InnoVest Group, LC

Independent Verification and Validation (IV&V)
Statement of Qualification (SOQ)

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Presented by
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Service Delivery Nationwide
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Statement of Qualification (SOQ)

InnoVest has systems integration experience, application development and operations support expertise. We have sector expertise in government and commercial technology projects.

Turning Client Mission into Performance and Result

With talented professionals, extensive capabilities and a flexible project approach, InnoVest helps commercial and government Clients achieve their mission.

Key practice areas

- Application Development
- Business Process Re-Engineering
- Communication
- Configuration Management
- Data Center Consolidation
- Data Center Design & Implementation
- Data Sharing & Exploitation
- Data Warehousing
- Database Design & Development
- Disaster Recovery
- Enterprise Storage Solutions
- Enterprise Transformation Services
- ERP
- Governance, Risk And Compliance
- Help Desk
- Information Management
- IV&V
- Legacy System Modernization

- Logistics Management
- Network Management
- Object Oriented Analysis & Design
- Operations Management
- Performance Measurement & Evaluation
- Planning & Analysis
- Professional Services
- Program Management
- QA/QC
- Records Management
- Requirements Analysis
- Security Planning & Analysis
- Software Engineering & Integration
- Staff Augmentation

Company Information

Small Business

NAICS Code

517110 - Wired Telecommunications Carriers
518210 - Data Processing & Hosting Services
541330 - Engineering Services
541511 - Custom Computer Programming
541512 - Computer System Design Services
541513 - Computer Facilities Management
541519 - Other Computer Related Services
541611 - General Management & Consulting Services
541618 - Other Management Consulting Services
541990 - All Other Professional, Scientific & Technical Services
561210 - Facilities Support Services
561410 - Document Preparation Services
561499 - All Other Business Support Services

IV&V Solutions and Services

InnoVest is a Small Disadvantaged Business (SDB) that provides Enterprise resource planning (ERP) consulting and professional services. We have a consulting and staffing model that leverages our Client's onsite subject matter expertise and supplements it as necessary. We are expert at providing onsite and remote profesional and consulting services either on a full-time or part-time basis. This is the foundation of our value propostion and provides our commercial and public sector customers with cost savings that are greatly needed. We are strategic partner with large commercial and public sector customers. Every Client has access to our program management team and benefits from lessons learned, best practices and an extensive knowledge repository to help shape future project portfolios.

IV&V Project Management

InnoVest specializes in helping our Clients select, prepare for, and implement ERP solutions. Our experts provide targeted IV&V professional services and will work closely with the Client project management team to identify areas of opportunity to improve the efficiencies and effectiveness of the ERP implementation. Our ERP project team lead our engagements from the customer perspective. We know how to implement ERP and our expertise lie in our ability to monitor project's progress and evaluate the different team members and their roles, responsibilities and project deliverables and make targeted recommendations as needed.

We believe it is imperative to implement an IV&V strategy early in the project lifecycle and setup a process that allows us to identify risks before their impact is too costly. Because we are experts at managing ERP implementations we fully recognize that it is too expensive to provide IV&V services on everything. We know what areas are often the most likely to cause issues and we help our customers target specific areas of their implementation based on lessons learned and best practices.

Approach to Delivering IV&V Services

The goal of independent verification and validation (IV&V) is to ensure the intended outcome and work product of a project meets the project specifications and that progress is being made according to plan. It can be thought of as "Project Due Diligence" since it is an investigation of performance and risk based on standards and best practices. This is also sometimes referred to as "Independent Project Oversight," although that is typically more of an ongoing effort than independent verification and validation.

InnoVest Verification is the process of ensuring the accuracy of a project based on written specifications and requirements. Our Validation is our certification at the end of the audit or review that states our findings. Being independent provides distance from the project that allows for increased objectivity. Our IV&V high-level outline of the process includes:

- An in-depth review of the project documents (statement of Work (SOW), business case justification, selection criteria)
- A review of project status documents, meeting minutes, etc.
- A review of the various planning documents (project plan, communication plan, risk management information, regulatory compliance plans, test plans and acceptance criteria, etc.)
- Interviews with the project sponsor, stakeholders, and various team members

- A review of the deliverables

Throughout the process we will refine our understanding, validate our findings, and focus on identifying specific improvements that will make a tangible difference to the project. We will also provide project management tools, templates, and sample plans as appropriate as part of an IV&V engagement.

InnoVest will provide periodic, independent analyses of the IV&V review areas by accomplishing the corresponding IV&V task items identified in the requirements. These analyses will serve to identify, inform and educate the project team, and the various oversight agencies, committees and boards of any areas of weakness and risk to the project, as well as the proposed and recommended solutions for their remediation and/or mitigation. We anticipate that the services will be tied to the phase of the project and areas for review will be identified in advance of each review cycle as follows.

Phase	Category	Service or Focus of Review
Planning	Project Governance Plan	– Decision making and escalation processes – Team structures and campus representation
Planning	Project Management Review	– Review Scope of Work – Review project team roles and responsibilities and discuss resource availability, competing projects and potential issues – Review Project Management Tools/Templates – Evaluate the Project Plan and make recommendations – Evaluate project milestones, key dates, dependencies and how the team will monitor progress – Analyze project tracking of issues and status reports – Evaluate project tracking website, version control, documentation standards and other PM principles.
Planning	Business Process Modeling and Foundations Build	– Review process for gathering and documenting business processes and configuration requirements. – Review process for user sign off on design and configuration decisions. – Review documentation standards.
Planning	Infrastructure & Data Center Review	– Analyze system requirements and make recommendations. (servers, database, networks) – Review hardware and software configuration and identify areas of improvement. – Evaluate disaster recovery plans and make recommendations. – Evaluate plans and staffing to support Banner system and third party products
Planning / Execute	Technical Development Review	– Evaluate technical team's development capabilities and staffing levels and make recommendations. – Review technical requirements including interfaces, reports and modifications/customizations to delivered application. – Analyze technical design documents and ensure proper procedure for requirements gathering, review, coding, unit testing and user sign off. – Evaluated version control of documentation is sufficient.
Planning / Execute	Data Governance and Conversion Reviews	– Evaluate Data Governance plan and make recommendations – Introduce Client to other organizations to share lessons learned around their internal data governance plans and identify areas of opportunity to improve. – Assess progress of data mapping and conversion activities and identify risks.

Phase	Category	Service or Focus of Review
Execute	Testing Reviews	– Review Testing Methodology and make recommendations – At predefined intervals review unit, integration, system and user acceptance testing materials and evaluate progress and identify risks. – Identify areas that might cause delays or negatively impact future system and help improve process.
Execute	Resource Reviews & Audits	– Meet with project team leads (or entire teams) and identify signs of burnout. – Identify competing projects that might impact team member's ability to complete deliverables on time. – Work with Client to identify resources that can be cross trained. – Meet with Client and Sungard and identify potential project risks.
Execute	Organizational Change Management Reviews	– Regularly review communication plan including audience, frequency of communiqués and identify areas of improvement. – Evaluate organization change and strategy report. – Assess initiatives identified in roadmap and progress toward completion. – Make recommendations for improvement.
Execute	Review End User Training Strategy and Plan	– Review Training Strategy and Plan and make recommendations. – Regularly monitor progress of training activities and identify potential risks. – Introduce Client to other organizations to share lessons learned & best practices and training materials.
Manage	Review Deployment Plan	– Regularly monitor progress of go live activities and identify potential risks. – Ensure Client is ready for ownership of system. – Analyze business and IT operations' ability to manage day to day business functions.
Manage	Post Production Support Review	– Monitor progress of Client staff to adapt to new business functions and associated policies, process flows and procedures. – Identify areas of improvement. – Identify risks. – Identify areas that need additional training or remediation.

InnoVest IV&V project team is capable of providing onsite, remote and "as needed" services around the proposed schedule. We believe our flexibility to provide a flexible approach to IV&V scope of work is a differentiator of our services. InnoVest spends a great deal of time working with Client project team to identify key tasks and deliverables that other customers typically request.

Typical IV&V Review Areas

The following matrix depicts the areas that our Clients typically seek IV&V consulting services.

	Review Area	Detailed Project Planning Review	In-Progress Reviews	Test Planning And Execution Reviews	Closeout Review
	Planning				
1	Feasibility Studies				
2	Business Case				
3	Procurement				
4	Project Complexity				
	Project Management				
5	Project Sponsorship				
6	Management Assessment				
7	Project Management				
8	Business Process Reengineering				
9	Risk Management				
10	Change Management				
11	Communication Management				
12	Configuration Management				
13	Project Estimating and Scheduling				
14	Project Personnel				
15	Project Organization				
16	Contractors and External Staff				
17	Oversight of Contractors				
	Quality Management				
18	Quality Management				
19	Process Definition and Product Standards				
	Training				
20	User Training and Documentation				
21	Developer Training and Documentation				
	Requirements Management				
22	Requirements Management				
23	Security and Privacy Requirements				
24	Requirements Analysis				
25	Interface Requirements				
26	Requirements Allocation and Specification				
27	Reengineering				
	Development Environment				
28	Development Hardware				

	Review Area	Detailed Project Planning Review	In-Progress Reviews	Test Planning And Execution Reviews	Closeout Review
29	Development Software				
	System Development				
30	High-Level Design				
31	Detailed Design				
32	Coding				
33	Unit Testing				
34	Integration Testing				
35	System Testing				
36	Interface Testing				
37	Acceptance Testing				
38	Implementation				
	Data Management				
39	Data Conversion				
40	Database Design				
	Operating Environment				
41	System Hardware				
42	System Software				
43	Database Software				
44	Hardware and Software Environment Capacity				
	Operations				
45	Change Tracking				
46	User Satisfaction				
47	Goals and Objectives				
48	Documentation				
49	Operational Processes				

IV&V Review Areas & Task

The following template is often used to map out what the our IV&V consultants will be doing and allow the Client project manager to track specific tasks, deliverables and milestones in a structured manner.

1.	PLANNING		
Review Area	**IV&V Task**	**Task Description**	**Applicable**
Feasibility Studies		Assess the methodologies used for the technical feasibility study verifying it was objective, reasonable, measurable, repeatable, consistent, accurate and verifiable.	☐
		Assess the methodologies used for the economic feasibility study verifying it was objective, reasonable, measurable, repeatable, consistent, accurate and verifiable.	☐
		Review the system requirements (e.g., system requirements specification, feasibility study report, business rules description) in the RFP, Vendor Proposal, and Contract SOW to validate whether the requirements can be satisfied by the defined technologies, methods, and algorithms defined for the project (feasibility).	☐
Business Case		Review and evaluate the Business Case for the project to assess its reasonableness.	☐
Procurement		Verify that the procurement strategy supports Client project objectives.	☐
		Review and make recommendations on the solicitation documents relative to their ability to adequately inform potential vendors about project objectives, requirements, risks, etc.	☐
		Verify that the evaluation criteria are consistent with project objectives and evaluation processes are consistently applied; verify all evaluation criteria are metrics based and clearly articulated within the solicitation documents.	☐
		Verify that the obligations of the vendor, sub-contractors and external staff (terms, conditions, statement of work, requirements, technical standards, performance standards, development milestones, acceptance criteria, delivery dates, etc.) are clearly defined. This includes verifying that performance metrics have been included that will allow tracking of project performance and progress against criteria set by the agency and Client.	☐
		Verify the final contract for the vendor team states that the vendor will participate in the IV&V process, being cooperative in the coordination and communication of information.	☐
Project Complexity		Verify that the assigned project complexity level is current and accurate. If the project complexity level is not current and/or accurate, then reassign a project complexity level to the project.	☐

		2. PROJECT MANAGEMENT	
Review Area	**IV&V Task**	**Task Description**	**Applicable**
Project Sponsorship		Assess agency sponsor buy-in, participation, support and commitment to the project.	☐
		Verify that open pathways of communication exist among all project stakeholders.	☐
		Verify that agency sponsor has bought-in to all changes that impact project scope, cost, schedule or performance.	☐
Management Assessment		Verify that lines of reporting and responsibility provide adequate technical, financial and managerial oversight of the project.	☐
		Evaluate project progress, resources, budget, schedules, and reporting.	☐
		Assess coordination, communication and management, to verify agencies and departments are not working independently of one another.	☐
Project Management		Verify that a project management plan exists and that the plan is followed.	☐
		Evaluate the project management plan maintenance procedures to verify that they are developed, communicated, implemented, monitored and complete.	☐
		Evaluate project reporting processes, procedures, and actual project reports to verify that project status is being accurately traced using project metrics.	☐
		Verify that milestones and completion dates are planned, monitored, and met.	☐
		Verify the existence and institutionalization of an appropriate project issue tracking mechanism that documents issues as they arise, enables communication of issues to proper stakeholders, documents a mitigation strategy as appropriate, and tracks the issue to closure.	☐
		Evaluate the status of the schedule being reported for the project on Client Major IT Project Status Report Dashboard. **Note:** Prior to selecting this task contact PMO to avoid duplicative effort.	☐
		Verify that the Critical Path Milestones described for the project on Client Major IT Project Status Report Dashboard are those approved by Management, including the date when the Critical Path Milestones received approval from Management. **Note:** Prior to selecting this task contact PMO to avoid duplicative effort.	☐
		Evaluate the system's planned life-cycle development methodology or methodologies (waterfall, evolutionary spiral, rapid prototyping, incremental, etc.) to see if they are appropriate for the system being developed.	☐
		Evaluate the status of each Measure of Success being reported for the project on Client Major IT Project Status Report Dashboard.	☐
		Verify that the Measures of Success for the project incorporate input from the system's users and customers.	☐
		Determine if the project has remained within its approved scope.	☐
		For each change in the approved scope of the project verify the date the change was approved and by whom.	☐
		For each change in the approved scope of the project, evaluate the description of the change, the reason for the change, and the impact of the change, particularly on the cost and schedule baselines of the project.	☐

2. PROJECT MANAGEMENT			
Review Area	**IV&V Task**	**Task Description**	**Applicable**
Business Process Reengineering		Evaluate the project's ability and plans to redesign business processes to achieve improvements in critical measures of business performance, such as cost, quality, service, and speed.	☐
		Verify that the reengineering plan has the strategy, management backing, resources, skills and incentives necessary for effective change.	☐
		Verify that resistance to change is anticipated and prepared for by using principles of change management at each step (such as excellent communication, participation, incentives) and having the appropriate leadership (executive pressure, vision, and actions) throughout the reengineering process.	☐
Risk Management		Verify that risk management processes and procedures exist and are being followed. Evaluate the project's risk management processes and procedures to verify that risks are identified and quantified and that mitigation plans are developed, communicated, implemented, monitored, and complete.	☐
		Verify that a list of risk events is maintained and that the probability of occurrence and impact are measured for each event.	☐
		Verify that a mitigation approach has been documented for each risk event listed.	☐
		Determine if any risk events have been dropped from the list and the reason why.	☐
		Verify that the top five risk events identified for the project are those being reported for the project on Client Major IT Project Status Report Dashboard.	☐
		Verify that the Client PMO has reviewed the project Risk Assessment(s), including the date(s) when the Risk Assessment(s) were reviewed by the PMO.	☐
Change Management		Verify that change management processes and procedures exist and are being followed. Evaluate the project's change management processes and procedures to verify they are developed, communicated, implemented, monitored, and complete.	☐
		Evaluate the project's organizational change management processes and procedures to verify that organizational resistance to change is anticipated and prepared for.	☐
Communication Management		Verify that communication processes and procedures exist and are being followed. Evaluate the project's communication processes and procedures to verify they support communications and work product sharing between all project stakeholders; and assess if communication plans and strategies are effective, implemented, monitored and complete.	☐
Configuration Management		Review and evaluate the configuration management (CM) processes and procedures associated with the development process. Verify that configuration management (CM) processes and procedures exist and are being followed. Evaluate the project's configuration control processes and procedures to verify that they are effective, implemented, monitored and complete.	☐

		2. PROJECT MANAGEMENT	
Review Area	**IV&V Task**	**Task Description**	**Applicable**
		Verify that all critical development documents, including but not limited to requirements, design, code and test are maintained under an appropriate level of control.	☐
		Verify that the processes and tools are in place to identify code versions and to rebuild system configurations from source code.	☐
		Verify that appropriate source and object libraries are maintained for training, test, and production and that formal sign-off procedures are in place for approving deliverables.	☐
		Verify that appropriate processes and tools are in place to manage system changes, including formal logging of change requests and the review, prioritization and timely scheduling of maintenance actions.	☐
		Verify that mechanisms are in place to prevent unauthorized changes being made to the system and to prevent authorized changes from being made to the wrong version.	☐
		Review the use of CM information (such as the number and type of corrective maintenance actions over time) in project management.	☐
Project Estimating and Scheduling		Evaluate the estimating and scheduling process of the project to ensure that the project planning assumptions, budget, and resources are adequate to support the work-breakdown structure and schedule.	☐
		Examine historical data and data sources to determine if the project has been able to accurately estimate the schedule, labor requirements and cost of product, service or system development efforts.	☐
		Examine historical data and data sources to determine if the project has been able to accurately apply Earned Value Management to the project.	☐
		Examine historical data and data sources to determine if the project has been able to accurately accumulate the actual costs of tasks completed for the project.	☐
		Examine historical data and data sources to determine if the project has been able to accurately determine the earned value of tasks completed for the project.	☐
		Examine historical data and data sources to determine if the project has been able to accurately accumulate the budgeted cost/planned value of tasks for the project.	☐
		Examine historical data and data sources to determine if the project has been able to accurately calculate Schedule Variance.	☐
		Examine historical data and data sources to determine if the project has been able to accurately calculate Cost Variance.	☐
		Compare and evaluate the status of the planned and actual costs being reported for the project on Client Major IT Project Status Report Dashboard. **Note:** Prior to selecting this task contact PMO to avoid duplicative effort.	☐
		Validate that the Planned Costs To Date reflected for the project on Client Major IT Project Status Report Dashboard are the same as those approved by the Internal Agency Oversight Committee.	☐

2.		PROJECT MANAGEMENT	
Review Area	**IV&V Task**	**Task Description**	**Applicable**
		Validate the Actual Costs To Date figures reported for the project on Client Major IT Project Status Report Dashboard. **Note:** Prior to selecting this task contact PMO to avoid duplicative effort.	☐
		Evaluate the nature and amount of cost variance between the budgeted and actual costs to the project to date.	☐
		Verify that PMO approved the Planned Costs for the Project, including the date when the Planned Costs received approval from the PMO.	☐
Project Personnel		Examine the job assignments, skills, training and experience of the personnel involved in program development to verify that they are adequate for the development task.	☐
		Evaluate the project's personnel planning for the project to verify that adequate human resources will be available for development and maintenance.	☐
		Evaluate the project's personnel policies to verify that staff turnover will be minimized.	☐
Project Organization		Verify that lines of reporting and responsibility provide adequate technical, financial and managerial oversight of the project.	☐
		Verify that the project's organizational structure supports training, process definition, risk management, quality assurance, configuration management, product testing and any other functions critical for the project's success.	☐
Contractors and External Staff		Evaluate the use of contractors or other external sources of project staff (such as IS staff from another State organization) in project development.	☐
		Verify that the obligations of contractors and external staff (terms, conditions, statement of work, requirements, standards, development milestones, acceptance criteria, delivery dates, etc.) are clearly defined.	☐
		Verify that the contractors' software development methodology and product standards are compatible with the system's standards and environment.	☐
		Verify that the contractor has and maintains the required skills, personnel, plans, resources, procedures and standards to meet their commitment. This will include examining the feasibility of any offsite support of the project	☐
		Verify that any proprietary tools used by contractors do not restrict the future maintainability, portability, and reusability of the system.	☐
Oversight of Contractors		Verify that project management oversight of contractors is provided in the form of periodic status reviews and technical interchanges.	☐
		Verify that the project management has defined the technical and managerial inputs the contractor needs (reviews, approvals, requirements and interface clarifications, etc.) and has the resources to supply them on schedule.	☐
		Verify that the project management staff has the ultimate responsibility for monitoring project cost and schedule.	☐

		3. QUALITY MANAGEMENT	
Review Area	**IV&V Task**	**Task Description**	**Applicable**
Quality Management		Evaluate and make recommendations on the project's quality assurance (QA) processes, procedures and organization.	☐
		Verify that QA has an appropriate level of independence from project management.	☐
		Verify that the QA organization monitors the fidelity of all defined processes in all phases of the project.	☐
		Verify that the quality of all products produced by the project is monitored by formal reviews and sign-offs.	☐
		Verify that project self-evaluations are performed and that measures are continually taken to improve the process.	☐
		Monitor the performance of the QA contractor by reviewing its processes and reports and performing spot checks of system documentation; assess findings and performance of the processes and reports.	☐
		Verify that QA has an appropriate level of independence. Evaluate and make recommendations on the project's Quality Assurance plans, procedures and organization.	☐
		Verify that the QA vendor provides periodic assessment of the CMM activities of the project and that the project takes action to reach and maintain the next CMM Level.	☐
		Evaluate the mechanisms that are in place for project self-evaluation and process improvement.	☐
Process Definition and Product Standards		Review and make recommendations on all defined processes and product standards associated with the system development.	☐
		Verify that all major development processes are defined and that the defined and approved processes and standards are followed in development.	☐
		Verify that the processes and standards are compatible with each other and with the system development methodology.	☐
		Verify that all process definitions and standards are complete, clear, up-to-date, consistent in format, and easily available to project personnel.	☐

		4. TRAINING	
Review Area	**IV&V Task**	**Task Description**	**Applicable**
User Training and Documentation		Review and make recommendations on the training provided to product users. Verify that sufficient knowledge transfer occurs for the maintenance and operation of the new product.	☐
		Verify that training for users is instructor-led and hands-on and is directly related to the business process and required job skills.	☐
		Verify that user-friendly training materials and help desk services are easily available to all users.	☐

4. TRAINING

Review Area	IV&V Task	Task Description	Applicable
		Verify that all necessary policies, processes, and documentation are easily available to users.	☐
		Verify that all training is given on time and is evaluated and monitored for effectiveness, with additional training provided as needed.	☐
Developer Training and Documentation		Review and make recommendations on the training provided to system developers.	☐
		Verify that developer training is technically adequate, appropriate for the development phase, and available at appropriate times.	☐
		Verify that all necessary policies, processes and standards documentation are easily available to developers.	☐
		Verify that all training is given on time and is evaluated and monitored for effectiveness, with additional training provided as needed.	☐

5. REQUIREMENTS MANAGEMENT

Review Area	IV&V Task	Task Description	Applicable
Requirements Management		Evaluate and make recommendations on the project's process and procedures for managing requirements.	☐
		Verify that system requirements are well defined, understood and documented.	☐
		Evaluate the allocation of system requirements to hardware and software requirements.	☐
		Validate that software requirements can be traced through design, code and test phases to verify that the system performs as intended and contains no unnecessary software elements.	☐
		Validate that the relationships between each software requirement and its system requirement are correct.	☐
		Verify that requirements are under formal configuration control.	☐
Security and Privacy Requirements		Evaluate and make recommendations on project policies and procedures for ensuring that the system is secure and that the privacy of Client data is maintained.	☐
		Evaluate the project's restrictions on system and data access.	☐
		Evaluate the project's security and privacy risk analyses.	☐
		Verify that processes and equipment are in place to back up Client and project data and files and archive them safely at appropriate intervals.	☐
Requirements Analysis		Verify that an analysis of user needs and objectives has been performed to verify that requirements of the system are well understood, well defined, and satisfy any regulatory requirements.	☐
		Verify that all stakeholders have been consulted to the desired functionality of the system, and that users have been involved in prototyping of the user interface.	☐

5. REQUIREMENTS MANAGEMENT			
Review Area	**IV&V Task**	**Task Description**	**Applicable**
		Verify that all stakeholders have agreed to all changes that impact project cost, schedule or performance.	☐
		Verify that performance requirements (e.g. timing, response time and throughput) satisfy user needs.	☐
		Verify that user's operations and maintenance requirements for the system are completely specified.	☐
		Concept documentation evaluation: Validate that the concept documentation satisfies user needs and is consistent with acquisition needs. Validate constraints of interfacing systems and constraints or limitations of proposed approach. Analyze system requirements and validate that the following satisfy user needs: a. System functions b. End-to-end system performance c. Feasibility and testability of the functional requirements d. System architecture design e. Operation and maintenance requirements and environments f. f. Migration requirements from an existing system where applicable.	☐
Interface Requirements		Verify that all system interfaces are exactly described, by medium and by function, including input/output control codes, data format, polarity, range, units, and frequency.	☐
		Verify those approved interface documents are available and that appropriate relationships (such as interface working groups) are in place with all agencies and organizations supporting the interfaces.	☐
		Verify that all external and internal system and software interface requirements have been identified.	☐
		Verify that each interface is described and that the interface description includes data format and performance criteria (e.g., timing, bandwidth, accuracy, safety, and security).	☐
Requirements Allocation and Specification		Verify that all system requirements have been allocated to either a software or hardware subsystem.	☐
		Verify that requirements specifications have been developed for all hardware and software subsystems in a sufficient level of detail to ensure successful implementation.	☐
		Verify that performance requirements (e.g., timing, response time, and throughput) allocated to hardware, software, and user interfaces satisfy user needs.	☐
		Verify that the internal and external interfaces specify the data formats, interface protocols, frequency of data exchange at each interface, and other key performance requirements to demonstrate compliance with user requirements.	☐
		Verify that application specific requirements, such as functional diversity, fault detection, fault isolation, and diagnostic and error recovery satisfy user needs.	☐
		Verify that the user's maintenance requirements for the system are completely specified.	☐

5. REQUIREMENTS MANAGEMENT

Review Area	IV&V Task	Task Description	Applicable
		Validate that there are objective acceptance testing criteria for validating the requirements of the requirements specification documents.	☐
Reengineering		If a legacy system or a transfer system is or will be used in development, verify that a well-defined plan and process for reengineering the system is in place and is being followed.	☐

6. DEVELOPMENT ENVIRONMENT

Review Area	IV&V Task	Task Description	Applicable
Development Hardware		Evaluate new and existing development hardware configurations to determine if their performance is adequate to meet the needs of system development.	☐
		Determine if hardware is maintainable, easily upgradeable, and compatible with the agency's existing development and processing environment. This evaluation should include, but is not limited to CPUs and other processors, memory, network connections and bandwidth, communication controllers, telecommunications systems (LAN/WAN), terminals, printers and storage devices.	☐
		Current and projected vendor support of the hardware should also be evaluated, as well as the agency's hardware configuration management plans and procedures.	☐
Development Software		Evaluate new and existing development software to determine if its capabilities are adequate to meet system development requirements.	☐
		Determine if the software is maintainable, easily upgradeable, and compatible with the agency's current hardware and software environment.	☐
		Evaluate the development environment as a whole to see if it shows a degree of integration compatible with good development. This evaluation should include, but is not limited to, operating systems, network software, CASE tools, project management software, configuration management software, compilers, cross-compilers, linkers, loaders, debuggers, editors, and reporting software.	☐
		Language and compiler selection should be evaluated with regard to portability and reusability (ANSI standard language, non-standard extensions, etc.)	☐
		Current and projected vendor support of the software should also be evaluated, as well as the agency's software acquisition plans and procedures.	☐

7. SYSTEM DEVELOPMENT

Review Area	IV&V Task	Task Description	Applicable
High-Level Design		Evaluate and make recommendations on existing high-level design products to verify the design is workable, efficient, and satisfies all system and system interface requirements.	☐

7.	SYSTEM DEVELOPMENT		
Review Area	**IV&V Task**	**Task Description**	**Applicable**
		Evaluate the design products for adherence to the project design methodology and standards.	☐
		Evaluate the design and analysis process used to develop the design and make recommendations for improvements. Evaluate design standards, methodology and CASE tools used and make recommendations.	☐
		Verify that design elements can be traced back to system requirements.	☐
		Determine if the relationship between the design elements and the requirements are specified to a constant level of detail.	☐
		Verify that all design products are under configuration control and formally approved before detailed design begins.	☐
Detailed Design		Evaluate and make recommendations on existing detailed design products to verify that the design is workable, efficient, and satisfies all high-level design requirements.	☐
		Evaluate the design products for adherence to the project design methodology and standards.	☐
		Evaluate and make recommendations on the design and analysis process used to develop the design.	☐
		Evaluate and make recommendations on the design standards, methodology and CASE tools used.	☐
		Verify that design elements can be traced back to system requirements and high-level design elements.	☐
		Determine if the relationship between the design elements and the high-level design elements are specified to a constant level of detail.	☐
		Verify that all design products are under configuration control and formally approved before coding begins.	☐
Coding		Evaluate and make recommendations on the standards and processes currently in place for code development.	☐
		Evaluate the existing code base for portability and maintainability, taking software metrics including but not limited to modularity, complexity and source and object size.	☐
		Evaluate code documentation for quality, completeness (including maintenance history) and accessibility.	☐
		Evaluate the coding standards and guidelines and the projects compliance with these standards and guidelines. This evaluation should include, but not be limited to, structure, documentation, modularity, naming conventions and format.	☐
		Verify that developed code is kept under appropriate configuration control and is easily accessible by developers.	☐
		Evaluate the project's use of software metrics in management and quality assurance.	☐
		Verify and validate that code components satisfy the detailed design.	☐
		Validate that the logic, computational, and interface precision (e.g., truncation and rounding) satisfy the requirements in the system environment.	☐

7. SYSTEM DEVELOPMENT			
Review Area	**IV&V Task**	**Task Description**	**Applicable**
Unit Testing		Evaluate the plans, requirements, environment, tools, and procedures used for unit testing system modules.	☐
		Evaluate the level of test automation, interactive testing and interactive debugging available in the test environment.	☐
		Verify that an appropriate level of test coverage is achieved through the testing process, that test results are verified, that the correct code configuration has been tested, and that the tests are appropriately documented, including formal logging of errors found in testing.	☐
		Validate that the unit test plan satisfies the following criteria: Traceable to the software requirements and design; External consistency with the software requirements and design; Internal consistency between unit requirements; Test coverage of requirements in each component; Feasibility of software integration and testing; and Feasibility of operation and maintenance (e.g., capability to be operated and maintained in accordance with user needs).	☐
		a. Validate that the results of the Unit Testing of each software configuration item indicates that the item correctly implements the software design for the item as documented in the software design documentation for that item. b. Document the results as required by the test plan. c. Validate that the results of the Unit Testing of each software configuration item satisfies the test acceptance criteria as specified in the Unit Test Plan. d. Document discrepancies between actual and expected test results.	☐
Integration Testing		Evaluate the plans, requirements, environment, tools, and procedures used for integration testing of system modules.	☐
		Evaluate the level of automation and the availability of the integration test environment.	☐
		Verify that an appropriate level of test coverage is achieved through the test process, that test results are verified, that the correct code configuration has been tested, and that the tests are appropriately documented, including formal logging of errors found in testing.	☐
		Validate that the integration test plan satisfies the following criteria: Traceable to the software requirements and design; External consistency with the software requirements and design; Internal consistency between unit requirements; Test coverage of requirements in each component; Feasibility of software integration and testing; and Feasibility of operation and maintenance (e.g., capability to be operated and maintained in accordance with user needs).	☐
		Verify that the test organization has an appropriate level of independence from the development organization.	☐

7.		SYSTEM DEVELOPMENT	
Review Area	**IV&V Task**	**Task Description**	**Applicable**
		a. Validate that the results of the Integration Testing of each software configuration item indicates that the item correctly implements the software design for the item as documented in the software design documentation for that item. b. Document the results as required by the test plan. c. Validate that the results of the Integration Testing of each software configuration item satisfies the test acceptance criteria as specified in the Integration Test Plan. d. Document discrepancies between actual and expected test results.	☐
System Testing		Evaluate the plans, requirements, environment, tools, and procedures for system testing of the system.	☐
		Evaluate the level of automation and the availability of the system test environment.	☐
		Verify that a sufficient number and type of case scenarios are used to ensure comprehensive but manageable testing and that tests are run in a realistic, real-time environment.	☐
		Verify that test scripts are complete, with step-by-step procedures, required pre-existing events or triggers, and expected results.	☐
		Verify that test results are verified, that the correct code configuration has been used, and that the test runs are appropriately documented, including formal logging of errors found in testing.	☐
		Validate that the system test plan satisfies the following criteria: Traceable to the software requirements and design; External consistency with the software requirements and design; Internal consistency between unit requirements; Test coverage of requirements in each component; Feasibility of software integration and testing; and Feasibility of operation and maintenance (e.g., capability to be operated and maintained in accordance with user needs).	☐
		Verify that the test organization has an appropriate level of independence from the development organization.	☐
		a. Validate that the results of the System Testing of each software configuration item indicates that the item correctly implements the software design for the item as documented in the software design documentation for that item. b. Document the results as required by the test plan. c. Validate that the results of the System Testing of each software configuration item satisfies the test acceptance criteria as specified in the System Test Plan. d. Document discrepancies between actual and expected test results.	☐
Interface Testing		Evaluate the plans, requirements, environment, tools, and procedures for interface testing of the system.	☐
		Evaluate the level of automation and the availability of the system test environment.	☐
		Verify that a sufficient number and type of case scenarios are used to ensure comprehensive but manageable testing and that test are run in a realistic, real-time environment.	☐

7.	SYSTEM DEVELOPMENT		
Review Area	**IV&V Task**	**Task Description**	**Applicable**
		Verify that test scripts are complete, with step-by-step procedures, required pre-existing events or triggers, and expected results.	☐
		Verify that test results are verified, that the correct code configuration has been used, and that the test runs are appropriately documented, including formal logging of errors found in testing.	☐
		Validate that the interface test plan satisfies the following criteria: Traceable to the software requirements and design; External consistency with the software requirements and design; Internal consistency between unit requirements; Test coverage of requirements in each component; Feasibility of software integration and testing; and Feasibility of operation and maintenance (e.g., capability to be operated and maintained in accordance with user needs).	☐
		Verify that the test organization has an appropriate level of independence from the development organization.	☐
		a. Validate that the results of the Interface Testing of each software configuration item indicates that the item correctly implements the software design for the item as documented in the software design documentation for that item. b. Document the results as required by the test plan. c. Validate that the results of the Interface Testing of each software configuration item satisfies the test acceptance criteria as specified in the Interface Test Plan. d. Document discrepancies between actual and expected test results.	☐
Acceptance Testing		Evaluate the plans, requirements, environment, tools, and procedures for acceptance testing of the system.	☐
		Verify that acceptance procedures and acceptance criteria for each product are defined, reviewed, and approved prior to tests and that test results are documented. Acceptance procedures must also address the process by which any software product that does not pass acceptance testing will be corrected.	☐
		Verify that a sufficient number and type of case scenarios are used to ensure comprehensive but manageable testing and that tests are run in a realistic, real-time environment.	☐
		Verify that test scripts are complete, with step-by-step procedures, required pre-existing events or triggers, and expected results.	☐
		Verify that test results are verified, that the correct code configuration has been used, and that the test runs are appropriately documented, including formal logging of errors found in testing.	☐
		Validate that the acceptance test plan satisfies the following criteria: Traceable to the software requirements and design; External consistency with the software requirements and design; Internal consistency between unit requirements; Test coverage of requirements in each component; Feasibility of software integration and testing; and Feasibility of operation and maintenance (e.g., capability to be operated and maintained in accordance with user needs).	☐
		Verify that the acceptance test organization has an appropriate level of independence from the subcontractor.	☐

7.	SYSTEM DEVELOPMENT			
Review Area	**IV&V Task**	**Task Description**		**Applicable**
		Validate that appropriate acceptance testing based on the defined acceptance criteria is performed satisfactorily before acceptance of software products.		☐
		Verify that the process by which any software product that does not pass acceptance testing should be corrected has been defined and documented.		☐
		a. Validate that the results of the Acceptance Testing of each software configuration item indicates that the item correctly implements the software design for the item as documented in the software design documentation for that item. b. Document the results as required by the test plan. c. Validate that the results of the Acceptance Testing of each software configuration item satisfies the test acceptance criteria as specified in the Acceptance Test Plan. d. Document discrepancies between actual and expected test results.		☐
Implementation		Review and evaluate implementation planning.		☐
		Verify that all software products required to install and operate each software component being implemented by the project are present in the software component's installation package.		☐
		Validate that all site-dependent parameters or conditions to verify supplied values are correct.		☐

8.	DATA MANAGEMENT			
Review Area	**IV&V Task**	**Task Description**		**Applicable**
Data Conversion		Evaluate the agency's existing and proposed plans, procedures and software for data conversion.		☐
		Verify that procedures are in place and are being followed to review the converted data for completeness and accuracy and to perform data cleanup as required.		☐
		Determine conversion error rates and if the error rates are manageable.		☐
		Make recommendations on making the conversion process more efficient and on maintaining the integrity of data during the conversion.		☐
Database Design		Evaluate new and existing database designs to determine if they meet existing and proposed system requirements.		☐
		Recommend improvements to existing designs to improve data integrity and system performance.		☐
		Evaluate the design for maintainability, scalability, concurrence, normalization (where appropriate) and any other factors affecting performance and data integrity.		☐
		Evaluate the project's process for administering the database, including backup, recovery, performance analysis and control of data item creation.		☐

9.	OPERATING ENVIRONMENT		
Review Area	**IV&V Task**	**Task Description**	**Applicable**
System Hardware		Evaluate new and existing system hardware configurations to determine if their performance is adequate to meet existing and proposed system requirements.	☐
		Determine if hardware is compatible with the agency's existing processing environment, if it is maintainable, and if it is easily upgradeable. This evaluation should include, but is not limited to CPUs and other processors, memory, network connections and bandwidth, communication controllers, telecommunications systems (LAN/WAN), terminals, printers and storage devices.	☐
		Evaluate current and projected vendor support of the hardware, as well as the agency's hardware configuration management plans and procedures.	☐
System Software		Evaluate new and existing system software to determine if its capabilities are adequate to meet existing and proposed system requirements.	☐
		Determine if the software is compatible with the agency's existing hardware and software environment, if it is maintainable, and if it is easily upgradeable. This evaluation should include, but is not limited to, operating systems, middleware, and network software including communications, file-sharing protocols, etc.	☐
		Current and projected vendor support of the software should also be evaluated, as well as the agency's software acquisition plans and procedures.	☐
Database Software		Evaluate new and existing database products to determine if their capabilities are adequate to meet existing and proposed system requirements.	☐
		Determine if the database's data format is easily convertible to other formats, if it supports the addition of new data items, if it is scalable, if it is easily refreshable and if it is compatible with the agency's existing hardware and software.	☐
		Evaluate any current and projected vendor support of the software, as well as the agency's software acquisition plans and procedures.	☐
Hardware and Software Environment Capacity		Evaluate the existing processing capacity of the planned hardware and software environment and verify that it is adequate for projected system.	☐
		Evaluate the historic availability and reliability of the current hardware and software environment, including the frequency and criticality of failures.	☐
		Evaluate the results of any volume testing or stress testing.	☐
		Evaluate any existing measurement and capacity-planning program and evaluate the hardware and software environment's capacity to support future growth.	☐
		Make recommendations on changes in processing hardware, storage, network systems, operating systems, COTS software, and software design to meet future growth and improve system performance.	☐

10. OPERATIONS

Review Area	IV&V Task	Task Description	Applicable
Change Tracking		Evaluate the system change request and defect tracking processes.	☐
		Evaluate the implementation of the product change request and defect tracking process activities and request volumes to determine if processes are effective and are being followed.	☐
User Satisfaction		Evaluate user satisfaction with the product to determine areas for improvement.	☐
Goals and Objectives		Evaluate impact of the product on operational goals and performance objectives.	☐
Documentation		Evaluate operational documentation.	☐
Operational Processes		Evaluate the implementation of operational processes including backup, disaster recovery and day-to-day operations to verify the processes are being followed.	☐