



Emergency Communications System Lifecycle Planning Guide

Compendium: Best Practices, Considerations, and Recommended Checklists



Homeland
Security

EXECUTIVE SUMMARY

The Department of Homeland Security (DHS) Office of Emergency Communications (OEC), in coordination with SAFECOM and the National Council of Statewide Interoperability Coordinators (NCSWIC), is pleased to present a compendium to the *2011 Emergency Communications System Lifecycle Planning Guide, (Lifecycle Guide)* which provides additional information about public safety communications system lifecycle planning in light of changes in the field. In particular, this document takes a more comprehensive approach to the lifecycle by incorporating a Pre-Planning Phase as well as recommendations for technological innovation and implementation. It is meant for stakeholders to use in their efforts to fund, plan, procure, implement, support, and maintain public safety communications systems, and eventually to replace and dispose of system components. This document provides considerations and recommended actions through easy-to-use checklists for each phase of the system lifecycle planning model.

OEC supports and promotes communications used by emergency responders and government officials to keep America safe, secure, and resilient. The office leads the Nation's operable and interoperable public safety, national security, and emergency preparedness communications efforts. To accomplish this, OEC provides training, coordination, tools, and guidance to help its federal, state, local, tribal, territorial, and industry partners develop their emergency communications capabilities.

In support of its mission, OEC collaborates with SAFECOM and NCSWIC to ensure public safety stakeholders drive content in guidance documents intended for the entire public safety community. This collaboration resulted in the *2011 Emergency Communications System Lifecycle Planning Guide*, which defined system lifecycle phases, goals and products, stakeholder involvement, roles and responsibilities, and items for consideration in each phase. The *Lifecycle Guide* provided recommendations for agencies interested in building, maintaining, and operating an emergency communications system through decommission and replacement.

Since publishing the *Lifecycle Guide* in 2011, the emergency communications ecosystem has evolved. Today, a more complex and interdependent ecosystem has emerged due to new policies, stakeholders, technologies, and risks impacting emergency communications. Key factors influencing the landscape include the reduction and streamlining of grant programs; recent national guidance, policies, and laws, such as the updated *2014 National Emergency Communications Plan (NECP)*; and industry developments in technologies and services, such as planning for a nationwide public safety broadband network (NPSBN) and other next generation technologies. To account for these changes, public safety stakeholders recommended OEC update the *Lifecycle Guide* and other guidance materials.

OEC, in collaboration with the Joint SAFECOM and NCSWIC Funding and Sustainment Committee, developed this document as a compendium to the original *2011 Emergency Communications System Lifecycle Planning Guide*. It builds upon recommendations and addresses changes within the ecosystem, key issues, and gaps identified since the 2011 release, including:

- Accounting for the evolving emergency communications ecosystem as described in the 2014 NECP, in which emergency response agencies are shifting to broadband services and other advanced technologies. Recognizing the eventual implementation of new communications technologies and services, but acknowledging traditional land mobile radio (LMR) will continue to have its place in public safety communications for the foreseeable future. This document contains related considerations, such as those addressing cybersecurity risks and the adoption of technical standards.
- Expanding the system lifecycle planning model to include pre-planning. The *Lifecycle Guide* assumed the project was already approved and funded. This update adds the *Pre-Planning Phase* to provide guidance and best practices to help agencies assess needs, build a strong request for

proposals, and garner widespread support and a commitment of funding—not just for the initial capital investment, but for the entire system lifecycle.

- Clarifying system lifecycle planning is not a *one-time investment*. Many elected officials and decision-makers should better understand communications systems maintenance and funding requirements throughout the lifecycle. This document recommends specific steps and tools to assist project planners who need to convey system lifecycle information to leaders.

Each phase of the system lifecycle planning model—Pre-Planning; Project Planning; Request for Proposals and Acquisition; Implementation; Support, Maintenance, and Sustainment; End-of-Lifecycle Assessment and Replacement; and Disposition—includes best practices, considerations, and recommended checklists to assist public safety agencies embarking on system lifecycle planning. Specifically, the checklists are designed to be torn-out, referenced, and used by project management teams throughout the system lifecycle. **Figure ES.1** summarizes the system lifecycle planning model phases and high-level recommendations contained in this document.

Figure ES.1: System Lifecycle Planning Model and Recommendations Summary

Planning Model	Recommendations
<p>Phase 1: Pre-Planning Timing: 6–12 months Goals: Inform and secure the decision to replace, upgrade, maintain, dispose of, and/or acquire a new system</p>	<ul style="list-style-type: none"> • Establish the core planning team • Research and develop system and funding options • Decide on the optimal and alternative solutions with funding options • Plan for frequency needs and channel programming • Develop a business case, presentation materials, and strategic plan • Identify a legislative- or executive-level project champion • Present to decision-makers and secure funding to support the initial build-out and sustain the system throughout the entire lifecycle
<p>Phase 2: Project Planning Timing: 6–18 months Goals: Formalize the project team; identify operational and technical requirements for system replacement and upgrade; and develop the project plan</p>	<ul style="list-style-type: none"> • Consider how long the planning process can take and communicate expected timeframes to elected officials • Collect user needs and requirements and incorporate into project plans • Engage with communications leaders early for guidance and support (e.g., Statewide Interoperability Coordinators [SWIC], Statewide Interoperability Governing Bodies [SIGB]) • Identify strong Project Sponsors (e.g., state or local elected officials) • Begin planning the Request for Proposals (RFP)
<p>Phase 3: RFP and Acquisition Timing: 6–12 months Goals: Select the appropriate procurement vehicle and procure systems and components</p>	<ul style="list-style-type: none"> • Develop a written action plan • Form the RFP team • Develop the Statement of Work (SOW) • Include specifications or requirements in the RFP • Establish written evaluation criteria well before the award • Conduct a formal objective review process and document results
<p>Phase 4: Implementation Timing: 12–18 months Goals: Develop an implementation plan; install new systems; test; train users; and transition from legacy to new</p>	<ul style="list-style-type: none"> • Develop the implementation plan • Understand and document testing procedures (e.g., factory testing, staging, site installation and testing, coverage verification, testing and acceptance, cut-over, final acceptance) • Update operational procedures and train users • Promote new communications capabilities and benefits to the community
<p>Phase 5: Support, Maintenance, and Sustainment Timing: Year(s) 1–25 Goals: Inventory and maintain equipment; manage budget; and assess and communicate needs</p>	<ul style="list-style-type: none"> • Maintain an accurate inventory of equipment (e.g., scope, database tool, inventory team, processes to compile and secure data) • Determine and execute an ongoing maintenance and operations model • Manage the budget when the project is conceived, directly before it is funded, and after delivery • Share communications needs with decision-makers early and continually
<p>Phase 6: End-of-Lifecycle Assessment and Replacement Timing: Years 7–25 Goals: Determine when to replace systems or components with solutions to best fit operational and technical needs</p>	<ul style="list-style-type: none"> • Conduct ongoing assessments of current system (e.g., implement a balanced scorecard) to plan for technology maturity • Refresh or upgrade systems, as needed, to extend the life • Determine potential replacement solutions, with consideration to support national, state, and regional interoperability initiatives; consider early adoption of new technologies; and adhere to widely-used technical standards
<p>Phase 7: Disposition Timing: 90 days after cut-over or transition Goals: Determine options and dispose of legacy systems or components</p>	<ul style="list-style-type: none"> • Develop the disposition plan • Determine options (e.g., reuse or repurpose old components, consider space availability, convey surplus equipment to partner agencies) in consideration of legal or policy limitations, and business requirements • Brief leaders on disposition plans • Identify lessons learned following disposition

TABLE OF CONTENTS

EXECUTIVE SUMMARY	I
INTRODUCTION.....	1
UPDATED PLANNING MODEL	2
ABOUT SAFECOM / NCSWIC	3
EMERGENCY COMMUNICATIONS SYSTEM LIFECYCLE PHASES.....	4
1. PRE-PLANNING.....	4
2. PROJECT PLANNING	8
3. REQUEST FOR PROPOSALS AND ACQUISITION	11
4. IMPLEMENTATION	14
5. SUPPORT, MAINTENANCE, AND SUSTAINMENT	18
6. END-OF-LIFECYCLE ASSESSMENT AND REPLACEMENT	25
7. DISPOSITION.....	28
CONCLUSION	30

INTRODUCTION

In 2011, the Department of Homeland Security (DHS) Office of Emergency Communications (OEC) released the *Emergency Communications System Lifecycle Planning Guide* (referred hereafter as the *Lifecycle Guide*) to better enable practitioners to plan for and deploy public safety communications systems. The *Lifecycle Guide* defined six phases of the system lifecycle: planning, acquisition, implementation, maintenance, refreshment, and disposition of communications systems. It provided an overview of each phase, including goals and products, stakeholder involvement, roles and responsibilities, and items for consideration. In short, the *Lifecycle Guide* provided recommendations for stakeholders interested in building, maintaining, and operating an emergency communications system through the time to decommission and replace.

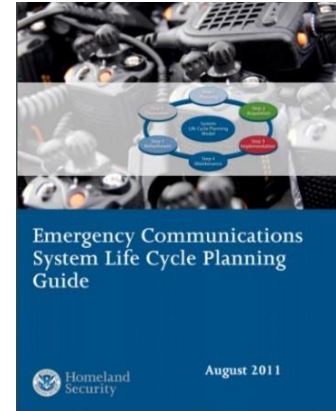


Figure 1: 2011 Lifecycle Guide Cover

Since the *Lifecycle Guide*'s publishing in 2011, circumstances have changed and the emergency communications ecosystem (i.e., communications across government entities and partners and with the public) continues to evolve. Public safety stakeholders have seen a decrease in federal, state, and local funding, which affects their ability to maintain, sustain, or upgrade emergency communications systems. Available funding for interoperable communications has also shifted toward supporting, adopting, and integrating advanced technologies (e.g., Internet Protocol [IP]-based and broadband equipment) for public safety.

In 2012, the Federal Government expanded its focus on supporting interoperability between individual state and local land mobile radio (LMR) systems by funding the development and deployment of a single, nationwide public safety broadband network (NPSBN) designed to enhance interoperability nationwide.¹ The NPSBN will eventually support public safety agencies across the country and enable public safety to access, transmit, and share important data. While public safety agencies are excited to adopt advanced technologies and improve data capabilities, the NPSBN will not offer mission critical voice capabilities from the outset, which complicates lifecycle planning and decisions regarding LMR system upgrades and replacements.

Until the NPSBN can provide mission critical voice capabilities, the public safety community will continue to rely on LMR as its primary source to achieve mission critical voice communications in the field. As a result, many agencies have prioritized maintaining LMR systems and other emergency communications capabilities gained in recent years as they gradually adopt and deploy IP-based technologies and services for data access and transmission.² This convergence of technologies presents new challenges for public safety agencies responsible for maintaining and financing these systems.

In 2014, DHS published the revised [National Emergency Communications Plan](#) (NECP), which provided information and guidance to those who plan for, coordinate, invest in, and use communications to support response and recovery operations. The NECP ensures strategies, resource decisions, and investments for emergency communications keep pace with the evolving environment, and the emergency response community is collectively driving toward a common end-state for communications. DHS recognizes how advanced technologies have helped to integrate current systems and increased the flow of communications among public safety agencies and with the public. Furthermore, with the emergency communications ecosystem expanding, there is a greater need for coordination among agencies and a broader set of partners, given increased connectivity and flow of information.³

¹ For more information on the NPSBN, see the First Responder Network Authority website at: <http://www.firstnet.gov>.

² See the DHS *Public Safety Communications Evolution Brochure* at: <http://www.dhs.gov/publication/lmr-and-broadband-evolution>.

³ For more information, see the 2014 [National Emergency Communications Plan](#) discussion on the “Communications Ecosystem” (pages 10-14) and the need for increased coordination among public safety agencies responsible for responding to natural disasters and acts of terrorism.

Public safety agencies are experiencing an increase in data shared across jurisdictions, disciplines, and agencies at various levels of government. This creates the need and opportunity for public safety agencies to increasingly coordinate with other agencies. Many agencies are already working together to incorporate advanced technologies to support regional systems, and to develop formal governance structures, joint processes, and procedures to improve emergency communications and response.⁴ This increased level of coordination and complexity affects system lifecycle planning, especially as agencies prepare to integrate systems and share infrastructure, equipment, and costs.

Updated Planning Model

To encompass the emergency communications ecosystem changes into an updated *Lifecycle Guide*, OEC collaborated with Joint SAFECOM and the National Council of Statewide Interoperability Council (NCSWIC) Funding and Sustainment Committee (Committee) to gather input from members and other public safety stakeholders responsible for various aspects of the emergency communications ecosystem. The Joint SAFECOM and NCSWIC Funding and Sustainment Committee acknowledged the environment is extremely complex and technology is evolving quickly, making it difficult for public safety agencies to assess technological and financial options for communications systems. Decision-makers are also struggling to understand new technologies' features and limitations as well as their funding implications.

To address these challenges, the Committee developed a trio of documents on LMR technologies to inform decision-makers and identified options for funding public safety communications systems.⁵ These documents emphasize the need to sustain LMR systems and clarify funding requirements for ongoing maintenance, operations, and upgrades—not simply initial capital costs. The Committee applied its findings, including best practices and recommendations on each phase of the system lifecycle, to update the *Lifecycle Guide* as follows:

- (1) Public safety stakeholders are encouraged to consider all options of a project proposal (e.g., technological, funding, cost-benefits) *before* seeking funding. The *Lifecycle Guide* assumed the project was already approved by decision-makers and funders when, in fact, this pre-approval phase (i.e., the approval to proceed from agency officials, appropriators, legislators, executive-level state leaders, or the voting public) is one of the most difficult steps for public safety officials. Thus, a Pre-Planning Phase has been added to the system lifecycle planning model, along with best practices and key considerations to help the project team assess needs, build a strong project, and garner widespread support and commitment to funding.
- (2) Public safety stakeholders requested examples of funding methods other state and local officials were using to fund public safety communications systems. The Committee collected examples of funding approaches throughout the year and compiled the [Funding Mechanisms for Public Safety Communications Systems](#). This document provides an overview of several methods of funding (e.g., bonds, taxes, grants) and examples of how these methods were used in state and local systems. These funds can be used for planning, capital costs, ongoing costs, refreshments, upgrades, and replacements. The document also provides examples of cost-saving methods, including innovative financing programs and information on shared systems.

Figure 2 depicts the updated system lifecycle planning model with seven phases, including the anticipated time of each phase. Best practices and recommended checklists for each phase are detailed in this document.

⁴ For governance best practices, see the DHS [Governance Guide for State, Local, Tribal, and Territorial Officials](#).

⁵ SAFECOM/NCSWIC Funding and Sustainment Committee documents, including the *LMR Trio* and *Funding Mechanisms for Public Safety Communications Systems*, are available at: <https://www.dhs.gov/safecom/funding>.

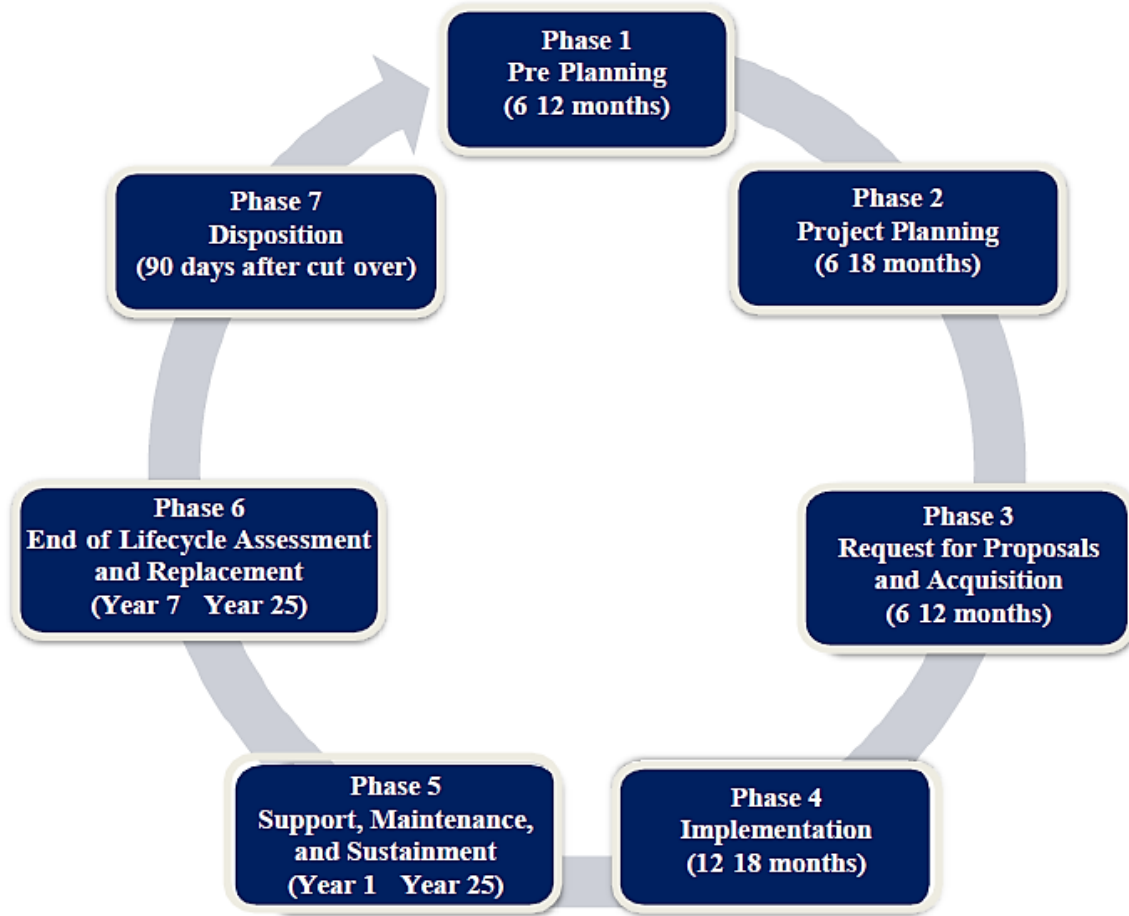


Figure 2: Updated System Lifecycle Planning Model

About SAFECOM / NCSWIC

SAFECOM is comprised of more than 70 members representing federal, state, local, and tribal emergency responders, and major intergovernmental and national public safety associations, who aim to improve multi-jurisdictional and intergovernmental communications interoperability through collaboration with emergency responders and policymakers across federal, state, local, tribal, territorial, and international partners. SAFECOM members bring years of experience with emergency communications during day-to-day operations, and natural and man-made disasters. SAFECOM members offer insight and lessons learned on governance, planning, training, exercises, and technologies, including knowledge of equipment standards, requirements, and use. SAFECOM members also provide input on the challenges, needs, and best practices of emergency communications, and work in coordination with DHS to share best practices and lessons learned with others.

The NCSWIC is comprised of Statewide Interoperability Coordinators (SWIC) and their staff from the 56 states and territories. NCSWIC assists states and territories with promoting the critical importance of interoperable communications and sharing best practices to ensure the highest level of interoperable communications within and across states and with their international partners along the borders.

This Joint SAFECOM and NCSWIC Funding and Sustainment Committee developed the document with support from OEC. This document reflects the expertise and knowledge of SAFECOM and NCSWIC members, and the coordination efforts of OEC in bringing stakeholders together to share technical information, best practices, and lessons learned in funding and deploying public safety communications systems. Questions on this document can be sent to: SAFECOMGovernance@hq.dhs.gov and NCSWICGovernance@hq.dhs.gov.

EMERGENCY COMMUNICATIONS SYSTEM LIFECYCLE PHASES



1 Pre-Planning (6–12 months)

As the first step in the *Lifecycle Guide*, the goal of the Pre-Planning Phase is to inform and secure the decision and funding needed to replace, upgrade, maintain, dispose of, or acquire a communications system. A key take-away in this phase is to identify funding options not just for the initial capital investment, but for the entire system lifecycle (e.g., acquisition, maintenance, and upgrades), and to secure funding commitments before proceeding to the Project Planning Phase.

Recommendations

The following recommendations are provided to assist public safety agencies embarking on communications system planning:

- **Establish a core planning team.** The core planning team may be comprised of the SWIC; agency officials; technical staff; affected users; and, procurement, financial, and legal staff. The core planning team should include representatives of agencies affected by the project who have full authorization to participate on behalf of the agencies they represent. The team should consist of combinations of key personnel from the technical and operational areas, and include (i) an Executive or Steering Committee; (ii) User Committee; (iii) Technical Committee; and, (iv) Ad Hoc Working Groups.
- **Identify the problem, needs, and requirements.** Project planners should investigate the current system faults, user needs, and project requirements, such as:
 - Diminishing performance of current systems or equipment
 - End-of-lifecycle or lack of availability of replacement equipment
 - Staffing for implementation and sustainment
 - Whether maintenance costs outweigh replacement costs
 - Lack of coverage or capacity for critical users
 - Need to close gaps in capabilities or improve capabilities
 - Desire to add new users
 - Cost-efficiencies that could be achieved by the proposal
 - Expertise needed for the project
- **Research system options.** Project planners may choose to develop and release a Request for Information (RFI). An RFI is a formal, non-binding request for information about current technologies and services offered by vendors based on functional requirements and user, business, and system needs and requirements set by the entity.

RFIs help agencies gain a better understanding of solutions, services, and options to determine the appropriate procurement method and draft associated solicitation documents. For a sample RFI, agencies should review Seattle, Washington's 2011 RFI seeking information on a [Public-Private Partnership for the Purpose of Providing State-of-the-Art Wireless Mission-Critical Voice and Broadband Data Capabilities for Public Safety and General Government](#). This RFI was developed in collaboration with ten state and local governments, and endorsed by the Chief Technology Officer in the Office of Science and Technology Policy in the White House. It is an innovative model that could support other state and local efforts.

- **Research funding options.** Project planners should review the [Funding Mechanisms for Public Safety Communications Systems](#), which provides examples of funding methods to support planning, capital, replacement, and ongoing costs for public safety systems. The document also provides examples of states and localities that utilize various funding methods to pay for system upgrades, replacements, and ongoing costs.
- **Determine an approach.** Project planners should evaluate both technical system and funding options, and decide on a limited set of approaches (1-3) to present to decision-makers. The team must fully understand options, including strengths and weaknesses, and clearly convey information. Experienced officials caution that planners frequently approach decision-makers too early in the process, before the team has assessed user requirements and understands all options. Best practices for evaluating approaches include:
 - Research and record options in writing *before* approaching decision-makers
 - Weigh strengths and weaknesses of system options and feasibility of funding
 - Develop consensus on an optimal approach and “next best” approaches
 - Create a one-page fact sheet on basic requirements, recommended approach, and summary of alternative approaches; reference the [System Lifecycle Planning Tool](#)
- **Plan for frequency needs and channel programming.** To use communications systems effectively, responders must have access to channels used for all types of events, including multi-disciplinary and multi-jurisdictional response. Planning radio channel usage and programming interoperability channels into equipment in advance of an emergency or planned event enhances preparedness. If communities plan their communications systems and operations to meet only their perceived immediate needs, they will be less able to give or receive assistance. Interoperability in the form of mutual aid to adjacent jurisdictions, other disciplines, or assistance to distant areas suffering a major disaster requires advanced planning, including interoperable communications pre-programming.

DHS published the [Programming Guide and Template for Interoperability Channels](#) to assist technicians to program radios. The template is consistent with the Federal Communications Commission and the National Telecommunications and Information Administration rules and regulations, and the National Public Safety Telecommunications Council’s standard channel nomenclature.

- **Create a business case, talking points, and marketing materials.** Before discussing with decision-makers, project planners should develop a business case outlining why the system should be funded. A successful business case must demonstrate the value of the interoperability effort, provide a clear picture of the future of interoperability in the community, and speak to the interests and concerns of community leaders. DHS published guidance to help stakeholders develop effective business plans for interoperability projects in the [Interoperability Business Case: An Introduction to Ongoing Local Funding](#). This guidance helps emergency response officials develop a compelling business case by presenting steps and considerations to follow and to tap into local funding sources.

In addition to creating a strong business case for funding purposes, project planners and the core planning team should develop simple talking points on the business case to present to decision-makers and funders. Developing talking points helps ensure the whole team is involved in creating a business case, and the message regarding needs and options is comprehensible and consistent. Lastly, project planners should develop concise marketing materials to inform decision-makers, funders, and their staff. Materials left with decision-makers or funders should be concise, so decision-makers can easily understand the problem and recommended solution as well as consider alternatives.

- **Identify executive-level project champions.** Once project materials are created, project planners should identify one or more “champions” to review presentation materials, provide professional input

on messaging and approach, help usher the project through executive and legislative processes, and manage roadblocks. Experienced officials report how champions have helped the core planning team:

- Incorporate useful advice into the project and presentation materials
 - Connect to state and local experts (e.g., technical, procurement)
 - Coordinate with other initiatives and partners which could support the project
 - Gain access to leaders and elected officials
 - Learn about state and local funding processes
- **Present proposal to decision-makers.** After consultation with the team and project champion(s), project planners should begin to communicate, through formal and informal means, the proposal with decision-makers to obtain necessary approvals and funding. With the help of the project champion(s), planners should gain access to key officials, navigate the local decision-making process, and build support for the proposal.

Key Considerations

Timing for the Pre-Planning Phase can vary greatly depending on the status and coordination history of emergency communications leaders and governing bodies across the whole community. Ideally, agencies should begin pre-planning activities several months to a year *before* funding is needed. Project planners should consider the following when developing project plans and securing funding:

- **Proposals cannot be funded immediately.** Experienced officials report securing funding for a communications project often takes a year or more. This is due to the ongoing nature of state and local budget processes, which are often finalized long before an annual budget is passed. Agencies seeking funding need to understand the relevant funding cycle and determine (with state and local leaders, or their champion) the optimal timeframe for submitting a funding request, and when funding will be allocated (if approved). Many factors drive the amount, availability, and access to funding, including:
 - Federal budget cycle and grant deadlines
 - State/local budget cycles and timelines for submitting project proposals or budget requests
 - Mandated programs or pre-determined priorities (funding already allocated to other projects)
- **Strategic plans provide context for decision-makers.** A strategic plan should establish a single, overarching goal for improving public safety communications. The plan should then divide a large communications initiative into several smaller projects that could be funded and implemented in phases over time. This allows decision-makers to understand how each smaller project is an integral part of a larger plan. Experienced officials recommend dividing projects into phases to help an agency effectively manage the project—both technically and financially.
- **Communications projects compete for funding.** State leaders are aware of the importance of emergency communications for public safety; however, they are charged with creating a budget addressing a variety of state and local needs beyond emergency communications. Project planners must be fully prepared to provide decision-makers with a written proposal, including benefits to the community, and promote confidence in the project and the core planning team.
- **Agencies must proactively assess and present requirements before a system fails.** Project planners should continually assess needs and end-of-lifecycle indicators (e.g., lack of available replacement parts, end of production on equipment, cost of maintenance outweighing replacement costs) to anticipate system requirements. Experienced officials recommend maintaining relationships with vendors to forecast lifecycle needs and stay informed about equipment availability and issues affecting system upgrades. Project planners should update state and local governing bodies (e.g., Statewide

Interoperability Governing Body [SIGB] or State Interoperability Executive Committee [SIEC]) and communications leaders (e.g., SWIC, State Administrative Agency [SAA]) on the status of systems and proposed projects. These governing bodies and leaders are the first step to coordinating proposals and ensuring alignment with the area’s strategic plans (e.g., Statewide Communication Interoperability Plan [SCIP], broadband deployment plans).

Checklist: Pre-Planning Phase	
<input type="checkbox"/>	Establish the core planning team, ⁶ with the right mix of experts (e.g., technical, financial, legal, procurement, users) to define needs and basic requirements, research and develop system and funding options, and determine optimal approaches
<input type="checkbox"/>	Identify the problem, needs, and requirements, such as diminishing performance of current systems; lack of availability of replacement equipment; cost of maintenance outweighs replacement; lack of coverage or capacity for critical users; need to improve capabilities; desire to add new users; and potential cost-efficiencies that could be achieved
<input type="checkbox"/>	Research system and funding options <ul style="list-style-type: none"> – Develop and release a Request for Information to solicit input on system capabilities – Reference the Funding Mechanisms for Public Safety Communications Systems to understand methods for capital and ongoing costs; develop funding options for entire system lifecycle; and seek cost-saving methods (e.g., asset sharing)
<input type="checkbox"/>	Determine an approach <ul style="list-style-type: none"> – Research and record options in writing before approaching decision-makers – Weigh strengths and weaknesses of system options, and feasibility of funding – Develop consensus on an optimal approach and “next best” approaches – Create a one-page fact sheet on basic requirements, recommended approach, and summary of alternative approaches; Reference the System Lifecycle Planning Tool
<input type="checkbox"/>	Plan for frequency needs and channel programming to include various interoperability channels. Reference the Programming Guide and Template for Interoperability Channels
<input type="checkbox"/>	Create a business case, talking points, and marketing materials to outline the proposal and ensure consistency and clarity in messaging. Reference the Interoperability Business Case: An Introduction to Ongoing Local Funding
<input type="checkbox"/>	Identify executive-level project champions, and seek review and input on technical approach, funding options, and presentation materials
<input type="checkbox"/>	Present proposal to state or local decision-makers, after consultation with the project champion(s)
<input type="checkbox"/>	Secure funding to support the initial investment and sustain the system throughout the entire lifecycle

⁶ Pre-planning is usually conducted by existing staff or consultants. While consultants can assist in the process and can provide subject matter expertise (e.g., financial, legal), it is essential for the agency to be involved in the pre-planning process to define requirements, set project goals, and make major decisions. By participating in this process, project planners will be able to describe and defend decisions to decision-makers.



2 Project Planning (6–18 months)

The *Lifecycle Guide* emphasizes system planning that occurs after a strategic decision has been made to replace, upgrade, maintain, dispose of, or acquire a system. Once the strategic decisions have been made, and the Pre-Planning Phase is complete, then project planning can begin. The goals of the Project Planning Phase are to formalize the project management team; identify and approve the operational and technical requirements for system replacement or upgrade; and develop the project plan to include key elements such as the purpose, objectives, timeline, and budget.

Recommendations

The following recommendations should be considered during the Project Planning Phase:

- **Document user needs and requirements.** The core planning team should engage with a wide array of system users from all agencies impacted by system replacement or updates to understand communication users' needs and requirements. By engaging with users early in the planning process, the team will be better able to define gaps and needs, and shape the process to meet user needs.
- **Engage with communications leaders for guidance and support.** Project planners should engage with statewide governing bodies and communications leaders, such as the SWIC, if not already part of the core planning team. The SWIC can ensure the project supports statewide plans and initiatives, help the team connect with state, regional, and local agencies with similar projects underway, and foster asset-sharing, joint procurement, and partnerships with other agencies and jurisdictions. By working with statewide governing bodies and SWICs, the team can strengthen proposals and increase their chances of securing support and funding.
- **Identify strong Project Sponsors.** The *Lifecycle Guide* identifies the need for a Project Sponsor who can help the core planning team secure support and additional funding for the project from senior-level state leaders (e.g., Governor), and state and local elected officials. Often, project management teams recruit state or local elected officials to serve as Project Sponsors because they have: (i) a commitment to improving community services; (ii) working relationships with senior-level executives; (iii) strong communication skills; and, (iv) the ability to secure additional funding, as needed. Project Sponsors should bring:
 - Some subject matter expertise relevant to the project and passion for the cause
 - Access to senior-level executives and subject matter experts (e.g., financial, legal, technical)
 - Strong communication skills
 - Experience developing funding and financing proposals
 - Awareness of surrounding systems to help inform potential opportunities for partnerships, asset-sharing, and resource sharing
 - Experience managing projects and identifying and mitigating risks

The core planning team should complete initial planning (see Pre-Planning Phase) and scoping of the project before identifying and engaging with a Project Sponsor. This allows the team to develop its own thoughts on an approach (e.g., upgrade, replacement, or refreshment), select the best and alternate options, and identify funding sources for the selected approach. With a unified front, the team can effectively present its proposal and written materials to the Project Sponsor(s), and solicit his or her feedback and support.

Once the project has support, the core planning team can proceed with the formal Project Planning Phase activities, including: (i) building a project management team; (ii) developing a project plan;

(iii) defining functional and technical requirements; and, (iv) documenting the requirements in a Functional Requirements Document (FRD).

- Begin planning the Request for Proposals (RFP).** Experienced officials recommend forming an RFP team during early planning, comprised of a variety of experts (e.g., legal, financial, procurement, grant, and communications technicians). See the RFP and Acquisition Phase for additional guidance on forming the RFP team. This RFP team should establish an action plan and preliminary timeline for developing the RFP, and communicate that timeline to the core planning and project management teams.

Before drafting the RFP, the team should consult state and local procurement offices, as well as past RFPs, to understand the state or local RFP process, procurement requirements, confidentiality and non-disclosure requirements, and the typical process and timeline for RFP approval. Additionally, the RFP team should become familiar with the project—the general approach, funding options, services and products needed, specific technical and operational requirements in the FRD, foreseeable risks, and any necessary sequence of events. Lastly, the RFP team should reference the formal project plan (once complete) to set preliminary milestones and dates in a draft RFP. See **Figure 3** for recommended Project Planning Phase activities leading to RFP development.

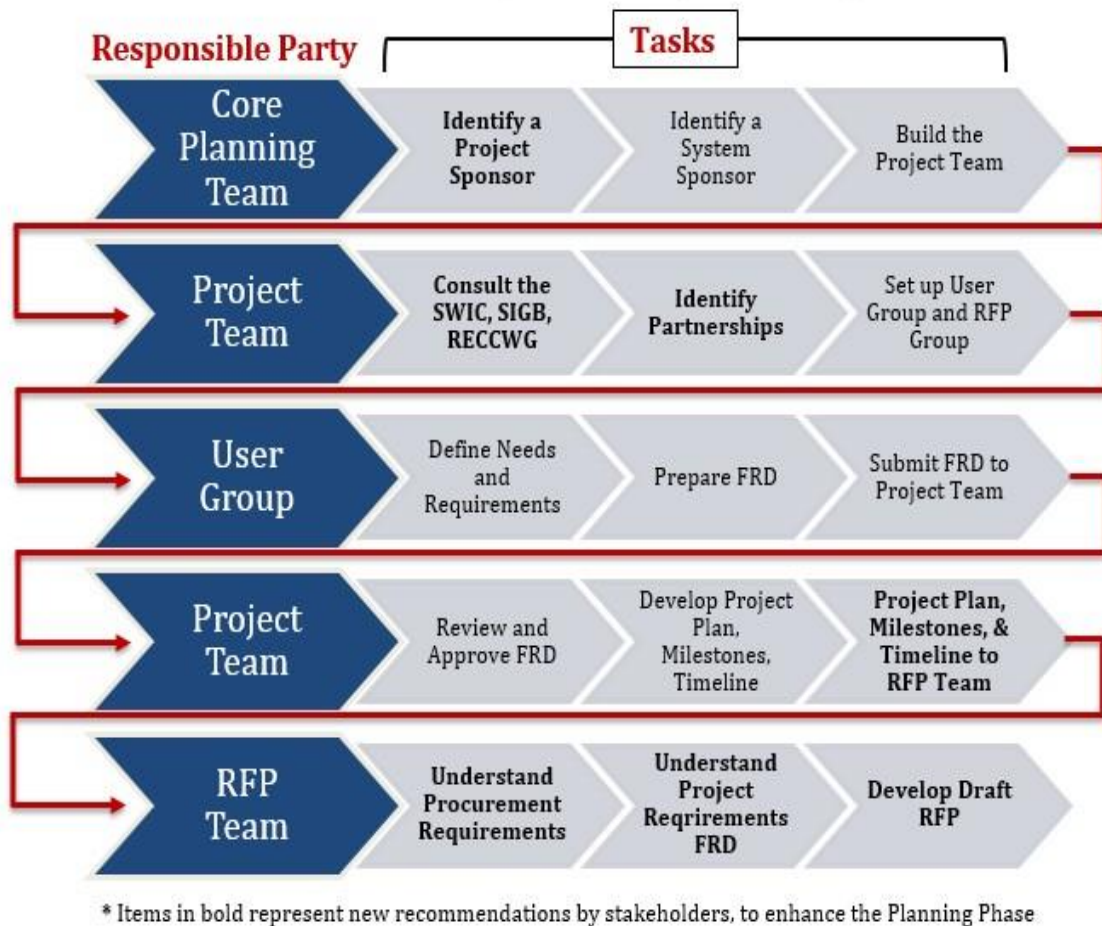


Figure 3: Project Planning Phase Process and Responsibilities

Key Considerations

Experienced officials have noted project planning can take from 6 to 18 months⁷ to plan all aspects of the project, educate decision-makers, and secure a commitment of funding if not already accomplished during the Pre-Planning Phase. Due to the length of this phase, project planners should be funded separately, and not as part of a grant providing funding for the communications system, if applicable. Grants have a set period of performance, and if planning activities are delayed, then agencies may not be able to complete system acquisition and are at-risk of losing grant funding. Agencies should conduct planning before requesting grant funding, or apply for supplemental grants and acquisition funds near the end of the Project Planning Phase.

Checklist: Project Planning Phase	
<input type="checkbox"/>	<p>Ensure appropriate time for project planning (typically 6–18 months)</p> <ul style="list-style-type: none"> – Review past projects to learn how long the Project Planning Phase has taken for other projects in your agency, jurisdiction, and region – Build sufficient time for planning into project work plans (given the time it takes for environmental planning and historic preservation review, zoning review, state/local legislative reviews, optimal times to request funding) – Communicate the expected project timeline to elected officials, including the time needed to adequately plan the project
<input type="checkbox"/>	<p>Document user needs and requirements</p> <ul style="list-style-type: none"> – Engage with system users early – Collect user needs and requirements – Determine how user needs may affect project timelines and system costs – Document user needs and requirements in project materials
<input type="checkbox"/>	<p>Engage with communications leaders for guidance and support, including:</p> <ul style="list-style-type: none"> – Statewide Interoperability Coordinator – Statewide Interoperability Governing Body or State Interoperability Executive Committee – Regional Emergency Communications Coordination Working Groups – Federal Communications Commission to coordinate spectrum/licensing issues – Elected officials
<input type="checkbox"/>	<p>Identify strong Project Sponsors after Pre-Planning Phase activities are complete, but before engaging in formal project planning (e.g., developing work plans, budgets)</p> <ul style="list-style-type: none"> – Identify an executive-level leader who has knowledge of the state or local legislative process, procurement processes, and funding options – Share project materials with Project Sponsors – Gain feedback on products and messaging – Support the Project Sponsors in meetings with elected officials, decision-makers, and funders
<input type="checkbox"/>	<p>Begin planning the Request for Proposals</p> <ul style="list-style-type: none"> – Identify experts (e.g., legal, financial, procurement, grant, technical) for the RFP team – Examine past RFPs and approval processes – Reference the project plan for dates, milestones, and timelines to include in the draft RFP – Incorporate the planned RFP development and review timelines into the project plan – Communicate planned RFP timelines to the core planning and project management teams

⁷ Experts report state and local legislative review and approval processes, as well as environmental and historical preservation review processes, can extend this timeframe.



3 Request for Proposals and Acquisition (6–12 months)

The *Lifecycle Guide* provides guidance on RFP development and acquisition, which is the third phase of the system lifecycle planning model. This phase includes identifying specific costs associated with emergency communications projects (e.g., backhaul sites, subscriber units, consoles, peripheral equipment, system interfaces), as well as ongoing costs (e.g., software upgrades, hardware repair or replacement, leasing fees, warranties, programming costs, training, refreshment). The goals of the RFP and Acquisition Phase are to select the appropriate procurement vehicle (e.g., Full and Open Competition, Sole Source), oversee an objective review process, and procure necessary systems and system components.

Recommendations

The following recommendations should be considered during the RFP and Acquisition Phase:

- **Obtain full approval from appropriate officials and funders (if applicable) on the project before drafting the RFP.** A key change in this updated *Lifecycle Guide* is the project plan and funding approach should occur in the Pre-Planning and Project Planning Phases, and the overall strategy should be approved by elected officials *before* the RFP and Acquisition Phase is started.⁸ Initial RFP planning should begin early, with the formation of an RFP team to review past RFPs and approval processes, as well as the project plan, to determine development timelines.
- **Develop an action plan.** Project planners should develop an action plan for developing their RFP. Developing an action plan will help the sponsoring agency think through the RFP process—who needs to be involved, how long it will take, what requirements should be included in the RFP, and what the key milestones are to indicate progress. As part of their action plan, planners should include time to:
 - Form an RFP team
 - Set expectations for confidentiality
 - Understand procurement rules and timelines
 - Develop a clear understanding of services and products needed
 - Set milestones for the procurement schedule
- **Form the RFP team.** If not already completed during the Project Planning Phase, the core planning team should form an RFP team to manage the RFP process. The team should include:
 - **Procurement Manager:** This person is assigned to manage the RFP process on behalf of the agency procuring the system or components, from leading the development of the RFP, through contract negotiation, award, and purchase
 - **Procurement Officer:** This is a person (or office) assigned to oversee adherence to the state’s procurement code and provide oversight of the process from issuance of the RFP through award and possible protest
 - **General Counsel:** Ensures legal sufficiency of any contract terms and conditions as part of the RFP and in negotiating terms
 - **Program Manager:** The person from the sponsoring agency responsible and accountable for the services and products to be procured
 - **Subject Matter Experts:** People with expertise (e.g., financial analyst who can evaluate bids) to advise during the

Best Practice

The evaluation committee should participate in the RFP development to understand user needs and requirements, which will help proposal evaluation.

⁸ Some agencies report they have approached officials after the RFP is complete so they can provide more details for decision-makers; however, most public safety leaders advocated for full approval and buy-in before the RFP process begins to raise awareness of the project and to save time and money if the project is ultimately not supported.

- RFP process, from the evaluation, financial decisions, award, and possible protest
- **Evaluation Committee:** This is a group of people from various backgrounds who will participate in the evaluation of RFP vendor responses. This can include the program manager, such as an agency head, technical staff, and the project manager. The committee could also include advisory staff supporting the evaluation process, such as a financial expert, a legal expert, and/or a procurement expert. While these experts would not be “voting members” of the committee, they could advise during evaluation

By forming a diverse RFP team of experts, project planners will be able to better manage the RFP process, ensure user needs and requirements are incorporated, comply with legal and procurement rules, and develop a strong RFP to yield the best possible procurement for the sponsoring agency.

- **Develop the Statement of Work (SOW).** The SOW is meant to provide guidance to the potential vendors of the work, services, products, and type of contract the procuring entity is seeking. The SOW should include clear and helpful information to support development of the RFP specifications and evaluation criteria to easily identify the differences between vendors. Additionally, the SOW should allow some vendor flexibility in the proposed solutions for the work, services, or products, and ensure vendors meet the procuring agency’s minimum requirements.
- Best Practice**

Identify minimum requirements to ensure essential procurement needs are met.
- **Include specifications or requirements in the RFP.** It is essential the people selected for the RFP team have sufficient knowledge, expertise, and experience writing RFPs. When developing an RFP, the language should be clear and concise. The RFP team should:
 - Review and compare user requirements (collected in Pre-Planning and Project Planning Phases) in the SOW with the terms and conditions included in the RFP to ensure they are consistent
 - Use generic or nonproprietary language, when appropriate. This reduces the risk of a potential protest where it may be perceived the RFP is leaning toward a particular company or product
 - Be careful with the words “shall” and “should.” The word “shall” is a binding term on the Contractor. The word “should” means something is recommended but not mandatory
 - Include definitions for any acronyms or technical and special terms used in the RFP
 - Avoid unclear or vague language by using simple language to minimize confusion

Vendors must clearly understand specifications or requirements in the RFP so they can respond with appropriate proposals. In addition, responses will be more targeted to the agency’s needs, more easily compared during evaluation, and evaluation will be more objective. When developing specifications for vendors, the RFP team should:

- Identify minimum requirements for vendors (i.e., the must-haves)
 - Ensure non-price requirements are at no added cost
 - Include technical standards to ensure interoperability is established/maintained
 - Provide an opportunity for vendors to differentiate themselves from competitors
 - Use the specifications to convey project requirements and gain clarity on vendor products
 - Set evaluation criteria in alignment with the specifications or requirements
- **Establish written evaluation criteria.** The evaluation criteria should reflect both the SOW and RFP specifications or requirements. The Evaluation Committee will use these criteria to compare vendors, offerings, price points, and non-price factors, and to select the best, most advantageous vendor. Most criteria are weighted and listed in priority order to indicate the importance of each specification. While price must be included as a factor, setting evaluation criteria that are price- and non-price-based allows the agency to select the proposal that is truly the best value. Well-documented evaluation criteria in alignment with project requirements are essential prior to the objective review, as the selection and award process will be more defensible.

- Conduct a formal objective review process and document results.** The RFP team should develop a written objective review process (known as an Objective Review Plan) to ensure the evaluation of proposals is done consistently and in accordance with a pre-approved process. The Objective Review Plan sets the criteria for review, rejection, selection, and award. An initial review of proposals will reject any failing to meet the mandatory requirements. Proposals that pass initial review are then forwarded to the Evaluation Committee for review against evaluation criteria. After selection documentation is finalized, agencies communicate results to vendors.

Key Considerations

This phase should not be rushed—experts recommend at least 6 months and often up to 12 to develop an RFP, conduct an objective review process, and select a vendor. To avoid potential protests, project planners should understand and adhere to state and local procurement rules, establish evaluation criteria and an objective review process in advance of selection and award, and document evaluation outcomes in alignment with project requirements. If an RFP selection is contested, it could delay a project indefinitely.

Checklist: RFP and Acquisition Phase	
<input type="checkbox"/>	Develop a written action plan <ul style="list-style-type: none"> – Identify members for an RFP team and establish roles and responsibilities – Set expectations for confidentiality – Understand procurement rules and timelines – Develop a clear understanding of services and products needed – Set milestones for the procurement schedule
<input type="checkbox"/>	Form the RFP team, including the Procurement Manager, Procurement Officer, General Counsel, Program Manager, Subject Matter Experts, and Evaluation Committee
<input type="checkbox"/>	Develop the Statement of Work (SOW) in clear and concise language <ul style="list-style-type: none"> – Identify and incorporate minimum requirements – List basic services and products to be delivered
<input type="checkbox"/>	Include specifications or requirements in the RFP <ul style="list-style-type: none"> – Identify minimum requirements for vendors – Ensure non-price requirements are provided at no additional cost – Include technical standards to ensure interoperability is established and maintained – Provide an opportunity for vendors to differentiate themselves – Confirm the SOW and the RFP specifications or requirements are consistent – Use specifications to convey project requirements and gain clarity on vendor products – Set evaluation criteria in alignment with the specifications or requirements – Ensure requirements meet user needs specified in Pre-Planning and Project Planning Phases
<input type="checkbox"/>	Establish written evaluation criteria, well before the award <ul style="list-style-type: none"> – Align criteria to user needs, SOW, and RFP requirements – Assign weight to every criterion – Categorize the criteria in priority order and by evaluation weight (priority) – Develop an Objective Review Plan that includes evaluation criteria and selection factors
<input type="checkbox"/>	Conduct a formal objective review process and document results <ul style="list-style-type: none"> – Conduct an initial review to reject proposals that don’t meet minimum requirements – Document the objective review process and outcomes – Ensure all team members adhere to confidentiality agreements, procurement rules, and the formal objective review process as written – Communicate results to vendors based on evaluation criteria and selection factors



4 Implementation (12–18 months)

During the fourth phase, implementation activities occur after the system has been purchased. The goals of the Implementation Phase are: develop an implementation plan; install and test new systems or components; transition or cut-over to new systems; update operational procedures and train users; and promote new communications capabilities and benefits to the community. There are often hidden costs and financial considerations during implementation. Project planners should identify residual costs and develop an implementation plan to cover those costs and ensure successful migration to new systems or components.

Recommendations

The following recommendations should be considered during the Implementation Phase:

- **Develop an implementation plan.** Implementation plans (also known as project plans) are often developed at the start of a project, with high-level tasks and dates. Plans are refined during the RFP process to convey expectations to vendors, and then further refined after the RFP process based on negotiations with the selected vendor. Given the time between the project start date and procurement, project planners should ensure implementation plans—dates, milestones, roles, and responsibilities—are accurate and achievable. Project planners should coordinate with vendors to validate plans, as well as gain buy-in from senior officials and decision-makers on any revisions to ensure everyone understands the implementation process. Final implementation plans should include:
 - List of tasks (e.g., install new system, test the system, train users, cut-over)
 - Percentage completed (tied to status completion)
 - Status of each task (which will change over time)
 - Task start date (or planned start date) and end date (or planned end date)
 - Completion dates
 - Task owners
 - Milestones (e.g., significant stage in project development, budget progress at key stages)

Experienced officials recommend including project- and budget-focused milestones in the implementation plan. While most project planners incorporate project milestones, many do not set budget milestones (e.g., targets for spending funds) in the same way. Budget milestones help planners monitor the percentage of funds spent to facilitate better monitoring and reporting, which is important for grant funds. Budget milestones also serve as progress indicators and keep agencies on schedule, especially in cases where funding expires (e.g., grant period of performance).

- **Understand and document testing procedures in coordination with the Technical Committee.** The *Lifecycle Guide* provides recommendations for the vendor and Technical Committee to fully understand testing criteria, procedures, and costs. Testing procedures should be tied closely to an Acceptance Test Plan (ATP) that tests requirements included in the FRD and RFP. The Association of Public-Safety Communications Officials (APCO) International⁹ describes the testing process in greater detail, including:
 - **Factory testing** is performed on each piece of equipment at the manufacturer location. Vendors provide performance specification sheets on each piece of equipment, which should be retained by the project managers. Project planners should request vendors to provide documentation of compliance for equipment purchased (e.g., Project 25 standards for LMR). The document not

⁹ See APCO International website for guidance on the testing process at: www.Psc.apcointl.org/2012/09/20/reviewing-contracts-acceptance-tests/.

only ensures equipment is standards-based, it also provides proof of compliance in the event the agency is audited by the granting agency, if grant funds were used to procure equipment.

- **Staging** is the testing of a system at a factory or on-site. The *Lifecycle Guide* notes the vendor will often pass on costs associated with staging to its customer, whether it is in a factory or in the actual location to be installed. Agencies should understand what the vendor is offering and the associated costs. Neither factory staging nor on-site staging is simple or all-encompassing. Staging provides an opportunity to demonstrate the functions and features of the new system in a controlled setting. It also provides an opportunity to test equipment and conduct interoperability testing with third-party (or existing) equipment. Agencies need to understand the costs of staging (e.g., personnel needed to oversee demonstrations, travel to staging site) and build those costs into project plans and budgets.
- Best Practice**

Some agencies have saved costs by using in-house staff to install equipment and conduct site and coverage verification with vendors to test system performance.
- **Site acceptance** occurs when the equipment is installed and tested on-site, site-by-site, to ensure equipment for the site is working. The purpose is to validate system operation. Some agencies have adopted a hybrid approach to site acceptance, where they install some equipment using in-house staff, and then work with vendors to test new equipment and interoperability with existing equipment. This ensures all equipment at an individual site is installed properly and operates as expected, and allows the agency to save on installation costs.
 - **Coverage verification** occurs after all equipment is installed, tested, and accepted. The purpose is to measure the actual transmission of the new system against existing coverage and contractual expectations. Changes to equipment could yield changes to coverage, which then affect the coverage guaranty. Agencies should be aware there are significant costs to performing coverage testing. Roles and responsibilities for coverage testing should be carefully negotiated and defined in the final contract for the project. Lastly, agencies should document coverage and consider how the actual performance may affect the vendor’s performance guaranty and other terms.
- Best Practice**

Agencies should account for additional costs needed during testing, including technical personnel to oversee vendor testing, backfill for those technical staff, and personnel to modify any vendor agreements or other documents.
- **Testing/acceptance** includes additional testing of the system as a whole once all sites are installed. The purpose is to test the system after installation, including its features and functions, as well as any sub-systems that have been integrated into the new system. Equipment, network performance, interoperability, and “failure scenarios” are all tested to simulate real-world operation. Agencies should ensure this is not simply an equipment check; rather, this should be a test against the functional requirements defined in the RFP. Agencies should be aware of additional costs during the testing period, including technical personnel who understand the functional requirements and can validate performance; backfill for personnel engaged in testing; and personnel who can make technical adjustments to agreements, legal documents, licenses, and guarantees as a result of changes to system performance or coverage.
 - **Cut-over** is the transition period when agencies are testing new systems and troubleshooting issues. Vendors typically offer assistance during this time, although the amount of time may vary. Agencies report a 90-day period is necessary to ensure a smooth transition from legacy to new systems, and having a detailed cut-over plan helps. There are additional costs in this phase as well, including personnel to maintain legacy systems while new systems are coming online;

Best Practice

Agencies should plan for the time and funding needed for training (including staffing and backfill costs). Training should be delivered “just in time” or simultaneous to the system roll-out.

training personnel to use new equipment; training technicians to identify and troubleshoot issues; and providing backup communications. Agencies should address all operator training requirements to ensure issues with the system cannot be attributed to operator error. Agencies should also maintain current (legacy) systems until the new system has been fully implemented and embraced by users.

- **Final acceptance** occurs after all deficiencies in the system are addressed. Acceptance of the system indicates all functional requirements defined in the RFP are met, and the system performs to the required contractual specifications. The *Lifecycle Guide* describes the formal testing and acceptance of the system, and offers three additional recommendations.

Experienced officials recommend tying the warranty to final acceptance, not at cut-over. Vendors will often assist as needed during the implementation phase to ensure the system is functional. The *Lifecycle Guide* recommends agencies tie warranties to the date when they assume full responsibility for the system after final acceptance. This will maximize the length and value of the warranty.

Best Practice

Agencies recommended discussing with vendors the expected maintenance and operation costs, levels of support over time, and anticipated system end-of-life, so the agency can prepare its needs and messages to officials.

- **Update operational procedures and train users.** Agencies should ensure plans and standard operating procedures include new communications capabilities and provide ongoing training to system users. Experienced officials recommend training and exercising to help response personnel understand their communications roles and responsibilities during an emergency, as well as the processes for working with other agencies. As communications technologies continue to evolve, the need for training and exercises becomes even greater to ensure personnel are proficient in using existing and new technologies. Agencies should involve responders from all levels of government, as well as non-governmental stakeholders, to practice a whole community response and identify gaps and problems with technologies or protocols. Continued investments in operational procedures, training, and exercises are needed to address gaps identified in response and recovery operations, which should include thoroughly testing resiliency and continuity of communications.
- **Promote new communications capabilities and benefits to the community.** Once the system is operational, agencies should communicate the benefits to elected officials, funders, public safety users, and the whole community—especially if the project was supported with public funds, a special tax, or revenue bonds. Continuous training and promotion of the new system results in well-educated officials and users who appreciate the system’s impact, which helps ensure future support. Experienced officials recommend providing annual reports to elected officials on the communications systems performance and needs. This has proven to be an effective means to communicate funding for maintenance, operations, replacements, and repair.

Key Considerations

Implementation of communications systems often take 12 to 18 months to complete. It is important to understand anticipated lifespans of system components during implementation, so agencies can plan the next phases of the lifecycle. Manufacturers and vendors are eager to develop the next generation of equipment. This results in shortened useful life of many legacy systems, especially as replacement parts and the support needed to maintain legacy systems are no longer available. Agencies should verify the level of support vendors provide during scheduled maintenance and possible support available beyond the warranty or maintenance agreements.

Checklist: Implementation Phase	
<input type="checkbox"/>	<p>Develop the implementation plan, including:</p> <ul style="list-style-type: none"> – List of tasks (e.g., install new system, test the system, train users, cut-over) and owners – Percentage completed and current status of each task – Task start/end dates and completion date (planned or actual) – Project- and budget- focused milestones – Risk (e.g., issues that have not occurred but at-risk of occurring) and issues trackers (e.g., issues that have occurred and are being addressed by mitigation plans)
<input type="checkbox"/>	<p>Understand and document testing procedures in coordination with the Technical Committee:</p> <p>Factory testing</p> <ul style="list-style-type: none"> – Request and retain documentation of factory testing <p>Staging</p> <ul style="list-style-type: none"> – Compare costs associated with off-site and on-site staging/testing – Choose off-site or on-site staging – Understand residual costs during staging (e.g., personnel, backfill, travel) – Assess staging performance/results <p>Site installation and testing</p> <ul style="list-style-type: none"> – Seek out cost-saving methods on installation and testing – Understand the proposed schedule for site installation and testing – Oversee the vendor during site installation and testing <p>Coverage verification</p> <ul style="list-style-type: none"> – Understand coverage requirements in the RFP – Assess and verify coverage analysis – Ensure changes to the system do not affect vendor warranties and guarantees – Adjust agreements as necessary to reflect coverage changes <p>Testing and acceptance</p> <ul style="list-style-type: none"> – Discuss residual costs and ensure they are funded (e.g., technical staff, backfill, training) – Conduct vendor testing of entire system after installation – Ensure all system components, equipment, and features are functioning – Integrate sub-systems into the new system – Test network performance, interoperability, and failure scenarios – Record results and compare to requirements in the RFP – Address any deficiencies <p>Cut-over</p> <ul style="list-style-type: none"> – Develop a cut-over plan – Ensure residual costs are considered/funded (e.g., personnel, training, technical assistance) – Train operators to avoid attributing system errors – Confirm legacy and backup communications are available <p>Final acceptance</p> <ul style="list-style-type: none"> – Engage the Procurement Officer – Discuss expected lifecycle, ongoing costs, and refreshment options with the vendor – Retain vendor to provide initial support – Initiate the warranty
<input type="checkbox"/>	<p>Update operational procedures and train users, to include new communications capabilities</p> <ul style="list-style-type: none"> – Ensure proficient personnel through ongoing training and exercising across the whole community – Address gaps identified in response and recovery operations, testing resiliency and continuity
<input type="checkbox"/>	<p>Promote new communications capabilities and benefits to the community, including:</p> <ul style="list-style-type: none"> – Project successes to users, elected officials, and citizens – Future funding needs to officials – Continued need for training to users



5 Support, Maintenance, and Sustainment (Year 1–Year 25)

Once an emergency communications system has been installed, tested, and accepted, the public safety agency enters the Support, Maintenance, and Sustainment Phase. The goals of this phase are to maintain the system and equipment, manage the budget, and continually assess and communicate needs.

Experienced officials caution communications system maintenance is complex. Agencies must manage many moving parts, including day-to-day operations; ongoing maintenance and repair of equipment, hardware, and software upgrades¹⁰; and asset tracking. In addition, systems and system components have varying lifecycle lengths, such as infrastructure (e.g., 20-25 years), fixed station equipment (e.g., 11-15 years), and devices (e.g., 7-10 years) as shown in **Figure 4**. To further complicate maintenance activities, agencies are typically managing multiple systems (e.g., LMR, data, IP-based broadband, alert and warning systems), while simultaneously planning for future capabilities or integration of systems (e.g., statewide or regional systems, NPSBN). Agencies must communicate system lifecycles and funding needs, as any delayed maintenance could have a negative effect on communications capabilities and response operations.

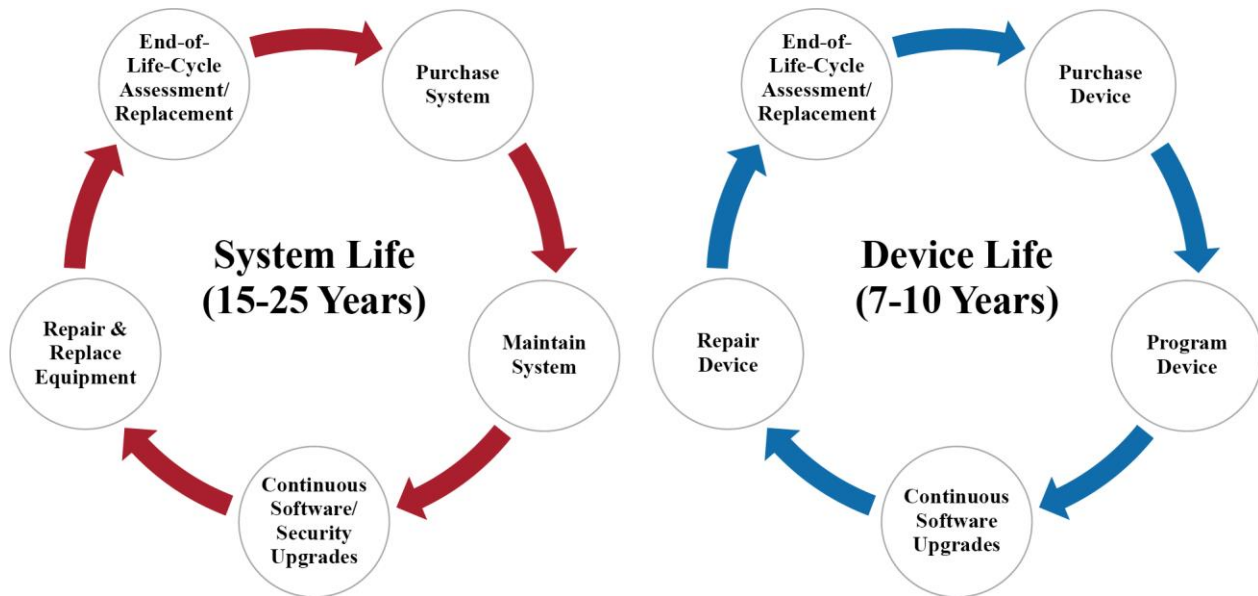


Figure 4: System and Device Lifecycles

Recommendations

The following recommendations should be considered during the Support, Maintenance, and Sustainment Phase:

- Maintain an accurate inventory of equipment.** Inventorying communications equipment is an immense task. It is critical public safety agencies know where every piece of equipment is located, its capabilities, condition, and other factors for emergency preparedness. An accurate inventory assists countless maintenance tasks, such as reprogramming, servicing, updating, planning for regional and

¹⁰ New communications equipment often has computer-based elements (e.g., programmable radios, ability to interface with a computer, ability to interconnect with other components). These features and functions are helpful to communications managers, but come with an additional cost. Software is continually being upgraded and new features and protections added; in turn, equipment with that software needs to be upgraded with the latest versions as they are released to ensure security features are installed and the equipment is compatible with other similar equipment.

statewide interoperability, disabling lost equipment, grant reporting, and audits. It also provides agency officials with a broad view of current communications equipment and capabilities, and enables officials to recognize and communicate future needs to decision-makers.

The best time to start an inventorying system is when a public safety agency first takes ownership of assets. During the acceptance of new systems and equipment, vendors and procurement agents confirm delivery from the purchased list and provide a full accounting. Public safety agencies use this initial inventorying to build their own inventory list for all equipment, adding in location, tracking identification information, responsible agency, user information, and projected replacement dates,¹¹ among other asset inventory data elements. APCO International has identified critical steps for planning and conducting an asset inventory, as summarized in the following checklist.¹²

Checklist: Asset Inventory	
<input type="checkbox"/>	Determine the inventory scope (e.g., conduct an enterprise-wide inventory including all communications equipment, or update an existing inventory system)
<input type="checkbox"/>	<p>Identify all data elements to collect and track; APCO International recommends:</p> <ul style="list-style-type: none"> - Agency: Department in possession of the radio - Make: Manufacturer of the radio - Model Name: The manufacturer-assigned model name - Model #: The manufacturer-assigned model number - Serial #: The equipment’s serial number - License #: There may be a need for a license # (for software) - Type: Control station, portable, mobile, etc. - Asset #: Your agency’s asset number affiliated with the radio, if any - Band(s): VHF, UHF, 800, etc. - Condition: Create a consistent code to indicate the physical condition (e.g., simple 1-5 scale, with 1 meaning “This radio should be replaced” to 5 meaning “Like new condition”) - LOC1: Primary location to which this piece of equipment is assigned - LOC2: Specific location where equipment is permanently mounted or stored when not in use - Channels: Number of channels in the radio (if applicable) - MFG date: Date of manufacture, as shown on a manufacturer’s plate - Firmware version: Version number and date of radio’s firmware - Radio ID: Push to talk or internal ID of radio - Alias: If an alias has been programmed for the radio, show it here - Program: If your agency uses standard templates to program your radios, indicate here (e.g., “EMS Supervisor”) - Rebanding: Status of rebanding (if applicable) - Narrowband: Status of narrowband (if applicable) - Encryption capable: Yes or No - Encryption type: AES, DES-OFB, etc. - Encryption enabled: Yes or No - Purchase date: Date radio was purchased, if known - Purchase price: Price paid for initial purchase of radio, if known - Funding Source: Grant, state funds, etc. - Accessories: Holster, charger, speaker/mic, etc. either provided upon issuance or later

¹¹ There are several factors affecting replacement dates besides optimal lifespan of the equipment, including requirements or desire to migrate to a new technology; interoperability needs with a new or existing statewide or regional system; lack of replacement parts; and cost of maintenance or upgrades outweighing cost of purchasing new equipment. Experts report the rapid pace of technological changes and the expansion of integrated communications systems also impact decisions to replace equipment. Agencies must maintain awareness of the whole communications environment and set replacement dates based on their best understanding of needs.

¹² APCO International online article, “Where’s That Radio,” provides critical steps to conducting a successful inventory of your agency’s radio equipment, <http://psc.apointl.org/2011/01/27/wheres-that-radio/>.

Checklist: Asset Inventory	
	<ul style="list-style-type: none"> - Last Inspected: Dates on when the equipment was last inspected - Last Upgraded: Dates on when the equipment/software was last upgraded - Upgrade Due: Dates on when the equipment is scheduled for upgrade (if applicable) - Notes: Free-form notes about the radio (e.g., repair notes, transfer notes) - Fleet information: some agencies keep a separate list for vehicles - FCC Licenses: Number and status of licenses
<input type="checkbox"/>	Determine and list sites for all inventory , which may include fire/police stations, substations, dispatch centers, transmitter sites, satellite receiver sites, and other sites where assets are stored
<input type="checkbox"/>	Consider options and develop/purchase the inventory tool , such as an Excel spreadsheet with drop-down boxes, or a Web-based tool enabling multiple agencies to update information online
<input type="checkbox"/>	Determine how data will be collected (e.g., initial inventory list provided by vendor; automatically via radio test/diagnostic mode to provide serial number, firmware version, etc. through a key combination/cable connection to a laptop; manually during a physical examination of the equipment; or a combination of solutions)
<input type="checkbox"/>	Determine how equipment will be tracked and marked , such as asset tags affixed to equipment corresponding to number in asset inventory; bar codes; Quick Response codes; or color-coded stickers
<input type="checkbox"/>	Determine the inventory team , including personnel who are savvy about communications equipment
<input type="checkbox"/>	Prepare to collect information <ul style="list-style-type: none"> - Distribute data elements to inventory team, solicit feedback, and update the tool as needed - Ensure laptops being used to collect data have the software needed to read equipment numbers and software versions are up-to-date - Coordinate with each site to schedule an inventory session; ensure all users have or bring all equipment to the inventory session - Schedule training for inventory team
<input type="checkbox"/>	Train and assign locations to the inventory team <ul style="list-style-type: none"> - Train the inventory team on capturing data in the selected tool - Create a mechanism (feedback loop) to capture idiosyncrasies found while collecting data so team members are managing idiosyncrasies in the same way (i.e., standardized data collection) - Assign team members to specific locations - Provide targeted milestone and completion dates
<input type="checkbox"/>	Conduct the inventory <ul style="list-style-type: none"> - Survey all equipment information and record into the inventory tool - Make note of missing information - Keep a list of departments/agencies that need to be revisited
<input type="checkbox"/>	Revisit departments/agencies to collect any missing information <ul style="list-style-type: none"> - Prepare a list of missing information and send to specific departments/agencies - Revisit to collect missing information
<input type="checkbox"/>	Compile data <ul style="list-style-type: none"> - Appoint a single person to review, assure, and compile data - Conduct quality assurance on data - Make a list of any remaining information to be tracked down - Indicate any caveats in the Notes section of the database - Record best practices and lessons learned
<input type="checkbox"/>	Develop processes for maintaining data <ul style="list-style-type: none"> - Create policies and processes for updating inventory (e.g., reporting transfer or loss of equipment) - Distribute policies and processes to personnel - Remind personnel frequently of the importance of an accurate inventory

Once the inventory data has been collected, agencies should use the information to manage the maintenance of equipment, including:

- Identify equipment that needs immediate upgrades or replacement
 - Plan future purchases (e.g., purchase equipment that has been most reliable, avoid equipment that required frequent repair)
 - Estimate future budgets (e.g., request regular intervals of funding based on regularly occurring costs, estimate replacement timelines and budgets at the start of a new project)
 - Communicate ongoing costs and needs to decision-makers based on real-time information
 - Inform grant proposals and risk assessments
 - Identify and prioritize equipment that can be purchased when funds become available
 - Extend or amend service contracts
- **Determine and execute an ongoing maintenance and operations (M&O) model.** During the lifespan of a communications system, public safety agencies must actively maintain equipment from the start. There are different types and levels of support, including:
 - System-level support activities—also referred to as operations—to ensure equipment is operating and functioning (e.g., managing software, access, outages, cyber incidents)
 - Maintenance activities to fix anything broken or prevent something from failing (e.g., repair)
 - User support for answering operational questions (e.g., helpdesk, radio shop)

Best Practices

- Continually assess equipment status for optimal operation
- Ensure equipment is functioning properly before the warranty period expires
- Monitor M&O ticket items and repair requests managed by the vendor or the agency to inform future purchases (e.g., identify radios that are constantly in the shop or need to be repaired)
- Monitor repair costs as reported by the vendor or recorded by the agency (e.g., replacement parts, level of effort) to understand full cost of M&O program and to inform future decisions
- Continually communicate with the vendor on solutions available after M&O contracts have expired (e.g., will the vendor still support the system, will replacement parts be available)
- Stockpile spare parts while they are available (i.e., before the vendor stops supporting or discontinues manufacturing certain parts); this can significantly extend the lifespan of equipment
- Carefully monitor and install all software and security upgrades; failure to upgrade software can lead to system failure, compromise of security, system shut-down, or increased costs

Vendors typically provide **Initial Support** immediately after the system is installed. During this timeframe, the system and equipment is under warranty—guarantee on parts and installation—and includes assistance with training, operations, and user support for a short period of time. Specific requirements are often detailed in the purchasing contract. Public safety agencies should request and compare warranty offerings from various RFP responses to:

- Make informed decisions during vendor selection processes
- Be in the best position to negotiate terms and conditions of contracts with vendors
- Save money—the longer the vendor is supporting the system, the less time agencies are providing support, which may yield significant cost savings
- Inform details on warranty conditions for future contracts

M&O requires long-term support, which can be provided by the vendor (at an additional cost), by in-house staff, by a third-party provider (e.g., another public agency or a private entity established through an Interagency Agreement [IAA] or contract), or through a combination of providers. Each model has its advantages and disadvantages. **Figure 5** provides a comparison of these maintenance and operations models.

Models	Advantages	Disadvantages
Vendor, including parts and labor	<ul style="list-style-type: none"> • Vendors understand the system and often provide a fast solution to any issues • Agencies can learn from vendor solutions • Agencies are under obligation to pay per contract terms; thus, the level of service is not affected by fiscal climate 	<ul style="list-style-type: none"> • This is typically the highest-cost option • Agencies have less control over the level of support and solution offered • Agencies may rely on vendors and not learn how to effectively operate the system or troubleshoot any issues
In-house staff	<ul style="list-style-type: none"> • This is typically the lowest-cost option • Agencies have the greatest control over the level of support and solutions • Agencies learn how to effectively operate the systems and troubleshoot any issues 	<ul style="list-style-type: none"> • There is a steep learning curve for new systems • Staff may not have the technical ability • The level of maintenance can be affected by the agency’s fiscal climate • There may be additional costs for parts and some labor
Third-party public agency	<ul style="list-style-type: none"> • There are typically high-quality technical staff • This allows for efficient operations and potential cost-savings across enterprise-wide operations • Knowledge is retained within the public agency 	<ul style="list-style-type: none"> • This requires an IAA signed by leadership • The primary agency has less control over level of support and solution offered • This may lead to over reliance on third-party technicians to fix issues and agency does not learn how to effectively operate the system • This may not include parts and labor costs
Third-party private entity	<ul style="list-style-type: none"> • There are typically high-quality technical staff • This is a good option if agency does not have knowledgeable staff to manage M&O 	<ul style="list-style-type: none"> • This requires a separate service contract • This may lead to over reliance on third-party technicians • This may not include parts and labor costs

Figure 5: Comparison of Maintenance and Operations Models

Agencies should select an M&O model based on their individual capacity, needs, and funding availability. Some agencies choose an approach during the Pre-Planning Phase as part of the project proposal or seek grant funds to support M&O costs.¹³ Alternatively, other agencies wait until the RFP and Acquisition Phase as vendors may offer a robust warranty or affordable M&O package with the purchase of the new system. Regardless of the timing of this decision, agencies should understand what the M&O provider is offering (e.g., warranty conditions, parts, labor, software upgrades, hardware repair, security upgrades).

- **Manage the budget.** Agencies make several budget decisions prior to this phase, including:
 - When the project is conceived, determining how capital and ongoing costs will be paid (e.g., bonds, general revenue, revenue from traffic tickets)
 - During the evaluation of RFP responses, determining which vendor offers the optimal M&O package for the best value
 - After the system is accepted, conducting an asset inventory and monitoring equipment status, repairs, costs, and replacement dates to estimate the lifespan and to plan future budgets

Knowing the manufacturing date, trends in repair, general maintenance costs, and estimated lifespan of equipment, agencies can budget for replacement before a failure occurs or before the manufacturer ends support. **Figure 6** provides a long-term budget that shows periodic replacement of equipment after an initial inventory assessment.

¹³ Agencies should review grants to ensure M&O is an allowable cost and understand any restrictions. In some DHS grants, maintenance contracts, warranties, repair or replacement costs, and upgrades may be allowed but there are [restrictions](#) on renewal contracts. Warranties purchased with the system can extend beyond the grant period of performance (e.g., agency can purchase a 5-year maintenance agreement even if the grant has a 2-year period of performance). However, after the initial purchase, the agency is not allowed to purchase a service agreement with grant funds extending beyond the grant period of performance.

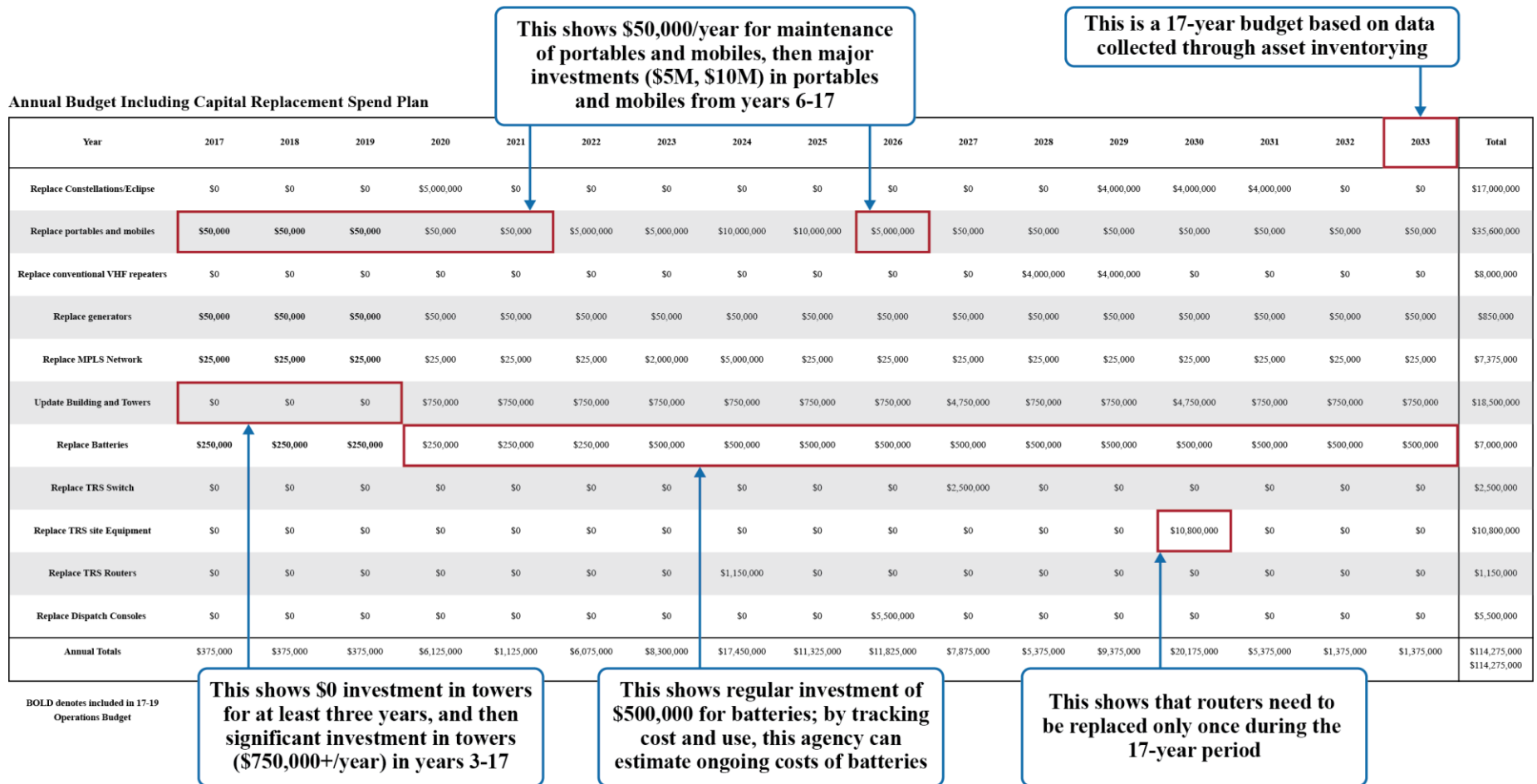


Figure 6. Sample Lifecycle Plan and Budget

This sample budget includes all components of a communications system, information on current state, maintenance costs, and insight into replacement dates. For example, some equipment requires no immediate investment; some equipment requires steady, ongoing funding; some equipment needs to be replaced only once; and other equipment is so mammoth and costly that funding is spread across several years. The sample budget includes:

- Ongoing costs (e.g., \$50,000/year for generators, \$500,000/year for batteries)
- Major capital investments and estimated dates (e.g., \$10.8M for new site equipment in 10 years)
- Total funding needed each year and overall

- **Share communications needs with decision-makers early and continually.** Experts report as complex as system support, maintenance, and sustainment can be, it may be as challenging to educate decision-makers about ongoing emergency communications costs. Agencies should coordinate with statewide and regional communications leaders, governing bodies, and elected officials, as well as prepare an annual report to convey ongoing communications system needs and costs. The key messages public safety agencies must communicate include:
 - **Communications systems are not a one-time investment.** Systems require a large initial capital investment, as well as ongoing funding for upgrades, repairs, replacement, and operations (e.g., fuel for generators). Agencies should communicate ongoing needs from the start, and should continually share long-term budget projections to educate elected officials and decision-makers on anticipated costs (e.g., ongoing, short-term, long-term) of communications systems.
 - **Systems are comprised of a variety of interconnected components, each with their own optimal lifespan.** Agencies should overlay their long-term budget projections to show interval replacement dates and investments required over time so components are replaced on time or as needed to keep the system operating. While some system components need infrequent M&O, other components may require extensive repairs, reprogramming, or replacement (e.g., portable equipment) to maintain communications.
 - **Technicians are managing multiple lifecycles simultaneously.** For example, an agency may be managing a 20-year infrastructure lifecycle, an 11 to 15-year fixed station equipment lifecycle, a 10-year mobile equipment lifecycle, and a 7-year portable equipment lifecycle, at the same time it is planning to migrate toward a statewide or regional system. Agencies should explain how current communications systems must be sustained prior to migrating to new communications capabilities, meaning M&O costs will continue through the End-of-Lifecycle Assessment and Replacement Phase.

Key Considerations

This phase spans from the moment the system becomes operational until transition to its replacement—sometimes 25 years or more in traditional LMR systems. Agencies should employ these best practices to understand budget requirements and raise awareness of M&O needs. A key take-away is a communications system is only as good as the ability to keep it running. Maintaining a system can be difficult and costly, but public safety agencies cannot afford to be without a sound maintenance plan.

Checklist: Support, Maintenance, and Sustainment Phase	
<input type="checkbox"/>	Maintain an accurate inventory of equipment , through enforcement and reminders of asset inventorying policies and requirements
<input type="checkbox"/>	Determine and execute an ongoing M&O model , in consideration of the agency’s needs, staffing ability, and funding. M&O may be provided by the vendor, by in-house staff, by a third-party provider (e.g., another public agency or a private entity), or through a combination of providers
<input type="checkbox"/>	Upgrade hardware and software, as needed , to avoid negative impacts to operations, compatibility with partner agencies, security, access, and functionality of equipment
<input type="checkbox"/>	Manage the budget and build M&O expenses and personnel to effectively manage system assets (e.g., continually monitor asset inventory) into plans from the start <ul style="list-style-type: none"> – Report any unexpected costs to project managers immediately
<input type="checkbox"/>	Share emergency communications needs with decision-makers early and continually <ul style="list-style-type: none"> – Coordinate with the SWIC, SIGB/SIEC, state and local officials, state planners, SAA, risk managers, and users to convey ongoing communications system needs and costs – Prepare an annual report and brief state/local legislature regularly on the status of the communications system and funding priorities



6

End-of-Lifecycle Assessment and Replacement (Year 7–Year 25)

Previously entitled the Refreshment step, the *Lifecycle Guide* provides guidance on assessment and refreshment activities to ensure the system continues to support users' needs over the system's useful life. Technology refreshment does not necessarily mean system replacement—it includes the infusion of technology advancements due to external influences, such as a new standard or interoperability need. However, at some point in time, a system will reach its end-of-life and need to be replaced. The goals of this phase are to conduct ongoing assessments of current systems, refresh or upgrade systems as needed to extend the life of the systems, and determine when to replace the system or system components with the solution to best fit an agency's operational and technical needs.

Recommendations

The following recommendations should be considered during the End-of-Lifecycle Assessment and Replacement Phase:

- **Conduct ongoing assessments of current systems.** Assessments involve tracking operational suitability, stability, and potential failure points, as well as conducting an overall cost analysis account for capital expenditures, recurring costs, and maintenance. Project planners should facilitate periodic meetings with end-users to provide insight into current communications capabilities and gaps, and identify key performance indicators to signal when the system nears the end of its useful life. When considering capabilities or features, agencies must analyze benefits, costs, and potential impacts of future demographic and operating environment shifts, including expansion of services, workforce, and areas of operation. To assist in assessment, agencies may implement a balanced scorecard to plan for technology maturity:
 - **Implement a balanced scorecard to plan for technology maturity.** A balanced scorecard refers to a performance management report used by project planners to capture relevant information for managing the implementation of a strategy or operational activities. Following data collection with system technicians, users, and stakeholders, project planners should develop a balanced scorecard as a quick assessment of the public safety mission critical systems in use. The balanced scorecard provides a forward-thinking approach towards technologies that advertise a migration strategy with minimal stranded system exposure. As part of the ongoing lifecycle planning and review, project planners should also include the state of technology in use and emerging technologies.
- **Refresh or upgrade systems as needed to extend the life of the systems.** Project planners should review possible technologies to extend the life of mission critical communications systems. Similar to aspects of conventional computer systems, many of the features, enhancements, and newer developments of communications capabilities are reliant on periodic upgrades of the operating systems and cybersecurity protections. Version upgrades—to hardware and software—are often sequential and require the installation of all intermediary version upgrades; thus, it is imperative agencies install upgrades in a timely manner to avoid extensive costs, potential downtimes, and unnecessary exposure to security threats.
- **Determine potential replacement solutions.** When determining the appropriate end-of-life of current systems and evaluating new technological replacements, project planners should consider the following:

- **Support national, state, and regional interoperability initiatives.**¹⁴ Interoperability has evolved over the years and is a necessity for public safety communications, rather than only a consideration. As replacement solutions are considered, project planners should understand what interoperability efforts are underway which may impact system design or advancements. Agencies are migrating to regional initiatives and statewide communications systems, as well as gateway approaches that link regional and local systems via the “systems of systems” approach. Project planners should coordinate with area leaders and governing bodies to support and align with national, state, and regional interoperability initiatives.
- **Consider early adoption of new technologies.** The innovation adoption lifecycle, as shown in **Figure 7**, is a visual representation of the time agencies tend to adopt new technologies. Innovators make up 2.5% of the population, and is the group to be the first to adopt an innovation. Early adopters make up 13.5%, and are the second group of individuals who will adopt an innovation. The early majority consists of 34% of the population. This group will adopt a new technology over a varying amount of time and after confirmation of reliability of the innovation. Late majority is also 34% of the population and due to their skepticism, they wait until a majority of society has adopted the innovation. Laggards are at the end of the innovation adoption lifecycle, make up 16% of the population, and are the last to adopt an innovation, typically due to financial reasons or restrictions.

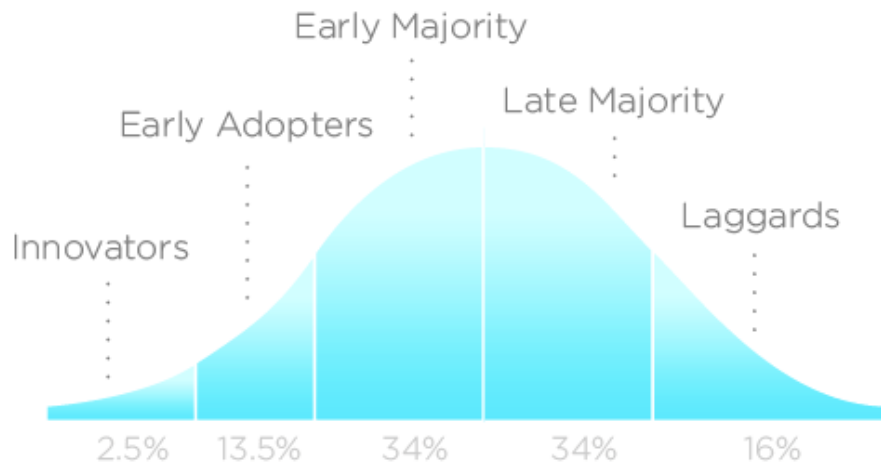


Figure 7: Innovation Adoption Lifecycle

Public safety mission critical communications systems have stringent survivability requirements, which make early technology adoption difficult. Project planners should consider the environment in which public safety users operate and why, for a variety of reasons, they are not usually the first to adopt new technology. The risk of jumping in too soon is significant, while tried and tested solutions may be a more reliable model. It is important to understand the potential impacts before investing. However, there are certainly new technologies for which the public safety agencies can, and should, be the innovators, and consideration should be given to

¹⁴ OEC leads the Nation’s operable and interoperable public safety and national security and emergency preparedness communications efforts. The office collaborates with stakeholder groups such as SAFECOM and NCSWIC to develop policy guidance (e.g., *National Emergency Communications Plan, SAFECOM Grant Guidance*), and offers technical assistance to help federal, state, local, tribal, and territorial governments improve emergency communications.

adopting these technologies to improve response and recovery when the risk to the mission critical nature of the system can be identified and managed.

- **Adhere to widely-used technical standards.** Adoption of technical standards promotes interoperability and provides protection from isolation and obsolescence. For example, experts recognize the Project 25 (P25) suite of standards for the design and manufacture of interoperable, digital two-way wireless communications products for LMR systems.¹⁵ Agencies should adhere to technical standards for all communications technologies (e.g., long-term evolution [LTE] for broadband/IP-based systems, Common Alerting Protocol for alert and warning systems). Reference the [SAFECOM Guidance on Emergency Communications Grants](#) and various products from the [Federal Partnership for Interoperable Communications](#) for additional information on technical standards relevant to public safety communications systems. While technology is not the sole component of ensuring interoperable communications, it is a major facilitator of interoperability, and standards help make it work.

Key Considerations

Continual assessments will occur throughout the system lifespan to identify any gaps or areas for refreshment. As the system ages and nears its end-of-life, agencies should circle back to Pre-Planning Phase activities to determine replacement solutions, gain leadership approval, and solidify funding support.

Checklist: End-of-Lifecycle Assessment and Replacement Phase	
<input type="checkbox"/>	<p>Conduct ongoing assessments of current systems</p> <ul style="list-style-type: none"> - Meet with users to determine the status of communications capabilities - Assess operational suitability and stability - Identify system weaknesses, both technical and operational - Analyze system expenses including capital expenditures, recurring costs, and maintenance - Review the potential impacts of future demographic and operating environment shifts, including expansion of services, workforce, and areas of operation - Implement a balanced scorecard to plan for technology maturity
<input type="checkbox"/>	<p>Refresh or upgrade systems as needed to extend the life</p> <ul style="list-style-type: none"> - Review possible technologies to extend the life of mission critical communications systems - Upgrade hardware and install software versions to maintain operations and security
<input type="checkbox"/>	<p>Determine potential replacement solutions, with consideration to:</p> <ul style="list-style-type: none"> - Support national, state, and regional interoperability initiatives - Consider early adoption of new technologies - Adhere to widely-used technical standards; reference the SAFECOM Guidance on Emergency Communications Grants and products from the Federal Partnership for Interoperable Communications

¹⁵ To learn more about P25 standards, visit the P25 Technology Interest Group website at: <http://www.project25.org/>.



7 Disposition (90 days after cut-over)

Disposition is the final phase in the *Lifecycle Guide*. System asset disposal is often the least considered step during system lifecycle planning. The goals of the Disposition Phase are to weigh the options for disposal, dispose of the old system or system components in accordance with legal limitations and business requirements, and ensure minimal impact to operations of the new or upgraded system.

Although disposition of a communications system occurs at the end of the lifecycle, disposition planning should begin as early as the Pre-Planning Phase. Depending on the system and its components, there may be many disposition options available or very few. Ideally, disposition of equipment should occur within 90 days after agencies transition to new systems. Considering available options and coordinating with partner agencies early will help to ensure potential recipients have time to explore whether the offered components meet their needs and are compatible with their system. As an added incentive to early disposition planning, public safety agencies may benefit from demonstrating how savings or contribution to support a partner agency's need partially offsets investment in a new or upgraded communications system.

Recommendations

The following recommendations should be considered during the Disposition Phase:

- **Reuse old components in the new system.** Project planners should consider the entire system and possible reuse of equipment, along with a review of the risk management strategy that addresses system failure points and backup plans. Before disposing of equipment, review whether components have an extended life value and can be reused in the new communications system. Old components may prove valuable as backup or secondary communications pathways. Those making these considerations should weigh the benefits of incorporating older components against potential risks posed to the new system while maintaining operability and interoperability.
- **Repurpose old components to another department.** Project planners should also consider repurposing system components to another public safety agency regardless of jurisdictional boundaries, if allowed. The receiving department or unit may be able to use the components to support their operations or create a new communication capability. Use of refurbished and repurposed equipment often occurs out of necessity as a stopgap solution for agencies that do not have sufficient funding for new upgrades. In effect, repurposing old components stretches the budget for communications equipment that is approaching or at its end-of-life by adding time until complete replacement or upgrade is necessary. An evaluation of the condition and usefulness of the equipment should be included in the plan to make sure the donation meets the needs of the receiving department or agency.
- **Consider space availability.** Project planners should understand space requirements, such as the physical size of equipment shelters, antenna loading on towers, power capacity, and heating and cooling systems necessary to support legacy and new systems during the transition. As a result, installations may be subject to tight quarters during the initial migration while multiple systems are operational. Project planners should also consider space freed by unnecessary equipment and plan for its removal—the timeframe for dual operations of old and new components within the transition plan is crucial. Space considerations may be short-term during the system migration or long-term depending on how planners determine to reuse or dispose of old components.

- Convey surplus property to partner agencies.** Surplus property refers to equipment not compatible with the new system, but all or part may be useful to another department or agency. Prior to announcing the availability of surplus property to partner agencies, there should be a clear understanding by giving and receiving agencies of statutes and policies related to surplus exchange. Both sides should obtain approval at the appropriate level prior to action. If grant funds were used to obtain the equipment, disposition of the property must conform to grant requirements, if necessary.

Other agencies may benefit from surplus property

Adopting excess equipment from larger agencies remains a popular tactic among smaller agencies. While vendors may offer small trade-in value for used equipment when procuring new systems, it typically provides minimal financial impact to donor agencies. Instead, agencies can assist partner agencies when upgrading their systems and capabilities.

Key Considerations

The disposal of systems and system components requires thoughtful consideration to ensure compliance with statutes, Executive Orders, and policies, as well as business requirements of the jurisdiction disposing of and receiving the property. Use of refurbished and repurposed equipment requires appropriate protocols, effective oversight, and adherence to established technical standards (e.g., P25 for LMR, LTE for broadband/IP-based systems). In addition, property purchased with the assistance of grant funds must be disposed of in compliance with any grant requirements. Repurposing or donating system components and equipment may create or improve communication capabilities. Project planners must consider all advantages and disadvantages prior to disposal.

Checklist: Disposition Phase	
<input type="checkbox"/>	Develop a disposition plan <ul style="list-style-type: none"> – Incorporate disposition planning early in the project planning process – Review past projects to learn how long the Disposition Phase has taken for similar projects – Build sufficient time for planning into project work plans
<input type="checkbox"/>	Engage stakeholders and partners early to understand user needs and requirements <ul style="list-style-type: none"> – Convene a meeting with disposition leadership, managers, and appropriate team members – Discuss activities in the disposition plan and assign leads to relevant activities – Determine how users and user needs may affect project disposition and the timeline
<input type="checkbox"/>	Identify disposition options in consideration of legal limitations and business requirements <ul style="list-style-type: none"> – Reuse old components for the new system – Repurpose old components into another department – Consider space availability for equipment – Convey surplus property to partner agencies regardless of jurisdictional boundaries
<input type="checkbox"/>	Brief leaders on disposition plans <ul style="list-style-type: none"> – Obtain final, formal approvals on the disposition plans – Consider rolling unresolved issues and changes into the next phase of a new project – Communicate user needs to elected officials – Share results with relevant stakeholder bodies (e.g., Statewide Interoperability Governing Bodies, Regional Emergency Communications Coordination Working Group)
<input type="checkbox"/>	Identify lessons learned following disposition <ul style="list-style-type: none"> – Ensure compliance with funding closeout requirements, if applicable – Conduct a post-disposition survey or session to solicit feedback with stakeholders – Compile a closeout report showing final status of system issues, changes, risks, and costs – Share lessons learned with stakeholders and officials to assist with future decision-making – Reassign remaining disposition staff to other assignments

Conclusion

Public safety officials make numerous decisions to fund, plan, procure, implement, support, and maintain communications systems, and eventually replace and dispose of system components. This continuous system lifecycle planning can be daunting. To assist officials, this compendium to the *2011 Emergency Communications System Lifecycle Planning Guide* is intended to provide considerations and recommended actions through easy-to-use checklists for each phase of the system lifecycle planning model. These checklists combine best practices and lessons learned by public safety officials and experts who have successfully managed communications systems across the Nation—from initial planning through final disposition. Agencies may contact OEC, SAFECOM, and NCSWIC with questions on this document or requests for assistance.