briefing is contained in Appendix 5 and our subsequent Process Improvement Action Plan is contained in Appendix 6.

The December 2002 SCE team reported many strengths in our CMM implementation and no weaknesses at all. [redacted] SRA received an outstanding score when ISD ruled that we had fully satisfied all 111 of the applicable key practices with no weaknesses.

[redacted]

[redacted]

Global strengths described in the SCE final briefing include the following:

- Broad institutionalization of Level 3 processes across the company
- Role-based training program and project training plans
- Independent audit group that verifies project compliance with standard processes
- Policies and procedures that are actually used throughout the company
- A robust set of management reviews to evaluate program status and risks using performance measures

[redacted]

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[redacted]

- Earned Value Management (EVM) Implementation – This improvement deals with the selection and implementation of a corporate-wide EVM data collection and reporting tool, and with the definition and implementation of the required policies, processes, and procedures such that SRA has an externally certified EVM System in early 2004.

[redacted]

USVQ 147

Figure 3-3. Our process improvement plan covers areas important to our business and customers, and builds upon our successful use of CMM Level 3 processes

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Figure 3-4 shows the timeline for implementing our process improvement plan.

USVQ-128

Figure 3-4. SRA is currently pilot testing improved processes and tools for measurement and Earned Value Management, and is well positioned to achieve a CMMI SE/SW Level 3 rating this summer

3.1.3 Requested Information

Figure 3-5 outlines the information requested in L.15.4 of the RFP. A copy of our SCE final briefing is contained in Appendix 5 and a copy of our Process Improvement Action Plan is contained in Appendix 6. Our summary of significant process improvement areas since the last appraisal is contained in paragraphs 3.2 through 3.4. [redacted]

3.1.4 Summary

As a teaming partner and integral member of the Smart Border Alliance, we will learn and follow Alliance processes and procedures. Our first-hand experience in defining and using similar CMM-based processes at SRA enables our personnel to rapidly learn Alliance processes, and put them to good use as part of the integrated product team. In addition, we freely offer our best practices and tools in project management, system integration, peer reviews, and performance measurement for potential use by the Alliance and US-VISIT. We look forward to adapting and applying our expertise and CMMI best practices to help the Government secure our borders and protect our citizens.

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Item	Requested SCAMPI Information
(a) Identification of the Company and business unit that was appraised	■ SRA International, Inc. ■ Consulting and Systems Integration (C&SI) ■ Headquartered in Fairfax, VA
(b) Date of the assessment	■ 12/16/02 - 12/20/02
(c) Identification of the model, type of appraisal, and whether the appraisal was against a staged or continuous model; if against a staged model, the model that was assessed	■ Capability Maturity Model for Software (v1.1) ■ Software Capability Evaluation Method v3.0 ■ Staged model (SW-CMM)
(d) Contact information for the assessment team identification of the assessment team lead and contact information for this person	■ Integrated System Diagnostics, Inc (ISD) ■ Assessment Team Lead: [redacted]
(e) Copy of the final report	■ Contained in Appendix 5
(g) Copy of the action plan	■ Contained in Appendix 6
(h) Summary of all significant process improvements that have occurred in the Teaming Partner's business unit since the appraisal	■ Contained in paragraphs 3.2 – 3.4

USVQ 136

Figure 3-5. SRA received a SW-CMM Level 3 rating from ISD, the most respected provider of independent SCE services authorized by the SEI

3.2 Process Improvement #1 – Project Support Team

Our Project Support Teams partner with project managers and engineers throughout the lifecycle to accelerate process tailoring, project planning, and peer reviews resulting in committed team leaders and quality products.

This process improvement area ties to slide 14 of SRA's Process Improvement Action Plan.

3.2.1 Our Project Support Team Concept

The Project Support Team provides focused and collaborative assistance to project teams throughout the life cycle

- Our PST Process focuses on the timely completion of quality products
- Our techniques result in reduced project execution risk
- SRA captures best practices for re-use by other project teams
- Our support team methodology is designed to produce organizational process compliance as evidenced by our most recent Software CMM Level 3 assessment which found no weaknesses

USVQ-130

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SRA's Project Support Team (PST) approach is in Figure 3-6. The PST process is designed to pair experienced process experts with project teams to expedite project planning and infuse quality throughout the development effort.

Delivering high quality products to our customers is an essential component of our vision. The PST helps achieve this vision by assigning senior PST personnel to project teams and this support continues through all project phases.

[redacted]

Our commitment to deliver quality products on time and within budget depends upon the flexibility and comprehension of the management and engineering processes that the project team uses.

[redacted]

[redacted]

Our commitment to delivering high quality products as scheduled can only be accomplished if SDPs are comprehensive, addressing all aspects of project management.

[redacted]

Tailoring and project planning often involves integrating our management and engineering processes so that they are compatible with customer-specified

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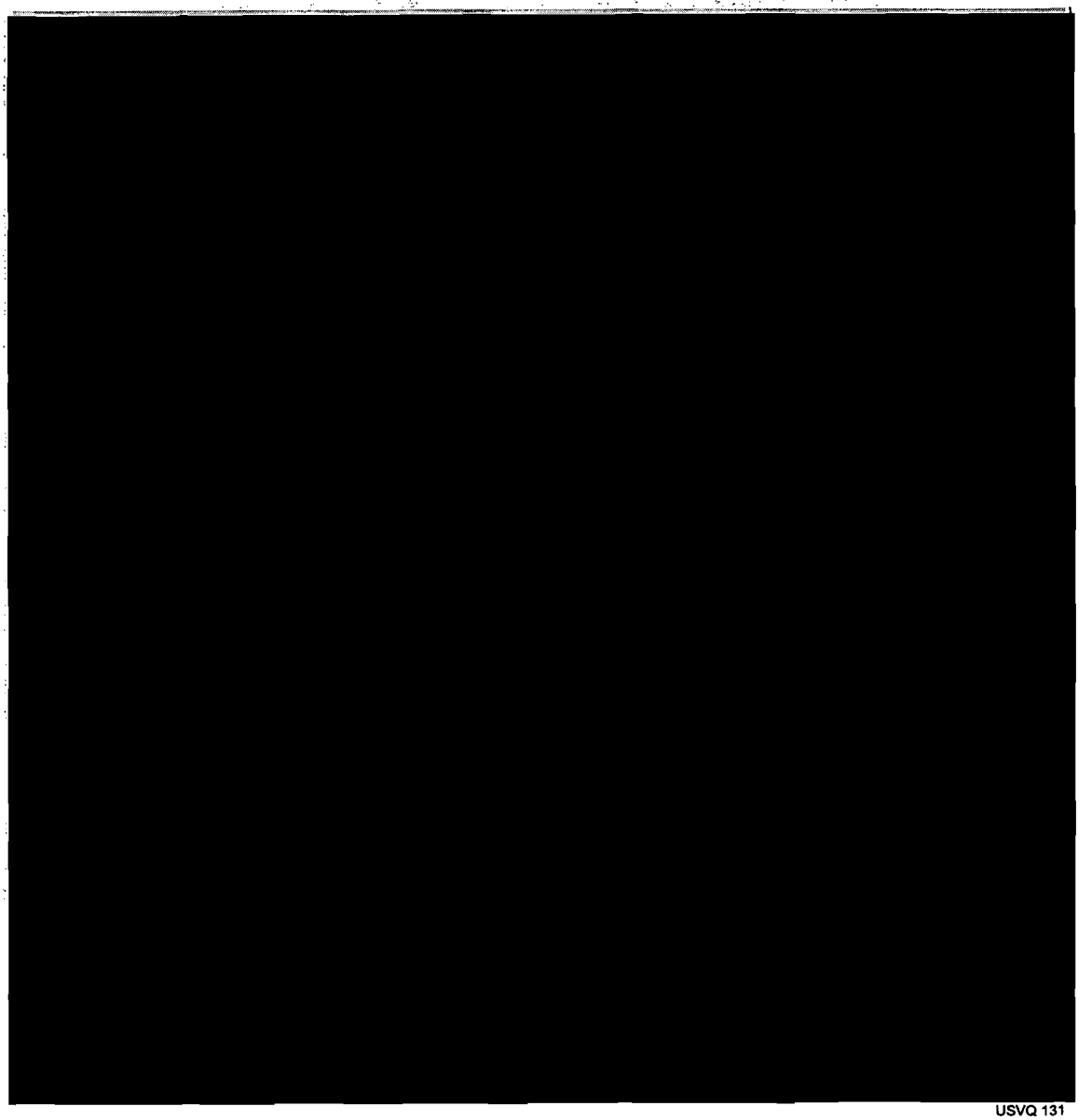

USVQ 131

Figure 3-6. Our cost-effective PST activities support project teams throughout the lifecycle, ensuring quality and process compliance

processes. This is easily achieved

[redacted]

At SRA, process improvement is continuous. Project teams are always finding more efficient ways of accomplishing their tasks. They are always improving their internal work products.

[redacted]

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[redacted]

3.2.2 Relevance to US-VISIT

There are features of the PST that provide benefits to US-VISIT as shown in Figure 3-7. The PST has helped to foster a quality culture. Quality begins with process and comprehensive planning. It includes risk identification and early detection and correction of problems. We achieve quality through mentoring, collaborative support, standardized processes, tools and templates, and reuse of best practices.

After award, at no cost to the Government, the PST joins with other Alliance team members to help tailor and implement Alliance processes for US-VISIT. The PST helps review the Alliance management and engineering processes and [redacted] The PST will work with the Alliance to help train personnel on the processes that guide execution.

Collaboration continues with the Alliance over the life of the project. As we identify new techniques and tools that

[redacted]

USVQ 135

Figure 3-7. The PST helps instill a culture of quality and commitment and this culture is of great benefit to US-VISIT

could improve efficiency and product quality, we make them available to the Alliance for evaluation. In addition, the PST provides subject matter experts, as required, to participate in peer reviews or informal inspections.

3.2.3 Ongoing Process Improvement Efforts

[redacted]

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[redacted]

USVQ 132

Figure 3-8. The PST provides process experts to assist project teams, resulting in higher quality products and on-time delivery

3.3 Process Improvement #2 – Earned Value Management System

The SRA EVM experience enhances the Smart Border Alliance' ability to track and control US-VISIT program performance and supports the US-VISIT Program Office in meeting the Office of Management and Budget (OMB) Exhibit 300 reporting requirements.

This process improvement ties to slides 12 and 22 of the SRA Process Improvement Action Plan.

3.3.1 Our EVMS Concept

[redacted]

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[redacted]

We can offer and adapt these tools to support the US-VISIT program management office in providing the OMB A-11 EVM report to the General Accounting Office (GAO).

[redacted]

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USVQ-133

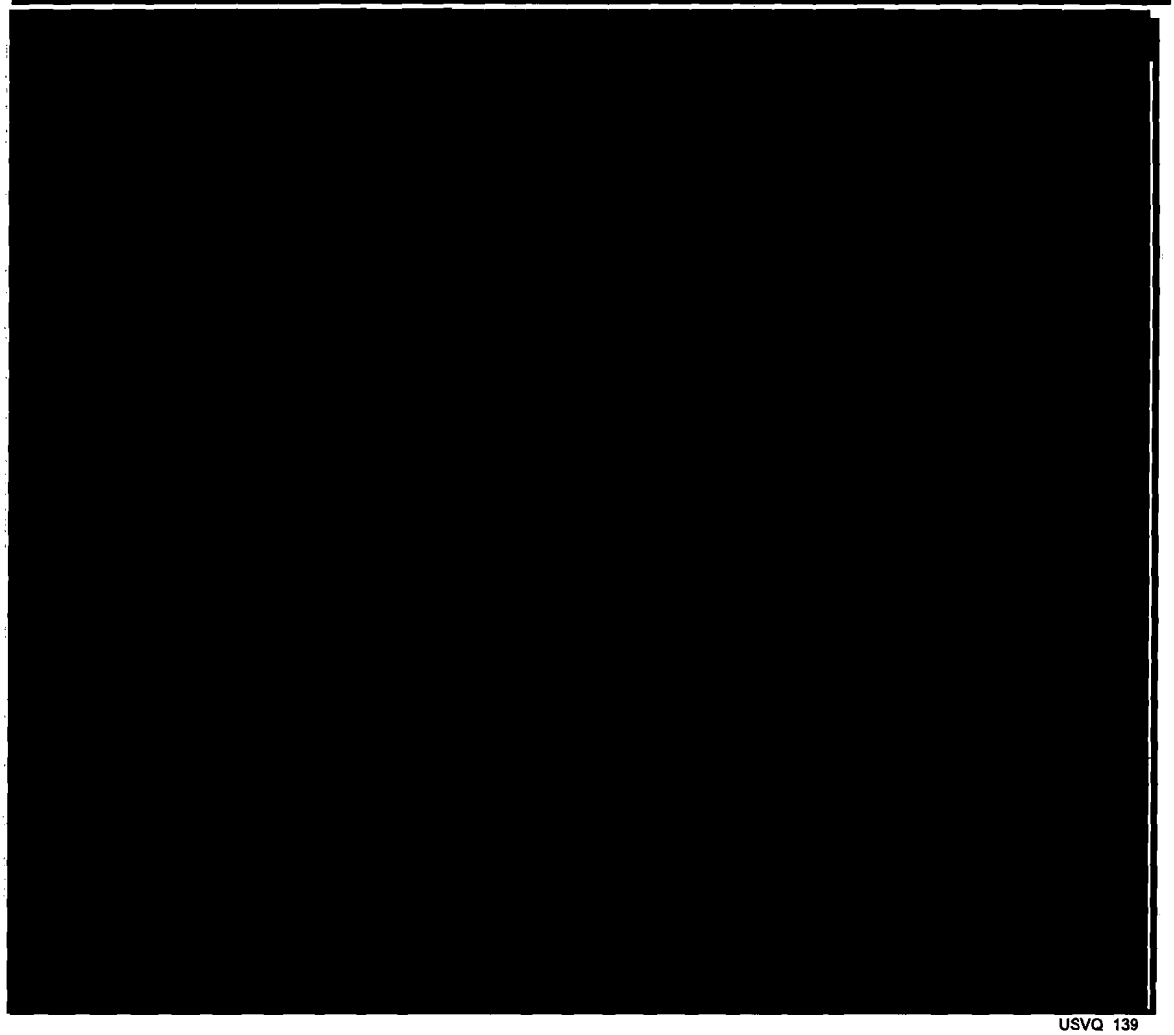
Figure 3-9. SRA's Earned Value Management System (EVMS),

performance reporting requirements.

3.3.2 Relevance to US-VISIT

We have established an EVMS that is compliant with the Standard EIA-748A criteria and supports the OMB

Our EVM knowledge and experience on several major programs



USVQ 139

Figure 3-10. Our experience in applying EVM on major programs and for different agencies enables the Alliance team to establish an effective EVM system for the US-VISIT Program

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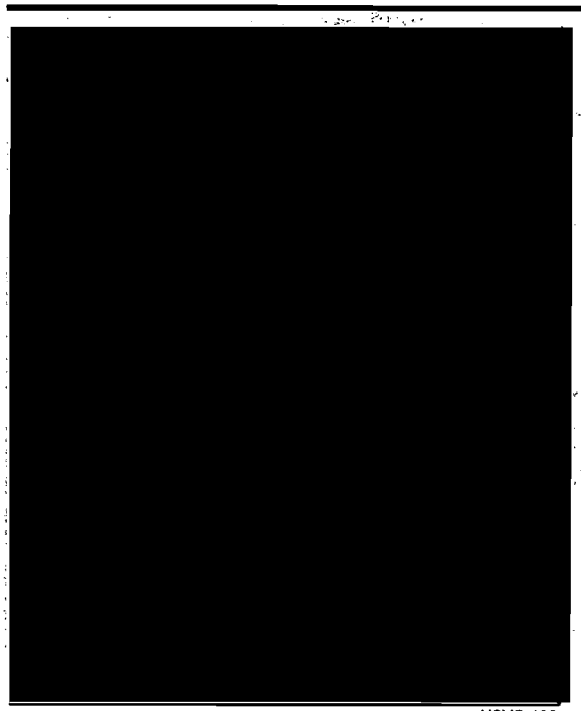
enable us to help the Alliance team meet the US-VISIT requirements.

3.3.3 Ongoing Process Improvement Efforts

Our EVMS process improvement deals with the selection and implementation of a corporate-wide EVM data collection and reporting tool, the definition, and implementation of the required policies, processes, and procedures, and the development and conduct of the necessary training courses. We began by reviewing the existing architecture of our corporate infrastructure environment and operations procedures. We conducted an internal assessment of the review results against the standard EIA-748A criteria to determine the scope of the improvement effort and to define our EVM improvement plan. Figure 3-11 summarizes our ongoing EVMS process improvement efforts.

Before selecting an EVM tool, we conducted a survey of all the EVM tools in terms of their ability to integrate with our infrastructure environment and their user interfaces, taking into account their capability to generate the data and reports required by our clients.



USVQ-138

Figure 3-11. We are improving our EVM system

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widely accepted COTS tools in the EVM community, and they meet our selection criteria. We have successfully integrated both of the tools into our environment and with the Microsoft Project scheduling tool. We piloted the use of the tools in proposal development and project planning efforts with demonstrated success. We have begun the rollout of the tools to proposal teams and projects that require EVM reporting and have received favorable feedback.

We developed the EVM System Description and an EVM Guide for Project Managers to complement the existing PMH. The EVM System Description provides a comprehensive description of our infrastructure and its operational procedures and the interfaces of the source systems to the EVM tools, as required by EIA-748A. For program managers who are already familiar with the PMH, the EVM Guide for Project Managers provides a quick reference allowing them to focus on EVM specific process and tool requirements and implementation guidance.

We have developed separate courses to focus training on specific needs of targeted audience. We develop an EVM Concepts introductory course for all audience. We train program managers in the tailoring and implementation of the EVM processes and tools, and in the analysis of the EVM data and reports. We train business analysts in the use of the tools to help program managers establish and control performance baseline and to generate EVM reports for management reviews and for submission to the client. We provide training to corporate senior management and business program managers in the review and analysis of EVM data. In our management training courses, we include general guidance in correlating risks to EVM analysis results to help determine appropriate corrective actions and necessary improvements.

As we continue to implement EVM processes and tools and conduct associated training, we actively solicit improvement suggestions and lessons learned to determine further refinement and revisions. As a standard practice, our independent QA organization conducts periodic audits to verify the compliance of projects in the proper implementation of the EVM processes. QA monitors and tracks any corrective actions from the audits and verifies their completion.

3.4 Process Improvement #3 – Measurement Program

Our Measurement Program systematically collects and analyzes project information to help manage project activities effectively by employing a color-coding system that focuses management attention on anomalies before they manifest themselves as problems.

This process improvement ties to slide 12 of our Process Improvement Action Plan.

3.4.1 Our Measurement Process

The purpose of measurement is not to collect data, but to provide insight into project performance so that managers and technical leaders perform their jobs more effectively. [redacted]

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Measurement has been part of our culture since SRA's inception. [redacted]

Over the years, the number of measures collected and reported by projects has grown and been refined as our experience and project sizes have grown. As part of our migration to CMMI, we enhanced our measurement program to provide additional support to managers, including the expansion of our indicator specifications and the addition of in-house measurement training based on lessons learned from a variety of projects of varying size, scope, and domain. [redacted]

SRA's Measurement Program is practical and action-oriented, giving project teams the information they need to stay on track

- Common project objectives and indicators streamline the measurement planning process

[redacted] using

USVQ-148

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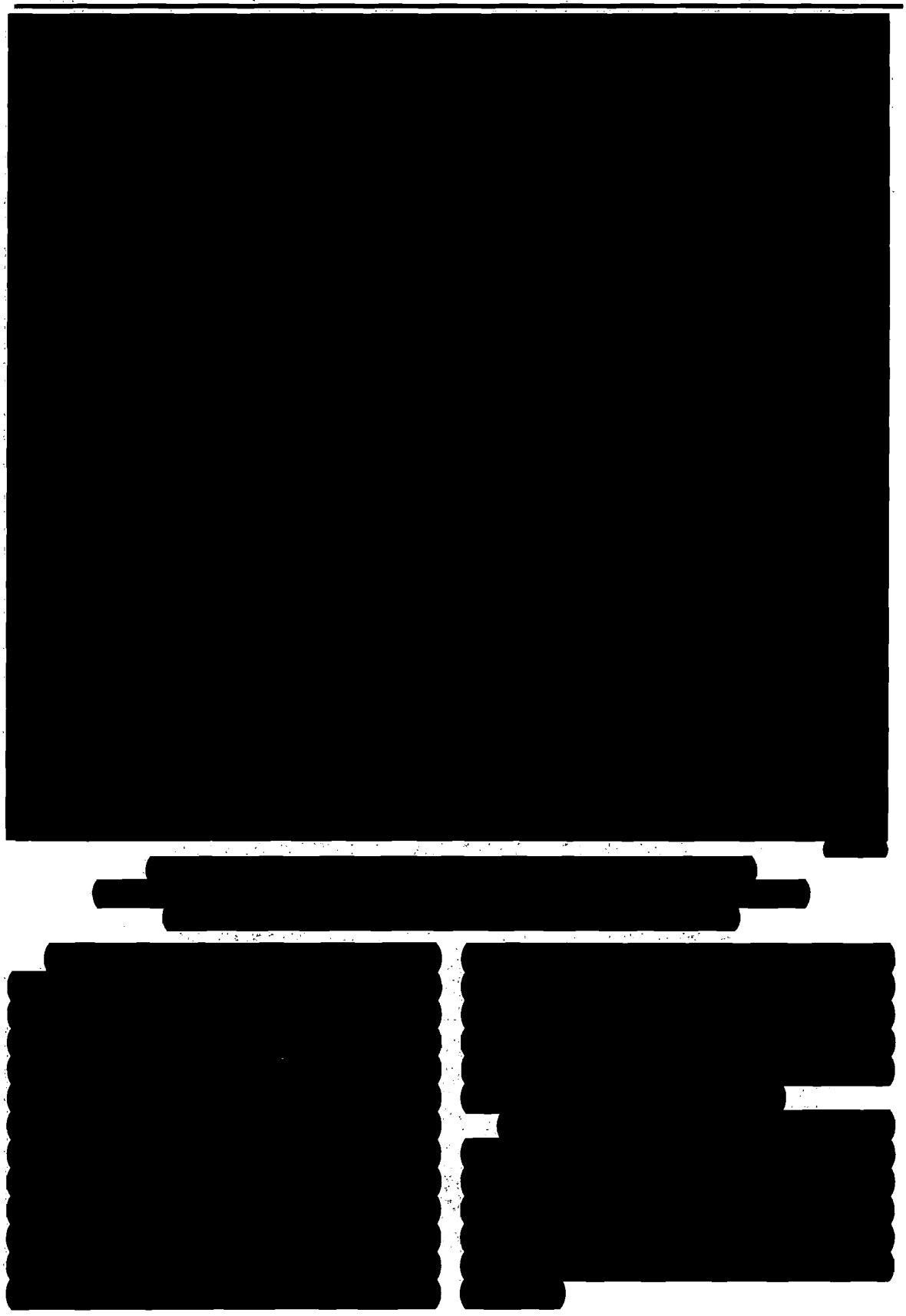

[redacted]

Our processes also collect and feed the data required by the Smart Border Alliance to manage the program. In addition, our processes, tools, and support material are available to the Alliance to augment their existing processes.

Our tailoring guidelines help managers establish a meaningful measurement

3.4.2 Relevance to US-VISIT

Figure 3-13 enumerates how specific features of our measurement program benefits US-VISIT. [redacted]

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[redacted]

USVQ 200

Figure 3-13. We bring a mature measurement process to US-VISIT, and the experience to select and use measures that are practical and action-oriented.

program based on the specific needs of US-VISIT. [redacted]

[redacted]

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[redacted]

3.4.3 Ongoing Process Improvement Efforts

A key goal of our measurement process improvement initiative is to make the management process easier for project managers to use. Our managers told us that they spent too much time preparing indicators relative to the time they spent analyzing the trends shown by the indicators. [redacted]

Figure 3-14 depicts SRA's Measurement Tool Suite and the many interfaces from which it receives project data. The Tool Suite gives project teams a more complete and integrated view of project measures and better forecasting tools to assist in the planning of corrective actions for any unacceptable condition.

[redacted]

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USVQ-141

Figure 3-14. SRA's measurement architecture is designed to support automated interfaces into various source systems, improving the efficiency and accuracy of collecting, analyzing and reporting quantitative project status

4.0 PROOF OF CAPABILITY MATURITY - TITAN

C4ISR, Titan's Command, Control, Communications, Computer, Intelligence, Surveillance, and Reconnaissance (C4ISR) Systems Division provides Software Engineering services. It earned a SW-CMM Level 3 rating in April, 2003. C4ISR fully integrates its SW-CMM Level 3 assessed processes and is committed and scheduled to achieving CMMI 3 rating in the next year.

Structure of Section 4.0. The first part of this section provides the proof of capability maturity that has no page limit. It is followed by three significant process improvements (paragraphs 4.2, 4.3 and 4.4.) Each process improvement complies with the five-page limit.

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4.1 Corporate Commitment to Quality

Figure 4-1 shows how Titan Corporation, as a Performance Based Organization (PBO), institutes process improvement as a key element in its

Titan has an active CMM-based program for process improvement

- C4ISR Division evaluated SW-CMM Level 3 on April 11, 2003
- Internalize quality standards and customer requirements to improve consistency of products across programs and increase level of customer satisfaction
- Maintain process asset library to facilitate repeatability and consistency
- Emphasize perpetuating successful practices with emphasis on capturing, institutionalizing, and repeating successful practices
- Extend quality practices to other organizational elements to broaden our quality focus across the corporation
- Continuous improvement focus at an institutional/enterprise level

USVQ 169

USVQ 163

Figure 4-1. Titan as a performance based organization consistently improves its process assets

NOTE:
All pages are included; however, they are misnumbered. Page 4-6 should have been page 4-1.

approach. Titan demonstrates a history of commitment to quality ideals and objectives, with many quality-related initiatives throughout the corporation.

As a performance based organization (PBO), we recognize the value of our process assets, the importance of perpetuating successful practices and the advantages of extending them to other organizational elements.

Executive leadership is committed to quality and provides corporate guidance for each individual business unit to obtain certifications in the standards most appropriate to its activities. This quality focus is how we proactively deliver better products and services, meet customer expectations, and maintain leadership roles in our chosen markets.

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The Software Engineering Institute (SEI) models – either the Capability Maturity Model (CMM) or one of the CMM Integration (CMMI) representations – provide the reference quality base for a number of operating elements. In other cases, the chosen approach uses the International Organization for Standardization (ISO) 9000 series of standards – the current version of which is ISO 9001:2000. Five organizations have been assessed at CMM Level II or higher, three of which are in the process of moving to a higher level under CMMI. Five other organizations have ISO 9001:2000 Certifications, and four are working towards their ISO certifications.

Each organizational element establishes a quality culture with emphasis on improving practices to better meet customer requirements, regardless of which reference model is employed.

Legacy quality initiatives include those of the Enterprise Services and Solutions Sector which, as Intermetrics, was a key player in the process improvement initiative of Electronic Data Systems (EDS), resulting in EDS achieving a SW-CMM level 2 rating on the Immigration and Naturalization Service Information Technology Partnership contract. Other quality-focused initiatives have been based on ISO standards.

Our corporate commitment is reinforced by the formation of a corporate-wide quality assurance (QA) working group. This group was formed to span all sectors and divisions across the corporation. It provides a forum for all quality assurance professionals to lend their experience, expertise and best practices to new quality initiatives taking place in different sectors. It also enables communication among our QA staff and facilitates knowledge sharing among our subject matter experts with other Titan personnel. A major objective of this group is to assist organizations in the process of achieving the appropriate ISO or CMM certifications and to help them in their process improvement efforts to move to higher levels of certification.

We have established a secure intranet web site structure, shown in Figure 4-2, to share corporate quality management documentation. This tool serves as a valuable resource and library for Titan's QA personnel

The forum provides access to those with specific knowledge in areas such as ISO and CMMI. This exchange of ideas

USV Q 207

Figure 4-2. Logical file structure simplifies sharing quality information

and process increases the efficiency and facilitates the launch of new quality initiatives. The forum eliminates organizational stovepipes and promotes awareness of the quality initiatives that exist across the company.

The quality assurance working group is thriving and meetings that were once held on a quarterly basis, are now held monthly.

4.1.1 C4ISR Process Improvement Program

Titan business units align operations with those of their customers and provide active quality management and continuous improvement programs.

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We support the Smart Border Alliance through several operating divisions across the company. Software Engineering services are provided through the C4ISR Systems Division, which was awarded a SW-CMM Level 3 rating on April 11, 2003. The assessment was the result of a CMM-Based Appraisal for Internal Process Improvement (CBA IPI), and the report noted that C4ISR has a "strong organizational commitment, at all levels, to process improvement and adherence."

[redacted]

USVQ 168

Figure 4-3. Titan established this framework for improving from CMM-SW Level 3

[redacted]

4.1.2 April 2003 CBA IPI Results

[redacted]

C4ISRs strongest process areas are Software Configuration Management, Software Project Management and

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[redacted]

USVQ 164

Figure 4-4. We are perpetuating the strengths identified in the appraisal; these are Titan's strongest process areas

Software Quality Assurance (SQA). These strengths are highly relevant to our role on the Smart Border Alliance because they relate directly to the quality of the software product and to the integration of efforts from all the participants.

Among the practices that C4ISR performed well are the control of work products and the subsequent release of baseline updates by configuration management. Effective communication of the content of software baselines was also a noted strength. One of the project management strengths is the use of an Earned Value Management System (EVMS) to measure project performance. Many organizations track schedule performance and technical performance as separate measures, but we use this information to determine the earned value of the project. This EVMS focus helps us proactively manage our programs on time and on budget.

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In C4ISR, an SQA group exists at the organizational level, which provides independent assessments of project activities and work products. This further demonstrates our corporate commitment to producing quality products in accordance with defined processes. Many organizations do not fund an independent QA organization and thus are unable to perform independent assessments.

[redacted]

[redacted]

4.1.3 Requested Information

The appraisal was led by an independent, SEI-authorized Lead Assessor from Soza and Company, Ltd., and resulted in a SW-CMM Level 3 rating for the C4ISR Division.

[redacted]

USVQ 167

Figure 4-5. [redacted]

[redacted]

A discussion of the significant process improvement areas Titan is addressing is contained in paragraphs 4.2 to 4.4. The process improvement areas we are discussing in the following paragraphs are selected from the CMM Level 3 Process Improvement Plan. Because our certification is so recent, many of these improvements are still being developed and implemented. Some have, however, already benefited our overall processes where opportunity existed to make identified improvements independently.

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Item	*Requested SCAMPI Information*
(a) Identification of the Company and business unit that was appraised	■ Titan Corporation ■ C4ISR Division within Systems Integration Sector ■ Fairfax, VA
(b) Date of the assessment	■ 03/31/03 to 04/11/03
(c) Identification of the model, type of appraisal, and whether the appraisal was against a staged or continuous model; if against a staged model, the model that was assessed	■ SEI CMM Level 3 for Software Process Maturity (SW-CMM) (v1.1) ■ CBA IPI ■ Staged Representation of CMM, Level 2 and 3 process areas
(d) Contact information for the assessment team identification of the assessment team lead and contact information for this person	■ SOZA/TeraQuest Assessment Team Lead: [redacted]
(e) Copy of the final report	■ Contained in Appendix 7
(g) Copy of the action plan	■ Contained in Appendix 8
(h) Summary of all significant process improvements that have occurred in the teaming partner's business unit since the CBA IPI appraisal	■ Contained in paragraph 4.2 – 4.4

USVQ 161

Figure 4-6. Our SW-CMM Level 3 appraisal was conducted by an independent assessment team to provide an objective view of our process maturity

4.2 Process Improvement #1 – Measurement and Analysis

We are upgrading our measurement methodology to improve insight into our processes by providing managers and developers with the tools they need to assess progress and improve products.

This process improvement area ties to the following action plan items: 1,2,3,7

4.2.1 Our Measurement Processes

We began a measurement program several years ago as part of the CMM effort and continue to enhance and improve it as an integral part of reaching the CMMI goal.

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[redacted]

The CMMI also has an increased emphasis on measurement and analysis. [redacted]

4.2.2 Relevance to US-VISIT

As members of the Smart Border Alliance, we define the interfaces with the team's overall CMMI Level 3 practices so that the methodologies used are seamlessly integrated. Because the principles of quality management are well-defined for CMM and CMMI, the fit is logical and can be cleanly dovetailed into the way we already manage our activities. We adhere to the across-the-board measurement objectives of the Alliance and include these with our ongoing programs.

4.2.3 Ongoing Process Improvement Efforts

Titan's measurement program is part of process improvement following the CMM model. The program includes collection, [redacted]

USVQ-166

Figure 4-7. [redacted]

[redacted]

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Best Practices in measurement were identified and considered for use, including the Practical Software and

[redacted]

USVQ 170

Figure 4-8. Process Action Team drives implementation of enhanced measurement and analysis

Systems Measurement model and the CMMI. [redacted]

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[redacted]

USVQ 175

Figure 4-9. These criteria map to a CMMI-compliant measurement system for US-VISIT

[redacted]

[redacted] A variety of tools, analytical methods, trending capabilities and limit and alert displays assist in providing management and team members insight into progress and in tracking and predicting performance. [redacted]

This [redacted] process ties into our already strong capabilities in EVMS and our commitment to improved estimating. Together they create a strong and internally consistent framework that reduces risk and provides the visibility to continuously improve the accuracy and accountability of our performance projections.

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[redacted]

USVQ-174

Figure 4-10. [redacted]

4.3 Process Improvement #2 - Estimating

Improvement in our estimating process provides value by improving the accuracy of baselines, honing the predictability of costs and lowering the risk of schedule and cost variances.

This process improvement ties to the following action plan items: 2,3,5,6

4.3.1 Our Estimating Processes

The ideal estimating process for the organization provides all projects within the organization a way to perform estimates using proven tools and procedures. This [redacted] allows Program Managers a more efficient way to manage [redacted] data for project tracking and future estimating. Combining this with an already strong EVM system and a strengthened metrics process gives detailed, current and accurate insight into project trends and performance against resource use. [redacted] accuracy with the benefits of lessons learned and exact context.

[redacted]

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4.3.2 Relevance to US-VISIT

Because cost and schedule estimates flow through team members and to the

[redacted]

USVQ-160

Figure 4-11. [redacted]

prime contractor, it is important that the basis for these estimates is thoroughly understood and is consistent among Alliance members. When estimates go from the subcontractor to the prime, a clear definition of the interface between them is essential so that the information can be correctly interpreted.

We adhere to the prime's overall methodologies, but must also live within the management framework of our own company. [redacted]

[redacted] Simultaneously improving our estimating process and our capabilities in tracking performance and managing emerging trends provides lower risk solutions to our customers and helps the Smart Border Alliance meet its cost and performance goals.

4.3.3 Ongoing Process Improvement Efforts

Figure 4-12 shows the steps our estimating process teams are engaged in and briefly describes the status of each. Our organization took the initiative, even though no weakness was identified, to improve the overall estimating process and to provide an environment that promoted sharing of information and consistency of

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USVQ 162

Figure 4-12. [redacted]

methodology. It also recognized the importance to our customers of reliable and accurate estimating.

Because the estimating process involves a variety of organizations it requires buy-in from other divisions and participation by support organizations, including Purchasing and Finance/ Accounting. Our team has the backing at the appropriate senior management level to involve all the stakeholders.

Our PAT team for this process improvement area is still in progress. Once the team has finalized its analysis, it makes recommendations to Senior Management for approval and subsequent implementation. When the team identifies an opportunity that can be implemented immediately to make an improvement, as with the software development and forecasting tools, management backs immediate action.

4.4 Process Improvement #3 - Migration to CMMI

Moving to CMMI was always the goal of our process improvement agenda. It is the quality model most appropriate to our overall business and CMM gave us the springboard to achieve it in an evolutionary manner.

This process improvement ties to the following action plan items: 1-7

4.4.1 Our Migration to CMMI

Our organizational goal is to move to CMMI having achieved SW-CMM Level 3. [redacted] given the value to the organization of the improvement opportunities for all of the SW-CMM Key Process Areas, we are well positioned to make the transition. The organization's process improvement plan is primarily aligned with this migration.

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[redacted]

4.4.2 Relevance to US-VISIT

The Titan process improvement initiative is comparable to the process improvement activity that the US-VISIT contractor must undertake in establishing industry best practices, providing continuous improvements to those processes and expanding process scope. Our completed, in-process, and planned improvements are exactly aligned with

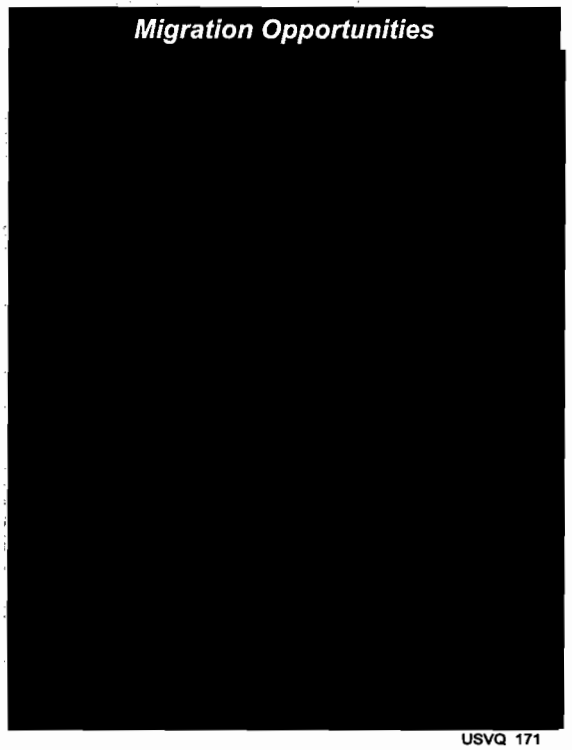

Figure 4-13. Titan identified opportunities to improve quality associated with the CMMI migration initiative

US-VISIT's objectives, giving us a head start on the desired end-result of strong practices and a highly predictable environment for this contract.

4.4.3 Ongoing Process Improvement Efforts

The Process Improvement Plan contains the following major process areas and targets that incorporate features of CMMI that differ from SW-CMM. The overall list of elements in the Process Improvement Plans is as follows:

[redacted]

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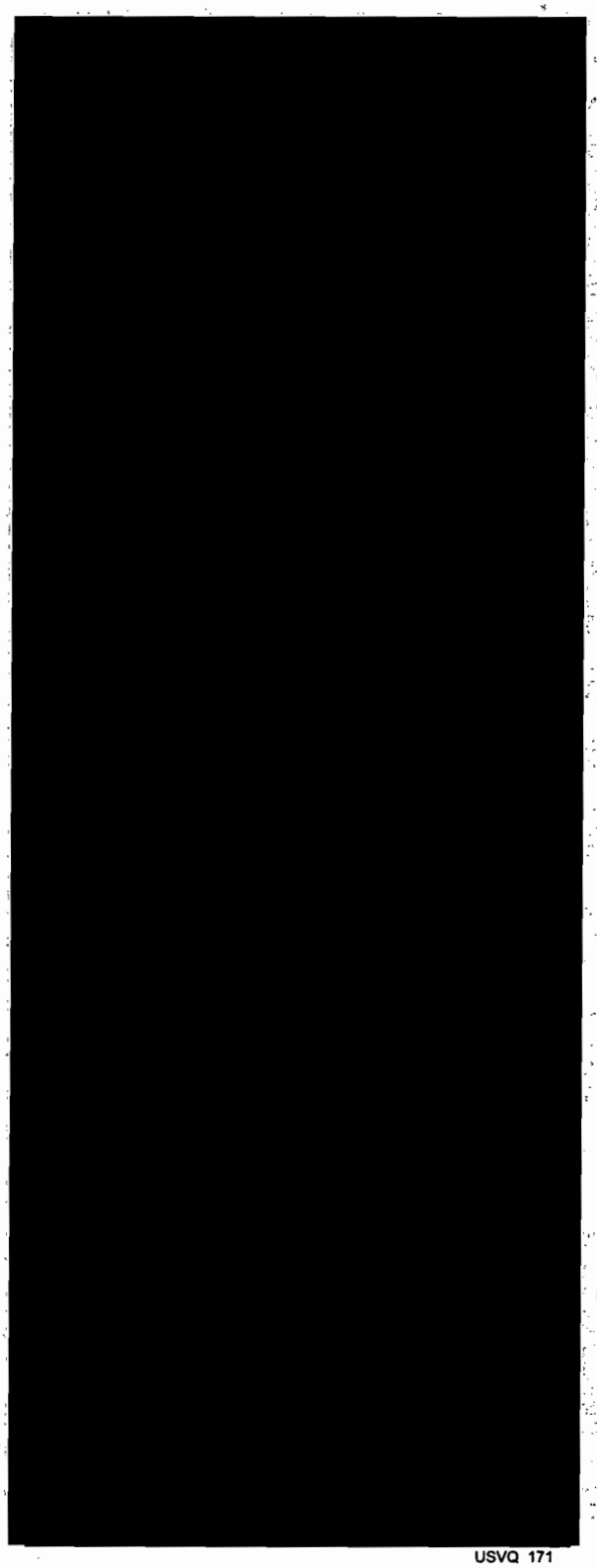

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Figure 4-14. Titan identified opportunities to improve quality associated with the CMMI migration initiative

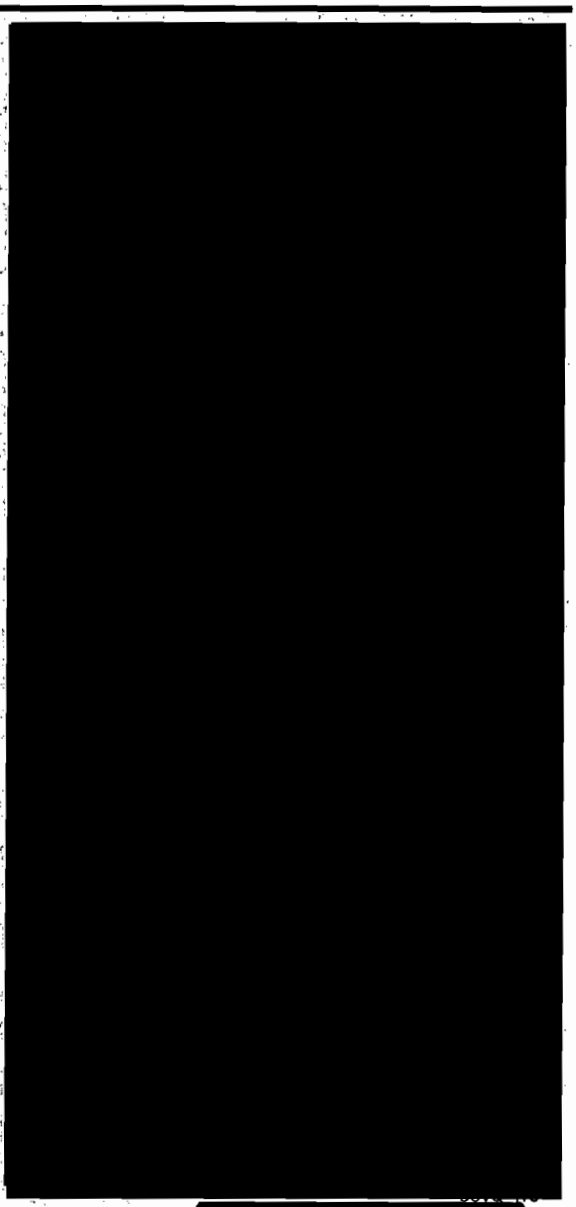

Figure 4-15.

[redacted] requires all teams to complete their work for an assessment in 2004. Figure 4-16 tabulates the ongoing activities and the benefits to the Smart Border Alliance that we expect to accrue from them.

Our schedule, shown in Appendix 8,

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Figure 4-16. Our seven Process Action teams have charters that confer benefits on the Smart Border Alliance Effort