

DESIGN REQUIREMENTS FOR SRB  
PRODUCTION CONTROL SYSTEM

FINAL REPORT  
VOLUME IV  
IMPLEMENTATION

SUBMITTED BY:

A.T. KEARNEY, INC.



**DESIGN REQUIREMENTS FOR THE SRB  
PRODUCTION CONTROL SYSTEM**

**VOLUME IV**

**IMPLEMENTATION**

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**SECTION IX -IMPLEMENTATION PLAN**

## IX - IMPLEMENTATION PLAN

### INTRODUCTION

The implementation plan which is presented in this section has been developed to provide the means for the successful implementation of the automated production control system. There are three factors which the implementation plan encompasses and which will contribute to this success:

1. Detailed planning.
2. Phased implementation.
3. User involvement.

The plan which follows has been detailed to the task level in terms of necessary activities as the system is developed, refined, installed and tested. These tasks have been scheduled, on a preliminary basis, over a two-and-one-half-year time frame. This level of detailed planning ensures that no important steps will be missed.

One challenge in introducing a new system into an organization is providing for the acceptance of the system. It is principally for this reason that the subsystems are phased in over a two-and-one-half-year period. A phased implementation allows a smoother transition to the new system.

Finally, the plan has been developed to provide for the greatest possible degree of user involvement. USBI personnel will head each of the special implementation groups and will play an active role in detailing the system's characteristics and

implementing the system. This section of the report has been submitted as a separate volume to encourage participation by making the plan more accessible.

The implementation plan contains the following sections:

- Proposed Implementation Organization.
- Subsystem Implementation Schedule.
- Major Implementation Milestones.
- Project Start-Up Phase.
- Data Base Development Phase.
- Software Modification and Installation Phase.
- Network Design Refinement Phase.
- Hardware Acquisition Phase.
- Policies and Procedures Development Phase.
- System Integration and Checkout Phase.
- Training Phase.
- Operations Phase.
- Estimated Costs of Implementation.

The implementation of the entire system is expected to take two and one-half years. For the purposes of this plan, we have assumed that authorization to proceed will be received on or about June 1, 1981, and that the software vendor will be on-board by the end of July 1981. Any changes in this start-up schedule should be reflected in the remainder of the plan by "slipping" the rest of the implementation schedule.

PROPOSED  
IMPLEMENTATION  
ORGANIZATION

One of the crucial elements in the implementation of any new system is the cooperation of all parties who will be affected by the system. The best way to ensure cooperation is to invite participation in the development, design, and implementation of the system. In this manner, each of the participants has a "stake" in the successful outcome of the project.

In addition, certain expertise is required for successful program implementation. Resources such as production management personnel, MIS personnel and shop floor personnel, among others, will be required during each implementation phase.

These two criteria, participation of affected parties and required expertise, guided the development of the proposed implementation organization. Personnel have been chosen for the implementation organization from USBI, NASA/MSFC, NASA/KSC, and the software vendor. This organization, we believe, will provide the following factors which characterize a successful implementation program:

1. Top management commitment, visibility and involvement.
2. Responsibility for successful implementation rests with the user (USBI assembly operations) management.
3. Maximum user involvement in detailed planning for implementation and actual implementation.

4. Specifically defined authorities and responsibilities for each of the project teams.

5. Involvement of key users on the project team.

(a) USBI  
Responsibilities

The USBI team, as the user of the system, will have primary responsibility for the implementation of the system. A USBI team member will head the two groups which will oversee the project, the Implementation Team and the Steering Committee. In addition, a USBI team member will also take on Group Team Leader responsibilities for each functional project team. (The composition and responsibilities of each of the implementation organizations are detailed elsewhere in this section).

USBI personnel will have primary responsibility for providing the technical information necessary for software modification. In addition, USBI personnel will be responsible for communication and coordination of efforts within their operations and with their vendors.

(b) NASA  
Responsibilities

NASA personnel from MSFC and KSC will be represented on each of the implementation organizations, the Implementation Team, the Steering Committee and each of the project teams.

NASA personnel will be responsible for ensuring that government requirements, such as security or quality assurance

requirements, are communicated to each of the implementation organizations as the system is being designed. Further, the NASA representatives will be responsible for communications with any other NASA contractors who might be affected by the system or whose cooperation might be needed.

(c) Software Vendor  
Responsibilities

The software vendor will be represented on the Implementation Team and the Steering Committee, and will participate in project team activities on a regular basis.

The vendor is responsible for providing detailed system design specifications, software modifications, the development and conduct of some training programs, and assisting NASA and USBI with the successful implementation and operation of the production control system.

(d) Steering  
Committee

The members of the Steering Committee will be drawn from the Implementation Team. The proposed participants are:

1. USBI Director of Industrial Engineering.
2. USBI Manager MBAC Operations.
3. USBI Manager KBAC Operations.
4. USBI Manager Management Information Systems.
5. NASA/SRB Production Management and Planning Office.
6. NASA/KSC Director of Shuttle Operations.
7. Software Vendor Technical Representative.

8. Group Team Leaders (on as-needed basis).

The duties and responsibilities of the Steering Committee include:

1. Oversee Implementation Team directives to ensure compliance.
2. Develop, with the assistance of the project teams, the information required by the Implementation Team to carry out its mission.
3. Provide daily project oversight and track schedule compliance.
4. Resolve issues, when possible, before they reach the Implementation Team.
5. Ensure coordination among the project team.

The Steering Committee will also be established when the project is authorized and will operate through the implementation and operational phases.

(e) Implementation Team

The proposed Implementation Team participants are:

1. USBI Director of Industrial Engineering (Chairman).
2. USBI General Manager.
3. USBI Field Operations Manager.
4. USBI Manager Support Operations.
5. USBI Manager Quality Assurance.
6. USBI Manager Management Information Systems.

7. USBI Manager MBAC Operations.
8. USBI Manager KBAC Operations.
9. NASA/SRB Production Management and Planning Office.
10. NASA/SRB/KSC Resident Manager.
11. NASA/KSC Director of Shuttle Operations.
12. NASA/KSC Director of Design Engineering.
13. NASA/KSC Director of Technical Support.
14. NASA/KSC Director of Shuttle Engineering.
15. NASA/KSC Director STS Processing.
16. Software Vendor Technical Representative(s).
17. Group Team Leaders (on as-needed basis).

The duties and responsibilities of the Implementation Team include, but are not limited to:

1. Review and approve detailed subsystem design, specifications and implementation plans.
2. Monitor subsystem implementation progress and approve required rescheduling or reallocation of resources.
3. Resolve systems conflicts between functional groups, if necessary.
4. Approve test results and operating documentation prior to final system implementation.
5. Assign responsibility for subsystems implementation to project teams and approve the composition of the project teams.

The Implementation Team will be established as soon as a decision to proceed has been made and will continue to operate through the implementation and operations phases.

(f) Project Teams

The project teams will be established along the following functional lines:

1. Resource Planning.
2. Quality Assurance and Reliability.
3. Design Engineering.
4. Process Engineering.
5. Production Control.
6. Inventory Control.
7. Dispatching.
8. Operations Control.
9. Performance Reporting.
10. Preventive Maintenance.
11. Purchasing and Subsystem Technical Support.
12. Production Costing.
13. Materials Handling.
14. Data Processing Support.

In addition, a project team will be established to develop, coordinate and maintain training programs.

Each of the project teams will be chaired by an appropriate person from USBI, with team members being drawn from USBI, NASA and the software vendor.

The responsibilities of each of the functional project teams

include:

1. Develop detailed implementation plans for review and approval by functional group management, the Steering Committee and the Implementation Team.
2. Develop training requirements and determine personnel to be trained. Communicate this information to the Training Project Team.
3. Meet assigned targets in the Implementation Plan.
4. Assign tasks to team members or user employees.
5. Review detailed systems design and specifications and modify as required.
6. Ensure adequate and complete documentation of systems procedures.
7. Review and approve system/subsystem test results.
8. Refer systems conflicts to the appropriate level for resolution.

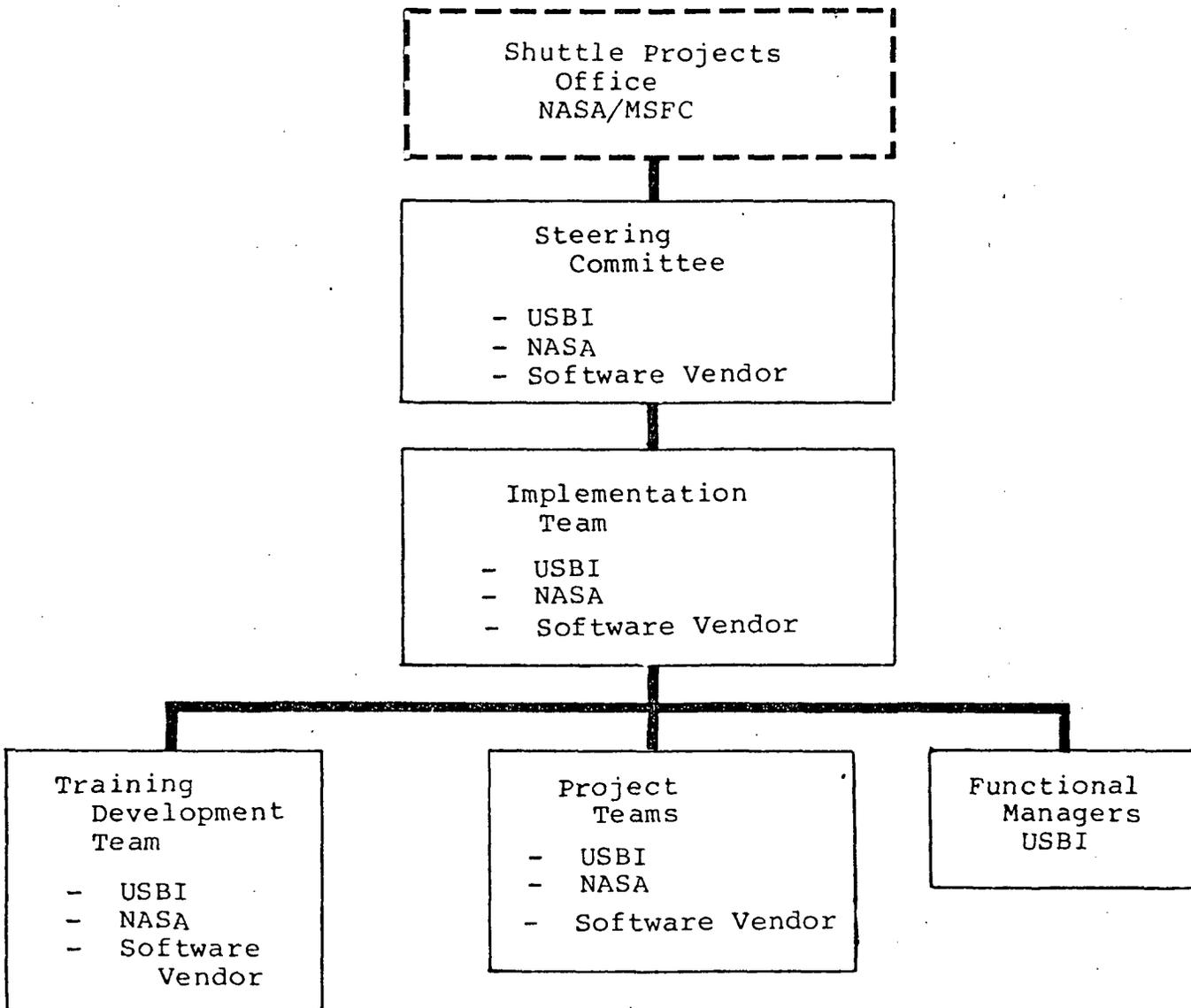
(g) Summary

The proposed implementation organization is shown in Figure IX-1. The Implementation Team is ultimately responsible to the Shuttle Project Office (NASA/MSFC), with the participation of this office being ensured through the representation of the SRB Production Management and Planning Office.

The Implementation Team, with representatives of USBI, NASA and the software vendor, will direct the implementation project. The Steering Committee will provide oversight for the project, and

coordinate the efforts of the project teams and the functional managers.

Figure IX-1  
Implementation Organization



SUBSYSTEM  
IMPLEMENTATION  
SCHEDULE

As was previously noted, the subsystems will be implemented on a phased schedule. This reflects both a desire to bring about changes slowly and an interdependence among the subsystems, such that certain subsystems must be in place before others are implemented.

The PERT chart, shown in Figure IX-2, shows this interdependency among the subsystem modules. As can be seen, the Inventory subsystem is the first one to be implemented. The Bill of Materials and MRP subsystems are dependent upon the data generated by the Inventory subsystem and follow it. This process continues through the implementation of the entire system. It should be noted that the Master Scheduling subsystem is operated manually on an interim basis at first, and then automated.

Table IX-1 reflects and summarizes the information in this exhibit. For each subsystem, the projected start and completion dates are provided. The completion date allows for a period in which the automated system will be run in parallel with the existing system.

Figure IX-2  
 SRB/AUTOMATED PRODUCTION CONTROL SYSTEMS INSTALLATION CRITICAL PATH NETWORK

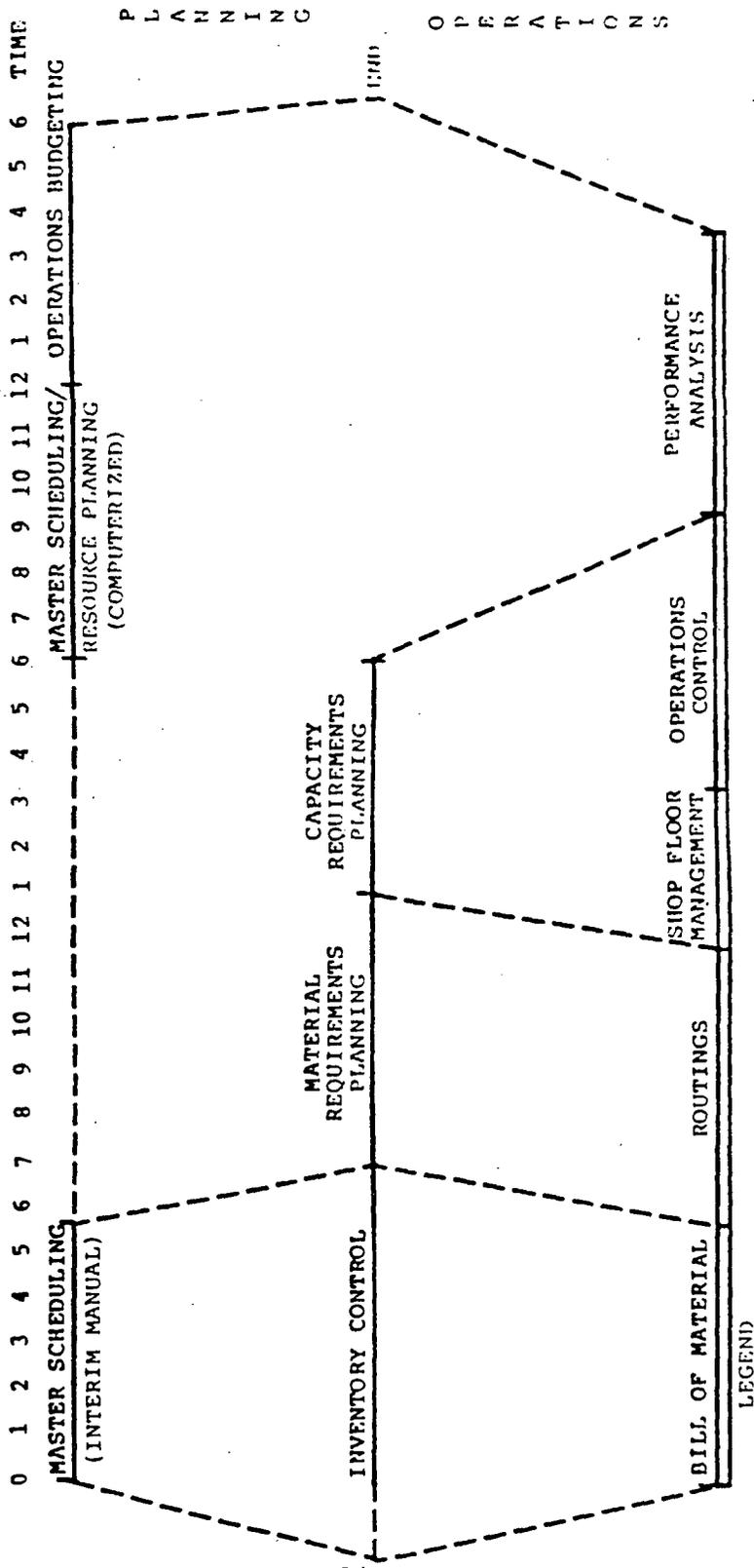


Table IX-1Subsystem Implementation Schedule

<u>Subsystem</u>	<u>Start Date</u>	<u>Finish Date</u>
Master Scheduling/Resource Planning	January 1983	January 1984
Launch Schedule	Complete	
Refurbishment Schedule	May 1983	July 1983
Operations Budgeting	August 1983	November 1983
Materials Requirements Planning	June 1981	July 1982
Attrition Forecasting	December 1981	July 1982
Design Engineering	June 1981	November 1981
BOM	July 1981	January 1982
Purchasing	March 1982	October 1982
Vendor Orders	May 1982	November 1982
Receiving	June 1981	November 1981
Inventory	July 1981	January 1982
Capacity Requirements Planning	November 1981	January 1983
PM Planning	December 1982	April 1983
PM Process Documents	December 1982	April 1983
Process Engineering	November 1981	May 1982
Exception WADs	November 1981	May 1982
Process Document WADs	November 1981	May 1982
Process Constraints	November 1981	May 1982
Work Center Data	August 1981	February 1982
Mission Compliance Risk Analysis	?	?
Production Resources Pool	May 1982	November 1982
Resource Availability Planning	May 1982	November 1982
Shop Floor Management	March 1982	October 1982
Resource Assignments	May 1982	November 1982
Resource Status	May 1982	November 1982
Personnel Certification	May 1982	November 1982
Operations Control	June 1982	April 1983
Kitting	May 1982	August 1982
Labor Control	August 1982	April 1983
Configuration Management	September 1981	July 1982
Exceptions	May 1982	February 1983
Performance Analysis	March 1983	October 1983
PMS/Budget Analysis/Costing	April 1983	October 1983

MAJOR IMPLEMENTATION  
MILESTONES

The implementation schedule is made up of phases, activities and tasks (from the gross to the fine level). The phases and activities constitute the major implementation milestones, and are presented in this section. In the remainder of this section, and in the exhibits to this section, the detailed tasks are defined, including estimated start and completion dates and associated levels of effort.

The major implementation milestones are presented below.

(a) Phase I - Project  
Start-Up

1. Implementation Authorization.
2. Implementation Organization Establishment.
3. Business System Design.
4. Computer System Design.
5. Software Vendor Selection.

(b) Phase II - Data  
Base Developments

1. Define Data Base Organization.
2. Develop Part Numbering System.
3. Develop Engineering Bill.
4. Cross Reference Drawing and Drawing Location Identification to Bill of Materials.
5. Develop Manufacturing Bill.
6. Develop Refurbishment Forecasted Attrition Bills.

7. Prepare Item Configuration Data and Effectivity

Status.

8. Develop Item Life Management Data.
9. Reorganize Work Authorization Documents.
10. Develop Routing Data.
11. Develop Work Center Master Data.
12. Develop Labor Skill Certification Master Data.
13. Develop Resource Master Data.
14. Develop Standards.
15. Prepare Resource Requirements Planning Bills.
16. Develop Preventive Maintenance Work Authorization

Documents.

17. Develop Preventive Maintenance Routing Data.
18. Cross Reference Shop Order Operations to WADs and/or

EOs.

19. Record Work in Process.

(c) Phase III -  
Software  
Modification  
and Installation(\*)

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1. Determine Required Modifications.
2. Compile Detailed System Specifications.
3. Develop Program Specifications/Modifications.
4. Subsystem Installation.

(\*)

Phase III, as will be seen, is to be conducted for each subsystem as it is implemented according to the subsystem implementation schedule shown in Table IX-1.

(d) Phase IV -  
Network Design  
Refinement

1. Develop Traffic Analysis.
2. Develop Refined Network Design.
3. Calculate/Simulate Communications Load.
4. Acquire Network Requirements.
5. Install Network.

(e) Phase V -  
Hardware  
Acquisition

1. Review Data Processing Requirements.
2. Refine Configuration Design.
3. Order Hardware.
4. Prepare Computer Sites.
5. Install Hardware/Communications Equipment.

(f) Phase VI -  
Policies and  
Procedures  
Development

1. Assign Policies and Procedures Development Responsibility.
2. Develop Detailed Business System Requirements by Function.
3. Determine Information Flows Dictated by the Detailed Business System.
4. Clarify Impact of Detailed Business System on Organizational Structure.
5. Define Policies and Procedures by Function and Activity.

(g) Phase VII -  
System  
Integration  
and Checkout

1. Integrate Each New Subsystem as Installed.
2. Test System.

(h) Phase VIII -  
Training

1. Implementation Organization Training Programs.
2. Middle Management/User Training.
3. Maintain Ongoing Programs.

(i) Phase IX -  
Operations

1. Review and Update Procedures.
2. Data Base Maintenance.
3. System Maintenance.

Each of the phases of the implementation plan and the associated activities and tasks are described in more detail in the following subsections. Included are planned start and finish dates and an estimated level of effort for each task.

Gantt charts are provided at the end of this section (Exhibits IX-10 and IX-11), showing the duration of each phase and the estimated USBI man-days required.

PHASE I - PROJECT  
START-UP

The project start-up phase is designed to put the mechanism in place for effective control of the APC system implementation.

Further, it involves some of the administrative actions which are required to initiate the project. This phase is estimated to take three to four months. Assuming that authorization to proceed is received by June 1, 1981, this phase should be completed by the end of August 1981. The activities and tasks associated with this phase are shown in Exhibit IX-1.

#### PHASE II - DATA BASE DEVELOPMENT

The data base development phase is one of the keys to the successful implementation of the APC system. In this phase any modifications to the SRB assembly operations environment which are necessary to effectively use the system are made. This includes the development of a new part numbering system to account for effectivities, the development of engineering and manufacturing bills of material, and the development of routings and resource master data, among others.

The importance of this phase is demonstrated to a certain extent by the time frame over which it is to be accomplished and also by the level of effort which will be required. This phase spans almost the entire implementation time frame of two and one-half years and is estimated to require over 7,000 man-days of USBI effort, excluding external support.

The detailed activities and tasks associated with this phase are displayed in Exhibit IX-2.

PHASE III - SOFTWARE  
MODIFICATION AND  
INSTALLATION

The software modification and installation phase has been subdivided by subsystem, according to the subsystem implementation schedule presented previously. Thus, the same activity and task and descriptions appear for each of the subsystem modules. As might be expected, the length of time and level of effort associated with each subsystem module varies.

PHASE IV - NETWORK  
DESIGN REFINEMENT

This phase will further detail the network design requirements which were developed during this study (see Section V). The design effort can begin upon completion of the first activity in the Data Base Development phase, the definition of the data base organization (October 1981), and will conclude in November 1982. It will require approximately 225 man-days of USBI effort. The activities and tasks involved in the network design refinement are detailed in Exhibit IX-4.

PHASE V - HARDWARE  
ACQUISITION

The hardware acquisition phase will include hardware procurement, site preparation (including security arrangements), and hardware installation. It is scheduled to run from October 1981 through August 1982, and will require approximately 355 man-days of USBI effort, depending on the time required for vendor selection. Additional labor will be required for actual installation. Further details regarding this phase are presented in Exhibit IX-5.

PHASE VI - POLICIES  
AND PROCEDURES  
DEVELOPMENT

20

e

The policies and procedures development phase will play an important role in bringing about the most effective use of the APC system. This will involve defining and formalizing the information flows required by the business system and examining the organizational structure of USBI for its fit with the requirements of the business system.

This phase is projected to run throughout the course of the project and will require approximately 1,250 man-days of USBI effort. Further details regarding this phase can be found in Exhibit IX-6.

PHASE VII - SYSTEM  
INTEGRATION AND  
CHECKOUT

This phase involves the integration of each subsystem as it is installed with previously installed subsystems. Therefore, it will span the entire APC system implementation project. The level of USBI effort for this phase is estimated to be 870 man-days. Further, detail regarding the activities and tasks associated with this phase are presented in Exhibit IX-7.

PHASE VIII -  
TRAINING

The training phase also runs the entire length of the implementation schedule; first developing programs for the implementation organization and top management, and then coordinating and conducting programs for middle management and system users. Its functions

are actually ongoing and will be absorbed in the USBI organization for new employee training and the maintenance of up-to-date materials and programs. These continuing activities will be part of the Operations Phase (Phase IX).

The level of USBI effort associated with this phase is approximately 3,570 man-days. Further details regarding this phase are presented in Exhibit IX-8.

#### PHASE IX - OPERATIONS

The operations phase of the implementation plan is a statement of the need to update and maintain procedures, the data base and other system features. It is an ongoing phase which involves an initial level of USBI effort estimated at 1,500 man-days. The activities associated with the phase are shown in Exhibit IX-9.

#### ESTIMATED COSTS OF IMPLEMENTATION

The estimated costs of implementation can be divided into three types of costs:

- Software Acquisition and Installation.
- Hardware Acquisition and Installation.
- USBI and NASA Manpower.

##### (a) Software Costs

The estimated rough order of magnitude cost of software acquisition and modifications is \$2.0 million (plus or minus \$500,000). This includes all vendor support for software, software modifications, and software installation. It does not

include other vendor support services, such as training development.

(b) Hardware Costs

The estimated rough order of magnitude cost for hardware acquisition and installation is \$2.7 million. This is shown in Table IX-3, on the following page.

Table IX-3Hardware and Communications Costs

<u>Item</u>	<u>Costs</u>
<u>Hardware</u>	
Main Processing Computers	\$1,000,000
Disk Storage/Controllers	210,000
Communications Controllers	220,000
Printers	350,000
Display Stations	330,000
Card Punch/Reader	25,000
Tape Controllers and Drives	230,000
Miscellaneous	35,000
<u>Communications</u>	
Lines	200,000
Modems	<u>100,000</u>
Total	<u>\$2,700,000</u>

(c) USBI And NASA  
Manpower

The estimated manpower required by the proposed implementation plan is as follows:

USBI	19,915	MAN-DAYS (83 MAN-YEARS)
NASA	2,879	MAN-DAYS (12 MAN-YEARS)
	<hr/>	
TOTAL	22,794	MAN-DAYS (95 MAN-YEARS)

Using an estimated average cost of \$34,000 per man-year for USBI and NASA personnel, the projected manpower cost is \$3,230,000.

(d) Summary of  
Implementation  
Costs

On the following page (Table 1X-4) is a summary for the estimated ROM system implementation costs. We feel that these estimates are conservative and could be used for initial budgeting requirements.

TABLE IX-4

SUMMARY OF ESTIMATED IMPLEMENTATION COSTS

SOFTWARE COST		
Initial Package Purchase	=	\$250,000 - \$300,000
R&S Modifications	=	\$1,620,000 - \$1,800,000
		<hr/>
(Section VII, Exhibit VII-2)		\$1,870,000 - \$2,100,000
HARDWARE COST		\$2,700,000
USBI and NASA PERSONNEL		\$3,230,000
		<hr/>
TOTAL		<u>\$7,800,000</u> <u>\$8,030,000</u>

ESTIMATED COSTS  
OF OPERATION

The estimated costs of ongoing operations can be divided into four types of costs.

- Operating Personnel
- Computer Center Personnel
- Hardware Maintenance
- Miscellaneous

(a) Operating  
Personnel

While it is difficult to determine the number of operating personnel required for a system, group of facilities, and operation of this magnitude; we have, based upon our experience, made initial estimates as shown in Table IX-5.

TABLE IX-5OPERATING PERSONNEL ESTIMATE

<u>Function</u>	<u>Quantity/ Shift</u>	<u>Number of Shifts</u>	<u>Total</u>
Director	1	1	1
Management Office	3	2	6
Planning/Scheduling	4	2	8
Dispatching/Expediting	<u>6</u>	<u>2</u>	<u>12</u>
Total "New" Staff Functions			<u>27</u>
Work Control Stations	12	2	<u>24</u>
			<u>51</u>

Using an estimated cost of \$35,000 to \$45,000 per person, it is estimated that these operating personnel will cost between \$1,785,000 and \$2,295,000 per year.

(b) Computer  
Center  
Personnel

Table IX-6 shows our estimates for the computer center personnel required to operate the APC system.

TABLE IX-6COMPUTER CENTER PERSONNEL ESTIMATE

<u>Function</u>	<u>Quantity/ Shift</u>	<u>Number of Shifts</u>	<u>Total</u>
Director	1	1	1
Operators	5	3	15
Maintenance Programmers	5	1	5
Analysts	3	1	3
Data Base Administrators	2	1	2
Technical Software Support	2	1	2
I/O Control	2	1	2
			30

Using an estimated cost of \$35,000 to \$45,000 per person, it is estimated that these computer center personnel will cost between \$1,050,000 and \$1,350,000 per year.

(c) Hardware  
Maintenance

Based upon the computer configuration identified in Section VIII of this report, it is estimated that the yearly maintenance costs associated with that hardware is approximately \$140,000.

(d) Miscellaneous  
Costs

These types of costs are the most difficult to isolate and estimate and are therefore probably the "roughest" of the ROM costs presented. However they are a small order of magnitude

and are therefore probably not significant.

We estimate facility maintenance to be approximately \$100,000 per year while such things as supplies may approximate \$50,000 to \$100,000 per year.

ASSUMPTIONS  
ASSOCIATED  
WITH THE  
IMPLEMENTATION  
WORKPLAN

This implementation schedule is predicated upon certain assumptions which must be kept in mind during the implementation start-up as well as the on-going phases of the project.

1. The implementation has been scheduled for completion in 2-1/2 years at NASA's request. Projects of this magnitude and scope often require a longer implementation time frame due to such things as lack of top management support, lack of availability of critical skills, lack of planning and execution ability, etc. With the proper effort and focus, NASA and USBI can overcome these difficulties. However, it should be noted that the 2-1/2 year schedule is an optimistic time frame under even the most favorable circumstances.

2. Manpower and specific skill requirements are not leveled in the implementation workplan. Certain skills such as systems analysts, industrial engineers, materials/inventory managers, etc., will be required during the course of this project, in order to insure successful completion. However, no attempt

has been made to achieve a "leveling" of these critical skills by time-period. This implies that, based upon the current and anticipated skills available, the time table will have to be adjusted to reflect a "more realistic" workload for these critical personnel. This may not however, cause the total length of the project to require more than 2 1/2 years for implementation.

3. Hardware acquisition leadtime in the workplan may not be sufficient, depending upon market conditions. While every attempt has been made to provide for a "realistic" time frame, it must be recognized that things such as hardware acquisitions are highly variable depending on such things as market conditions, required configuration, as well as other factors. It will be necessary for NASA and USBI to negotiate with the selected hardware vendor, not only the installation price (purchased or leased) but also the installation timing.

4. "Streamlined" NASA procedures are assumed to be followed through the implementation of the system.

5. Engineering design changes will be reduced to a "reasonable" level. While it is recognized that a vehicle as complex as the Space Shuttle is developed by evolution, it is assumed that at some point in the development, design changes will be considered "frozen" for the configuration which is in the actual refurbishment process at that time.

6. Acquisition of additional material control skills by USBI is not considered in the implementation. It is recognized that additional skills in the form of material control

expertise may be needed by USBI, in order to implement a system such as this. Our past experience has been that while these skills are available, a "level-time" is usually associated with acquiring such resources. This "lead-time" has not been factored into the workplan.

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-1  
Page 1 of 5

Project Phase I - Activity 1  
Implementation Authorization

Keatney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review System Requirements with NASA Officials	USBI/HSV	1	30	5			6/81		6/81		
Approve System Approach (Modify as Desired)	NASA/MSPC	2	10	50			6/81		6/81		
Obtain Funding and Authorization to Proceed	USBI/HSV	3	<u>5</u>	<u>20</u>			6/81		6/81		
<b>Total</b>			<u>45</u>	<u>75</u>							

Note: (1) ES - External Support. All NASA support unless otherwise indicated.

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-1  
Page 2 of 5

Project Phase I - Activity 2  
Implementation Organization Establishment

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES (I)	USBI	ES (I)	Plan	Actual	Plan	Actual	
Establish Implementa- tion Team and Steering Committee	USBI/HSV USBI/KSC NASA	1	10	2			6/81	6/81			
Define Duties and Responsibilities of Each	USBI/HSV USBI/KSC	2	10	5			7/81	7/81			
Establish Functional Project Teams	Implementation Team	3	<u>20</u>	<u>2</u>			7/81	7/81		Implementation Organi- zation	
<b>Total</b>			<u>40</u>	<u>9</u>							

Note: (1). ES - External Support. All NASA support unless otherwise indicated.

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-1  
Page 1 of 5

Project Phase I - Activity 3  
Preliminary Business  
System Design

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES (1)	USBI	ES (1)	Plan	Actual	Plan	Actual	
Review Business and Computer System Requirements	USBI	1	50	10			6/81		6/81		
Modify as Required to Reflect "Scope" of APC	USBI	2	50	10			6/81		6/81		
Develop Preliminary System Designs by Module	USBI	3	500	20			6/81		8/81		
Submit for PDR and Identify Changes Required	USBI	4	20	10			8/81		8/81		
Revise Preliminary System Design as Necessary	USBI	5	<u>30</u>	<u>10</u>			8/81		8/81		
<b>Total</b>			<b><u>650</u></b>	<b><u>60</u></b>							

Note: (1) ES - External Support. All NASA support unless otherwise indicated.

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-1  
Page 4 of 5

Project Phase I - Activity 4  
Preliminary Computer  
System Design

Keatney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Computer System Requirements	USBI	1	30	10			6/81		6/81		
Modify as Required to Reflect "Scope" of APC	USBI	2	30	5			6/81		6/81		
Develop Preliminary Computer System Design by Program	USBI	3	200	20			6/81		8/81		
Submit for PDR and Identify Changes Required	USBI	4	20	10			8/81		8/81		
Revise Preliminary Computer System Design as Necessary	USBI	5	<u>20</u>	<u>10</u>			8/81		8/81		
<b>Total</b>			<u>300</u>	<u>55</u>							

Note: (1) ES - External Support. All NASA support unless otherwise indicated.

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-1  
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Project Phase I - Activity 5  
Software Vendor Selection

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Prepare RFQ for Software and Distribute	Implementation Team USBI-MIS	1	15	5			6/81		7/81		
Evaluate Responses	Implementation Team USBI-MIS	2	15	15			7/81		8/81		
Negotiate with Vendor(s)	Implementation Team	3	10	10			8/81		8/81		
Issue Contract	USBI/HSV	4	<u>10</u>	<u>5</u>			8/81		8/81	Software Vendor Contract	
Total			<u>50</u>	<u>35</u>							

Note: (1) ES - External Support. All NASA support unless otherwise indicated.

Kearney Management Consultants

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-2  
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Project Phase II - Activity 1  
Define Data Base Organization

Keatney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Detailed Data Dictionary	USBI/Software Vendor	1	50	30			7/81		8/81		
Evaluate Data Transaction Volumes and File Sizes	USBI/Software Vendor	2	20	15			7/81		8/81		
Evaluate Data Base Structure and Efficiencies	USBI	3	20	20			8/81		9/81		
Define Load Scheme	USBI	4	10	10			8/81		9/81		
<b>Total</b>			<u>100</u>	<u>75(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (50 days).

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EXHIBIT IX-2  
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Project Phase II - Activity 2  
Develop Part Numbering System

Keatney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Policy for Part Numbering/ Effectivity Control	Project Teams	1	15	5			7/81		8/81		
Assign Part Numbers	USBI-Engineering	2	150	20			8/81		10/81		
Enter into Inventory Control		3	100	—			8/81		10/81		
<b>Total</b>			<u>265</u>	<u>25(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (5 days).

PROJECT PLANNING AND CONTROL SHEET

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Project Phase II - Activity 3  
Develop Engineering Bill

Keatney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Update Current Engineering Bills with New Part Numbering System	USBI-Engineering	1	100	-			7/81		10/81		
Reverify Bill of Materials Structure	USBI-Engineering	2	50	15			7/81		10/81		
Institute Logic for Multiple Effectivity Bill of Material Control		3	25	15			7/81		10/81		
Institute Launch Effectivity Engineering Change Control		4	<u>25</u>	<u>15</u>			10/81		10/81		
<b>Total</b>			<u>200</u>	<u>45(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (10 days).

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-2  
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Project Phase II - Activity 4  
Cross-Reference Drawing and Drawing  
Location Identification to Bill of  
Materials

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(I)	USBI	ES(I)	Plan	Actual	Plan	Actual	
Reorient Drawings To Include Components Location Identifier		1	200	10			7/81		10/81		
Cross-Reference Bill of Material Compon- ent Location to Drawing		2	100	5			8/81		11/81		
Total			<u>300</u>	<u>15(2)</u>							

Notes: (1) ES - External Support. All NASA support unless  
otherwise indicated.  
(2) Software vendor support (5 days).

PROJECT PLANNING AND CONTROL SHEET

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Project Phase II - Activity 5  
Develop Manufacturing Bill

Keamy Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Reorient Engineering Bill Structure To Be Compatible with Manufacturing Process		1	<u>300</u>	<u>30</u>			9/81		12/81		
<b>Total</b>			<u>300</u>	<u>30(2)</u>							

- Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
 (2) Software vendor support (10 days).

PROJECT PLANNING AND CONTROL SHEET

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Project Phase II - Activity 6  
Develop Refurbishment Forecasted  
Attrition Bills

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES (1)	USBI	ES (1)	Plan	Actual	Plan	Actual	
Define Component Attrition Rates		1	60	5			10/81		11/81		
Restructure Manufacturing Bill of Materials Refurbishment Manufacturing Process		2	60	20			10/81		1/82		
Establish Attrition Bills of Material		3	30	10			12/81		1/82		
<b>Total</b>			<u>150</u>	<u>35(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (15 days).

PROJECT PLANNING AND CONTROL SHEET

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Project Phase II - Activity 7  
Prepare Item Configuration Data  
and Effectivity Status

Keamy Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Record Effectivity of Existing Hardware		1	120	15			10/81		11/81		
Load "As Built" Configuration Data Base for All Currently Utilized Hardware		2	100	10			12/81		2/82		
Update Manufacturing Status by Shop Floor Activity		3	<u>100</u>	<u>10</u>			3/82		7/82		
<b>Total</b>			<u>320</u>	<u>35(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (15 days).

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-2  
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Project Phase II - Activity 8  
Develop Item Life  
Management Data

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Record Part-Life Expectancies and Summary Flight and Installation History into the Serialized Inventory Master Record		1	<u>500</u>	<u>50</u>			10/81		1/82		
<b>Total</b>			<u>500</u>	<u>50(2)</u>							

- Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (10 days).

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EXHIBIT IX-2  
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Project Phase II - Activity 9  
Reorganize Work Authorization Documents

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Restructure OMs and BOSS To Conform with Manufacturing Bill of Materials		1	1,000	50			1/82		7/82		
Identify Work Centers, Labor Certifications and Resources by BOS or OMI Section		2	200	10			1/82		7/82		
Enter WADs into Word Processing		3	250	-			1/82		7/82		
<b>Total</b>			<u>1,450</u>	<u>60(2)</u>							

Kearney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (15 days).

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EXHIBIT IX-2  
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Project Phase II - Activity 10  
Develop Routing Data

Keatney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Define Routing Operations, Structure and Sequence		1	250	15			1/82		7/82		
Define Work Centers, Labor Skill Certifications and Resources by Routing Operation		2	250	5			1/82		7/82		
Define the Routing Operations Network or Process Constraints		3	100	10			1/82		7/82		
Load Data into Routing File		4	100	5			1/82		7/82		
<b>Total</b>			<u>700</u>	<u>35(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (15 days).

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Project Phase II - Activity 11  
Develop Work Center Master Data

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Identify Work Centers		1	50	10			6/82		8/82		
Determine Work Center Capacities		2	100	10			8/82		10/82		
Load the Data into Master File		3	20	-			10/82		11/82		
Total			170	20(2)							

Kearney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (5 days).

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Project Phase II - Activity 12  
Develop Labor Skill Certification  
Master Data

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Identify Labor Certifications To Be Controlled		1	30	5			6/82		8/82		
Determine Hours Available within Each Certification		2	20	5			8/82		10/82		
Load the Data into Master File		3	30	5			10/82		11/82		
Total			80	15(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (5 days).

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Project Phase II - Activity 13  
Develop Resource Master Data

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Identify Resources To Be Controlled; i.e., GSE, Tools and Subcontractors		1	50	10			6/82		8/82		
Determine Capacity Available for each Resource		2	30	5			8/82		10/82		
Load the Data into the Master File		3	<u>30</u>	<u>5</u>			10/82		11/82		
<b>Total</b>			<u>110</u>	<u>20(2)</u>							

Kearney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (5 days).

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Project Phase II - Activity 14  
Develop Standards

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Historical Actual Time Data by Operation and by Labor Certification, Work Center Time and Other Resource Usage		1	300	5			6/82		10/82		
Determine Approximate Standards		2	1,000	70			7/82		11/82		
Load into Routing File		3	30	5			10/82		11/82		
<b>Total</b>			<u>1,330</u>	<u>80(2)</u>							

- Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (20 days).

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EXHIBIT IX-2  
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Project Phase II - Activity 15  
Prepare Resource Requirements  
Planning Bill

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Identify the Resources To Be Controlled at a Gross Level		1	50	10			7/82		8/82		
Determine the Time-Phased Requirements for Each Resource per Aisle Transfer Schedule and Final Assembly Schedule		2	50	10			8/82		10/82		
Load into Resource Planning Bill of Materials File		3	<u>20</u>	<u>5</u>			11/82		11/82		
<b>Total</b>			<u>120</u>	<u>25(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (5 days).

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-2  
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Project Phase II - Activity 16  
Develop Preventive Maintenance  
WADs

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review PM WAD for Simplification Opportunities		1	30	10			12/82		1/83		
Revise WADs to the Degree Feasible		2	200	100			1/83		4/83		
Enter PM WADs into Word Processing		3	30	5			1/83		4/83		
Total			260	115(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (10 days).

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Project Phase II - Activity 17  
Develop Preventive Maintenance  
Routing Data

Keatney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Define Routing Operations, Structure and Sequence		1	50	20			1/83		4/83		
Define Work Centers, Labor Skill Certifications and Resources by Routing Operation		2	20	10			1/83		4/83		
Define the Routing Operation Network or Process Constraints		3	20	20			1/83		4/83		
Load Data into the Routing File		4	10	—			1/83		4/83		
<b>Total</b>			<u>100</u>	<u>50(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (5 days).

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EXHIBIT IX-2  
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Project Phase II - Activity 18  
Cross-Reference Shop  
Operation To WADs and/or EDs

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Identify OMI, OMI Section or BOS Document Which Contains Detailed Process Instructions for Each Routing Operation		1	100	15			4/82		6/82		
Identify Engineering Orders Relating to Each Routing Operation		2	50	10			4/82		6/82		
Record in the Routing Operation Data		3	10	-			6/82		7/82		
Total			160	25(2)							

Kearney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (10 days).

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Project Phase II - Activity 19  
Record Work-In-Process

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Identify Work-in-Process in Terms of Materials, Resources and Labor by Routing Operation		1	300	30			4/82		7/82		
Record in Shop Order Work-in-Process File		2	100	10			4/82		7/82		
<b>Total</b>			<u>400</u>	<u>40(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (5 days).

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-3  
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Project Phase III - Activity 1  
Software Modification and Installation - Master Scheduling/  
Resource Planning - Determine Required Modifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review APC Requirements and Preliminary Systems Designs with Software Vendor		1	25	15			1/83		4/83		
Finalize Required Software and Data Base Modifications		2	50	25			1/83		4/83		
Assign Detailed Modifications to Project Teams for Development of Detailed System Specifications		3	<u>20</u>	<u>10</u>			1/83		4/83		
Total			<u>95</u>	<u>50(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (35 days).

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-3  
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Project Phase III - Activity 2  
Software Modification and Installation - Master Scheduling/  
Resource Planning - Compile Detailed System Specifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Policies and Procedures, Information Flows and Business System Requirements/ Designs		1	25	15			4/83		6/83		
Finalize Computer System Requirements; e.g., Data Requirements, Other System Interfaces, Etc.		2	20	15			4/83		6/83		
Determine Input/ Output Formats		3	30	20			4/83		6/83		
Develop Processing Logic Requirements	Software Vendor	4	5	20			4/83		6/83		
Define Data Base Access Requirements	Software Vendor	5	5	25			4/83		6/83		
Develop Detailed Systems Specifications	Project Teams	6	80	70			4/83		7/83		
Total			165	165(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (150 days).

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Project Phase III - Activity 3  
Software Modification and Installation - Master Scheduling/  
Resource Planning - Develop Program Specifications/Modifications

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Program Specifications/Modifications	Software Vendor	1	5	60			7/83		10/83		
Program Modifications	Software Vendor	2	10	100			7/83		10/83		
Test and "Debug"	Software Vendor	3	10	40			7/83		10/83		
Total			25	200(2)							

Kearney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (180 days).

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Project Phase III - Activity 4  
Software Modification and Installation - Master Scheduling/  
Resource Planning - Subsystem Installation

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Subsystem Installation Plan Assigning Instal- lation Tasks		1	10	10			10/83		11/83		
Train Users		2	100	40			10/83		11/83		
Conduct On-Site Test		3	50	20			11/83		12/83		
Run Subsystem in Par- allel with Existing System		4	50	20			12/83		1/84		
Transition to Opera- tions Phase		5	50	20			12/83		1/84		
Total			<u>260</u>	<u>110(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (25 days).

Kearney Management Consultants

PROJECT PLANNING AND CONTROL SHEET

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Project Phase III - Activity 5  
Software Modification and Installation - Material  
Requirements Planning - Determine Required Modifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review APC Requirements and Preliminary Systems Designs with Software Vendor		1	20	10			8/81		8/81		
Review Required Software and Data Base Modifications		2	20	10			8/81		9/81		
Assign Detailed Modifications to Project Teams for Development of Detailed System Specifications		3	<u>20</u>	<u>10</u>			9/81		10/81		
Total			<u>60</u>	<u>30(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (20 days).

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EXHIBIT IX-3  
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Project Phase III - Activity 6  
Software Modification and Installation - Material  
Requirements Planning - Compile Detailed System Specifications

Keatney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Policies and Procedures, Information Flows and Business System Requirements/Design		1	20	10			10/81		11/81		
Analyze Computer System Requirements; e.g., Data Requirements, Other System Interfaces, Etc.		2	30	10			10/81		11/81		
Determine Input/Output Formats		3	50	50			11/81		12/81		
Develop Processing Logic Requirements	Software Vendor	4	5	25			11/81		12/81		
Define Data Base Access Requirements	Software Vendor	5	5	25			11/81		12/81		
Develop Detailed Systems Specifications	Software Vendor	6	30	30			11/81		12/81		
Total			140	150(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (120 days).

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Project Phase III - Activity 7  
Software Modification and Installation - Material  
Requirements Planning - Develop Program Specifications/Modifications

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Program Specifications/Modifications	Software Vendor	1	5	50			12/81		1/82		
Program Modifications	Software Vendor	2	10	75			1/82		2/82		
Test and "Debug"	Software Vendor	3	10	50			1/82		3/82		
Total			25	175(2)							

Kearney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (150 days).

PROJECT PLANNING AND CONTROL SHEET

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Project Phase III - Activity B  
Software Modification and Installation - Material  
Requirements Planning - Subsystem Installation

Keirney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES (1)	USBI	ES (1)	Plan	Actual	Plan	Actual	
Develop Subsystem Installation Plan Assigning Installation Tasks		1	10	10			3/82		3/82		
Train Users		2	100	30			3/82		4/82		
Conduct On-Site Test		3	50	20			4/82		5/82		
Run Subsystem in Parallel with Existing System		4	50	20			5/82		6/82		
Transition to Operations Phase		5	50	20			6/82		7/82		
Total			260	100(2)							

- Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (30 days).

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Project Phase III - Activity 9  
Software Modification and Installation - Capacity  
Requirements Planning - Determine Required Modifications

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review APC Requirements and Preliminary Systems Design with Software Vendor		1	10	5			11/81		12/81		
Finalize Required Software and Data Base Modifications		2	30	10			11/81		12/81		
Assign Detailed Modifications to Project Teams for Development of Detailed System Specifications		3	<u>30</u>	<u>15</u>			1/82		2/82		
<b>Total</b>			<u>70</u>	<u>30(2)</u>							

Keatney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (20 days).

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Project Phase III - Activity 10  
Software Modification and Installation - Capacity  
Requirements Planning - Compile Detailed System Specifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Policies and Procedures, Information Flows and Business System Requirements/Design		1	30	15			2/82		3/82		
Finalize Computer System Requirements, Other System Interfaces, Etc.		2	30	15			2/82		3/82		
Determine Input/Output Formats		3	60	50			3/82		4/82		
Develop Processing Logic Requirements	Software Vendor	4	5	35			3/82		4/82		
Define Data Base Access Requirements	Software Vendor	5	5	35			3/82		4/82		
Develop Detailed Systems Specifications	Software Vendor	6	<u>80</u>	<u>70</u>			4/82		6/82		
Total			<u>210</u>	<u>220(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (200 days).

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Project Phase III - Activity 11  
Software Modification and Installation - Capacity  
Requirements Planning - Develop Program Specifications/Modifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Program Specifications/ Modifications	Software Vendor	1	5	75			4/82		7/82		
Program Modifications	Software Vendor	2	10	100			5/82		8/82		
Test and "Debug"	Software Vendor	3	10	50			6/82		9/82		
Total			25	225(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (200 days).

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Project Phase III - Activity 12  
Software Modification and Installation - Capacity  
Requirements Planning - Subsystem Installation

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Subsystem Installation Plan Assigning Instal- lation Tasks		1	25	15			8/82		9/82		
Train Users		2	100	30			9/82		10/82		
Conduct On-Site Test		3	50	20			10/82		11/82		
Run Subsystem in Parallel with Existing System		4	50	20			11/82		12/82		
Transition to Opera- tions Phase		5	50	20			12/82		1/83		
Total			275	105(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (35 days).

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Project Phase III - Activity 13  
Software Modification and Installation - Shop Floor  
Management - Determine Required Modifications

Keatney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review APC Requirements and Preliminary Systems Designs with Software Vendor		1	10	5			3/82		4/82		
Finalize Required Software and Data Base Modifications		2	20	10			3/82		4/82		
Assign Detailed Modifications to Project Teams for Development of Detailed System Specifications		3	<u>20</u>	<u>10</u>			4/82		5/82		
<b>Total</b>			<u>50</u>	<u>25(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (15 days).

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Project Phase III - Activity 14  
Software Modification and Installation - Shop Floor  
Management - Compile Detailed System Specifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Policies and Procedures, Information Flows and Business System Requirements/Design		1	10	10			5/82		6/82		
Finalize Computer System Requirements; e.g., Data Requirements, Other System Interfaces, Etc.		2	10	10			5/82		6/82		
Determine Input/Output Formats		3	50	50			6/82		7/82		
Develop Processing Logic Requirements	Software Vendor	4	5	25			6/82		7/82		
Define Data Base Access Requirements	Software Vendor	5	5	25			6/82		7/82		
Develop Detailed Systems Specifications	Software Vendor	6	70	70			6/82		8/82		
Total			150	190(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (150 days).

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Project Phase III - Activity 15  
Software Modification and Installation - Shop Floor  
Management - Develop Program Specifications/Modifications

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Program Specifications/Modifications	Software Vendor	1	5	40			6/82		9/82		
Program Modifications	Software Vendor	2	10	125			6/82		9/82		
Test and "Debug"	Software Vendor	3	10	70			6/82		9/82		
Total			<u>25</u>	<u>235(2)</u>							

Kearney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (200 days).

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Project Phase III - Activity 16  
Software Modification and Installation - Shop Floor  
Management - Subsystem Installation

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Subsystem Installation Plan Assigning Installation Tasks		1	20	15			7/82		8/82		
Train Users		2	100	30			7/82		8/82		
Conduct On-Site Test		3	50	20			8/82		9/82		
Run Subsystem in Parallel with Existing System		4	50	20			9/82		10/82		
Transition to Operations Phase		5	50	20			9/82		10/82		
Total			270	105(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (30 days).

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Project Phase III - Activity 17  
Software Modification and Installation - Operations  
Control - Determine Required Modifications

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review APC Requirements and Preliminary Systems Designs with Software Vendor		1	10	5			6/82		7/82		
Review Required Software and Data Base Modifications		2	20	10			6/82		7/82		
Assign Detailed Modifications to Project Teams for Development of Detailed System Specifications		3	<u>20</u>	<u>10</u>			7/82		8/82		
Total			<u>50</u>	<u>25(2)</u>							

Kearney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (15 days).

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Project Phase III - Activity 18  
Software Modification and Installation - Operations  
Control - Compile Detailed System Specifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Policies and Procedures, Information Flows and Business System Requirements/Design		1	20	10			8/82		9/82		
Finalize Computer System Requirements; e.g., Data Requirements, Other System Interfaces, Etc.		2	20	10			8/82		9/82		
Determine Input/Output Formats		3	50	25			9/82		10/82		
Develop Processing Logic Requirements	Software Vendor	4	5	25			9/82		10/82		
Define Data Base Access Requirements	Software Vendor	5	5	25			9/82		10/82		
Develop Detailed Systems Specifications	Software Vendor	6	50	50			9/82		11/82		
Total			150	145(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (125 days).

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Project Phase III - Activity 19  
Software Modification and Installation - Operations  
Control - Develop Program Specifications/Modifications

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Program Specifications/Modifications	Software Vendor	1	5	25			10/82		12/82		
Program Modifications	Software Vendor	2	5	50			11/82		1/83		
Test and "Debug"	Software Vendor	3	5	15			12/82		2/83		
Total			15	90(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (75 days).

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Project Phase III - Activity 20  
Software Modification and Installation - Operations  
Control - Subsystem Installation

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Subsystem Installation Plan Assigning Instal- lation Tasks		1	25	10			1/83		2/83		
Train Users		2	50	20			1/83		2/83		
Conduct On-Site Test		3	20	10			2/83		3/83		
Run Subsystem in Par- allel with Existing System		4	20	10			3/83		4/83		
Transition to Opera- tions Phase		5	30	15			3/83		4/83		
Total			145	65(2)							

Kearney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (15 days).

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Project Phase III - Activity 21  
Software Modification and Installation - Performance  
Analysis - Determine Required Modifications

Keatney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review APC Requirements and Preliminary Systems Designs with Software Vendor		1	10	5			3/83		4/83		
Analyze Required Software and Data Base Modifications		2	20	10			3/83		4/83		
Assign Detailed Modifications to Project Teams for Development of Detailed System Specifications		3	<u>20</u>	<u>10</u>			4/83		5/83		
Total			<u>50</u>	<u>25(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (20 days).

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Project Phase III - Activity 22  
Software Modification and Installation - Performance  
Analysis - Compile Detailed System Specifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Policies and Procedures, Information Flows and Business System Requirements/Design		1	20	10			5/83		6/83		
Finalize Computer System Requirements; e.g., Data Requirements, Other System Interfaces, Etc.		2	20	10			5/83		6/83		
Determine Input/Output Formats		3	50	25			6/83		7/83		
Develop Processing Logic Requirements	Software Vendor	4	5	25			6/83		7/83		
Define Data Base Access Requirements	Software Vendor	5	5	25			6/83		7/83		
Develop Detailed Systems Specifications	Software Vendor	6	<u>50</u>	<u>50</u>			6/83		8/83		
Total			<u>150</u>	<u>145(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (125 days).

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Project Phase III - Activity 23  
Software Modification and Installation - Performance  
Analysis - Develop Program Specifications/Modifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES (1)	USBI	ES (1)	Plan	Actual	Plan	Actual	
Develop Program Specifications/Modifications	Software Vendor	1	5	50			6/83		9/83		
Program Modifications	Software Vendor	2	5	100			6/83		9/83		
Test and "Debug"	Software vendor	3	5	25			6/83		9/83		
<b>Total</b>			<u>15</u>	<u>175(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (140 days).

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Project Phase III - Activity 24  
Software Modification and Installation - Performance  
Analysis - Subsystem Installation

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Subsystem Installation Plan Assigning Installation Tasks		1	20	10			7/83		8/83		
Train Users		2	150	20			7/83		8/83		
Conduct On-Site Test		3	50	20			8/83		9/83		
Run Subsystem in Parallel with Existing System		4	50	20			9/83		10/83		
Transition to Operations Phase		5	50	20			9/83		10/83		
<b>Total</b>			<u>320</u>	<u>90(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (25 days).

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Project Phase III - Activity 25  
Software Modification and Installation - Bill of  
Materials - Determine Required Modifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review APC Requirements and Preliminary Systems Designs with Software Vendor		1	10	5			8/81		8/81		
Review Required Software and Data Base Modifications		2	20	10			8/81		9/81		
Assign Detailed Modifications to Project Teams for Development of Detailed System Specifications		3	<u>20</u>	<u>10</u>			9/81		10/81		
<b>Total</b>			<u>50</u>	<u>25(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (15 days).

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Project Phase III - Activity 26  
Software Modification and Installation - Bill of  
Materials - Compile Detailed System Specifications

Keatney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Policies and Procedures, Information Flows and Business System Requirements/Design		1	10	5			10/81		10/81		
Finalize Computer System Requirements; e.g., Data Requirements, Other System Interfaces, Etc.		2	10	5			10/81		10/81		
Determine Input/Output Formats		3	20	5			11/81		11/81		
Develop Processing Logic Requirements	Software Vendor	4	5	10			11/81		11/81		
Define Data Base Access Requirements	Software Vendor	5	5	5			11/81		11/81		
Develop Detailed Systems Specifications	Software Vendor	6	<u>30</u>	<u>30</u>			12/81		12/81		
Total			<u>80</u>	<u>60</u> (2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (45 days).

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Project Phase III - Activity 27  
Software Modification and Installation - Bill of  
Materials - Develop Program Specifications/Modifications

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Program Specifications/Modifications	Software Vendor	1	5	20			11/81		1/82		
Program Modifications	Software Vendor	2	5	50			11/81		1/82		
Test and "Debug"	Software Vendor	3	5	10			11/81		1/82		
Total			15	80(2)							

Kearney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (60 days).

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Project Phase III - Activity 28  
Software Modification and Installation - Bill of  
Materials - Subsystem Installation

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Subsystem Installation Plan Assigning Instal- lation Tasks		1	10	5			12/81		1/82		
Train Users		2	50	10			12/81		1/82		
Conduct On-Site Test		3	20	10			1/82		2/82		
Run Subsystem in Par- allel with Existing System		4	20	10			3/82		3/82		
Transition to Opera- tions Phase		5	20	10			4/82		4/82		
Total			120	45(2)							

Kearney Management Consultants

Notes: (1) ES - External Support. All NASA support unless  
otherwise indicated.  
(2) Software vendor support (10 days).

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Project Phase III - Activity 29  
Software Modification and Installation -  
Inventory - Determine Required Modifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review APC Requirements and Preliminary Systems Design with Software Vendor		1	10	5			8/81		8/81		
Finalize Required Software and Data Base Modifications		2	20	10			8/81		9/81		
Assign Detailed Modifications to Project Teams for Development of Detailed System Specifications		3	20	10			9/81		10/81		
<b>Total</b>			<u>50</u>	<u>25(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (15 days).

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Project Phase III - Activity 30  
Software Modification and Installation -  
Inventory - Compile Detailed System Specifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Policies and Procedures, Information Flows and Business System Requirements/Design		1	20	10			10/81		10/81		
Finalize Computer System Requirements; e.g., Data Requirements, Other System Interfaces, Etc.		2	20	20			10/81		10/81		
Determine Input/Output Formats		3	50	25			11/81		11/81		
Develop Processing Logic Requirements	Software Vendor	4	5	25			11/81		11/81		
Define Data Base Access Requirements	Software Vendor	5	5	25			11/81		11/81		
Develop Detailed Systems Specifications	Software Vendor	6	<u>30</u>	<u>30</u>			12/81		12/81		
Total			<u>130</u>	<u>135(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (100 days).

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Project Phase III - Activity 31  
Software Modification and Installation -  
Inventory - Develop Program Specifications/Modifications

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Program Specifications/Modifications	Software Vendor	1	5	30			11/81		1/82		
Program Modifications	Software Vendor	2	5	60			11/81		1/82		
Test and "Debug"	Software Vendor	3	5	20			11/81		1/82		
<b>Total</b>			<u>15</u>	<u>110(2)</u>							

- Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (80 days).

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Project Phase III - Activity 32  
Software Modification and Installation -  
Inventory - Subsystem Installation

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Subsystem Installation Plan Assigning Installation Tasks		1	20	10			12/81		1/82		
Train Users		2	50	20			12/81		1/82		
Conduct On-Site Test		3	20	10			1/82		2/82		
Run Subsystem in Parallel with Existing System		4	20	10			3/82		3/82		
Transition to Operations Phase		5	20	10			4/82		4/82		
Total			130	60(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (15 days).

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Project Phase III - Activity 33  
Software Modification and Installation -  
Purchasing - Determine Required Modifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review APC Requirements and Preliminary Systems Designs with Software Vendor		1	5	5			3/82		4/82		
Review Required Software and Data Base Modifications		2	10	5			3/82		4/82		
Assign Detailed Modifications to Project Teams for Development of Detailed System Specifications		3	<u>10</u>	<u>5</u>			4/82		6/82		
<b>Total</b>			<u>25</u>	<u>15(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (10 days).

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Project Phase III - Activity 34  
Software Modification and Installation -  
Purchasing - Compile Detailed System Specifications

Keatney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Policies and Procedures, Information Flows and Business System Requirements/Design		1	10	5			6/82		7/82		
Finalize Computer System Requirements; e.g., Data Requirements, Other System Interfaces, Etc.		2	10	5			6/82		7/82		
Determine Input/Output Formats		3	10	5			7/82		8/82		
Develop Processing Logic Requirements	Software Vendor	4	5	5			7/82		8/82		
Define Data Base Access Requirements	Software Vendor	5	5	5			7/82		8/82		
Develop Detailed Systems Specifications	Software Vendor	6	<u>10</u>	<u>5</u>			8/82		8/82		
Total			<u>50</u>	<u>30(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (20 days).

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Project Phase III - Activity 35  
Software Modification and Installation -  
Purchasing - Develop Program Specifications/Modifications

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Program Specifications/Modifications	Software Vendor	1	5	10			8/82		9/82		
Program Modifications	Software Vendor	2	5	20			8/82		9/82		
Test and "Debug"	Software Vendor	3	<u>5</u>	<u>5</u>			8/82		9/82		
Total			<u>15</u>	<u>35(2)</u>							

Keatney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (25 days).

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Project Phase III - Activity 36  
Software Modification and Installation -  
Purchasing - Subsystem Installation

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Subsystem Installation Plan Assigning Installation Tasks		1	5	5			8/82		9/82		
Train Users		2	10	5			8/82		9/82		
Conduct On-Site Test		3	10	5			9/82		10/82		
Run Subsystem in Parallel with Existing System		4	10	5			9/82		10/82		
Transition to Operations Phase		5	<u>10</u>	<u>5</u>			9/82		10/82		
<b>Total</b>			<u>45</u>	<u>25(2)</u>							

- Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (5 days).

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Project Phase III - Activity 37  
Software Modification and Installation - GSE Preventive  
Maintenance - Determine Required Modifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review APC Requirements and Preliminary Systems Designs with Software Vendor		1	5	5			12/82		1/83		
Review Required Software and Data Base Modifications		2	10	5			12/82		1/83		
Assign Detailed Modifications to Project Teams for Development of Detailed System Specifications		3	<u>10</u>	<u>5</u>			1/83		2/83		
Total			<u>25</u>	<u>15(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (10 days).

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Project Phase III - Activity 38  
Software Modification and Installation - Preventive  
Maintenance - Compile Detailed System Specifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES (I)	USBI	ES (I)	Plan	Actual	Plan	Actual	
Review Policies and Procedures, Information Flows and Business System Requirements/Design		1	10	5			1/83		2/83		
Finalize Computer System Requirements; e.g., Data Requirements, Other System Interfaces, Etc.		2	10	5			1/83		2/83		
Determine Input/Output Formats		3	10	5			1/83		2/83		
Develop Processing Logic Requirements	Software Vendor	4	5	5			1/83		2/83		
Define Data Base Access Requirements	Software Vendor	5	5	5			1/83		2/83		
Develop Detailed Systems Specifications	Software Vendor	6	<u>25</u>	<u>15</u>			1/83		3/83		
Total			<u>65</u>	<u>40(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (30 days).

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Project Phase III - Activity 39  
Software Modification and Installation - GSE Preventive  
Maintenance - Develop Program Specifications/Modifications

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Program Specifications/Modifications	Software Vendor	1	5	10			2/83		4/83		
Program Modifications	Software Vendor	2	5	25			2/83		4/83		
Test and "Debug"	Software Vendor	3	5	5			2/83		4/83		
Total			<u>15</u>	<u>40(2)</u>							

Kearney Management Consultants

- Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (30 days).

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Project Phase III - Activity 40  
Software Modification and Installation - GSE Preventive  
Maintenance - Subsystem Installation

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Subsystem Installation Plan Assigning Instal- lation Tasks		1	5	5			3/83		5/83		
Train Users		2	20	5			3/83		5/83		
Conduct On-Site Test		3	10	5			3/83		5/83		
Run Subsystem in Par- allel with Existing System		4	10	5			3/83		5/83		
Transition to Opera- tions Phase		5	<u>10</u>	<u>5</u>			3/83		5/83		
Total			<u>55</u>	<u>25(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (5 days).

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Project Phase III - Activity 41  
Software Modification and Installation - Routing and  
WAD Maintenance - Determine Required Modifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review APC Requirements and Preliminary Systems Designs with Software Vendors		1	25	15			12/81		1/82		
Review Required Software and Data Base Modifications		2	50	25			12/81		1/82		
Assign Detailed Modifications to Project Teams for Development of Detailed System Specification		3	<u>20</u>	<u>10</u>			1/82		2/82		
Total			<u>95</u>	<u>50(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (35 days).

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Project Phase III - Activity 42  
Software Modification and Installation - Routing and  
WAD Maintenance - Compile Detailed System Specifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Policies and Procedures, Information Flows and Business System Requirements/Design		1	10	5			2/82		3/82		
Finalize Computer System Requirements; e.g., Data Requirements, Other System Interfaces, Etc.		2	10	5			2/82		3/82		
Determine Input/Output Formats		3	10	5			3/82		4/82		
Develop Processing Logic Requirements		4	5	5			3/82		4/82		
Define Data Base Access Requirements		5	5	5			3/82		4/82		
Develop Detailed Systems Specifications		6	10	5			3/82		6/82		
Total			50	30(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (25 days).

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Project Phase III - Activity 43  
Software Modification and Installation - Routing and  
WAD Maintenance - Develop Program Specifications/Modifications

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Program Specifications/Modifications	Software Vendor	1	5	10			3/82		7/82		
Program Modifications	Software Vendor	2	5	25			3/82		7/82		
Test and "Debug"	Software Vendor	3	5	5			3/82		7/82		
<b>Total</b>			<u>15</u>	<u>40(2)</u>							

Keatney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (30 days).

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Project Phase III - Activity 44  
Software Modification and Installation - Routing and  
WAD Maintenance - Subsystem Installation

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Subsystem Installation Plan Assigning Instal- lation Tasks		1	5	5			4/82		5/82		
Train Users		2	10	5			4/82		5/82		
Conduct On-Site Test		3	10	5			5/82		6/82		
Run Subsystem in Parallel with Existing System		4	10	5			6/82		8/82		
Transition to Opera- tions Phase		5	10	5			6/82		8/82		
Total			45	25(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (5 days).

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Project Phase III - Activity 45  
Software Modification and Installation - Configuration  
Maintenance - Determine Required Modifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review APC Requirements and Preliminary Systems Designs with Software Vendor		1	25	15			10/81		10/81		
Review Required Software and Data Base Modifications		2	50	25			10/81		10/81		
Assign Detailed Modifications to Project Teams for Development of Detailed System Specifications		3	<u>20</u>	<u>10</u>			10/81		1/82		
Total			<u>95</u>	<u>50(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (35 days).

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Project Phase III - Activity 46  
Software Modification and Installation - Configuration  
Maintenance - Compile Detailed System Specifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Policies and Procedures, Information Flows and Business System Requirements/Design		1	20	10			12/81		4/82		
Finalize Computer System Requirements; e.g., Data Requirements, Other System Interfaces, Etc.		2	20	10			12/81		4/82		
Determine Input/Output Formats		3	50	25			12/81		4/82		
Develop Processing Logic Requirements	Software Vendor	4	5	25			12/81		4/82		
Define Data Base Access Requirements	Software Vendor	5	5	25			12/81		4/82		
Develop Detailed System Specifications	Software Vendor	6	25	25			12/81		4/82		
Total			125	120(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (100 days).

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Project Phase III - Activity 47  
Software Modification and Installation - Configuration  
Maintenance - Develop Program Specifications/Modifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Program Specifications/Modifications	Software Vendor	1	5	25			1/82		5/82		
Program Modifications	Software Vendor	2	5	50			1/82		5/82		
Test and "Debug"	Software Vendor	3	5	20			2/82		5/82		
Total			15	95(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.

(2) Software vendor support (75 days).

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Project Phase III - Activity 48  
Software Modification and Installation - Configuration  
Maintenance - Subsystem Installation

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Subsystem Installation Plan Assigning Instal- lation Tasks		1	20	10			2/82		4/82		
Train Users		2	50	15			3/82		4/82		
Conduct On-Site Test		3	20	10			3/82		4/82		
Run Subsystem in Par- allel with Existing System		4	20	10			4/82		7/82		
Transition to Opera- tion Phase		5	20	10			4/82		7/82		
Total			130	55(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (15 days).

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Project Phase III - Activity 49  
Software Modification and Installation - Effectivity  
Control - Determine Required Modifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review APC Requirements and Preliminary Systems Designs with Software Vendor		1	25	15			12/81		1/82		
Finalize Required Software and Data Base Modifications		2	50	25			12/81		1/82		
Assign Detailed Modifications to Project Teams for Development of Detailed System Specifications		3	<u>45</u>	<u>10</u>			1/82		2/82		
Total			<u>95</u>	<u>50(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (35 days).

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Project Phase III - Activity 50  
Software Modification and Installation - Effectivity  
Control - Compile Detailed System Specifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Policies and Procedures, Information Flows and Business System Requirements/Design		1	10	5			2/82		3/82		
Finalize Computer System Requirements; e.g., Data Requirements, Other System Interfaces, Etc.		2	10	5			2/82		3/82		
Determine Input/Output Formats		3	10	5			3/82		4/82		
Develop Processing Logic Requirements	Software Vendor	4	5	5			3/82		4/82		
Define Data Base Access Requirements	Software Vendor	5	5	5			3/82		4/82		
Develop Detailed System Specifications	Software Vendor	6	<u>25</u>	<u>10</u>			3/82		5/82		
Total			<u>65</u>	<u>35(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (25 days).

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Project Phase III - Activity 51  
Software Modification and Installation - Effectivity  
Control - Develop Program Specifications/Modifications

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Program Specifications/Modifications	Software Vendor	1	5	5			3/82		7/82		
Program Modifications	Software Vendor	2	5	30			3/82		7/82		
Test and "Debug"	Software Vendor	3	5	5			3/82		7/82		
<b>Total</b>			<u>15</u>	<u>40(2)</u>							

Kearney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (30 days).

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Project Phase III - Activity 52  
Software Modification and Installation - Effectivity  
Control - Subsystem Installation

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Subsystem Installation Plan Assigning Installation Tasks		1	5	5			4/82		5/82		
Train Users		2	20	5			4/82		5/82		
Conduct On-Site Test		3	10	5			5/82		6/82		
Run Subsystem in Parallel with Existing System		4	10	5			6/82		8/82		
Transition to Operations Phase		5	10	5			6/82		8/82		
Total			55	25(2)							

- Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (5 days).

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Project Phase III - Activity 53  
Software Modification and Installation - Part Life Cycle  
Management - Determine Required Modifications

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review APC Requirements and Preliminary Systems Designs with Software Vendor		1	5	5			12/81		1/82		
Review Required Software and Data Base Modifications		2	10	5			12/81		1/82		
Assign Detailed Modifications to Project Teams for Development of Detailed System Specifications		3	<u>20</u>	<u>5</u>			1/82		2/82		
Total			<u>40</u>	<u>15(2)</u>							

Keatney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (10 days).

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Project Phase III - Activity 54  
Software Modification and Installation - Part Life Cycle  
Management - Compile Detailed System Specifications

Keatney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES (1)	USBI	ES (1)	Plan	Actual	Plan	Actual	
Review Policies and Procedures, Information Flows and Business System Requirements/Design		1	10	5			2/82		3/82		
Finalize Computer System Requirements; e.g., Data Requirements, Other System Interfaces, Etc.		2	10	5			2/82		3/82		
Determine Input/Output Formats		3	20	5			3/82		4/82		
Develop Processing Logic Requirements	Software Vendor	4	5	10			3/82		4/82		
Define Data Base Access Requirements	Software Vendor	5	5	5			3/82		4/82		
Develop Detailed Systems Specifications	Software Vendor	6	<u>30</u>	<u>25</u>			3/82		5/82		
Total			<u>80</u>	<u>55(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (45 days).

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Project Phase III - Activity 55  
Software Modification and Installation - Part Life Cycle  
Management - Develop Program Specifications/Modifications

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Program Specifications/Modifications	Software Vendor	1	5	20			3/82		6/82		
Program Modifications	Software Vendor	2	5	40			3/82		6/82		
Test and "Debug"	Software Vendor	3	5	10			3/82		6/82		
Total			15	70(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (50 days).

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Project Phase III - Activity 56  
Software Modification and Installation - Part Life Cycle  
Management - Subsystem Installation

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USDI	ES(1)	USDI	ES(1)	Plan	Actual	Plan	Actual	
Develop Subsystem Installation Plan Assigning Instal- lation Tasks		1	10	5			4/82		5/82		
Train Users		2	25	5			4/82		5/82		
Conduct On-Site Test		3	20	10			5/82		6/82		
Run Subsystem in Par- allel with Existing System		4	20	10			5/82		7/82		
Transition to Opera- tions Phase		5	<u>20</u>	<u>10</u>			6/82		7/82		
<b>Total</b>			<u>95</u>	<u>40(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (5 days).

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Project Phase III - Activity 57  
Software Modification and Installation - Part Attrition  
Planning - Determine Required Modifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review APC Requirements and Preliminary Systems Designs with Software Vendor		1	10	5			12/81		1/82		
Review Required Software and Data Base Modifications		2	10	5			12/81		1/82		
Assign Detailed Modifications to Project Teams for Development of Detailed System Specifications		3	<u>10</u>	<u>5</u>			1/82		2/82		
Total			<u>30</u>	<u>15(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (10 days).

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Project Phase III - Activity 58  
Software Modification and Installation - Part Attrition  
Planning - Compile Detailed System Specifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Policies and Procedures, Information Flows and Business System Requirements/Design		1	10	5			2/82		3/82		
Finalize Computer System Requirements; e.g., Data Requirements, Other System Interfaces, Etc.		2	10	5			2/82		3/82		
Determine Input/Output Formats		3	10	5			3/82		4/82		
Develop Processing Logic Requirements	Software Vendor	4	5	5			3/82		4/82		
Define Data Base Access Requirements	Software Vendor	5	5	5			3/82		4/82		
Develop Detailed System Specifications	Software Vendor	6	<u>25</u>	<u>25</u>			3/82		5/82		
Total			<u>65</u>	<u>50(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (40 days).

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Project Phase III - Activity 59  
Software Modification and Installation - Part Attrition  
Planning - Develop Program Specifications/Modifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Program Specifications/Modifications		1	5	20			3/82		6/82		
Program Modifications		2	5	30			3/82		6/82		
Test and "Debug"		3	5	5			3/82		6/82		
Total			15	55(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (40 days).

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-3  
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Project Phase III - Activity 60  
Software Modification and Installation - Part Attrition  
Planning - Subsystem Installation

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Subsystem Installation Plan Assigning Installation Tasks		1	5	5			4/82		5/82		
Train Users		2	20	5			4/82		5/82		
Conduct On-Site Test		3	10	5			5/82		6/82		
Run Subsystem in Parallel with Existing System		4	10	5			6/82		7/82		
Transition to Operations Phase		5	10	5			6/82		7/82		
Total			55	25(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (5 days).

PROJECT PLANNING AND CONTROL SHEET

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Project Phase III - Activity 61  
Software Modification and Installation - Engineering Document  
Control - Determine Required Modifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review APC Requirements and Preliminary Systems Designs with Software Vendor		1	5	5			12/81		1/82		
Finalize Required Software and Data Modifications		2	5	5			12/81		1/82		
Assign Detailed Modifications to Project Teams for Development of Detailed System Specifications		3	<u>20</u>	<u>10</u>			1/82		2/82		
<b>Total</b>			<u>30</u>	<u>20(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (15 days).

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Project Phase III - Activity 62  
Software Modification and Installation - Engineering Document  
Control - Compile Detailed System Specifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Policies and Procedures, Information Flows and Business System Requirements/Design		1	20	10			2/82		7/82		
Finalize Computer System Requirements; e.g., Data Requirements, Other System Interfaces, Etc.		2	20	10			2/82		3/82		
Determine Input/Output Formats		3	50	25			3/82		4/82		
Develop Processing Logic Requirements	Software Vendor	4	5	25			3/82		4/82		
Define Data Base Access Requirements	Software Vendor	5	5	25			3/82		4/82		
Develop Detailed Systems Specifications	Software Vendor	6	<u>50</u>	<u>30</u>			3/82		5/82		
Total			<u>150</u>	<u>125(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (100 days).

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-3  
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Project: Phase III - Activity 63  
Software Modification and Installation - Engineering Document  
Control - Develop Program Specifications/Modifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Program Specifications/Modifications	Software Vendor	1	5	25			3/82		6/82		
Program Modifications	Software Vendor	2	5	50			3/82		6/82		
Test and "Debug"	Software Vendor	3	5	15			3/82		6/82		
Total			15	90(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (75 days).

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EXHIBIT IX-3  
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Project Phase III - Activity 64  
Software Modification and Installation - Engineering Document  
Control - Subsystem Installation

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Subsystem Installation Plan Assigning Installation Tasks		1	25	10			4/82		5/82		
Train Users		2	50	15			4/82		5/82		
Conduct On-Site Test		3	20	10			5/82		6/82		
Run Subsystem in Parallel with Existing System		4	20	10			6/82		7/82		
Transition to Operations Phase		5	30	10			6/82		7/82		
Total			<u>145</u>	<u>55(2)</u>							

- Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (15 days).

PROJECT PLANNING AND CONTROL SHEET

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Project Phase III - Activity 65  
Software Modification and Installation -  
Performance Measurement System - Determine  
Required Modifications

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review APC Require- ments and Prelimi- nary Systems Designs with Software Vendor		1	5	5			4/83		5/83		
Finalize Required Software and Data Base Modifications		2	5	5			4/83		5/83		
Assign Detailed Modi- fications to Proj- ect Teams for Development of De- tailed System Specifications		3	<u>5</u>	<u>5</u>			5/83		6/83		
Total			<u>15</u>	<u>15(2)</u>							

Kearney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (10 days).

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Project Phase III - Activity 66  
Software Modification and Installation -  
Performance Measurement System - Compile  
Detailed System Specifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Policies and Procedures, Information Flows and Business System Requirements/Design		1	10	5			6/83		7/83		
Finalize Computer System Requirements; e.g., Data Requirements, Other System Interfaces, Etc.		2	10	5			6/83		7/83		
Determine Input/Output Formats		3	10	5			6/83		7/83		
Develop Processing Logic Requirements	Software Vendor	4	5	5			6/83		7/83		
Define Data Base Access Requirements	Software Vendor	5	5	5			6/83		7/83		
Develop Detailed Systems Specifications	Software Vendor	6	10	5			6/83		8/83		
Total			50	30(2)							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (25 days).

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-3  
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Project Phase III - Activity 67  
Software Modification and Installation -  
Performance Measurement System - Develop  
Program Specifications/Modifications

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Develop Program Specifications/Modifications	Software Vendor	1	5	5			6/83		9/83		
Program Modifications	Software Vendor	2	5	10			6/83		9/83		
Test and "Debug"	Software Vendor	3	<u>5</u>	<u>10</u>			6/83		9/83		
<b>Total</b>			<u>15</u>	<u>25(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (20 days).

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-3  
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Project Phase III - Activity 68  
Software Modification and Installation -  
Performance Measurement System - Subsystem  
Installation

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES (1)	USBI	ES (1)	Plan	Actual	Plan	Actual	
Develop Subsystem Installation Plan Assigning Instal- lation Tasks		1	5	5			7/83		9/83		
Train Users		2	10	5			7/83		8/83		
Conduct On-Site Test		3	10	5			8/83		9/83		
Run Subsystem in Par- allel with Existing System		4	10	5			9/83		10/83		
Transition to Opera- tions Phase		5	<u>10</u>	<u>5</u>			9/83		10/83		
Total			<u>45</u>	<u>25(2)</u>							

Notes: (1) ES - External Support. All NASA support unless  
otherwise indicated.  
(2) Software vendor support (5 days).

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-4  
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Project Phase IV - Activity 1  
Develop Traffic Analysis

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Identify Number and Distribution of Users	Data Processing Support Project Team	1	30					11/81	12/81		
Identify Flow Types, Record Lengths, and Volumes	Data Processing Support Project Team	2	25					12/81	1/82		
Calculate Communication Volumes	Data Processing Support Project Team	3	5-10					1/82	1/82		
Determine User Response Time Requirements	Data Processing Support Project Team	4	5					1/82	1/82		
			<u>65-70</u>								

Kearney Management Consultants

Note: (1) ES - External Support. All NASA support unless otherwise indicated.

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-4  
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Project Phase IV - Activity 2  
Develop Refined Network Design

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Identify Line Speeds	Data Processing Support Project Team	1	5				2/82		2/82		
Identify Communication Protocols	Data Processing Support Project Team	2	3				2/82		2/82		
Identify Communications Hardware	Data Processing Support Project Team	3	5				2/82		2/82		
Identify Network Design	Data Processing Support Project Team	4	10				2/82		2/82		
			<u>25</u>								

Note: (1) ES - External Support. All NASA support unless otherwise indicated.

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-4  
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Project Phase IV - Activity 3  
Calculate/Simulate Communications Load

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Identify Peak Loads and Bottlenecks	Data Processing Support Project Team	1	10	5			11/81		11/81		
Reconfigure Network Design	Data Processing Support Project Team	2	10	5			11/81		11/81	Final Network Design	
			<u>20</u>	<u>10</u>							

Note: (1) ES - External Support. All NASA support unless otherwise indicated.

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-4  
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Project Phase IV - Activity 4  
Acquire Network Requirements

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES (1)	USBI	ES (1)	Plan	Actual	Plan	Actual	
Review Network Re- quirements	Data Processing Support Project Team	1	5	5			12/81		12/81	Management Approval	
Select Vendor	Data Processing Support Project Team	2	20	5			12/81		12/81	Vendor Selection	
Order Network Re- quirements	Data Processing Support Project Team	3	<u>5</u>	<u>5</u>			12/81		12/81	Order	
Total			<u>30</u>	<u>15</u>							

Note: (1) ES - External Support. All NASA support unless otherwise indicated.

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-4  
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Project Phase IV - Activity 5  
Install Network

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Install Network Re- quirements	Data Processing Support Project Team	1	30	30			2/82		2/82		
Check-Out Operations	Data Processing Support Project Team	2	<u>50</u>	<u>30</u>			3/82		3/82	Management Approval	
Total			<u>80</u>	<u>60(2)</u>							

Kearney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Vendor support (40 days).

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-5  
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Project Phase V - Activity 1  
Refine Data Processing Requirements

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES (1)	USBI	ES (1)	Plan	Actual	Plan	Actual	
Review Record Sizes, File Sizes and Access Requirements	Data Processing Support Project Team	1	20	10			10/81		11/81		
Review Operating, Communications, DBMS Operating Requirements	Data Processing Support Project Team	2	10	10			10/81		11/81		
Review Application Software Operating Requirements	Data Processing Support Project Team	3	20	10			10/81		11/81		
Review System Transaction Rates, Program Processing Requirements, Update Volumes and Frequencies	Data Processing Support Project Team	4	30	10			10/81		11/81		
Review Communication Requirements	Data Processing Support Project Team	5	20	10			10/81		11/81		
Review Backup Requirements	Data Processing Support Project Team	6	20	10			10/81		11/81		
<b>Total</b>			<u>120</u>	<u>60(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Vendor support (30 days).

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-5  
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Project Phase V - Activity 2  
Refine Configuration Design

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Determine Disk Requirements	Data Processing Support Project Team	1	10	5			12/81		12/81	Disk Requirements	
Determine Tape Requirements	Data Processing Support Project Team	2	5	5			12/81		12/81	Tape Requirements	
Determine Communication Controller Requirements	Data Processing Support Project Team	3	5	5			12/81		12/81	Communication Requirements	
Determine Printer Requirements	Data Processing Support Project Team	4	5	5			12/81		12/81	Printer Requirements	
Determine CRT Requirements	Data Processing Support Project Team	5	5	5			12/81		12/81	CRT Requirements	
Determine Main Memory Requirements	Data Processing Support Project Team	6	10	5			12/81		12/81	Memory Requirements	
Determine CPU Requirements	Data Processing Support Project Team	7	5	5			12/81		12/81	CPU Requirements	
Determine Backup Hardware Requirements	Data Processing Support Project Team	8	<u>10</u>	<u>5</u>			12/81		12/81	Backup Hardware Requirements	
<b>Total</b>			<u>55</u>	<u>40(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Vendor support (20 days).

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-5  
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Project Phase V - Activity 3  
Order Hardware

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Requirements	Data Processing Support Project Team	1	5	5			1/82	1/82		Management Approval	
Select Best Vendor	Data Processing Support Project Team	2	10	5			1/82	1/82		Vendor Selection	
Place Order	Data Processing Support Project Team	3	5	10			1/82	1/82		Hardware Order	
Total			20	20							

Kearney Management Consultants

Note: (1) ES - External Support. All NASA support unless otherwise indicated.

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-5  
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Project Phase V - Activity 4  
Prepare Computer Sites

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Install and Test Security Systems	Data Processing Support Project Team	1	10	10			2/82		6/82	Acceptance	
Install and Test Protection Systems	Data Processing Support Project Team	2	10	10			2/82		6/82	Acceptance	
Install and Test Cooling Systems	Data Processing Support Project Team	3	10	10			2/82		6/82	Acceptance	
Install and Test Humidity Control Systems	Data Processing Support Project Team	4	10	10			2/82		6/82	Acceptance	
Install and Test Power Systems	Data Processing Support Project Team	5	10	10			2/82		6/82	Acceptance	
Install and Test Cabling Systems	Data Processing Support Project Team	6	<u>10</u>	<u>10</u>			2/82		6/82	Acceptance	
<b>Total</b>			<u>60</u>	<u>60(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Vendor support (30 days).

Kearney Management Consultants

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-5  
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Project Phase V - Activity 5  
Install Hardware

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Install Hardware	Data Processing Support Project Team	1	50	70			3/82		8/82	Management Acceptance	
Check-Out Hardware	Data Processing Support Project Team	2	<u>50</u>	<u>70</u>			3/82		8/82	Management Acceptance	
Total			<u>100</u>	<u>140(2)</u>							

Kearney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Vendor support (100 days).

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-6  
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Project Phase VI - Activity 1  
Assign Policies and Procedures  
Development Responsibility

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Assign Policies and Procedures Development to Project Teams	Implementation Team	1	50	5			8/81		8/81		
Orient Project Teams to Integrated Automated Production Control Techniques	Training Project Team	2	50	5			8/81		9/81		
Total			100	10							

Keatney Management Consultants

Note: (1) ES - External Support. All NASA support unless otherwise indicated.

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-6  
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Project Phase VI - Activity 2  
Develop Detailed Business System  
Requirements by Function

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES (1)	USBI	ES (1)	Plan	Actual	Plan	Actual	
Define Function Objectives	Project Teams	1	50	10			9/81		1/82		
Define Functional Interfaces	Project Teams	2	50	10			9/81		1/82		
Determine Decisions To Be Made	Project Teams	3	50	10			9/81		1/82		
Identify Information Required To Support Decisions	Project Teams	4	50	10			9/81		1/82		
Identify Management Policies for Decisionmaking	Project Teams	5	<u>50</u>	<u>15</u>			9/81		1/82		
<b>Total</b>			<u>250</u>	<u>55</u>							

Note: (1) ES - External Support. All NASA support unless otherwise indicated.

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-6  
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Project Phase VI - Activity 3  
Determine Information Flows Dictated  
by the Detailed Business System

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Integrate Information Requirements Derived by Project Teams		1	50	5			9/81		1/82		
Determine Media, Format, Content and Frequency		2	50	5			9/81		1/82		
Total			100	10							

Kearney Management Consultants

Note: (1) ES - External Support. All NASA support unless otherwise indicated.

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-6  
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Project Phase VI - Activity 4  
Clarify Impact of Detailed Business  
System on Organization Structure

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES (1)	USBI	ES (1)	Plan	Actual	Plan	Actual	
Determine Management Responsibility Overlaps in Relation to Detailed Business System	Project Teams/ Integration Team	1	50	5	-			10/81		3/82	
Determine Management Responsibility Gaps in Relation to Detailed Business System	Project Teams/ Integration Team	2	50	5				10/81		3/82	
Make Necessary Organizational Adjustments	USBI-HSV/USBI-KSC	3	<u>50</u>	<u>5</u>				10/81		3/82	
<b>Total</b>			<u>150</u>	<u>15</u>							

Note: (1) ES - External Support. All NASA support unless otherwise indicated.

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-6  
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Project Phase VI - Activity 5  
Define Policies and Procedures  
by Function and Activity

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES (1)	USBI	ES (1)	Plan	Actual	Plan	Actual	
Compile Output of Project Teams		1	50	10			2/82		7/82		
Write a Procedures Manual for Each Corporate Function		2	400	40			2/82		7/82		
Revise and Update as Detailed Design and Implementation Procedures		3	<u>200</u>	<u>20</u>			7/82		1/84		
Total			<u>650</u>	<u>70</u>							

Note: (1) ES - External Support. All NASA support unless otherwise indicated.

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-7  
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Project Phase VII - Activity 1  
Integrate Each New  
Subsystem as Installed

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES (1)	USBI	ES (1)	Plan	Actual	Plan	Actual	
Define Subsystem Integration Requirements, by Module	Project Teams	1	50	20			12/81		1/84		
Develop Subsystem Integration Performance Criteria, by Module	Project Teams	2	70	20			12/81		1/84		
Integrate Subsystems into Operation When Ready		3	<u>250</u>	<u>80</u>			12/81		1/84		
<b>Total</b>			<u>370</u>	<u>120(2)</u>							

Kearney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (110 days).

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-7  
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Project Phase VII - Activity 2  
Test System

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Define System Test Procedures		1	50	20			1/82	2/82			
Test System Integration		2	350	80			8/82	1/84			
Report System Integration Performance		3	100	40			8/82	1/84			
Total			500	140(2)							

Kearney Management Consultants

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Software vendor support (130 days).

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-8  
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Project Phase VIII - Activity 1  
Implementation Organization  
Training Programs

Kearney Management Consultants

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Determine Training Needs of Implementation Teams, Project Teams and Top Management		1	40	10			6/81		7/81		
Define Objectives and Scope of Training Programs		2	40	10			6/81		7/81		
Develop Training Materials		3	100	30			6/81		8/81		
Conduct Training Programs for the Implementation Organization and Top Management		4	<u>30</u>	<u>10</u>			7/81		10/81		
Total			<u>210</u>	<u>60(2)</u>							

Notes: (1) ES - External Support. All NASA support unless otherwise indicated.  
(2) Vendor support (50 days).

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-8  
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Project Phase VIII - Activity 2  
Middle Management and  
User Training

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES(1)	USBI	ES(1)	Plan	Actual	Plan	Actual	
Review Functional Policies and Procedures	Project Teams	1	50	5			9/81		7/82		
Identify Training Needs by Function and by Level (e.g., Middle Management, User)	Project Teams	2	100	10			9/81		7/82		
Review Organization and Determine Personnel To Be Trained	Project Teams	3	50	5			9/81		7/82		
Develop Recommended Training Schedule	Project Teams	4	50	5			9/81		7/82		
Develop Training Materials by Function and by Level	Training Project Team	5	100	10			10/81		7/82		
Develop Middle Management/User Training Schedule and Assign Instructors	Training Project Team	6	40	5			10/81		7/82		
Secure Department Heads' Acquiescence to Training Schedule	Training Project Team	7	20	5			10/81		7/82		
Conduct Classroom Training and Workshops	Training Project Team	8	800	10			10/81		1/84		
Conduct Hands-On Systems Demonstrations	Training Project Team	9	500	10			10/81		1/84		
Perform On-Site (Work Center) Training	Training Project Team	10	50	10			10/81		1/84		
Conduct Training Follow-Up During Parallel Operations	Training Project Team	11	500	20			10/81		1/84		
Total			2,260	95							

Note: (1) ES - External Support. All NASA support unless otherwise indicated.

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PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-8  
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Project Phase VIII - Activity 3  
Integrate Each New  
Subsystem as Installed

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Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES (1)	USBI	ES (1)	Plan	Actual	Plan	Actual	
Perform Postinstal- lation Special Training for Prob- lems Encountered		1	400	20			1/82		1/84		
Update Users Manuals, Training Materials, Etc., as Needed		2	200	10			1/82		1/84		
Retrain Personnel for Systems Changes		3	<u>500</u>	<u>25</u>			1/82		1/84		
Total			<u>1,100</u>	<u>55</u>							

Note: (1) ES - External Support. All NASA support unless otherwise indicated.

PROJECT PLANNING AND CONTROL SHEET

EXHIBIT IX-9

Project Phase IX - Operations Phase

Task	Responsibility	Seq.	Man-Days				Calendar				Output
			Plan		Actual		Start		Stop		
			USBI	ES (1)	USBI	ES (1)	Plan	Actual	Plan	Actual	
Review and Update Procedures		1	500	100			1/82		1/84		
Data Base Maintenance		2	500	100			1/82		1/84		
System Maintenance		3	<u>500</u>	<u>100</u>			1/82		1/84		
Total			<u>1,500</u>	<u>300</u>							

Note: (1) ES - External Support. All NASA support unless otherwise indicated.

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