IT PROCUREMENT ON CAPITAL PROJECTS - BEST PRACTICES

DEVELOPED BY

ACC TERMINAL & FACILITIES –

TECHNOLOGY SUBCOMMITTEE

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1.0 INTRODUCTION

A. INTENT

The intent of this white paper is to discuss methods for improving the planning, design, and procurement of Information Technology (IT) Systems on Capital Improvement Programs (CIPs) at airports.

The term IT Systems used in this whitepaper is defined as systems and applications providing some form of software or data processing functions including the necessary supporting infrastructure. The Architecture and Engineering (A&E) industry sometimes refers to these as low-voltage systems or specialty systems.

B. INTENDED AUDIENCE

The white paper is intended to be used by the following airport staff and consultants/contractors:

- Airport Manager/Airport Executive Team – to guide on how to best structure a capital programs team to optimize the IT procurement process.
- Airport Procurement and Program Management – to guide the technology procurement process for "best value" bids and selecting the most efficient project delivery methods.
- Airport Capital Planners/Project Staff – to provide considerations for developing accurate and complete IT systems budgetary estimates.
- Airport Information Technology Staff – inform airport IT staff on ways to improve engagement and collaboration with the capital program team.
- Architectural, Engineering, and Technology Consultants – to provide suggestions to improve design collaboration support and "best value" bids.
- General Contractors or Construction Management – to provide guidance on best value bids and on the role of a Master Systems Integrator for risk mitigation.

C. CONTRIBUTING PROFESSIONALS

Members of the ACC Terminal and Facilities – Technology Subcommittee developed these best practices by volunteering their time, knowledge, experience, and resources to help the airport industry achieve the highest quality levels on Information Technology projects at airports:

- Enrique M. Melendez, The JW Group – Chair
- Mike DeVault, Mead & Hunt – Vice-Chair
- Mark Adams, Burns Engineering, Inc.
- Stuart R. Garrett, Burns & McDonnell
- Nick Ryan, RS&H

2.0 CURRENT CHALLENGES

A. CAPITAL PROJECT STRUCTURES

Capital projects are very "brick and mortar" focused with significant emphasis on physical construction. While "brick and mortar" design and procurement packages tend to be straightforward (you can see what you are building) , Airport IT Systems are far more complex (system functionality and data transactions occurring amongst systems are not physically visible but logical by design). With the increasing application of digital technology in the development of smart buildings and growing operational systems applications, the procurement of technology systems is becoming more of a focus by airport operators due to the positive impact on operational efficiency and the passenger experience.

It is important for an airport's Capital Project Team (CPT) to understand that an airport's digital world encompasses the entire campus and typically extends beyond the projects "construction limits". It is critical to success that IT Systems are viewed holistically across the airport enterprise rather than taking a siloed view for each physical area of an airport. An appreciation for the understanding of the airport's enterprise information architecture requirement is a must.

Another challenge is that too many IT Systems bid packages lack sufficient documented requirements for systems integration and interfaces. Not only does each IT System have its own specific requirements, but IT Systems may perform data transactions (requiring interfaces amongst themselves) which must be understood in the planning and design stages to meet the business operational requirements.

One important factor impacting IT Systems procurement on capital projects is the method of procurement delivery. Airports owned and operated by city or county governments may have stringent procurement guidelines related to design-build, low-bid, or sole-source delivery of hardware, software, systems, and related infrastructure. As such these constraints must be understood.

Some popular procurement methods, such as the Construction Manager (CM) model, tend to potentially exacerbate implementation challenges, because this model lends itself to low bid procurement packages for IT Systems. Low bid procurement for IT typically minimizes the systems engineering work required for supporting the logical system/data integration among the IT Systems. This results in poorly implemented solutions.

Airport capital projects that put less than the required amount of focus on IT Systems elements during the planning and design phases have traditionally had opening day delays, or many opening day issues that impact passenger services and operational performance.

B. INFORMATION TECHNOLOGY ORGANIZATIONAL ROLE

Most airport organizations lack a C-Suite level executive (sponsor) representing IT, such as a Chief Information Officer (CIO). Instead, airports typically have a Director of Information Technology or a Manager of Information Technology. Such positions lack the organizational visibility needed to

involve the IT department in the planning, design, and procurement decisions on capital projects. Such an organizational structure may hinder collaboration and coordination of the IT Staff with the CPT and hence introduce project risks, which may include cyber security risks and lack of an enterprise holistic view of systems requirements.

3.0 IT AS A STAKEHOLDER

A. STAKEHOLDERS

It is essential to engage stakeholders in the project process. A stakeholder, by definition, is someone who has a vested interest in the outcome of a project. Airport stakeholders can be internal or external, and may include airport department heads, staff employees, airlines, tenants, or government authorities.

The airport IT department, as a key project stakeholder regarding technology systems, has a natural vested interest in most capital projects. Additional technology stakeholders include any group representing a system that uses the network as its primary source of communications. These include security, facilities management, government agencies (FAA, TSA, CBP), airline and non-airline tenants.

B. TRADITIONAL ROLES

The CPT follows an iterative design process which usually includes an initial meeting to set goals, constraints, and timelines for the new capital project. This usually includes a discussion of how this new space will fit into or help progress the overall master plan for facilities. Then the team meets regularly to discuss iterations of the design as it progresses towards a final state and becomes ready for procurement/construction.

This iterative process is helpful, as stakeholders have many opportunities to express ideas about what did or did not work well in previous projects. This also gives the A&E team many opportunities to present their plans and designs, gain feedback, and relay their opinions based on their experiences planning and designing similar spaces/buildings.

The Airport IT's representatives may or may not be involved in this process. Often the passive infrastructure (pathways, spaces, and cabling) will be designed by an electrical engineer or a technology consultant who will then discuss the layout with the IT representatives.

At some point prior to move in, the Airport's IT representatives will be required to plan and design the necessary elements (e.g., network components) to support "cutting over" to the new facilities. If the Airport's IT representatives are not included in the overall iterative design process, it will eliminate all the associated benefits and will likely cause difficulties during this phase of construction.

C. COLLABORATIVE ROLES

Engaging stakeholders in the early phases of a project allows the design team to collect input early, incorporate comments during design, and hopefully reduce feedback later.

It is imperative that the CPT does not wait for the project review milestones to get feedback from the Airport's IT representatives. The capital project meetings will allow the Airport IT's representatives to offer input from the beginning as an active participant in the effort.

A true collaborative model will include Airport IT representative's engagement early on as part of the related stakeholder meetings, as well as early feedback on the plans, design, and procurement methods rather than late in the project.

4.0 RECOMMENDED BEST PRACTICES

A. OVERVIEW

There are several major challenges that impact IT procurement on capital projects either directly or indirectly. The following recommended industry best practices can improve the existing airport IT procurement process on capital projects.

B. IT GOVERNANCE

Airport executive management and senior management should ensure the organization has a formal IT Governance Committee in place representing the major airport business areas. The IT Governance Committee is responsible for communicating IT related procurements and collaborating with the IT department on all projects. This not only ensures consistent procurement practices of technologies but will also help the airport be more cost effective in its IT procurement approach.

Capital projects should use the IT Governance Committee for feedback regarding any identified IT components during the conceptual planning efforts. This will ensure the IT elements proposed on the capital project have been thoroughly vetted in accordance with the airport's best practices. The IT Governance Committee typically has two major goals which can benefit capital projects:

1. Provide clear guidance on how decisions regarding technology and projects are made.
2. Provide transparency into the decision-making process at the airport.

It is recommended that the IT Governance Committee and the CPT have means for effective communication and collaboration.

C. IT MASTER PLAN AND CAPITAL PROJECT PLAN

Over the past two decades there has been an increasing awareness that the development of terminal facilities at airports cannot be solely driven by peak-hour passenger demand and physical construction. The business model of how the airports intend to operate the facility is just as important. The business model is inherently focused on business processes which are enabled by IT Systems. As such, airports develop IT Master Plans, or at a minimum, IT Strategic Plans which provide a roadmap for the technology related investments needed over a three- to five-year planning period. The IT Master Plan helps define the specific technology needs from an enterprise level across the entire airport organization.

When an airport capital project is implemented it is important that the CPT and the IT department synchronize their efforts. This cohesion serves to avoid either redundant and costly technology or situations where opportunities to implement IT Systems called out in the IT Master Plan were not appropriately included in the capital project. If planned correctly in a collaborative manner, the CPT will benefit from the information available within the IT Master Plan which supports the programming (budgeting), design and procurement efforts for the IT Systems. If an airport does not have an IT Master Plan and intends to commence a capital project for a terminal facility, it should quickly develop one since the planning and design efforts on a capital project may take several years.

D. EARLY INVOLVEMENT

The most successful airport construction projects have shown that the early programming and planning activities related to IT Systems requirements result in improved and realistic budget forecasting. This strategy also allows IT Systems to meet project objectives with minimal project implementation risks. Projects that involve the early and open collaboration of the IT department typically develop the most efficient path forward on capital projects, with realistic schedules, budget estimates, design, implementation dependencies and efficient systems, as well as data integration when multiple systems procurements are involved.

Early involvement of IT considerations is essential to capture lessons learned and vision for the future from airport stakeholders and design team members' experience. The Basis of Design developed from early involvement with IT centric design members of the team promotes the adherence of design concepts to the Airport's IT Masterplan (either documented or de facto) and the IT Roadmap for future development.

E. BUSINESS ANALYST LIAISON

Airport business units have historically been driving the business automation needs of the airport organization especially within the administration, finance, and operations divisions. With the additional convergence of smart terminal buildings and security systems with IT, the business needs for technology continues to grow. From an airport business process perspective some of these requirements tend to be specifically focused on day-to-day business unit operations. But for management purposes, some of the processes are interrelated and data becomes a useful asset for the airport as an enterprise. This situation clearly calls for someone on the capital project team who understands the enterprise business needs and application/systems technologies. Such a person could be the Business Analyst. Since the business units tend to be non-technical and IT staff tend not to be business process focused, the role of an IT Business Analyst is essential. The IT Business Analyst can support both the business unit(s) and the IT department by clarifying, updating, and improving the business processes impacted by proposed technology changes. This position ensures the IT department meets the needs of the business. Hence it is recommended that the CPT and the IT department engage the IT Business Analysist on the capital project as required.

F. PROGRAM MANAGER/A&E TEAM /CM/CMAR PERSPECTIVE

Typically, the CPT has key members such as the Program Management Team (PMT), the A&E Design Team and, prior to the design finalization, a Construction Manager (CM) or Construction Management At-Risk (CMAR) team. Each plays a significant role in the successful procurement and

implementation of IT Systems. Each of these team members serve in either professional services consulting or contractor roles.

The PMT is primarily responsible for managing the capital project effort in terms of overall project management on behalf of the airport's CPT. The PMT oversees the planning, design, and construction phases. The PMT is a key player in defining the best approach for project delivery. Specifically, the PMT plays a significant role in developing the overall budget for the IT Systems. As such it is imperative that the PMT have onboard an IT PM dedicated to working with the A&E IT consultant and the airport IT stakeholders. An IT PM can help define the project roadmap to ensure cross project coordination within large projects.

Under the PMT, or in direct cooperation with the PMT, there is usually the A&E team which serves as the design team with some construction administrative support. In terms of IT procurement strategy, the A&E is particularly important as they specify the design requirements for the IT Systems which ultimately are captured in the bid packages for procurement. For a capital project to be successful, it is imperative that the A&E IT consultant understand the airport's existing conditions and develop the most efficient design and procurement strategy for the IT Systems. The A&E IT consultant should be involved in the procurement process early to verify technical and integration requirements for the project working alongside the airport IT stakeholders and the IT PM. The A&E IT consultant should coordinate with all facility stakeholders to ensure the planned design improvements holistically address the needs of the enterprise with a workable and efficient solution.

The implementation phase of the capital project is assigned to a general contractor, who also serves as the CM or CMAR. The CM/CMAR should understand that procuring IT Systems by nature is unique and distinct as compared to the other procurement items on airport projects. The reason for this is that unlike non-systems related procurement, IT Systems span across functional boundaries because of data processing requirements. IT Systems, consisting mostly of hardware and software functionality, usually have a variety of users across the airport and their operations can be critical in terms of passenger processing, safety and security, and efficient operations. As such, the CM or CMAR must ensure that "best value" solutions are solicited rather than "low bid" wins.

One of the biggest IT procurement cultural changes that should occur is the elimination of "low bid" win criteria. Airport IT Systems procurement should be based on best value rather than low bid especially when the effort includes systems/data integration.

G. PROCUREMENT DELIVERY METHODS

IT Systems, because of their complex nature, are ideally procured as "best value". This implies the solutions meet or exceed the technical requirements, not only addressing the immediate needs of the airport, but making it "future-ready" as well. As such the CPT should ensure where possible that a best value bid takes precedence over low bid.

Existing sole source procurement delivery method may be usurped by a capital program. For instance, an existing contract with a Flight Information Display System (FIDS) vendor may allow the IT department to add a new monitor without any open procurement tender. But in a capital project, where a Design-Build team or a Contractor might be procuring FIDS components to extend an existing FIDS system for a terminal expansion, a city/county or airport authority may not legally

allow an extension without a competitive bid. Thus, it is vital for capital project team leadership to work together with IT department leadership to create the structure of the project's procurement delivery.

Without such considerations, it is likely that a large airport will find itself with multiple vendors. Many of these scenarios are well-known today, where multiple building automation system vendors are onsite at different terminals across an airport campus. This leads to inefficiencies in operations and maintenance support, strains in contract administration, and more work for procurement officials and IT System stakeholders. Such deficiencies can lead to non-integrated solutions, which hamper much-needed data sharing for enterprise-wide, data driven decision making.

One of the other major issues with the traditional project delivery methods is that the CM or CMAR usually hires an electrical contractor to procure and integrate the IT Systems. On the surface, this sounds reasonable because electrical contractors have the licenses to install most of these systems. However, the problem is most electrical contractors do not have qualified IT staff, do not understand the airport operational business environment, and lack systems/data integration experience. Alternatively, there are IT Master Systems Integrators in the industry who can accomplish the job at hand.

IT Master Systems Integrators do not necessarily need to procure the IT Systems or install them. But they can provide complete oversight and management of the implementation process, including systems integration & testing, ORAT, customer acceptance and systems commissioning, along with maintenance and operations service readiness activities of the IT Systems. In several circumstances, RFPs dictate that the IT Master Systems Integrator is to serve as a prime and to have an electrical contractor license. This license requirement excludes the best IT Master Systems Integrator firms. Bringing in an Electrical Contractor to oversee the IT Master Systems Integrator introduces unnecessary overhead cost to the project.

Having an IT Master Systems Integrator on board early in the project as part of the CPT (before the design stage is completed) will save time and money. This will help to ensure that the IT Systems specifications and drawings are sufficient and adequate for implementation. In terms of project delivery for IT Systems, the Design-Build process works best when the Master Systems Integrator contracts directly with the airport but also works directly with the CM/CMAR. This way, the IT Master Systems Integrator can hire an electrical contractor with a license for equipment installation. This ensures firms with the appropriate expertise are in the most efficient roles for IT Project Delivery.

5.0 SMALL AIRPORT CONSIDERATIONS

Due to lack of IT staff experienced on capital projects, there are a few additional recommendations related to Procurement of IT that can support small airports.

1. The A&E design firms can fill the void, where the small airport lack internal IT subject matter experts for ensuring the procurement of best value solutions.
2. Small airports can further enhance their procurement strategy by allowing 3rd party members on the RFP Selection Committee. The 3rd party members would augment the limited IT staff

expertise at the airport. Potential 3rd party members could be the A&E IT consultant, city, or county government IT subject matter experts.

3. Small airports, to ensure best value criteria are met, should utilize a well thought out selection scoring system criteria which can protect the airport from sole source issues, post award protests / delays while ensuring the successful selection is the best fit for the project budget and technical delivery.

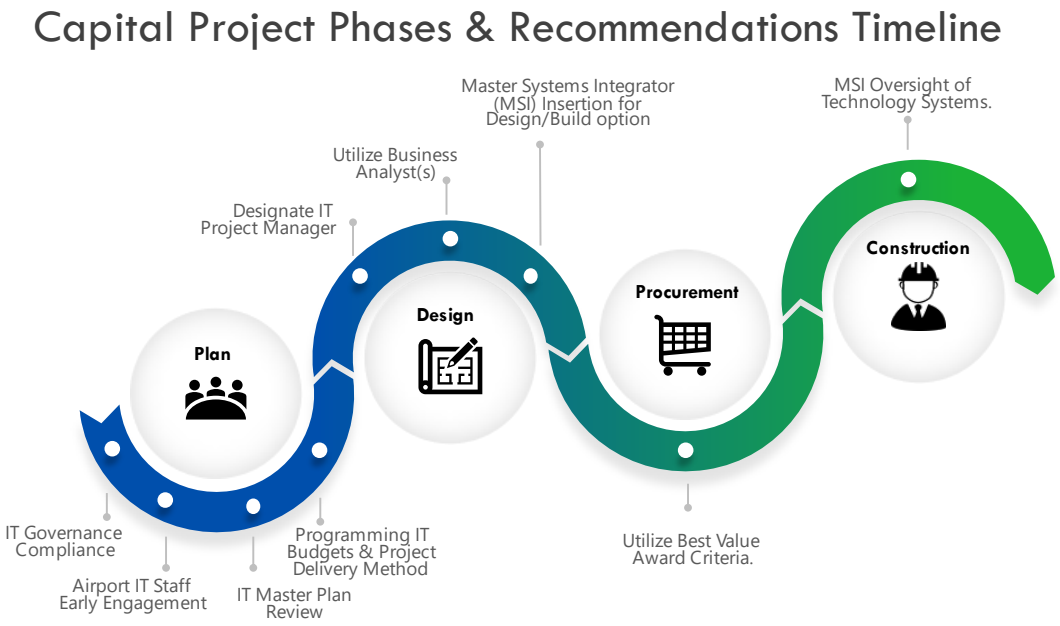
6.0 SUMMARY

IT procurement on capital projects presents unique challenges. The challenge of providing the best approach to IT procurement on capital projects is a shared responsibility of the entire CPT and the IT department. When the CPT and IT department come together on a capital project in mutual understanding throughout the project life cycle, the chances for success increase significantly.

The following summarizes the recommendations presented which can improve the IT procurement process:

- Capital projects' IT related improvements should follow, adhere, and comply to an airport's IT Governance program.
- IT staff should be engaged early in the capital project planning cycle and have the ability to contribute at regularly scheduled meetings with the CPT.
- Capital project planners should utilize an existing airport IT Master Plan as a project guidance document as it relates to IT systems procurement planning. If one does not exist have one quickly developed.
- Early IT programming budgets should be part of the overall capital programming process.
- The CPT and IT staff should engage the respective airport business unit's Business Analyst Liaison during the early design process to ensure the airport operator's business requirements are being captured.
- The PMT should have a dedicated IT Project Manager to facilitate all related IT project matters between the CPT, the airport IT staff and airport stakeholders throughout the project lifecycle. The IT Project Manager can ensure adequate communications and collaboration is being utilized on the capital project.
- IT procurement should focus on best value bids when significant number of systems and data integration is involved.
- An IT Master Systems Integrator should be engaged early in the project lifecycle of a project.

The following is the list of recommendations mapped against a typical project lifecycle timeline:



Below are some airports which have utilized some of the Best Practices outlined in white paper:

RECOMMENDATION	AIRPORT CAPITAL PROJECT EXAMPLE
IT Governance Compliance	LAX, SLC, DEN, SAT, AUS
Early Engagement of IT Group during capital project planning cycle	SAN, DFW
Utilizing the current airport IT Master Plan for planning IT-related scope on the capital project	SAN, SJC, SAT
Ensuring capital project programming includes suitable IT budget	SAN, SJC, SFO, ABE
Utilizing the business analyst to ensure adequate capture of business requirements for IT related scope	LAX, SAT
Assigning a dedicated IT Program Manager on the capital project	LAX, TOR, SFO, SJC, SAT, ABE
Focusing on best value bids rather than low bids.	JFK T4, TOR
For large projects which involve many IT systems, ensuring an IT Master Systems Integrator is engaged early in the project lifecycle	JFK T4, SLC, SFO, ICT, MCO, AUS

In terms of next steps, the ACC Terminal & Facilities - Technology Subcommittee has been discussing addressing several further topics for the future: "The Role of an Airport IT Master Systems Integrator", "Development of an Airport IT Master Plan", "Best Value vs. Low Bid IT Procurements – The Details" and " Data Management at Airports" . If you have any thoughts on future topics to be addressed, the ACC Terminal & Facilities – Technology Subcommittee welcomes your feedback. Please contact Enrique Melendez, Technology Subcommittee Chair at emelendez@thejwg.com .