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The STG Systems Delivery Approach Cuts the Delivery Time and Reduces the Delivery Risk of Complex Systems

Introduction. Over the past 20 years STG staff has been involved in the delivery of complex, high performance systems critical to the core business needs of our clients. The basic premise of the STG design approach is to eliminate *surprises* which cause unacceptable performance or system design rework and subsequent cost escalation or schedule delays.

Early systems delivery was based on the use well defined and distinct delivery phases. Subsequent approaches moved to incremental delivery of system components. Today, STG uses a delivery approach based on a spiral delivery of system builds, employing modeling, prototypes and early risk mitigation to resolve the most critical delivery issues early in the development cycle. STG has found that this proactive delivery approach has proven effective in (1) eliminating technical surprises and (2) reducing the risk associated with establishing a system design which meets the client's requirements and business needs without rework or redevelopment.

Discussion. The STG Delivery Approach has matured through 20 years of systems delivery experience with over 40 systems successfully installed and operating for Commercial and Defense clients. These systems typically require augmentation or interfacing with legacy mainframe environments, distributed and client-server architectures and extensive user interface design requirements. In all cases system performance, reliability and availability, and operational simplicity are driving system considerations. Throughout these deliveries, our processes have continued to be updated and tailored to reflect developments in technology and the evolution of our process methods and procedures based on experience and lessons learned. The four fundamental steps of our system delivery approach is depicted in Figure 1.

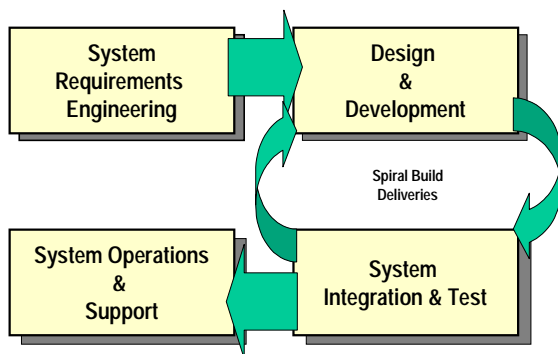


Figure 1. STG E-Statement Access Screen

Under the STG spiral delivery approach, client's see the system early in the delivery schedule. Through the use of advanced tools and delivery methods that include prototyping and modeling, STG can "show" the system to its clients rather than "tell" the client what the system will look like and how it will perform. This approach allows STG and the client to reach early consensus on how best to meet the requirements.

Each of the basic four steps which constitute our delivery approach is discussed briefly in the following paragraphs.

System Requirements Engineering. During this step, STG focuses on the functional, performance and operating requirements of the system to be delivered; including the support and maintenance requirements. Where necessary key user and operator interfaces are prototyped to reach agreement on ease of use and operator-system performance. The commercial system is defined, acquired and established as a target architecture. The stability of the target commercial environment is assessed for production acceptability. If there are commercial product incompatibilities, they are identified early and alternative solutions are identified.

Specific emphasis is placed on system performance drivers. Performance risks are identified and where needed system performance trades are completed and alternative design recommendations are provided. In addition, the end-game system delivery is planned out during this phase including the phased delivery builds and identification of client requirements which may be needed for downstream system installation.

Design & Development. During this step the detailed design of the hardware and software architecture is completed. This includes early emphasis on the design and development of the highest risk most technically challenging system areas identified in the requirements phase. External interfaces are finalized and areas considered to be performance drivers are designed and developed early to ensure the best performance possible.

STG develops the system in multiple layers, focusing on the operational infrastructure, system auditing and recording facilities and commercial environment. External system interfaces are developed next including their operational concepts. The system's user interface and the support infrastructure of the system are one of the next layers to be addressed. While the core applications and are among the later system layers to be developed. Where necessary external system interfaces to cooperating systems are identified and development relationships are established early. Where feasible, cooperative development schedules are coordinated sometimes including joint integration and testing activities.

Systems Integration & Test. With the STG spiral delivery approach, STG initiates integration and testing early and in phases with each delivery build. The commercial software and hardware environment is integrated and tested early in conjunction with the requirements phase. When necessary, STG will establish a functionally equivalent target environment consistent with the final client system. This target environment will be used to establish prototypes and shakeout design approaches from an integrated system performance viewpoint before the system builds are ever delivered to the client's site.

With each system delivery build, systems integration and testing of that build is completed at the STG facilities before installation at the client facilities. Through a comprehensive integration and test process, STG has been able to find problems before installation and has been successful in minimizing the disruption to client operations.

System Operations and Support. STG provides support to its client from the moment the system is placed in the client facility.

STG provides training to its clients before they commence use of the system. STG will tailor training to meet the client's specific needs. Training can either be provided at STG facilities or at the client site(s) in conjunction with the installation and checkout of the system. In most cases STG will train the client trainers, who in turn will train the majority of the user community. Satisfactory training is completed before the system is turned over to the client for internal acceptance testing. Although STG systems are delivered with predefined auditing and reporting facilities, STG will tailor reporting and monitoring to meet specific customer needs.

Once the system is turned over to the client for acceptance testing, STG will provide operational oversight and monitoring of the system for an agreed-to period of time. In general, STG designs systems to minimize on-going operations overhead and ease of support. When requested STG will provide operations support in cooperation with the client's staff. During this period a partnership is established between the Client's support staff and STG support staff. STG will continue to monitor the system on a daily basis and provide regular status reports which track the system use and its performance under the evolving user environment.

Benefits of STG Approach. Through the use of the STG Spiral Development and Delivery approach we have consistently been able to reduce the number of problems which arise late in the delivery cycle and we have consistently been able to reduce the overall delivery schedule of our systems (reference Figure 2). Our experience with system delivery have involved methodologies which have evolved with the technology and management concepts over the last 20 years. The three main concepts which represent this evolution of system delivery concepts are depicted below.

Traditional delivery approaches were characterized by distinct phases with well defined and documented milestones dictating the

transition between phases. Development did not occur until requirements were complete and agreed-to by all parties. Integration and testing of the system components occurred late in the delivery cycle and as a result system problems were uncovered late in the delivery causing design and software rework.

Phased delivery approaches followed in which the system was developed and delivered incrementally. Each increment was designed and delivered based on an overall set of system requirements and system design which was defined and agreed-to early in the overall cycle. The client saw the system evolve incrementally. The challenge with this approach was the identification and accommodation of late changing requirements and design as the system matured with each delivery.

Spiral delivery of STG integrates a well defined set of system builds with early prototyping and modeling to provide insight into how the system will work very early in the delivery. The methods and tolls employed by STG provide flexibility to accommodate changes to meet the client's needs early and efficiently. This approach eliminates much of the risk of late changing requirements due to surprises in the delivered system based on missed expectations.

Additional information on the ImGate Subsystem can be obtained by contacting

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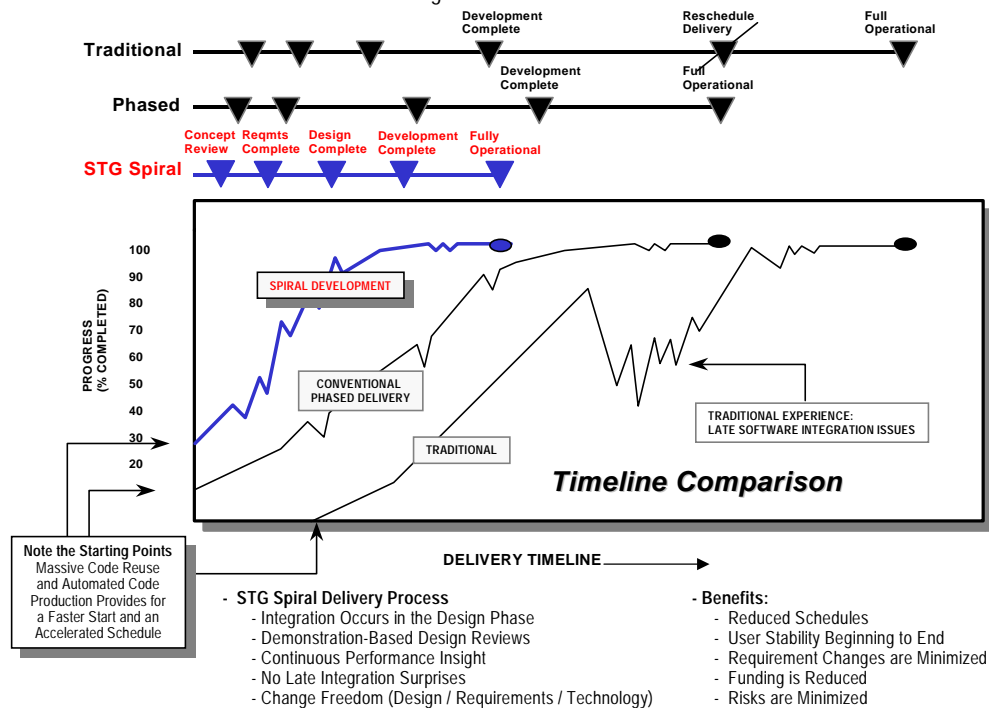


Figure 2. STG Spiral Delivery Approach has Provided Benefits for Complex Systems