An Application of Project Management Methodology for the Development of an Advance Identity Product within Budget and On Time Delivery

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Abstract — *In an Advanced Identity Management Technology Company the purpose is to create solutions to identifying individuals in a system (such as a country, a network, or an enterprise) and controlling their access to resources within that system by associating user rights and restrictions with the established identity. The objective of this project was to reduce the manufacturing cost of an advance iris identity product so it can have a competitive price in today's advance technology market. A Project Management methodology was used to plan, organize, secure and manage all the require steps and processes to deliver the product to the customer on time with the requested specifications. A plan was created using project management tools to re-design the product and tackle the sales issues due to high manufacturing costs. As part of the closure phase, a summary of the project which was completed was provided to communicate all lessons learned and recommendations for future projects.*

Key Terms — *CPM, Gantt chart, Post Project Review, Project Status Report.*

INTRODUCTION

This project was held in an Advanced Identity Management Technology Company focused on developing next-generation systems for the global access control and identity management markets. An iris recognition system was evaluated; this kind of iris biometric product is a leading new technology which eventually will be a very competitive market in the technology industry.

Since this is a company focused on developing next-generation systems, it is very important to satisfy today's digital driven consumers. Offering revolutionary hardware and software products and solutions without a competitive price will point to consumer's dissatisfaction. It is impossible for this company to sustain itself without its consumers.

To achieve a competitive product with an outstanding performance but at the same time have a moderate manufacturing cost so it can be offered at a price that consumers can afford, a Project Management approach will help to identify the necessary processes and project tasks to successfully complete the project objective and sustain the company in competence among other advanced technology solutions organizations. This way the root causes can be identified in order to implement corrective actions for processes improvement.

METHODOLOGY

For this project development, the 5 basic project management processes were used. Project management is the discipline of planning, organizing, securing, and managing resources to achieve specific goals. The 5 phases included in this methodology are: Definition, Planning, Execution, Control and Closure [1].

The Definition phase allows the team to explore and elaborate the idea for the project The goal of this phase is to examine the feasibility of the project and decisions are made concerning who is to carry out the project. The tool used during this phase was

- **Project Charter:** This is a document that names de project, summarizes the project by explaining the business case in a brief statement, and also lists the project's scope and goals.

The Planning phase is to create a specific list of things that need to happen in order for the goal or goals to be met. In this process, the project plan is derived in order to address the project requirements such as, requirements, scope, budget, and timelines. The tools to planning the project were the following:

- **Work Breakdown Structure:** A work breakdown structure (WBS) is a chart in which the critical work elements, called tasks, of a project are illustrated to portray their relationships to each other and to the project as a whole.
- **Critical Path Method (CPM):** Critical path is the sequential activities from start to the end of a project. It is used to determine timing estimates for the project, each activity in the project, and slack time for activities.
- **Gantt chart:** The Gantt chart is one of the most widely used tools for presenting a project schedule because it can show planned and actual progress. A time scale is indicated along the horizontal axis. Horizontal bars or lines representing activities are ordered along the vertical axis.

The Execution and Control phase involves coordinating people and resources, as well as integrating and performing the activities of the project in accordance with the project management plan. During the Execution phase, the project manager spends a considerable amount of time in communication making sure the resources are available to do their work and know what work needs to be completed. Project Control utilizes all the plans, schedules, procedures and templates that were prepared and anticipated during prior phases [2]. This phase consisted in the following processes:

- **Conduct Project Execution and Control Kick-off:** is where the Project Manager conducts a meeting to formally begin the Project Execution and Control phase, orient new Project Team members, and review the documentation and current status of the project.

- **Manage Project Execution:** is where the Project Manager must manage every aspect of the Project Plan to ensure that all the work of the project is being performed correctly and on time. One example is requesting Project Status Report to keep all team members updated.

The Closure phase includes the formal acceptance of the project and the ending thereof. Administrative activities include the archiving of the files and documenting lessons learned aims to address.

- **Complete and store Project Acceptance Form:** where the Project Manager, Customer and Project Sponsor acknowledge that all deliverables produced during Project Execution and Control have been completed, tested, accepted and approved.
- **Carry out a Post-Project Review:** here a project summary is documented so that the project manager and his teammates can use the experience they have gained in future projects.

RESULTS AND DISCUSSION

The discussion of the problem statement will be presented using a Project Management approach and the results obtained to fulfill the project objective will be shown.

Define Phase

The Definition phase helps to clarify the understanding of the problem. A project charter was made in order to define the project statement, objective statement, business impact, project scope and project schedule (Figure 1).

Project Charter	
Event Type:	Project Management Event for the Development of an Advance Iris Identity Product
Event Location:	Caguas, Puerto Rico
Event Start Date:	10/12/2011
Problem Statement:	Advanced identity management solutions Company is not meeting sales expectations due to the high manufacturing cost for the advance identity product.
Objective Statement:	Reduce the Manufacturing cost of an advance identity product by 30%.
Business Impact:	Achieve 100% On Time Delivery, Increase Customer Satisfaction, Sustain the advance identity product good quality performance and its ease of use.
Scope and Boundaries	For an advance iris identity product from R&D to Manufacturing
Team Members:	E. Rodriguez, J. Lopez, L. Matos, I. Rodriguez, F. Hernandez and C. Delgado
Executive Sponsor(s):	Research & Development Department and Manufacturing Department
Pre-Work Plan/Activities:	Definition (1 wks), Planning (1 wks), Execution and Control (5 wks), Closure (1 wks)
Benefits/Measure of Success:	Receive zero customer complaint and no product recall. Accomplish due dates on tasks as defined on Gantt Chart.

Figure 1
Project Charter

Planning Phase

A Work Breakdown Structure (WBS) is a fundamental project management technique for defining and organizing the total scope of a project, using a hierarchical tree structure. The WBS is shown in the Figure 2.
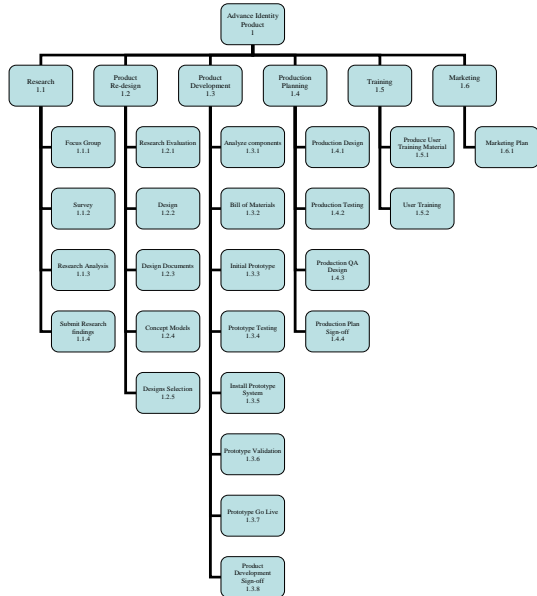

Figure 2
WBS

A CPM was made to denote the activities and tasks required to complete the project. Each activity is listed in Table 1. It indicates a designation letter, the immediate predecessor which means the activity required before the current activity can begin, and the duration in weeks.

Table 1
CPM Activities

Activity	Designation	Immediate Predecessor	Duration (Weeks)
Focus Group	A	None	0.2
Survey	B	A	2
Research Analysis	C	A	2
Submit Research findings	D	A	0.3
Research Evaluation	E	D	2
Design	F	D	5
Design Documents	G	F	4
Concept Models	H	G	3
Design Selection	I	H	1
Analyze Components	J	G, H	2
Bill of Materials	K	G, J	2
Initial Prototype	L	G, K	3
Prototype Testing	M	L	3

Table 1
CPM Activities (Continue)

Install Prototype System	N	L,M	0.2
Prototype Validation	O	L	2
Prototype Go Live	P	O	0.2
Product Development Sign-off	Q	L, M, N, O, P	0.1
Production Design	R	G	3
Production Testing	S	G	3
Production QA Design	T	R,S	2
Product Plan Sign-off	U	R, S, T	0.1
Produce User Training Material	V	M, O	3
User Training	W	V	3
Marketing Plan	X	G	2

The CPM diagram is shown in Figure 3. It defines when tasks will begin and finish. The critical path is denoted in red and it includes the tasks A, D, F, G, H, J, K, L, M, N, O, V and W which are described in Table 1. The project will take 30.7 weeks to complete.
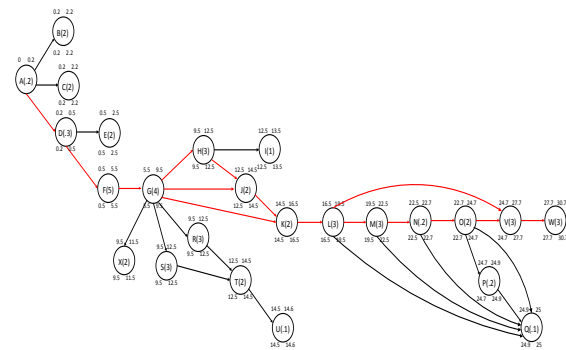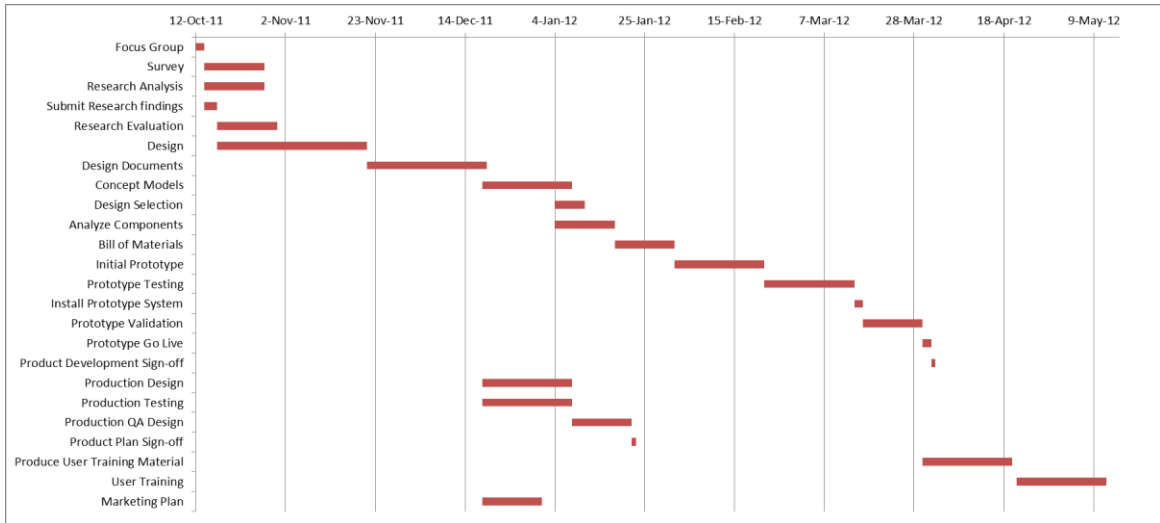

Figure 3
CPM

A Gantt chart was created to help work out the critical path. The required tasks and activities to complete the project are scheduled to help monitor the project and keep the status updated. Refer to Figure 4.

Execution and Control Phase

After developing the Project Definition and Project Planning, a Kick-off meeting Agenda was conducted as part of the Project Execution and Control. The goal of the kick-off meeting is to verify that all parties involved have consistent levels of understanding and acceptance of the work done so far to validate expectations pertaining to the deliverables to be produced during this phase [3]. Refer to Figure 5

Figure 4
Gantt chart

Figure 5
Project Execution and Control Kick-off Meeting Agenda

Figure 6
Meetings Minutes

Following the Kick-off meeting agenda, the notes, discussion and action items were compiled into meeting minutes and distributed to all attendees for review and approval. After everyone approval the meeting minutes were added to the project repository. The Meeting Minutes are shown in Figure 6.

A Project Status Report was scheduled to submit on a biweekly basis The Project Status Report was a means of communicating regularly the ongoing progress and status of the project. The overall project status was communicated to all team members using the Project Status Report. The same report was used to communicate the project status to managers and other stakeholders. A report from the period 4/4/12 to 4/17/12 when the Production Development phase was taking part is shown in Figure 7.

Project Status Report

A. General Information

Project Title: Redesign of an Advance Iris Identity product

Reporting Period: From: 4/4/12 To: 4/17/12

B. Previous Period Activity Status
Provide a list of Previous Reporting Period Activities and the status of each.

Design – Completed
Design Documents - Completed
Production Design - Completed
Production Testing - Completed

C. Current Period Activity Status
Provide a list of Current Reporting Period Activities and the status of each.

The concept models were created and a Design selection was made. It was proceeded to analyze the different components needed to develop the concept model chosen. As the components are selected the bill of materials is updated. In addition, the development of Production QA Design documents was begun in parallel with the analysis of components.

D. Significant Accomplishments for Current Period
Summarize any Significant Accomplishments during the Current Reporting Period

During this current period the Concept Models from the final design document were finalized. A Review and analysis of quality, performance and cost of the concept models was executed. Having these measures in consideration, the best and most appropriate model was chosen. It was proceeded with the analysis of the necessary components to develop this concept model. Different suppliers were considered, but at the end the one with less lead time and best quality components were selected.

E. Planned Activities for Next Period
Provide a list of Activities Planned for the next reporting period and the status of each.

- For the next period it's expected to complete the bill of material for the selected model and then begin the preparation to develop the initial prototype.

- At the same time the Production QA Design document is expected to be finalized and the product plan sign-off could be executed.

F. Non-technical Project Issues
List and describe any Non-Technical Issues impacting the project at this point.

During this period there were no Non-technical Project Issues.

G. Technical Project Issues
List and describe any Technical Issues impacting the project at this point.

- The Quality Engineer assigned to do the Production Testing documentation did not have the necessary skills and knowledge to complete it.

- An Industrial Engineer working with suppliers to find the correct components had trouble explaining the required electrical specifications needed for some components.

H. Action Items
Identify all open Action Items and any Action Items closed during the reporting period.

- During the Production Testing documentation task a System Integrator was assigned to help the Quality Engineer in charge of this process. The System Integrator help him with the require tests procedure to validate the components.

- An Electrical Engineer from the R&D Department was involved in contacting the suppliers to let them know from an electrical perspective the specifications needed for certain components.

Figure 7
Project Status Report

A transition checklist was used at the end of the Execution and Control phase to focuses on completion of project tasks, and verification that acceptance criteria have been met.

The project transition checklist provides a vehicle to verify completion of the project Execution and Control phase before beginning the Closure. The transition checklist forces the project teams and project members to formally address the transfer and acceptance of the deliverables and associated documentation. Refer to Table 2.

Table 2
Transition Checklist

Execution and Control Transition Checklist

Project Title: Re-design of an advance iris identity product

Prepared by: Project Manager

Date: 5/14/12

The checklist provides a status column where the completion status of project elements is recorded (as one of the answers shown below).

- Y = Item has been addressed and is completed.
- N = Item has not been addressed, and needs to be to complete the process.
- N/A = Item has not been addressed and is not related to this project.

	Item	Status	Comments
1	Have all activities, tasks, and subtask been completed as specified in the WBS?	Y	
1.1	If the answer to 1 is No, is there a plan to complete these tasks?	N/A	
2	Have all issues raised during the course of the Project?	Y	
2.1	If the answer to 2 is No, is there a plan to close out these issues?	N/A	
3	Has all documentation supporting the deliverables of the Design of the product been completed?	Y	
4	Have planning and project status report meetings been held with project teams and departments to insure a smooth transition of responsibility?	Y	
5	Has the project met or exceeded performance goals established in the Project Gantt chart?	Y	
5.1	If the answer to 5 is No, is there an impact on project deliverables?	N/A	
6	Have all deliverable tests been completed?	Y	
6.1	Did the product deliverables meet the acceptance criteria established in the project plan?	Y	
7.1	Has the authorized user authority complete the Product Development and Production Plan signed-off?	Y	
7.2	Were there any conditions or exceptions identified in Product Development and Production Plan signed-off??	N/A	
7.3	If the answer to 7.2 is Yes, is there a plan to satisfy the conditions or exceptions?	N/A	
8	Is a plan in place to conduct the project closeout task?	Y	
8.1	Have the project closeout tasks been assigned?	Y	
8.2	Has a date been established when the Project Closeout Report will be completed?	Y	
9	Is there an expectation of administrative and marketing plan during project closeout?	Y	

Closure Phase

As the deliverables of the project were produced and accepted, approval signatures were gained from the Project Sponsor. Following the final status meeting, the Project Manager obtained the Project Sponsor's signature one final time, indicating acceptance of the project to date, and indicating approval to proceed to Closure the Project. Refer to Figure 8 for The Project Acceptance Form.

Figure 8
Project Status Report

A Post Project Review was made to provide a summary of the project which was completed. This document will communicate what went right and wrong with the project, as well as lessons learned and recommendations for future projects. This section provides enough background information to base the details in the rest of the document on. Figure 9 shows the Post Project Review which includes the Project Summary, Project Team and Staffing, Project Deliverables and Project Schedule.

1. PROJECT SUMMARY

Advanced identity management technology solutions Company recently completed the *Re-design of an advance iris identity product* Project. This marks the end of a difficult but successful project for the research and development (R&D), Design, Technical Support and Production groups.

The objective of this project was to re-design an advance iris identity product without sacrificing any performance parameters. The purpose of this is to reduce material costs by utilizing less expensive materials but with good or same quality in the manufacturing process.

The scope of this project included a phased approach for the design, testing, zero customer complaint and transition to manufacturing for the new Re-design of an advance iris identity product Project. Project success was defined as re-designing and manufacturing an existing advance iris identity product with less manufacturing cost but sustaining its good quality performance. The product which passed all performance, software and hardware testing, achieved the goal of less expensive materials, received positive customer feedback in live testing, and was able to be transitioned to production.

2. PROJECT TEAM AND STAFFING

This section provides information about who the project team consisted of. This information is useful when questions may arise on future projects which are similar in nature. It also provides a useful list of points of contact should more information be needed on lessons learned from the project.

The chart below provides information about the Project team members:

Name	Title	Project Role
E. Rodriguez	Project Manager	Project Manager
F. Hernandez	VP of Technology	R&D Director
C. Delgado	Chief Industrial Designer	Design Engineer
J. Lopez	Technical Support Director	Testing Engineer
L. Matos	Quality Manager	Materials Engineer
I. Rodriguez	Production Manager	Production Engineer

Project team members utilized standard project management methodologies to successfully complete the project. The project team was a matrixed organization with full support from functional managers and senior leadership. Effective communication, detailed planning, project management tools, and organizational structure all played key roles in the project's success.

3. PROJECT DELIVERABLES (PLANNED VS. ACTUAL)

This section describes the expected outcomes of the project as it was originally planned and compares these outcomes against the actual outcomes. This is beneficial in defining any occurrences of scope creep or whether a project may not have been completed as planned. This is helpful information for lessons learned and for future project teams conducting similar projects.

The *Re-design of an advance iris identity product* Project has been completed successfully. There were planned deliverables for each phase of this project as well as for the completed product. This section highlights the planned deliverables and compares them to actual deliverables as they occurred.

Research

Planned Deliverable	Actual Deliverable	Summary
Perform Analysis of the Research findings.	Perform Analysis of the Research findings.	This deliverable was completed as planned
Submit the Research findings to proceed with Product Design.	Submit the Research findings to proceed with Product Design.	This deliverable was completed as planned

Design

Planned Deliverable	Actual Deliverable	Summary
Create draft design, Review design document and develop final design.	Create draft design, Review design document and develop final design.	This deliverable was completed as planned
Develop Concept Models from the final design document.	Develop Concept Models from the final design document.	This deliverable was completed as planned

Testing

Planned Deliverable	Actual Deliverable	Summary
The system is tested with a select set of users under certain parameters and circumstances.	The system is tested with a select set of users under certain parameters and circumstances.	This deliverable was completed as planned

Figure 9
Post Project Review

Production

Planned Deliverable	Actual Deliverable	Summary
Design the production processes and assembly documentation to manufacture the product.	Design the production processes and assembly documentation to manufacture the product.	This deliverable was completed as planned
Design and create the require tests procedure to be applied in manufacturing process.	Design and create the require tests procedure to be applied in manufacturing process.	This deliverable was completed as planned
Design the Quality Assurance test for different parts and components of the product.	Design the Quality Assurance test for different parts and components of the product.	This deliverable was completed as planned

In summary all documented project deliverables have been met by the project team. All members have submitted their feedback and acknowledge that there are no deliverables which were missed or omitted for this project.

4. PROJECT SCHEDULE

This section describes the project's planned schedule or timeline and how the project measured against this plan. This information is helpful in identifying and understanding what may have contributed to project delays or allowed the project to complete early or on time. This can then be used by the team members on future projects or be referenced by other project teams for use on future projects. Archiving project information during the project closure phase is one of the best ways for an organization to improve its project management methodologies and effectiveness.

The *Re-design of an advance iris identity product* Project schedule called for a seven month project with initiation beginning on October 12, 2011 and project closeout ending on May 18, 2012. The below chart shows the most important tasks of the project lifecycle, the planned schedule dates, and the actual completion dates of each phase.

Project Phase	Scheduled Completion	Actual Completion	Comments
Initiation	October 12, 2011	October 12, 2011	Completed on time
Research Analysis	October 27, 2011	October 27, 2011	Completed on time
Design Documents	December 19, 2011	December 19, 2011	Completed on time
Bill of Materials	February 6, 2012	February 6, 2012	Completed on time
Prototype Testing	March 19, 2012	March 19, 2012	Completed on time
Production QA Design	January 30, 2012	January 30, 2012	Completed on time
User Training	April 19, 2012	April 19, 2012	Completed on time

The Project team successfully completed each phase on time which can be attributed to effective planning and communication as well as sponsor and executive level support of this important initiative. Throughout the project there was a strong sense of cooperation across the organization as the importance of this project was stressed and its benefits were realized.

Figure 9
Post Project Review (Continue)

CONCLUSION

Identity management is one of the issues that almost every organization wants to address, only to discover how complicated it actually is to accomplish from both a technology and business perspective. Security is today's most important consideration when managing the identity of a human being. To manage the identity of a person an identification card, password or biometric is stored in a database to. Today the best way to secure a person identity is using a biometric security system, especially an iris recognition system. The objective of this project was to reduce the manufacturing cost of an advance iris identity product so it can have a competitive price in today's advance technology market.

A Project Management approach was used to plan, organize, execute and control the require steps and processes to re-design the product and develop the necessary testing and production documentation to deliver it on time. Some tool were used such as Project Charter, WBS, Critical Path Method, Gantt chart, Project Status Report, Transition checklist, Project Acceptance Form and Post Project Review in order to complete and manage each project task on time. From the CPM was found the most important task in the project which is the longest time it will take to complete. A Gantt chart was created to schedule the project plan and help the project team to finish each task on time. Using bi-weekly Project Status Report and meetings regarding those reports to manage and control the project team members and staff were able to complete each deliverable as planned. The Project was successfully completed on time which can be attributed to effective planning and communication.

As part of the closure phase a Post Project Review was created to provide the scope and a summary of the project completion. This document will communicate what went right and wrong with the project, as well as lessons learned and recommendations for future projects.

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