Software Project Management Plan (SPMP)
for Nirvana National Bank ATM Software Project

Baseline version 1.0
Issued on: May 08, 2004

Issued by: Terasoft, Inc.
Issued for: Nirvana National Bank

Signature

The following signature indicates approval of the enclosed Software Project Management Plan.

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NNB Executive Committee representative

Change History

Version	Date	Author	Changes
0.1	February 27, 2004	M. Buckley-Golder	• initial version
1.0	May 08, 2004	M. Buckley-Golder	o RFP baseline

Preface

The following Software Project Management Plan (SPMP) describes the proposed plan to be taken by Terasoft, Inc. to complete the software portion of Nirvana National Bank's (NNB) ATM project. As such, it deals only with the delivery of the software component of the project and has dependencies on the Hardware and Network portions of the product, which Terasoft has been told will be treated as separate projects by NNB.

This SPMP is intended to be used by NNB's executive committee for the purpose of evaluating Terasoft's response to the RFP issued by NNB for delivery of the software product. Should Terasoft's RFP response be accepted and Terasoft chosen to deliver the software product, it shall also be used by Terasoft's project manager as a plan for conducting the product, and by project participants as a reference to project plans and processes.

Important Notes for Soft-copy Viewing

If you are viewing the softcopy version of this document, it will have been provided in Adobe Acrobat PDF format, which allows collection of output from multiple sources into a common format, presented in the way the source application intended.

It is highly recommended that the document be viewed with a suitable application from the Adobe Acrobat family, version 6.0 or higher as intermittent visual glitches have presented themselves when testing the document on Adobe Acrobat Reader 5.0.

In the annexes, some pages have much larger than normal paper sizes which may appear to be very small and illegible in the Acrobat program. There is sufficient resolution stored in the document for these pages to be enlarged using Acrobat's zoom controls. Using the zoom controls, the content will be legible. As an example of why this was done, the network diagram was reduced from 180 pages in 8.5" x 11" paper size, to 9 pages in this document, resulting in a much more easily comprehended diagram.

Acrobat's page numbering feature has been used so that the document is easily navigable. The PDF page number corresponds to the document page number, inclusive of pages numbered with roman numerals.

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Section 1

Overview

This section of the document is an introduction to Terasoft's proposal to complete the software development portion of the Nirvana National Bank (NNB) Automated Teller Machine (ATM) project ("the project"). It will describe the purpose of the project and the objectives that are to be accomplished, the assumptions and constraints that underlie the effort, the deliverables that will be produced by the project, and a summary of the project schedule and budget.

1.1 Project Summary

1.1.1 Purpose, Scope, and Objectives

The purpose of the project is to analyze the requirements of, design, implement, and maintain the software for both the central bank server and the ATM client machines that will comprise the Nirvana National Bank ATM network, according to the requirements specified by the client.

All activities directly related to the purpose are considered to be in scope. All activities not directly related to the purposes are considered to be out of scope. For example, issues concerning ATM hardware and network availability are not within the scope of this project.

The objectives of the project are as follows:

- complete the project by the project due date
- complete the project within budget
- provide all deliverables identified in section 1.1.3 by the project due date
- fulfill all stated requirements, as in the SRS, of the software product deliverable, which fall into one of the following categories
    - central bank customer database modifications
    - interface with central bank computerized accounting system
    - customer ATM transactions
    - customer ATM statement
    - weekly statistical report of ATM operations

1.1.2 Assumptions and Constraints

The project will be planned with the following assumptions:

- this project is a component of a larger project
- this project will deliver only the software components of the larger project
- initial estimates for the project as provided in this SPMP are +/- 40%
- the larger project that this project is a part of has already defined the hardware that the software will run on
- the software products will be Windows NT-based using Windows Open Services Architecture / eXtensions for Financial Services (WOSA/XFS), supporting NNB's desire for an open architecture ATM product
- the ATM hardware has documentation available suitable for interface discovery
- the ATM hardware is defined (4^{th} generation NCR ATM hardware) and detailed documentation about the platform will be delivered to Terasoft by June 1, 2004.
- a documented physical ATM computer network is being created in a separate project and will exist between each ATM client and the central bank in time for acceptance testing

- the ATM hardware is being handled as a separate project and will be available in time for the installation phase
- we will be able to acquire the expertise of two outside consultants from Banks, Etc. to assist with the requirements elicitation and detail design of the ATM client/server software
- this SPMP is submitted as a firm-fixed-price (FFP) bid; the project shall not exceed the established budget
- consultation with NNB and the Steering Committee comes at no cost to the project
- Terasoft will be able to acquire commitment from the required staff for the duration of their activities

The project will be planned with the following constraints:

- budget
  - $3,000,000 (25% of total $12,000,000 budget; software portion only)
- time
  - one year
  - once the software product is installed on the ATM machines, it will take 30 days for NNB to install the physical ATM machines in their permanent locations
- staff
  - two outside consultants from Banks Etc. will be required to assist in the requirements and detail design phases of the project, so as to lend their extensive ATM experience to the project. The consultants will also supplement our team elsewhere, as necessary.
- maintenance
  - the software will have to be designed such that maintenance expenses do not exceed $100,000 per year (software maintenance portion of the total $600,000 budget)

1.1.3 Project Deliverables

All of the items listed in this subsection are the deliverables requested by NNB's ATM project manager that are to be provided prior to completion of the project.

- Software program and library binaries
- Software documentation
  - Installation documentation
  - End-user documentation
  - updates applied to NNB's central bank documentation
- Installation of software program and library binaries on target hardware
- Software training performed against affected users
  - ATM site users (i.e. bank branch staff)
  - ATM site installers
  - Software maintenance team
- Project documentation
  - Software Requirements Specification (SRS)
  - Software Design Specification (SDS)

- Software Project Management Plan (SPMP)
- Software Test Plan (STP)
- Software Quality Assurance Plan (SQAP)
- Software Configuration Management Plan (SCMP)
- Software Verification and Validation Plan (SVVP)

1.1.4 Schedule and Budget Summary

The project has the following high-level schedule:

- Delivery of baseline project plan: May 10, 2004
- Software products ready for operation: May 31, 2005

The project has a budget of $3,000,000. Once the software product is delivered, annual maintenance costs should be no larger than $100,000.

The project will be tracked using the Earned Value Management System (EVMS).

1.2 Evolution of the Plan

The plan is considered to be a dynamic document and will be updated monthly by default and on an unscheduled basis as necessary. Scheduled updates to the plan will occur once every month, on the last business day of the month.

Notification of scheduled and unscheduled updates to the plan will be communicated via e-mail to all project participants according to the Reporting Plan (section

Once the initial plan is finalized, a baseline of the plan will be created. Changes to the plan will take place against this baseline. The plan will only receive further baselines if significant change in scope occurs.

Section 2

References

2.1 Software Requirements Specification (SRS)

Version	0.1
Date	May 5, 2004
Author	Harry Patel
Access information	\\PROJECTS\NNBATM\SRS\0.1.doc
Publisher	Matthew Buckley-Golder

2.2 Software Design Specification (SDS)

Version	0.1
Date	May 5, 2004
Author	Alfred Lim
Access information	\\PROJECTS\NNBATM\SDS\0.1.doc
Publisher	Matthew Buckley-Golder

2.3 Software Test Plan (STP)

Version	0.1
Date	May 5, 2004
Author	Alex Wong
Access information	\\PROJECTS\NNBATM\STP\0.1.doc
Publisher	Matthew Buckley-Golder

2.4 Software Quality Assurance Plan (SQAP)

Version	0.1
Date	May 5, 2004
Author	Mark Owen
Access information	\\PROJECTS\NNBATM\SQAP\0.1.doc
Publisher	Matthew Buckley-Golder

2.5 Software Configuration Management Plan (SCMP)

Version	0.1
Date	May 5, 2004
Author	Sarah Schmidt
Access information	\\PROJECTS\NNBATM\SCMP\0.1.doc
Publisher	Matthew Buckley-Golder

2.6 Software Verification and Validation Plan (SVVP)

Version	0.1
Date	May 5, 2004
Author	Alex Wong
Access information	\\PROJECTS\NNBATM\SVVP\0.1.doc
Publisher	Matthew Buckley-Golder

2.7 Quality Software Project Management

Futrell, R. T., Shafer, D. F., Shafer, L. I. (2002). *Quality software project management*. Upper Saddle River, N.J.: Prentice Hall PTR.

2.8 IEEE Standard 1063-2001

Access information	http://shop.ieee.org/store/product.asp?prodno=SS94976

2.9 IEEE Standard 830-1998

Access information	http://shop.ieee.org/store/product.asp?prodno=SS94654

2.10 IEEE Standard 1016-1998

Access information	http://shop.ieee.org/store/product.asp?prodno=SS94688

2.11 IEEE Standard 1058-1998

Access information	http://shop.ieee.org/store/product.asp?prodno=SS94690

2.12 IEEE Standard 1074-1997

Access information	http://shop.ieee.org/store/product.asp?prodno=SS94600

2.13 IEEE Standard 1012-1998

Access information	http://shop.ieee.org/store/product.asp?prodno=SS94625

2.14 IEEE Standard 1012a-1998

Access information	http://shop.ieee.org/store/product.asp?prodno=SS94677

2.15 IEEE Standard 730-2002

Access information	http://shop.ieee.org/store/product.asp?prodno=SS94995

2.16 IEEE Standard 828-1998

Access information	http://shop.ieee.org/store/product.asp?prodno=SS94653

2.17 Terasoft Standard Documentation template

Version	1.0
Date	December 10, 2003
Author	Alex Wong
Access information	\\PROJECTS\$TEMPLATES\stddoc1_0.dot
Publisher	Alex Wong

2.18 Terasoft Test Plan template

Version	1.0
Date	November 2, 2003
Author	Alex Wong

Access information	\\PROJECTS\$TEMPLATES\stp1_0.dot
Publisher	Alex Wong

2.19 Terasoft Meeting Minutes template

Version	1.0
Date	November 2, 2001
Author	Michael Bennett
Access information	\\PROJECTS\$TEMPLATES\mtgmin1_0.dot
Publisher	Michael Bennett

2.20 Terasoft Meeting Agenda template

Version	1.0
Date	November 2, 2001
Author	Michael Bennett
Access information	\\PROJECTS\$TEMPLATES\mtgage1_0.dot
Publisher	Michael Bennett

2.21 Terasoft Technical Review Summary template

Version	1.0
Date	April 2, 2003
Author	Alex Wong
Access information	\\PROJECTS\$TEMPLATES\trevsum1_0.dot
Publisher	Alex Wong

2.22 Terasoft Training Plan template

Version	1.0
Date	February 10, 2002
Author	Nigel Planer
Access information	\\PROJECTS\$TEMPLATES\trnplan1_0.dot
Publisher	Nigel Planer

2.23 Terasoft Quality Audit template

Version	1.0
Date	February 10, 2002
Author	Mark Owen
Access information	\\PROJECTS\$TEMPLATES\qaudit1_0.dot
Publisher	Mark Owen

2.24 Terasoft Quality Audit template

Version	1.0
Date	February 10, 2002
Author	Mark Owen
Access information	\\PROJECTS\$TEMPLATES\qaudit1_0.dot
Publisher	Mark Owen

2.25 PPA Questionnaire template

Version	1.0
Date	October 1, 2000
Author	Matthew Buckley-Golder
Access information	\\PROJECTS\$TEMPLATES\ppa1_0.dot
Publisher	Matthew Buckley-Golder

Section 3

Definitions

Term	Definition
NNB	Nirvana National Bank
ATM Software Project Manager	the Terasoft project manager of the project described by this SPMP
ATM Project Manager	the NNB project manager responsible for the entire ATM project (software, hardware, network)
ATM Hardware Project Manager	the NNB project manager responsible for planning the acquisition and installation of hardware related to the ATM project
ATM Network Project Manager	the NNB project manager responsible for planning the acquisition, configuration, and installation of network infrastructure to support ATM and central bank communication
ATM	Automated Teller Machine
ATM network	the computer network connecting ATM clients to the central bank; does not imply underlying technology (specifically, it *does not* refer to Asynchronous Transfer Mode network technology)
FFP	Firm-Fixed-Price; a price for fulfilling the contract that will not be under- or over-run
EVMS	Earned Value Management System
BCWP	Budgeted Cost of Work Performed
ACWP	Actual Cost of Work Performed
BCWP	Budgeted Cost of Work Performed
BCWS	Budgeted Cost of Work Scheduled
CR	Critical Ratio
SPI	Schedule Performance Indicator
CPI	Cost Performance Indicator
IEEE	Institute of Electrical and Electronics Engineers
SRS	Software Requirements Specification
SQAP	Software Quality Assurance Plan
STP	Software Testing Plan
SDS	Software Design Specification
SCMP	Software Configuration Management Plan
SVVP	Software Verification and Validation Plan
SPMP	Software Project Management Plan
IEEE 1058-1998	the IEEE standard for Software Project Management Plans on which this plan is based
IEEE 1074-1997	the IEEE standard for developing software lifecycle processes, used by this project to organize work activities
work package	a specification of work that must be accomplished to complete a work task
work product	any tangible item produced during the process of developing of modifying software
baseline	a work product that has been formally reviewed and accepted by the

	involved parties
project deliverable	a work product to be delivered to the acquirer
milestone	a scheduled event used to measure progress
subactivity milestone	milestones within a single activity that allow measurement of progress within that activity

Section 4

Project Organization

4. Project organization

4.1 External interfaces

Since our company specializes in outside contracts, we use a “strong matrix” organization and are able to assemble the necessary resources underneath the project manager where they are utilized as necessary. The external structure of the companies having interest in the project is as shown in the following organizational chart. While the external organization chart suggests “functional” organization, this is for grouping purposes only. The manager of each group is responsible for administration of and dissemination of general organizational information to his/her group, but does not enjoy a strong reporting relationship with group members.

The external organization chart which shows these relationships is included in Appendix C.

The “functional” managers will not incur any direct costs to the project; any administrative costs are integrated into the per-hour cost of the individual resources.

4.2 Internal structure

Due to the strong matrix organization used by the company, resources are assigned to directly report to our project managers. The following diagram shows the proposed project team and its relationship to the project manager. In situations where there is more than one member of a single category, a “Lead” is assigned as an interface to the function.

The internal organization chart which shows these relationships is included in Appendix C.

4.3 Roles and responsibilities

Roles and responsibilities are illustrated by a Resource Allocation Matrix (RAM). Due to its size, the RAM is included in Appendix A.

Section 5

Managerial Process Plans

5.1 Start-up Plan

5.1.1 Estimation Plan

Schedule, Cost, and Resource Estimates

An estimation chart showing activities, estimated duration, estimated cost, and estimated resource requirements is included in Appendix B.

Estimation methods

Schedule duration and work estimation for each leaf activity in the Work Breakdown Structure (WBS) will be performed using a combination of the following methods and data sources:

- Resource input
    - For the resource(s) identified as being required to complete the activity, the resources will be asked for an estimate of the amount of time required to complete the activity. A detailed estimate will be requested, broken down into subactivity milestones. Subactivity milestones tied to the "% complete" metric will force a consideration of everything that is involved in the activity as well as providing a basis for EVM monitoring.
    - When more than one resource is assigned to the activity, their estimates will be collected independently and, if substantially different, meetings will be held between the project manager and all resources so that an agreement may be reached on a final estimate. This is in the spirit of the wideband delphi approach, but is modified for the size of our organization and tight project schedule.
- Organizational project history data
    - Terasoft has been involved in numerous financial software development project in the past. Data from those that are most relevant will be used to fine-tune the estimates for the activities on this project.
- Contractor project history data
    - The contracting company that we use to assist in financial software devleopment project has a substantial project history from which we can draw. The acquisition of two contractors from the company, as outlined in the project staffing plan, will give us access to this data for the purpose of making estimates.

Cost estimation for each activity will be performed by multiplying the amount of work expected by the hourly rate for the resources connected to the activity, multiplied by the percentage of participation that each resource expects to make toward the activity.

The resulting estimates for each leaf activity will be rolled-up to produce an estimate for the larger group of activities that the activity is a part of. The highest-level activity in the WBS (after attaching schedule, resource, and cost estimates) will therefore reflect the schedule and cost estimates for the entire project.

Re-estimation methods

When re-estimation is necessary, it will be performed using the following methods and data sources:

- Resource input
    - Estimation of the amount of work remaining in the task will be collected from each resource. A detailed estimate will be requested, showing breakdown of the work remaining along with identifiable subactivity milestones. This will force consideration of all work remaining as well as provide a basis for continued EVM monitoring. Subactivity milestones will be restated, if necessary. A new estimate will be formulated using the same approach as in “Estimation Methods” above.
- Contractor input
    - Following resource input, the Banks, Etc. contractors assigned to the project will be asked for an analysis of the work completed to date and the work remaining, as submitted by the involved resource(s). Their comments and feedback will be used to fine-tune the estimate provided by the attached resource(s).

Once new estimates have been collected, and if schedule is adversely affected (+/- 10%), organizational project history data will be used to determine whether or not it would be effective to add additional resources to assist in completing the activity, taking “roll-on” time into consideration.

Re-estimation Schedule

Time has been allocated in the schedule for monthly SPMP updates. Necessary updates to the cost, schedule and resource estimates will be included in these SPMP updates. However, such re-baselining will only take place in extreme circumstances, such as when significant scope change has been introduced.

The purpose of these monthly updates is to force allocated time toward maintaining the SPMP and to provide a schedule on which stakeholders can expect to see updates to the plan. A revised SPMP will be published following each of these update sessions regardless of whether any significant changes have been made so that it is obvious to all involved that the scheduled update has occurred.

Impromptu updates to the estimation plan will be made as necessary and communicated to those affected. In particular, detailed explanation is given below to the handling of communication of these update types:

- Resource
- Cost
- Schedule

Resource

- If an increase in existing allocation is required
    - Affected resource
    - Functional manager of affected resource

- If addition of internal resources is required
    - Terasoft CEO

Cost

- If an increase in costs is required but does not exceed the project budget
    - Terasoft CEO
- If an increase in costs is required which exceeds the project budget
    - Terasoft CEO
    - ATM Project Manager
- If a decrease in costs is expected
    - Teraosft CEO

Schedule

- If an increase in schedule is required which does not exceed the deadline
    - Terasoft CEO
- If an increase in schedule is required which exceeds the deadline
    - Terasoft CEO
    - ATM Project Manager
- If a decrease in schedule is expected
    - Terasoft CEO

[due to page orientation differences, section 5.1.2 starts on the next page]

5.1.2 Staffing Plan

Resource Requirements

Based on initial estimates, the project will require the human resources shown in the table below. All resources exist within Terasoft with the exception of two contractors. Quantity required, estimated work requirement, key work periods and affordable hourly rate ranges are included for each resource type. The key work periods are those periods where the resource will be heavily allocated and should be prepared to have significant (above 20% working time) availability to the project:

Human Resource Type	Work (hrs)	Key Periods Req'd	Key Project Phase(s)	Qty	Affordable Hourly Rate	Personality Characteristics
Project Manager	1193	02/15/2004 to 06/30/2005	All	1	$250-300	Since the members of our organization often work together in software development projects, the personal characteristics required of our staff are specified when they are hired into the organization, according to the Myers-Briggs Personality Type Indicator (MBTI) ; no additional effort in a search for specific personality types is required.
Requirements Analyst (Lead)	142	05/30/2004 to 07/15/2004, 11/14/2004 to 02/13/2005	Requirements	1	$150-200	
Requirements Analyst	170	05/30/2004 to 07/15/2004	Requirements	1	$150-200	
Consultants with detailed ATM knowledge	914 + 300 = 1214	[1] 05/30/2004 to 02/13/2005 [2] 06/13/2004 to 08/31/2005	Requirements, Design	2	$350-450	
Software Architect (Lead)	267	05/30/2004 to 08/29/2004	System Allocation, Design	1	$150-200	
Software Architect	80	05/30/2004 to 08/15/2004	System Allocation	1	$150-200	
Programmer (Lead)	737	12/05/2004 to 04/24/2005	Implementation	1	$150-200	
Programmer	570	12/05/2004 to 04/03/2005	Implementation	1	$150-200	
Verification Engineer (Lead)	654	08/15/2004 to 04/06/2005	Requirements, Design, Implementation,	1	$150-200	
Verification Engineer	532	08/15/2004 to 02/13/2005	Requirements, Design, Implementation	1	$150-200	

Software Designer	483	08/01/2004 to 11/30/2004	Design	1	$150-200	
Validation Engineer	653	08/01/2004 to 09/30/2004, 11/01/2004 to 02/28/2005	Requirements, Design	1	$150-200	
Quality Analyst	262	07/01/2004 to 09/30/2004	All (but most work up-front during definition)	1	$150-200	
Configuration Manager	225	05/30/2004 to 07/31/2004	All (but most work up-front during definition)	1	$150-200	
Database Engineer	89	07/01/2004 to 08/15/2004, 12/01/2004 to 12/15/2004, 03/01/2004 to 05/31/2005	Design, Implementation, Installation	1	$150-200	
Technical Writer	280	12/01/2004 to 01/31/2005	Documentation	1	$150-200	
Training Specialist	241	11/21/2004 to 12/12/2004, 04/10/2005 to 05/15/2005	Training	1	$150-200	
Installation Specialist	70	12/05/2004 to 12/12/2004, 03/27/2004 to 04/10/2005, 05/15/2005 to 05/31/2005	Installation	1	$150-200	

In addition to the human resources noted above, the following material resources will be required:

Material Resource Type	Units	Rate	Notes
Printing services	12	$100 / use + $250 / unit	1 unit = 1 hour of printing time
Computer time for object code generation	20	$500 / use + $400 / unit	1 unit = 1 hour of computer time
Computer software purchase	30	$400 / unit	Units are applied arbitrarily to account for software cost
Software repository storage	48	$400 / unit	1 unit = 1GB per month

Attendance at weekly project status meetings

Most staff will be required to attend weekly project status meetings, for which the dates are yet to be determined. All staff identified as "Leads" will be required to attend the meetings. Staff who are in a group underneath a "Lead" will not be required to attend, while staff who have a "Lead" role, or who have no subordinate "Lead" will be required to attend.

Reassignment

All efforts will be made to communicate changes in the key resource requirement dates to the CEO and to functional managers of project team members. Due to the size and structure of our organization, this is important because team members will be involved in more than one project at a time and the communication of changes will allow other projects to make optimal use of organizational resources. Since it is our company's policy to have no more than two large projects in progress at any given time, the company will use this information to assign resources to other projects as necessary. *Project team members will be made aware of their next assignments two months before the end of their last major participation period.*

Resource Histograms

Resource histograms are used to illustrate the allocation of each resource group over the project period. **Note that regular, ongoing participation will be required for the duration of the project from the following resources:**

- Project Manager
- Configuration Managers
- Quality Analysts
- Validation Engineers
- Verification Engineers

The resource histograms for the above resource types are to demonstrate peak requirements only. The histograms can be found in Appendix D.

[due to page orientation differences, section 5.1.3 starts on the next page]

5.1.3 Resource Acquisition Plan

All human resources shall be acquired for the purposes of working on the project by the project manager. The project manager must present the resource requirements in detail to the CEO of Terasoft and the functional managers of each requested resource; the CEO of Terasoft has the ultimate responsibility for approving resources to work on Terasoft's projects.

The project manager shall be responsible for acquiring all non-human resources required by the project. The non-human resources identified as being required for the project are:

- Printing services
- Computer time for object code generation
- Computer software purchase
- Software repository

The acquisition of each non-human resource will be described separately.

Printing Services

Required Dates: 1/10/2005, 1/24/2005
Request By: 12/20/2004
Terasoft uses an outside printing company (Trees, Etc.) for all volume printing requirements. Trees, Etc. requires 3 weeks advance notification for any large volume printing requests in order to schedule our print jobs against those of their other customers. Printing services through Trees, Etc. are requisitioned via Terasoft's administrative assistant.

Computer time for object code generation

Required Dates: 2/4/2005, 2/7/2005, 3/1/2005, 3/30/2005, 4/6/2005
Reserve By: 1/21/2005
Computer time for object code generation is provided in-house at Terasoft and is managed by Barry Bush (Computer System Services). Requests for object code generation must be made 2 weeks in advance through Terasoft's administrative assistant.

Computer software purchase

Required Date: **3/22/2005**
Request By: 3/16/2005
Computer software purchases are made by purchase order and are processed through Terasoft's administrative assistant. The administrative assistant will be able to let us know if any existing software licenses are available within Terasoft that may be transferred from other, terminated projects; doing so represents potential cost savings. The administrative assistant will be responsible for selecting the purchase vendor and arranging payment and receipt of products.

Software repository

Required Dates: 3/2/2004, 3/9/2004
Request By: 2/24/2004

Software repository storage space is provided in-house at Terasoft and is managed by Jane Seagal (Repository Manager). Requests for repository storage space must be made 1 week in advance through Terasoft's administrative assistant.

5.1.4 Project Staff Training Plan

No training for Terasoft's project participants will be provided. The project team members are already well-trained in their respective disciplines and each has many years of experience in working with the waterfall lifecycle model and its associated phases. In addition, each member has undergone many hours of training under Terasoft's organizational training initiatives, including training in Personal Software Process (PSP) and Team Software Process (TSP).

In terms of domain-specific knowledge as it relates to the development ATM software, we have accommodated our limited experience in this area by recognizing the need for two consultants from a company with which we have had a good working relationship in the development of financial software. The two consultants whose services we will acquire from Banks, Etc. will fill our knowledge gap in this area.

5.2 Work Plan

5.2.1 Work Activities

Work activities are illustrated by a work activities table. Due to the length and abnormal width of the work activities table, it is included in Appendix E.

The soft-copy PDF version of this document uses very large page sizes to allow as much information to be shown in the table as possible. The default view of these pages when viewed in the Adobe Acrobat viewer will likely be unsuitable for inspection. In this case, please use the software's zoom controls to inspect the diagram at different zoom levels.

5.2.2 Schedule Allocation

Schedule allocation is illustrated by a network diagram. The critical path is illustrated in red. Due to the large size of the network diagram, it is included in Appendix F.

If you are viewing this document as a software document, the pages of the network diagram should be assembled as follows (numbers indicate the local page numbers of Appendix F, where the title page of Appendix F is page 0):

1	4	7
2	5	8
3	6	9

The soft-copy PDF version of this document uses very large page sizes to allow as much continuity in the diagram as possible. The default view of these pages when viewed in the Adobe Acrobat viewer will likely be unsuitable for inspection. In this case, please use the software's zoom controls to inspect the diagram at different zoom levels.

5.2.3 Resource Allocation

Resource allocation is illustrated by a resource allocation table. Due to the length and abnormal width of the resource allocation table, it has been included in Appendix G.

5.2.4 Budget Allocation

Budget allocation is illustrated by a budget allocation table. Due to the length and abnormal width of the budget allocation table, it has been included in Appendix H.

5.3 Control Plan

5.3.1 Requirements Control Plan

Requirements tracing

IBM Rational Requisite Pro is a software tool that will be used during the project to trace requirements from their initial entry through each of the phases through to delivery. All work effort must be related to a traceable requirement, in order to limit unnecessary work and ensure integrity of the product requirements.

Prioritization

When a requirement is entered into the system, it is assigned a priority, as follows:

- 3 = mission critical (product must have)
- 2 = important (should exist, but not absolutely necessary)
- 1 = nice to have (should be present if time permits, but is optional)

A requirement's priority will affect the attention it receives when tradeoffs become necessary, and when changes to requirements are requested. In conjunction with the above, a requirement change priority will also be used to rate the priority of incorporating change to the requirement, as follows:

- 3 = critical (change must be made to requirement)
- 2 = important (change should be made, but not absolutely necessary)
- 1 = nice to have (change should be made if time permits, but is optional)

Product requirements change control

Changes to product requirements will be considered based on their priority, their point-in-time of introduction within the overall project schedule, the extent of their impact to work products already baselined as configuration items, and the extent of their impact to in-progress work products.

All efforts will be made to incorporate changes to priority 3 requirements. Changes to priority 2 and 1 requirements will be handled only if time permits and/or the customer is willing to negotiate a increase in project budget and schedule.

The following matrix shows the requirement-change priority a change will receive, based on the requirement priority and change priority, as described in “Prioritization”, above.

		Requirement priority		
		3	**2**	**1**
Change priority	**3**	3	2	1
	2	3	2	1
	1	2	1	1

The development model being used for this project is based on up-front solidification of requirements and is appropriate for software products having the profile of the product being developed by this project. Therefore, all requirements change requests should come with the expectation that project schedule and/or budget will be affected if they are introduced after the requirements phase is complete.

Assessment

Assessment of the impact of requirements changes on product scope and quality will be decided in a review of the requirement change, performed in a meeting format. The selection of meeting participants will depend on how far downstream the requirement change is introduced. Usually, the Leads involved in the current project phase will be invited, along with Quality Analyst 1, the project manager, Configuration Manager 1. In addition, the Leads of the phase immediately following the current phase will be included for awareness. This review will be complete when the change’s impact on the following areas of assessment is determined:

- product scope
- product quality
- project schedule
- project budget
- project resources
- project risks

Reporting

Assessments produced for each area of assessment listed in “Assessment” above must be communicated to the NNB ATM Project Manager. The NNB ATM Project Manager will coordinate necessary resources to approve or reject the requirements change and associated/negotiated increases in budget and schedule. When multiple requirements changes are under consideration at the same time, the requirement-change priority will be used to determine which changes will and will not be implemented, and/or to settle issues of contention.

Terasoft’s CEO must be made aware of all requirements changes that are determined to require changes to project schedule, budget or resource requirements occur once the SRS is baselined. Quantities associated with each of these items must also be reported.

Configuration management

All requirements changes will be reflected in the SRS by making changes necessary to properly reflect the effects of the requirements. Changes to the SRS, once baselined, will require adherence to configuration item change procedures as per section 7.1. Depending on the phase in which the requirements change is made, configuration items that are further downstream may also be affected and may also be subject to the procedures in section 7.1.

5.3.2 Schedule Control Plan

As stated in section 1.1.4, the project will perform schedule control using the Earned Value Management System (EVMS). In addition, the Critical Path Method (CPM) will be used to control the activities most crucial to completion of the project on-schedule.

Critical Path Method (CPM)

The critical path illustrated by the red activities in the network diagram of section 5.2.2 shall receive special attention with respect to completion on schedule. Failure to complete these activities within their allotted time will cause slippage of the entire schedule.

Bi-weekly examination of the critical path will be undertaken in order to account for activities that enter and leave the critical path as real progress data is entered against the baseline project schedule.

Activity completion status

In the estimation plan (section 5.1.1), it is stated that each activity (represented by a work package) estimate shall consist of subactivity milestones which will be attached to the identification of how complete ("% complete") a work package is at a given point in time. Activity completion status will be reflected (and only reflected) by the meeting of these subactivity milestones. Subactivity milestones will be developed for each activity by the assigned resources as the depth of each activity becomes known. These milestones will be communicated to the project manager, who will work with the resource to attach a "% complete" value to each milestone so that the progress of each activity may be understood.

Major Milestones

The following major milestones and associated completion identifiers are defined in the following table:

WBS	Milestone	Date	**Complete When…** (for approval responsibility, see section 4.3)
1.2.4.4	Baseline SPMP completed	April 22, 2004	Baseline SPMP approved by responsible party
1.2.4.6.4	Baseline project charter completed	May 17, 2004	Baseline project charter approved by responsible party

1.3.1	Project kickoff	June 1, 2004	Baseline schedule created in Microsoft Project and all activities in it are assigned to team members
1.2.4.7	Receive ATM hardware documentation	June 1, 2004	ATM hardware documentation is received by project manager and confirmed sufficient for interface development
1.4.3	SCMP completed	June 14, 2004	SCMP is submitted for approval, technically reviewed, and is approved by responsible party
1.6.4	System allocation completed	June 14, 2004	Technical review of system allocation yields no showstopper defects
1.5.3	SQAP completed	June 21, 2004	SQAP is submitted for approval, technically reviewed, and is approved by responsible party
1.7.5	SRS completed	July 22, 2004	SRS is submitted for approval, technically reviewed, and is approved by responsible party
1.8.7	SDS completed	November 25, 2004	SDS is submitted for approval, technically reviewed, and is approved by responsible party
1.9.3	Requirements & Design V&V completed	December 6, 2004	SRS and SDS have been verified, validated, and signed off by V&V team
1.9.5.7	STP completed	December 24, 2004	STP is submitted for approval, technically reviewed, and is approved by responsible party
1.10.4	Documentation completed	January 31, 2005	All documentation required for implementation is approved, technically reviewed, and is approved by responsibly parties
1.9.1.6	SVVP completed	February 1, 2005	SVVP is submitted for approval, technically reviewed, and is approved by responsible party

1.9.8	V&V completed	April 25, 2005	All software products are tested such that no showstopper defects exist
1.12.6	Implementation completed	April 26, 2005	All software products are in a form suitable for installation by installation team
1.11.5	Training completed	May 27, 2005	95% of all identified training targets have received training
1.13.6	Installation completed	June 2, 2005	Installation of software is completed on all ATM and central bank systems and is accepted and approved by responsible parties
1.3.9	All project deliverables have been delivered	June 2, 2005	
1.3.10	Project closeout	June 2, 2005	Closeout checklist items are all accounted for (see section 5.5)

The arrival of major milestones will be treated specially from an effort data collection perspective. With the completion of each major milestone, all team members will be expected to update their effort data, as per section 5.3.6, so that a milestone performance report may be issued; milestone status and performance data will then be updated on the performance reporting website (see section 5.3.5).

Collection of progress data

At the regular weekly project status meetings, where applicable, the participants will each identify the subactivity milestones that have been met by the work for which they are responsible for during the period in which the status meeting falls. This information will be correlated with the "% complete" value attached to the milestone and the latter value will be entered into the project schedule maintained in Microsoft Project.

Effort data are collected according to the method outlined in section 5.3.6. These data will be used as inputs into progress measurement analysis.

Measurement of progress

The following Earned Value measurements will be used to monitor schedule progress:

- Budgeted Cost of Work Scheduled (BCWS)
- Budgeted Cost of Work Performed (BCWP)
- Schedule Variance (SV)
- Schedule Performance Index (SPI)
- Estimated Time At Completion (ETAC)
- Critical Ratio (CR)

Budgeted Cost of Work Performed (BCWP) will be automatically calculated by Microsoft Project as the "% complete" activity status is collected and entered into the appropriate fields in the program; collection is as per "Collection of progress data" earlier in this section. Budgeted Cost of Work Scheduled (BCWS) is automatically maintained by Microsoft Project as time passes after a plan baseline is saved within the software.

Schedule Performance Indicator (SPI) will be considered to be within acceptable limits if it lies between 0.95 and 1.1. If the SPI value exceeds either of these limits, investigation into the cause and potential remedies to the problem will begin. SPI values exceeding these limits will also cause an elevation in the risk rating of the "Schedule fit" risk item, as per section 5.4.

Schedule Variance (SV) is automatically calculated by Microsoft Project as the BCWS and BCWP values change. In the "Earned Value Schedule Indicators" view of the software, the topmost activity in the WBS will display the schedule variance at present. An SV value of +/- 1% of BCWS will elevate the "Schedule performance" risk rating, as per section 5.4, which will prompt investigation into the cause and potential remedies to the problem.

Estimated Time At Completion (ETAC) will be used to estimate the date on which the project will finish, based on schedule progress to date.

Each measurement will be retrieved from Microsoft Project and published to the project reporting website (as described in section 5.3.5) on a bi-weekly basis.

Critical Ratio

The Critical Ratio (CR) is treated as a separate measurement because it is a composite measurement that has a dependency on a budget control measurement; specifically, it depends on the Cost Performance Index (CPI) from section 5.3.3, in addition to the Schedule Performance Index (SPI) of this section:

CR = SPI * CPI

If the Critical Ratio (CR) is below 0.9 or above 1.2, the "Project performance" risk rating, as per section 5.4, will elevate, which will prompt investigation into the cause and potential remedies to the problem.

Crashing

As the project is dependent on other projects, and there is no stated cost advantage to completing the project sooner than the deadline, crashing will not be an integral consideration in the management of the project. However, if schedule slippage becomes problematic, crashing the project using an established crashing process will be considered as an option for bringing the schedule back in line with objectives

5.3.3 Budget Control Plan

As stated in section 1.1.4, the project will perform schedule control using the Earned Value Management System (EVMS). The most important metrics category to budget control is the "Effort" category; collection of these metrics is described in section 5.3.6.

Cost Baseline

A cost baseline will be created for the project once resource assignments are solidified. Changes in cost will be measured against this baseline. A proposed Cost Baseline chart is included in Appendix I. The Cost Baseline chart will be updated when a cost baseline is saved.

Activity completion status

In the estimation plan (section 5.1.1), it is stated that each activity (represented by a work package) estimate shall consist of subactivity milestones which will be attached to the identification of how complete ("% complete") a work package is at a given point in time. Activity completion status will be reflected (and only reflected) by the meeting of these subactivity milestones. Subactivity milestones will be developed for each activity by the assigned resources as the depth of each activity becomes known. These milestones will be communicated to the project manager, who will work with the resource to attach a "% complete" value to each milestone so that the progress of each activity may be understood.

Major Milestones

The following major milestones and associated completion identifiers are defined in the following table. This milestone list is the same as the one that appears in the schedule control plan (section 5.3.2):

WBS	Milestone	Date	**Complete When…** (for approval responsibility, see section 4.3)
1.2.4.4	Baseline SPMP completed	April 22, 2004	Baseline SPMP approved by responsible party
1.2.4.6.4	Baseline project charter completed	May 17, 2004	Baseline project charter approved by responsible party
1.3.1	Project kickoff	June 1, 2004	Baseline schedule created in Microsoft Project and all activities in it are assigned to team members
1.2.4.7	Receive ATM hardware documentation	June 1, 2004	ATM hardware documentation is received by project manager and confirmed sufficient for interface development

1.4.3	SCMP completed	June 14, 2004	SCMP is submitted for approval, technically reviewed, and is approved by responsible party
1.6.4	System allocation completed	June 14, 2004	Technical review of system allocation yields no showstopper defects
1.5.3	SQAP completed	June 21, 2004	SQAP is submitted for approval, technically reviewed, and is approved by responsible party
1.7.5	SRS completed	July 22, 2004	SRS is submitted for approval, technically reviewed, and is approved by responsible party
1.8.7	SDS completed	November 25, 2004	SDS is submitted for approval, technically reviewed, and is approved by responsible party
1.9.3	Requirements & Design V&V completed	December 6, 2004	SRS and SDS have been verified, validated, and signed off by V&V team
1.9.5.7	STP completed	December 24, 2004	STP is submitted for approval, technically reviewed, and is approved by responsible party
1.10.4	Documentation completed	January 31, 2005	All documentation required for implementation is approved, technically reviewed, and is approved by responsibly parties
1.9.1.6	SVVP completed	February 1, 2005	SVVP is submitted for approval, technically reviewed, and is approved by responsible party
1.9.8	V&V completed	April 25, 2005	All software products are tested such that no showstopper defects exist
1.12.6	Implementation completed	April 26, 2005	All software products are in a form suitable for installation by installation team

1.11.5	Training completed	May 27, 2005	95% of all identified training targets have received training
1.13.6	Installation completed	June 2, 2005	Installation of software is completed on all ATM and central bank systems and is accepted and approved by responsible parties
1.3.9	All project deliverables have been delivered	June 2, 2005	
1.3.10	Project closeout	June 2, 2005	Closeout checklist items are all accounted for (see section 5.5)

The arrival of major milestones will be treated specially from an effort data collection perspective. With the completion of each major milestone, all team members will be expected to update their effort data, as per section 5.3.6, so that a milestone performance report may be issued; milestone status and performance data will then be updated on the performance reporting website (see section 5.3.5).

Collection of progress data

At the regular weekly project status meetings, where applicable, the participants will each identify the subactivity milestones that have been met by the work for which they are responsible for during the period in which the status meeting falls. This information will be correlated with the "% complete" value attached to the milestone and the latter value will be entered into the project plan maintained in Microsoft Project.

Effort data are collected according to the method outlined in section 5.3.6. These data will be used as inputs into progress measurement analysis.

Measurement of progress

The following Earned Value measurements will be used to monitor budget progress:

- Budgeted Cost of Work Performed (BCWP)
- Actual Cost of Work Performed (ACWP)
- Cost Variance (CV)
- Cost Performance Index (CPI)
- Estimated Cost At Completion (ECAC)
- Critical Ratio (CR)

Actual Cost of Work Performed (ACWP) and Budgeted Cost of Work Performed (BCWP) will be automatically calculated by Microsoft Project as the "% complete" activity status is collected and entered into the appropriate fields in the program; collection is as per "Collection of progress data" earlier in this section.

Cost Performance Indicator (CPI) will be considered to be within acceptable limits if it lies between 0.95 and 1.1. If the CPI value exceeds either of these limits, investigation into the cause and potential remedies to the problem will begin. CPI values exceeding these limits will also cause an elevation in the risk rating of the "Budget fit" risk item, as per section 5.4.

Cost Variance (CV) is automatically calculated by Microsoft Project as the BCWP and ACWP values change. In the "Earned Value Cost Indicators" view of the software, the topmost activity in the WBS will display the schedule variance at present. A CV value of +/- 1% of BCWP will elevate the "Budget performance" risk rating, as per section 5.4, which will prompt investigation into the cause and potential remedies to the problem.

Estimated Cost At Completion (ECAC) will be used to estimate the cost of the project on the day it fulfills all of its objectives.

Each measurement will be retrieved from Microsoft Project and published to the project reporting website (as described in section 5.3.5) on a bi-weekly basis.

Critical Ratio

The Critical Ratio (CR) is treated as a separate measurement because it is a composite measurement that has a dependency on a schedule control measurement; specifically, it depends on the Schedule Performance Index (SPI) from section 5.3.2, in addition to the Cost Performance Index (CPI) of this section:

CR = SPI * CPI

If the Critical Ratio (CR) is below 0.9 or above 1.2, the "Project performance" risk rating, as per section 5.4, will elevate, which will prompt investigation into the cause and potential remedies to the problem.

5.3.4 Quality Control Plan

This subsection will describe the mechanisms to be used for measuring and controlling quality of work processes and products. Each of the mechanisms mentioned here are described in more detail in section 7.4.

Audits

Audits of work processes will not be conducted on a schedule. However, they may be requested by one of the following:

- Terasoft project manager
- Terasoft CEO
- NNB ATM project manager

When requested, audits will be carried out as specified in section 7.4.

Reviews

Regularly scheduled reviews of work products will take place according to the schedule described in section 7.5.

Defect/issue tracking

Defects and other issues will be tracked with IBM Rational ClearQuest, providing a central location for defect/issue logging and resolution status.

Metrics collection

Quality-specific metrics will be collected and stored in Terametric, the internally-developed metrics collection database. Quality-specific metrics are shown in the following table, along with an initial trigger value (where appropriate), which will prompt investigation into the cause of the trigger being fired:

Quality metric	Trigger
Open defects vs. closed defects over time	rate of increase of open defects > 0.5 * rate of increase of closed defects over the past 2 weeks
Lines of code (LOC)	N/A
Source code comment percentage	<10%
Defects per KLOC	>10% of defined norm for implementation phases, as follows: o coding: 15 o compilation: 6 o black-box test: 7 o integration: 3

Initial trigger values may be further tuned when necessary.

5.3.5 Reporting Plan

This section describes the reporting requirements for the project. Specifically, it identifies the project stakeholders, their generic information requirements, the distribution of items of communication, and the performance reporting data that will be communicated during the project.

Stakeholders

The stakeholders in the project are as follows
:

- NNB executive committee
- NNB steering committee
- NNB ATM project manager
- Terasoft CEO

Ad-hoc communication with hierarchy levels above the NNB ATM project manager (as specified in section 4.1) will be made through the NNB ATM project manager. Scheduled

communication (communication included in this plan) will take place directly with recipients of the item of communication.

As per instructions from NNB, communication of items in this plan to parties within NNB but outside of those identified in the list of stakeholders above will take place through any of the NNB stakeholders as necessary at the discretion of NNB.

Information

The stakeholders have the following general information requirements:

Stakeholder	Description	Format(s)	Frequency
NNB exec. committee	Schedule	Paper, electronic	monthly
	Performance reports	Electronic	as needed
NNB steering committee	Schedule	Paper, electronic	monthly
	Performance reports	Electronic	as needed
	Status updates	Oral	monthly
NNB ATM project manager	Specification documents	Paper, electronic	when created/changed
	Performance reports	Electronic	as needed
	Status updates	Oral	monthly
	Minutes	Paper, electronic	as created
	Plans	Paper, electronic	as created/changed
	Schedule	Paper, electronic	weekly
Terasoft CEO	Schedule	Paper, electronic	weekly
	Performance reports	Electronic	as needed
	Minutes	Paper, electronic	as created

Distribution

The following distribution matrix illustrates which participants should receive which specific items of communication.

[see next page]

Document / Item	Dist Method	NNB Steering Committee	NNB Executive Committee	ATM Project Manager	Terasoft CEO	ATM Software Project Manager	Requirements Analyst 1 (Lead)	Requirements Analyst 2	Programmer 1 (Lead)	Programmer 2	Verification Engineer 1 (Lead)	Verification Engineer 2	Software Architect 1 (Lead)	Software Architect 2	Software Designer 1	Validation Engineer 1	Quality Analyst 1	Configuration Manager 1	Database Engineer 1	Consultant 1	Consultant 2	Technical Writer 1	Training Specialist 1	Installation Specialist 1
Weekly status meeting minutes	EMAIL			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Weekly status meeting agenda	EMAIL					X	X	X	X	X	X	X	X				X	X	X	X		X	X	X
Software Requirements Specification (SRS)	EMAIL, POSTAL			X		X	X	X			X		X		X		X	X				X		
Software Design Specification (SDS)	EMAIL, POSTAL			X		X			X		X		X				X	X	X			X		
Software Project Management Plan (SPMP)	EMAIL, POSTAL	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
SPMP updates	EMAIL, POSTAL	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Software Test Plan (STP)	EMAIL, POSTAL			X		X			X		X						X	X	X					
Software Quality Assurance Plan (SQAP)	EMAIL, POSTAL			X		X	X		X		X		X		X		X	X	X			X	X	X
Software Configuration Mgmt Plan (SCMP)	EMAIL, POSTAL			X		X	X		X		X		X		X		X	X	X			X	X	X
Software Verificatn & Validtn Plan (SVVP)	EMAIL, POSTAL			X		X	X		X		X		X		X		X	X	X			X	X	X
Performance reports	WEB	N/A (on demand)																						
Project status updates	PRESENT	X	X	X	X																			
Dist Method Key:																								
EMAIL: item transmitted electronically via electronic mail																								
POSTAL: item transmitted in hardcopy via snail mail																								
PRESENT: presentation conducted in-person at physical location																								

Distribution locations are as follows:

- for NNB Participants
  - POSTAL: NNB Home Office
  - EMAIL: Internet e-mail address
- for Terasoft Participants
  - POSTAL: Terasoft Headquarters
  - EMAIL: Internal e-mail
- WEB distribution
  - The WEB distribution format will be posted on an extranet website accessible to both Terasoft and NNB networks and will be accessible on-demand using a web browser capable of accessing information with the HTTP protocol
- PRESENT distribution

- The PRESENT distribution format will arrange the group of recipients in a common location for the purpose of receiving a presentation
- All presentations involving at least one NNB participant will be held at NNB Home Office.
- All presentations involving solely Terasoft participants will be held at Terasoft Headquarters.

Consultants hired by Terasoft are considered to be "Terasoft Participants" due to the fact that they perform all work on Terasoft's premises and are provided with cubicles and internal e-mail addresses.

Performance Reporting

The project will report performance to plan with the following metrics:

- Earned Value
  - Budgeted Cost of Work Scheduled (BCWS) vs. Budgeted Cost of Work Performed (BWCP)
  - Schedule Variance (CV)
  - Budgeted Cost of Work Performed (BCWP) vs. Actual Cost of Work Performance (ACWP)
  - Cost Variance (CV)
  - Cost Performance Index (CPI)
  - Schedule Performance Index (SPI)
  - Critical Ratio (CR)
  - Estimated Cost at Completion (ECAC)
  - Estimated Time at Completion (ETAC)
- Requirements
  - Requirements change count
- Configuration
  - Configuration churn
- Quality
  - Open defects vs. closed defects over time
  - Lines of code (LOC)
  - Comment percentage
  - Defects per LOC
- Risks
  - Risk exposure
    - Top 10 risks
    - Weekly risk change

This information will be available electronically in a format accessible by a web browser supporting the HTTP protocol. The metrics will be posted to the website on a bi-weekly basis, with special updates when project milestones are met.

Approvals

The following approval signatures are required in order to confirm consent to and validity of this reporting plan.

Name	Role	Date	Signature
Tom Terrific	Member, NNB executive committee		
Jim Knowles	ATM project manager		

5.3.6 Metrics Collection Plan

This section describes the metrics that will be collected by the project and the methods that will be used to collect them. The metrics collected generally fall into one of the following three categories:

- Effort
- Reviews
- Change Requests

Effort

Effort metrics will be collected by having project team members fill out electronic timesheets as they work on the project. Each team member will login to the electronic timesheet software and allocate time to one of the listed categories. To increase accuracy of data, each team member will see only those categories related to his or her project role. Team members will be asked to enter timesheet data as time is incurred; entry should be made at least weekly and preferably more often, especially if the team member is involved in work on more than one category in a week. This will increase the accuracy of data by reducing the impact of time on human memory of effort expended. With the completion of each milestone, team members will be asked to make their effort data current in the electronic timesheet so that milestone-related reporting can be made to the performance reporting website (see section 5.3.5)

In order to emphasize the importance of effort metrics collection, a small percentage of every second weekly (i.e. every other week) project status meeting will be dedicated to reviewing effort metrics and those metrics to which effort metrics contribute for each week. Questionable metrics will be clarified at the meetings. The metrics will be summarized during the meeting and the information that is produced from them will be highlighted.

Reviews

Review metrics will be collected from review meeting forms, which will identify each of the reviewed problems as either “errors” or “defects”. It will be the responsibility of the review minutes note taker to so identify each reviewed problem on the problem report forms. The note taker will also enter the metrics into the metrics database.

Change Requests

Change request metrics will automatically be collected as they are entered into the project’s change management database, which is where changes are triaged and considered for

implementation. An established change management process within Terasoft requires change requestors to fill out an electronic form in the organization's change management system. As part of this form, the change is identified as one of the following types of changes:

- Corrective
- Adaptive
- Preventive
- Perfective

Another field in the change request form requires specification of a project ID. The change request information, combined with the project ID, will provide the basis for change request metrics collection.

Additional Metrics

Additional metrics may be defined upon completion of WBS activity 1.5.4, as necessary.

Publishing and archiving of metrics

All of the above collected metrics will be published and archived as part of project closeout.

5.4 Risk Management Plan

This section will discuss the methods, tools, and techniques used to manage project risks. The information in this section is based on content from reference 2.7.

Risk categorization table

A risk categorization table will be maintained for the duration of the project. This table will list the current project risks, the indicators that determine the rating (High, Medium, Low) of the risk, and the current rating of the risk, obtained by comparing the current situation of the risk item against the risk indicators.

The risk categorization table will be maintained by the project manager, but will be distilled to produce "Top 10 Risks", "Risk Response", and "Weekly Risk Change" reports which will be reviewed at weekly project status meetings.

A preliminary risk categorization table has been populated with risks and risk status, where applicable, and included in Appendix J. If it is too soon to evaluate a risk, this is identified in the risk status column as "Too soon".

Each item described here will be reviewed weekly in project status meetings.

Top 10 risks

The "Top 10 Risks" report will consist of the top 10 risks posed to the project, with ranking determined by the calculated Risk Exposure (RE) for the risk item. The resolution approach, responsibility assignment, and expected resolution date will be included.

The template for the "Top 10 Risks" report is included in Appendix J.

Risk response

The “Risk Response” report will consist of the top 10 risks posed to the project and will include the metric trigger value, which causes the risk to become flagged for action. The current value of the metric will also be shown; the current value of each item on this report will have exceeded its trigger value. The resolution approach, responsibility assignment, and expected resolution date will be included.

The template for the “Risk Response” report is included in Appendix J.

Risk change

The “Weekly Risk Change” report will consist of the top 10 risks posed to the project alongside the rank of the risk in the preceding week and the number of weeks that the risk has existed on the report. The resolution approach will also be included.

Monitoring and control of the lists of risks will be actively managed throughout the life of the project, with risk status being reviewed with project participants and resolution approaches communicated at least weekly during the regularly scheduled project status meetings.

The template for the “Weekly Risk Change” reports is included in Appendix J.

New risks

New risks may be added to the Risk Categorization table by the project manager at any time. The risk should be added to the appropriate category with an associated risk rating indicator and initial risk rating.

5.5 Closeout Plan

This section describes the nature of the activities that will be used to closeout the project when it is completed.

Closure checklist

Upon termination of the entire project for any reason, whether due to the objectives being met or some other reason, there are a number of closure activities that will be performed before the project is considered closed. These activities are captured in the following checklist, with *preliminary* responsibility assignment details. All activities in the checklist will be accounted for, and responsibility assignments will be revisited before the items in the checklist are carried out.

The closure checklist is included in Appendix K.

Post-performance analysis

As noted in the closure checklist, project participants will be gathered for the purpose of a Post-Performance Analysis (PPA). The PPA allows data to be gathered about their performance and experiences so that project processes may be tuned to improve performance on future projects (see section 7.8 for how process improvements will be implemented). The PPA will also be used at the end of project phases (also expanded in section 7.8).

The PPA will be carried out according to the following seven-step process:

1. PPA meeting invitation will be sent to project participants. The invitation will include an instruction to assemble all available data from the following categories so that it may be collected and archived:
    a. dimensional data for all work products (how many, how big, how often produced, etc.)
    b. lessons learned (risk logs, correspondence, etc.)
    c. change requests (requirements, specifications, etc.)
    d. time and effort data (estimates in hours/dollars for WBS items, networks, schedules, etc.)
    e. questionnaire responses (based on distributed questionnaire; a different questionnaire for team leaders and team members will be used)
2. Allow sufficient time for the team to assemble their data and formulate responses to the questions on the questionnaire.
3. Assemble the team for a PPA meeting
    a. Before starting, communicate to participants that the meeting is for data collection and not “finger pointing”
    b. The meeting will be short and tightly focused on data collection
4. Additional meetings will be held until everyone who has something to contribute (i.e. all sources of information and materials) has made their contribution
5. Collected data and material will be categorized into one of the following two categories
    a. Process data
    b. Product data
6. Collected material will be categorized into one of the following two categories:
    a. For archive
    b. For disposal
7. A concise report of the PPA results will be published to summarize the findings, with the following goals:
    a. The report will link to as many of the archived documents as possible
    b. The report will be easily accessible to all project managers so that any contained information can be used to augment future projects

The questionnaires referred to in step 1(e) above will be based on standard Terasoft PPA questionnaires. See section 2 for details of this document.

Section 6

Technical Process Plans

6.1 Process Model

List of processes not used

The following IEEE 1074 processes were not used in the Software Life Cycle Process (SLCP) constructed for this project:

- Concept Exploration
    - Since this project is a subproject contracted to Terasoft, as part of a larger project initiated by NNB, we were presented with what was to be delivered. A concept exploration was not necessary because the concept had already been explored by NNB.
- Retirement
    - Retirement of the software is not within the scope of what Terasoft was asked to do by NNB. The project only exists for the purpose of delivering the ATM software to Terasoft.

List of processes used, but not elaborated

- Maintenance
    - No requirements for maintenance were provided to NNB, other than an expected budget for yearly maintenance.
- Operation and Support
    - Operation and support will take place once Terasoft has delivered the software to NNB. Terasoft was not asked to operate or support the system.

Process model diagram

The following diagram illustrates the information, document and product flow between the lifecycle processes. Although the project is carried out using the waterfall lifecycle model, the diagram is arranged differently from the usual depiction of the waterfall lifecycle so that flows between development processes and control processes can be more easily visualized.

Each process cannot begin until at least one of its inputs has been completed. To simplify the diagram, some processes which output to many other processes are grouped together into a textual list and referenced by a single arrow.

The process model diagram is included as Appendix L.

Individual process diagrams

Each of the process boxes on the “Process model diagram” are treated with individual diagrams to overcome the shortcomings of the larger diagram introduced due to layout space. These diagrams are included in Appendix L.

6.2 Methods, Tools, and Techniques

Development methodology

The project shall use the waterfall software development methodology to deliver the software products, with work activities organized according to a tailored version of those provided by the IEEE Standard for Developing Software Life Cycle Processes (IEEE 1074-1997).

The decision to use the waterfall methodology is due to the following characteristics of the project:

- the product definition is stable
- requirements and implementation of the product are both very well-understood
- technical tools and hardware technology are familiar and well-understood
- waterfall methodology has proven successful for projects of this nature performed by Terasoft and the consulting firm we use (Banks, Etc.) in the past

The Software Project Management Plan (SPMP) shall be based on the IEEE Standard for Software Project Management Plans (IEEE 1058-1998).

Development techniques

The requirement passed down to this project from the larger ATM project is that the software be based on an open architecture using a Windows NT-based platform and Windows Open Services Architecture / eXtensions for Financial Services (WOSA/XFS). This architecture allows us to use object-oriented methods and tools for analysis, design, and implementation. We will use Object Modeling Technique (OMT) for this purpose.

Tools

The following work categories will have their work products satisfied by the identified tools:

- Team member desktop foundation
    - Microsoft Windows 2000 desktop operating system
    - VMWare Workstation 4.5 [virtual machine support – one VM per active project]
    - Microsoft Office 2003 productivity application suite
    - IBM Lotus Notes R6 [e-mail, calendar]
    - MindJet MindManager X5 Pro [information organization, brainstorming]
    - Adobe Acrobat 6.0 [creating/viewing PDF files]
- Project management
    - Microsoft Project 2003 [WBS, schedule/cost estimates, resource planning, project control]
    - Best Carpe Diem [electronic time sheet]
    - Terametric [internally-developed metrics collection database]
- Document publishing *(applies to all documents published by the project)*
    - Microsoft Word 2003 [document preparation and revision]
- Configuration Management & Change Management
    - IBM Rational ClearCase LT [version control]
    - IBM Rational ClearQuest [defect and change tracking]

- Quality
  - Terametric [internally-developed metrics collection database]
- Requirements
  - IBM Rational RequisitePro [requirements tracking]
- Design
  - IBM Rational Rose Data Modeler [database design]
  - IBM Rational Rose Technical Developer [use cases, non-database software design]
- Implementation
  - Microsoft Visual C++ [programming language, development tools and object code generation]
  - Windows Software Development Kit (SDK) [programming support]
- Testing
  - IBM Rational Robot [automated functional and regression testing]
- Training
  - Microsoft PowerPoint 2003 [training presentations]
- Online Performance Reporting
  - Microsoft Windows 2000 Server Standard [server operating system]
  - Microsoft Internet Information Services 4.0 [web server software]

Document distribution

All documents distributed electronically will first be created in the Adobe PDF format using Adobe Acrobat 6.0 to remove reliance on installed tools for viewing document content.

Change management policy

Once a work product has been finalized and approved, all changes to that work product must be submitted through the Terasoft change management system, where the changes will be reviewed and either approved or denied by the Terasoft change manager, based on the risk profile and perceived benefit of the change to be made. Changes that are approved may be implemented against the work product, while changes that are denied must not take place against the work product.

Since the waterfall methodology is being used for this project, requests for changes will be treated conservatively as they will potentially be extremely disruptive to the activities downstream of the change.

For internal changes (those changes that originate within the project or within Terasoft), the severity and potential impact of the result of not implementing the change will be measured against the disruptiveness of implementing the change. In particular, changes that are 30 working days or less downstream of the approval of the work product that they are changing will be treated more liberally than those that are more than 30 working days downstream.

For external changes (those changes that originate outside of the project and outside of Terasoft), negotiation will take place with the project stakeholders with respect to the budget and schedule changes that will be required in order to implement the requested change.

6.3 Infrastructure Plan

Physical facilities

All team members will work within the facilities of Terasoft's headquarters. All team members employed directly by Terasoft have existing access to these headquarters via security access card. In addition, all team members have existing physical workspace within Terasoft's facilities.

Consultants employed to work on the project will be given temporary access cards which will be returned to Terasoft once the project is complete (see the "Closure Checklist" in section 5.5). Consultants will be provided with cubicles within Terasoft's headquarters for the duration of the project. Security administration is performed by Terasoft's administrative assistant (see section 4.1).

Access to NNB's premises is co-coordinated through the front security desk at their home office. No advance notification is necessary. Upon arriving at the home office, the security desk will announce the arrival to the contact within NNB with whom the meeting is being held. The contact will come to the security desk to sign the Terasoft employee into the building on a temporary basis.

Physical server access

Access to the server room is granted on an as-needed basis and revoked when access is no longer required. A "Server Access Request Form" must be filled out and signed by the Project Manager and submitted to Terasoft's administrative assistant (see section 4.1), who will grant access to the server room for the duration of the necessitating activity. Activity duration is entered into the security system and access to the server room is automatically revoked when that duration has been exceeded.

Workstation initialization

As is standard Terasoft procedure, VMWare Workstation will be used on each employee workstation, providing virtual machine services so that each project may be worked on inside a contained virtual machine. A new project image will be uploaded to each employee workstation prior to the beginning of the project. The image for this project for each team member will depend on the member's role. This is a very quick procedure (1 hour per workstation, done overnight while employees are out of the office). The image shall contain the base operating system and network configuration as per Terasoft standards, in addition to all of the tools required for the designated employee role. Each of the candidate tools for particular project functions are specified in section 6.2.

Workstation initialization is performed by Terasoft's Computer System Services (see section 4.1).

Network configuration

Configuration management and document storage repositories reside on Terasoft's Local Area Network (LAN). Each workstation's image shall come with a network configuration that allows access to the LAN. In addition, configuration for access to the Terasoft-NNB extranet (used for

performance reporting, as described in section 5.3.5), shall also be provided in every workstation image.

Software licensing

Licenses for operating systems and software tools are recycled between projects. License tracking is performed by Terasoft's administrative assistant (see section 4.1). Any additional licenses required shall be purchased by the administrative assistant (see section 5.1.3 for resource acquisition details).

Costs

Costs for all infrastructure operation and support activities are included in the organizational infrastructure budget; funding for this budget is automatically recovered by Terasoft as a fixed fraction of each employee's hourly rate.

6.4 Product Acceptance Plan

This section will describe the methods of acceptance for each of the project deliverables identified in section 1.1.3; the headings of this plan relate to the deliverable categories in that section. Acceptance of work products is ultimately achieved when approval is granted by the person with such responsibility, as described in section 4.3.

Project documentation

All "project documentation" items, with the exception of the SPMP, are approved by the project manager and will be reviewed by both the project manager and the person with lead authority in production of the document to ensure that the document meets all of the requirements of the phase into which it will be fed.

The SPMP will be approved by the NNB executive committee according to their private criteria, which are not well known to Terasoft outside of what was presented in the RFP. Assuming that Terasoft is selected to deliver the product outlined in the RFP, it is expected that the SPMP will require iterative development until the NNB acceptance criteria are met.

Software user documentation

Software user documentation will be verified against the intended users of the software during the training program. During the development of the end-user training program, the documentation will be included as part of the training materials. Each user's ability to operate the software based on consultation with the documentation will be measured; tasks will be broken down into subtasks and the ability of each training participant to complete each subtask will be recorded. Feedback on the usefulness and correctness of documentation will be collected and used to refine the documentation. User documentation will be accepted when all training participants are able to complete all tasks described by the documentation.

Software training performed against affected users

As part of training development, post-training tests will be developed to test participants' understanding and comprehension of the training material. Training results will be accepted

when all training participants have correctly answered at least 80% of the questions on the post-training tests.

Software program and library binaries

When the software program and library binaries are ready to be installed on the target hardware, the project manager will hold a review session with the NNB steering committee in order to report outstanding known issues with the software, once testing has been completed. The NNB steering committee will deliver a decision to the project manager on whether or not the list of issues is acceptable for procession with installation. If the list is not acceptable, the NNB steering committee will work with the project manager to reduce the list of issues to a list that is acceptable to NNB. Acceptance will occur when this list is satisfactory to the NNB steering committee.

Installation of software program and library binaries on target hardware

Installation of the software products on the target hardware is the final project deliverable. When all ATM machines are installed in their target locations, the physical network between the locations and the central bank are in-place, and the central bank system modifications are installed, a set of pre-determined transactions designed to fully test the functionality of the entire ATM system will be performed by NNB. For the purposes of this project, the presence of all functionality described in the RFP will be verified. These acceptance tests will be scheduled and co-coordinated as part of the overall ATM system acceptance and will be handled by NNB's ATM project manager. Upon receipt of satisfactory results of the acceptance tests, the work product(s) in question will be accepted by NNB. When the acceptance tests are complete, Terasoft will be required to undo the software effects of all transactions generated during testing.

A weekly statistical report based on limited data will be produced by the central bank system and reviewed by the NNB steering committee. This report will be accepted when it contains all required fields, as outlined in the RFP, and is in a format acceptable to NNB. Acceptance of this report is independent of the acceptance of the ATM software and central bank modifications as it does not affect ATM functionality.

Approvals

The following approval signatures are required in order to confirm consent to and validity of the above acceptance plan.

Name	Role	Date	Signature
Tom Terrific	Member, NNB executive committee		
Jim Knowles	ATM project manager		
Matthew Buckley-Golder	ATM software project manager		

Section 7

Supporting Process Plans

7.1 Configuration Management Plan

This section briefly describes the configuration management approach for the project. Unless otherwise specified, configuration management activities are performed by the Configuration Manager (see section 4.2). Further detail will be provided by the external Software Configuration Management Plan (SCMP), as per section 2.5, when it is developed by Configuration Manager 1.

Configuration management tools

Configuration management functions will be supported by the following tools:

- IBM Rational ClearCase LT
- IBM Rational ClearQuest

Both tools are a part of Terasoft's existing configuration management platform and are described hereafter as the "configuration management system".

Configuration identification method

Configuration identification will be performed in three stages, as follows:

- Identifying
  - the items to be placed under configuration control will be identified
- Naming
  - an identification system will be specified for assigning unique identifiers to each item under configuration control
- Acquiring
  - a procedure for placing items identified for configuration control into the appropriate library

Configuration control method

Configuration control will consist of the following mechanisms, as follows:

- Change requests
  - changes to a configuration item will be requested through Terasoft's change management software
- Change evaluation
  - the impact of a chance to the configuration item will be evaluated, usually based on perceived risk vs. benefit with respect to budget, schedule and the impact on other configuration items
- Change approval/rejection
  - based on an evaluation of the change to the configuration item, permission to change the item will be approved or rejected by the Change Control Board (CCB). At Terasoft, this is a single resource with the "Change Management specialist" title (see section 4.1)
- Change implementation

- if the change is approved, change to the configuration item will be allowed to take place

Status accounting method

The following data about each configuration item will be tracked and available for inspection within the configuration management software:

- Latest approved version of the configuration item
- Configuration control status of the configuration item
- Implementation status of the configuration item

Evaluation method

Evaluation of changes will be performed by a Change Control Board (CCB), consisting of the resources appropriate for evaluating a particular change; due to Terasoft's small size, the CCB will be a dynamically formed group of team members who are required to participate in the evaluation of a change. The decision of who to include in the CCB will be dependent on the configuration item affected and the impacts on other configuration items that the change will have.

Release management method

Releases will be defined in the configuration management system by the Configuration Manager when all configuration items that make up a release are suitable for delivery to NNB. By defining releases, it will be possible to recreate that release at a future point in time.

Procedure for baselining a work product

In order for a work product to become a configuration item, it must be baselined. The procedure for doing so is as follows:

Step	What	Who
1	Label baselined version • label configuration item according to organizational standard naming conventions	Configuration Manager
2	Announce baseline to project team • e-mail notification • include specification of whether baseline is a new baseline of an existing configuration item, or the creation of a baseline for a new configuration item • include reminder that the work product is now a configuration item and may not be changed without submitting a change request	Configuration Manager

Procedure for change logging

In order for a change request to be considered, it must be logged with the configuration management system. The procedure for doing so is as follows:

Step	What	Who
1	Enter change request • enter change details into the configuration management system • submit change request	Change requestor
2	Determine nature of change request • determine whether change is trivial or non-trivial o if trivial, approve request o if non-trivial, schedule Change Control Board meeting to review the change	Configuration Manager

Procedure for Change Control Board review of changes

In order for a change to be implemented, it must be reviewed by the Change Control Board and updated in the configuration management system by the Configuration Manager. The procedure for doing so is as follows:

Step	What	Who
1	Review change request • analyze change's importance • analyze change's impact on the project	Change Control Board
2	Approve or Reject Change Request • determine whether change importance is worth the change impact • communicate decision to Configuration Manager	Change Control Board
3	Update change request status • change the status of the change request to "Approved" or "Rejected"	Configuration Manager

7.2 Verification and Validation Plan

This section briefly describes the Verification and Validation (V&V) approach for the project. Further detail will be provided by the external Software Verification and Validation Plan (SVVP), as per section 2.6, when it is developed by Verification Engineer 1, Verification Engineer 2, and Validation Engineer 1..

Scope

Formal validation and verification will be performed on the following project work products and are listed below in order of occurrence:

- Software requirements
- Software architecture
- Software interface design
- Database design
- Implemented software interfaces

The main V&V activities performed on these work products will be inspections and reviews. Audits may also be performed on request.

All other work products will be informally verified and validated to some degree, but they will not receive formal verification and validation from the verification and validation team members.

Responsibilities

The verification and validation team consists of the following resources:

- Verification Engineer 1 (Lead)
- Verification Engineer 2
- Validation Engineer 1

Each of the validation and verification activities are included in the project WBS (see subsection 5.2.1). The specific responsibilities of resources and resource collaborations are identified in section 4.3.

The team "Lead", identified above, has responsibility for focusing and coordinating the V&V effort of each resource listed in this section and is ultimately responsible for the outcome of the activities of the team.

Tools & Techniques

Each of the items listed in the "Scope" subsection of this section will be verified and validated to ensure that they account for all items in the products of the preceding activity. The first item, which has no precedent, will be verified and validated against documented customer meetings to ensure that all requirements are included in the SRS.

Tracing will be used to trace the existence of features between phases back to the original requirements and avoid the introduction of unnecessary work into the products. In particular, the following will be traced:

- User requirements to software requirements
- Software requirements to interface requirements
- Architecture requirements to interface requirements
- Interface requirements to database requirements
- Software tests to interface requirements
- Acceptance tests to user requirements

The information produced by tracing will be used during software inspections. Software inspections will ensure that work products are faithfully representing the goals set out for them by the predecessor documents.

Black-box testing will be performed on the implemented software interfaces to ensure that the outputs of each interface are consistent with what is input, based on the interface design. The Software Test Plan (STP) will specify the methods to be used

The following tools will be used to assist with V&V:

- IBM Rational RequisitePro
    - allows requirements tracing from inception to facilitate requirements accountability
- IBM Rational Robot
    - allows automated black-box testing by feeding inputs and recording outputs

Reviews

Regular peer reviews will be held to review in-progress work products. The procedure for scheduling these reviews is included in section 7.5.

Plans

The Software Test Plan (STP) will be one of the main deliverables of the V&V team, and will describe the plan for testing work products completed as a result of the Implementation phase.

The Software Verification & Validation Plan (SVVP) will also be a main deliverable of the V&V team, which will further specify the details of the topics discussed in this section of the SPMP.

Reporting

For each verification and validation of a configuration item, a corresponding report will be issued by the team. The report will consist of:

- unique report ID
- problems discovered, and, if known, corresponding solutions
- acceptance or rejection of the item (rejections should be explained)

[due to page orientation differences, section 7.3 starts on the next page]

7.3 Documentation Plan

This section describes the documentation plan for the project's deliverable and non-deliverable documentation work products. All deliverable work products appear in section 1.1.3.

The table headings are defined as follows:

- **Document**: the documentation work product described by the remaining columns in the row
- **Template/Standard**: the template or standard on which the document is based (may be organizational or external). See section 2 for template/standard details.
- **Preparer**: the person responsible for preparing the document
- **Reviewer**: the person responsible for reviewing the document
- **Review copy due**: the due date on which the document shall be available for review by the **Reviewer**
- **Baseline version**: (if applicable) the version of the document that represents the baseline for that document
- **Distribution list**: expected recipients of the review copies and baseline versions of the document
- **WBS #**: (if applicable) the WBS activity associated with the creation of this document Deliverable documentation work products

Deliverable documentation work products

Document	Template/Standard	Preparer	Reviewer	Review copy due	Baseline version	WBS #	Distribution list
Installation documentation	Terasoft Standard Documentation template v1.0	Technical Writer 1	Installation Specialist 1	01/10/2005	1.0	1.10.2.1	Document repository, Preparer, Reviewer, Project Manager
End-user documentation	IEEE 1063-2001	Technical Writer 1	Consultant 2	01/10/2005	1.0	1.10.2.2	Document repository, Preparer, Reviewer, Project Manager
NNB central bank documentation updates	based on existing documentation within NNB; no formal template	Technical Writer 1	Consultant 2	01/24/2005	1.0	1.10.2.3	Document repository, Preparer, Reviewer, Project Manager
Software	IEEE 830-1998	Requirements	Requirements	07/22/2004	1.0	1.7.4	Document

Requirements Specification (SRS)		Analyst 2	Analyst 1, Project Manager,				repository, Preparer, Reviewer, Project Manager, Software Designer 1, Consultant 1
Software Design Specification (SDS)	IEEE 1016-1998	Software Designer 1	Consultant 1, Project Manager	11/25/2004	1.0	1.8.6	Document repository, Preparer, Reviewer, Project Manager, Consultant 1, Programmer 1, Technical Writer 1
Software Project Management Plan (SPMP)	IEEE 1058-1998, IEEE 1074-1997 (activities)	Project Manager	NNB Executive Committee	04/22/2004	1.0	1.2.4.3	Document repository, Preparer, Reviewer, Project Manager, NNB Executive Committee
Software Test Plan (STP)	Terasoft Test Plan template (adapted from IEEE 829-1998)	Verification Engineer 1, Verification Engineer 2	Project Manager	12/22/2004	1.0	1.9.5.6	Document repository, Preparer, Reviewer, Project Manager, Programmer 1
Software Quality Assurance Plan (SQAP)	IEEE 730-2002	Quality Analyst 1	Project Manager	06/21/2004	1.0	1.5.2	Document repository, Preparer, Reviewer, Project Manager
Software Configuration Management Plan (SCMP)	IEEE 828-1998	Configuration Manager 1	Project Manager	06/14/2004	1.0	1.4.2	Document repository, Preparer, Reviewer, Project Manager
Software Verification	IEEE 1012-1998 + IEEE 1012a-1998	Verification Engineer 1,	Project Manager	02/08/2005	1.0	1.9.1.5	Document repository,

and Validation Plan (SVVP)		Verification Engineer 2, Consultant 1, Validation Engineer 1					Preparer, Reviewer, Project Manager, Programmer 1

Non-deliverable documentation work products

Document	Template/Standard	Preparer	Reviewer	Review copy due	Baseline version	WBS #	Distribution list
Project team meeting minutes	Terasoft Meeting Minutes template v1.0	Project Manager	Meeting participants	24 hours after meeting	N/A	N/A	Document repository, Reviewer
Project team meeting agendas	Terasoft Meeting Agenda template v1.0	Project Manager	Meeting participants	24 hours prior to meeting	N/A	N/A	Document repository, Reviewer
Requirements peer review summaries	Terasoft Technical Review Summary template v1.0	Requirements Analyst 1	Review participants	48 hours prior to review	N/A	N/A	Document repository, Reviewer
Design peer review summaries	Terasoft Technical Review Summary template v1.0	Software Designer 1	Review participants	48 hours prior to review	N/A	N/A	Document repository, Reviewer
Implementation peer review summaries	Terasoft Technical Review Summary template v1.0	Programmer 1	Review participants	48 hours prior to review	N/A	N/A	Document repository, Reviewer
Installation training plan	Terasoft Training Plan template v1.0	Training Specialist 1	N/A	N/A	N/A	1.11.1.1	Document repository, Preparer, Reviewer, Project Manager
ATM site training plan	Terasoft Training Plan template v1.0	Training Specialist 1	N/A	N/A	N/A	1.11.1.2	Document repository, Preparer, Project Manager
Project	Terasoft Quality	Quality	Meeting	N/A	N/A	N/A	Document

documentation reviews (Quality)	Audit template v1.0	Analyst 1	participants				repository, Preparer, Reviewer, Project Manager
Closure review (Quality)	N/A	Quality Analyst 1	Meeting participants	N/A	N/A	N/A	Document repository, Preparer, Reviewer, Project Manager
Software maintenance training plan	Terasoft Training Plan template v1.0	Training Specialist 1	N/A	N/A	N/A	1.11.1.3	Document repository, Preparer, Project Manager

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7.4 Quality Assurance Plan

This section will describe the plans for assuring that the quality of delivered work products is consistent with what is expected for the project. Further detail will be provided by the external Software Quality Assurance Plan (SQAP), as per section 2.4, when it is developed by Quality Analyst 1.

Scope

The processes used to create the following products will be tracked:

- Software Requirements Specification (SRS)
- Software Design Specification (SDS)
- Software Project Management Plan (SPMP)
- Software risk management plan
- Software Test Plan (STP)
- Software Quality Assurance Plan (SQAP)
- Software Configuration Management Plan (SCMP)
- Software Verification and Validation Plan (SVVP)
- Software product object code
- Software product binaries
- End-user training program
- End-user documentation

Reviews

Quality reviews will ensure that documentation products adhere to the standards on which they are based (as per section 7.3), and that non-documentation work products adhere to the plans/designs laid out by their input prerequisites.

Quality reviews of in-scope documentation work products will be conducted once the products are complete. Reviews of in-scope non-documentation work products will take place weekly during the periods that their production is active.

Each quality review will be in a meeting format and will require the attendance of the following participants:

- Project Manager
- Quality Analyst 1
- Configuration Manager 1

In addition, the Lead team members of teams having involvement in the production of work products must attend.

A closure review will be held after all work products have been delivered. This review will be in a meeting format and will be for the purpose of gathering “lessons learned”, and identifying process improvement opportunities.

Audits

Brief, informal functional audits of in-scope work products will be held during the software testing and integration phases and findings will be documented.

Physical audits of software source code will be performed in order to assure that a minimum level of documentation quality exists. In addition, a quantity (% of documentation to code) will be taken to provide an indicator as to whether there is sufficient internal documentation being written.

Scheduled audits of other work products will not be held. However, audits may be performed at the request of a project manager or senior executive. This is usually done to verify adherence of procedures described in the other project plans (i.e. SCMP, SVVP, etc.) The procedure for requesting is an audit is as follows:

Step	What	Who
1	• Make a formal, written request for an audit to the project manager o specify configuration item(s) to be audited	Audit requestor (must be a project manager or executive)
2	• Schedule audit session with resources required for audit session o Quality analyst 1 o Project manager o anyone else requested by audit requestor	Project manager
3	• Distribute audit agenda to resources o date of audit o required resources o purpose of audit o item(s) to be audited	Project manager
4	• Hold audit session	Project manager
5	• Distribute audit results o date of audit o audit participants o item(s) audited o conclusion o recommendations	Project manager

Risk Management

SQA will assist in the following risk factors, included in the "Risk Categorization Table" in Appendix J:

- Project processes

    - by ensuring process adherence, SQA will help prevent this risk factor from materializing
- Requirements complete and clear
    - by reviewing the SRS for adherence to the standard, SQA will assist in preventing this risk factor from materializing
- Quality assurance approach
    - although this risk item will depend on the quality of SQA itself, the fact that a documented approach exists should limit this risk factor to a Medium rating

Record storage

All SQA records will be stored in the project repository by Quality Analyst 1

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7.5 Reviews and Audits Plan

This section will describe the schedule, resources, methods and procedures used to conduct project reviews and audits.

Since multiple project managers are referred to in the following tables, "Terasoft ATM Software Project Manager" will be used to refer to the project manager on the project described by this SPMP.

All review agendas and minutes are subject to handling as described in the documentation plan in section 7.3.

The table headings are defined as follows:

- **Review/Audit**: the review/audit type described by the remaining columns in the row
- **Schedule**: the schedule basis for the review meetings
- **Resources**: the resources required to participate in the review
- **Method**: a characterization of what will be done in the review
- **Procedure**: how the review will be organized and communicated

Joint acquirer/supplier reviews

Review	Schedule	Resources	Method	Procedure
Steering committee progress review	Monthly; to be completed by 3rd business day of the month	NNB Steering Committee, NNB ATM Project Manager, NNB ATM Hardware Project Manager, NNB ATM Network Project Manager, Terasoft ATM Software Project Manager	Review project progress according to Earned Value measurements, report revised cost/schedule estimates (changes to be justified and cause explained). Other issues may also be discussed, providing they are listed on the agenda.	1. Resources booked by NNB ATM Project Manager for meeting in the final week of the month prior to the meeting 2. NNB ATM Project Manager distributes agenda in the final week of the month prior to the meeting 3. Meeting held at NNB home office to review agenda items and create issue resolution plan.

				4. NNB ATM Project Manager distributes minutes to resources
ATM software project review	Monthly, within 3 business days following Steering committee progress review	NNB ATM Project Manager, Terasoft ATM Software Project Manager	Review top 10 risk list and status/impact of those risks, informally discuss progress of overall project. This review will have two agendas – one from each participant. Other items that appear on either agenda will be discussed.	1. Resources booked by NNB ATM Project Manager 2. Dual agendas distributed by NNB ATM Project Manager and Terasoft ATM Software Project Manager at least 24 hours prior to meeting 3. Meeting held at NNB home office to discuss both agendas and create issue resolution plan. 4. Meeting minutes distributed by NNB ATM Project Manager

Management progress reviews

Review	Schedule	Resources	Method	Procedure
Terasoft management progress review	Bi-monthly, 1st business day of the month in which the meeting falls	Terasoft CEO, Terasoft ATM Software Project Manager	Review budget and schedule progress. Provide resource requirement updates.	1. Resources booked by Terasoft CEO 2. Terasoft ATM Software Project Manager distributes meeting agenda 3. Meeting held at Terasoft headquarters to review agenda items and create issue resolution plan. 4. Terasoft ATM Software Project Manager

				distributes minutes to resources

Developer peer reviews

Review	Schedule	Resources	Method	Procedure
Requirements peer reviews	Weekly, during Requirements phase	Terasoft ATM Software Project Manager, Requirements Analyst 1, Requirements Analyst 2, Consultant 1	Review current state of in-progress design documents, document issues that need resolving, assign resolution, and set schedule for resolution.	1. Resources booked by Requirements Analyst 2. Documents to be reviewed will be distributed at least 48 hours prior to the meeting by Requirements Analyst 1 3. Meeting held to review requirements documents and create issue resolution plan. 4. Requirements Analyst 1 distributes review summary
Design peer reviews	Weekly, during Design phase	Terasoft ATM Software Project Manager, Software Designer 1, Software Architect 1	Review current state of in-progress design documents, document issues that need resolving, assign resolution, and set schedule for resolution.	1. Resources booked by Software Designer 1 2. Documents to be reviewed will be distributed at least 48 hours prior to the meeting by Software Designer 1 3. Meeting held to review design documents and create issue resolution plan. 4. Software Designer 1 to distribute review summary to resources
Implementation peer reviews	Weekly, during Implementation phase	Terasoft ATM Software Project Manager,	Review current state of in-progress	1. Resources booked by Programmer 1

		Programmer 1, Programmer 2, Software Designer 1, Consultant 1	implementation products (i.e. source code), document issues that need resolving, assign resolution, and set schedule for resolution.	2. Products to be reviewed will be distributed at least 48 hours prior to the meeting by Programmer 1 3. Meeting held to review implementation products and create issue resolution plan. 4. Programmer 1 distributes review summary

Quality assurance audits

Review	Schedule	Resources	Method	Procedure
Project documentation reviews	Weekly, during periods when project documentation is being created (see "Deliverable Documentation Work Products" in section 7.3), and on request.	Quality Analyst 1, Document preparer(s), Document reviewer(s) (preparers/reviewers are as in section 7.3)	Review deliverable documentation work products, particularly for consistency with the higher-level plans on which the document is based (i.e. design consistency with requirements, source code consistent with design). Inconsistencies will be noted and an action plan for resolution produced.	1. Resources booked by Quality Analyst 1 2. Documentation to be reviewed will be distributed to resources 48 hours prior to the review meeting 3. Meeting held to review document consistency with higher-level document, and standard/template on which it is based. Issues will be documented and a plan for resolution created. 4. Quality Analyst 1 to distribute review summary to resources, schedule additional reviews if necessary.

			Inspection of document for compliance with the standard/template on which the documentation product is based.	
Closure review	After all work products delivered (WBS # 1.3.9)	Quality Analyst 1, all project participants shown in section 4.2	Derive "lessons learned" based on input from project participants on how better quality (based on results of documentation quality reviews) could be achieved in future. Document this information for potential training/process improvement opportunities..	1. Resources booked by Quality Analyst 1 2. Goal of the meeting to be communicated to resources at least 48 hours prior to meeting 3. "Lessons learned" and quality improvement ideas will be collected from resources, and documented. 4. Quality Analyst 1 will distribute review summary to resources 5. Quality Analyst 1 will use meeting results to propose improvements to organizational project processes and training, as appropriate.

Acquirer-conducted reviews

Review	Schedule	Resources	Method	Procedure
ATM software acceptance review	Once, see WBS # 1.13.5.1 and 1.13.5.3 in	Terasoft ATM Software Project	Review software work products, as	1. Resources booked by NNB ATM project manager

	project schedule. Unsatisfactory review will result in subsequent reviews as needed.	Manager, NNB ATM project manager, various NNB resources (to be arranged by NNB ATM project manager). May involve additional Terasoft resources if exceptions are found.	part of overall ATM acceptance review, for full functionality based on planned transaction sample to test all aspects of ATM product.	2. Transaction entries will be performed by NNB resources, and exceptions documented. 3. NNB ATM project manager will distribute documentation on perceived software issues. 4. Meeting held to triage issues document (remove non-software issues, identify remaining issues as central bank-related and ATM software-related), review issues document, review any exceptions found and produce action plan for issue resolution. 5. NNB ATM project manager to distribute review summary to resources, schedule additional reviews if necessary.
ATM weekly statistical report acceptance review	Once, see WBS # 1.13.5.2 in project schedule. Unsatisfactory review will result in subsequent reviews as needed.	Terasoft ATM Software Project Manager, NNB ATM project manager, various NNB resources (to be arranged by NNB ATM project manager). May involve additional Terasoft	Review content (presence and accuracy) and format of weekly statistical report work product by performing line comparison of actual printout with specifications.	6. Resources booked by NNB ATM project manager 7. Terasoft ATM Software Project Manager to deliver statistical report printout sample to resources 8. Meeting held to inspect report printout sample, document issues, and produce schedule for issue resolution. 9. NNB ATM project manager to distribute review summary

		resources if exceptions are found.		to resources, schedule additional reviews if necessary.

Acquirer-conducted audits

No acquirer-conducted audits have been requested by NNB.

[due to page orientation differences, section 7.6 starts on the next page]

7.6 Problem Resolution Plan

Problem reporting

All problems must be reported to the project manager using the problem reporting form designated for use on the project. When complete, the form should be submitted electronically, via e-mail.

Problem analysis

Reported problems will be analyzed to determine the risk they pose to the project, and the short- and long-term impact they will have on project resources, schedule, and budget.

Problem reports will be analyzed against the Risk Categorization Table (see section 5.4). If an existing risk's status is determined to require elevation due to the problem report, this will be done. If the problem poses a new risk to the project, a new risk entry will be made to the Risk Categorization Table.

Depending on the nature and reach of the problem, the appropriate team members will be engaged to properly analyze the problem, determine resolution steps, and estimate time required to resolve the problem. Mandatory participants are:

- Project Manager
- Configuration Manager 1
- Quality Analyst 1

As time is more important than budget or resources on this project, emphasis will be on determining the problem's impact on project schedule. This must include an analysis of the impact of diverting resource attention away from planned project activities toward resolving problems.

Root cause analysis will be performed on the problem if time permits and/or a serious process flaw is suspected to be the cause or to have contributed to the cause. Associated possible process improvements will be documented by Quality Analyst 1. See section 7.8 for process improvement plans.

Problem prioritizing

Based on analysis of the problems, and given that time is the most important factor on this project, the problems will be prioritized based on the extent of their impact to schedule if they are allowed to persist. The problems will be classified as follows:

- **Critical (highest priority):** problem will impact and/or has impacted delivery time of activities on the critical path
- **High:** problem has impacted and continues to impact delivery time of activities not on the critical path; will affect critical path if not resolved
- **Medium:** problem has an ongoing impact to schedule but is not expected to affect critical path

- **Low (lowest priority):** problem has/had a one-time impact, and/or is so minor that critical path will never be affected

Problem processing

Once a problem has been analyzed and a priority attached, a problem summary document will be created which will include:

- unique problem ID
- priority of problem
- resource(s) required to resolve problem
- activities required to resolve problem
- assignment of resources to resolution activities

Electronic timesheets will be configured such that a time code is provided for each problem resolution to which a resource is assigned.

The completion of this summary document will signal the start of implementing a problem resolution.

Problems will be addressed in order of severity first, but will not necessarily be resolved serially due to readiness of solution. In cases where two problem resolutions are ready to be implemented simultaneously and there is a resource constraint, the resolution with the highest priority will be implemented first.

Effort expended on problem resolution should be billed separately by team members. Billing should take place against the time code designated for the problem resolution being worked on. By doing this, rework effort will be logged separately from work effort.

Roles

The following table illustrates the roles of project team members in the problem resolution process:

Team function	Role(s)
Project Manager	• Recipient of new problem reports • Organizes meetings • Authors problem summary document
Configuration Managers	• Must participate in problem resolution meetings • Analyzes impact of problem resolution on other configuration items
Quality Analysts	• Must participate in problem resolution meetings • If root cause analysis is performed, gathers information on process deficiencies that led to problem occurrence.

Verification & Validation	• **Only** if problem affects a work product under the "Scope" heading of section 7.2 o Verifies & validates problem resolution to confirm proper and accurate resolution o Reapplies verification & validation to work products affected by a change that were previously verified & validated
CCB	• Reviews changes affecting configuration items, stemming from problem resolution • Approves changes to configuration items, stemming from problem resolution
Other functions	• Participate as necessary in problem resolution

7.7 Subcontractor Management Plan

This section will describe the nature of the relationship between Terasoft and the subcontractors that will be hired to assist with the project.

Selection criteria

The two subcontractors selected for the project both originate from the same company (Banks, Etc.) and were selected based on a successful history of working on similar projects with the subcontractors. No formal selection criteria were used.

Subcontractor requirements management

The subcontractor requirements are based on the work activities allocated to them by the resource allocation. They have no independent deliverables, but have been subcontracted to augment the capabilities of our own employees for the purpose of this project. The subcontractor requirements are therefore illustrated in section 5.2.3.

Monitoring of subcontractor technical progress

Since the subcontractor's effort is entwined with the effort of our own employees, their technical progress will be monitored as part of general project progress monitoring and will not be handled separately for subcontractors. For every quarter in which there is subcontractor involvement, Terasoft collaborators will be asked to provide feedback on the effectiveness of the subcontractors. This form will be based on Terasoft's standard subcontractor evaluation form.

Subcontractor schedule and budget control

Since the subcontractor's effort is entwined with the effort of our own employees, schedule and budget control will be handled for all team members at the project level and will not be handled separately for subcontractors.

Subcontractor product acceptance criteria

Since the subcontractor's effort is entwined with the effort of our own employees, product acceptance criteria are the same for all team members, and will not be handled separately for subcontractors.

Subcontractor risk management plan

Since the subcontractor's effort is entwined with the effort of our own employees, the subcontractor risk management plan is included in the project risk management plan (section 5.4). A specific item dealing with subcontractor retention is included in this plan.

Subcontract document

A copy of the subcontract document associated with the subcontractors from Banks, Etc. will be stored in the project repository.

Points of contact

The contractors will work on Terasoft's premises, working closely with Terasoft's own employees and will therefore always be available for contact. For escalation, calls may be directed to Banks Etc.'s head office.

7.8 Process Improvement Plan

This section describes plans for process improvements obtained during problem resolution and through periodic assessment of the project through PPAs.

PPA

The same PPA procedure described in section 5.5 will be used to produce process improvements based on input from participants of project phases the have closed. Any project process improvements that may benefit the ongoing performance of this project will be considered for implementation so that they may benefit the remaining project phases. Potential changes to organizational processes that may produce benefit from PPA input will be documented and deferred for analysis independently of this project.

Problem resolution input

Project process improvements are those that result from the problem resolution efforts described in section 7.6. If a root cause analysis is performed and justified process improvements are identified, Quality Analyst 1 will work with the project manager and other key resources directly involved with the process in question to develop changes to the problematic process. If an organizational process is at fault, a temporary workaround will be devised by the same participants which will last for the duration of the project. The problems and temporary workarounds will be documented so that the organizational process that caused the problem can be inspected to determine whether the changes used in this project may be of benefit to the organizational process. If the workaround was only of particular application to the current project, the documentation will be stored in the project repository so that future project managers will be aware of changes required in the process for projects of a similar nature in future.

Other process improvements

Process improvements, while the project is in progress, will not normally result from anything other than PPAs and problem resolution input for this project in order to keep the project focused. However, any suggestions for process improvements may be forwarded to the project manager at any time. Suggestions that are well-substantiated and supported by metrics may be considered for implementation in mid-project.

Section 8

Additional Plans

There are no additional plans.

Annexes (Appendices)

Appendix A

Responsibility Assignment Matrix (RAM)

Nirvana National Bank ATM project

Responsibility Assignment Matrix (RAM)

#	WBS #	Deliverable or Work Product	Completed	NNB Steering Committee	NNB Executive Committee	Terasoft CEO	Project Manager	Requirements Analyst 1 (Lead)	Requirements Analyst 2	Programmer 1 (Lead)	Programmer 2	Verification Engineer 1 (Lead)	Verification Engineer 2	Software Architect 1 (Lead)	Software Architect 2	Software Designer 1	Validation Engineer 1	Quality Analyst 1	Configuration Manager 1	Database Engineer 1	Consultant 1	Consultant 2	Technical Writer 1	Training Specialist 1	Installation Specialist 1	A	L	S	C	R
	1	Nirvana National Bank ATM project																												
	1.1	Software Lifecycle Model Process																												
1	**1.1.1**	**Identify candidate SLCMs**					L																			0	1	0	0	0
2	**1.1.2**	**Select project model**					L																			0	1	0	0	0
	1.2	Project Initiation																												
3	**1.2.1**	**Map activities to the SLCM**					L																			0	1	0	0	0
	1.2.2	Allocate project resources																												
4	**1.2.2.1**	**Identify staffing requirements**					L																			0	1	0	0	0
5	**1.2.2.2**	**Acquire commitment from required staff**				A	L																			1	1	0	0	0
6	**1.2.2.3**	**Allocate identified activites to staff**					L																			0	1	0	0	0
	1.2.3	Establish project environment																												
7	**1.2.3.1**	**Identify tool requirements**					L																			0	1	0	0	0
8	**1.2.3.2**	**Acquire required tools**					L																			0	1	0	0	0
9	**1.2.3.3**	**Identify communication needs**					L																			0	1	0	0	0
10	**1.2.3.4**	**Create communication plan**					L																			0	1	0	0	0
11	**1.2.3.5**	**Establish documentation repository**					L																			0	1	0	0	0
12	**1.2.3.6**	**Establish software engineering workspaces**					L																			0	1	0	0	0
	1.2.4	Plan project management																												
13	**1.2.4.1**	**Create baseline Work Breakdown Structure (WBS)**					L	C		C		C		C													0	1	0	4	0
	1.2.4.2	Create SPMP subplans																												
14	**1.2.4.2.1**	**Create start-up plan**					L	C		C		C		C													0	1	0	4	0
15	**1.2.4.2.2**	**Create work plan**				A	L																			1	1	0	0	0
16	**1.2.4.2.3**	**Create control plan**				A	L																			1	1	0	0	0

																										Approver	Lead Develope	Second Lead	Contributor	Reviewer

17	**1.2.4.2.4**	**Create risk management plan**					L																			0	1	0	0	0
18	**1.2.4.2.5**	**Create closeout plan**					L																			0	1	0	0	0
19	**1.2.4.2.6**	**Create technical process plans**					L																			0	1	0	0	0
20	**1.2.4.2.7**	**Create subcontractor management plan**					L																			0	1	0	0	0
21	**1.2.4.2.8**	**Create process improvement plan**					L																			0	1	0	0	0
22	**1.2.4.2.9**	**Create problem resolution plan**					L																			0	1	0	0	0
23	**1.2.4.3**	**Assemble baseline SPMP document**					L																			0	1	0	0	0
24	**1.2.4.4**	**Baseline SPMP completed**			A		L																			1	1	0	0	0
25	**1.2.4.5**	**Create schedule baseline**					L																			0	1	0	0	0
	1.2.4.6	Finalize project charter																													
26	**1.2.4.6.1**	**Create project charter**		S			L																			0	1	1	0	0
27	**1.2.4.6.2**	**Deliver project charter to NNB for signoff**					L																			0	1	0	0	0
28	**1.2.4.6.3**	**Receive signed project charter from NNB**			A		L																			1	1	0	0	0
29	**1.2.4.6.4**	**Baseline project charter completed**					L																			0	1	0	0	0
30	**1.2.4.7**	**Receive ATM hardware documentation**		L			A																			1	1	0	0	0
	1.3	Project Monitoring & Control																													
31	**1.3.1**	**Project kickoff**					L																			0	1	0	0	0
32	**1.3.2**	**Analyze risks**		S			L																			0	1	1	0	0
33	**1.3.3**	**Perform contingency planning**					L																			0	1	0	0	0
	1.3.4	Manage the project																													
34	**1.3.4.1**	**Steering Committee meetings**		C			L																			0	1	0	1	0
35	**1.3.4.2**	**Project team meetings**					L	C		C		C		C					C	C	C	C		C	C	C	0	1	0	11	0
36	**1.3.4.3**	**Other project management tasks**					L																			0	1	0	0	0
37	**1.3.5**	**Retain records**					L																			0	1	0	0	0
38	**1.3.6**	**Implement problem reporting method**					L																			0	1	0	0	0
39	**1.3.7**	**Maintain project charter**		S	A		L																			1	1	1	0	0
	1.3.8	SPMP Scheduled Updates																													
40	**1.3.8.1**	**Month 1**		A			L																			1	1	0	0	0
41	**1.3.8.2**	**Month 2**		A			L																			1	1	0	0	0
42	**1.3.8.3**	**Month 3**		A			L																			1	1	0	0	0
43	**1.3.8.4**	**Month 4**		A			L																			1	1	0	0	0
44	**1.3.8.5**	**Month 5**		A			L																			1	1	0	0	0
45	**1.3.8.6**	**Month 6**		A			L																			1	1	0	0	0
46	**1.3.8.7**	**Month 7**		A			L																			1	1	0	0	0
47	**1.3.8.8**	**Month 8**		A			L																			1	1	0	0	0
48	**1.3.8.9**	**Month 9**		A			L																			1	1	0	0	0
49	**1.3.8.10**	**Month 10**		A			L																			1	1	0	0	0
50	**1.3.8.11**	**Month 11**		A			L																			1	1	0	0	0
51	**1.3.8.12**	**Month 12**		A			L																			1	1	0	0	0
52	**1.3.9**	**All project deliverables have been delivered**		S	A		L																			1	1	1	0	0
	1.4	Configuration Management																													
53	**1.4.1**	**Plan configuration management**																	L							0	1	0	0	0

54	**1.4.2**	**Create Software Configuration Management Plan (SCMP)**					A												L								1	1	0	0	0
55	**1.4.3**	**SCMP completed**					L																				0	1	0	0	0
56	**1.4.4**	**Develop configuration identification**																	L								0	1	0	0	0
57	**1.4.5**	**Perform configuration control**																	L								0	1	0	0	0
58	**1.4.6**	**Perform status accounting**																	L								0	1	0	0	0
	1.5	Software Quality Management																																
59	**1.5.1**	**Plan software quality management**																L									0	1	0	0	0
60	**1.5.2**	**Create Software Quality Assurance Plan (SQAP)**					A											L									1	1	0	0	0
61	**1.5.3**	**SQAP completed**					L																				0	1	0	0	0
62	**1.5.4**	**Define metrics**																L									0	1	0	0	0
63	**1.5.5**	**Manage software quality**																L									0	1	0	0	0
64	**1.5.6**	**Identify quality improvement needs**																L									0	1	0	0	0
	1.6	System Allocation																																
65	**1.6.1**	**Analyze functions**											L	S													0	1	1	0	0
	1.6.2	Develop system architecture																																
66	**1.6.2.1**	**Identify hardware functions**											L	S													0	1	1	0	0
67	**1.6.2.2**	**Identify software functions**											L	S													0	1	1	0	0
68	**1.6.3**	**Decompose system requirements**											L	S													0	1	1	0	0
69	**1.6.4**	**System allocation completed**					L																				0	1	0	0	0
	1.7	Requirements																																
	1.7.1	Define and develop software requirements																																
70	**1.7.1.1**	**Define and develop weekly statistical report requirements**		C				L													C						0	1	0	2	0
71	**1.7.1.2**	**Define and develop ATM session statement requirements**		C					L													C					0	1	0	2	0
72	**1.7.1.3**	**Define and develop ATM software requirements**		C				L													C						0	1	0	2	0
73	**1.7.1.4**	**Define and develop central bank software requirements**		C					L													C					0	1	0	2	0
	1.7.2	Define interface requirements																																
74	**1.7.2.1**	**Define ATM software interface requirements**							L													C					0	1	0	1	0
75	**1.7.2.2**	**Define hardware interface requirements**						L													C						0	1	0	1	0
76	**1.7.2.3**	**Define user interface requirements**		C					L													C					0	1	0	2	0
77	**1.7.2.4**	**Define central bank interface requirements**						L													C						0	1	0	1	0
	1.7.3	Prioritize and integrate requirements																																
78	**1.7.3.1**	**Prioritize and integrate software requirements**							L												C						0	1	0	1	0
79	**1.7.3.2**	**Prioritize and integrate interface requirements**						L														C					0	1	0	1	0
80	**1.7.3.3**	**Prioritize and integrate all requirements**							L												C						0	1	0	1	0
81	**1.7.4**	**Create Software Requirements Specification (SRS)**					A	R	L																		1	1	0	0	1
82	**1.7.5**	**SRS completed**					L																				0	1	0	0	0
	1.8	Design																																
	1.8.1	Perform architectural design																																
83	**1.8.1.1**	**Design ATM-to-central bank communication architecture**											L								C	C					0	1	0	2	0
84	**1.8.1.2**	**Design ATM software internal architecture**											L								C	C					0	1	0	2	0
	1.8.2	Design the database																																
85	**1.8.2.1**	**Design card/PIN additions to central system database**																		L							0	1	0	0	0

86	**1.8.2.2**	**Design ATM transaction additions to central system database**																	L						0	1	0	0	0
87	**1.8.2.3**	**Design weekly statistical report**																	L						0	1	0	0	0
	1.8.3	Design interfaces																													
88	**1.8.3.1**	**Design ATM software interfaces**													L										0	1	0	0	0
89	**1.8.3.2**	**Design ATM software-to-hardware interfaces**													L										0	1	0	0	0
90	**1.8.3.3**	**Design user interfaces**													L										0	1	0	0	0
91	**1.8.3.4**	**Design central bank system interfaces**													L										0	1	0	0	0
92	**1.8.4**	**Select or develop algorithms**													L										0	1	0	0	0
	1.8.5	Perform detailed design																													
93	**1.8.5.1**	**Detail design ATM software interfaces**													L					C					0	1	0	1	0
94	**1.8.5.2**	**Detail design ATM software-to-hardware interfaces**													L					C					0	1	0	1	0
95	**1.8.5.3**	**Detail design user interfaces**													L					C					0	1	0	1	0
96	**1.8.5.4**	**Detail design central bank system interfaces**													L					C					0	1	0	1	0
97	**1.8.6**	**Create Software Design Specification (SDS)**					A								L					R					1	1	0	0	1
98	**1.8.7**	**SDS completed**					L																		0	1	0	0	0
	1.9	Verification & Validation																													
	1.9.1	Plan verification and validation																													
99	**1.9.1.1**	**Plan requirements verification and validation**									L	C				S									0	1	1	1	0
100	**1.9.1.2**	**Plan architecture verification and validation**									L	C				S									0	1	1	1	0
101	**1.9.1.3**	**Plan interface design verification and validation**									L	C				S									0	1	1	1	0
102	**1.9.1.4**	**Plan database design verification and validation**									L	C				S									0	1	1	1	0
103	**1.9.1.5**	**Create Software Verification & Validation Plan (SVVP)**					A				L	C				S				C					1	1	1	2	0
104	**1.9.1.6**	**SVVP completed**					L																		0	1	0	0	0
	1.9.2	Execute verification and validation tasks																													
105	**1.9.2.1**	**Verify requirements**									L														0	1	0	0	0
106	**1.9.2.2**	**Validate requirements**					A									S									1	0	1	0	0
107	**1.9.2.3**	**Verify architecture**					A				L														1	1	0	0	0
108	**1.9.2.4**	**Validate architecture**					A									S									1	0	1	0	0
109	**1.9.2.5**	**Verify interface design**					A				L														1	1	0	0	0
110	**1.9.2.6**	**Validate interface design**					A									S									1	0	1	0	0
111	**1.9.2.7**	**Verify database design**					A				L														1	1	0	0	0
112	**1.9.2.8**	**Validate database design**					A									S									1	0	1	0	0
113	**1.9.3**	**Requirements & Design V&V completed**					L																		0	1	0	0	0
114	**1.9.4**	**Collect and analyze metric data**									L					S									0	1	1	0	0
	1.9.5	Plan testing																													
115	**1.9.5.1**	**Plan ATM software-to-hardware interface black box test**									L	C													0	1	0	1	0
116	**1.9.5.2**	**Plan ATM software interface black box test**									L	C													0	1	0	1	0
117	**1.9.5.3**	**Plan end user test**									L	C													0	1	0	1	0
118	**1.9.5.4**	**Plan central bank interface black box test**									L	C													0	1	0	1	0
119	**1.9.5.5**	**Plan weekly statistical report test**									L	C													0	1	0	1	0
120	**1.9.5.6**	**Create Software Test Plan (STP)**					A				L	C													1	1	0	1	0
121	**1.9.5.7**	**STP completed**					L																		0	1	0	0	0

	1.9.6	Develop test requirements																															
122	**1.9.6.1**	**Design ATM software-to-hardware interface black box test**										L	C													0	1	0	1	0
123	**1.9.6.2**	**Design ATM software interface black box test**										L	C													0	1	0	1	0
124	**1.9.6.3**	**Design end user test**										L	C													0	1	0	1	0
125	**1.9.6.4**	**Design central bank interface black box test**										L	C													0	1	0	1	0
126	**1.9.6.5**	**Design weekly statistical report test**										L	C													0	1	0	1	0
	1.9.7	Execute the tests																															
127	**1.9.7.1**	**Execute ATM software-to-hardware interface black box test**										L	C													0	1	0	1	0
128	**1.9.7.2**	**Execute ATM software interface black box test**										L	C													0	1	0	1	0
129	**1.9.7.3**	**Execute end user test**										L	C													0	1	0	1	0
130	**1.9.7.4**	**Execute central bank interface black box test**										L	C													0	1	0	1	0
131	**1.9.7.5**	**Execute weekly statistical report test**										L	C													0	1	0	1	0
132	**1.9.8**	**V&V completed**					L																			0	1	0	0	0
	1.10	Documentation development																															
	1.10.1	Plan documentation																															
133	**1.10.1.1**	**Define installation documentation contents**																					L			0	1	0	0	0
134	**1.10.1.2**	**Define ATM software documentation contents**																					L			0	1	0	0	0
135	**1.10.1.3**	**Define central bank accounting system documentation updates**																					L			0	1	0	0	0
136	**1.10.1.4**	**Create documentation plan**					A																L			1	1	0	0	0
	1.10.2	Implement documentation																															
137	**1.10.2.1**	**Write installation documentation**																					L		R	0	1	0	0	1
138	**1.10.2.2**	**Write ATM software documentation**																				R	L			0	1	0	0	1
139	**1.10.2.3**	**Write central bank accounting system documentation updates**																				R	L			0	1	0	0	1
	1.10.3	Produce and distribute documentation																															
140	**1.10.3.1**	**Print installation documentation**																					L			0	1	0	0	0
141	**1.10.3.2**	**Print ATM software documentation**																					L			0	1	0	0	0
142	**1.10.3.3**	**Print central bank accounting system documentation**																					L			0	1	0	0	0
143	**1.10.3.4**	**Distribute installation documentation to installers**					L																			0	1	0	0	0
144	**1.10.3.5**	**Distribute ATM software documentation to ATM sites**					L																			0	1	0	0	0
145	**1.10.3.6**	**Distribute central bank accounting system documentation to end users**					L																			0	1	0	0	0
146	**1.10.4**	**Documentation completed**					L																			0	1	0	0	0
	1.11	Training																															
	1.11.1	Plan the training program																															
147	**1.11.1.1**	**Plan installation training content**																						L		0	1	0	0	0
148	**1.11.1.2**	**Plan ATM site training content**																						L		0	1	0	0	0
149	**1.11.1.3**	**Plan software maintenance training content**																						L		0	1	0	0	0
	1.11.2	Develop training materials																															
150	**1.11.2.1**	**Create installation training materials**																						L		0	1	0	0	0
151	**1.11.2.2**	**Create ATM site training materials**																						L		0	1	0	0	0
152	**1.11.2.3**	**Create software maintenance training materials**																						L		0	1	0	0	0
	1.11.3	Validate the training program																															
153	**1.11.3.1**	**Validate installation training content**																						L		0	1	0	0	0

154	**1.11.3.2**	**Validate ATM site training content**																						L		0	1	0	0	0
155	**1.11.3.3**	**Validate software maintenance training content**																						L		0	1	0	0	0
	1.11.4	Implement the training program																														
156	**1.11.4.1**	**Hold training session for ATM sites**					A																	L		1	1	0	0	0
157	**1.11.4.2**	**Hold training session for software maintenance team**					A																	L		1	1	0	0	0
158	**1.11.4.3**	**Hold training session for installers**					A																	L		1	1	0	0	0
159	**1.11.5**	**Training completed**					L																			0	1	0	0	0
	1.12	Implementation																														
160	**1.12.1**	**Create test data**									L															0	1	0	0	0
	1.12.2	Create source code																														
161	**1.12.2.1**	**Code ATM software-to-hardware interfaces**							L	S																0	1	1	0	0
162	**1.12.2.2**	**Code ATM software interfaces**							L	S																0	1	1	0	0
163	**1.12.2.3**	**Code user interfaces**							L	S																0	1	1	0	0
164	**1.12.2.4**	**Code central bank interfaces**							L	S																0	1	1	0	0
165	**1.12.2.5**	**Code weekly statistical report generation routines**							L	S																0	1	1	0	0
	1.12.3	Generate object code																														
166	**1.12.3.1**	**Generate ATM software-to-hardware interface object code**							L																	0	1	0	0	0
167	**1.12.3.2**	**Generate ATM software interface object code**							L																	0	1	0	0	0
168	**1.12.3.3**	**Generate ATM user interface object code**							L																	0	1	0	0	0
169	**1.12.3.4**	**Generate central bank interface object code**							L																	0	1	0	0	0
170	**1.12.3.5**	**Generate weekly statistical report generation object code**							L																	0	1	0	0	0
	1.12.4	Plan integration																														
171	**1.12.4.1**	**Plan integration of ATM software/hardware interface and software interfa**							L																	0	1	0	0	0
172	**1.12.4.2**	**Plan integration of ATM software with user interfaces**							L																	0	1	0	0	0
173	**1.12.4.3**	**Plan integration of ATM software with central bank**							L																	0	1	0	0	0
174	**1.12.4.4**	**Plan integration of weekly statistical report with central bank**							L																	0	1	0	0	0
	1.12.5	Perform integration																														
175	**1.12.5.1**	**Integrate ATM software/hardware interface with software interfaces**							L																	0	1	0	0	0
176	**1.12.5.2**	**Integrate ATM software with user interfaces**							L																	0	1	0	0	0
177	**1.12.5.3**	**Integrate ATM software product with central bank**							L										C							0	1	0	1	0
178	**1.12.5.4**	**Integrate weekly statistical report with central bank**							L										C							0	1	0	1	0
179	**1.12.6**	**Implementation completed**					L																			0	1	0	0	0
	1.13	Installation																														
	1.13.1	Plan installation																														
180	**1.13.1.1**	**Plan installation of ATM software product onto ATM machines**																							L	0	1	0	0	0
181	**1.13.1.2**	**Plan installation of modifications to central bank system**																	C						L	0	1	0	1	0
182	**1.13.1.3**	**Plan installation of weekly statistical report**																	C						L	0	1	0	1	0
	1.13.2	Distribute software																														
183	**1.13.2.1**	**Distribute ATM software product to ATM installation team**																							L	0	1	0	0	0
184	**1.13.2.2**	**Distribute central bank system modifications to central bank installation t**																							L	0	1	0	0	0
185	**1.13.2.3**	**Distribute weekly statistical report to central bank installation team**																							L	0	1	0	0	0
	1.13.3	Install software																														

186	**1.13.3.1**	**Install ATM software product onto all ATM machines**																							L	0	1	0	0	0
187	**1.13.3.2**	**Install central bank system modifications**																		C					L	0	1	0	1	0
188	**1.13.3.3**	**Install weekly statistical report**																		C					L	0	1	0	1	0
189	**1.13.4**	**ATMs installed on-site by third party**		L			A																			1	1	0	0	0
	1.13.5	Accept software in operational environment																															
190	**1.13.5.1**	**Accept configured ATMs in banking locations**		A			L																		C	1	1	0	1	0
191	**1.13.5.2**	**Accept modified central bank system**		A			L																		C	1	1	0	1	0
192	**1.13.5.3**	**Accept weekly statistical report**		A			L																		C	1	1	0	1	0
193	**1.13.6**	**Installation completed**					L																			0	1	0	0	0
	1.14	Operation & Support																															
194	**1.14.1**	**Operate the system**		L																						0	1	0	0	0
195	**1.14.2**	**Provide technical assistance and consulting**		L																						0	1	0	0	0
196	**1.14.3**	**Maintain support request log**		L																						0	1	0	0	0
	1.15	Maintenance																															
197	**1.15.1**	**Reapply a software lifecycle**		L																						0	1	0	0	0
	KEY																																
	A	Approval: responsible for approving the item as complete (if no A, then L approves)		15	4	3	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
	L	Lead: responsible for producing the item (also approves, if no A defined)		6	0	0	70	5	7	18	0	27	0	6	0	10	0	5	5	3	0	0	10	12	9								
	S	Secondary: backup responsibility for Lead (assumes C, R)		4	0	0	0	0	0	0	5	0	0	0	4	0	10	0	0	0	0	0	0	0	0								
	C	Contributor: contributes to production of the item (assumes R)		6	0	0	0	3	0	3	0	3	21	3	0	0	0	1	1	7	14	7	1	1	4								
	R	Reviewer: only responsible for reviewing the item		0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	1								
		None: no participation in producing or approving item																															
	Total																																

Appendix B

Estimation Chart

ID	WBS	Task Name	Duration	Cost	Resource Names
1	**1**	**Nirvana National Bank ATM project**	**336.64 days?**	**$1,778,703.62**	
2	**1.1**	**Software Lifecycle Model Process**	**2 days**	**$1,000.00**	
3	1.1.1	Identify candidate SLCMs	1 day	$500.00	Project Manager[25%]
4	1.1.2	Select project model	1 day	$500.00	Project Manager[25%]
5	**1.2**	**Project Initiation**	**74 days**	**$121,750.00**	
6	1.2.1	Map activities to the SLCM	2 days	$1,000.00	Project Manager[25%]
7	**1.2.2**	**Allocate project resources**	**29 days**	**$6,500.00**	
8	1.2.2.1	Identify staffing requirements	2 days	$2,000.00	Project Manager[50%]
9	1.2.2.2	Acquire commitment from required staff	5 days	$2,000.00	Project Manager[20%]
10	1.2.2.3	Allocate identified activites to staff	5 days	$2,500.00	Project Manager[25%]
11	**1.2.3**	**Establish project environment**	**32 days**	**$53,000.00**	
12	1.2.3.1	Identify tool requirements	10 days	$5,000.00	Project Manager[25%]
13	1.2.3.2	Acquire required tools	5 days	$17,500.00	Project Manager[25%],Computer software purchase[30]
14	1.2.3.3	Identify communication needs	4 days	$2,000.00	Project Manager[25%]
15	1.2.3.4	Create communication plan	4 days	$4,000.00	Project Manager[50%]
16	1.2.3.5	Establish documentation repository	1 day	$12,250.00	Project Manager[13%],Software repository[24]
17	1.2.3.6	Establish software engineering workspaces	1 day	$12,250.00	Project Manager[13%],Software repository[24]
18	**1.2.4**	**Plan project management**	**74 days**	**$61,250.00**	
19	1.2.4.1	Create baseline Work Breakdown Structure (WBS)	10 days	$21,500.00	Project Manager[50%],Software Architect 1 (Lead)[25%],Programmer 1 (Lead)[25%],Verification
20	**1.2.4.2**	**Create SPMP subplans**	**29 days**	**$27,000.00**	
21	1.2.4.2.1	Create start-up plan	3 days	$7,000.00	Project Manager[42%],Requirements Analyst 2[25%],Programmer 1 (Lead)[25%],Software Architect 1
22	1.2.4.2.2	Create work plan	3 days	$2,500.00	Project Manager[42%]
23	1.2.4.2.3	Create control plan	3 days	$2,500.00	Project Manager[42%]
24	1.2.4.2.4	Create risk management plan	3 days	$2,500.00	Project Manager[42%]
25	1.2.4.2.5	Create closeout plan	3 days	$2,500.00	Project Manager[42%]
26	1.2.4.2.6	Create technical process plans	3 days	$2,500.00	Project Manager[42%]
27	1.2.4.2.7	Create subcontractor management plan	3 days	$2,500.00	Project Manager[42%]
28	1.2.4.2.8	Create process improvement plan	3 days	$2,500.00	Project Manager[42%]
29	1.2.4.2.9	Create problem resolution plan	3 days	$2,500.00	Project Manager[42%]
30	1.2.4.3	Assemble baseline SPMP document	1 day	$2,000.00	Project Manager
31	1.2.4.4	Baseline SPMP completed	0 days	$0.00	
32	1.2.4.5	Create schedule baseline	1 day	$500.00	Project Manager[25%]
33	**1.2.4.6**	**Finalize project charter**	**64 days**	**$10,250.00**	
34	1.2.4.6.1	Create project charter	5 days	$10,000.00	Project Manager
35	1.2.4.6.2	Deliver project charter to NNB for signoff	1 day	$250.00	Project Manager[13%]

ID	WBS	Task Name	Duration	Cost	Resource Names
36	1.2.4.6.3	Receive signed project charter from NNB	5 days	$0.00	
37	1.2.4.6.4	Baseline project charter completed	0 days	$0.00	
38	1.2.4.7	Receive ATM hardware documentation	0 days	$0.00	
39	**1.3**	**Project Monitoring & Control**	**299 days?**	**$227,500.00**	
40	1.3.1	Project kickoff	0 days	$0.00	
41	1.3.2	Analyze risks	5 days?	$10,000.00	Project Manager
42	1.3.3	Perform contingency planning	5 days?	$10,000.00	Project Manager
43	**1.3.4**	**Manage the project**	**216 days?**	**$164,000.00**	
44	1.3.4.1	Steering Committee meetings	48 days	$12,000.00	Project Manager[13%]
45	1.3.4.2	Project team meetings	200 days?	$75,000.00	Project Manager[19%]
46	1.3.4.3	Other project management tasks	200 days?	$77,000.00	Project Manager[19%]
47	1.3.5	Retain records	16 days?	$20,000.00	Project Manager[63%]
48	1.3.6	Implement problem reporting method	10 days	$10,000.00	Project Manager[50%]
49	1.3.7	Maintain project charter	200 days	$7,500.00	Project Manager[2%]
50	**1.3.8**	**SPMP Scheduled Updates**	**240 days**	**$6,000.00**	
51	1.3.8.1	Month 1	1 day	$500.00	Project Manager[25%]
52	1.3.8.2	Month 2	1 day	$500.00	Project Manager[25%]
53	1.3.8.3	Month 3	1 day	$500.00	Project Manager[25%]
54	1.3.8.4	Month 4	1 day	$500.00	Project Manager[25%]
55	1.3.8.5	Month 5	1 day	$500.00	Project Manager[25%]
56	1.3.8.6	Month 6	1 day	$500.00	Project Manager[25%]
57	1.3.8.7	Month 7	1 day	$500.00	Project Manager[25%]
58	1.3.8.8	Month 8	1 day	$500.00	Project Manager[25%]
59	1.3.8.9	Month 9	1 day	$500.00	Project Manager[25%]
60	1.3.8.10	Month 10	1 day	$500.00	Project Manager[25%]
61	1.3.8.11	Month 11	1 day	$500.00	Project Manager[25%]
62	1.3.8.12	Month 12	1 day	$500.00	Project Manager[25%]
63	1.3.9	All project deliverables have been delivered	0 days	$0.00	
64	1.3.10	Project closeout	0 days	$0.00	
65	**1.4**	**Configuration Management**	**35 days?**	**$39,375.00**	
66	1.4.1	Plan configuration management	5 days	$3,500.00	Configuration Manager 1[50%]
67	1.4.2	Create Software Configuration Management Plan (SCMP)	5 days	$5,250.00	Configuration Manager 1[75%]
68	1.4.3	SCMP completed	0 days	$0.00	
69	1.4.4	Develop configuration identification	5 days	$2,625.00	Configuration Manager 1[38%]
70	1.4.5	Perform configuration control	10 days?	$14,000.00	Configuration Manager 1
71	1.4.6	Perform status accounting	10 days?	$14,000.00	Configuration Manager 1

ID	WBS	Task Name	Duration	Cost	Resource Names
72	**1.5**	**Software Quality Management**	**79.33 days?**	**$64,400.00**	
73	1.5.1	Plan software quality management	1 day	$1,400.00	Quality Analyst 1
74	1.5.2	Create Software Quality Assurance Plan (SQAP)	13.33 days	$7,000.00	Quality Analyst 1[38%]
75	1.5.3	SQAP completed	0 days	$0.00	
76	1.5.4	Define metrics	10 days	$14,000.00	Quality Analyst 1
77	1.5.5	Manage software quality	50 days?	$35,000.00	Quality Analyst 1[50%]
78	1.5.6	Identify quality improvement needs	5 days?	$7,000.00	Quality Analyst 1
79	**1.6**	**System Allocation**	**10 days**	**$30,000.00**	
80	1.6.1	Analyze functions	2.5 days	$7,500.00	Software Architect 1 (Lead),Software Architect 2
81	**1.6.2**	**Develop system architecture**	**5 days**	**$15,000.00**	
82	1.6.2.1	Identify hardware functions	2.5 days	$7,500.00	Software Architect 1 (Lead),Software Architect 2
83	1.6.2.2	Identify software functions	2.5 days	$7,500.00	Software Architect 1 (Lead),Software Architect 2
84	1.6.3	Decompose system requirements	2.5 days	$7,500.00	Software Architect 1 (Lead),Software Architect 2
85	1.6.4	System allocation completed	0 days	$0.00	
86	**1.7**	**Requirements**	**37.12 days**	**$178,063.94**	
87	**1.7.1**	**Define and develop software requirements**	**5 days**	**$47,000.00**	
88	1.7.1.1	Define and develop weekly statistical report requirements	2.5 days	$11,500.00	Requirements Analyst 2,Consultant 1
89	1.7.1.2	Define and develop ATM session statement requirements	2.5 days	$12,000.00	Requirements Analyst 1 (Lead),Consultant 2
90	1.7.1.3	Define and develop ATM software requirements	2.5 days	$11,500.00	Requirements Analyst 2,Consultant 1
91	1.7.1.4	Define and develop central bank software requirements	2.5 days	$12,000.00	Requirements Analyst 1 (Lead),Consultant 2
92	**1.7.2**	**Define interface requirements**	**25 days**	**$94,000.00**	
93	1.7.2.1	Define ATM software interface requirements	5 days	$24,000.00	Requirements Analyst 1 (Lead),Consultant 2
94	1.7.2.2	Define hardware interface requirements	5 days	$23,000.00	Requirements Analyst 2,Consultant 1
95	1.7.2.3	Define user interface requirements	5 days	$24,000.00	Requirements Analyst 1 (Lead),Consultant 2
96	1.7.2.4	Define central bank interface requirements	5 days	$23,000.00	Requirements Analyst 2,Consultant 1
97	**1.7.3**	**Prioritize and integrate requirements**	**8.37 days**	**$31,213.91**	
98	1.7.3.1	Prioritize and integrate software requirements	2.04 days	$9,662.88	Requirements Analyst 1 (Lead),Consultant 1
99	1.7.3.2	Prioritize and integrate interface requirements	2.61 days	$10,031.04	Requirements Analyst 2,Consultant 2
100	1.7.3.3	Prioritize and integrate all requirements	3.38 days	$11,520.00	Requirements Analyst 1 (Lead),Consultant 1
101	1.7.4	Create Software Requirements Specification (SRS)	3.75 days	$5,850.03	Requirements Analyst 2,Requirements Analyst 1 (Lead)[10%]
102	1.7.5	SRS completed	0 days	$0.00	
103	**1.8**	**Design**	**90.77 days**	**$383,700.00**	
104	**1.8.1**	**Perform architectural design**	**20 days**	**$160,000.00**	
105	1.8.1.1	Design ATM-to-central bank communication architecture	10 days	$80,000.00	Software Architect 1 (Lead),Consultant 1,Consultant 2
106	1.8.1.2	Design ATM software internal architecture	10 days	$80,000.00	Software Architect 1 (Lead),Consultant 1,Consultant 2

ID	WBS	Task Name	Duration	Cost	Resource Names
107	**1.8.2**	**Design the database**	**8 days**	**$9,600.00**	
108	1.8.2.1	Design card/PIN additions to central system database	3 days	$3,600.00	Database Engineer 1
109	1.8.2.2	Design ATM transaction additions to central system database	3 days	$3,600.00	Database Engineer 1
110	1.8.2.3	Design weekly statistical report	2 days	$2,400.00	Database Engineer 1
111	**1.8.3**	**Design interfaces**	**25 days**	**$28,000.00**	
112	1.8.3.1	Design ATM software interfaces	5 days	$7,000.00	Software Designer 1
113	1.8.3.2	Design ATM software-to-hardware interfaces	5 days	$7,000.00	Software Designer 1
114	1.8.3.3	Design user interfaces	5 days	$7,000.00	Software Designer 1
115	1.8.3.4	Design central bank system interfaces	5 days	$7,000.00	Software Designer 1
116	1.8.4	Select or develop algorithms	5 days	$7,000.00	Software Designer 1
117	**1.8.5**	**Perform detailed design**	**40 days**	**$172,250.00**	
118	1.8.5.1	Detail design ATM software interfaces	10 days	$46,000.00	Software Designer 1,Consultant 1
119	1.8.5.2	Detail design ATM software-to-hardware interfaces	10 days	$46,000.00	Software Designer 1,Consultant 1
120	1.8.5.3	Detail design user interfaces	10 days	$34,250.00	Software Designer 1,Consultant 1
121	1.8.5.4	Detail design central bank system interfaces	10 days	$46,000.00	Software Designer 1,Consultant 1
122	1.8.6	Create Software Design Specification (SDS)	5 days	$6,850.00	Software Designer 1[75%],Consultant 1[10%]
123	1.8.7	SDS completed	0 days	$0.00	
124	**1.9**	**Verification & Validation**	**175.52 days?**	**$372,153.96**	
125	**1.9.1**	**Plan verification and validation**	**123.84 days**	**$218,611.89**	
126	1.9.1.1	Plan requirements verification and validation	6.92 days	$45,346.15	Verification Engineer 2[63%],Validation Engineer 1[63%],Consultant 1,Verification Engineer 1 (Lead)
127	1.9.1.2	Plan architecture verification and validation	6.92 days	$45,346.15	Verification Engineer 2[63%],Validation Engineer 1[63%],Consultant 1,Verification Engineer 1 (Lead)
128	1.9.1.3	Plan interface design verification and validation	6.92 days	$45,346.15	Verification Engineer 2[63%],Validation Engineer 1[63%],Consultant 1,Verification Engineer 1 (Lead)
129	1.9.1.4	Plan database design verification and validation	6.92 days	$45,346.15	Verification Engineer 2[63%],Validation Engineer 1[63%],Consultant 1,Verification Engineer 1 (Lead)
130	1.9.1.5	Create Software Verification & Validation Plan (SVVP)	6.36 days	$37,227.27	Verification Engineer 2[38%],Validation Engineer 1[38%],Consultant 1,Verification Engineer 1 (Lead)
131	1.9.1.6	SVVP completed	0 days	$0.00	
132	**1.9.2**	**Execute verification and validation tasks**	**61.92 days**	**$22,400.00**	
133	1.9.2.1	Verify requirements	5 days	$2,800.00	Verification Engineer 2[40%]
134	1.9.2.2	Validate requirements	5 days	$2,800.00	Validation Engineer 1[40%]
135	1.9.2.3	Verify architecture	5 days	$2,800.00	Verification Engineer 2[40%]
136	1.9.2.4	Validate architecture	5 days	$2,800.00	Validation Engineer 1[40%]
137	1.9.2.5	Verify interface design	5 days	$2,800.00	Verification Engineer 2[40%]
138	1.9.2.6	Validate interface design	5 days	$2,800.00	Validation Engineer 1[40%]
139	1.9.2.7	Verify database design	5 days	$2,800.00	Verification Engineer 2[40%]
140	1.9.2.8	Validate database design	5 days	$2,800.00	Validation Engineer 1[40%]

ID	WBS	Task Name	Duration	Cost	Resource Names
141	1.9.3	Requirements & Design V&V completed	0 days	$0.00	
142	1.9.4	Collect and analyze metric data	5 days?	$14,000.00	Verification Engineer 2,Validation Engineer 1
143	**1.9.5**	**Plan testing**	**58.91 days**	**$40,128.79**	
144	1.9.5.1	Plan ATM software-to-hardware interface black box test	3.33 days	$7,666.67	Verification Engineer 2[50%],Verification Engineer 1 (Lead)
145	1.9.5.2	Plan ATM software interface black box test	3.33 days	$7,666.67	Verification Engineer 2[50%],Verification Engineer 1 (Lead)
146	1.9.5.3	Plan end user test	1.67 days	$3,833.33	Verification Engineer 2[50%],Verification Engineer 1 (Lead)
147	1.9.5.4	Plan central bank interface black box test	3.33 days	$7,666.67	Verification Engineer 2[50%],Verification Engineer 1 (Lead)
148	1.9.5.5	Plan weekly statistical report test	2.73 days	$5,795.45	Verification Engineer 2[38%],Verification Engineer 1 (Lead)
149	1.9.5.6	Create Software Test Plan (STP)	2.5 days	$7,500.00	Verification Engineer 2,Verification Engineer 1 (Lead)
150	1.9.5.7	STP completed	0 days	$0.00	
151	**1.9.6**	**Develop test requirements**	**20.23 days**	**$58,295.45**	
152	1.9.6.1	Design ATM software-to-hardware interface black box test	5 days	$15,000.00	Verification Engineer 2,Verification Engineer 1 (Lead)
153	1.9.6.2	Design ATM software interface black box test	5 days	$15,000.00	Verification Engineer 2,Verification Engineer 1 (Lead)
154	1.9.6.3	Design end user test	2.5 days	$7,500.00	Verification Engineer 2,Verification Engineer 1 (Lead)
155	1.9.6.4	Design central bank interface black box test	5 days	$15,000.00	Verification Engineer 2,Verification Engineer 1 (Lead)
156	1.9.6.5	Design weekly statistical report test	2.73 days	$5,795.45	Verification Engineer 2[38%],Verification Engineer 1 (Lead)
157	**1.9.7**	**Execute the tests**	**51.68 days**	**$18,717.83**	
158	1.9.7.1	Execute ATM software-to-hardware interface black box test	2.38 days	$3,976.33	Verification Engineer 2,Verification Engineer 1 (Lead)
159	1.9.7.2	Execute ATM software interface black box test	2.38 days	$3,976.33	Verification Engineer 2,Verification Engineer 1 (Lead)
160	1.9.7.3	Execute end user test	2.38 days	$3,976.33	Verification Engineer 2,Verification Engineer 1 (Lead)
161	1.9.7.4	Execute central bank interface black box test	2.38 days	$3,976.33	Verification Engineer 2,Verification Engineer 1 (Lead)
162	1.9.7.5	Execute weekly statistical report test	5 days	$2,812.50	Verification Engineer 2[19%],Verification Engineer 1 (Lead)[19%]
163	1.9.8	V&V completed	0 days	$0.00	
164	**1.10**	**Documentation development**	**40 days**	**$61,450.00**	
165	**1.10.1**	**Plan documentation**	**40 days**	**$28,000.00**	
166	1.10.1.1	Define installation documentation contents	5 days	$7,000.00	Technical Writer 1
167	1.10.1.2	Define ATM software documentation contents	5 days	$7,000.00	Technical Writer 1
168	1.10.1.3	Define central bank accounting system documentation updates	5 days	$7,000.00	Technical Writer 1
169	1.10.1.4	Create documentation plan	5 days	$7,000.00	Technical Writer 1
170	**1.10.2**	**Implement documentation**	**20 days**	**$28,800.00**	
171	1.10.2.1	Write installation documentation	10 days	$8,400.00	Technical Writer 1[50%],Installation Specialist 1[10%]
172	1.10.2.2	Write ATM software documentation	10 days	$10,200.00	Technical Writer 1[50%],Consultant 2[10%]
173	1.10.2.3	Write central bank accounting system documentation updates	10 days	$10,200.00	Technical Writer 1[50%],Consultant 2[10%]

ID	WBS	Task Name	Duration	Cost	Resource Names
174	**1.10.3**	**Produce and distribute documentation**	**15 days**	**$4,650.00**	
175	1.10.3.1	Print installation documentation	1 day	$1,050.00	Printing Services[50%]
176	1.10.3.2	Print ATM software documentation	1 day	$1,050.00	Printing Services[50%]
177	1.10.3.3	Print central bank accounting system documentation	1 day	$1,050.00	Printing Services[50%]
178	1.10.3.4	Distribute installation documentation to installers	4 days	$500.00	Project Manager[6%]
179	1.10.3.5	Distribute ATM software documentation to ATM sites	4 days	$500.00	Project Manager[6%]
180	1.10.3.6	Distribute central bank accounting system documentation to end	4 days	$500.00	Project Manager[6%]
181	1.10.4	Documentation completed	0 days	$0.00	
182	**1.11**	**Training**	**128.75 days**	**$42,175.00**	
183	**1.11.1**	**Plan the training program**	**115.75 days**	**$21,000.00**	
184	1.11.1.1	Plan installation training content	5 days	$7,000.00	Training Specialist 1
185	1.11.1.2	Plan ATM site training content	5 days	$7,000.00	Training Specialist 1
186	1.11.1.3	Plan software maintenance training content	5 days	$7,000.00	Training Specialist 1
187	**1.11.2**	**Develop training materials**	**121.75 days**	**$15,750.00**	
188	1.11.2.1	Create installation training materials	5 days	$5,250.00	Training Specialist 1[75%]
189	1.11.2.2	Create ATM site training materials	5 days	$5,250.00	Training Specialist 1[75%]
190	1.11.2.3	Create software maintenance training materials	5 days	$5,250.00	Training Specialist 1[75%]
191	**1.11.3**	**Validate the training program**	**117.75 days**	**$2,625.00**	
192	1.11.3.1	Validate installation training content	1 day	$875.00	Training Specialist 1[63%]
193	1.11.3.2	Validate ATM site training content	1 day	$875.00	Training Specialist 1[63%]
194	1.11.3.3	Validate software maintenance training content	1 day	$875.00	Training Specialist 1[63%]
195	**1.11.4**	**Implement the training program**	**117.75 days**	**$2,800.00**	
196	1.11.4.1	Hold training session for ATM sites	1 day	$350.00	Training Specialist 1[25%]
197	1.11.4.2	Hold training session for software maintenance team	5 days	$1,750.00	Training Specialist 1[25%]
198	1.11.4.3	Hold training session for installers	1 day	$700.00	Training Specialist 1[50%]
199	1.11.5	Training completed	0 days	$0.00	
200	**1.12**	**Implementation**	**100.75 days**	**$240,233.33**	
201	1.12.1	Create test data	1 day	$1,400.00	Verification Engineer 2
202	**1.12.2**	**Create source code**	**93.75 days**	**$199,500.00**	
203	1.12.2.1	Code ATM software-to-hardware interfaces	21.88 days	$61,250.00	Programmer 1 (Lead),Programmer 2
204	1.12.2.2	Code ATM software interfaces	21.88 days	$61,250.00	Programmer 1 (Lead),Programmer 2
205	1.12.2.3	Code user interfaces	10 days	$28,000.00	Programmer 1 (Lead),Programmer 2
206	1.12.2.4	Code central bank interfaces	15 days	$42,000.00	Programmer 1 (Lead),Programmer 2
207	1.12.2.5	Code weekly statistical report generation routines	2.5 days	$7,000.00	Programmer 1 (Lead),Programmer 2
208	**1.12.3**	**Generate object code**	**51 days**	**$18,500.00**	

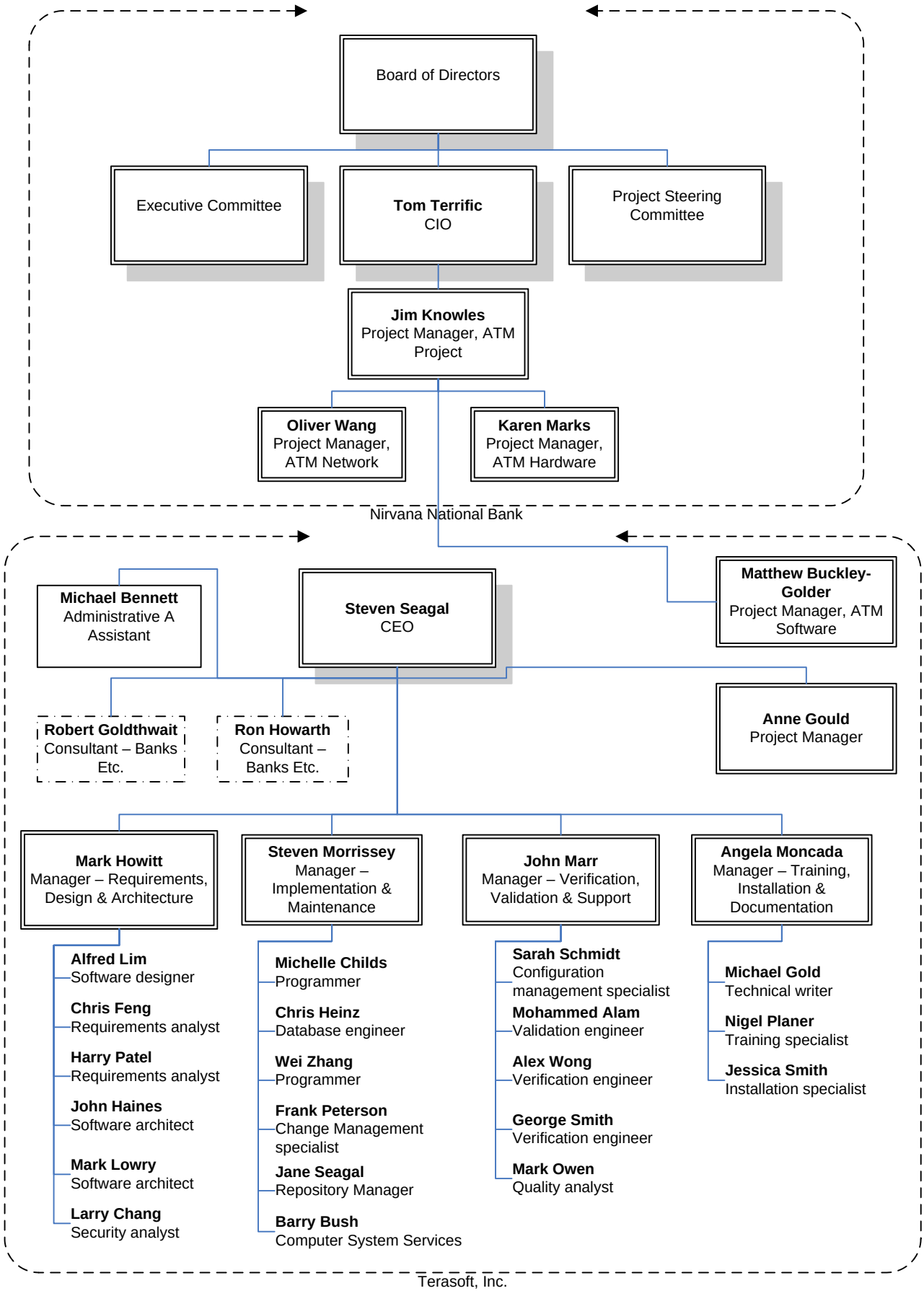
ID	WBS	Task Name	Duration	Cost	Resource Names
209	1.12.3.1	Generate ATM software-to-hardware interface object code	1 day	$3,700.00	Programmer 1 (Lead),Computer time for object code generation[4]
210	1.12.3.2	Generate ATM software interface object code	1 day	$3,700.00	Programmer 1 (Lead),Computer time for object code generation[4]
211	1.12.3.3	Generate ATM user interface object code	1 day	$3,700.00	Programmer 1 (Lead),Computer time for object code generation[4]
212	1.12.3.4	Generate central bank interface object code	1 day	$3,700.00	Programmer 1 (Lead),Computer time for object code generation[4]
213	1.12.3.5	Generate weekly statistical report generation object code	1 day	$3,700.00	Programmer 1 (Lead),Computer time for object code generation[4]
214	**1.12.4**	**Plan integration**	**51.5 days**	**$16,000.00**	
215	1.12.4.1	Plan integration of ATM software/hardware interface and softwa	2.5 days	$4,000.00	Programmer 1 (Lead)
216	1.12.4.2	Plan integration of ATM software with user interfaces	2.5 days	$4,000.00	Programmer 1 (Lead)
217	1.12.4.3	Plan integration of ATM software with central bank	2.5 days	$4,000.00	Programmer 1 (Lead)
218	1.12.4.4	Plan integration of weekly statistical report with central bank	2.5 days	$4,000.00	Programmer 1 (Lead)
219	**1.12.5**	**Perform integration**	**41.5 days**	**$4,833.33**	
220	1.12.5.1	Integrate ATM software/hardware interface with software interfa	5 days	$1,600.00	Programmer 1 (Lead)[20%]
221	1.12.5.2	Integrate ATM software with user interfaces	5 days	$1,600.00	Programmer 1 (Lead)[20%]
222	1.12.5.3	Integrate ATM software product with central bank	1 day	$933.33	Programmer 1 (Lead)[33%],Database Engineer 1[33%]
223	1.12.5.4	Integrate weekly statistical report with central bank	1 day	$700.00	Programmer 1 (Lead)[25%],Database Engineer 1[25%]
224	1.12.6	Implementation completed	0 days	$0.00	
225	**1.13**	**Installation**	**127.75 days**	**$16,902.38**	
226	**1.13.1**	**Plan installation**	**4.82 days**	**$9,160.71**	
227	1.13.1.1	Plan installation of ATM software product onto ATM machines	2.5 days	$3,500.00	Installation Specialist 1
228	1.13.1.2	Plan installation of modifications to central bank system	1.25 days	$3,250.00	Installation Specialist 1,Database Engineer 1
229	1.13.1.3	Plan installation of weekly statistical report	1.07 days	$2,410.71	Installation Specialist 1[75%],Database Engineer 1
230	**1.13.2**	**Distribute software**	**10.5 days**	**$1,050.00**	
231	1.13.2.1	Distribute ATM software product to ATM installation team	1 day	$350.00	Installation Specialist 1[25%]
232	1.13.2.2	Distribute central bank system modifications to central bank inst	1 day	$350.00	Installation Specialist 1[25%]
233	1.13.2.3	Distribute weekly statistical report to central bank installation tea	1 day	$350.00	Installation Specialist 1[25%]
234	**1.13.3**	**Install software**	**35 days**	**$4,141.67**	
235	1.13.3.1	Install ATM software product onto all ATM machines	3 days	$3,500.00	Installation Specialist 1[83%]
236	1.13.3.2	Install central bank system modifications	1 day	$325.00	Installation Specialist 1[13%],Database Engineer 1[13%]
237	1.13.3.3	Install weekly statistical report	1 day	$316.67	Installation Specialist 1[8%],Database Engineer 1[17%]
238	1.13.4	ATMs installed on-site by third party	30 days	$0.00	
239	**1.13.5**	**Accept software in operational environment**	**2.5 days**	**$2,550.00**	
240	1.13.5.1	Accept configured ATMs in banking locations	0.5 days	$850.00	Project Manager[50%],Installation Specialist 1[50%]
241	1.13.5.2	Accept modified central bank system	0.5 days	$850.00	Project Manager[50%],Installation Specialist 1[50%]
242	1.13.5.3	Accept weekly statistical report	0.5 days	$850.00	Project Manager[50%],Installation Specialist 1[50%]

ID	WBS	Task Name	Duration	Cost	Resource Names
243	1.13.6	Installation completed	0 days	$0.00	
244	**1.14**	**Operation & Support**	**2 days?**	**$0.00**	
245	1.14.1	Operate the system	1 day?	$0.00	
246	1.14.2	Provide technical assistance and consulting	1 day?	$0.00	
247	1.14.3	Maintain support request log	1 day?	$0.00	
248	**1.15**	**Maintenance**	**1 day?**	**$0.00**	
249	1.15.1	Reapply a software lifecycle	1 day?	$0.00	

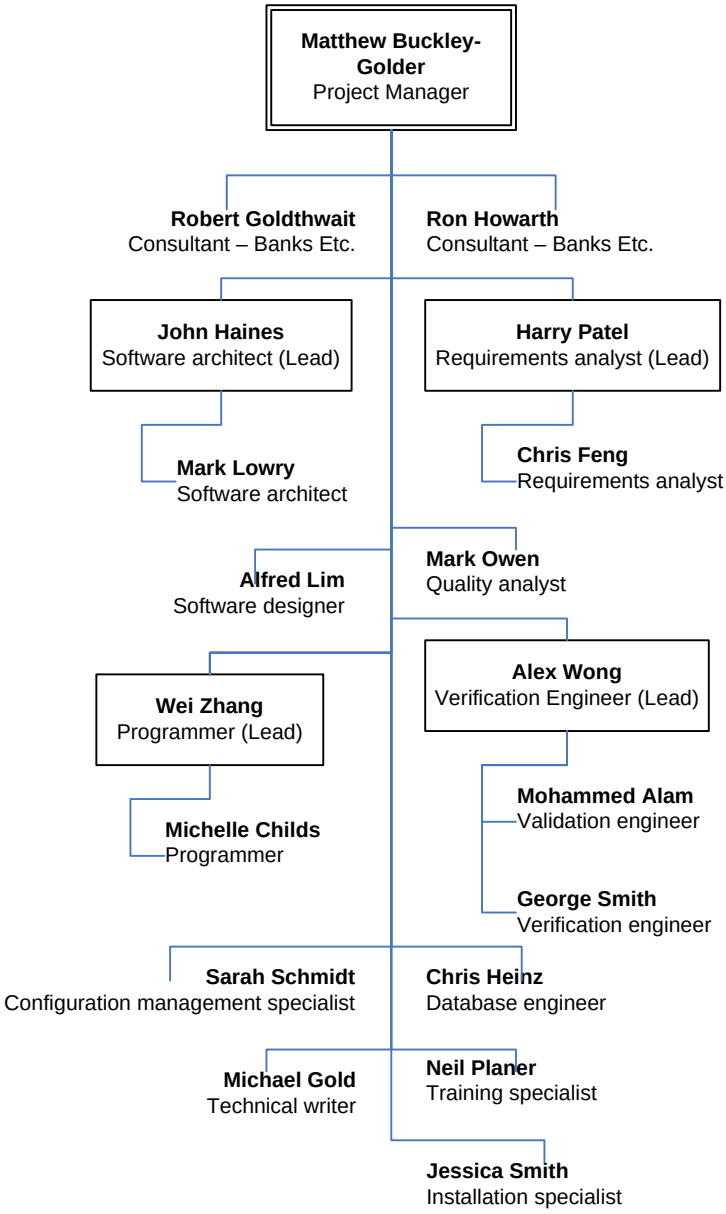
Appendix C

Organization Charts

External Organization Chart

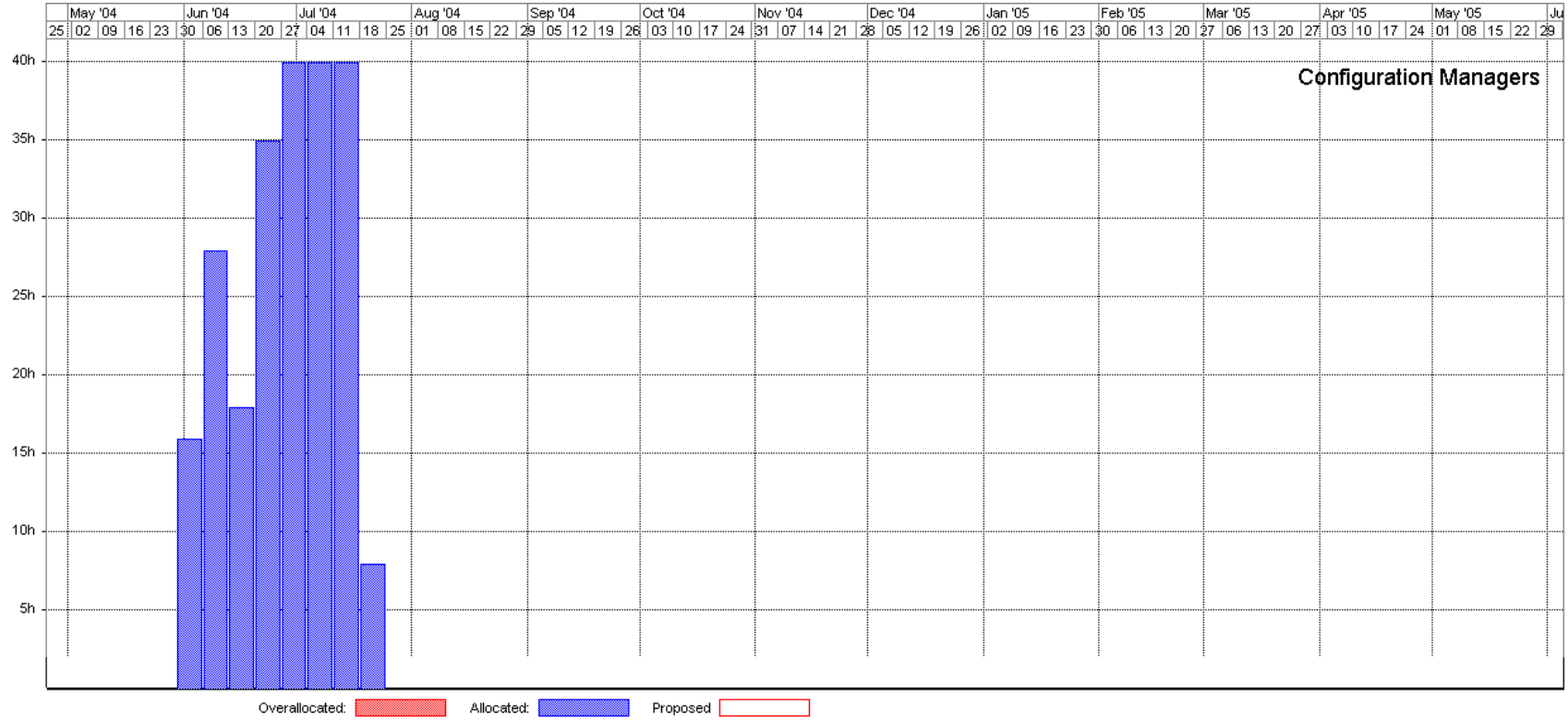


Internal Organization Chart



Appendix D

Resource Histograms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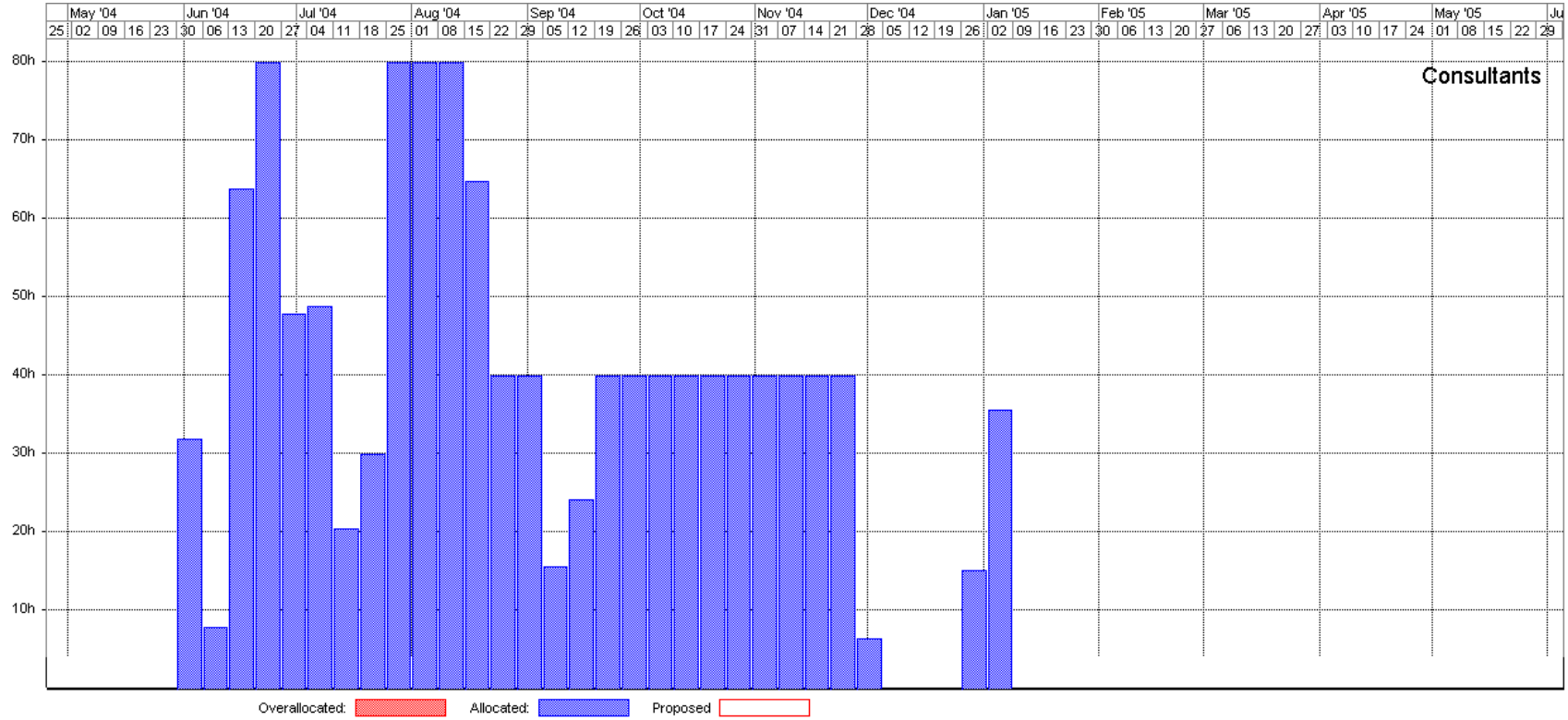
Configuration Managers
Overallocated:
Allocated:
Proposed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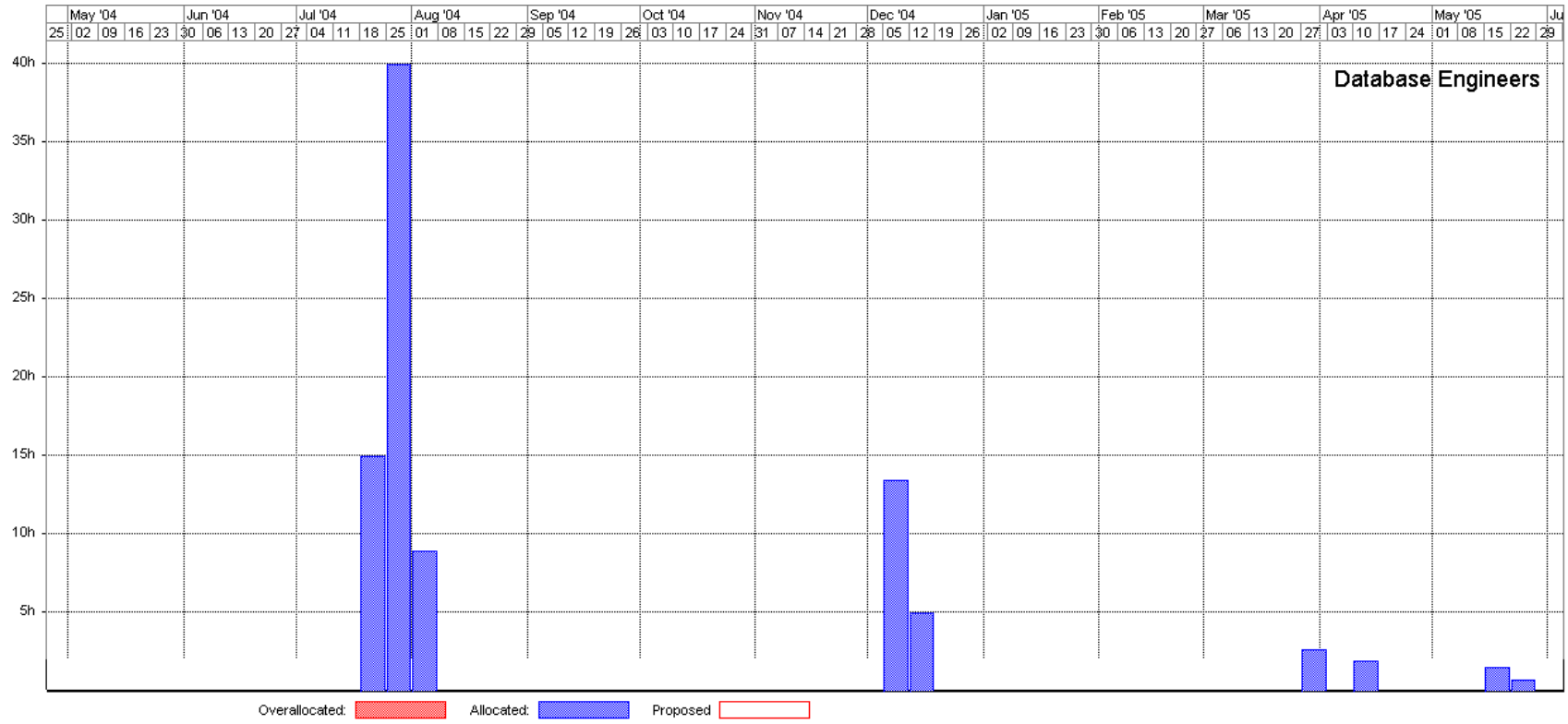
Consultants
Overallocated:
Allocated:
Proposed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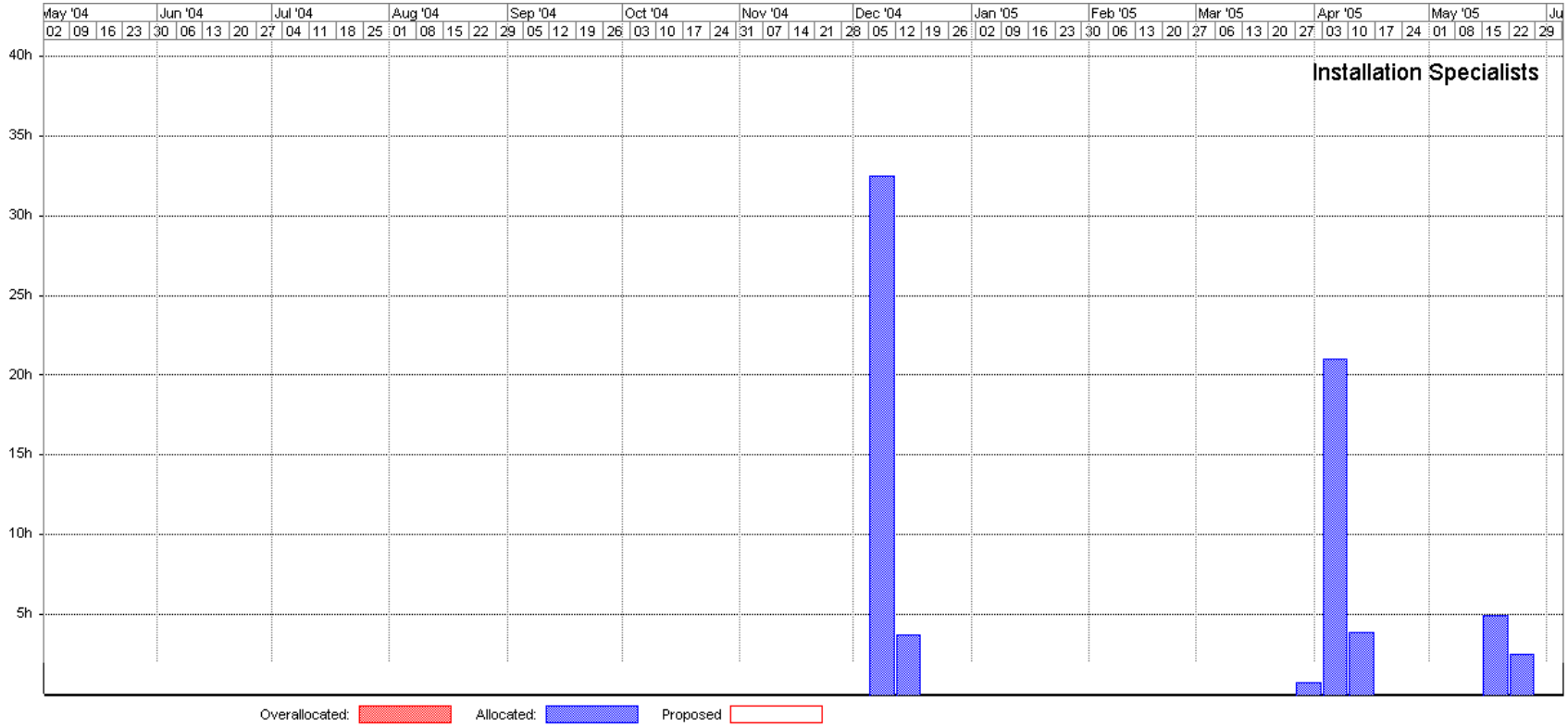
Database Engineers
Overallocated:
Allocated:
Proposed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Installation Specialists
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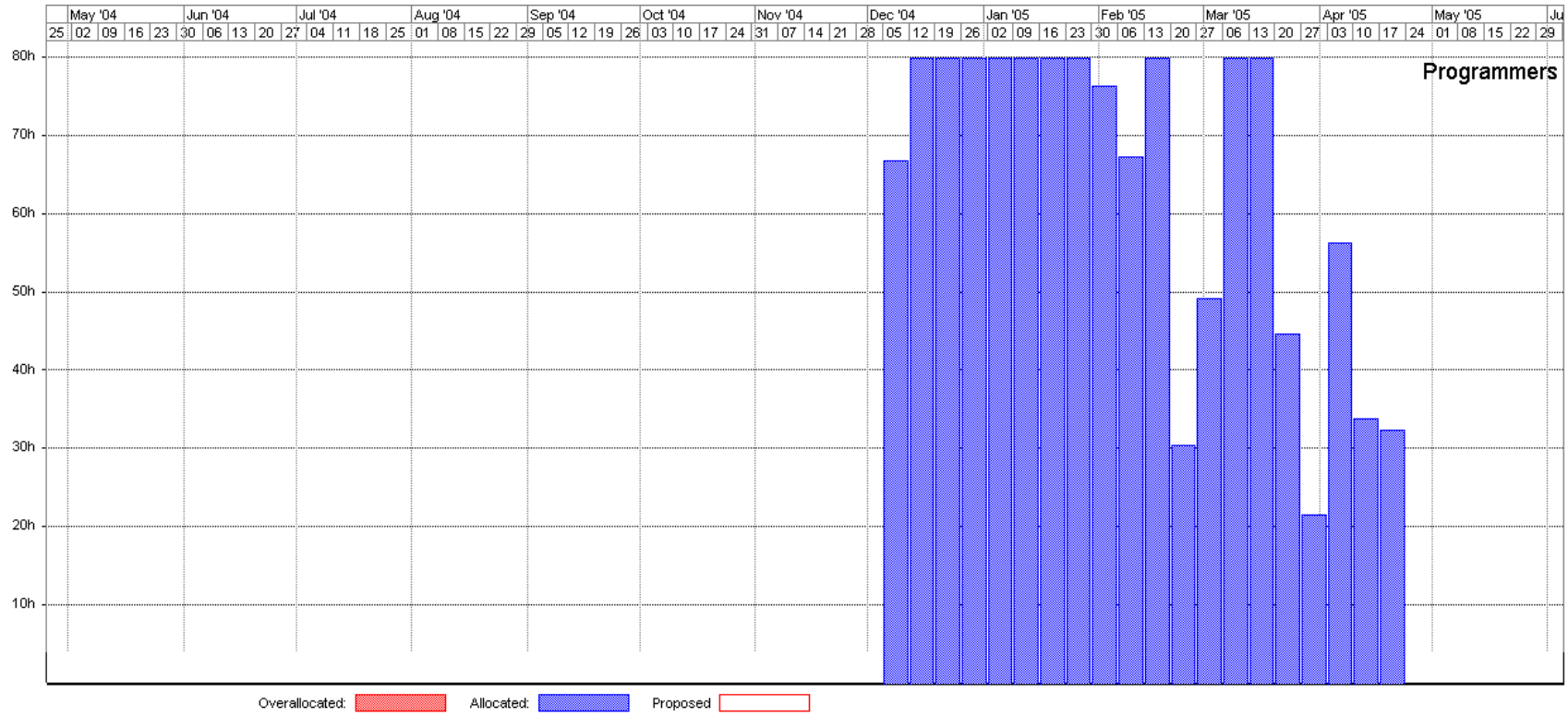
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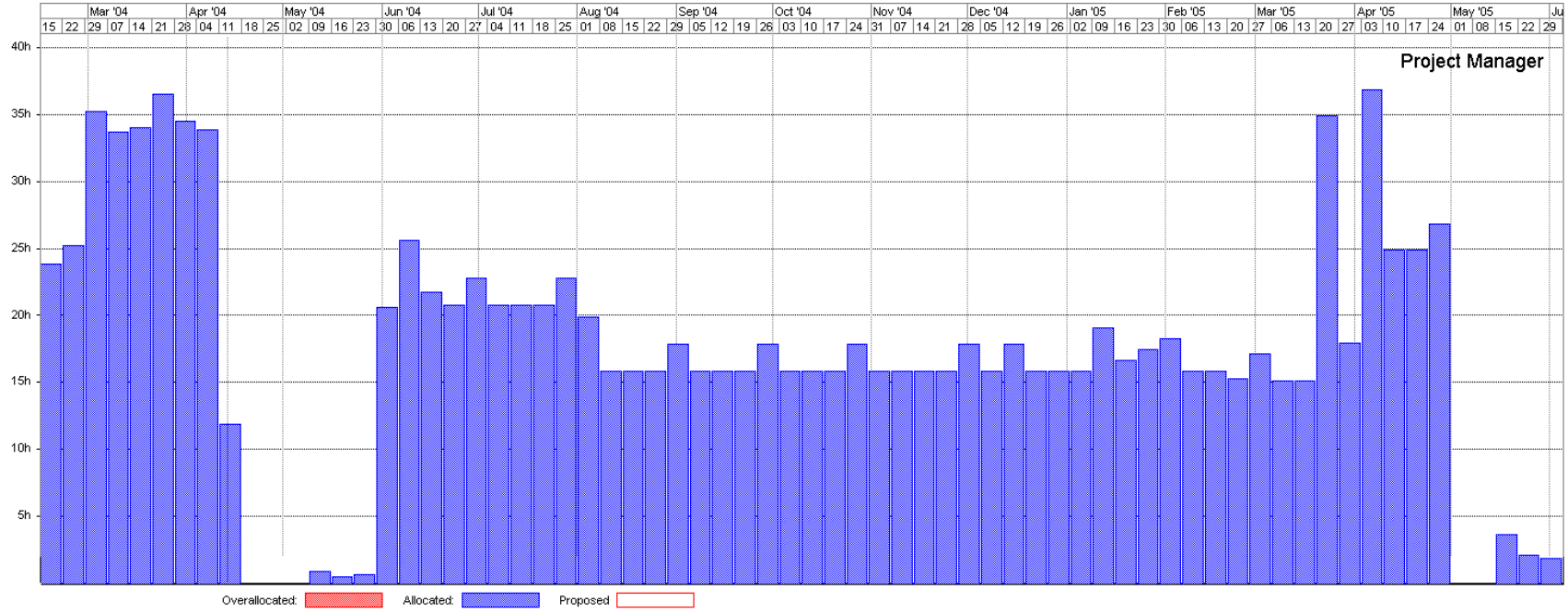
Programmers
Overallocated:
Allocated:
Proposed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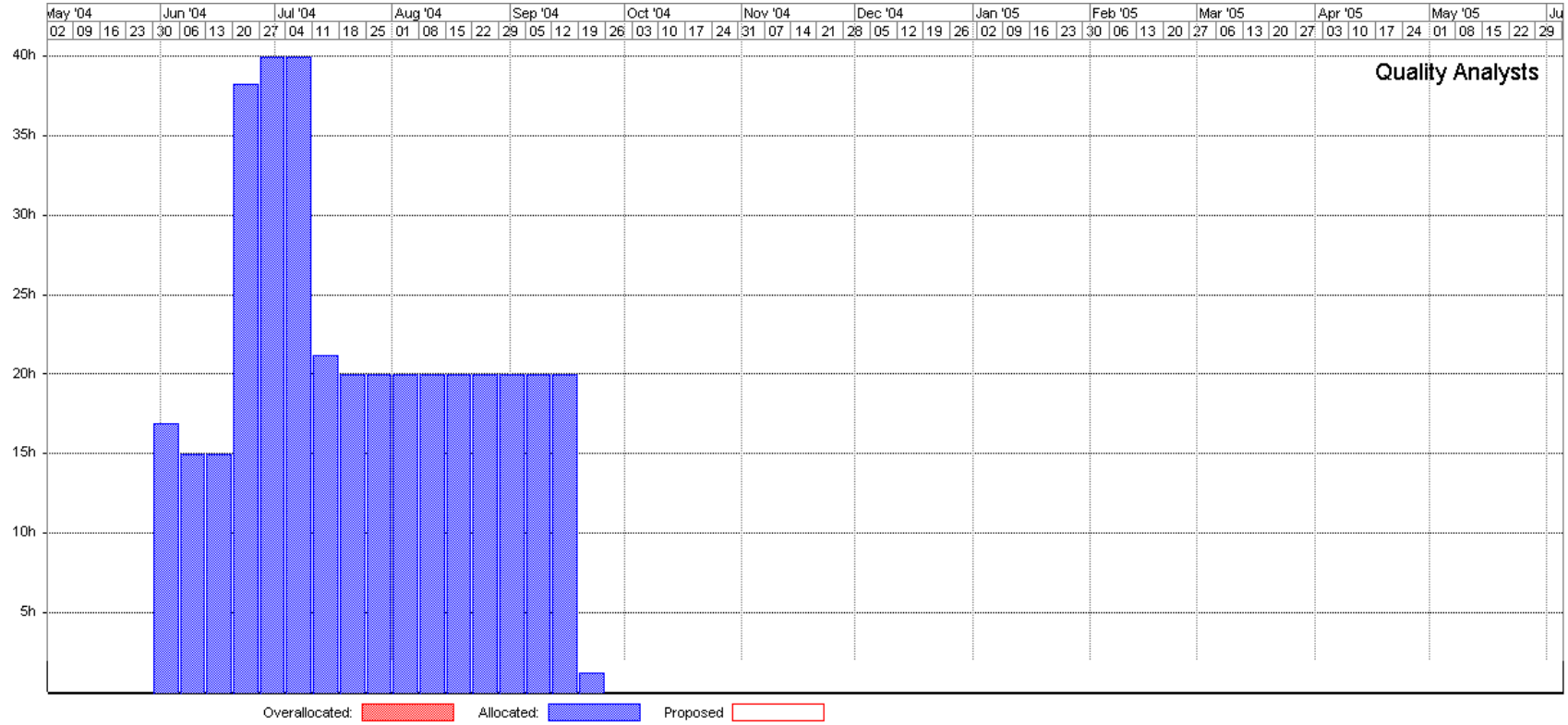
Allocated:
Proposed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Quality Analysts
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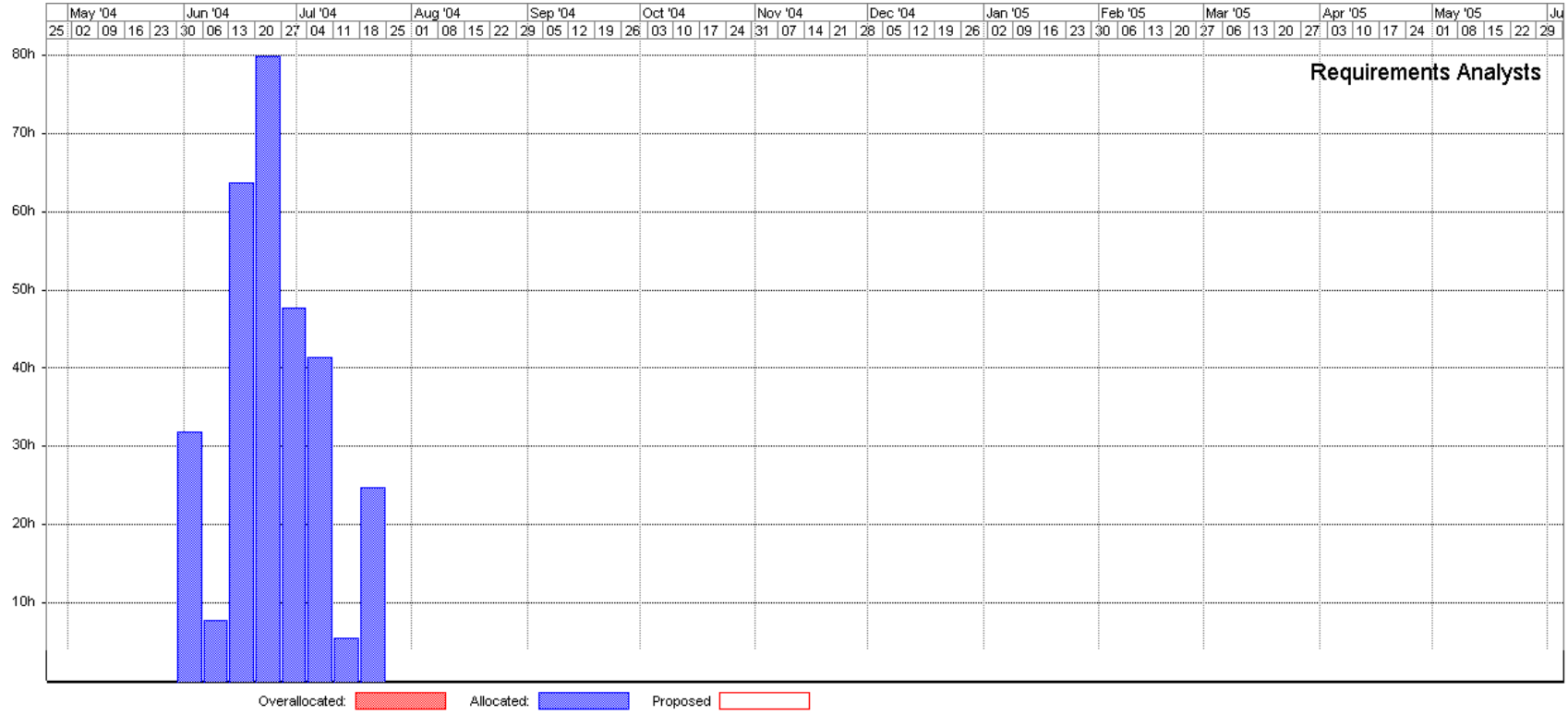
Allocated:
Proposed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Requirements Analysts
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Allocated:
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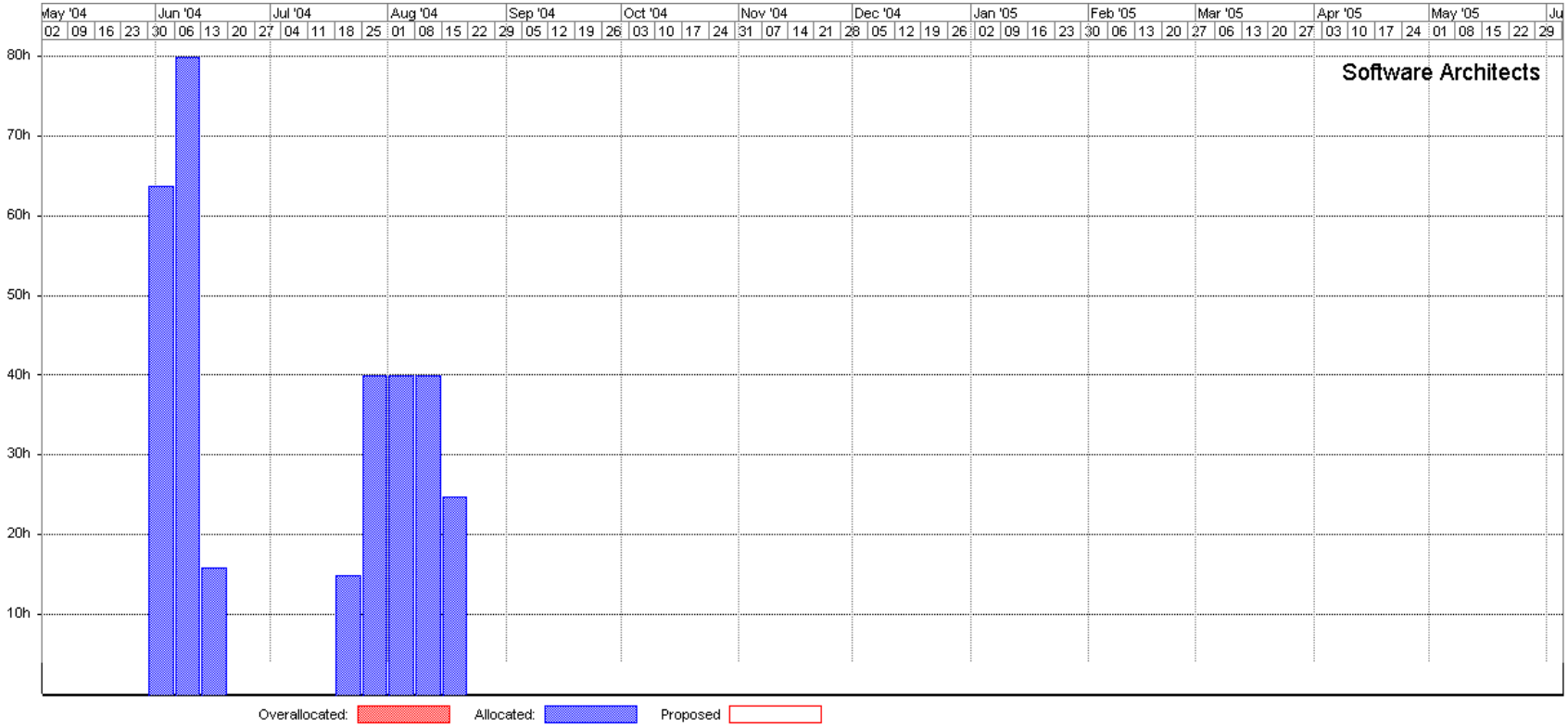
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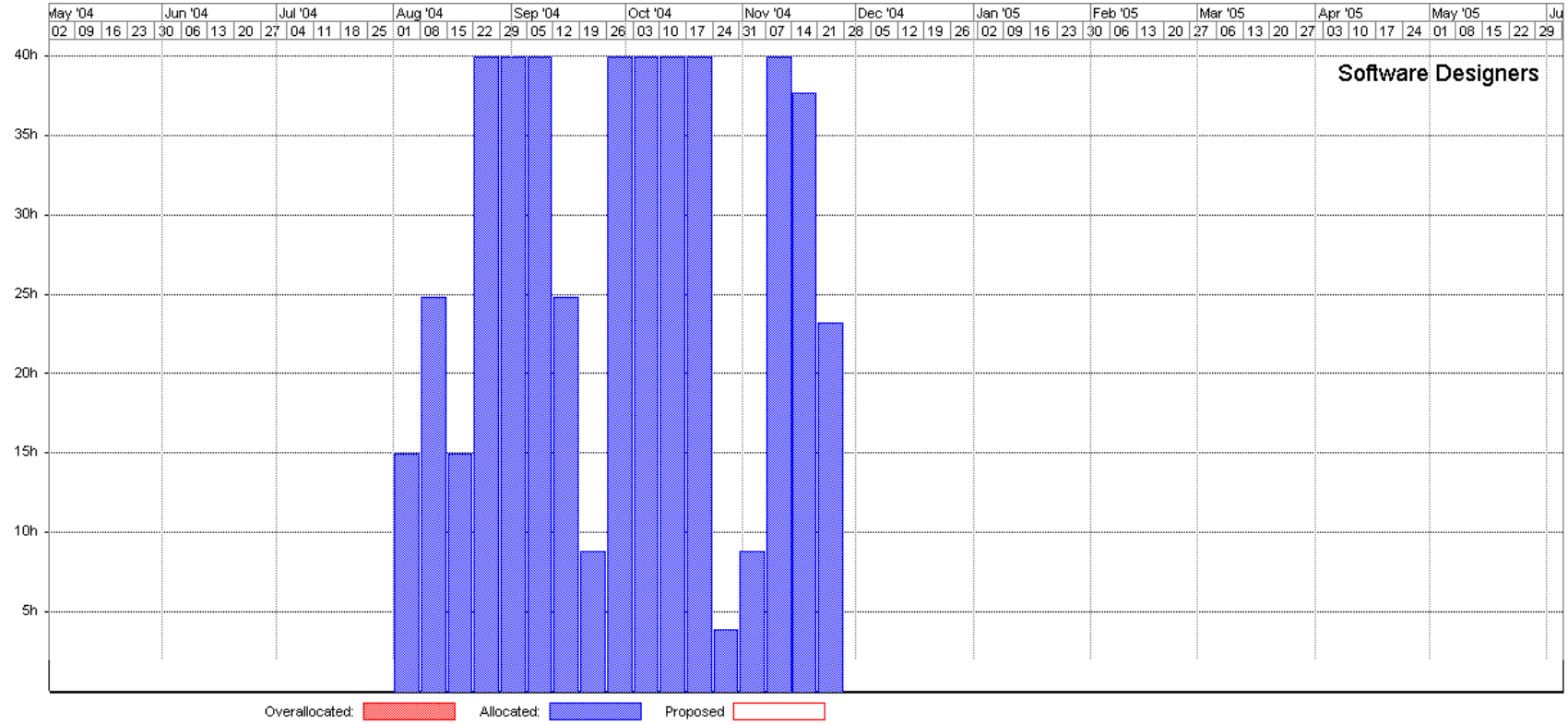
Allocated:
Proposed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Software Designers
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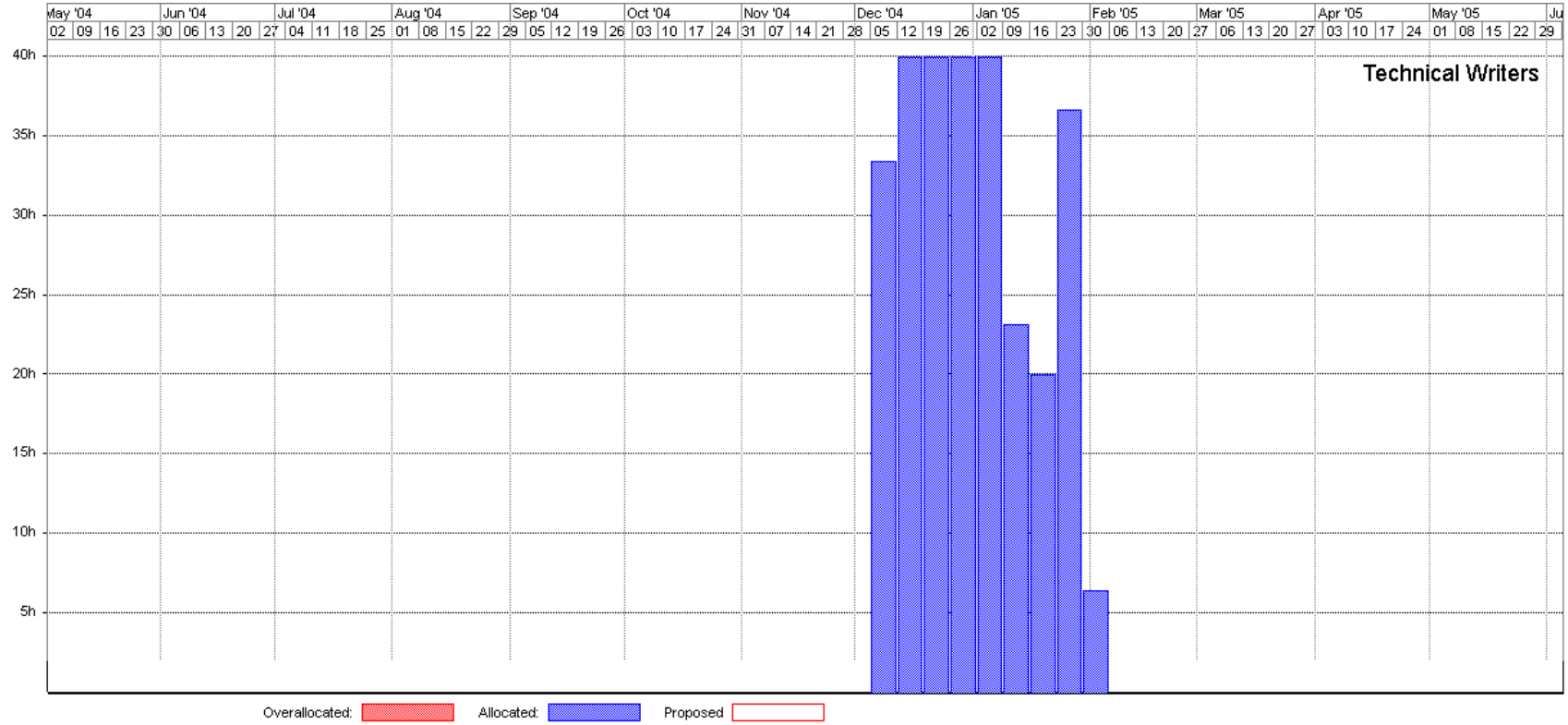
Allocated:
Proposed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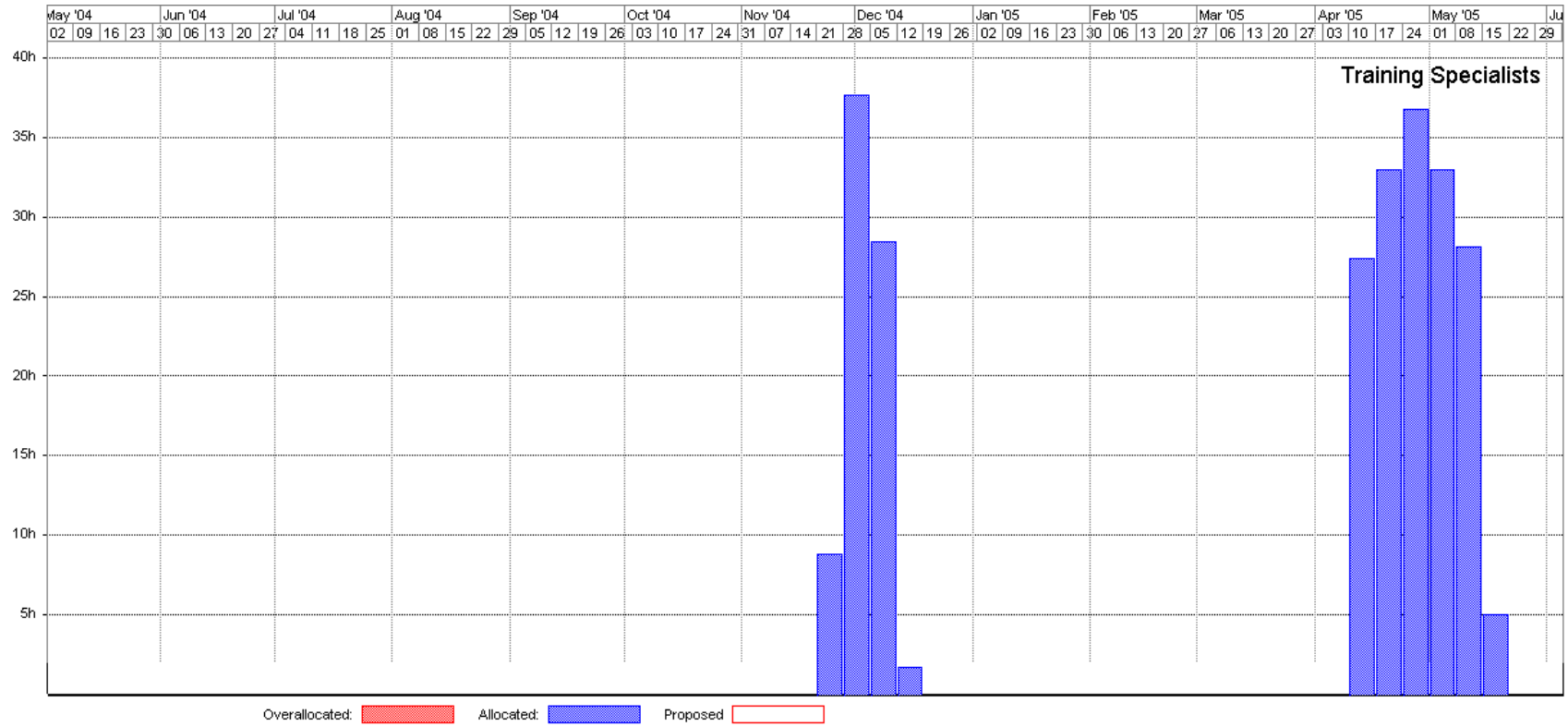
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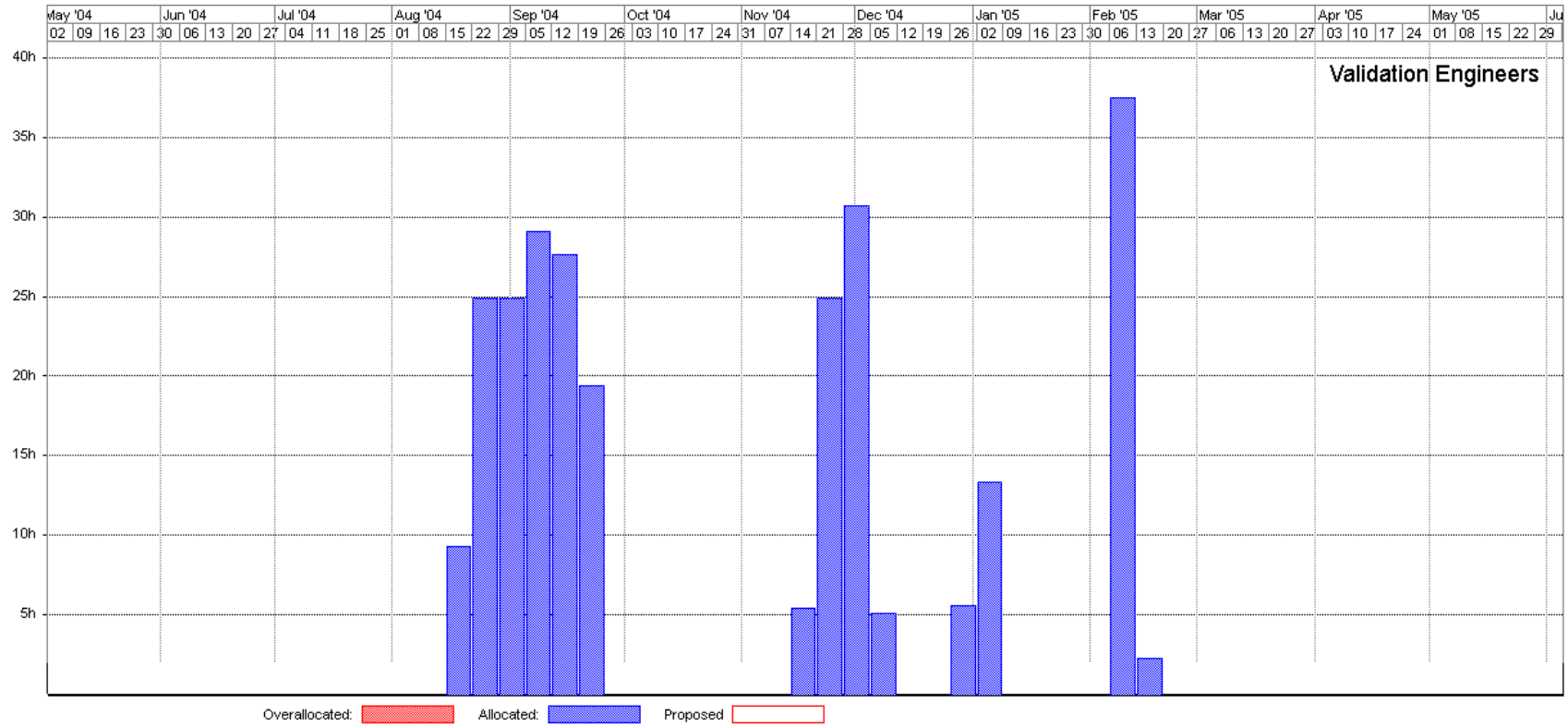
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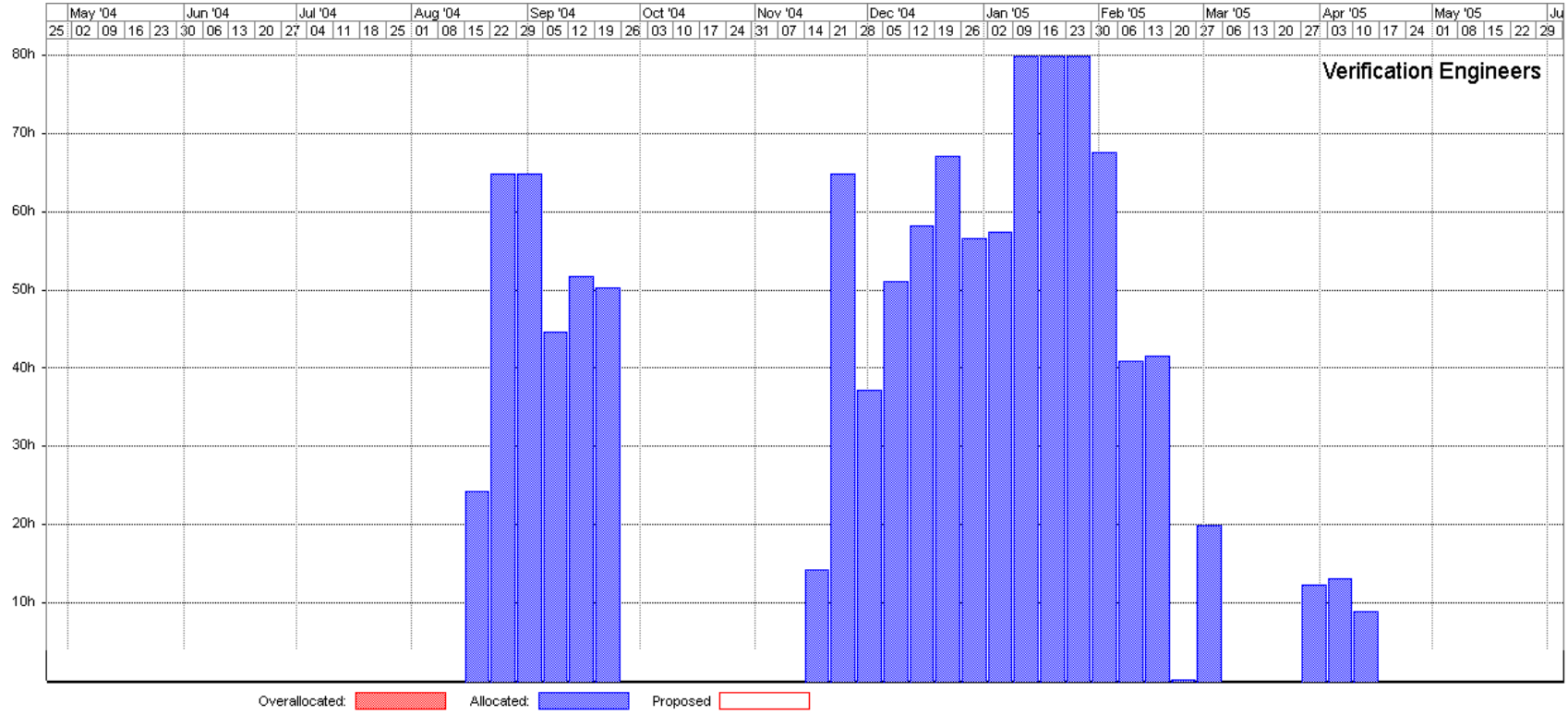
Validation Engineers
Overallocated:
Allocated:
Proposed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Verification Engineers
Overallocated:
Allocated:
Proposed

Appendix E

Work Activities

ID	WBS	Task Name	Resource Names	Duration	Predecessors	Successors
1	**1**	**Nirvana National Bank ATM project**		**358.48 days?**		
2	**1.1**	**Software Lifecycle Model Process**		**2 days**		
3	1.1.1	Identify candidate SLCMs	Project Manager[25%]	1 day		4
4	1.1.2	Select project model	Project Manager[25%]	1 day	3	6,21,24,25,26,27,28,29
5	**1.2**	**Project Initiation**		**74 days**		
6	1.2.1	Map activities to the SLCM	Project Manager[25%]	2 days	4	8,12,14,16,17,19
7	**1.2.2**	**Allocate project resources**		**29 days**		
8	1.2.2.1	Identify staffing requirements	Project Manager[50%]	2 days	6	9
9	1.2.2.2	Acquire commitment from required staff	Project Manager[20%]	5 days	8	10
10	1.2.2.3	Allocate identified activites to staff	Project Manager[25%]	5 days	19,9	40
11	**1.2.3**	**Establish project environment**		**32 days**		
12	1.2.3.1	Identify tool requirements	Project Manager[25%]	10 days	6	13
13	1.2.3.2	Acquire required tools	Project Manager[25%],Computer software purchase[30]	5 days	12	77,70,71,203,204,205,206,207
14	1.2.3.3	Identify communication needs	Project Manager[25%]	4 days	6	15
15	1.2.3.4	Create communication plan	Project Manager[50%]	4 days	14	40
16	1.2.3.5	Establish documentation repository	Project Manager[13%],Software repository[24]	1 day	6	40
17	1.2.3.6	Establish software engineering workspaces	Project Manager[13%],Software repository[24]	1 day	6	48
18	**1.2.4**	**Plan project management**		**74 days**		
19	1.2.4.1	Create baseline Work Breakdown Structure (WBS)	Project Manager[50%],Software Architect 1 (Lead)[25%],Programmer 1 (Lead)[25%],Verification Engineer 2[25%]	10 days	6	22,23,10,30
20	**1.2.4.2**	**Create SPMP subplans**		**29 days**		
21	1.2.4.2.1	Create start-up plan	Project Manager[42%],Requirements Analyst 2[25%],Programmer 1 (Lead)[25%],Software Architect 1 (Lead)[25%],Verification Engineer	3 days	4	30
22	1.2.4.2.2	Create work plan	Project Manager[42%]	3 days	19	30
23	1.2.4.2.3	Create control plan	Project Manager[42%]	3 days	19	30
24	1.2.4.2.4	Create risk management plan	Project Manager[42%]	3 days	4	30
25	1.2.4.2.5	Create closeout plan	Project Manager[42%]	3 days	4	30
26	1.2.4.2.6	Create technical process plans	Project Manager[42%]	3 days	4	30
27	1.2.4.2.7	Create subcontractor management plan	Project Manager[42%]	3 days	4	30
28	1.2.4.2.8	Create process improvement plan	Project Manager[42%]	3 days	4	30
29	1.2.4.2.9	Create problem resolution plan	Project Manager[42%]	3 days	4	30
30	1.2.4.3	Assemble baseline SPMP document	Project Manager	1 day	21,22,23,24,25,26,27,28,29,19	31
31	1.2.4.4	Baseline SPMP completed		0 days	30	32,63
32	1.2.4.5	Create schedule baseline	Project Manager[25%]	1 day	31	40
33	**1.2.4.6**	**Finalize project charter**		**64 days**		
34	1.2.4.6.1	Create project charter	Project Manager	5 days		35
35	1.2.4.6.2	Deliver project charter to NNB for signoff	Project Manager[13%]	1 day	34	36
36	1.2.4.6.3	Receive signed project charter from NNB		5 days	35	37
37	1.2.4.6.4	Baseline project charter completed		0 days	36	49
38	1.2.4.7	Receive ATM hardware documentation		0 days		94
39	**1.3**	**Project Monitoring & Control**		**320.48 days?**		
40	1.3.1	Project kickoff		0 days	16,15,10,32	41,47,66,73,80,51,44,45,46
41	1.3.2	Analyze risks	Project Manager	5 days?	40	42
42	1.3.3	Perform contingency planning	Project Manager	5 days?	41	64
43	**1.3.4**	**Manage the project**		**216 days?**		
44	1.3.4.1	Steering Committee meetings	Project Manager[13%]	48 days	40	64
45	1.3.4.2	Project team meetings	Project Manager[19%]	200 days?	40	64
46	1.3.4.3	Other project management tasks	Project Manager[19%]	200 days?	40	64
47	1.3.5	Retain records	Project Manager[63%]	16 days?	40	64
48	1.3.6	Implement problem reporting method	Project Manager[50%]	10 days	17	64
49	1.3.7	Maintain project charter	Project Manager[2%]	200 days	37	64
50	**1.3.8**	**SPMP Scheduled Updates**		**240 days**		

ID	WBS	Task Name	Resource Names	Duration	Predecessors	Successors
51	1.3.8.1	Month 1	Project Manager[25%]	1 day	40	52
52	1.3.8.2	Month 2	Project Manager[25%]	1 day	51	53
53	1.3.8.3	Month 3	Project Manager[25%]	1 day	52	54
54	1.3.8.4	Month 4	Project Manager[25%]	1 day	53	55
55	1.3.8.5	Month 5	Project Manager[25%]	1 day	54	56
56	1.3.8.6	Month 6	Project Manager[25%]	1 day	55	57
57	1.3.8.7	Month 7	Project Manager[25%]	1 day	56	58
58	1.3.8.8	Month 8	Project Manager[25%]	1 day	57	59
59	1.3.8.9	Month 9	Project Manager[25%]	1 day	58	60
60	1.3.8.10	Month 10	Project Manager[25%]	1 day	59	61
61	1.3.8.11	Month 11	Project Manager[25%]	1 day	60	62
62	1.3.8.12	Month 12	Project Manager[25%]	1 day	61	
63	1.3.9	All project deliverables have been delivered		0 days	31,68,75,102,123,131,181,199,224,243	64
64	1.3.10	Project closeout		0 days	63,44,45,46,47,48,49,42,70,71,77,78	
65	**1.4**	**Configuration Management**		**35 days?**		
66	1.4.1	Plan configuration management	Configuration Manager 1[50%]	5 days	40	67
67	1.4.2	Create Software Configuration Management Plan (SCMP)	Configuration Manager 1[75%]	5 days	66	68
68	1.4.3	SCMP completed		0 days	67	69,63
69	1.4.4	Develop configuration identification	Configuration Manager 1[38%]	5 days	68	70,71
70	1.4.5	Perform configuration control	Configuration Manager 1	10 days?	69,13	64
71	1.4.6	Perform status accounting	Configuration Manager 1	10 days?	69,13	64
72	**1.5**	**Software Quality Management**		**79.33 days?**		
73	1.5.1	Plan software quality management	Quality Analyst 1	1 day	40	74
74	1.5.2	Create Software Quality Assurance Plan (SQAP)	Quality Analyst 1[38%]	13.33 days	73	75
75	1.5.3	SQAP completed		0 days	74	76,77,63
76	1.5.4	Define metrics	Quality Analyst 1	10 days	75	78
77	1.5.5	Manage software quality	Quality Analyst 1[50%]	50 days?	75,13	64
78	1.5.6	Identify quality improvement needs	Quality Analyst 1	5 days?	76	64
79	**1.6**	**System Allocation**		**10 days**		
80	1.6.1	Analyze functions	Software Architect 1 (Lead),Software Architect 2	2.5 days	40	82,83
81	**1.6.2**	**Develop system architecture**		**5 days**		
82	1.6.2.1	Identify hardware functions	Software Architect 1 (Lead),Software Architect 2	2.5 days	80	84
83	1.6.2.2	Identify software functions	Software Architect 1 (Lead),Software Architect 2	2.5 days	80	84
84	1.6.3	Decompose system requirements	Software Architect 1 (Lead),Software Architect 2	2.5 days	82,83	85
85	1.6.4	System allocation completed		0 days	84	88,89
86	**1.7**	**Requirements**		**37.12 days**		
87	**1.7.1**	**Define and develop software requirements**		**5 days**		
88	1.7.1.1	Define and develop weekly statistical report requirements	Requirements Analyst 2,Consultant 1	2.5 days	85	91
89	1.7.1.2	Define and develop ATM session statement requirements	Requirements Analyst 1 (Lead),Consultant 2	2.5 days	85	90
90	1.7.1.3	Define and develop ATM software requirements	Requirements Analyst 2,Consultant 1	2.5 days	89	93,95
91	1.7.1.4	Define and develop central bank software requirements	Requirements Analyst 1 (Lead),Consultant 2	2.5 days	88	96
92	**1.7.2**	**Define interface requirements**		**25 days**		
93	1.7.2.1	Define ATM software interface requirements	Requirements Analyst 1 (Lead),Consultant 2	5 days	90	98
94	1.7.2.2	Define hardware interface requirements	Requirements Analyst 2,Consultant 1	5 days	38	99
95	1.7.2.3	Define user interface requirements	Requirements Analyst 1 (Lead),Consultant 2	5 days	90	98,99
96	1.7.2.4	Define central bank interface requirements	Requirements Analyst 2,Consultant 1	5 days	91	98
97	**1.7.3**	**Prioritize and integrate requirements**		**8.37 days**		
98	1.7.3.1	Prioritize and integrate software requirements	Requirements Analyst 1 (Lead),Consultant 1	2.04 days	93,95,96	100
99	1.7.3.2	Prioritize and integrate interface requirements	Requirements Analyst 2,Consultant 2	2.61 days	94,95	100
100	1.7.3.3	Prioritize and integrate all requirements	Requirements Analyst 1 (Lead),Consultant 1	3.38 days	98,99	101
101	1.7.4	Create Software Requirements Specification (SRS)	Requirements Analyst 2	3.75 days	100	102,113,114,115

ID	WBS	Task Name	Resource Names	Duration	Predecessors	Successors
102	1.7.5	SRS completed		0 days	101	105,106,108,109,110,126,127,128,129,63
103	**1.8**	**Design**		**112.48 days**		
104	**1.8.1**	**Perform architectural design**		**20 days**		
105	1.8.1.1	Design ATM-to-central bank communication architecture	Software Architect 1 (Lead),Consultant 1,Consultant 2	10 days	102	112,115
106	1.8.1.2	Design ATM software internal architecture	Software Architect 1 (Lead),Consultant 1,Consultant 2	10 days	102	112,113,114
107	**1.8.2**	**Design the database**		**8 days**		
108	1.8.2.1	Design card/PIN additions to central system database	Database Engineer 1	3 days	102	122
109	1.8.2.2	Design ATM transaction additions to central system database	Database Engineer 1	3 days	102	122
110	1.8.2.3	Design weekly statistical report	Database Engineer 1	2 days	102	122
111	**1.8.3**	**Design interfaces**		**25 days**		
112	1.8.3.1	Design ATM software interfaces	Software Designer 1	5 days	105,106	116
113	1.8.3.2	Design ATM software-to-hardware interfaces	Software Designer 1	5 days	101,106	116
114	1.8.3.3	Design user interfaces	Software Designer 1	5 days	101,106	116
115	1.8.3.4	Design central bank system interfaces	Software Designer 1	5 days	101,105	116
116	1.8.4	Select or develop algorithms	Software Designer 1	5 days	112,113,114,115	118,119,120,121
117	**1.8.5**	**Perform detailed design**		**40 days**		
118	1.8.5.1	Detail design ATM software interfaces	Software Designer 1,Consultant 1	10 days	116	122
119	1.8.5.2	Detail design ATM software-to-hardware interfaces	Software Designer 1,Consultant 1	10 days	116	122
120	1.8.5.3	Detail design user interfaces	Software Designer 1,Consultant 1	10 days	116	122
121	1.8.5.4	Detail design central bank system interfaces	Software Designer 1,Consultant 1	10 days	116	122
122	1.8.6	Create Software Design Specification (SDS)	Software Designer 1[75%]	5 days	118,119,120,121,108,109,110	123
123	1.8.7	SDS completed		0 days	122	137,138,139,140,185,63
124	**1.9**	**Verification & Validation**		**217.63 days?**		
125	**1.9.1**	**Plan verification and validation**		**113.84 days**		
126	1.9.1.1	Plan requirements verification and validation	Verification Engineer 2[63%],Validation Engineer 1[63%],Consultant 1,Verification Engineer 1 (Lead)	6.92 days	102	133,134,130
127	1.9.1.2	Plan architecture verification and validation	Verification Engineer 2[63%],Validation Engineer 1[63%],Consultant 1,Verification Engineer 1 (Lead)	6.92 days	102	135,136,130
128	1.9.1.3	Plan interface design verification and validation	Verification Engineer 2[63%],Validation Engineer 1[63%],Consultant 1,Verification Engineer 1 (Lead)	6.92 days	102	130
129	1.9.1.4	Plan database design verification and validation	Verification Engineer 2[63%],Validation Engineer 1[63%],Consultant 1,Verification Engineer 1 (Lead)	6.92 days	102	130
130	1.9.1.5	Create Software Verification & Validation Plan (SVVP)	Verification Engineer 2[38%],Validation Engineer 1[38%],Consultant 1,Verification Engineer 1 (Lead)	6.36 days	126,127,128,129	131
131	1.9.1.6	SVVP completed		0 days	130	142,63
132	**1.9.2**	**Execute verification and validation tasks**		**103.63 days**		
133	1.9.2.1	Verify requirements	Verification Engineer 2[40%]	5 days	126	141
134	1.9.2.2	Validate requirements	Validation Engineer 1[40%]	5 days	126	141
135	1.9.2.3	Verify architecture	Verification Engineer 2[40%]	5 days	127	141
136	1.9.2.4	Validate architecture	Validation Engineer 1[40%]	5 days	127	141
137	1.9.2.5	Verify interface design	Verification Engineer 2[40%]	5 days	123	141
138	1.9.2.6	Validate interface design	Validation Engineer 1[40%]	5 days	123	141
139	1.9.2.7	Verify database design	Verification Engineer 2[40%]	5 days	123	141
140	1.9.2.8	Validate database design	Validation Engineer 1[40%]	5 days	123	141
141	1.9.3	Requirements & Design V&V completed		0 days	133,134,135,136,137,138,139,140	146,144,145,147,148,166,167,168,201,203,204,205,206,207,215,216,217,218,227,228,229
142	1.9.4	Collect and analyze metric data	Verification Engineer 2,Validation Engineer 1	5 days?	131	
143	**1.9.5**	**Plan testing**		**65.09 days**		
144	1.9.5.1	Plan ATM software-to-hardware interface black box test	Verification Engineer 2[50%],Verification Engineer 1 (Lead)	3.33 days	141	149
145	1.9.5.2	Plan ATM software interface black box test	Verification Engineer 2[50%],Verification Engineer 1 (Lead)	3.33 days	141	149
146	1.9.5.3	Plan end user test	Verification Engineer 2[50%],Verification Engineer 1 (Lead)	1.67 days	141	149
147	1.9.5.4	Plan central bank interface black box test	Verification Engineer 2[50%],Verification Engineer 1 (Lead)	3.33 days	141	
148	1.9.5.5	Plan weekly statistical report test	Verification Engineer 2[38%],Verification Engineer 1 (Lead)	2.73 days	141	149

ID	WBS	Task Name	Resource Names	Duration	Predecessors	Successors
149	1.9.5.6	Create Software Test Plan (STP)	Verification Engineer 2,Verification Engineer 1 (Lead)	2.5 days	144,145,146,148	153,154,155,156,150
150	1.9.5.7	STP completed		0 days	149	152
151	**1.9.6**	**Develop test requirements**		**18.56 days**		
152	1.9.6.1	Design ATM software-to-hardware interface black box test	Verification Engineer 2,Verification Engineer 1 (Lead)	5 days	150	158
153	1.9.6.2	Design ATM software interface black box test	Verification Engineer 2,Verification Engineer 1 (Lead)	5 days	149	159
154	1.9.6.3	Design end user test	Verification Engineer 2,Verification Engineer 1 (Lead)	2.5 days	149	160
155	1.9.6.4	Design central bank interface black box test	Verification Engineer 2,Verification Engineer 1 (Lead)	5 days	149	161
156	1.9.6.5	Design weekly statistical report test	Verification Engineer 2[38%],Verification Engineer 1 (Lead)	2.73 days	149	162
157	**1.9.7**	**Execute the tests**		**50.75 days**		
158	1.9.7.1	Execute ATM software-to-hardware interface black box test	Verification Engineer 2,Verification Engineer 1 (Lead)	2.38 days	152,209	163,220
159	1.9.7.2	Execute ATM software interface black box test	Verification Engineer 2,Verification Engineer 1 (Lead)	2.38 days	153,210	163,220
160	1.9.7.3	Execute end user test	Verification Engineer 2,Verification Engineer 1 (Lead)	2.38 days	154,211	163,221
161	1.9.7.4	Execute central bank interface black box test	Verification Engineer 2,Verification Engineer 1 (Lead)	2.38 days	155,212	222
162	1.9.7.5	Execute weekly statistical report test	Verification Engineer 2[19%],Verification Engineer 1 (Lead)[19%]	5 days	156,213	163,223
163	1.9.8	V&V completed		0 days	158,159,160,162	
164	**1.10**	**Documentation development**		**40 days**		
165	**1.10.1**	**Plan documentation**		**40 days**		
166	1.10.1.1	Define installation documentation contents	Technical Writer 1	5 days	141	171,169
167	1.10.1.2	Define ATM software documentation contents	Technical Writer 1	5 days	141	172,169
168	1.10.1.3	Define central bank accounting system documentation updates	Technical Writer 1	5 days	141	173,169
169	1.10.1.4	Create documentation plan	Technical Writer 1	5 days	166,167,168	
170	**1.10.2**	**Implement documentation**		**20 days**		
171	1.10.2.1	Write installation documentation	Technical Writer 1[50%]	10 days	166	175
172	1.10.2.2	Write ATM software documentation	Technical Writer 1[50%]	10 days	167	176
173	1.10.2.3	Write central bank accounting system documentation updates	Technical Writer 1[50%]	10 days	168	177
174	**1.10.3**	**Produce and distribute documentation**		**15 days**		
175	1.10.3.1	Print installation documentation	Printing Services[50%]	1 day	171	178,181
176	1.10.3.2	Print ATM software documentation	Printing Services[50%]	1 day	172	179,181
177	1.10.3.3	Print central bank accounting system documentation	Printing Services[50%]	1 day	173	180,181
178	1.10.3.4	Distribute installation documentation to installers	Project Manager[6%]	4 days	175	181
179	1.10.3.5	Distribute ATM software documentation to ATM sites	Project Manager[6%]	4 days	176	181
180	1.10.3.6	Distribute central bank accounting system documentation to end users	Project Manager[6%]	4 days	177	181
181	1.10.4	Documentation completed		0 days	175,176,177,178,179,180	63
182	**1.11**	**Training**		**129.15 days**		
183	**1.11.1**	**Plan the training program**		**116.15 days**		
184	1.11.1.1	Plan installation training content	Training Specialist 1	5 days	219	188
185	1.11.1.2	Plan ATM site training content	Training Specialist 1	5 days	123	189
186	1.11.1.3	Plan software maintenance training content	Training Specialist 1	5 days	200	190
187	**1.11.2**	**Develop training materials**		**122.15 days**		
188	1.11.2.1	Create installation training materials	Training Specialist 1[75%]	5 days	184	192
189	1.11.2.2	Create ATM site training materials	Training Specialist 1[75%]	5 days	185	193
190	1.11.2.3	Create software maintenance training materials	Training Specialist 1[75%]	5 days	186	194
191	**1.11.3**	**Validate the training program**		**118.15 days**		
192	1.11.3.1	Validate installation training content	Training Specialist 1[63%]	1 day	188	198
193	1.11.3.2	Validate ATM site training content	Training Specialist 1[63%]	1 day	189	196
194	1.11.3.3	Validate software maintenance training content	Training Specialist 1[63%]	1 day	190	197
195	**1.11.4**	**Implement the training program**		**118.15 days**		
196	1.11.4.1	Hold training session for ATM sites	Training Specialist 1[25%]	1 day	193	199
197	1.11.4.2	Hold training session for software maintenance team	Training Specialist 1[25%]	5 days	194	199
198	1.11.4.3	Hold training session for installers	Training Specialist 1[50%]	1 day	192	199
199	1.11.5	Training completed		0 days	196,197,198	245,63

ID	WBS	Task Name	Resource Names	Duration	Predecessors	Successors
200	**1.12**	**Implementation**		**101.15 days**		**186**
201	1.12.1	Create test data	Verification Engineer 2	1 day	141	
202	**1.12.2**	**Create source code**		**93.9 days**		
203	1.12.2.1	Code ATM software-to-hardware interfaces	Programmer 1 (Lead),Programmer 2	21.88 days	141,13	209
204	1.12.2.2	Code ATM software interfaces	Programmer 1 (Lead),Programmer 2	21.88 days	141,13	210
205	1.12.2.3	Code user interfaces	Programmer 1 (Lead),Programmer 2	10 days	141,13	211
206	1.12.2.4	Code central bank interfaces	Programmer 1 (Lead),Programmer 2	15 days	141,13	212
207	1.12.2.5	Code weekly statistical report generation routines	Programmer 1 (Lead),Programmer 2	2.5 days	141,13	213
208	**1.12.3**	**Generate object code**		**50.5 days**		
209	1.12.3.1	Generate ATM software-to-hardware interface object code	Programmer 1 (Lead),Computer time for object code generation[4]	1 day	203	158
210	1.12.3.2	Generate ATM software interface object code	Programmer 1 (Lead),Computer time for object code generation[4]	1 day	204	159
211	1.12.3.3	Generate ATM user interface object code	Programmer 1 (Lead),Computer time for object code generation[4]	1 day	205	160
212	1.12.3.4	Generate central bank interface object code	Programmer 1 (Lead),Computer time for object code generation[4]	1 day	206	161
213	1.12.3.5	Generate weekly statistical report generation object code	Programmer 1 (Lead),Computer time for object code generation[4]	1 day	207	162
214	**1.12.4**	**Plan integration**		**51.5 days**		
215	1.12.4.1	Plan integration of ATM software/hardware interface and software interfaces	Programmer 1 (Lead)	2.5 days	141	220
216	1.12.4.2	Plan integration of ATM software with user interfaces	Programmer 1 (Lead)	2.5 days	141	221
217	1.12.4.3	Plan integration of ATM software with central bank	Programmer 1 (Lead)	2.5 days	141	222
218	1.12.4.4	Plan integration of weekly statistical report with central bank	Programmer 1 (Lead)	2.5 days	141	223
219	**1.12.5**	**Perform integration**		**42.25 days**		**184**
220	1.12.5.1	Integrate ATM software/hardware interface with software interfaces	Programmer 1 (Lead)[20%]	5 days	158,159,215	221,224,231
221	1.12.5.2	Integrate ATM software with user interfaces	Programmer 1 (Lead)[20%]	5 days	220,160,216	222,224,231
222	1.12.5.3	Integrate ATM software product with central bank	Programmer 1 (Lead)[33%],Database Engineer 1[33%]	1 day	221,217,161	224,231,232
223	1.12.5.4	Integrate weekly statistical report with central bank	Programmer 1 (Lead)[25%],Database Engineer 1[25%]	1 day	218,162	224,232,233
224	1.12.6	Implementation completed		0 days	220,221,222,223	63
225	**1.13**	**Installation**		**127.88 days**		
226	**1.13.1**	**Plan installation**		**5.47 days**		
227	1.13.1.1	Plan installation of ATM software product onto ATM machines	Installation Specialist 1	2.5 days	141	231
228	1.13.1.2	Plan installation of modifications to central bank system	Installation Specialist 1,Database Engineer 1	1.25 days	141	232
229	1.13.1.3	Plan installation of weekly statistical report	Installation Specialist 1[75%],Database Engineer 1	1.07 days	141	233
230	**1.13.2**	**Distribute software**		**10.77 days**		
231	1.13.2.1	Distribute ATM software product to ATM installation team	Installation Specialist 1[25%]	1 day	220,221,222,227	235
232	1.13.2.2	Distribute central bank system modifications to central bank installation team	Installation Specialist 1[25%]	1 day	222,223,228	236
233	1.13.2.3	Distribute weekly statistical report to central bank installation team	Installation Specialist 1[25%]	1 day	223,229	237
234	**1.13.3**	**Install software**		**35 days**		
235	1.13.3.1	Install ATM software product onto all ATM machines	Installation Specialist 1[83%]	3 days	231	238
236	1.13.3.2	Install central bank system modifications	Installation Specialist 1[13%],Database Engineer 1[13%]	1 day	238,232	237,241
237	1.13.3.3	Install weekly statistical report	Installation Specialist 1[8%],Database Engineer 1[17%]	1 day	233,236	242
238	1.13.4	ATMs installed on-site by third party		30 days	235	236,240
239	**1.13.5**	**Accept software in operational environment**		**2.5 days**		
240	1.13.5.1	Accept configured ATMs in banking locations	Project Manager[50%],Installation Specialist 1[50%]	0.5 days	238	243
241	1.13.5.2	Accept modified central bank system	Project Manager[50%],Installation Specialist 1[50%]	0.5 days	236	243
242	1.13.5.3	Accept weekly statistical report	Project Manager[50%],Installation Specialist 1[50%]	0.5 days	237	243
243	1.13.6	Installation completed		0 days	240,241,242	245,63
244	**1.14**	**Operation & Support**		**2 days?**		
245	1.14.1	Operate the system		1 day?	199,243	246,247,249
246	1.14.2	Provide technical assistance and consulting		1 day?	245	
247	1.14.3	Maintain support request log		1 day?	245	
248	**1.15**	**Maintenance**		**1 day?**		
249	1.15.1	Reapply a software lifecycle		1 day?	245	

Appendix F

Network Diagram

Identify candidate SLCMs
WBS: 1.1.1
Duration: 1 day | Start: Wed 25/02/04 | Finish: Wed 25/02/04
Res: Project Manager[25%]

Select project model
WBS: 1.1.2
Duration: 1 day | Start: Thu 26/02/04 | Finish: Thu 26/02/04
Res: Project Manager[25%]

Map activities to the SLCM
WBS: 1.2.1
Duration: 2 days | Start: Fri 27/02/04 | Finish: Mon 01/03/04
Res: Project Manager[25%]

Identify staffing requirements
WBS: 1.2.2.1
Duration: 2 days | Start: Tue 02/03/04 | Finish: Wed 03/03/04
Res: Project Manager[50%]

Acquire commitment from req
WBS: 1.2.2.2
Duration: 5 days | Start: Thu 04/03/04 | Finish: Wed 10/03/04
Res: Project Manager[50%]

Allocate identified activities to
WBS: 1.2.2.3
Duration: 5 days | Start: Mon 05/04/04 | Finish: Fri 09/04/04
Res: Project Manager[25%]

Identify tool requirements
WBS: 1.2.3.1
Duration: 10 days | Start: Tue 09/03/04 | Finish: Mon 22/03/04
Res: Project Manager[25%]

Acquire required tools
WBS: 1.2.3.2
Duration: 5 days | Start: Mon 05/04/04 | Finish: Fri 09/04/04
Res: Project Manager[25%], Computer r

Identify communication needs
WBS: 1.2.3.3
Duration: 4 days | Start: Wed 03/03/04 | Finish: Mon 08/03/04
Res: Project Manager[25%]

Create communication plan
WBS: 1.2.3.4
Duration: 4 days | Start: Mon 12/04/04 | Finish: Thu 15/04/04
Res: Project Manager[50%]

Establish documentation repo
WBS: 1.2.3.5
Duration: 1 day | Start: Thu 04/03/04 | Finish: Thu 04/03/04
Res: Project Manager[13%], Software e

Project kickoff
WBS: 1.3.1
Duration: 9 days | Start: Tue 01/06/04 | Finish: Tue 01/06/04
Res:

Analyze risks
WBS: 1.3.2
Duration: 5 days? | Start: Fri 01/04/05 | Finish: Thu 07/04/05
Res: Project Manager

Perform contingency planning
WBS: 1.3.3
Duration: 5 days? | Start: Fri 08/04/05 | Finish: Thu 14/04/05
Res: Project Manager

Retain records
WBS: 1.3.5
Duration: 16 days? | Start: Tue 01/06/04 | Finish: Tue 22/06/04
Res: Project Manager[63%]

Plan configuration manageme
WBS: 1.4.1
Duration: 5 days | Start: Tue 01/06/04 | Finish: Mon 07/06/04
Res: Configuration Manager 1[50%]

Create Software Configuratior
WBS: 1.4.2
Duration: 5 days | Start: Tue 08/06/04 | Finish: Mon 14/06/04
Res: Configuration Manager 1[75%]

SCMP completed
WBS: 1.4.3
Duration: 0 days | Start: Mon 14/06/04 | Finish: Mon 14/06/04
Res:

Develop configuration identifi
WBS: 1.4.4
Duration: 5 days | Start: Tue 15/06/04 | Finish: Mon 21/06/04
Res: Configuration Manager 1[38%]

Perform configuration control
WBS: 1.4.5
Duration: 10 days? | Start: Tue 22/06/04 | Finish: Mon 05/07/04
Res: Configuration Manager 1

Perform status accounting
WBS: 1.4.6
Duration: 10 days? | Start: Tue 06/07/04 | Finish: Mon 19/07/04
Res: Configuration Manager 1

Plan software quality manage
WBS: 1.5.1
Duration: 1 day | Start: Tue 01/06/04 | Finish: Tue 01/06/04
Res: Quality Analyst 1

Create Software Quality Assur
WBS: 1.5.2
Duration: 13.33 days | Start: Wed 02/06/04 | Finish: Mon 21/06/04
Res: Quality Analyst 1[38%]

SQAP completed
WBS: 1.5.3
Duration: 0 days | Start: Mon 21/06/04 | Finish: Mon 21/06/04
Res:

Define metrics
WBS: 1.5.4
Duration: 10 days | Start: Mon 21/06/04 | Finish: Mon 05/07/04
Res: Quality Analyst 1

Identify quality improvement n
WBS: 1.5.6
Duration: 5 days? | Start: Mon 13/09/04 | Finish: Mon 20/09/04
Res: Quality Analyst 1

Manage software quality
WBS: 1.5.5
Duration: 50 days? | Start: Mon 05/07/04 | Finish: Mon 13/09/04
Res: Quality Analyst 1[50%]

Analyze functions
WBS: 1.6.1
Duration: 2.5 days | Start: Tue 01/06/04 | Finish: Thu 03/06/04
Res: Software Architect 1 (Lead), Softw

Identify hardware functions
WBS: 1.6.2.1
Duration: 2.5 days | Start: Thu 03/06/04 | Finish: Mon 07/06/04
Res: Software Architect 1 (Lead), Softw

Identify software functions
WBS: 1.6.2.2
Duration: 2.5 days | Start: Tue 08/06/04 | Finish: Thu 10/06/04
Res: Software Architect 1 (Lead), Softw

Decompose system requirem
WBS: 1.6.3
Duration: 2.5 days | Start: Thu 10/06/04 | Finish: Mon 14/06/04
Res: Software Architect 1 (Lead), Softw

System allocation completed
WBS: 1.6.4
Duration: 0 days | Start: Mon 14/06/04 | Finish: Mon 14/06/04
Res:

Define and develop weekly sta
WBS: 1.7.1.1
Duration: 2.5 days | Start: Tue 15/06/04 | Finish: Thu 17/06/04
Res: Requirements Analyst 2, Consultan

Define and develop ATM sessi
WBS: 1.7.1.2
Duration: 2.5 days | Start: Tue 15/06/04 | Finish: Thu 17/06/04
Res: Requirements Analyst 1 (Lead), Co

Define and develop central ba
WBS: 1.7.1.4
Duration: 2.5 days | Start: Thu 17/06/04 | Finish: Mon 21/06/04
Res: Requirements Analyst 1 (Lead), Co

Define and develop ATM softw
WBS: 1.7.1.5
Duration: 2.5 days | Start: Thu 17/06/04 | Finish: Mon 21/06/04
Res: Requirements Analyst 2, Consultan

Define central bank interface r
WBS: 1.7.2.4
Duration: 5 days | Start: Tue 15/06/04 | Finish: Mon 28/06/04
Res: Requirements Analyst 2, Consultan

Define ATM software interface
WBS: 1.7.2.2
Duration: 5 days | Start: Tue 29/06/04 | Finish: Mon 05/07/04
Res: Requirements Analyst 1 (Lead), Co

Define user interface requirer
WBS: 1.7.2.3
Duration: 5 days | Start: Tue 22/06/04 | Finish: Mon 28/06/04
Res: Requirements Analyst 1 (Lead), Co

Prioritize and integrate softwa
WBS: 1.7.3.1
Duration: 3.04 days | Start: Tue 06/07/04 | Finish: Thu 08/07/04
Res: Requirements Analyst 1 (Lead), Co

Month 1
WBS: 1.1.8.1
Duration: 1 day | Start: Wed 30/06/04 | Finish: Wed 30/06/04
Res: Project Manager[25%]

Month 2
WBS: 1.1.8.2
Duration: 1 day | Start: Fri 30/07/04 | Finish: Fri 30/07/04
Res: Project Manager[25%]

Month 3
WBS: 1.1.8.3
Duration: 1 day | Start: Tue 31/08/04 | Finish: Tue 31/08/04
Res: Project Manager[25%]

Month 4
WBS: 1.1.8.4
Duration: 1 day | Start: Thu 30/09/04 | Finish: Thu 30/09/04
Res: Project Manager[25%]

Month 5
WBS: 1.1.8.5
Duration: 1 day | Start: Fri 29/10/04 | Finish: Fri 29/10/04
Res: Project Manager[25%]

Month 6
WBS: 1.1.8.6
Duration: 1 day | Start: Tue 30/11/04 | Finish: Tue 30/11/04
Res: Project Manager[25%]

Month 7
WBS: 1.1.8.7
Duration: 1 day | Start: Fri 17/12/04 | Finish: Fri 17/12/04
Res: Project Manager[25%]

Month 8
WBS: 1.1.8.8
Duration: 1 day | Start: Mon 31/01/05 | Finish: Mon 31/01/05
Res: Project Manager[25%]

Month 9
WBS: 1.1.8.9
Duration: 1 day | Start: Mon 28/02/05 | Finish: Mon 28/02/05
Res: Project Manager[25%]

Steering Committee meetings
WBS: 1.3.4.1
Duration: 48 days | Start: Tue 01/06/04 | Finish: Thu 05/08/04
Res: Project Manager[13%]

Project team meetings
WBS: 1.3.4.2
Duration: 200 days? | Start: Wed 23/06/04 | Finish: Tue 29/03/05
Res: Project Manager[19%]

Other project management tas
WBS: 1.3.4.3
Duration: 200 days? | Start: Wed 23/06/04 | Finish: Tue 29/03/05
Res: Project Manager[19%]

Establish software engineerin
WBS: 1.2.3.6
Duration: 1 day | Start: Wed 03/03/04 | Finish: Wed 03/03/04
Res: Project Manager[13%], Software e

Implement problem reporting r
WBS: 1.3.6
Duration: 10 days | Start: Thu 08/04/04 | Finish: Wed 21/04/04
Res: Project Manager[50%]

Create baseline Work Breakdc
WBS: 1.2.4.1
Duration: 10 days | Start: Wed 31/03/04 | Finish: Tue 30/04/04
Res: Project Manager[50%], Software e

Create work plan
WBS: 1.2.4.2.2
Duration: 3 days | Start: Wed 31/03/04 | Finish: Fri 02/04/04
Res: Project Manager[42%]

Create control plan
WBS: 1.2.4.2.3
Duration: 3 days | Start: Wed 31/03/04 | Finish: Fri 02/04/04
Res: Project Manager[42%]

Assemble baseline SPMP doc
WBS: 1.2.4.3
Duration: 1 day | Start: Thu 22/04/04 | Finish: Thu 22/04/04
Res: Project Manager

Baseline SPMP completed
WBS: 1.2.4.4
Duration: 0 days | Start: Thu 22/04/04 | Finish: Thu 22/04/04
Res:

Create schedule baseline
WBS: 1.2.4.5
Duration: 1 day | Start: Fri 23/04/04 | Finish: Fri 23/04/04
Res: Project Manager[25%]

Create start-up plan
WBS: 1.2.4.2.1
Duration: 3 days | Start: Fri 27/02/04 | Finish: Tue 02/03/04
Res: Project Manager[42%], Requireme

Create risk management plan
WBS: 1.2.4.2.4
Duration: 3 days | Start: Thu 04/03/04 | Finish: Mon 08/03/04
Res: Project Manager[42%]


Create closeout plan
WBS: 1.2.4.2.5
Duration: Start: Tue Finish: Thu
3 days 09/03/04 11/03/04
Res: Project Manager[42%]
Create technical process plan
WBS: 1.2.4.2.6
Duration: Start: Fri Finish: Tue
3 days 12/03/04 16/03/04
Res: Project Manager[42%]
Create subcontractor manage
WBS: 1.2.4.2.7
Duration: Start: Tue Finish: Thu
3 days 23/03/04 25/03/04
Res: Project Manager[42%]
Create process improvement j
WBS: 1.2.4.2.8
Duration: Start: Fri Finish: Tue
5 days 26/03/04 30/03/04
Res: Project Manager[42%]
Create problem resolution pla
WBS: 1.2.4.2.9
Duration: Start: Mon Finish: Wed
3 days 05/04/04 07/04/04
Res: Project Manager[42%]
Create project charter
WBS: 1.2.4.6.1
Duration: Start: Wed Finish: Tue
5 days 18/02/04 24/02/04
Res: Project Manager
Deliver project charter to NNB
WBS: 1.2.4.6.2
Duration: Start: Mon Finish: Mon
1 day 03/05/04 03/05/04
Res: Project Manager[13%]
Receive signed project charte
WBS: 1.2.4.6.3
Duration: Start: Tue Finish: Mon
5 days 11/05/04 17/05/04
Res:
Baseline project charter comp
WBS: 1.2.4.6.4
Duration: Start: Mon Finish: Mon
0 days 17/05/04 17/05/04
Res:
Maintain project charter
WBS: 1.3.7
Duration: Start: Tue Finish: Mon
200 days 18/05/04 21/02/05
Res: Project Manager[2%]
Receive ATM hardware docum
WBS: 1.2.4.7
Duration: Start: Tue Finish: Tue
0 days 01/06/04 01/06/04
Res:
Define hardware interface req
WBS: 1.7.2.2
Duration: Start: Tue Finish: Mon
5 days 01/06/04 07/06/04
Res: Requirements Analyst 2, Consultan
Prioritize and integrate interfa
WBS: 1.7.3.2
Duration: Start: Tue Finish: Fri
2.61 days 06/07/04 09/07/04
Res: Requirements Analyst 2, Consultan
Prioritize and integrate all requ
WBS: 1.7.3.3
Duration: Start: Fri Finish: Fri
3.38 days 09/07/04 16/07/04
Res: Requirements Analyst 1 (Lead), Co


Plan software maintenance tra
WBS: 1.11.1.3
Duration: Start: Fri Finish: Fri
5 days 22/04/05 29/04/05
Res: Training Specialist 1
Create software maintenance
WBS: 1.11.2.3
Duration: Start: Fri Finish: Fri
5 days 06/05/05 13/05/05
Res: Training Specialist 1[75%]
Validate software maintenanc
WBS: 1.11.3.3
Duration: Start: Fri Finish: Mon
1 day 13/05/05 16/05/05
Res: Training Specialist 1[57%]
Hold training session for softr
WBS: 1.11.4.2
Duration: Start: Mon Finish: Mon
5 days 16/05/05 23/05/05
Res: Training Specialist 1[25%]

Code ATM software-to-hardwa
WBS: 1.12.2.1
Duration: 21.88 days | Start: Thu 02/12/04 | Finish: Mon 03/01/05
Res: Programmer 1 (Lead), Programme

Generate ATM software-to-har
WBS: 1.12.3.1
Duration: 1 day | Start: Wed 03/02/05 | Finish: Thu 03/02/05
Res: Programmer 1 (Lead), Computer Sy

Execute ATM software-to-harc
WBS: 1.9.7.1
Duration: 2.38 days | Start: Tue 08/02/05 | Finish: Fri 11/02/05
Res: Verification Engineer 2, Verification

V&V completed
WBS: 1.9.8
Duration: 0 days | Start: Thu 21/04/05 | Finish: Thu 21/04/05
Res:

Integrate ATM software/hardw
WBS: 1.12.5.1
Duration: 5 days | Start: Thu 24/02/05 | Finish: Thu 03/03/05
Res: Programmer 1 (Lead)[20%]

Integrate ATM software with u
WBS: 1.12.5.2
Duration: 5 days | Start: Tue 29/03/05 | Finish: Tue 05/04/05
Res: Programmer 1 (Lead)[20%]

Integrate ATM software produ
WBS: 1.12.5.3
Duration: 1 day | Start: Fri 08/04/05 | Finish: Mon 11/04/05
Res: Programmer 1 (Lead)[13%], Datat

Code ATM software interfaces
WBS: 1.12.2.2
Duration: 21.88 days | Start: Mon 03/01/05 | Finish: Wed 02/02/05
Res: Programmer 1 (Lead), Programme

Generate ATM software interfa
WBS: 1.12.3.2
Duration: 1 day | Start: Thu 03/02/05 | Finish: Fri 04/02/05
Res: Programmer 1 (Lead), Computer Sy

Execute ATM software interfac
WBS: 1.9.7.2
Duration: 2.38 days | Start: Wed 16/02/05 | Finish: Fri 18/02/05
Res: Verification Engineer 2, Verification

Code user interfaces
WBS: 1.12.2.3
Duration: 10 days | Start: Wed 09/02/05 | Finish: Wed 23/02/05
Res: Programmer 1 (Lead), Programme

Generate ATM user interface c
WBS: 1.12.3.3
Duration: 1 day | Start: Wed 23/02/05 | Finish: Thu 24/02/05
Res: Programmer 1 (Lead), Computer Sy

Execute end user test
WBS: 1.9.7.3
Duration: 1.38 days | Start: Thu 24/02/05 | Finish: Mon 28/02/05
Res: Verification Engineer 2, Verification

Code central bank interfaces
WBS: 1.12.2.4
Duration: 15 days | Start: Mon 07/03/05 | Finish: Mon 28/03/05
Res: Programmer 1 (Lead), Programme

Generate central bank interfac
WBS: 1.12.3.4
Duration: 1 day | Start: Mon 28/03/05 | Finish: Tue 29/03/05
Res: Programmer 1 (Lead), Computer Sy

Execute central bank interfacc
WBS: 1.9.7.4
Duration: 2.38 days | Start: Tue 29/03/05 | Finish: Fri 01/04/05
Res: Verification Engineer 2, Verification

Code weekly statistical report
WBS: 1.12.2.5
Duration: 23 days | Start: Mon 14/03/05 | Finish: Wed 13/04/05
Res: Programmer 1 (Lead), Programme

Generate weekly statistical rep
WBS: 1.12.3.5
Duration: 1 day | Start: Wed 13/04/05 | Finish: Thu 14/04/05
Res: Programmer 1 (Lead), Computer Sy

Execute weekly statistical rep
WBS: 1.9.7.5
Duration: 5 days | Start: Thu 14/04/05 | Finish: Thu 21/04/05
Res: Verification Engineer 2 (19%), Verif

Integrate weekly statistical rep
WBS: 1.12.5.4
Duration: 1 day | Start: Thu 21/04/05 | Finish: Fri 22/04/05
Res: Programmer 1 (Lead)[75%], Datat

Distribute weekly statistical re
WBS: 1.13.2.3
Duration: 1 day | Start: Fri 22/04/05 | Finish: Mon 25/04/05
Res: Installation Specialist 1[25%]

Month 10
WBS: 1.14.10
Duration: 1 day | Start: Thu 31/03/05 | Finish: Thu 31/03/05
Res: Project Manager[25%]

Month 11
WBS: 1.14.11
Duration: 1 day | Start: Fri 29/04/05 | Finish: Fri 29/04/05
Res: Project Manager[25%]

Month 12
WBS: 1.14.12
Duration: 1 day | Start: Tue 31/05/05 | Finish: Tue 31/05/05
Res: Project Manager[25%]

Create Software Requirement
WBS: 1.7.4
Duration: Start: Fri Finish: Thu
3.75 days 16/07/04 22/07/04
Res: Requirements Analyst 2, Requirem

SRS completed
WBS: 1.7.5
Duration: Start: Thu Finish: Thu
0 days 22/07/04 22/07/04
Res:

Design ATM-to-central bank cr
WBS: 1.8.1.1
Duration: Start: Thu Finish: Thu
10 days 22/07/04 05/08/04
Res: Software Architect 1 (Lead), Consu

Design ATM software interfac
WBS: 1.8.3.1
Duration: Start: Thu Finish: Thu
5 days 19/08/04 26/08/04
Res: Software Designer 1

Design ATM software internal
WBS: 1.8.1.2
Duration: Start: Thu Finish: Thu
10 days 05/08/04 19/08/04
Res: Software Architect 1 (Lead), Consu

Design card/PIN additions to c
WBS: 1.8.2.1
Duration: Start: Thu Finish: Tue
3 days 22/07/04 27/07/04
Res: Database Engineer 1

Design ATM transaction additi
WBS: 1.8.2.2
Duration: Start: Tue Finish: Fri
3 days 27/07/04 30/07/04
Res: Database Engineer 1

Design weekly statistical repo
WBS: 1.8.2.3
Duration: Start: Fri Finish: Tue
2 days 30/07/04 03/08/04
Res: Database Engineer 1

Plan requirements verification
WBS: 1.9.1.1
Duration: Start: Thu Finish: Mon
6.92 days 19/08/04 30/08/04
Res: Verification Engineer 2(62%), Valic

Verify requirements
WBS: 1.9.3.1
Duration: Start: Tue Finish: Tue
5 days 07/09/04 14/09/04
Res: Verification Engineer 2(40%)

Create Software Design Speci
WBS: 1.8.6
Duration: Start: Thu Finish: Thu
5 days 18/11/04 25/11/04
Res: Software Designer 1(75%), Consul

SDS completed
WBS: 1.8.7
Duration: Start: Thu Finish: Thu
0 days 25/11/04 25/11/04
Res:

Verify interface design
WBS: 1.9.2.5
Duration: Start: Thu Finish: Thu
5 days 25/11/04 02/12/04
Res: Verification Engineer 2(40%)

Validate interface design
WBS: 1.9.2.6
Duration: Start: Thu Finish: Thu
5 days 25/11/04 02/12/04
Res: Validation Engineer 1(40%)

Verify database design
WBS: 1.9.2.7
Duration: Start: Thu Finish: Thu
5 days 25/11/04 02/12/04
Res: Verification Engineer 2(40%)

Validate database design
WBS: 1.9.2.8
Duration: Start: Thu Finish: Thu
5 days 25/11/04 02/12/04
Res: Validation Engineer 1(40%)

Plan ATM site training content
WBS: 1.11.1.2
Duration: Start: Thu Finish: Thu
5 days 25/11/04 02/12/04
Res: Training Specialist 1

Requirements & Design V&V c
WBS: 1.9.3
Duration: Start: Thu Finish: Thu
0 days 02/12/04 02/12/04
Res:

Create ATM site training mater
WBS: 1.11.2.2
Duration: Start: Thu Finish: Thu
5 days 02/12/04 09/12/04
Res: Training Specialist 1(25%)

Validate ATM site training con
WBS: 1.11.3.2
Duration: Start: Thu Finish: Fri
1 day 09/12/04 10/12/04
Res: Training Specialist 1(62%)

Hold training session for ATM
WBS: 1.11.4.1
Duration: Start: Fri Finish: Mon
1 day 10/12/04 13/12/04
Res: Training Specialist 1(25%)

Plan end user test
WBS: 1.9.5.3
Duration: Start: Thu Finish: Fri
5 days 16/12/04 17/12/04
Res: Verification Engineer 2(50%), Verif

Create Software Test Plan (ST
WBS: 1.9.5.8
Duration: Start: Fri Finish: Wed
2.5 days 17/12/04 22/12/04
Res: Verification Engineer 2, Verification

Design ATM software interfac
WBS: 1.9.6.2
Duration: Start: Wed Finish: Wed
5 days 29/12/04 05/01/05
Res: Verification Engineer 2, Verification

Design end user test
WBS: 1.9.6.3
Duration: Start: Wed Finish: Fri
2.5 days 05/01/05 07/01/05
Res: Verification Engineer 2, Verification

Design central bank interface
WBS: 1.9.6.4
Duration: Start: Fri Finish: Fri
5 days 07/01/05 14/01/05
Res: Verification Engineer 2, Verification

Design weekly statistical repo
WBS: 1.9.6.5
Duration: Start: Fri Finish: Wed
2.75 days 14/01/05 19/01/05
Res: Verification Engineer 2(38%), Verif

STP completed
WBS: 1.9.5.7
Duration: Start: Wed Finish: Wed
0 days 22/12/04 22/12/04
Res:

Design ATM software-to-hardv
WBS: 1.9.6.1
Duration: Start: Wed Finish: Wed
5 days 22/12/04 29/12/04
Res: Verification Engineer 2, Verification

Plan ATM software-to-hardwar
WBS: 1.9.5.1
Duration: Start: Thu Finish: Wed
3.33 days 02/12/04 08/12/04
Res: Verification Engineer 2(50%), Verif

Plan ATM software interface b
WBS: 1.9.5.2
Duration: Start: Wed Finish: Mon
3.33 days 08/12/04 13/12/04
Res: Verification Engineer 2(50%), Verif

Plan central bank interface blo
WBS: 1.9.5.4
Duration: Start: Fri Finish: Wed
3.33 days 18/02/05 23/02/05
Res: Verification Engineer 2(50%), Verif

Plan weekly statistical report t
WBS: 1.9.5.5
Duration: Start: Mon Finish: Thu
2.73 days 13/12/04 16/12/04
Res: Verification Engineer 2(38%), Verif

Define installation documenta
WBS: 1.10.1.1
Duration: Start: Thu Finish: Thu
5 days 02/12/04 09/12/04
Res: Technical Writer 1

Write installation documentati
WBS: 1.10.2.1
Duration: Start: Thu Finish: Thu
10 days 23/12/04 06/01/05
Res: Technical Writer 1(50%), Installatio

Print installation documentatio
WBS: 1.10.3.1
Duration: Start: Thu Finish: Fri
1 day 06/01/05 07/01/05
Res: Printing Service(50%)

Distribute installation docume
WBS: 1.10.3.4
Duration: Start: Fri Finish: Thu
4 days 07/01/05 13/01/05
Res: Project Manager(6%)

Documentation completed
WBS: 1.10.4
Duration: Start: Thu Finish: Thu
0 days 27/01/05 27/01/05
Res:

Create documentation plan
WBS: 1.10.1.4
Duration: Start: Thu Finish: Thu
5 days 20/01/05 27/01/05
Res: Technical Writer 1

Define ATM software documer
WBS: 1.10.1.2
Duration: Start: Thu Finish: Thu
5 days 09/12/04 16/12/04
Res: Technical Writer 1

Write ATM software document
WBS: 1.10.2.2
Duration: Start: Thu Finish: Thu
10 days 23/12/04 06/01/05
Res: Technical Writer 1(50%), Consulta

Print ATM software document
WBS: 1.10.3.2
Duration: Start: Thu Finish: Fri
1 day 06/01/05 07/01/05
Res: Printing Service(50%)

Distribute ATM software docu
WBS: 1.10.3.5
Duration: Start: Fri Finish: Thu
4 days 07/01/05 13/01/05
Res: Project Manager(6%)

Define central bank accountin
WBS: 1.10.1.3
Duration: Start: Thu Finish: Thu
5 days 16/12/04 23/12/04
Res: Technical Writer 1

Write central bank accounting
WBS: 1.10.2.3
Duration: Start: Thu Finish: Thu
10 days 06/01/05 20/01/05
Res: Technical Writer 1(50%), Consulta

Print central bank accounting
WBS: 1.10.3.3
Duration: Start: Thu Finish: Fri
1 day 20/01/05 21/01/05
Res: Printing Service(50%)

Distribute central bank accou
WBS: 1.10.3.6
Duration: Start: Fri Finish: Thu
4 days 21/01/05 27/01/05
Res: Project Manager(3%)

Create test data
WBS: 1.12.1
Duration: Start: Wed Finish: Thu
2 day 19/01/05 20/01/05
Res: Verification Engineer 2

Plan integraion of ATM softw
WBS: 1.12.4.1
Duration: Start: Fri Finish: Wed
2.5 days 04/02/05 09/02/05
Res: Programmer 1 (Lead)

Plan integraion of ATM softw
WBS: 1.12.4.2
Duration: Start: Thu Finish: Mon
2.5 days 03/02/05 07/02/05
Res: Programmer 1 (Lead)

Plan integration of ATM softw
WBS: 1.12.4.3
Duration: 2.5 days Start: Tue 05/04/05 Finish: Fri 08/04/05
Res: Programmer 1 (Lead)
Plan integration of weekly sta
WBS: 1.12.4.4
Duration: 2.5 days Start: Thu 14/04/05 Finish: Tue 19/04/05
Res: Programmer 1 (Lead)
Plan installation of ATM softw
WBS: 1.13.1.1
Duration: 2.5 days Start: Thu 02/12/04 Finish: Tue 07/12/04
Res: Installation Specialist 1
Plan installation of modificati
WBS: 1.13.1.2
Duration: 1.25 days Start: Tue 07/12/04 Finish: Wed 08/12/04
Res: Installation Specialist 1, Database
Plan installation of weekly sta
WBS: 1.13.1.3
Duration: 1.07 days Start: Wed 08/12/04 Finish: Thu 09/12/04
Res: Installation Specialist 1[75%], Dat
Validate requirements
WBS: 1.9.2.2
Duration: 5 days Start: Tue 07/09/04 Finish: Tue 14/09/04
Res: Validation Engineer 1[40%]
Create Software Verification &
WBS: 1.9.1.5
Duration: 6.36 days Start: Mon 31/01/05 Finish: Tue 08/02/05
Res: Verification Engineer 2[38%], Valid
SVVP completed
WBS: 1.9.1.6
Duration: 0 days Start: Tue 08/02/05 Finish: Tue 08/02/05
Res:
Collect and analyze metric dat
WBS: 1.9.4
Duration: 5 days? Start: Wed 09/02/05 Finish: Wed 16/02/05
Res: Verification Engineer 2, Validation
Plan architecture verification
WBS: 1.9.1.2
Duration: 6.92 days Start: Mon 30/08/04 Finish: Tue 07/09/04
Res: Verification Engineer 2[63%], Valid
Verify architecture
WBS: 1.9.2.3
Duration: 5 days Start: Tue 07/09/04 Finish: Tue 14/09/04
Res: Verification Engineer 2[40%]
Validate architecture
WBS: 1.9.2.4
Duration: 5 days Start: Tue 07/09/04 Finish: Tue 14/09/04
Res: Validation Engineer 1[40%]
Plan interface design verificat
WBS: 1.9.1.3
Duration: 6.92 days Start: Tue 14/09/04 Finish: Thu 23/09/04
Res: Verification Engineer 2[63%], Valid
Plan database design verificat
WBS: 1.9.1.4
Duration: 6.92 days Start: Thu 20/01/05 Finish: Mon 31/01/05
Res: Verification Engineer 2[63%], Valid
Design ATM software-to-hard
WBS: 1.8.3.2
Duration: 5 days Start: Thu 26/08/04 Finish: Thu 02/09/04
Res: Software Designer 1
Select or develop algorithms
WBS: 1.8.4
Duration: 5 days Start: Thu 09/09/04 Finish: Thu 16/09/04
Res: Software Designer 1
Detail design ATM software i
WBS: 1.8.5.1
Duration: 10 days Start: Thu 23/09/04 Finish: Thu 07/10/04
Res: Software Designer 1, Consultant 1
Detail design ATM software-to
WBS: 1.8.5.2
Duration: 10 days Start: Thu 07/10/04 Finish: Thu 21/10/04
Res: Software Designer 1, Consultant 1
Detail design user interfaces
WBS: 1.8.5.3
Duration: 10 days Start: Thu 21/10/04 Finish: Thu 04/11/04
Res: Software Designer 1, Consultant 1
Detail design central bank sys
WBS: 1.8.5.4
Duration: 10 days Start: Thu 04/11/04 Finish: Thu 18/11/04
Res: Software Designer 1, Consultant 1
Design user interfaces
WBS: 1.8.3.3
Duration: 5 days Start: Thu 02/09/04 Finish: Thu 09/09/04
Res: Software Designer 1
Design central bank system in
WBS: 1.8.3.4
Duration: 5 days Start: Thu 05/08/04 Finish: Thu 12/08/04
Res: Software Designer 1

Implementation completed
WBS: 1.12.4
Duration: 0 days | Start: Fri 21/04/05 | Finish: Fri 21/04/05
Res:

Plan installation training conte
WBS: 1.11.1.1
Duration: 5 days | Start: Fri 29/04/05 | Finish: Fri 06/05/05
Res: Training Specialist 1

Create installation training ma
WBS: 1.11.2.1
Duration: 5 days | Start: Mon 09/05/05 | Finish: Mon 23/05/05
Res: Training Specialist 1[77%]

Validate installation training c
WBS: 1.11.3.1
Duration: 1 day | Start: Mon 23/05/05 | Finish: Tue 24/05/05
Res: Training Specialist 1[82%]

Hold training session for insta
WBS: 1.11.4.3
Duration: 1 day | Start: Tue 24/05/05 | Finish: Wed 25/05/05
Res: Training Specialist 1[50%]

Distribute ATM software prodc
WBS: 1.13.2.1
Duration: 1 days | Start: Mon 11/04/05 | Finish: Tue 12/04/05
Res: Installation Specialist 1[25%]

Install ATM software product c
WBS: 1.13.3.1
Duration: 3 days | Start: Tue 12/04/05 | Finish: Fri 15/04/05
Res: Installation Specialist 1[83%]

ATMs installed on-site by thirc
WBS: 1.13.4
Duration: 30 days | Start: Fri 15/04/05 | Finish: Fri 27/05/05
Res:

Accept configured ATMs in ba
WBS: 1.13.5.1
Duration: 0.5 days | Start: Fri 27/05/05 | Finish: Fri 27/05/05
Res: Project Manager[50%], Installation

Distribute central bank system
WBS: 1.13.2.2
Duration: 1 day | Start: Fri 29/04/05 | Finish: Mon 25/04/05
Res: Installation Specialist 1[25%]

Install central bank system mc
WBS: 1.13.3.2
Duration: 5 day | Start: Fri 27/05/05 | Finish: Mon 30/05/05
Res: Installation Specialist 1[13%], Dat

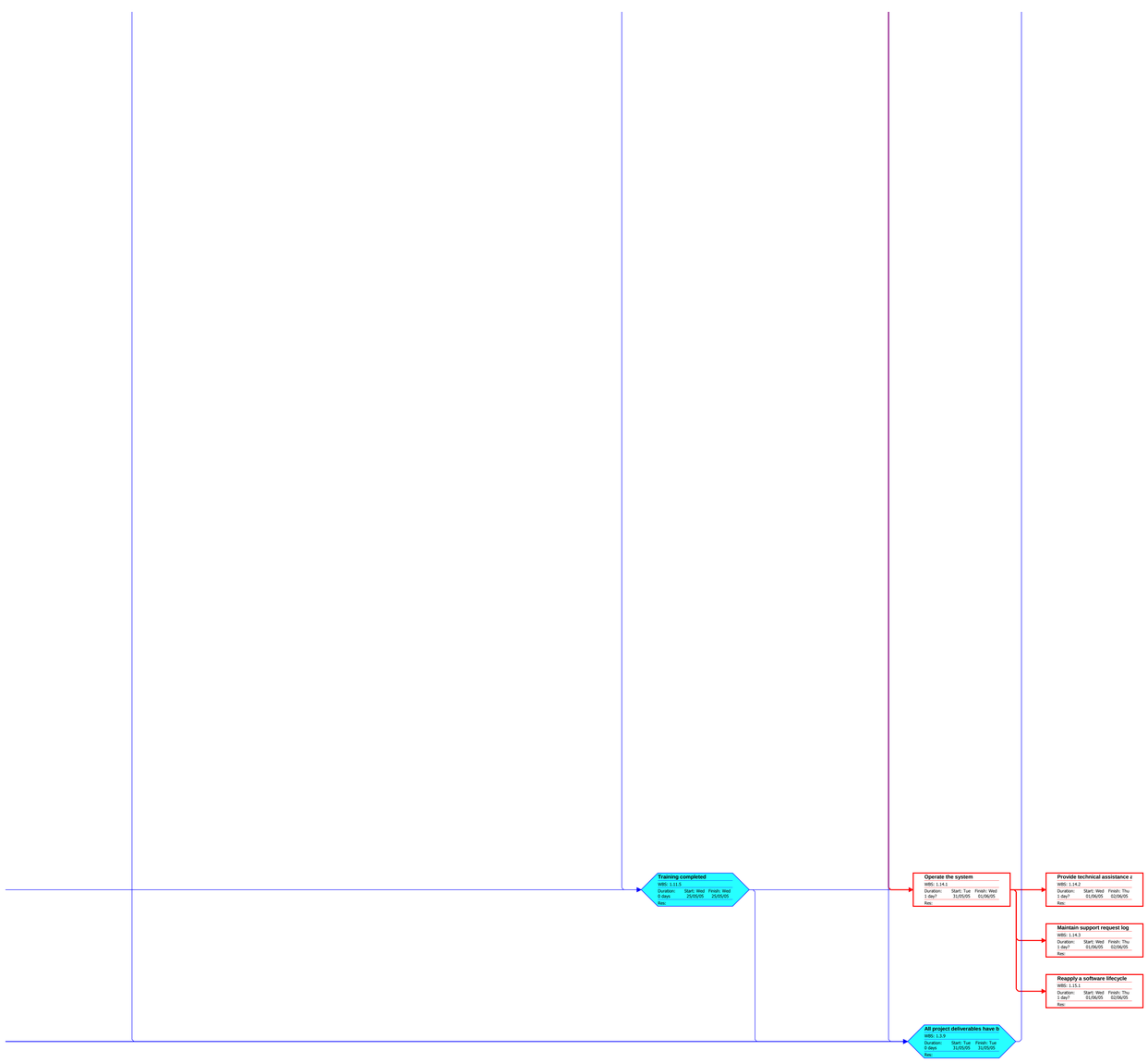
Install weekly statistical repor
WBS: 1.13.3.3
Duration: 1 day | Start: Mon 30/05/05 | Finish: Tue 31/05/05
Res: Installation Specialist 1[8%], Datal

Accept weekly statistical repo
WBS: 1.13.5.3
Duration: 0.5 days | Start: Tue 31/05/05 | Finish: Tue 31/05/05
Res: Project Manager[50%], Installatior

Accept modified central bank
WBS: 1.13.5.2
Duration: 0.5 days | Start: Mon 30/05/05 | Finish: Mon 30/05/05
Res: Project Manager[50%], Installatior

Installation completed
WBS: 1.13.6
Duration: 0 days | Start: Tue 31/05/05 | Finish: Tue 31/05/05
Res:

Project closeout
WBS: 1.13.10
Duration: 0 days | Start: Tue 31/05/05 | Finish: Tue 31/05/05
Res:


Training completed
WBS: 1.11.5
Duration: 0 days
Start: Wed 25/05/05
Finish: Wed 25/05/05
Res:
Operate the system
WBS: 1.14.1
Duration: 1 day?
Start: Tue 31/05/05
Finish: Wed 01/06/05
Res:
Provide technical assistance d
WBS: 1.14.2
Duration: 1 day?
Start: Wed 01/06/05
Finish: Thu 02/06/05
Res:
Maintain support request log
WBS: 1.14.3
Duration: 1 day?
Start: Wed 01/06/05
Finish: Thu 02/06/05
Res:
Reapply a software lifecycle
WBS: 1.15.1
Duration: 1 day?
Start: Wed 01/06/05
Finish: Thu 02/06/05
Res:
All project deliverables have b
WBS: 1.1.5
Duration: 0 days
Start: Tue 31/05/05
Finish: Tue 31/05/05
Res:

Appendix G

Resource Allocation Table

ID	WBS	Task Name	Work	Duration	Start	Finish
1	**1**	**Nirvana National Bank ATM project**	**7,583.2 hrs**	**338.56 days?**	**Wed 18/02/04**	**Mon 06/06/05**
2	**1.1**	**Software Lifecycle Model Process**	**4 hrs**	**2 days**	**Wed 25/02/04**	**Thu 26/02/04**
3	1.1.1	Identify candidate SLCMs	2 hrs	1 day	Wed 25/02/04	Wed 25/02/04
		Project Manager	*2 hrs*		*Wed 25/02/04*	*Wed 25/02/04*
4	1.1.2	Select project model	2 hrs	1 day	Thu 26/02/04	Thu 26/02/04
		Project Manager	*2 hrs*		*Thu 26/02/04*	*Thu 26/02/04*
5	**1.2**	**Project Initiation**	**351 hrs**	**74 days**	**Wed 18/02/04**	**Tue 01/06/04**
6	1.2.1	Map activities to the SLCM	4 hrs	2 days	Fri 27/02/04	Mon 01/03/04
		Project Manager	*4 hrs*		*Fri 27/02/04*	*Mon 01/03/04*
7	**1.2.2**	**Allocate project resources**	**26 hrs**	**29 days**	**Tue 02/03/04**	**Fri 09/04/04**
8	1.2.2.1	Identify staffing requirements	8 hrs	2 days	Tue 02/03/04	Wed 03/03/04
		Project Manager	*8 hrs*		*Tue 02/03/04*	*Wed 03/03/04*
9	1.2.2.2	Acquire commitment from required staff	8 hrs	5 days	Thu 04/03/04	Wed 10/03/04
		Project Manager	*8 hrs*		*Thu 04/03/04*	*Wed 10/03/04*
10	1.2.2.3	Allocate identified activites to staff	10 hrs	5 days	Mon 05/04/04	Fri 09/04/04
		Project Manager	*10 hrs*		*Mon 05/04/04*	*Fri 09/04/04*
11	**1.2.3**	**Establish project environment**	**56 hrs**	**32 days**	**Wed 03/03/04**	**Thu 15/04/04**
12	1.2.3.1	Identify tool requirements	20 hrs	10 days	Tue 09/03/04	Mon 22/03/04
		Project Manager	*20 hrs*		*Tue 09/03/04*	*Mon 22/03/04*
13	1.2.3.2	Acquire required tools	10 hrs	5 days	Mon 05/04/04	Fri 09/04/04
		Project Manager	*10 hrs*		*Mon 05/04/04*	*Fri 09/04/04*
		Computer software purchase	*30*		*Mon 05/04/04*	*Fri 09/04/04*
14	1.2.3.3	Identify communication needs	8 hrs	4 days	Wed 03/03/04	Mon 08/03/04
		Project Manager	*8 hrs*		*Wed 03/03/04*	*Mon 08/03/04*
15	1.2.3.4	Create communication plan	16 hrs	4 days	Mon 12/04/04	Thu 15/04/04
		Project Manager	*16 hrs*		*Mon 12/04/04*	*Thu 15/04/04*
16	1.2.3.5	Establish documentation repository	1 hr	1 day	Thu 04/03/04	Thu 04/03/04
		Project Manager	*1 hr*		*Thu 04/03/04*	*Thu 04/03/04*
		Software repository	*24*		*Thu 04/03/04*	*Thu 04/03/04*
17	1.2.3.6	Establish software engineering workspaces	1 hr	1 day	Wed 03/03/04	Wed 03/03/04
		Project Manager	*1 hr*		*Wed 03/03/04*	*Wed 03/03/04*
		Software repository	*24*		*Wed 03/03/04*	*Wed 03/03/04*
18	**1.2.4**	**Plan project management**	**265 hrs**	**74 days**	**Wed 18/02/04**	**Tue 01/06/04**
19	1.2.4.1	Create baseline Work Breakdown Structure (WBS)	100 hrs	10 days	Wed 17/03/04	Tue 30/03/04
		Project Manager	*40 hrs*		*Wed 17/03/04*	*Tue 30/03/04*
		Programmer 1 (Lead)	*20 hrs*		*Wed 17/03/04*	*Tue 30/03/04*
		Verification Engineer 2	*20 hrs*		*Wed 17/03/04*	*Tue 30/03/04*
		Software Architect 1 (Lead)	*20 hrs*		*Wed 17/03/04*	*Tue 30/03/04*
20	**1.2.4.2**	**Create SPMP subplans**	**114 hrs**	**29 days**	**Fri 27/02/04**	**Wed 07/04/04**
21	1.2.4.2.1	Create start-up plan	34 hrs	3 days	Fri 27/02/04	Tue 02/03/04
		Project Manager	*10 hrs*		*Fri 27/02/04*	*Tue 02/03/04*
		Requirements Analyst 2	*6 hrs*		*Fri 27/02/04*	*Tue 02/03/04*
		Programmer 1 (Lead)	*6 hrs*		*Fri 27/02/04*	*Tue 02/03/04*
		Verification Engineer 2	*6 hrs*		*Fri 27/02/04*	*Tue 02/03/04*
		Software Architect 1 (Lead)	*6 hrs*		*Fri 27/02/04*	*Tue 02/03/04*
22	1.2.4.2.2	Create work plan	10 hrs	3 days	Wed 31/03/04	Fri 02/04/04
		Project Manager	*10 hrs*		*Wed 31/03/04*	*Fri 02/04/04*
23	1.2.4.2.3	Create control plan	10 hrs	3 days	Wed 31/03/04	Fri 02/04/04
		Project Manager	*10 hrs*		*Wed 31/03/04*	*Fri 02/04/04*
24	1.2.4.2.4	Create risk management plan	10 hrs	3 days	Thu 04/03/04	Mon 08/03/04
		Project Manager	*10 hrs*		*Thu 04/03/04*	*Mon 08/03/04*
25	1.2.4.2.5	Create closeout plan	10 hrs	3 days	Tue 09/03/04	Thu 11/03/04
		Project Manager	*10 hrs*		*Tue 09/03/04*	*Thu 11/03/04*
26	1.2.4.2.6	Create technical process plans	10 hrs	3 days	Fri 12/03/04	Tue 16/03/04
		Project Manager	*10 hrs*		*Fri 12/03/04*	*Tue 16/03/04*
27	1.2.4.2.7	Create subcontractor management plan	10 hrs	3 days	Tue 23/03/04	Thu 25/03/04
		Project Manager	*10 hrs*		*Tue 23/03/04*	*Thu 25/03/04*
28	1.2.4.2.8	Create process improvement plan	10 hrs	3 days	Fri 26/03/04	Tue 30/03/04

ID	WBS	Task Name	Work	Duration	Start	Finish
		Project Manager	*10 hrs*		*Fri 26/03/04*	*Tue 30/03/04*
29	1.2.4.2.9	Create problem resolution plan	10 hrs	3 days	Mon 05/04/04	Wed 07/04/04
		Project Manager	*10 hrs*		*Mon 05/04/04*	*Wed 07/04/04*
30	1.2.4.3	Assemble baseline SPMP document	8 hrs	1 day	Thu 22/04/04	Thu 22/04/04
		Project Manager	*8 hrs*		*Thu 22/04/04*	*Thu 22/04/04*
31	1.2.4.4	Baseline SPMP completed	0 hrs	0 days	Thu 22/04/04	Thu 22/04/04
32	1.2.4.5	Create schedule baseline	2 hrs	1 day	Fri 23/04/04	Fri 23/04/04
		Project Manager	*2 hrs*		*Fri 23/04/04*	*Fri 23/04/04*
33	**1.2.4.6**	**Finalize project charter**	**41 hrs**	**64 days**	**Wed 18/02/04**	**Mon 17/05/04**
34	1.2.4.6.1	Create project charter	40 hrs	5 days	Wed 18/02/04	Tue 24/02/04
		Project Manager	*40 hrs*		*Wed 18/02/04*	*Tue 24/02/04*
35	1.2.4.6.2	Deliver project charter to NNB for signoff	1 hr	1 day	Mon 10/05/04	Mon 10/05/04
		Project Manager	*1 hr*		*Mon 10/05/04*	*Mon 10/05/04*
36	1.2.4.6.3	Receive signed project charter from NNB	0 hrs	5 days	Tue 11/05/04	Mon 17/05/04
37	1.2.4.6.4	Baseline project charter completed	0 hrs	0 days	Mon 17/05/04	Mon 17/05/04
38	1.2.4.7	Receive ATM hardware documentation	0 hrs	0 days	Tue 01/06/04	Tue 01/06/04
39	**1.3**	**Project Monitoring & Control**	**910 hrs**	**300.56 days?**	**Thu 08/04/04**	**Thu 02/06/05**
40	1.3.1	Project kickoff	0 hrs	0 days	Tue 01/06/04	Tue 01/06/04
41	1.3.2	Analyze risks	40 hrs	5 days?	Fri 01/04/05	Thu 07/04/05
		Project Manager	*40 hrs*		*Fri 01/04/05*	*Thu 07/04/05*
42	1.3.3	Perform contingency planning	40 hrs	5 days?	Fri 08/04/05	Thu 14/04/05
		Project Manager	*40 hrs*		*Fri 08/04/05*	*Thu 14/04/05*
43	**1.3.4**	**Manage the project**	**656 hrs**	**216 days?**	**Tue 01/06/04**	**Tue 29/03/05**
44	1.3.4.1	Steering Committee meetings	48 hrs	48 days	Tue 01/06/04	Thu 05/08/04
		Project Manager	*48 hrs*		*Tue 01/06/04*	*Thu 05/08/04*
45	1.3.4.2	Project team meetings	300 hrs	200 days?	Wed 23/06/04	Tue 29/03/05
		Project Manager	*300 hrs*		*Wed 23/06/04*	*Tue 29/03/05*
46	1.3.4.3	Other project management tasks	308 hrs	200 days?	Wed 23/06/04	Tue 29/03/05
		Project Manager	*308 hrs*		*Wed 23/06/04*	*Tue 29/03/05*
47	1.3.5	Retain records	80 hrs	16 days?	Tue 01/06/04	Tue 22/06/04
		Project Manager	*80 hrs*		*Tue 01/06/04*	*Tue 22/06/04*
48	1.3.6	Implement problem reporting method	40 hrs	10 days	Thu 08/04/04	Wed 21/04/04
		Project Manager	*40 hrs*		*Thu 08/04/04*	*Wed 21/04/04*
49	1.3.7	Maintain project charter	30 hrs	200 days	Tue 18/05/04	Mon 21/02/05
		Project Manager	*30 hrs*		*Tue 18/05/04*	*Mon 21/02/05*
50	**1.3.8**	**SPMP Scheduled Updates**	**24 hrs**	**240 days**	**Wed 30/06/04**	**Tue 31/05/05**
51	1.3.8.1	Month 1	2 hrs	1 day	Wed 30/06/04	Wed 30/06/04
		Project Manager	*2 hrs*		*Wed 30/06/04*	*Wed 30/06/04*
52	1.3.8.2	Month 2	2 hrs	1 day	Fri 30/07/04	Fri 30/07/04
		Project Manager	*2 hrs*		*Fri 30/07/04*	*Fri 30/07/04*
53	1.3.8.3	Month 3	2 hrs	1 day	Tue 31/08/04	Tue 31/08/04
		Project Manager	*2 hrs*		*Tue 31/08/04*	*Tue 31/08/04*
54	1.3.8.4	Month 4	2 hrs	1 day	Thu 30/09/04	Thu 30/09/04
		Project Manager	*2 hrs*		*Thu 30/09/04*	*Thu 30/09/04*
55	1.3.8.5	Month 5	2 hrs	1 day	Fri 29/10/04	Fri 29/10/04
		Project Manager	*2 hrs*		*Fri 29/10/04*	*Fri 29/10/04*
56	1.3.8.6	Month 6	2 hrs	1 day	Tue 30/11/04	Tue 30/11/04
		Project Manager	*2 hrs*		*Tue 30/11/04*	*Tue 30/11/04*
57	1.3.8.7	Month 7	2 hrs	1 day	Fri 17/12/04	Fri 17/12/04
		Project Manager	*2 hrs*		*Fri 17/12/04*	*Fri 17/12/04*
58	1.3.8.8	Month 8	2 hrs	1 day	Mon 31/01/05	Mon 31/01/05
		Project Manager	*2 hrs*		*Mon 31/01/05*	*Mon 31/01/05*
59	1.3.8.9	Month 9	2 hrs	1 day	Mon 28/02/05	Mon 28/02/05
		Project Manager	*2 hrs*		*Mon 28/02/05*	*Mon 28/02/05*
60	1.3.8.10	Month 10	2 hrs	1 day	Thu 31/03/05	Thu 31/03/05
		Project Manager	*2 hrs*		*Thu 31/03/05*	*Thu 31/03/05*
61	1.3.8.11	Month 11	2 hrs	1 day	Fri 29/04/05	Fri 29/04/05
		Project Manager	*2 hrs*		*Fri 29/04/05*	*Fri 29/04/05*

ID	WBS	Task Name	Work	Duration	Start	Finish
62	1.3.8.12	Month 12	2 hrs	1 day	Tue 31/05/05	Tue 31/05/05
		Project Manager	*2 hrs*		*Tue 31/05/05*	*Tue 31/05/05*
63	1.3.9	All project deliverables have been delivered	0 hrs	0 days	Thu 02/06/05	Thu 02/06/05
64	1.3.10	Project closeout	0 hrs	0 days	Thu 02/06/05	Thu 02/06/05
65	**1.4**	**Configuration Management**	**225 hrs**	**35 days?**	**Tue 01/06/04**	**Mon 19/07/04**
66	1.4.1	Plan configuration management	20 hrs	5 days	Tue 01/06/04	Mon 07/06/04
		Configuration Manager 1	*20 hrs*		*Tue 01/06/04*	*Mon 07/06/04*
67	1.4.2	Create Software Configuration Management Plan (SCMP)	30 hrs	5 days	Tue 08/06/04	Mon 14/06/04
		Configuration Manager 1	*30 hrs*		*Tue 08/06/04*	*Mon 14/06/04*
68	1.4.3	SCMP completed	0 hrs	0 days	Mon 14/06/04	Mon 14/06/04
69	1.4.4	Develop configuration identification	15 hrs	5 days	Tue 15/06/04	Mon 21/06/04
		Configuration Manager 1	*15 hrs*		*Tue 15/06/04*	*Mon 21/06/04*
70	1.4.5	Perform configuration control	80 hrs	10 days?	Tue 22/06/04	Mon 05/07/04
		Configuration Manager 1	*80 hrs*		*Tue 22/06/04*	*Mon 05/07/04*
71	1.4.6	Perform status accounting	80 hrs	10 days?	Tue 06/07/04	Mon 19/07/04
		Configuration Manager 1	*80 hrs*		*Tue 06/07/04*	*Mon 19/07/04*
72	**1.5**	**Software Quality Management**	**368 hrs**	**79.33 days?**	**Tue 01/06/04**	**Mon 20/09/04**
73	1.5.1	Plan software quality management	8 hrs	1 day	Tue 01/06/04	Tue 01/06/04
		Quality Analyst 1	*8 hrs*		*Tue 01/06/04*	*Tue 01/06/04*
74	1.5.2	Create Software Quality Assurance Plan (SQAP)	40 hrs	13.33 days	Wed 02/06/04	Mon 21/06/04
		Quality Analyst 1	*40 hrs*		*Wed 02/06/04*	*Mon 21/06/04*
75	1.5.3	SQAP completed	0 hrs	0 days	Mon 21/06/04	Mon 21/06/04
76	1.5.4	Define metrics	80 hrs	10 days	Mon 21/06/04	Mon 05/07/04
		Quality Analyst 1	*80 hrs*		*Mon 21/06/04*	*Mon 05/07/04*
77	1.5.5	Manage software quality	200 hrs	50 days?	Mon 05/07/04	Mon 13/09/04
		Quality Analyst 1	*200 hrs*		*Mon 05/07/04*	*Mon 13/09/04*
78	1.5.6	Identify quality improvement needs	40 hrs	5 days?	Mon 13/09/04	Mon 20/09/04
		Quality Analyst 1	*40 hrs*		*Mon 13/09/04*	*Mon 20/09/04*
79	**1.6**	**System Allocation**	**160 hrs**	**10 days**	**Tue 01/06/04**	**Mon 14/06/04**
80	1.6.1	Analyze functions	40 hrs	2.5 days	Tue 01/06/04	Thu 03/06/04
		Software Architect 1 (Lead)	*20 hrs*		*Tue 01/06/04*	*Thu 03/06/04*
		Software Architect 2	*20 hrs*		*Tue 01/06/04*	*Thu 03/06/04*
81	**1.6.2**	**Develop system architecture**	**80 hrs**	**5 days**	**Thu 03/06/04**	**Thu 10/06/04**
82	1.6.2.1	Identify hardware functions	40 hrs	2.5 days	Thu 03/06/04	Mon 07/06/04
		Software Architect 1 (Lead)	*20 hrs*		*Thu 03/06/04*	*Mon 07/06/04*
		Software Architect 2	*20 hrs*		*Thu 03/06/04*	*Mon 07/06/04*
83	1.6.2.2	Identify software functions	40 hrs	2.5 days	Tue 08/06/04	Thu 10/06/04
		Software Architect 1 (Lead)	*20 hrs*		*Tue 08/06/04*	*Thu 10/06/04*
		Software Architect 2	*20 hrs*		*Tue 08/06/04*	*Thu 10/06/04*
84	1.6.3	Decompose system requirements	40 hrs	2.5 days	Thu 10/06/04	Mon 14/06/04
		Software Architect 1 (Lead)	*20 hrs*		*Thu 10/06/04*	*Mon 14/06/04*
		Software Architect 2	*20 hrs*		*Thu 10/06/04*	*Mon 14/06/04*
85	1.6.4	System allocation completed	0 hrs	0 days	Mon 14/06/04	Mon 14/06/04
86	**1.7**	**Requirements**	**606 hrs**	**37.12 days**	**Tue 01/06/04**	**Thu 22/07/04**
87	**1.7.1**	**Define and develop software requirements**	**160 hrs**	**5 days**	**Tue 15/06/04**	**Mon 21/06/04**
88	1.7.1.1	Define and develop weekly statistical report requirements	40 hrs	2.5 days	Tue 15/06/04	Thu 17/06/04
		Requirements Analyst 2	*20 hrs*		*Tue 15/06/04*	*Thu 17/06/04*
		Consultant 1	*20 hrs*		*Tue 15/06/04*	*Thu 17/06/04*
89	1.7.1.2	Define and develop ATM session statement requirements	40 hrs	2.5 days	Tue 15/06/04	Thu 17/06/04
		Requirements Analyst 1 (Lead)	*20 hrs*		*Tue 15/06/04*	*Thu 17/06/04*
		Consultant 2	*20 hrs*		*Tue 15/06/04*	*Thu 17/06/04*
90	1.7.1.3	Define and develop ATM software requirements	40 hrs	2.5 days	Thu 17/06/04	Mon 21/06/04
		Requirements Analyst 2	*20 hrs*		*Thu 17/06/04*	*Mon 21/06/04*
		Consultant 1	*20 hrs*		*Thu 17/06/04*	*Mon 21/06/04*
91	1.7.1.4	Define and develop central bank software requirements	40 hrs	2.5 days	Thu 17/06/04	Mon 21/06/04
		Requirements Analyst 1 (Lead)	*20 hrs*		*Thu 17/06/04*	*Mon 21/06/04*
		Consultant 2	*20 hrs*		*Thu 17/06/04*	*Mon 21/06/04*
92	**1.7.2**	**Define interface requirements**	**320 hrs**	**25 days**	**Tue 01/06/04**	**Mon 05/07/04**

ID	WBS	Task Name	Work	Duration	Start	Finish
93	1.7.2.1	Define ATM software interface requirements	80 hrs	5 days	Tue 29/06/04	Mon 05/07/04
		Requirements Analyst 1 (Lead)	*40 hrs*		*Tue 29/06/04*	*Mon 05/07/04*
		Consultant 2	*40 hrs*		*Tue 29/06/04*	*Mon 05/07/04*
94	1.7.2.2	Define hardware interface requirements	80 hrs	5 days	Tue 01/06/04	Mon 07/06/04
		Requirements Analyst 2	*40 hrs*		*Tue 01/06/04*	*Mon 07/06/04*
		Consultant 1	*40 hrs*		*Tue 01/06/04*	*Mon 07/06/04*
95	1.7.2.3	Define user interface requirements	80 hrs	5 days	Tue 22/06/04	Mon 28/06/04
		Requirements Analyst 1 (Lead)	*40 hrs*		*Tue 22/06/04*	*Mon 28/06/04*
		Consultant 2	*40 hrs*		*Tue 22/06/04*	*Mon 28/06/04*
96	1.7.2.4	Define central bank interface requirements	80 hrs	5 days	Tue 22/06/04	Mon 28/06/04
		Requirements Analyst 2	*40 hrs*		*Tue 22/06/04*	*Mon 28/06/04*
		Consultant 1	*40 hrs*		*Tue 22/06/04*	*Mon 28/06/04*
97	**1.7.3**	**Prioritize and integrate requirements**	**96 hrs**	**8.37 days**	**Tue 06/07/04**	**Fri 16/07/04**
98	1.7.3.1	Prioritize and integrate software requirements	32 hrs	2.04 days	Tue 06/07/04	Thu 08/07/04
		Requirements Analyst 1 (Lead)	*15.68 hrs*		*Tue 06/07/04*	*Wed 07/07/04*
		Consultant 1	*16.32 hrs*		*Tue 06/07/04*	*Thu 08/07/04*
99	1.7.3.2	Prioritize and integrate interface requirements	32 hrs	2.61 days	Tue 06/07/04	Fri 09/07/04
		Requirements Analyst 2	*12.3 hrs*		*Tue 06/07/04*	*Wed 07/07/04*
		Consultant 2	*19.7 hrs*		*Tue 06/07/04*	*Fri 09/07/04*
100	1.7.3.3	Prioritize and integrate all requirements	32 hrs	3.38 days	Fri 09/07/04	Fri 16/07/04
		Requirements Analyst 1 (Lead)	*6.4 hrs*		*Fri 09/07/04*	*Mon 12/07/04*
		Consultant 1	*25.6 hrs*		*Fri 09/07/04*	*Fri 16/07/04*
101	1.7.4	Create Software Requirements Specification (SRS)	30 hrs	3.75 days	Fri 16/07/04	Thu 22/07/04
		Requirements Analyst 2	*30 hrs*		*Fri 16/07/04*	*Thu 22/07/04*
102	1.7.5	SRS completed	0 hrs	0 days	Thu 22/07/04	Thu 22/07/04
103	**1.8**	**Design**	**1,346.85 hrs**	**90.77 days**	**Thu 22/07/04**	**Thu 25/11/04**
104	**1.8.1**	**Perform architectural design**	**480 hrs**	**20 days**	**Thu 22/07/04**	**Thu 19/08/04**
105	1.8.1.1	Design ATM-to-central bank communication architecture	240 hrs	10 days	Thu 22/07/04	Thu 05/08/04
		Software Architect 1 (Lead)	*80 hrs*		*Thu 22/07/04*	*Thu 05/08/04*
		Consultant 1	*80 hrs*		*Thu 22/07/04*	*Thu 05/08/04*
		Consultant 2	*80 hrs*		*Thu 22/07/04*	*Thu 05/08/04*
106	1.8.1.2	Design ATM software internal architecture	240 hrs	10 days	Thu 05/08/04	Thu 19/08/04
		Software Architect 1 (Lead)	*80 hrs*		*Thu 05/08/04*	*Thu 19/08/04*
		Consultant 1	*80 hrs*		*Thu 05/08/04*	*Thu 19/08/04*
		Consultant 2	*80 hrs*		*Thu 05/08/04*	*Thu 19/08/04*
107	**1.8.2**	**Design the database**	**64 hrs**	**8 days**	**Thu 22/07/04**	**Tue 03/08/04**
108	1.8.2.1	Design card/PIN additions to central system database	24 hrs	3 days	Thu 22/07/04	Tue 27/07/04
		Database Engineer 1	*24 hrs*		*Thu 22/07/04*	*Tue 27/07/04*
109	1.8.2.2	Design ATM transaction additions to central system database	24 hrs	3 days	Tue 27/07/04	Fri 30/07/04
		Database Engineer 1	*24 hrs*		*Tue 27/07/04*	*Fri 30/07/04*
110	1.8.2.3	Design weekly statistical report	16 hrs	2 days	Fri 30/07/04	Tue 03/08/04
		Database Engineer 1	*16 hrs*		*Fri 30/07/04*	*Tue 03/08/04*
111	**1.8.3**	**Design interfaces**	**160 hrs**	**25 days**	**Thu 05/08/04**	**Thu 09/09/04**
112	1.8.3.1	Design ATM software interfaces	40 hrs	5 days	Thu 19/08/04	Thu 26/08/04
		Software Designer 1	*40 hrs*		*Thu 19/08/04*	*Thu 26/08/04*
113	1.8.3.2	Design ATM software-to-hardware interfaces	40 hrs	5 days	Thu 26/08/04	Thu 02/09/04
		Software Designer 1	*40 hrs*		*Thu 26/08/04*	*Thu 02/09/04*
114	1.8.3.3	Design user interfaces	40 hrs	5 days	Thu 02/09/04	Thu 09/09/04
		Software Designer 1	*40 hrs*		*Thu 02/09/04*	*Thu 09/09/04*
115	1.8.3.4	Design central bank system interfaces	40 hrs	5 days	Thu 05/08/04	Thu 12/08/04
		Software Designer 1	*40 hrs*		*Thu 05/08/04*	*Thu 12/08/04*
116	1.8.4	Select or develop algorithms	40 hrs	5 days	Thu 09/09/04	Thu 16/09/04
		Software Designer 1	*40 hrs*		*Thu 09/09/04*	*Thu 16/09/04*
117	**1.8.5**	**Perform detailed design**	**572.85 hrs**	**40 days**	**Thu 23/09/04**	**Thu 18/11/04**
118	1.8.5.1	Detail design ATM software interfaces	160 hrs	10 days	Thu 23/09/04	Thu 07/10/04
		Software Designer 1	*80 hrs*		*Thu 23/09/04*	*Thu 07/10/04*
		Consultant 1	*80 hrs*		*Thu 23/09/04*	*Thu 07/10/04*
119	1.8.5.2	Detail design ATM software-to-hardware interfaces	160 hrs	10 days	Thu 07/10/04	Thu 21/10/04

ID	WBS	Task Name	Work	Duration	Start	Finish
		Software Designer 1	*80 hrs*		*Thu 07/10/04*	*Thu 21/10/04*
		Consultant 1	*80 hrs*		*Thu 07/10/04*	*Thu 21/10/04*
120	1.8.5.3	Detail design user interfaces	92.85 hrs	10 days	Thu 21/10/04	Thu 04/11/04
		Software Designer 1	*12.85 hrs*		*Thu 21/10/04*	*Mon 25/10/04*
		Consultant 1	*80 hrs*		*Thu 21/10/04*	*Thu 04/11/04*
121	1.8.5.4	Detail design central bank system interfaces	160 hrs	10 days	Thu 04/11/04	Thu 18/11/04
		Software Designer 1	*80 hrs*		*Thu 04/11/04*	*Thu 18/11/04*
		Consultant 1	*80 hrs*		*Thu 04/11/04*	*Thu 18/11/04*
122	1.8.6	Create Software Design Specification (SDS)	30 hrs	5 days	Thu 18/11/04	Thu 25/11/04
		Software Designer 1	*30 hrs*		*Thu 18/11/04*	*Thu 25/11/04*
123	1.8.7	SDS completed	0 hrs	0 days	Thu 25/11/04	Thu 25/11/04
124	**1.9**	**Verification & Validation**	**1,683 hrs**	**177.44 days?**	**Thu 19/08/04**	**Mon 25/04/05**
125	**1.9.1**	**Plan verification and validation**	**860 hrs**	**118.84 days**	**Thu 19/08/04**	**Tue 01/02/05**
126	1.9.1.1	Plan requirements verification and validation	180 hrs	6.92 days	Thu 19/08/04	Mon 30/08/04
		Verification Engineer 1 (Lead)	*55.38 hrs*		*Thu 19/08/04*	*Mon 30/08/04*
		Verification Engineer 2	*34.62 hrs*		*Thu 19/08/04*	*Mon 30/08/04*
		Validation Engineer 1	*34.62 hrs*		*Thu 19/08/04*	*Mon 30/08/04*
		Consultant 1	*55.38 hrs*		*Thu 19/08/04*	*Mon 30/08/04*
127	1.9.1.2	Plan architecture verification and validation	180 hrs	6.92 days	Mon 30/08/04	Tue 07/09/04
		Verification Engineer 1 (Lead)	*55.38 hrs*		*Mon 30/08/04*	*Tue 07/09/04*
		Verification Engineer 2	*34.62 hrs*		*Mon 30/08/04*	*Tue 07/09/04*
		Validation Engineer 1	*34.62 hrs*		*Mon 30/08/04*	*Tue 07/09/04*
		Consultant 1	*55.38 hrs*		*Mon 30/08/04*	*Tue 07/09/04*
128	1.9.1.3	Plan interface design verification and validation	180 hrs	6.92 days	Tue 14/09/04	Thu 23/09/04
		Verification Engineer 1 (Lead)	*55.38 hrs*		*Tue 14/09/04*	*Thu 23/09/04*
		Verification Engineer 2	*34.62 hrs*		*Tue 14/09/04*	*Thu 23/09/04*
		Validation Engineer 1	*34.62 hrs*		*Tue 14/09/04*	*Thu 23/09/04*
		Consultant 1	*55.38 hrs*		*Tue 14/09/04*	*Thu 23/09/04*
129	1.9.1.4	Plan database design verification and validation	180 hrs	6.92 days	Thu 18/11/04	Mon 29/11/04
		Verification Engineer 1 (Lead)	*55.38 hrs*		*Thu 18/11/04*	*Mon 29/11/04*
		Verification Engineer 2	*34.62 hrs*		*Thu 18/11/04*	*Mon 29/11/04*
		Validation Engineer 1	*34.62 hrs*		*Thu 18/11/04*	*Mon 29/11/04*
		Consultant 1	*55.38 hrs*		*Thu 18/11/04*	*Mon 29/11/04*
130	1.9.1.5	Create Software Verification & Validation Plan (SVVP)	140 hrs	6.36 days	Mon 24/01/05	Tue 01/02/05
		Verification Engineer 1 (Lead)	*50.92 hrs*		*Mon 24/01/05*	*Tue 01/02/05*
		Verification Engineer 2	*19.08 hrs*		*Mon 24/01/05*	*Tue 01/02/05*
		Validation Engineer 1	*19.08 hrs*		*Mon 24/01/05*	*Tue 01/02/05*
		Consultant 1	*50.92 hrs*		*Mon 24/01/05*	*Tue 01/02/05*
131	1.9.1.6	SVVP completed	0 hrs	0 days	Tue 01/02/05	Tue 01/02/05
132	**1.9.2**	**Execute verification and validation tasks**	**128 hrs**	**63.85 days**	**Tue 07/09/04**	**Mon 06/12/04**
133	1.9.2.1	Verify requirements	16 hrs	5 days	Tue 07/09/04	Tue 14/09/04
		Verification Engineer 2	*16 hrs*		*Tue 07/09/04*	*Tue 14/09/04*
134	1.9.2.2	Validate requirements	16 hrs	5 days	Tue 07/09/04	Tue 14/09/04
		Validation Engineer 1	*16 hrs*		*Tue 07/09/04*	*Tue 14/09/04*
135	1.9.2.3	Verify architecture	16 hrs	5 days	Tue 07/09/04	Tue 14/09/04
		Verification Engineer 2	*16 hrs*		*Tue 07/09/04*	*Tue 14/09/04*
136	1.9.2.4	Validate architecture	16 hrs	5 days	Tue 07/09/04	Tue 14/09/04
		Validation Engineer 1	*16 hrs*		*Tue 07/09/04*	*Tue 14/09/04*
137	1.9.2.5	Verify interface design	16 hrs	5 days	Mon 29/11/04	Mon 06/12/04
		Verification Engineer 2	*16 hrs*		*Mon 29/11/04*	*Mon 06/12/04*
138	1.9.2.6	Validate interface design	16 hrs	5 days	Mon 29/11/04	Mon 06/12/04
		Validation Engineer 1	*16 hrs*		*Mon 29/11/04*	*Mon 06/12/04*
139	1.9.2.7	Verify database design	16 hrs	5 days	Mon 29/11/04	Mon 06/12/04
		Verification Engineer 2	*16 hrs*		*Mon 29/11/04*	*Mon 06/12/04*
140	1.9.2.8	Validate database design	16 hrs	5 days	Mon 29/11/04	Mon 06/12/04
		Validation Engineer 1	*16 hrs*		*Mon 29/11/04*	*Mon 06/12/04*
141	1.9.3	Requirements & Design V&V completed	0 hrs	0 days	Mon 06/12/04	Mon 06/12/04
142	1.9.4	Collect and analyze metric data	80 hrs	5 days?	Tue 01/02/05	Tue 08/02/05

ID	WBS	Task Name	Work	Duration	Start	Finish
		Verification Engineer 2	*40 hrs*		*Tue 01/02/05*	*Tue 08/02/05*
		Validation Engineer 1	*40 hrs*		*Tue 01/02/05*	*Tue 08/02/05*
143	**1.9.5**	**Plan testing**	**210 hrs**	**54.25 days**	**Mon 06/12/04**	**Mon 21/02/05**
144	1.9.5.1	Plan ATM software-to-hardware interface black box test	40 hrs	3.33 days	Mon 06/12/04	Fri 10/12/04
		Verification Engineer 1 (Lead)	*26.67 hrs*		*Mon 06/12/04*	*Fri 10/12/04*
		Verification Engineer 2	*13.33 hrs*		*Mon 06/12/04*	*Fri 10/12/04*
145	1.9.5.2	Plan ATM software interface black box test	40 hrs	3.33 days	Fri 10/12/04	Wed 15/12/04
		Verification Engineer 1 (Lead)	*26.67 hrs*		*Fri 10/12/04*	*Wed 15/12/04*
		Verification Engineer 2	*13.33 hrs*		*Fri 10/12/04*	*Wed 15/12/04*
146	1.9.5.3	Plan end user test	20 hrs	1.67 days	Mon 20/12/04	Tue 21/12/04
		Verification Engineer 1 (Lead)	*13.33 hrs*		*Mon 20/12/04*	*Tue 21/12/04*
		Verification Engineer 2	*6.67 hrs*		*Mon 20/12/04*	*Tue 21/12/04*
147	1.9.5.4	Plan central bank interface black box test	40 hrs	3.33 days	Tue 15/02/05	Mon 21/02/05
		Verification Engineer 1 (Lead)	*26.67 hrs*		*Tue 15/02/05*	*Mon 21/02/05*
		Verification Engineer 2	*13.33 hrs*		*Tue 15/02/05*	*Mon 21/02/05*
148	1.9.5.5	Plan weekly statistical report test	30 hrs	2.73 days	Wed 15/12/04	Mon 20/12/04
		Verification Engineer 1 (Lead)	*21.82 hrs*		*Wed 15/12/04*	*Mon 20/12/04*
		Verification Engineer 2	*8.18 hrs*		*Wed 15/12/04*	*Mon 20/12/04*
149	1.9.5.6	Create Software Test Plan (STP)	40 hrs	2.5 days	Tue 21/12/04	Fri 24/12/04
		Verification Engineer 1 (Lead)	*20 hrs*		*Tue 21/12/04*	*Fri 24/12/04*
		Verification Engineer 2	*20 hrs*		*Tue 21/12/04*	*Fri 24/12/04*
150	1.9.5.7	STP completed	0 hrs	0 days	Fri 24/12/04	Fri 24/12/04
151	**1.9.6**	**Develop test requirements**	**310 hrs**	**20.23 days**	**Fri 24/12/04**	**Fri 21/01/05**
152	1.9.6.1	Design ATM software-to-hardware interface black box test	80 hrs	5 days	Fri 24/12/04	Fri 31/12/04
		Verification Engineer 1 (Lead)	*40 hrs*		*Fri 24/12/04*	*Fri 31/12/04*
		Verification Engineer 2	*40 hrs*		*Fri 24/12/04*	*Fri 31/12/04*
153	1.9.6.2	Design ATM software interface black box test	80 hrs	5 days	Fri 31/12/04	Fri 07/01/05
		Verification Engineer 1 (Lead)	*40 hrs*		*Fri 31/12/04*	*Fri 07/01/05*
		Verification Engineer 2	*40 hrs*		*Fri 31/12/04*	*Fri 07/01/05*
154	1.9.6.3	Design end user test	40 hrs	2.5 days	Fri 07/01/05	Tue 11/01/05
		Verification Engineer 1 (Lead)	*20 hrs*		*Fri 07/01/05*	*Tue 11/01/05*
		Verification Engineer 2	*20 hrs*		*Fri 07/01/05*	*Tue 11/01/05*
155	1.9.6.4	Design central bank interface black box test	80 hrs	5 days	Tue 11/01/05	Tue 18/01/05
		Verification Engineer 1 (Lead)	*40 hrs*		*Tue 11/01/05*	*Tue 18/01/05*
		Verification Engineer 2	*40 hrs*		*Tue 11/01/05*	*Tue 18/01/05*
156	1.9.6.5	Design weekly statistical report test	30 hrs	2.73 days	Tue 18/01/05	Fri 21/01/05
		Verification Engineer 1 (Lead)	*21.82 hrs*		*Tue 18/01/05*	*Fri 21/01/05*
		Verification Engineer 2	*8.18 hrs*		*Tue 18/01/05*	*Fri 21/01/05*
157	**1.9.7**	**Execute the tests**	**95 hrs**	**53.6 days**	**Tue 08/02/05**	**Mon 25/04/05**
158	1.9.7.1	Execute ATM software-to-hardware interface black box test	20 hrs	2.38 days	Tue 08/02/05	Fri 11/02/05
		Verification Engineer 1 (Lead)	*19.05 hrs*		*Tue 08/02/05*	*Fri 11/02/05*
		Verification Engineer 2	*0.95 hrs*		*Tue 08/02/05*	*Wed 09/02/05*
159	1.9.7.2	Execute ATM software interface black box test	20 hrs	2.38 days	Fri 11/02/05	Tue 15/02/05
		Verification Engineer 1 (Lead)	*19.05 hrs*		*Fri 11/02/05*	*Tue 15/02/05*
		Verification Engineer 2	*0.95 hrs*		*Fri 11/02/05*	*Fri 11/02/05*
160	1.9.7.3	Execute end user test	20 hrs	2.38 days	Mon 28/02/05	Wed 02/03/05
		Verification Engineer 1 (Lead)	*19.05 hrs*		*Mon 28/02/05*	*Wed 02/03/05*
		Verification Engineer 2	*0.95 hrs*		*Mon 28/02/05*	*Mon 28/02/05*
161	1.9.7.4	Execute central bank interface black box test	20 hrs	2.38 days	Thu 31/03/05	Mon 04/04/05
		Verification Engineer 1 (Lead)	*19.05 hrs*		*Thu 31/03/05*	*Mon 04/04/05*
		Verification Engineer 2	*0.95 hrs*		*Thu 31/03/05*	*Thu 31/03/05*
162	1.9.7.5	Execute weekly statistical report test	15 hrs	5 days	Mon 18/04/05	Mon 25/04/05
		Verification Engineer 1 (Lead)	*7.5 hrs*		*Mon 18/04/05*	*Mon 25/04/05*
		Verification Engineer 2	*7.5 hrs*		*Mon 18/04/05*	*Mon 25/04/05*
163	1.9.8	V&V completed	0 hrs	0 days	Mon 25/04/05	Mon 25/04/05
164	**1.10**	**Documentation development**	**298 hrs**	**40 days**	**Mon 06/12/04**	**Mon 31/01/05**
165	**1.10.1**	**Plan documentation**	**160 hrs**	**40 days**	**Mon 06/12/04**	**Mon 31/01/05**
166	1.10.1.1	Define installation documentation contents	40 hrs	5 days	Mon 06/12/04	Mon 13/12/04

ID	WBS	Task Name	Work	Duration	Start	Finish
		Technical Writer 1	*40 hrs*		*Mon 06/12/04*	*Mon 13/12/04*
167	1.10.1.2	Define ATM software documentation contents	40 hrs	5 days	Mon 13/12/04	Mon 20/12/04
		Technical Writer 1	*40 hrs*		*Mon 13/12/04*	*Mon 20/12/04*
168	1.10.1.3	Define central bank accounting system documentation updates	40 hrs	5 days	Mon 20/12/04	Mon 27/12/04
		Technical Writer 1	*40 hrs*		*Mon 20/12/04*	*Mon 27/12/04*
169	1.10.1.4	Create documentation plan	40 hrs	5 days	Mon 24/01/05	Mon 31/01/05
		Technical Writer 1	*40 hrs*		*Mon 24/01/05*	*Mon 31/01/05*
170	**1.10.2**	**Implement documentation**	**120 hrs**	**20 days**	**Mon 27/12/04**	**Mon 24/01/05**
171	1.10.2.1	Write installation documentation	40 hrs	10 days	Mon 27/12/04	Mon 10/01/05
		Technical Writer 1	*40 hrs*		*Mon 27/12/04*	*Mon 10/01/05*
172	1.10.2.2	Write ATM software documentation	40 hrs	10 days	Mon 27/12/04	Mon 10/01/05
		Technical Writer 1	*40 hrs*		*Mon 27/12/04*	*Mon 10/01/05*
173	1.10.2.3	Write central bank accounting system documentation updates	40 hrs	10 days	Mon 10/01/05	Mon 24/01/05
		Technical Writer 1	*40 hrs*		*Mon 10/01/05*	*Mon 24/01/05*
174	**1.10.3**	**Produce and distribute documentation**	**18 hrs**	**15 days**	**Mon 10/01/05**	**Mon 31/01/05**
175	1.10.3.1	Print installation documentation	4 hrs	1 day	Mon 10/01/05	Tue 11/01/05
		Printing Services	*4 hrs*		*Mon 10/01/05*	*Tue 11/01/05*
176	1.10.3.2	Print ATM software documentation	4 hrs	1 day	Mon 10/01/05	Tue 11/01/05
		Printing Services	*4 hrs*		*Mon 10/01/05*	*Tue 11/01/05*
177	1.10.3.3	Print central bank accounting system documentation	4 hrs	1 day	Mon 24/01/05	Tue 25/01/05
		Printing Services	*4 hrs*		*Mon 24/01/05*	*Tue 25/01/05*
178	1.10.3.4	Distribute installation documentation to installers	2 hrs	4 days	Tue 11/01/05	Mon 17/01/05
		Project Manager	*2 hrs*		*Tue 11/01/05*	*Mon 17/01/05*
179	1.10.3.5	Distribute ATM software documentation to ATM sites	2 hrs	4 days	Tue 11/01/05	Mon 17/01/05
		Project Manager	*2 hrs*		*Tue 11/01/05*	*Mon 17/01/05*
180	1.10.3.6	Distribute central bank accounting system documentation to end users	2 hrs	4 days	Tue 25/01/05	Mon 31/01/05
		Project Manager	*2 hrs*		*Tue 25/01/05*	*Mon 31/01/05*
181	1.10.4	Documentation completed	0 hrs	0 days	Mon 31/01/05	Mon 31/01/05
182	**1.11**	**Training**	**241 hrs**	**130.67 days**	**Thu 25/11/04**	**Fri 27/05/05**
183	**1.11.1**	**Plan the training program**	**120 hrs**	**117.67 days**	**Thu 25/11/04**	**Tue 10/05/05**
184	1.11.1.1	Plan installation training content	40 hrs	5 days	Tue 03/05/05	Tue 10/05/05
		Training Specialist 1	*40 hrs*		*Tue 03/05/05*	*Tue 10/05/05*
185	1.11.1.2	Plan ATM site training content	40 hrs	5 days	Thu 25/11/04	Thu 02/12/04
		Training Specialist 1	*40 hrs*		*Thu 25/11/04*	*Thu 02/12/04*
186	1.11.1.3	Plan software maintenance training content	40 hrs	5 days	Tue 26/04/05	Tue 03/05/05
		Training Specialist 1	*40 hrs*		*Tue 26/04/05*	*Tue 03/05/05*
187	**1.11.2**	**Develop training materials**	**90 hrs**	**123.67 days**	**Thu 02/12/04**	**Wed 25/05/05**
188	1.11.2.1	Create installation training materials	30 hrs	5 days	Wed 18/05/05	Wed 25/05/05
		Training Specialist 1	*30 hrs*		*Wed 18/05/05*	*Wed 25/05/05*
189	1.11.2.2	Create ATM site training materials	30 hrs	5 days	Thu 02/12/04	Thu 09/12/04
		Training Specialist 1	*30 hrs*		*Thu 02/12/04*	*Thu 09/12/04*
190	1.11.2.3	Create software maintenance training materials	30 hrs	5 days	Tue 10/05/05	Tue 17/05/05
		Training Specialist 1	*30 hrs*		*Tue 10/05/05*	*Tue 17/05/05*
191	**1.11.3**	**Validate the training program**	**15 hrs**	**119.67 days**	**Thu 09/12/04**	**Thu 26/05/05**
192	1.11.3.1	Validate installation training content	5 hrs	1 day	Wed 25/05/05	Thu 26/05/05
		Training Specialist 1	*5 hrs*		*Wed 25/05/05*	*Thu 26/05/05*
193	1.11.3.2	Validate ATM site training content	5 hrs	1 day	Thu 09/12/04	Fri 10/12/04
		Training Specialist 1	*5 hrs*		*Thu 09/12/04*	*Fri 10/12/04*
194	1.11.3.3	Validate software maintenance training content	5 hrs	1 day	Tue 17/05/05	Wed 18/05/05
		Training Specialist 1	*5 hrs*		*Tue 17/05/05*	*Wed 18/05/05*
195	**1.11.4**	**Implement the training program**	**16 hrs**	**119.67 days**	**Fri 10/12/04**	**Fri 27/05/05**
196	1.11.4.1	Hold training session for ATM sites	2 hrs	1 day	Fri 10/12/04	Mon 13/12/04
		Training Specialist 1	*2 hrs*		*Fri 10/12/04*	*Mon 13/12/04*
197	1.11.4.2	Hold training session for software maintenance team	10 hrs	5 days	Wed 18/05/05	Wed 25/05/05
		Training Specialist 1	*10 hrs*		*Wed 18/05/05*	*Wed 25/05/05*
198	1.11.4.3	Hold training session for installers	4 hrs	1 day	Thu 26/05/05	Fri 27/05/05
		Training Specialist 1	*4 hrs*		*Thu 26/05/05*	*Fri 27/05/05*
199	1.11.5	Training completed	0 hrs	0 days	Fri 27/05/05	Fri 27/05/05

ID	WBS	Task Name	Work	Duration	Start	Finish
200	**1.12**	**Implementation**	**1,293.33 hrs**	**100.75 days**	**Mon 06/12/04**	**Tue 26/04/05**
201	1.12.1	Create test data	8 hrs	1 day	Fri 21/01/05	Mon 24/01/05
		Verification Engineer 2	*8 hrs*		*Fri 21/01/05*	*Mon 24/01/05*
202	**1.12.2**	**Create source code**	**1,140 hrs**	**93.75 days**	**Mon 06/12/04**	**Fri 15/04/05**
203	1.12.2.1	Code ATM software-to-hardware interfaces	350 hrs	21.88 days	Mon 06/12/04	Wed 05/01/05
		Programmer 1 (Lead)	*175 hrs*		*Mon 06/12/04*	*Wed 05/01/05*
		Programmer 2	*175 hrs*		*Mon 06/12/04*	*Wed 05/01/05*
204	1.12.2.2	Code ATM software interfaces	350 hrs	21.88 days	Wed 05/01/05	Fri 04/02/05
		Programmer 1 (Lead)	*175 hrs*		*Wed 05/01/05*	*Fri 04/02/05*
		Programmer 2	*175 hrs*		*Wed 05/01/05*	*Fri 04/02/05*
205	1.12.2.3	Code user interfaces	160 hrs	10 days	Fri 11/02/05	Fri 25/02/05
		Programmer 1 (Lead)	*80 hrs*		*Fri 11/02/05*	*Fri 25/02/05*
		Programmer 2	*80 hrs*		*Fri 11/02/05*	*Fri 25/02/05*
206	1.12.2.4	Code central bank interfaces	240 hrs	15 days	Wed 09/03/05	Wed 30/03/05
		Programmer 1 (Lead)	*120 hrs*		*Wed 09/03/05*	*Wed 30/03/05*
		Programmer 2	*120 hrs*		*Wed 09/03/05*	*Wed 30/03/05*
207	1.12.2.5	Code weekly statistical report generation routines	40 hrs	2.5 days	Wed 13/04/05	Fri 15/04/05
		Programmer 1 (Lead)	*20 hrs*		*Wed 13/04/05*	*Fri 15/04/05*
		Programmer 2	*20 hrs*		*Wed 13/04/05*	*Fri 15/04/05*
208	**1.12.3**	**Generate object code**	**40 hrs**	**51 days**	**Fri 04/02/05**	**Mon 18/04/05**
209	1.12.3.1	Generate ATM software-to-hardware interface object code	8 hrs	1 day	Fri 04/02/05	Mon 07/02/05
		Programmer 1 (Lead)	*8 hrs*		*Fri 04/02/05*	*Mon 07/02/05*
		Computer time for object code generation	*4*		*Fri 04/02/05*	*Mon 07/02/05*
210	1.12.3.2	Generate ATM software interface object code	8 hrs	1 day	Mon 07/02/05	Tue 08/02/05
		Programmer 1 (Lead)	*8 hrs*		*Mon 07/02/05*	*Tue 08/02/05*
		Computer time for object code generation	*4*		*Mon 07/02/05*	*Tue 08/02/05*
211	1.12.3.3	Generate ATM user interface object code	8 hrs	1 day	Fri 25/02/05	Mon 28/02/05
		Programmer 1 (Lead)	*8 hrs*		*Fri 25/02/05*	*Mon 28/02/05*
		Computer time for object code generation	*4*		*Fri 25/02/05*	*Mon 28/02/05*
212	1.12.3.4	Generate central bank interface object code	8 hrs	1 day	Wed 30/03/05	Thu 31/03/05
		Programmer 1 (Lead)	*8 hrs*		*Wed 30/03/05*	*Thu 31/03/05*
		Computer time for object code generation	*4*		*Wed 30/03/05*	*Thu 31/03/05*
213	1.12.3.5	Generate weekly statistical report generation object code	8 hrs	1 day	Fri 15/04/05	Mon 18/04/05
		Programmer 1 (Lead)	*8 hrs*		*Fri 15/04/05*	*Mon 18/04/05*
		Computer time for object code generation	*4*		*Fri 15/04/05*	*Mon 18/04/05*
214	**1.12.4**	**Plan integration**	**80 hrs**	**51.5 days**	**Tue 08/02/05**	**Thu 21/04/05**
215	1.12.4.1	Plan integration of ATM software/hardware interface and software interfaces	20 hrs	2.5 days	Tue 08/02/05	Fri 11/02/05
		Programmer 1 (Lead)	*20 hrs*		*Tue 08/02/05*	*Fri 11/02/05*
216	1.12.4.2	Plan integration of ATM software with user interfaces	20 hrs	2.5 days	Mon 07/03/05	Wed 09/03/05
		Programmer 1 (Lead)	*20 hrs*		*Mon 07/03/05*	*Wed 09/03/05*
217	1.12.4.3	Plan integration of ATM software with central bank	20 hrs	2.5 days	Thu 07/04/05	Tue 12/04/05
		Programmer 1 (Lead)	*20 hrs*		*Thu 07/04/05*	*Tue 12/04/05*
218	1.12.4.4	Plan integration of weekly statistical report with central bank	20 hrs	2.5 days	Mon 18/04/05	Thu 21/04/05
		Programmer 1 (Lead)	*20 hrs*		*Mon 18/04/05*	*Thu 21/04/05*
219	**1.12.5**	**Perform integration**	**25.33 hrs**	**41.5 days**	**Mon 28/02/05**	**Tue 26/04/05**
220	1.12.5.1	Integrate ATM software/hardware interface with software interfaces	8 hrs	5 days	Mon 28/02/05	Mon 07/03/05
		Programmer 1 (Lead)	*8 hrs*		*Mon 28/02/05*	*Mon 07/03/05*
221	1.12.5.2	Integrate ATM software with user interfaces	8 hrs	5 days	Thu 31/03/05	Thu 07/04/05
		Programmer 1 (Lead)	*8 hrs*		*Thu 31/03/05*	*Thu 07/04/05*
222	1.12.5.3	Integrate ATM software product with central bank	5.33 hrs	1 day	Tue 12/04/05	Wed 13/04/05
		Programmer 1 (Lead)	*2.67 hrs*		*Tue 12/04/05*	*Wed 13/04/05*
		Database Engineer 1	*2.67 hrs*		*Tue 12/04/05*	*Wed 13/04/05*
223	1.12.5.4	Integrate weekly statistical report with central bank	4 hrs	1 day	Mon 25/04/05	Tue 26/04/05
		Programmer 1 (Lead)	*2 hrs*		*Mon 25/04/05*	*Tue 26/04/05*
		Database Engineer 1	*2 hrs*		*Mon 25/04/05*	*Tue 26/04/05*
224	1.12.6	Implementation completed	0 hrs	0 days	Tue 26/04/05	Tue 26/04/05
225	**1.13**	**Installation**	**97 hrs**	**127.75 days**	**Mon 06/12/04**	**Thu 02/06/05**
226	**1.13.1**	**Plan installation**	**55 hrs**	**4.82 days**	**Mon 06/12/04**	**Mon 13/12/04**

ID	WBS	Task Name	Work	Duration	Start	Finish
227	1.13.1.1	Plan installation of ATM software product onto ATM machines	20 hrs	2.5 days	Mon 06/12/04	Thu 09/12/04
		Installation Specialist 1	*20 hrs*		*Mon 06/12/04*	*Thu 09/12/04*
228	1.13.1.2	Plan installation of modifications to central bank system	20 hrs	1.25 days	Thu 09/12/04	Fri 10/12/04
		Database Engineer 1	*10 hrs*		*Thu 09/12/04*	*Fri 10/12/04*
		Installation Specialist 1	*10 hrs*		*Thu 09/12/04*	*Fri 10/12/04*
229	1.13.1.3	Plan installation of weekly statistical report	15 hrs	1.07 days	Fri 10/12/04	Mon 13/12/04
		Database Engineer 1	*8.57 hrs*		*Fri 10/12/04*	*Mon 13/12/04*
		Installation Specialist 1	*6.43 hrs*		*Fri 10/12/04*	*Mon 13/12/04*
230	**1.13.2**	**Distribute software**	**6 hrs**	**10.5 days**	**Wed 13/04/05**	**Wed 27/04/05**
231	1.13.2.1	Distribute ATM software product to ATM installation team	2 hrs	1 day	Wed 13/04/05	Thu 14/04/05
		Installation Specialist 1	*2 hrs*		*Wed 13/04/05*	*Thu 14/04/05*
232	1.13.2.2	Distribute central bank system modifications to central bank installation team	2 hrs	1 day	Tue 26/04/05	Wed 27/04/05
		Installation Specialist 1	*2 hrs*		*Tue 26/04/05*	*Wed 27/04/05*
233	1.13.2.3	Distribute weekly statistical report to central bank installation team	2 hrs	1 day	Tue 26/04/05	Wed 27/04/05
		Installation Specialist 1	*2 hrs*		*Tue 26/04/05*	*Wed 27/04/05*
234	**1.13.3**	**Install software**	**24 hrs**	**35 days**	**Thu 14/04/05**	**Thu 02/06/05**
235	1.13.3.1	Install ATM software product onto all ATM machines	20 hrs	3 days	Thu 14/04/05	Tue 19/04/05
		Installation Specialist 1	*20 hrs*		*Thu 14/04/05*	*Tue 19/04/05*
236	1.13.3.2	Install central bank system modifications	2 hrs	1 day	Tue 31/05/05	Wed 01/06/05
		Database Engineer 1	*1 hr*		*Tue 31/05/05*	*Wed 01/06/05*
		Installation Specialist 1	*1 hr*		*Tue 31/05/05*	*Wed 01/06/05*
237	1.13.3.3	Install weekly statistical report	2 hrs	1 day	Wed 01/06/05	Thu 02/06/05
		Database Engineer 1	*1.33 hrs*		*Wed 01/06/05*	*Thu 02/06/05*
		Installation Specialist 1	*0.67 hrs*		*Wed 01/06/05*	*Thu 02/06/05*
238	1.13.4	ATMs installed on-site by third party	0 hrs	30 days	Tue 19/04/05	Tue 31/05/05
239	**1.13.5**	**Accept software in operational environment**	**12 hrs**	**2.5 days**	**Tue 31/05/05**	**Thu 02/06/05**
240	1.13.5.1	Accept configured ATMs in banking locations	4 hrs	0.5 days	Tue 31/05/05	Tue 31/05/05
		Project Manager	*2 hrs*		*Tue 31/05/05*	*Tue 31/05/05*
		Installation Specialist 1	*2 hrs*		*Tue 31/05/05*	*Tue 31/05/05*
241	1.13.5.2	Accept modified central bank system	4 hrs	0.5 days	Wed 01/06/05	Wed 01/06/05
		Project Manager	*2 hrs*		*Wed 01/06/05*	*Wed 01/06/05*
		Installation Specialist 1	*2 hrs*		*Wed 01/06/05*	*Wed 01/06/05*
242	1.13.5.3	Accept weekly statistical report	4 hrs	0.5 days	Thu 02/06/05	Thu 02/06/05
		Project Manager	*2 hrs*		*Thu 02/06/05*	*Thu 02/06/05*
		Installation Specialist 1	*2 hrs*		*Thu 02/06/05*	*Thu 02/06/05*
243	1.13.6	Installation completed	0 hrs	0 days	Thu 02/06/05	Thu 02/06/05
244	**1.14**	**Operation & Support**	**0 hrs**	**2 days?**	**Thu 02/06/05**	**Mon 06/06/05**
245	1.14.1	Operate the system	0 hrs	1 day?	Thu 02/06/05	Fri 03/06/05
246	1.14.2	Provide technical assistance and consulting	0 hrs	1 day?	Fri 03/06/05	Mon 06/06/05
247	1.14.3	Maintain support request log	0 hrs	1 day?	Fri 03/06/05	Mon 06/06/05
248	**1.15**	**Maintenance**	**0 hrs**	**1 day?**	**Fri 03/06/05**	**Mon 06/06/05**
249	1.15.1	Reapply a software lifecycle	0 hrs	1 day?	Fri 03/06/05	Mon 06/06/05

Appendix H

Budget Allocation Table

ID	WBS	Task Name	Work	Cost
1	**1**	**Nirvana National Bank ATM project**	**7,583.2 hrs**	**$1,766,278.70**
2	**1.1**	**Software Lifecycle Model Process**	**4 hrs**	**$1,000.00**
3	1.1.1	Identify candidate SLCMs	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*
4	1.1.2	Select project model	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*
5	**1.2**	**Project Initiation**	**351 hrs**	**$122,550.00**
6	1.2.1	Map activities to the SLCM	4 hrs	$1,000.00
		Project Manager	*4 hrs*	*$1,000.00*
7	**1.2.2**	**Allocate project resources**	**26 hrs**	**$6,500.00**
8	1.2.2.1	Identify staffing requirements	8 hrs	$2,000.00
		Project Manager	*8 hrs*	*$2,000.00*
9	1.2.2.2	Acquire commitment from required staff	8 hrs	$2,000.00
		Project Manager	*8 hrs*	*$2,000.00*
10	1.2.2.3	Allocate identified activites to staff	10 hrs	$2,500.00
		Project Manager	*10 hrs*	*$2,500.00*
11	**1.2.3**	**Establish project environment**	**56 hrs**	**$53,000.00**
12	1.2.3.1	Identify tool requirements	20 hrs	$5,000.00
		Project Manager	*20 hrs*	*$5,000.00*
13	1.2.3.2	Acquire required tools	10 hrs	$17,500.00
		Project Manager	*10 hrs*	*$2,500.00*
		Computer software purchase	*30*	*$15,000.00*
14	1.2.3.3	Identify communication needs	8 hrs	$2,000.00
		Project Manager	*8 hrs*	*$2,000.00*
15	1.2.3.4	Create communication plan	16 hrs	$4,000.00
		Project Manager	*16 hrs*	*$4,000.00*
16	1.2.3.5	Establish documentation repository	1 hr	$12,250.00
		Project Manager	*1 hr*	*$250.00*
		Software repository	*24*	*$12,000.00*
17	1.2.3.6	Establish software engineering workspaces	1 hr	$12,250.00
		Project Manager	*1 hr*	*$250.00*
		Software repository	*24*	*$12,000.00*
18	**1.2.4**	**Plan project management**	**265 hrs**	**$62,050.00**
19	1.2.4.1	Create baseline Work Breakdown Structure (WBS)	100 hrs	$22,000.00
		Project Manager	*40 hrs*	*$10,000.00*
		Programmer 1 (Lead)	*20 hrs*	*$4,000.00*
		Verification Engineer 2	*20 hrs*	*$4,000.00*
		Software Architect 1 (Lead)	*20 hrs*	*$4,000.00*
20	**1.2.4.2**	**Create SPMP subplans**	**114 hrs**	**$27,300.00**
21	1.2.4.2.1	Create start-up plan	34 hrs	$7,300.00
		Project Manager	*10 hrs*	*$2,500.00*
		Requirements Analyst 2	*6 hrs*	*$1,200.00*
		Programmer 1 (Lead)	*6 hrs*	*$1,200.00*
		Verification Engineer 2	*6 hrs*	*$1,200.00*
		Software Architect 1 (Lead)	*6 hrs*	*$1,200.00*
22	1.2.4.2.2	Create work plan	10 hrs	$2,500.00
		Project Manager	*10 hrs*	*$2,500.00*
23	1.2.4.2.3	Create control plan	10 hrs	$2,500.00
		Project Manager	*10 hrs*	*$2,500.00*
24	1.2.4.2.4	Create risk management plan	10 hrs	$2,500.00
		Project Manager	*10 hrs*	*$2,500.00*
25	1.2.4.2.5	Create closeout plan	10 hrs	$2,500.00
		Project Manager	*10 hrs*	*$2,500.00*
26	1.2.4.2.6	Create technical process plans	10 hrs	$2,500.00
		Project Manager	*10 hrs*	*$2,500.00*
27	1.2.4.2.7	Create subcontractor management plan	10 hrs	$2,500.00
		Project Manager	*10 hrs*	*$2,500.00*
28	1.2.4.2.8	Create process improvement plan	10 hrs	$2,500.00

ID	WBS	Task Name	Work	Cost
		Project Manager	*10 hrs*	*$2,500.00*
29	1.2.4.2.9	Create problem resolution plan	10 hrs	$2,500.00
		Project Manager	*10 hrs*	*$2,500.00*
30	1.2.4.3	Assemble baseline SPMP document	8 hrs	$2,000.00
		Project Manager	*8 hrs*	*$2,000.00*
31	1.2.4.4	Baseline SPMP completed	0 hrs	$0.00
32	1.2.4.5	Create schedule baseline	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*
33	**1.2.4.6**	**Finalize project charter**	**41 hrs**	**$10,250.00**
34	1.2.4.6.1	Create project charter	40 hrs	$10,000.00
		Project Manager	*40 hrs*	*$10,000.00*
35	1.2.4.6.2	Deliver project charter to NNB for signoff	1 hr	$250.00
		Project Manager	*1 hr*	*$250.00*
36	1.2.4.6.3	Receive signed project charter from NNB	0 hrs	$0.00
37	1.2.4.6.4	Baseline project charter completed	0 hrs	$0.00
38	1.2.4.7	Receive ATM hardware documentation	0 hrs	$0.00
39	**1.3**	**Project Monitoring & Control**	**910 hrs**	**$227,500.00**
40	1.3.1	Project kickoff	0 hrs	$0.00
41	1.3.2	Analyze risks	40 hrs	$10,000.00
		Project Manager	*40 hrs*	*$10,000.00*
42	1.3.3	Perform contingency planning	40 hrs	$10,000.00
		Project Manager	*40 hrs*	*$10,000.00*
43	**1.3.4**	**Manage the project**	**656 hrs**	**$164,000.00**
44	1.3.4.1	Steering Committee meetings	48 hrs	$12,000.00
		Project Manager	*48 hrs*	*$12,000.00*
45	1.3.4.2	Project team meetings	300 hrs	$75,000.00
		Project Manager	*300 hrs*	*$75,000.00*
46	1.3.4.3	Other project management tasks	308 hrs	$77,000.00
		Project Manager	*308 hrs*	*$77,000.00*
47	1.3.5	Retain records	80 hrs	$20,000.00
		Project Manager	*80 hrs*	*$20,000.00*
48	1.3.6	Implement problem reporting method	40 hrs	$10,000.00
		Project Manager	*40 hrs*	*$10,000.00*
49	1.3.7	Maintain project charter	30 hrs	$7,500.00
		Project Manager	*30 hrs*	*$7,500.00*
50	**1.3.8**	**SPMP Scheduled Updates**	**24 hrs**	**$6,000.00**
51	1.3.8.1	Month 1	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*
52	1.3.8.2	Month 2	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*
53	1.3.8.3	Month 3	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*
54	1.3.8.4	Month 4	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*
55	1.3.8.5	Month 5	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*
56	1.3.8.6	Month 6	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*
57	1.3.8.7	Month 7	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*
58	1.3.8.8	Month 8	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*
59	1.3.8.9	Month 9	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*
60	1.3.8.10	Month 10	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*
61	1.3.8.11	Month 11	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*

ID	WBS	Task Name	Work	Cost
62	1.3.8.12	Month 12	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*
63	1.3.9	All project deliverables have been delivered	0 hrs	$0.00
64	1.3.10	Project closeout	0 hrs	$0.00
65	**1.4**	**Configuration Management**	**225 hrs**	**$39,375.00**
66	1.4.1	Plan configuration management	20 hrs	$3,500.00
		Configuration Manager 1	*20 hrs*	*$3,500.00*
67	1.4.2	Create Software Configuration Management Plan (SCMP)	30 hrs	$5,250.00
		Configuration Manager 1	*30 hrs*	*$5,250.00*
68	1.4.3	SCMP completed	0 hrs	$0.00
69	1.4.4	Develop configuration identification	15 hrs	$2,625.00
		Configuration Manager 1	*15 hrs*	*$2,625.00*
70	1.4.5	Perform configuration control	80 hrs	$14,000.00
		Configuration Manager 1	*80 hrs*	*$14,000.00*
71	1.4.6	Perform status accounting	80 hrs	$14,000.00
		Configuration Manager 1	*80 hrs*	*$14,000.00*
72	**1.5**	**Software Quality Management**	**368 hrs**	**$64,400.00**
73	1.5.1	Plan software quality management	8 hrs	$1,400.00
		Quality Analyst 1	*8 hrs*	*$1,400.00*
74	1.5.2	Create Software Quality Assurance Plan (SQAP)	40 hrs	$7,000.00
		Quality Analyst 1	*40 hrs*	*$7,000.00*
75	1.5.3	SQAP completed	0 hrs	$0.00
76	1.5.4	Define metrics	80 hrs	$14,000.00
		Quality Analyst 1	*80 hrs*	*$14,000.00*
77	1.5.5	Manage software quality	200 hrs	$35,000.00
		Quality Analyst 1	*200 hrs*	*$35,000.00*
78	1.5.6	Identify quality improvement needs	40 hrs	$7,000.00
		Quality Analyst 1	*40 hrs*	*$7,000.00*
79	**1.6**	**System Allocation**	**160 hrs**	**$30,000.00**
80	1.6.1	Analyze functions	40 hrs	$7,500.00
		Software Architect 1 (Lead)	*20 hrs*	*$4,000.00*
		Software Architect 2	*20 hrs*	*$3,500.00*
81	**1.6.2**	**Develop system architecture**	**80 hrs**	**$15,000.00**
82	1.6.2.1	Identify hardware functions	40 hrs	$7,500.00
		Software Architect 1 (Lead)	*20 hrs*	*$4,000.00*
		Software Architect 2	*20 hrs*	*$3,500.00*
83	1.6.2.2	Identify software functions	40 hrs	$7,500.00
		Software Architect 1 (Lead)	*20 hrs*	*$4,000.00*
		Software Architect 2	*20 hrs*	*$3,500.00*
84	1.6.3	Decompose system requirements	40 hrs	$7,500.00
		Software Architect 1 (Lead)	*20 hrs*	*$4,000.00*
		Software Architect 2	*20 hrs*	*$3,500.00*
85	1.6.4	System allocation completed	0 hrs	$0.00
86	**1.7**	**Requirements**	**606 hrs**	**$177,969.48**
87	**1.7.1**	**Define and develop software requirements**	**160 hrs**	**$47,000.00**
88	1.7.1.1	Define and develop weekly statistical report requirements	40 hrs	$12,000.00
		Requirements Analyst 2	*20 hrs*	*$4,000.00*
		Consultant 1	*20 hrs*	*$8,000.00*
89	1.7.1.2	Define and develop ATM session statement requirements	40 hrs	$11,500.00
		Requirements Analyst 1 (Lead)	*20 hrs*	*$3,500.00*
		Consultant 2	*20 hrs*	*$8,000.00*
90	1.7.1.3	Define and develop ATM software requirements	40 hrs	$12,000.00
		Requirements Analyst 2	*20 hrs*	*$4,000.00*
		Consultant 1	*20 hrs*	*$8,000.00*
91	1.7.1.4	Define and develop central bank software requirements	40 hrs	$11,500.00
		Requirements Analyst 1 (Lead)	*20 hrs*	*$3,500.00*
		Consultant 2	*20 hrs*	*$8,000.00*
92	**1.7.2**	**Define interface requirements**	**320 hrs**	**$94,000.00**

ID	WBS	Task Name	Work	Cost
93	1.7.2.1	Define ATM software interface requirements	80 hrs	$23,000.00
		Requirements Analyst 1 (Lead)	*40 hrs*	*$7,000.00*
		Consultant 2	*40 hrs*	*$16,000.00*
94	1.7.2.2	Define hardware interface requirements	80 hrs	$24,000.00
		Requirements Analyst 2	*40 hrs*	*$8,000.00*
		Consultant 1	*40 hrs*	*$16,000.00*
95	1.7.2.3	Define user interface requirements	80 hrs	$23,000.00
		Requirements Analyst 1 (Lead)	*40 hrs*	*$7,000.00*
		Consultant 2	*40 hrs*	*$16,000.00*
96	1.7.2.4	Define central bank interface requirements	80 hrs	$24,000.00
		Requirements Analyst 2	*40 hrs*	*$8,000.00*
		Consultant 1	*40 hrs*	*$16,000.00*
97	**1.7.3**	**Prioritize and integrate requirements**	**96 hrs**	**$30,969.45**
98	1.7.3.1	Prioritize and integrate software requirements	32 hrs	$9,270.73
		Requirements Analyst 1 (Lead)	*15.68 hrs*	*$2,744.98*
		Consultant 1	*16.32 hrs*	*$6,525.75*
99	1.7.3.2	Prioritize and integrate interface requirements	32 hrs	$10,338.71
		Requirements Analyst 2	*12.3 hrs*	*$2,461.38*
		Consultant 2	*19.7 hrs*	*$7,877.33*
100	1.7.3.3	Prioritize and integrate all requirements	32 hrs	$11,360.00
		Requirements Analyst 1 (Lead)	*6.4 hrs*	*$1,120.00*
		Consultant 1	*25.6 hrs*	*$10,240.00*
101	1.7.4	Create Software Requirements Specification (SRS)	30 hrs	$6,000.03
		Requirements Analyst 2	*30 hrs*	*$6,000.03*
102	1.7.5	SRS completed	0 hrs	$0.00
103	**1.8**	**Design**	**1,346.85 hrs**	**$382,100.00**
104	**1.8.1**	**Perform architectural design**	**480 hrs**	**$160,000.00**
105	1.8.1.1	Design ATM-to-central bank communication architecture	240 hrs	$80,000.00
		Software Architect 1 (Lead)	*80 hrs*	*$16,000.00*
		Consultant 1	*80 hrs*	*$32,000.00*
		Consultant 2	*80 hrs*	*$32,000.00*
106	1.8.1.2	Design ATM software internal architecture	240 hrs	$80,000.00
		Software Architect 1 (Lead)	*80 hrs*	*$16,000.00*
		Consultant 1	*80 hrs*	*$32,000.00*
		Consultant 2	*80 hrs*	*$32,000.00*
107	**1.8.2**	**Design the database**	**64 hrs**	**$9,600.00**
108	1.8.2.1	Design card/PIN additions to central system database	24 hrs	$3,600.00
		Database Engineer 1	*24 hrs*	*$3,600.00*
109	1.8.2.2	Design ATM transaction additions to central system database	24 hrs	$3,600.00
		Database Engineer 1	*24 hrs*	*$3,600.00*
110	1.8.2.3	Design weekly statistical report	16 hrs	$2,400.00
		Database Engineer 1	*16 hrs*	*$2,400.00*
111	**1.8.3**	**Design interfaces**	**160 hrs**	**$28,000.00**
112	1.8.3.1	Design ATM software interfaces	40 hrs	$7,000.00
		Software Designer 1	*40 hrs*	*$7,000.00*
113	1.8.3.2	Design ATM software-to-hardware interfaces	40 hrs	$7,000.00
		Software Designer 1	*40 hrs*	*$7,000.00*
114	1.8.3.3	Design user interfaces	40 hrs	$7,000.00
		Software Designer 1	*40 hrs*	*$7,000.00*
115	1.8.3.4	Design central bank system interfaces	40 hrs	$7,000.00
		Software Designer 1	*40 hrs*	*$7,000.00*
116	1.8.4	Select or develop algorithms	40 hrs	$7,000.00
		Software Designer 1	*40 hrs*	*$7,000.00*
117	**1.8.5**	**Perform detailed design**	**572.85 hrs**	**$172,250.00**
118	1.8.5.1	Detail design ATM software interfaces	160 hrs	$46,000.00
		Software Designer 1	*80 hrs*	*$14,000.00*
		Consultant 1	*80 hrs*	*$32,000.00*
119	1.8.5.2	Detail design ATM software-to-hardware interfaces	160 hrs	$46,000.00

ID	WBS	Task Name	Work	Cost
		Software Designer 1	*80 hrs*	*$14,000.00*
		Consultant 1	*80 hrs*	*$32,000.00*
120	1.8.5.3	Detail design user interfaces	92.85 hrs	$34,250.00
		Software Designer 1	*12.85 hrs*	*$2,250.00*
		Consultant 1	*80 hrs*	*$32,000.00*
121	1.8.5.4	Detail design central bank system interfaces	160 hrs	$46,000.00
		Software Designer 1	*80 hrs*	*$14,000.00*
		Consultant 1	*80 hrs*	*$32,000.00*
122	1.8.6	Create Software Design Specification (SDS)	30 hrs	$5,250.00
		Software Designer 1	*30 hrs*	*$5,250.00*
123	1.8.7	SDS completed	0 hrs	$0.00
124	**1.9**	**Verification & Validation**	**1,683 hrs**	**$368,223.51**
125	**1.9.1**	**Plan verification and validation**	**860 hrs**	**$215,739.51**
126	1.9.1.1	Plan requirements verification and validation	180 hrs	$44,826.92
		Verification Engineer 1 (Lead)	*55.38 hrs*	*$9,692.31*
		Verification Engineer 2	*34.62 hrs*	*$6,923.08*
		Validation Engineer 1	*34.62 hrs*	*$6,057.69*
		Consultant 1	*55.38 hrs*	*$22,153.85*
127	1.9.1.2	Plan architecture verification and validation	180 hrs	$44,826.92
		Verification Engineer 1 (Lead)	*55.38 hrs*	*$9,692.31*
		Verification Engineer 2	*34.62 hrs*	*$6,923.08*
		Validation Engineer 1	*34.62 hrs*	*$6,057.69*
		Consultant 1	*55.38 hrs*	*$22,153.85*
128	1.9.1.3	Plan interface design verification and validation	180 hrs	$44,826.92
		Verification Engineer 1 (Lead)	*55.38 hrs*	*$9,692.31*
		Verification Engineer 2	*34.62 hrs*	*$6,923.08*
		Validation Engineer 1	*34.62 hrs*	*$6,057.69*
		Consultant 1	*55.38 hrs*	*$22,153.85*
129	1.9.1.4	Plan database design verification and validation	180 hrs	$44,826.92
		Verification Engineer 1 (Lead)	*55.38 hrs*	*$9,692.31*
		Verification Engineer 2	*34.62 hrs*	*$6,923.08*
		Validation Engineer 1	*34.62 hrs*	*$6,057.69*
		Consultant 1	*55.38 hrs*	*$22,153.85*
130	1.9.1.5	Create Software Verification & Validation Plan (SVVP)	140 hrs	$36,431.82
		Verification Engineer 1 (Lead)	*50.92 hrs*	*$8,909.09*
		Verification Engineer 2	*19.08 hrs*	*$3,818.18*
		Validation Engineer 1	*19.08 hrs*	*$3,340.91*
		Consultant 1	*50.92 hrs*	*$20,363.64*
131	1.9.1.6	SVVP completed	0 hrs	$0.00
132	**1.9.2**	**Execute verification and validation tasks**	**128 hrs**	**$24,000.00**
133	1.9.2.1	Verify requirements	16 hrs	$3,200.00
		Verification Engineer 2	*16 hrs*	*$3,200.00*
134	1.9.2.2	Validate requirements	16 hrs	$2,800.00
		Validation Engineer 1	*16 hrs*	*$2,800.00*
135	1.9.2.3	Verify architecture	16 hrs	$3,200.00
		Verification Engineer 2	*16 hrs*	*$3,200.00*
136	1.9.2.4	Validate architecture	16 hrs	$2,800.00
		Validation Engineer 1	*16 hrs*	*$2,800.00*
137	1.9.2.5	Verify interface design	16 hrs	$3,200.00
		Verification Engineer 2	*16 hrs*	*$3,200.00*
138	1.9.2.6	Validate interface design	16 hrs	$2,800.00
		Validation Engineer 1	*16 hrs*	*$2,800.00*
139	1.9.2.7	Verify database design	16 hrs	$3,200.00
		Verification Engineer 2	*16 hrs*	*$3,200.00*
140	1.9.2.8	Validate database design	16 hrs	$2,800.00
		Validation Engineer 1	*16 hrs*	*$2,800.00*
141	1.9.3	Requirements & Design V&V completed	0 hrs	$0.00
142	1.9.4	Collect and analyze metric data	80 hrs	$15,000.00

ID	WBS	Task Name	Work	Cost
		Verification Engineer 2	*40 hrs*	*$8,000.00*
		Validation Engineer 1	*40 hrs*	*$7,000.00*
143	**1.9.5**	**Plan testing**	**210 hrs**	**$38,621.21**
144	1.9.5.1	Plan ATM software-to-hardware interface black box test	40 hrs	$7,333.33
		Verification Engineer 1 (Lead)	*26.67 hrs*	*$4,666.67*
		Verification Engineer 2	*13.33 hrs*	*$2,666.67*
145	1.9.5.2	Plan ATM software interface black box test	40 hrs	$7,333.33
		Verification Engineer 1 (Lead)	*26.67 hrs*	*$4,666.67*
		Verification Engineer 2	*13.33 hrs*	*$2,666.67*
146	1.9.5.3	Plan end user test	20 hrs	$3,666.67
		Verification Engineer 1 (Lead)	*13.33 hrs*	*$2,333.33*
		Verification Engineer 2	*6.67 hrs*	*$1,333.33*
147	1.9.5.4	Plan central bank interface black box test	40 hrs	$7,333.33
		Verification Engineer 1 (Lead)	*26.67 hrs*	*$4,666.67*
		Verification Engineer 2	*13.33 hrs*	*$2,666.67*
148	1.9.5.5	Plan weekly statistical report test	30 hrs	$5,454.55
		Verification Engineer 1 (Lead)	*21.82 hrs*	*$3,818.18*
		Verification Engineer 2	*8.18 hrs*	*$1,636.36*
149	1.9.5.6	Create Software Test Plan (STP)	40 hrs	$7,500.00
		Verification Engineer 1 (Lead)	*20 hrs*	*$3,500.00*
		Verification Engineer 2	*20 hrs*	*$4,000.00*
150	1.9.5.7	STP completed	0 hrs	$0.00
151	**1.9.6**	**Develop test requirements**	**310 hrs**	**$57,954.55**
152	1.9.6.1	Design ATM software-to-hardware interface black box test	80 hrs	$15,000.00
		Verification Engineer 1 (Lead)	*40 hrs*	*$7,000.00*
		Verification Engineer 2	*40 hrs*	*$8,000.00*
153	1.9.6.2	Design ATM software interface black box test	80 hrs	$15,000.00
		Verification Engineer 1 (Lead)	*40 hrs*	*$7,000.00*
		Verification Engineer 2	*40 hrs*	*$8,000.00*
154	1.9.6.3	Design end user test	40 hrs	$7,500.00
		Verification Engineer 1 (Lead)	*20 hrs*	*$3,500.00*
		Verification Engineer 2	*20 hrs*	*$4,000.00*
155	1.9.6.4	Design central bank interface black box test	80 hrs	$15,000.00
		Verification Engineer 1 (Lead)	*40 hrs*	*$7,000.00*
		Verification Engineer 2	*40 hrs*	*$8,000.00*
156	1.9.6.5	Design weekly statistical report test	30 hrs	$5,454.55
		Verification Engineer 1 (Lead)	*21.82 hrs*	*$3,818.18*
		Verification Engineer 2	*8.18 hrs*	*$1,636.36*
157	**1.9.7**	**Execute the tests**	**95 hrs**	**$16,908.24**
158	1.9.7.1	Execute ATM software-to-hardware interface black box test	20 hrs	$3,523.93
		Verification Engineer 1 (Lead)	*19.05 hrs*	*$3,333.46*
		Verification Engineer 2	*0.95 hrs*	*$190.48*
159	1.9.7.2	Execute ATM software interface black box test	20 hrs	$3,523.93
		Verification Engineer 1 (Lead)	*19.05 hrs*	*$3,333.46*
		Verification Engineer 2	*0.95 hrs*	*$190.48*
160	1.9.7.3	Execute end user test	20 hrs	$3,523.93
		Verification Engineer 1 (Lead)	*19.05 hrs*	*$3,333.46*
		Verification Engineer 2	*0.95 hrs*	*$190.48*
161	1.9.7.4	Execute central bank interface black box test	20 hrs	$3,523.93
		Verification Engineer 1 (Lead)	*19.05 hrs*	*$3,333.46*
		Verification Engineer 2	*0.95 hrs*	*$190.48*
162	1.9.7.5	Execute weekly statistical report test	15 hrs	$2,812.50
		Verification Engineer 1 (Lead)	*7.5 hrs*	*$1,312.50*
		Verification Engineer 2	*7.5 hrs*	*$1,500.00*
163	1.9.8	V&V completed	0 hrs	$0.00
164	**1.10**	**Documentation development**	**298 hrs**	**$53,650.00**
165	**1.10.1**	**Plan documentation**	**160 hrs**	**$28,000.00**
166	1.10.1.1	Define installation documentation contents	40 hrs	$7,000.00

ID	WBS	Task Name	Work	Cost
		Technical Writer 1	*40 hrs*	*$7,000.00*
167	1.10.1.2	Define ATM software documentation contents	40 hrs	$7,000.00
		Technical Writer 1	*40 hrs*	*$7,000.00*
168	1.10.1.3	Define central bank accounting system documentation updates	40 hrs	$7,000.00
		Technical Writer 1	*40 hrs*	*$7,000.00*
169	1.10.1.4	Create documentation plan	40 hrs	$7,000.00
		Technical Writer 1	*40 hrs*	*$7,000.00*
170	**1.10.2**	**Implement documentation**	**120 hrs**	**$21,000.00**
171	1.10.2.1	Write installation documentation	40 hrs	$7,000.00
		Technical Writer 1	*40 hrs*	*$7,000.00*
172	1.10.2.2	Write ATM software documentation	40 hrs	$7,000.00
		Technical Writer 1	*40 hrs*	*$7,000.00*
173	1.10.2.3	Write central bank accounting system documentation updates	40 hrs	$7,000.00
		Technical Writer 1	*40 hrs*	*$7,000.00*
174	**1.10.3**	**Produce and distribute documentation**	**18 hrs**	**$4,650.00**
175	1.10.3.1	Print installation documentation	4 hrs	$1,050.00
		Printing Services	*4 hrs*	*$1,050.00*
176	1.10.3.2	Print ATM software documentation	4 hrs	$1,050.00
		Printing Services	*4 hrs*	*$1,050.00*
177	1.10.3.3	Print central bank accounting system documentation	4 hrs	$1,050.00
		Printing Services	*4 hrs*	*$1,050.00*
178	1.10.3.4	Distribute installation documentation to installers	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*
179	1.10.3.5	Distribute ATM software documentation to ATM sites	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*
180	1.10.3.6	Distribute central bank accounting system documentation to end users	2 hrs	$500.00
		Project Manager	*2 hrs*	*$500.00*
181	1.10.4	Documentation completed	0 hrs	$0.00
182	**1.11**	**Training**	**241 hrs**	**$42,175.00**
183	**1.11.1**	**Plan the training program**	**120 hrs**	**$21,000.00**
184	1.11.1.1	Plan installation training content	40 hrs	$7,000.00
		Training Specialist 1	*40 hrs*	*$7,000.00*
185	1.11.1.2	Plan ATM site training content	40 hrs	$7,000.00
		Training Specialist 1	*40 hrs*	*$7,000.00*
186	1.11.1.3	Plan software maintenance training content	40 hrs	$7,000.00
		Training Specialist 1	*40 hrs*	*$7,000.00*
187	**1.11.2**	**Develop training materials**	**90 hrs**	**$15,750.00**
188	1.11.2.1	Create installation training materials	30 hrs	$5,250.00
		Training Specialist 1	*30 hrs*	*$5,250.00*
189	1.11.2.2	Create ATM site training materials	30 hrs	$5,250.00
		Training Specialist 1	*30 hrs*	*$5,250.00*
190	1.11.2.3	Create software maintenance training materials	30 hrs	$5,250.00
		Training Specialist 1	*30 hrs*	*$5,250.00*
191	**1.11.3**	**Validate the training program**	**15 hrs**	**$2,625.00**
192	1.11.3.1	Validate installation training content	5 hrs	$875.00
		Training Specialist 1	*5 hrs*	*$875.00*
193	1.11.3.2	Validate ATM site training content	5 hrs	$875.00
		Training Specialist 1	*5 hrs*	*$875.00*
194	1.11.3.3	Validate software maintenance training content	5 hrs	$875.00
		Training Specialist 1	*5 hrs*	*$875.00*
195	**1.11.4**	**Implement the training program**	**16 hrs**	**$2,800.00**
196	1.11.4.1	Hold training session for ATM sites	2 hrs	$350.00
		Training Specialist 1	*2 hrs*	*$350.00*
197	1.11.4.2	Hold training session for software maintenance team	10 hrs	$1,750.00
		Training Specialist 1	*10 hrs*	*$1,750.00*
198	1.11.4.3	Hold training session for installers	4 hrs	$700.00
		Training Specialist 1	*4 hrs*	*$700.00*
199	1.11.5	Training completed	0 hrs	$0.00

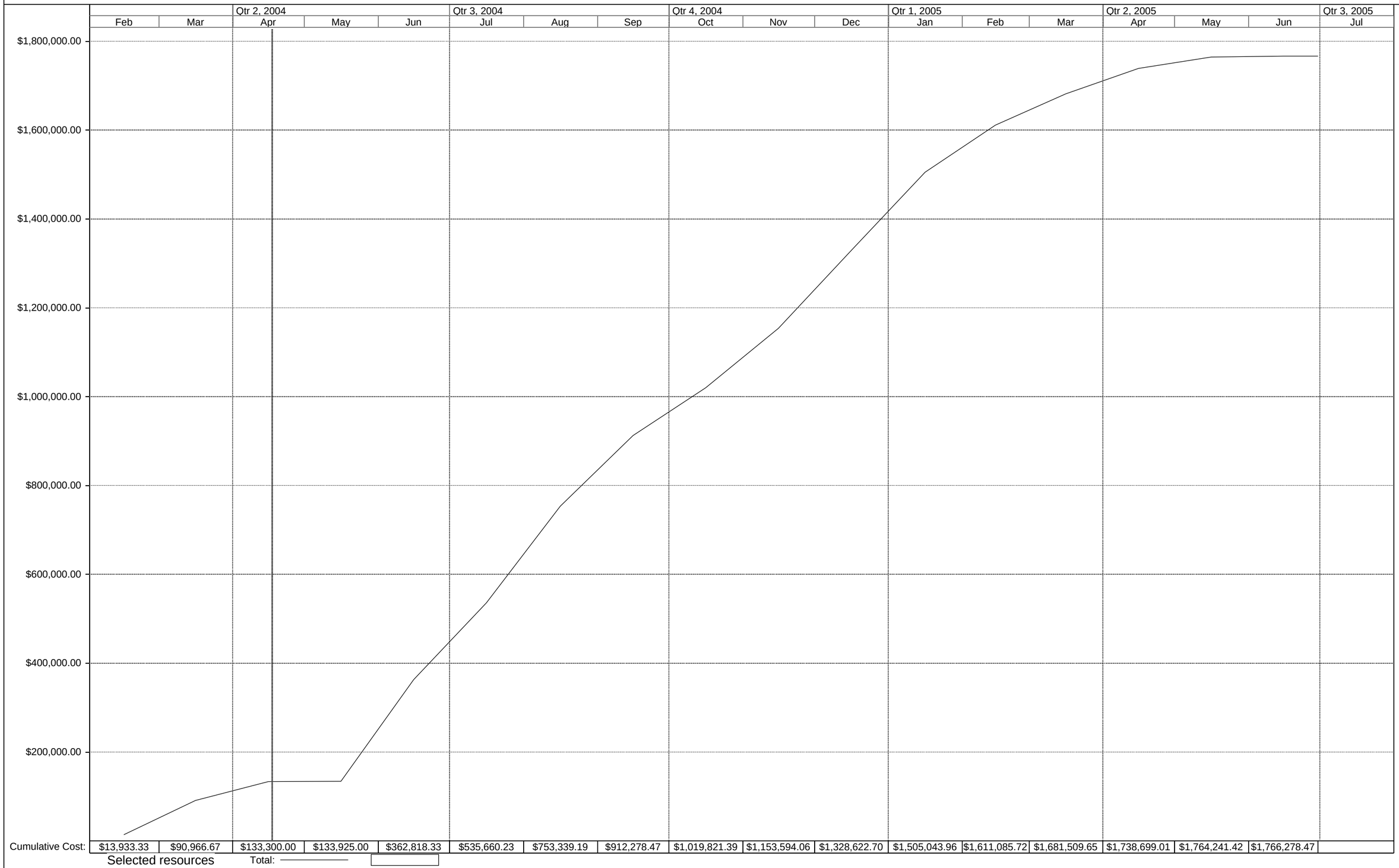
ID	WBS	Task Name	Work	Cost
200	**1.12**	**Implementation**	**1,293.33 hrs**	**$240,433.33**
201	1.12.1	Create test data	8 hrs	$1,600.00
		Verification Engineer 2	*8 hrs*	*$1,600.00*
202	**1.12.2**	**Create source code**	**1,140 hrs**	**$199,500.00**
203	1.12.2.1	Code ATM software-to-hardware interfaces	350 hrs	$61,250.00
		Programmer 1 (Lead)	*175 hrs*	*$35,000.00*
		Programmer 2	*175 hrs*	*$26,250.00*
204	1.12.2.2	Code ATM software interfaces	350 hrs	$61,250.00
		Programmer 1 (Lead)	*175 hrs*	*$35,000.00*
		Programmer 2	*175 hrs*	*$26,250.00*
205	1.12.2.3	Code user interfaces	160 hrs	$28,000.00
		Programmer 1 (Lead)	*80 hrs*	*$16,000.00*
		Programmer 2	*80 hrs*	*$12,000.00*
206	1.12.2.4	Code central bank interfaces	240 hrs	$42,000.00
		Programmer 1 (Lead)	*120 hrs*	*$24,000.00*
		Programmer 2	*120 hrs*	*$18,000.00*
207	1.12.2.5	Code weekly statistical report generation routines	40 hrs	$7,000.00
		Programmer 1 (Lead)	*20 hrs*	*$4,000.00*
		Programmer 2	*20 hrs*	*$3,000.00*
208	**1.12.3**	**Generate object code**	**40 hrs**	**$18,500.00**
209	1.12.3.1	Generate ATM software-to-hardware interface object code	8 hrs	$3,700.00
		Programmer 1 (Lead)	*8 hrs*	*$1,600.00*
		Computer time for object code generation	*4*	*$2,100.00*
210	1.12.3.2	Generate ATM software interface object code	8 hrs	$3,700.00
		Programmer 1 (Lead)	*8 hrs*	*$1,600.00*
		Computer time for object code generation	*4*	*$2,100.00*
211	1.12.3.3	Generate ATM user interface object code	8 hrs	$3,700.00
		Programmer 1 (Lead)	*8 hrs*	*$1,600.00*
		Computer time for object code generation	*4*	*$2,100.00*
212	1.12.3.4	Generate central bank interface object code	8 hrs	$3,700.00
		Programmer 1 (Lead)	*8 hrs*	*$1,600.00*
		Computer time for object code generation	*4*	*$2,100.00*
213	1.12.3.5	Generate weekly statistical report generation object code	8 hrs	$3,700.00
		Programmer 1 (Lead)	*8 hrs*	*$1,600.00*
		Computer time for object code generation	*4*	*$2,100.00*
214	**1.12.4**	**Plan integration**	**80 hrs**	**$16,000.00**
215	1.12.4.1	Plan integration of ATM software/hardware interface and software interfaces	20 hrs	$4,000.00
		Programmer 1 (Lead)	*20 hrs*	*$4,000.00*
216	1.12.4.2	Plan integration of ATM software with user interfaces	20 hrs	$4,000.00
		Programmer 1 (Lead)	*20 hrs*	*$4,000.00*
217	1.12.4.3	Plan integration of ATM software with central bank	20 hrs	$4,000.00
		Programmer 1 (Lead)	*20 hrs*	*$4,000.00*
218	1.12.4.4	Plan integration of weekly statistical report with central bank	20 hrs	$4,000.00
		Programmer 1 (Lead)	*20 hrs*	*$4,000.00*
219	**1.12.5**	**Perform integration**	**25.33 hrs**	**$4,833.33**
220	1.12.5.1	Integrate ATM software/hardware interface with software interfaces	8 hrs	$1,600.00
		Programmer 1 (Lead)	*8 hrs*	*$1,600.00*
221	1.12.5.2	Integrate ATM software with user interfaces	8 hrs	$1,600.00
		Programmer 1 (Lead)	*8 hrs*	*$1,600.00*
222	1.12.5.3	Integrate ATM software product with central bank	5.33 hrs	$933.33
		Programmer 1 (Lead)	*2.67 hrs*	*$533.33*
		Database Engineer 1	*2.67 hrs*	*$400.00*
223	1.12.5.4	Integrate weekly statistical report with central bank	4 hrs	$700.00
		Programmer 1 (Lead)	*2 hrs*	*$400.00*
		Database Engineer 1	*2 hrs*	*$300.00*
224	1.12.6	Implementation completed	0 hrs	$0.00
225	**1.13**	**Installation**	**97 hrs**	**$16,902.38**
226	**1.13.1**	**Plan installation**	**55 hrs**	**$9,160.71**

ID	WBS	Task Name	Work	Cost
227	1.13.1.1	Plan installation of ATM software product onto ATM machines	20 hrs	$3,500.00
		Installation Specialist 1	*20 hrs*	*$3,500.00*
228	1.13.1.2	Plan installation of modifications to central bank system	20 hrs	$3,250.00
		Database Engineer 1	*10 hrs*	*$1,500.00*
		Installation Specialist 1	*10 hrs*	*$1,750.00*
229	1.13.1.3	Plan installation of weekly statistical report	15 hrs	$2,410.71
		Database Engineer 1	*8.57 hrs*	*$1,285.71*
		Installation Specialist 1	*6.43 hrs*	*$1,125.00*
230	**1.13.2**	**Distribute software**	**6 hrs**	**$1,050.00**
231	1.13.2.1	Distribute ATM software product to ATM installation team	2 hrs	$350.00
		Installation Specialist 1	*2 hrs*	*$350.00*
232	1.13.2.2	Distribute central bank system modifications to central bank installation team	2 hrs	$350.00
		Installation Specialist 1	*2 hrs*	*$350.00*
233	1.13.2.3	Distribute weekly statistical report to central bank installation team	2 hrs	$350.00
		Installation Specialist 1	*2 hrs*	*$350.00*
234	**1.13.3**	**Install software**	**24 hrs**	**$4,141.67**
235	1.13.3.1	Install ATM software product onto all ATM machines	20 hrs	$3,500.00
		Installation Specialist 1	*20 hrs*	*$3,500.00*
236	1.13.3.2	Install central bank system modifications	2 hrs	$325.00
		Database Engineer 1	*1 hr*	*$150.00*
		Installation Specialist 1	*1 hr*	*$175.00*
237	1.13.3.3	Install weekly statistical report	2 hrs	$316.67
		Database Engineer 1	*1.33 hrs*	*$200.00*
		Installation Specialist 1	*0.67 hrs*	*$116.67*
238	1.13.4	ATMs installed on-site by third party	0 hrs	$0.00
239	**1.13.5**	**Accept software in operational environment**	**12 hrs**	**$2,550.00**
240	1.13.5.1	Accept configured ATMs in banking locations	4 hrs	$850.00
		Project Manager	*2 hrs*	*$500.00*
		Installation Specialist 1	*2 hrs*	*$350.00*
241	1.13.5.2	Accept modified central bank system	4 hrs	$850.00
		Project Manager	*2 hrs*	*$500.00*
		Installation Specialist 1	*2 hrs*	*$350.00*
242	1.13.5.3	Accept weekly statistical report	4 hrs	$850.00
		Project Manager	*2 hrs*	*$500.00*
		Installation Specialist 1	*2 hrs*	*$350.00*
243	1.13.6	Installation completed	0 hrs	$0.00
244	**1.14**	**Operation & Support**	**0 hrs**	**$0.00**
245	1.14.1	Operate the system	0 hrs	$0.00
246	1.14.2	Provide technical assistance and consulting	0 hrs	$0.00
247	1.14.3	Maintain support request log	0 hrs	$0.00
248	**1.15**	**Maintenance**	**0 hrs**	**$0.00**
249	1.15.1	Reapply a software lifecycle	0 hrs	$0.00

Appendix I

Cost Baseline Chart

Nirvana National Bank ATM Project WBS Cost Baseline



Cumulative Cost:	$13,933.33	$90,966.67	$133,300.00	$133,925.00	$362,818.33	$535,660.23	$753,339.19	$912,278.47	$1,019,821.39	$1,153,594.06	$1,328,622.70	$1,505,043.96	$1,611,085.72	$1,681,509.65	$1,738,699.01	$1,764,241.42	$1,766,278.47

Selected resources Total:

Project Manager

Appendix J

Risk Management Supplements

Risk Categorization Table

Risk Factors and Categories	Low Risk Evidence (L)	Medium Risk Evidence (M)	High Risk Evidence (H)	Risk Rating (H,M,L)	Comments
Mission and goals factors					
Project fit	Project fits within Terasoft's area of expertise and interest	Project limits Terasoft's ability to take on other attractive projects	Mid-project, the project conflicts with a change in Terasoft's direction.	L	Unlikely to be an issue, since the project involves most of Terasoft's resources and therefore sustains it.
Organization management factors					
Project team stability	Project staff are expected to stay with Terasoft for the duration of the project	One or more key project staff are expected to leave Terasoft before their accountabilities are met	More than three key project staff are expected to leave Terasoft before their accountabilities are met	L	
Project processes	All project processes are defined and being followed	One or more important and complex project processes not defined or being followed	More than three important and complex project processes not defined or being followed	Too soon	
Management support	Recognizes the importance of the project and strongly committed to seeing its success	Partial recognition of importance of the project or commitment to its success	Not committed to project, or does not recognize it as important	L	Concerns all management involved with project (i.e. Terasoft and NNB)
Performance objectives	Organization has verifiable performance objectives and reasonable requirements	Organization has some performance objectives, but not necessarily measurable ones	Organization has no established performance requirements, or requirements are not measurable	L	Concerns all organization around the project (i.e. internal/external)

Risk Categorization Table

Executive involvement	Visible and strong support	Occasional support, provides help on issues only when asked	No visible support or no help offered on unresolved issued	L	Concerns Terasoft executives and NNB steering committee
Customer factors					
Product fit	Overall ATM project fits within NNB's strategy	Overall ATM project receiving less interest within NNB	Overall ATM project being questioned by NNB	L	Concerns Terasoft's sustenance, due to heavy investment
Customer involvement	End-users are highly involved with the project team, provide significant input	End-users play minor roles, moderate impact on system	Minimal or no end-user involvement, little end-user input	Too soon	
Customer experience	End-users are highly experience in similar projects, have specific ideas on how needs can be met	End-users have experience with similar project and have needs in mind	End-users have no previous experience with similar project, unsure of how needs can be met	M	
Customer acceptance	End-users accept concepts and details of system, process is in place for end-user approvals	End-users accept most concepts and details of system, process in place for end-user approvals	End-users do not accept any concepts or design details of system	Too soon	
Customer training needs	End-user training needs considered, training in progress or plan in place	End-user training needs considered, no training yet or training plan is in development	Training requirements not identified or not addressed	L	

Risk Categorization Table

Budget/cost factors					
Customer downward pressure	Customer has signed contract, in agreement with project budget	Customer has signed contract, applying pressure to lower budget	Customer has not signed contract, or is demanding lower budget	H	Customer has not signed contract
Budget fit	Cost Variance (CV) shows that project is in line with or under budget	Cost Variance (CV) shows that project is exceeding budget by 1-5%	Cost Variance (CV) shows that project is exceeding budget by more than 5%	Too soon	
Project size	Small, non-complex or easily decomposed	Medium, moderate complexity, decomposable	Large, highly complex, or not decomposable	M	
Technology	Mature, existent, in-house experience	Existent, some in-house experience	New technology or a new use or under development, little in-house experience	M	
ATM network and hardware supply	Components available and compatible with approach	Components work under most circumstances	Components known to fail in certain cases, likely to be late, or incompatible with parts of approach	L	
Cost performance	Cost Performance Indicator (CPI) has a value of 0.95 <= CPI <= 1.1	Cost Performance Indicator (CPI) has a value of 0.9 <= CPI <= 1.2	Cost Performance Indicator (CPI) has a value of 0.9 > CPI > 1.2	too soon	evaluate this risk from right to left
Budget size	Sufficient budget allocated	Questionable budget allocated	Doubtful budget is sufficient	L	Concerns budget allocated to Terasoft's portion of project

Risk Categorization Table

Budget constraints	Funds allocated without constraints	Questionable budget allocated	Allocation in doubt or subject to change without notice	L	Concerns budget allocated to entire ATM project (insufficient budget elsewhere jeopardizes Terasoft)
Cost controls	Well-established, in place	System in place, weak in areas	System lacking or non-existent	M	
Schedule factors					
Delivery commitment	Stable commitment dates	Some uncertain commitments	Unstable, fluctuating commitments	M	
Schedule fit	Schedule Variance (SV) shows that project is in line with or under schedule	Schedule Variance (SV) shows that project is exceeding schedule by 1-5%	Schedule Variance (SV) shows that project is exceeding schedule by more than 5%	Too soon	
Schedule performance	Schedule Performance Indicator (SPI) has a value of 0.95 <= SPI <= 1.1	Schedule Performance Indicator (SPI) has a value of 0.9 <= SPI <= 1.2	Schedule Performance Indicator (SPI) has a value of 0.9 > SPI > 1.2	too soon	evaluate this risk from right to left
Development schedule	Team projects that schedule is acceptable and can be met	Team finds on phase of the plan to have a schedule that is too aggressive	Team projects that two or more phases of schedule are unlikely to be met	L	
Project content factors					
Requirements progress	Requirements definition is progressing according to schedule	Some requirements definition items are behind schedule	Requirements definition phase will clearly not be completed on schedule	Too soon	This is a factor because the requirements phase was squeezed to meet schedule requirements

Risk Categorization Table

Requirements complete and clear	All completely specified and clearly written	Some requirements incomplete or unclear	Some requirements only in the head of the customer	Too soon	
System testability	Software requirements easy to test, planning underway	Some requirements hard to test, or test plans insufficient	Most or all of the system hard to test, or no planning being done	Too soon	
Design difficulty	Well-defined interfaces, design well-understood	Unclear how to design, or aspects of design undecided	Interfaces not well-defined or controlled, subject to change	Too soon	
System dependencies	Clearly defined dependencies of the software effort and other parts of the system	Some elements of the system are well-understood and planned, others are not yet comprehended	No clear plan or schedule for how the whole system will come together	M	
Documents stability	Documents will be available on time and will contain few errors	Some documents may be late and contain minor errors	Little chance of getting documents on time, many corrections and changes expected	L	
Implementation difficulty	Algorithms and design are reasonable for the implementation team to implement	Algorithms and/or design have elements somewhat difficult for the implementation team to implement	Algorithms and/or design have components the implementation team will find very difficult to implement	Too soon	
Performance factors					

Risk Categorization Table

Hardware interface documentation	Hardware interface documentation is delivered to project team by deadline	Hardware interface documentation is delivered to project team by deadline, but is incomplete.	Hardware interface documentation is not delivered to project team by deadline.	Too soon	This will affect our ability to define hardware interfaces in the requirements stage, and puts staff availability further downstream in question
Project performance	Critical Ratio (CR) has a value of 0.9 <= CR <= 1.2	Critical Ratio (CR) has a value of 0.9 > CR > 1.2	Critical Ratio (CR) has a value of 0.8 > CR > 1.3	too soon	evaluate this risk from right to left
Test capability	Modular design allows for easy coverage test planning and execution	Modular design aids developing test harnesses for unit test	No modular design or ability to easily establish test coverage planning	Too soon	
Expected test effort	Good estimate available, readily fits system acceptance process	Rough estimate of test time, may be a bottleneck in the process	Poor or no estimate of test times, definite chance of bottleneck	M	
Functionality	Defined software product highly functional, meets all customer needs	Defined software product has good functionality, meets most customer needs	Defined software product has little functionality, many customer needs not met	Too soon	
External hardware or software interfaces	Little or not integration or interfaces needed	Some integration or interfaces needed	Extensive interfaces required	H	Many external, unfamiliar interfaces; to hardware and to external central bank. Contractors provide significant amount of our expertise in hardware and central bank interfaces
Project management factors					

Risk Categorization Table

Approach	Product and process planning and monitoring in place	Planning and monitoring need enhancement	Weak or nonexistent planning and monitoring	M	
Communication	Clearly communicates goals and status between the team and the rest of the organization	Communicates some of the information some of the time	Rarely communicates clearly to the team or to other who need to be informed of team status	Too soon	
Project manager experience	Project manager very experienced with similar projects	Project manager has moderate experience or has experience with different types of projects	Project manager has no experience with this type of project or is new to project management	M	
Project manager attitude	Strongly committed to success	Willing to do what it takes	Cares very little about project	L (biased; need more input)	
Project manager authority/support	Complete support of team and of management	Support of most of team, with some reservations	No visible support, manager in name only	L (biased; need more input)	
Development process factors					
Quality assurance approach	QA system established, followed, effective	Procedures established, but not well followed or effective	No QA process or established procedures	Too soon	
Commitment process	Changes to commitments in scope, content, schedule are reviewed and approved by all involved	Changes to commitments are communicated to all involved	Changes to commitments are made without review or involvement of the team	Too soon	

Risk Categorization Table

Use of defined engineering process	Development process in place, established, effective, followed by team	Development process established, but not followed or is ineffective	No formal process used	L	
Early identification of defects	Peer reviews are incorporated throughout	Peer reviews are used sporadically	Team expects to find all defects with testing	M	
Change control for work products	Formal change control process in place, followed, effective	Change control process in place, not followed, or is ineffective	No change control process used	L	Terasoft has a successful change control process
Defect tracking	Defect tracking is defined, consistent, effective	Defect tracking process defined, but inconsistently used	No process in place to track defects	L	
Development environment factors					
Hardware platform	Stable, no changes expected, capacity is sufficient	Some changes under evolution, but controlled	Platform under development along with software	Too soon	
Tools availability	Tools in place, documented, validated	Tools available, validated, some development needed (or minimal documentation)	Tools invalidated, proprietary, or major development needed, no documentation	Too soon	
Configuration management	Configuration fully controlled	Some configuration controls in place	No configuration controls in place	Too soon	

Risk Categorization Table

Security	All areas following security guidelines, data backed up, disaster recovery system in place, procedures followed	Some security measures in place, backups done, disaster recovery considered, but procedures lacking or not followed	No security measures in place, backup lacking, disaster recovery not considered	L	Terasoft has standard security procedures, which we will follow.
Vendor support	Complete support at reasonable price and in needed time frame	Adequate support at contracted price, reasonable response time	Little or no support, high cost, and/or poor response time	L	
Staff factors					
Staff adherence to task	Staff in place, no turnover expected, working on assigned tasks, few diversions and little fire fighting	Staff available, some turnover expected, some conflict in time allocation, some fire fighting	Staff not available, high turnover expected, many members spend much time fire fighting	L	
Mix of staff skills	Good mix of disciplines	Some disciplines inadequately represented	Some disciplines not represented at all	L	
Product knowledge	Very experienced at developing this type of product	Some experience in developing this type of product	No experience in developing this type of product	M	
Software development experience	Extensive experience with this type of project	Some experience with similar projects	Little or no experience with similar projects	M	

Risk Categorization Table

Subcontractor retention	Subcontractor activity is on-schedule and all required subcontractors are available for planned activities	Subcontractor activity is falling behind schedule, or some subcontractors cannot be available for planned activities.	Subcontractor activity is behind schedule, or subcontractors may not be able to remain committed to the project as required.	L	
Training of team	Training not required, or training plan in place and training ongoing	Training for some areas not available or training planned for future	No training plan or training not readily available	L	
Team spirit and attitude	Strongly committed to success of project, cooperative	Willing to do what it takes to get the job done	Little or no commitment to the project, not a cohesive team	M	
Team productivity	All milestones met, deliverables on time, productivity high	Milestones met, some delays in deliverables, productivity acceptable	Productivity low, milestones not met, delays in deliverables	Too soon	
Maintenance factors					
Complexity	Structurally maintainable (low complexity measured or projected)	Certain aspects difficult to maintain (medium complexity)	Extremely difficult to maintain (high complexity)	Too soon	
Change implementation	Team in place can be responsive to customer needs	Team experiences delays but acceptable to customer	Team is unable to respond to customer needs	Too soon	

Risk Categorization Table

Support personnel	In place, experienced, sufficient in number	Missing some areas of expertise	Significant discipline or expertise missing	Too soon	

Top 10 Risks Report template

ID	Risk Item	Probability	Loss	Risk Exposure	Resolution Approach	Who	Date
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Risk Response Report template

ID	Risk Item	Trigger	Value	Risk Exposure	Resolution Approach	Who	Date
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Weekly Risk Change Report template

Risk Item	Rank This Week	Last Rank	# Weeks On List	Resolution Approach
	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			

Appendix K

Closure Checklist

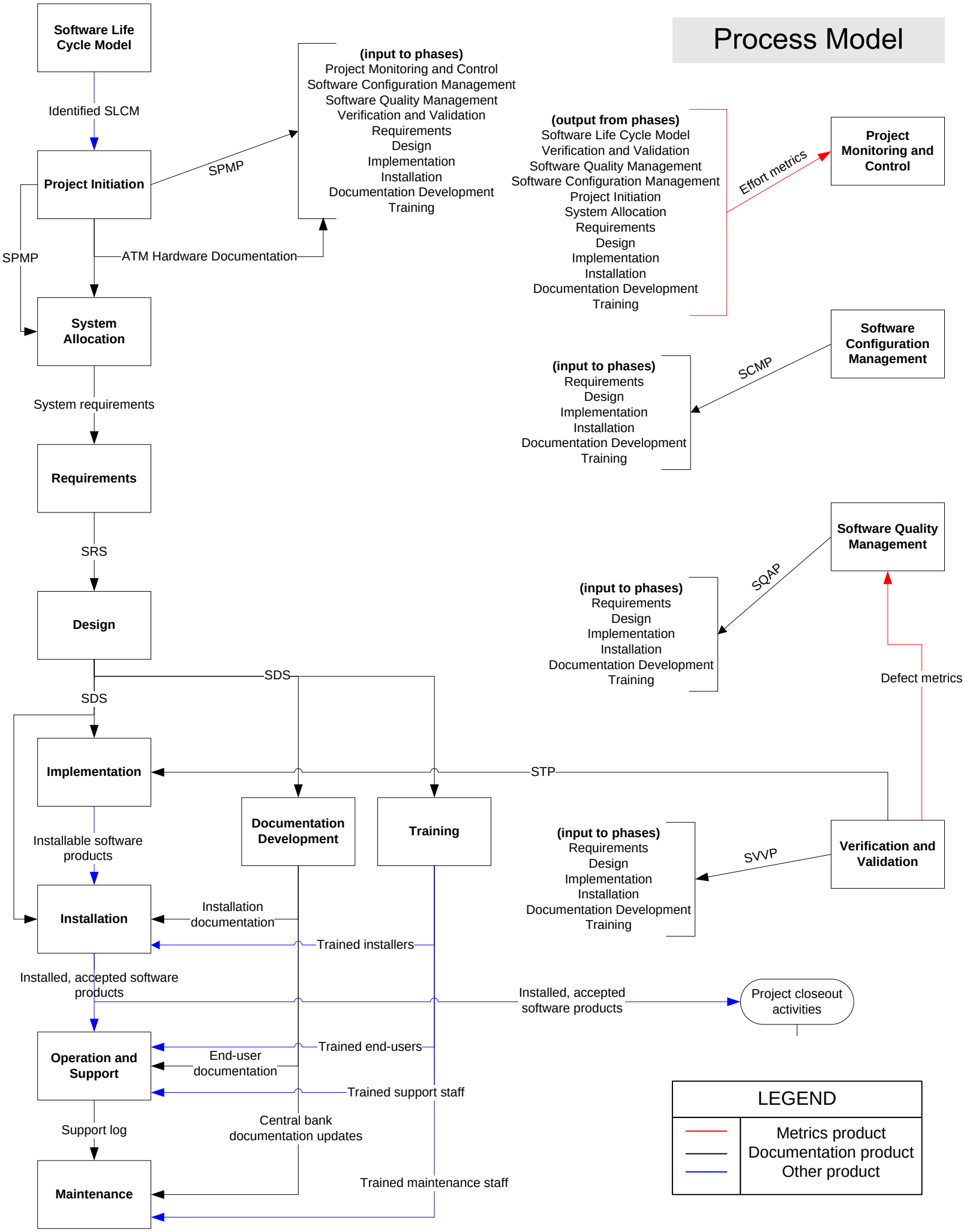
Closure Checklist

Item	Needed? (Y, N)	Due Date	Person Responsible	Done (√)
Communicate decision			Matthew Buckley-Golder	
Identify remaining work			Matthew Buckley-Golder	
Deliver released software			Jessica Smith	
Get customer approvals			Matthew Buckley-Golder, Jim Knowles (NNB)	
Publish released documentation			Michael Gold	
Perform personnel evaluations			Matthew Buckley-Golder	
Perform Post-Performance Analysis (PPA)			Matthew Buckley-Golder	
Hold closure event			Matthew Buckley-Golder	
Release or reassign team			Matthew Buckley-Golder	
Close outstanding work orders			Matthew Buckley-Golder	
Review final configuration management audit			Matthew Buckley-Golder, Sarah Schmidt	
Return or release vendor or customer materials			Matthew Buckley-Golder	
Return consultant security access cards			Matthew Buckley-Golder	
Return all borrowed equipment			Matthew Buckley-Golder	
Publish final report			Matthew Buckley-Golder	
Publish collected metrics			Mark Owen	
Archive collected metrics			Matthew Buckley-Golder	

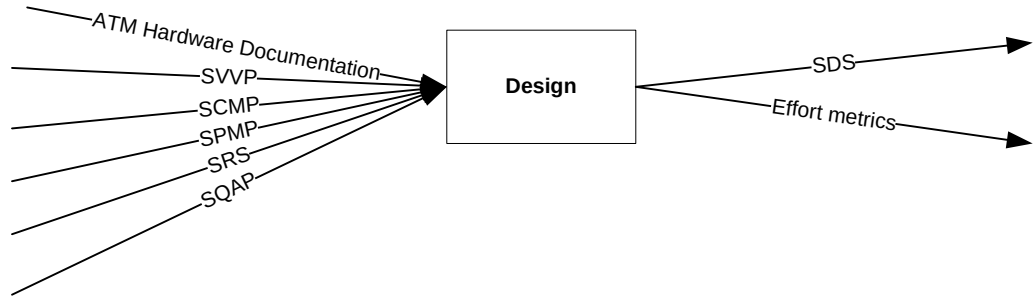
Appendix L

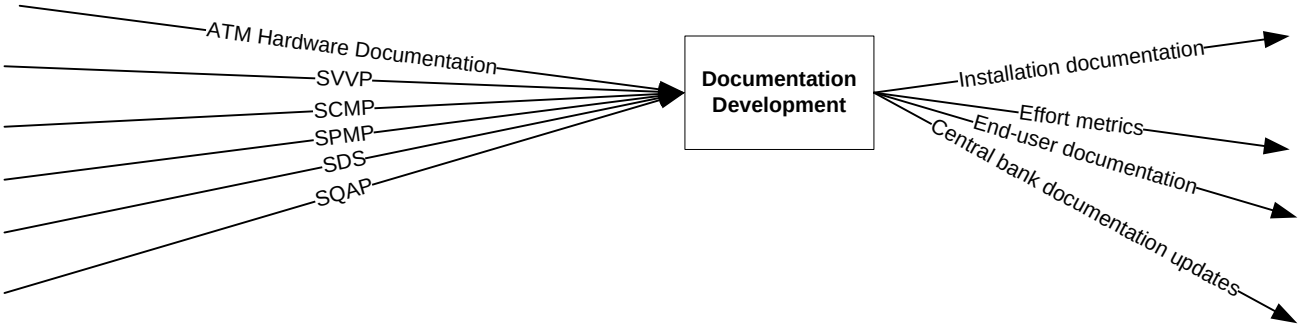
Process Model Diagrams

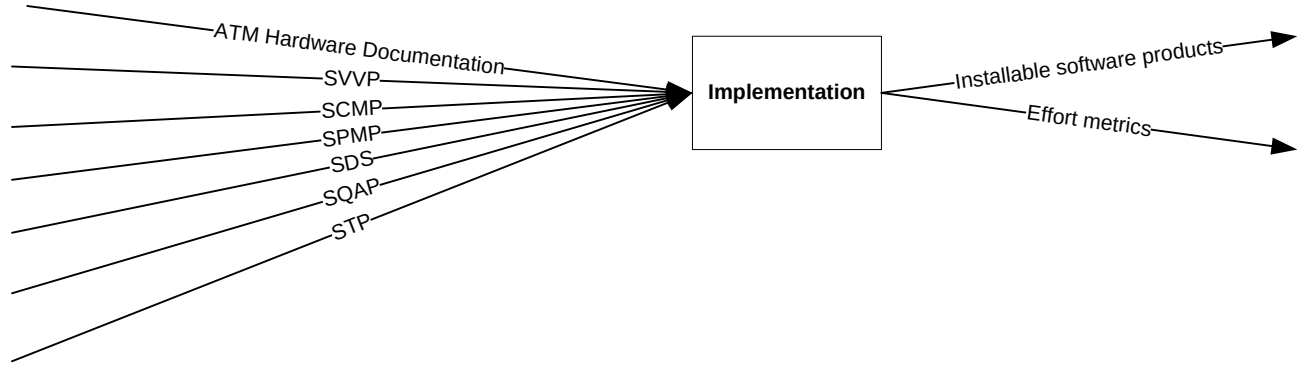
Process Model

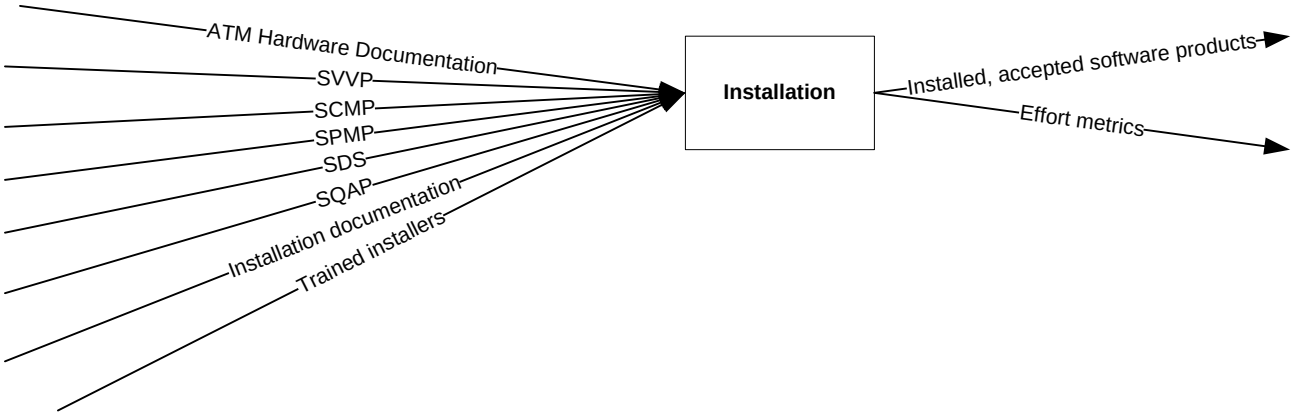


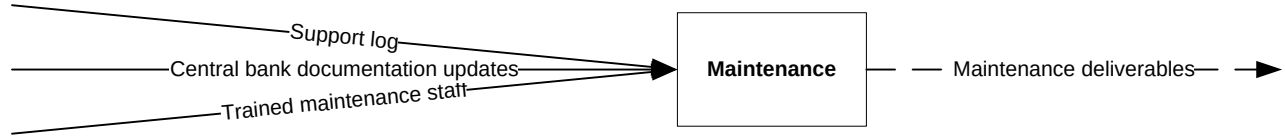
Individual Process Diagrams

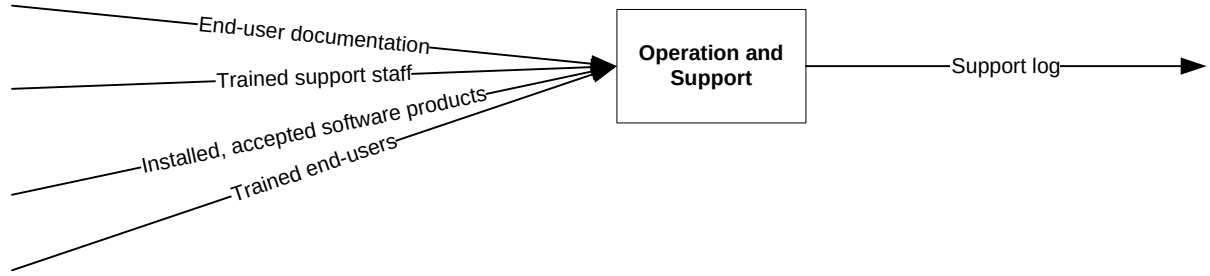


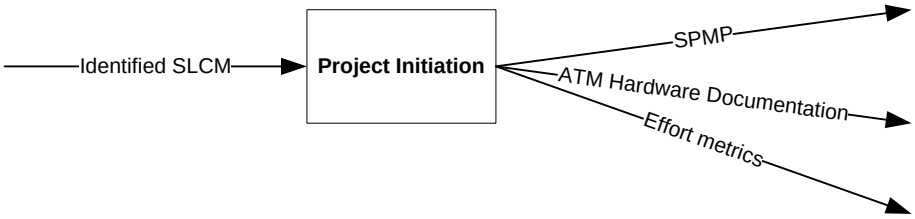


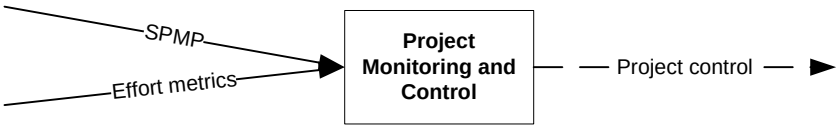


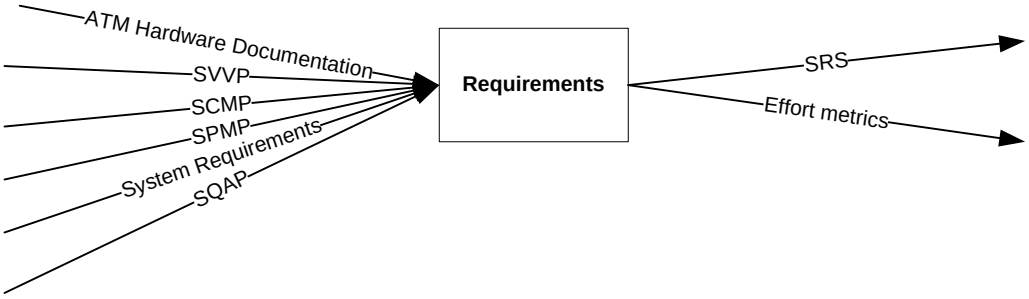


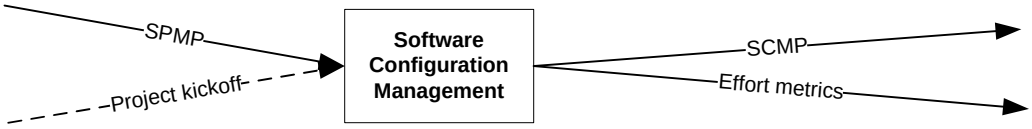


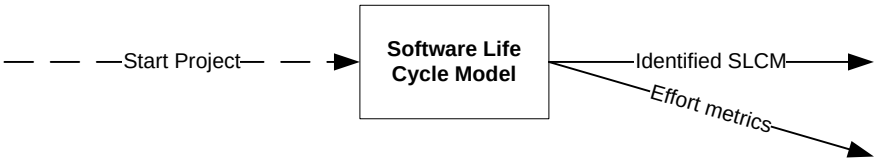

End-user documentation
Trained support staff
Installed, accepted software products
Trained end-users
Operation and Support
Support log

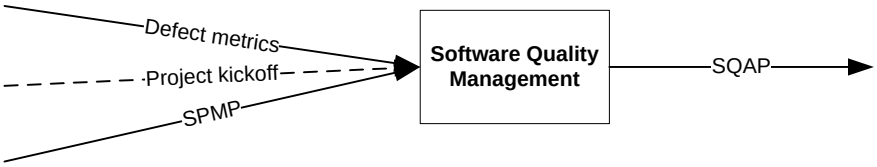

Identified SLCM
Project Initiation
SPMP
ATM Hardware Documentation
Effort metrics

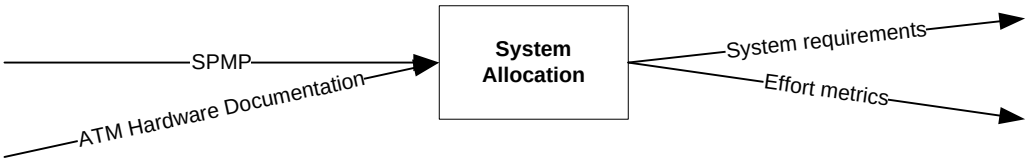

SPMP
Effort metrics
Project Monitoring and Control
Project control

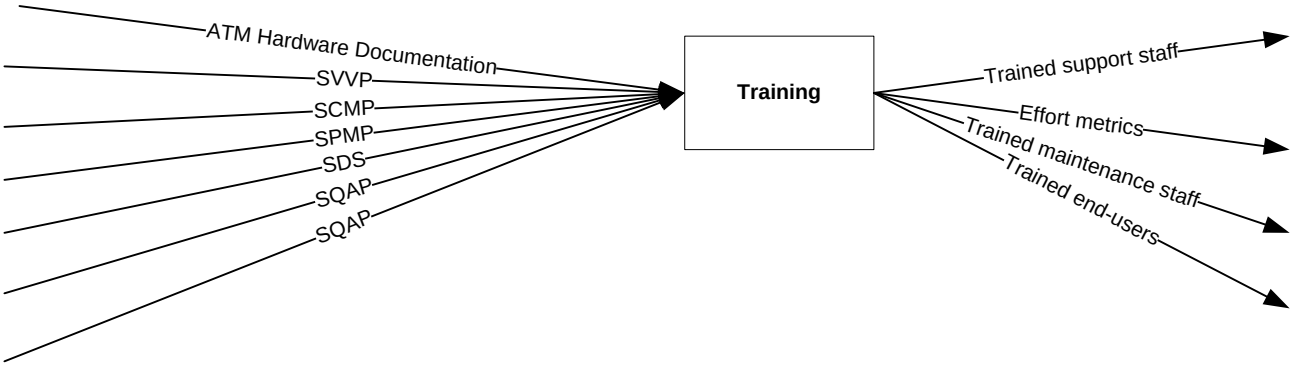

ATM Hardware Documentation
SVVP
SCMP
SPMP
System Requirements
SQAP
Requirements
SRS
Effort metrics

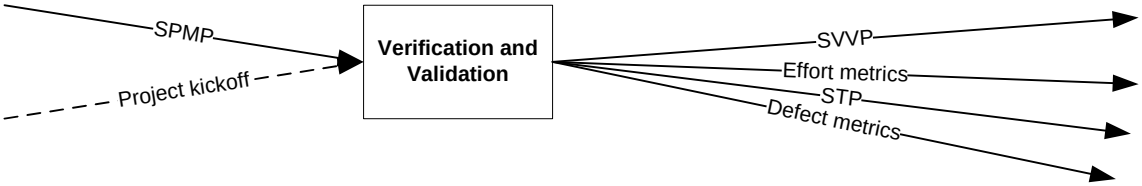

SPMP
Project kickoff
Software Configuration Management
SCMP
Effort metrics


Start Project
Software Life Cycle Model
Identified SLCM
Effort metrics


Defect metrics
Project kickoff
SPMP
Software Quality Management
SQAP


SPMP
ATM Hardware Documentation
System Allocation
System requirements
Effort metrics


ATM Hardware Documentation
SVVP
SCMP
SPMP
SDS
SQAP
SQAP
Training
Trained support staff
Effort metrics
Trained maintenance staff
Trained end-users


SPMP
Project kickoff
Verification and Validation
SVVP
Effort metrics
STP
Defect metrics