System Modernization Best Practices provides a roadmap to assist those in or about to begin their modernization journey, and paves the way for a successful project. It draws from the expertise of both industry professionals and motor vehicle agencies, whose participation in legacy modernizations largely has been undocumented up to now.
Introduction

While the necessity for legacy system and process modernization is understood and acknowledged across jurisdictions, it is a complex, costly and often overdue activity for most. It requires years of planning, training, risk preparedness, flexibility, commitment at every level of government, and a significant investment of time, money and resources. There is no one-size-fits-all solution, but learning from the successes and failures of others and following best practices can make a significant difference in the success of the process.

Additional resources on system modernization, including project documentation from agencies with system modernization experience, can be found on the AAMVA System Modernization Resources webpage at http://www.aamva.org/system-modernization/.
Chapter 1 — Before Getting Started

Significant planning and discussions among both business and technical staffs, as well as other stakeholders, start years before procurement efforts can begin. Since modernization will inevitably become necessary at some point, the conversation typically starts with determining “when” it will occur and what is to be accomplished—the project’s vision. This must occur before seeking funding, engaging additional stakeholders, initiating the project or developing procurement documents. Conversations with peers who have completed the process and in-person visits to a newly modernized system can be invaluable at this stage.

It is imperative that the decision whether to use independent verification and validation (IV&V) or oversight vendors be made early in the modernization program.

Chapter 2 — An Analysis of Internal versus Vendor Support

Business and IT professionals need to weigh the pros and cons of their system upgrade options—for both implementation and ongoing management—when deciding how to move forward. This should occur before writing an RFP. The options to discuss include:

- Internal Supported Systems
- Vendor Supported Systems
Blended Supported Systems
MOTS (modified off-the-shelf)/COTS (commercial-off-the-shelf)

Systems versus Custom-Built Systems

Chapter 3 — Business Case Development

To gain support and obtain approval for modernization efforts, an agency should first prepare a well-thought-out business case. This aids in marketing, governance and decision making, and it helps provide clear direction during the inevitable ups and downs experienced during the course of a modernization. At a minimum, it should include the following:

- Critical Success Factors
- Executive Summary
- Background and Vision
- Options
- Financial and Fiscal Impacts of the Recommended Solution
- Implementation
- Stakeholders
- Strategic Goals and Performance Measures

The pros and cons of each system upgrade option, as reported by the System Modernization Working Group, are detailed in System Modernization Best Practices, pp. 6-12.
Chapter 4 — Governance

Developing a comprehensive governance plan can help prepare for unanticipated changes in staffing, resources or stakeholder needs. Such changes may seem unlikely at the start of a project, but it is important to recognize they will occur. Implementing a governance process ensures accountability for all areas of the program and sets the tone for commitment to effort.

Chapter 5 — Legislation and Funding

A request for funding and legislative approval for system modernization is a key component of any program and is likely an ongoing process. Depending on the jurisdiction’s governmental structure, the agency may need to seek buy-in from the governor, minister, legislature or other body. Issues to address along these lines include:

- Educating Legislators
- Identifying Opposition
- Identifying Funding Sources
- Accounting and Auditing

Governance is defined as the process of developing, communicating, implementing, monitoring and assuring the policies, procedures, organization structures and practices associated with a given program play out as planned.
Chapter 6 — Enterprise Architecture

It is critical to engage an enterprise architect early in the system modernization process to help identify the solution that best fits the jurisdiction’s needs, incorporates the latest technologies, ensures there is room to grow, and identifies infrastructure that can be replaced in parallel. An experienced enterprise architect will be able to address critical issues and bring development tools, frameworks and models to the program, including architecture domains and various components of the enterprise architecture framework (governance, EAP).

Chapter 7 — Requirements and Methodologies

Jurisdictions need to identify and manage requirements to ensure the end solution meets stakeholder and user needs while adhering to business rules, security requirements, project timelines, risks, budgets and legislative/regulatory limitations. Issues to consider include:

- Requirements Gathering Methodology—agile, waterfall (structured), hybrid
- Types of Requirements—functional, nonfunctional, business, user, system, stakeholder

Jurisdictions should consider other projects and needs directly related to the modernization effort (e.g., workstation upgrades, network hardware or connectivity).
Characteristics of Good Requirements—vision-oriented, factual/relevant, realistic, necessary, clear, correctly implemented

Requirements Gathering—using good resources, documented well

General Requirements Gathering Considerations—thoughtful level of detail

A Requirements Traceability Matrix (RTM) is a critical tool in keeping the project on track and its usefulness cannot be overstated.

Chapter 8 — Procurement and Contract Management

Many jurisdictions have learned the hard way that contract management can be a single point of failure for a system modernization project. Procurement documents should be clear, specific, and easy to understand. Important considerations to help ensure that adequate resources and processes are in place include:

- Procurement Strategy for the Vendor or Solution
- Procurement Methodology Development—market review, validation

Deliverables and Evaluation
Development—goals, criteria

Contract Award

Procurement Management Team—subject matter experts, technical advisers, legal, business, IT, procurement

Vendor or Contract Management—clear plan, open communication, well-defined expectations

Vendor Performance Analysis

Vendor Payment Schedule

Contract Administration—key personnel, vendor team forecasting, security clearance requirements, annual security statement, asset management, document management and filing, scope management, project software management, peripheral management

Contract Completion activities—retention guidelines, documentation, legal considerations

Chapter 9 — Project Management

Adhering to effective project management principles is imperative to any modernization program and requires a dedicated certified project manager (PM) who is involved in the project as early as possible. For each separate project, a project management plan (PMP) is needed.
Chapter 10 — Security

Many aspects of security need to be considered during modernization, including ensuring the appropriate level of security is achieved for data, facilities and project team members. This responsibility should be trusted to someone educated and trained in security practices and guidelines. At a minimum, they will be responsible for:

- Security Plan Development
- User Agreements
- Security Standards and Guidelines
- User Roles
- Auditing

Security measures should be developed for the life of the system or facilities and should be included in the Project Management Plan. See pp. 36–38 of the System Modernization Best Practices for information on a comprehensive PMP.

Chapter 11 — Data Cleansing and Migration

Both “data cleansing” and “data migration” are time consuming. The PMP should include these activities in the overall timeline, incorporate milestones for such activities and dedicate the appropriate amount of knowledgeable resources to ensure success.
Considerations discussed in this chapter include:

- Data Governance
- Data Cleansing Activities—analysis, extraction, cleansing, data load to the staging environment, risk assessment
- Common or Shared Customer Considerations
- Data Extraction
- Determining Tools and Utilities
- Issue or Defect Tracking Repository
- Data Profiling
- Data Cleansing Rule Development
- System Test for Cleansing Recommendations
- Data Cleansing Report Verification
- Data Masking
- Data Migration Activities
- Data Migration Design
- Data Mapping
- Data Migration Verification or Testing
- Data Sampling

Chapter 12 – Organizational Change Management

Development of a comprehensive organizational change management (OCM) plan approach is critical to garnering buy-in, keeping stakeholders informed, managing expectations and appropriately assessing
outcomes of the system modernization program. It provides a systematic approach to managing the people side of change by focusing on managing communication, keeping employees and stakeholders informed, helping the organization recognize and develop required knowledge and skills for the future state, and providing tools and support to address emotions and behaviors commonly associated with change. Topics covered in this chapter include:

- OCM Success
- OCM Program Governing Principles
- Integration of the OCM Plan
- Change Readiness Assessment
- Managing Employees Expectations
- Stakeholder Management

Graphics are used in this chapter to illustrate: (1) the stages in which people process change, (2) expected outcomes for OCM, (3) the typical phases of change adoption in an organization, and (4) the flow of change-oriented information between management and staff.

Chapter 13 — Training

A training plan should be implemented early and continue for the life of the system. It describes the strategies, activities and tasks necessary to train personnel to operate the new systems successfully. Elements outlined in this chapter include:

- Business Objectives
- Training Plan
Chapter 14 — Communication

Effective communication plans identify the frequency of communications, how they will be distributed, who should receive a copy, who is responsible, the medium to be used, high-level key messages, appropriate dates and stakeholder contact information. Additional activities discussed:

- Define Roles
- Identify Internal Stakeholders
- Identify External Stakeholders
- Labor Relations or Collective Bargaining Agreements
- Interface Agreements
- Communications Resource
- Face-to-Face Communication
- Solicit Frequent Feedback
- Share Metrics and Continue Communicating
Chapter 15 — People and Facilities

Agencies often underestimate the importance of fully engaging and committing the right staff and the right number of backfilled staff prior to, during and after a system modernization project. Other staffing considerations include:

- Project Resources—people, equipment, facilities, funding
- Workforce planning—internal and external
- Business Resource Planning (internal and external)—PM, enterprise architect, organizational change management lead, contract compliance lead, data steward or migration lead, training lead, quality assurance or testing lead, business and IT subject matter experts, governance team
- Information Technology Resource Planning
- Staff Planning
- Equipment and Facilities
- Future State Staff Planning—modification, addition, elimination

*Whatever an agency can reasonably do to replicate the new environment will go a long way and should avoid the need for last-minute additions prior to a system going live.*
Chapter 16 — System Design and Development Lifecycle

Critical considerations outlined in this chapter include:

- Software Development Lifecycle (SDLC)—planning, analysis, design, implementation, maintenance
- Enterprise Architecture
- Gateway Reviews

Chapter 17 — Testing

Effective testing gives business and IT confidence that the system works as designed and offers an opportunity to address any issues prior to implementation. A test plan should be a required deliverable and should include:

- Scope
- Change Management
- Purpose and Objective
- Testing Cycle—planning, analysis and design, plan and script approval, implementation
- Testing Considerations—requirements, risks, roles and responsibilities
- Testing Methods
- Test Environment Planning
- Defect Management
- Reporting—test case readiness, plan progress, requirement test status, failure analysis, activity report, requirement coverage reports, defect status report
- Test Closure Activities
- Test Results and Sign-off

Chapter 18 — System Readiness

Identifying the key elements of system readiness cannot occur too early in the program. Elements include:

- System Readiness Planning
- Communications
- Deployment Planning
- Data Migration
- Deployment Preparations—go-live command center

A table describing applicable test methods is available in System Modernization Best Practices, pp. 70–71.

Chapter 19 — Long-Term and Ongoing Operational Support

It is important to consider whether the agency has sufficient resources and a desire to handle maintenance and support of its new modernized
Important considerations discussed in this chapter include:

- Transition Planning
- Code Releases—standard and emergency releases, permanent quality assurance (QA) and user acceptance testing (UAT) team
- Project Evaluation Report
- Logistical Operations—transitioning resources, returning to operations, program facilities, security
- Post-implementation and Ongoing Training
- Ongoing Operations
- Long-Term Planning—defect resolution, system enhancements and changes, infrastructure support
- Maintenance and Support Strategy
- Continuous Business Improvement and Modernization
- Data and Document Management
- Decommission Legacy System(s)
- End-of-Project Audit

Early in the project, an agency should weigh the pros and cons of available approaches and decide how to handle long-term maintenance and support.
Chapter 20 — Signs of a Troubled Project

Sometimes agencies and vendors do all the right things, yet a project fails. The best thing jurisdictions can do is keep an eye out for clues that challenges may exist, assess the issues that arise and take immediate corrective action. This chapter provides a list and description of warning signs, as well as recommended strategies for addressing issues such as:

- Lack of Sponsorship or Executive Support
- Extensive Resource Changes
- Missed Dates and Scheduling Adjustments
- Changes in Methodology, Scope, or Other “Contract” Modifications or Issues
- Process or Methodology Issues
- Lack of Communication and Collaboration
- Potential Legal Actions

Within Chapter 20 are several tables detailing a wide variety of strategies recommended to address potential project-killing issues that can arise.
Conclusion

Modernization of legacy systems is a complex process requiring significant people, resources, time and expertise to complete successfully. Comprehensive strategic planning and project management lead to better outcomes, as does preparing for and quickly addressing inevitable challenges and delays. By utilizing the provided roadmap, developed from lessons learned from trial, error, failure and triumph of others, agencies have a greater chance of success.

About AAMVA System Modernization Working Group

The System Modernization Working Group members offer more than 180 years of project experience. Its technical consultants offer an additional 100 years. Nearly 300 years of experience working for you!
safe drivers
safe vehicles
secure identities
saving lives!

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