

AGILE METHODOLOGY FOR SOFTWARE DEVELOPMENT AND DELIVERY FOR INFORMATION TECHNOLOGY

I. Purpose

The Department of Homeland Security (DHS) has established Agile development as the required approach for software development and delivery for Information Technology (IT) programs and projects. DHS Agile development policy is shaped by the Federal Chief Information Officer and Office of Management and Budget (OMB) guidance¹ on Modular development.

This instruction provides the scope, definitions, roles, responsibilities, and procedures to establish an Agile framework for IT software development programs and projects within DHS.

Note: *Agile software development is identified by different terminologies in several governance documents that are in effect. Therefore, to ensure full compliance, the terms 'Agile', 'Incremental', 'Iterative', 'Spiral', or 'Modular' Software Development are considered interchangeable.*

Programs/projects implementing Agile development are still subject to the requirements of the Acquisition Lifecycle Framework (ALF) and the Systems Engineering Life Cycle (SELC) established under Directive 102-01, as well as its implementing Instructions. This Instruction supplements the Acquisition Management Instruction, 102-01-001, and the SELC Instruction, 102-01-103.

II. Scope

This instruction applies throughout DHS to all IT and Mixed IT software development programs/projects within acquisition programs and non-IT acquisition programs that have hidden/shadow IT. This instruction also provides additional guidance through guidebooks to support the implementation of Agile methodologies.²

¹ 25 Point Implementation Plan to Reform Federal Information Technology Management (U.S. Chief Information Officer, December 9, 2010); Contracting Guidance to Support Modular Development (Office of Management and Budget, June 14, 2012)

² Instruction Manual 102-01-004-01, "DHS Agile Development and Delivery for Information Technology," provides specific examples of implementing Agile methodologies under the ALF.

III. References

- A. Public Law 113-291, "Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015", "Acquisition Policy, Acquisition Management, and Related Matters," Subtitle D, "Federal Information Technology Acquisition Reform"
- B. Title 40, United States Code (U.S.C.), Chapter 113, "Responsibility for Acquisitions of Information Technology"
- C. Title 41, U.S..C., Section 2308, "Modular Contracting for Information Technology"
- D. Federal Acquisition Regulation (FAR) Part 39, "Acquisition of Information Technology"
- E. OMB Annual Guidance for Circular A-11 Section 55, "IT Budget – Capital Planning Guidance"
- F. OMB Circular A-130, "Managing Information as a Strategic Resource"
- G. OMB Memorandum M-15-14, "Management and Oversight of Federal Information Technology"
- H. 25 Point Implementation Plan to Reform Federal Information Technology Management (U.S. Chief Information Officer, December 9, 2010)
- I. Contracting Guidance to Support Modular Development (OMB, June 14, 2012)
- J. DHS Delegation 00002, "Delegation to the Under Secretary for Management"
- K. DHS Delegation 04003, "Delegation to the Chief Technology Officer"
- L. DHS Directive 026-06, "Test and Evaluation" and associated Instructions and Guidebooks
- M. DHS Directive 102-01, "Acquisition Management Directive", and associated Instructions and Guidebooks
- N. DHS Directive 102-02, "Capital Planning and Investment Control"

O. DHS Directive 103-02, "Enterprise Architecture and Management" and associated supplemental guidance

P. DHS Agile Acquisition Software Delivery Core Metrics, Version 1.0, dated May 23, 2017

IV. Definitions

A. **Agile Development**: A development methodology that uses an iterative approach to deliver solutions incrementally through close collaboration and frequent reassessment.³ Agile development promotes continuous adaptive planning, development, testing, delivery/integration, and encourages rapid and flexible response to change between self organizing and cross functional teams.

Note: Agile development approaches support the Federal Chief Information Officer's goal to reform IT management and preference for modular acquisition approaches to release working functionality at least every six months."⁴ These timelines encompass the delivery of software from development into a production environment for use.⁵

B. **Agile Methodologies**: The specific principles, practices, and tools used to develop and deliver IT capabilities that adhere to the fundamental principles of Agile development. Agile is not one specific methodology, it is a conceptual framework implemented through various methods, delivering working, tested, and deployable IT solutions that are baselined under configuration control to increase value, visibility, adaptability, and to reduce program/project risk. Various Agile methodologies share much of the same philosophy, particularly the iterative nature of development, as well as many of the same characteristics and practices. However, from an implementation standpoint, each Agile method has its own set of practices, terminology, and tactics.

C. **Hidden/Shadow IT**: Refers to IT that is not fully transparent to the agency CIO and/or IT resources included as a portion of a program that is not primarily of an "information technology" purpose but delivers IT capabilities or contains IT resources. For example, a grants program that contains a portion of its spending on equipment, systems, or services that provide IT capabilities for administering or delivering the grants. (Source: OMB Circular A-130, FITARA Implementation Guidance, Appendix B, Definition of Terms, June 10, 2015)

³ OMB Circular A-130 10. Definitions 5) Agile Development

⁴ 25 Point Implementation Plan to Reform Federal Information Technology Management (U.S. Chief Information Officer, December 9, 2010)

⁵ 25 Point Implementation Plan to Reform Federal Information Technology Management (U.S. Chief Information Officer, December 9, 2010)

Note: Within the context of the acquisition management policy, 102-01, the term “Hidden/Shadow IT” is interchangeable with “Embedded IT” which is used in other governance policies.

D. **Information Technology:** Any services or equipment, or interconnected [or interfaced] system(s) or subsystem(s) of equipment, that are used in the automatic acquisition, storage, analysis, evaluation, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information by the agency. For purposes of this definition, such services or equipment is used by the agency directly or are used by a contractor under a contract with the agency that requires its use; or to a significant extent, its use in the performance of a service or the furnishing of a product. The term “information technology” includes computers, ancillary equipment (including imaging peripherals, input, output, and storage devices necessary for security and surveillance), peripheral equipment designed to be controlled by the central processing unit of a computer, software, firmware and similar procedures, services (including cloud computing and help-desk services or other professional services which support any point of the life cycle of the equipment or service), and related resources. (Source: OMB Circular A-130, FITARA Implementation Guidance, Appendix B, Definition of Terms, June 10, 2015)

E. **Information Technology (IT) Investment:** An expenditure of IT resources to address mission delivery and management support. This may include a project or projects for the development, modernization, enhancement, or maintenance of a single IT asset or group of IT assets with related functionality, and the subsequent operation of those assets in a production environment. (Source: OMB Circular A-130 10. Definitions 46) Information technology investment)

F. **Modular Contracting:** Contracting techniques that enable successive acquisitions of interoperable increments when acquiring major or non-major IT systems. Each increment needs to comply with common or commercially accepted standards applicable to information technology so that the increments are compatible with other increments of information technology comprising the system.⁶

⁶ See FAR Part 39.103 Modular Contracting for full definition

G. **Modular Development**: An approach that focuses on the delivery of specific investments, projects, or activities of an overall capability by progressively expanding upon delivered, baselined, and reusable capabilities until the full capability is realized. Investments may be decomposed into discrete projects, increments, or useful segments, each of which is undertaken to develop and implement products and capabilities that the larger investment delivers.⁷

H. **Software Development**: The process of conceiving, specifying, designing, programming, documenting, testing, baselining, updating, and bug fixing involved in creating and maintaining applications, frameworks, or other software components. Software development is a process of writing, maintaining, and building upon the source code, but in a broader sense, it includes all that is involved between the conception of the desired software through to the final manifestation of the software in a planned and structured process consistent with a systems engineering approach. Therefore, software development may include research, new development, prototyping, baselining, modification, reuse, re-engineering, maintenance, or any other activities that result in software products.

V. Responsibilities

A. **Chief Information Officer (CIO)**:

1. Manages the IT portfolio of the Department, and as such, sets the policies and procedures to ensure Agile development best practices are leveraged to meet the Department's goals and are within acquisition management policy established by Directive 102-01;
2. Certifies that software development projects within DHS investment (programs) are appropriately implementing incremental software development;
3. Reviews and approves IT investments to ensure appropriate tailoring and execution of Agile methodologies in consideration of the context of the specific programs and domains;

⁷ See Contracting Guidance to Support Modular Development (OMB, June 14, 2012)

4. With the Chief Procurement Officer (CPO), Component Acquisition Executives (CAE), Science & Technology Directorate's Director, Test and Evaluation (DOT&E), and Component CIOs, sets Agile outcomes and target measures, monitors the progress of DHS in achieving Agile outcomes, and reports (as required) to OMB and the Government Accountability Office (GAO) on DHS attainment of outcome metrics and associated benefits;
5. Supported by CPO, CAEs, DOT&E, Component CIOs, and the Office of Program Accountability and Risk Management (PARM), provides guidance, coaching, and mentoring for the adoption and execution of Agile development and associated contracts;
6. Serves as the overall Lead Technical Authority for Level 1, 2, and special interest IT programs/projects; and
7. Reviews and approves waivers submitted from projects/programs seeking a temporary exemption from the requirement to employ Agile methodologies. (Attachment A)

B. **Chief Procurement Officer.**

1. Supports DHS contracting organizations in implementing OMB guidance on modular contracting.
2. Supported by the CIO, CAEs, and PARM, provide guidance, and training for the adoption and execution of modular contracting in support of modular development for software development programs/projects.
3. Supported by the CIO, CAEs, DOT&E, and PARM, provides training opportunities and identifies appropriate Agile methodology training for acquisition program professionals, including PMs, test and evaluation personnel, system engineers, contracting officers, and logisticians.

C. **Chief Financial Officer** tailors, as necessary, OMB guidance regarding flexible budget and funding⁸ models that support Agile development of IT acquisition programs and distributes it to applicable parties within DHS.

⁸ This includes Planning, Programming, Budgeting, and Execution (PPBE) models.

D. Director, Office of Test and Evaluation, Science & Technology Directorate:

1. Provides independent test and evaluation (T&E) oversight for Level 1, Level 2, and special interest acquisition programs/projects, procurements, or capital investments using approved development methodologies based on authority and responsibility as directed in DHS Directive 026-06.
2. Works with acquisition programs/projects using Agile methodologies to develop integrated T&E strategies tailored to support Agile development in accordance with DHS T&E policy.
3. Provides T&E consultation to acquisition programs/projects, dependent upon available DOT&E staff resources.

E. Executive Director, Office of Program Accountability and Risk Management supports the Chief Acquisition Officer in managing DHS-wide acquisition program policy, governance, and oversight in accordance with Directive 102-01.

F. Component Chief Information Officers:

1. Provide oversight of their Component's Agile development approach for IT by appointing the responsible personnel, identifying investments for Agile adoption, and reviewing acquisition artifacts.
2. With CAEs, evaluate and approve the application of incremental development for software development programs/projects in IT, consistent with the Component's Agile development approach.
3. With CAEs, validate that the program/project is reporting the DHS Agile Acquisition Software Delivery Core Metrics in INVEST (or a follow-on system) for programs/projects on the Master Acquisition Oversight List (MAOL) or required by Component.
4. With support of the CAE, require PMs and other stakeholders to apply Agile methodologies for IT software development programs/projects within DHS acquisition programs, where appropriate.
5. Work with the DOT&E, and with the support of the CAE, to ensure programs/projects using Agile methodologies develop integrated T&E strategies tailored to support Agile development in accordance with DHS T&E policy.

6. Set modular outcomes and target measures and provide Subject Matter Expertise support to program managers, as necessary, to monitor progress in achieving Agile implementation for programs/projects within their Component such as software development roadmaps including requirements cut-off dates, build phases, T&E, configuration management baseline declaration, and release as depicted in Attachment B.

G. **Component Chief Financial Officers:**

1. Present program/project and budget requests that clearly describe the capability of the requested program/project and that justify its modular aspect and effectiveness to the Department's mission.
2. Certify, throughout the program/project and budget review process, that the program/project is fully resourced. If the program/project is not fully resourced, the Component needs to identify the trade-offs necessary to fund the acquisition within existing resources, or reduce performance/scope and/or schedule to make the acquisition affordable.
3. Assess near term IT modernization requirements and request appropriate early-funding for defining appropriate solution architecture.

H. **Component Acquisition Executives:**

1. Supported by Component CIOs and Heads of Contracting Authority (HCA), oversee Component programs (or delegated programs) to ensure compliance with this instruction.
2. With support of the Component CIO, ensure PMs and other stakeholders apply Agile methodologies for IT software development programs/projects within DHS acquisition programs, where appropriate.
3. With Component CIOs, provide information to the DHS CIO to support certification that Component IT software development programs/projects are appropriately implementing incremental software development, to include ensuring that it is reported in the DHS system of record data residing in the Investment Evaluation, Submission, and Tracking System (INVEST) (or a follow-on system).
4. With Component CIOs and HCAs, measure progress in achieving Agile outcomes and help to identify benefits.
5. Provide support to the Component CIO to ensure programs/projects using Agile methodologies develop integrated T&E strategies tailored to support Agile development in accordance with DHS T&E policy.

I. **Component Lead Business Authorities (LBA)** identify and prioritize usable functionality⁹ for implementation in cycles no longer than 6 months, unless there are mitigating circumstances.

J. **Component Lead Technical Authorities (LTA)** identify technological opportunities, critical technologies, maturity of technologies, commercial off the shelf (COTS) potential, and approaches for incorporating best technologies into systems.

K. **Program and Project Managers (PM):**

1. Implement Agile methodologies where applicable to gain agility, accelerate delivery of capabilities to users, and reduce risk with the assistance and support of LBAs and LTAs.

2. Enter required metrics into INVEST (or follow-on system) for software development programs, projects, and activities.

VI. Contents and Procedures

A. **Agile Development Procedures and Considerations for Major Programs/Projects:**

Major program/project acquisition is governed by Directive 102-01, the Acquisition Lifecycle Framework (ALF), Systems Engineering Life Cycle (SELC), and Homeland Security Enterprise Architecture (HLS EA). Major programs/projects are required to have acquisition and SELC review processes, events and artifacts, governance and oversight, and decision authorities as described in Sections A.1 - A.10 (below):

1. An early decision that any program team makes is the selection and employment of the developmental methodologies to execute the program's/project's systems engineering effort. The development methodologies are linked to the acquisition strategy a program/project follows. All development methodologies can be tailored under the SELC framework. Development methodologies are not mutually exclusive and can be used in conjunction with one another in an overall program/project to achieve the greatest efficiency. Additional details are provided in DHS Agile Development and Delivery for IT Instruction Manual 102-01-004-01.

⁹ Usable functionality is defined in most situations as a new or enhanced IT capability used by one or more customers in production.

2. Attachment B depicts a typical example of a SELC tailored path for IT Incremental Software Development including the ALF and EA reviews (“Golden Path”). The entrance criteria for the Acquisition Decision Events (ADEs) are established per Acquisition Management Instruction 102-01-001.
3. New programs/projects are required to use Agile development and need to document their use of Agile in their SELC tailoring plan. The SELC tailoring plan is initiated in the *Analyze/Select Phase* of the ALF and approved no later than Acquisition Decision Event (ADE)-2A, or the equivalent component level acquisition decision milestone, in the *Obtain Phase*. The SELC tailoring plan also identifies the specific activities, reviews, and artifacts modified or tailored out in support of the selected Agile methodology.
4. As programs/projects conduct *Mission Analysis* and early *Need Phase* activities, PMs should work with the component CFO or organization's/Directorate's budget office to request funding to enable bringing in any necessary external support.
5. As part of the planning effort leading to the ADE-2B decision milestone, stakeholders are to ensure that sufficient time remains in their release roadmap to allow the first delivery of capability to occur no later than 6 months, and ideally, less than 3 months following the ADE-2B decision unless a sound justification is made to extend this timeframe.
6. Programs/projects implementing Agile shall utilize the Lean Analysis of Alternatives (AoA). Guidance on the Lean AoA is available from PARM.
7. Programs/projects implementing Agile shall utilize Simplified Function Point Analysis (SFPA) to estimate the cost of their program and to track the development progress over time. Guidance on the SFPA method is available from OCFO/Cost Analysis Division.
8. For each program/project, the PM and appropriate stakeholders develop a release roadmap that identifies the proposed scope of each release with the first delivery occurring 6 months or less following the ADE-2B and subsequent releases targeted for 2-3 month intervals, or less, after the first. Under this release roadmap, the approval authority for subsequent releases may be delegated to the CAE (in writing). The Acquisition Decision Authority (ADA) may conduct a program/project review to align with the release cycles identified in the roadmap, or at any time if programmatic and/or technical risks or issues are identified during any release cycles.

9. For IT software development projects within DHS acquisition programs in the *Produce/Deploy/Support/Dispose Phase* of the ALF, if an operational analysis determines that major enhancements are required, then the program/project needs to seek and obtain approval/concurrence for a new development effort to start. Once approved then the guidance in Sections VI.A.2 and VI.A.3 applies.

10. If the program/project has transitioned part of the planned capability into Operations & Maintenance, but continues as a developmental program, then enhancements, fixes, or business process impacts are to be planned and programmed for as necessary and included in future releases so long as these changes are within the scope of the specific program's/project's release roadmap.

B. *Agile Development Procedures and Considerations for Non-major and Delegated Programs:*

In order to effectively implement the adoption of Agile development across the DHS enterprise, non-major and delegated programs/projects are also required to follow Directive 102-01, Component's acquisition management policy, or demonstrate that they have equivalent events and artifacts, governance and oversight, and decision authorities as described for major programs/projects in Sections VI.A.1 through VI.A.6 or appropriate tailoring that aligns to them.

C. *DHS SELC and Agile Guidebooks and Additional Resources:*

The DHS SELC Guidebook provides a highly tailorable and complete life-cycle framework for DHS acquisition programs/projects. Using critical thinking and the SELC Tailoring Guidance Section, the PM and stakeholders can develop a sound Agile approach and detailed set of activities, artifacts, and reviews that match the specific situation of the program or project. The SELC Guidebook describes Agile methodologies at a high level in the Tailoring Guidance Section. Agile acquisition processes are described in more detail in Instruction Manual 102-01-004-01, DHS Agile Development and Delivery for IT. Other considerations, such as strategic planning, Enterprise Architecture, etc., are contained in the Instruction Manual.

D. *Component Compliance:*

1. Annually, the Component CIO appraises the CAE and OCIO of:
2. The number and percent of their IT software development programs/projects that have applied an Agile methodology or plan to do so (with timeframes).

3. Justification for any IT software development projects supporting major DHS acquisition programs that are not intending to use Agile development.
4. Components with IT acquisition programs/projects must adhere to the OMB annual IT Budget Capital Planning Guidance requirements for software development by updating INVEST (or a follow-on system). In addition, the DHS Agile Acquisition Software Development Core Metrics must be updated on a monthly basis. The PM is the responsible party for ensuring that INVEST data is updated every month (with validation by the Component CIO and CAE).
5. Components clearly identify on OMB business case submissions whether, for each program/project, functionality is delivered within the time frames indicated in this instruction, and provide justification for programs/projects that do not plan to do so.
6. Components with Level 1 and 2 IT acquisition programs/projects that are unable to meet any or some Agile certification criteria are required to submit a waiver request specifying their timeframe for compliance (maximum of one year) (Attachment A).
7. Programs/projects that wish to be exempted from complying with the requirement to use Agile Development must submit a waiver (maximum of one year) (Attachment A).

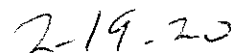
VII. Questions

Address questions or concerns regarding this Instruction to the Office of the Chief Information Officer (OCIO), or dhsocito@hq.dhs.gov.



R. D. Alles

Senior Official Performing the Duties of Under
Secretary for Management



Date

Attachment A: Waiver for Exemption



DEPARTMENT OF HOMELAND SECURITY
OFFICE OF THE CHIEF INFORMATION OFFICER

WAVIER FOR EXEMPTION: Applying and developing software using Agile methodologies per DHS Instruction 102-01-004 *Agile Methodology for Software Development and Delivery For Information Technology*

<Component Name>

<Program/Project Name>

<Component Name> requests approval on behalf of <Program/Project Name> for exemption from the requirements for Agile compliance laid out in DHS Instruction 102-01-004: *Agile Methodology for Software Development and Delivery for Information Technology*.

Justification for request: <Specify by section number which compliance requirements from the Instruction the Program/Project are requesting be waived. Specify a finite amount of time the Program/Project is requesting each requirement be waved (maximum one year). Attach any supporting documentation to support all claims to the end of this waiver>

- 1.
- 2.
- 3.
- 4.

Submitted by:

Signature: _____
<Program/Project Manager>

Signature: _____
<Component CIO>

Signature: _____
< Component CAE>

Attachment A: Waiver for Exemption

[For completion by the DHS OCIO]

Based on the reasoning and evidence submitted, the Office of the Chief Information Officer has determined that the [Program//Project Name>:

___ Has met the requirements to waive DHS Instruction 102-01-004 compliance.

___ Has not met the requirements to waive compliance obligations as described in DHS Instruction 102-01-004. Reasons for the disapproval are listed below <Provide reason(s) for disapproval. >

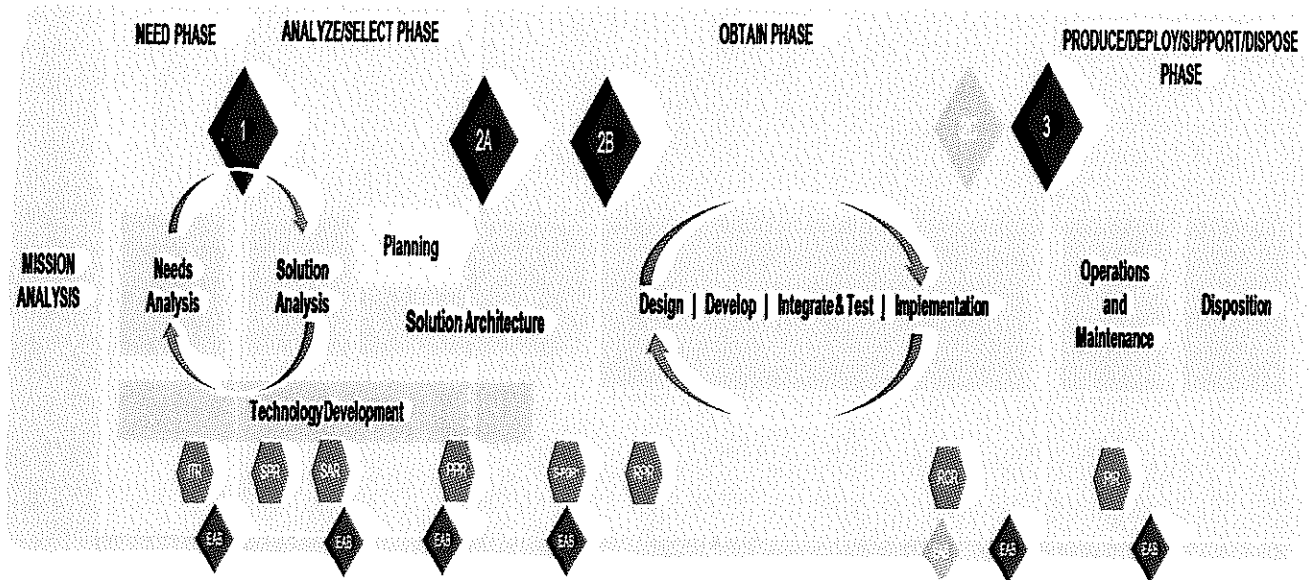
___ Has partially met the requirements to waive the required compliance to DHS Instruction 102-01-004. Conditions of this partial waver are:

1. <If applicable, list conditions here>
- 2.

Signature: _____

Chief Technology Officer, Department of Homeland Security

IT Incremental Software Development Golden Path (Typical)



System Level (Systems Engineering) Reviews

- ITR: Initial Technical Review
- SPR: Study Plan Review
- SAR: Solution Analysis Review
- PPR: Program Planning Review
- *S-PDR: Software PDR (Combines elements of SDR, PDR, RPR)
- RPR: Release Planning Review
- RCR: Release Cycle Review
- PIR: Post Implementation Review

GRAPHIC LEGEND

Acquisition Lifecycle Framework (ALF) Phase

Systems Engineering Life Cycle (SELC) Activity

Other DHS Activity

◆ Acquisition Decision Event
 Decision Event

▨ System Level (Systems Engineering) Review
 JRC & ALF Program Management Activities

◆ Enterprise Architecture Board
 SELC & ALF Program Management Activities