EXTERNAL AFFAIRS
FINANCIAL MANAGEMENT SYSTEM
REQUIREMENTS DEFINITION
VOLUME IV RECOMMENDATIONS

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DMR and Associates

June, 1985

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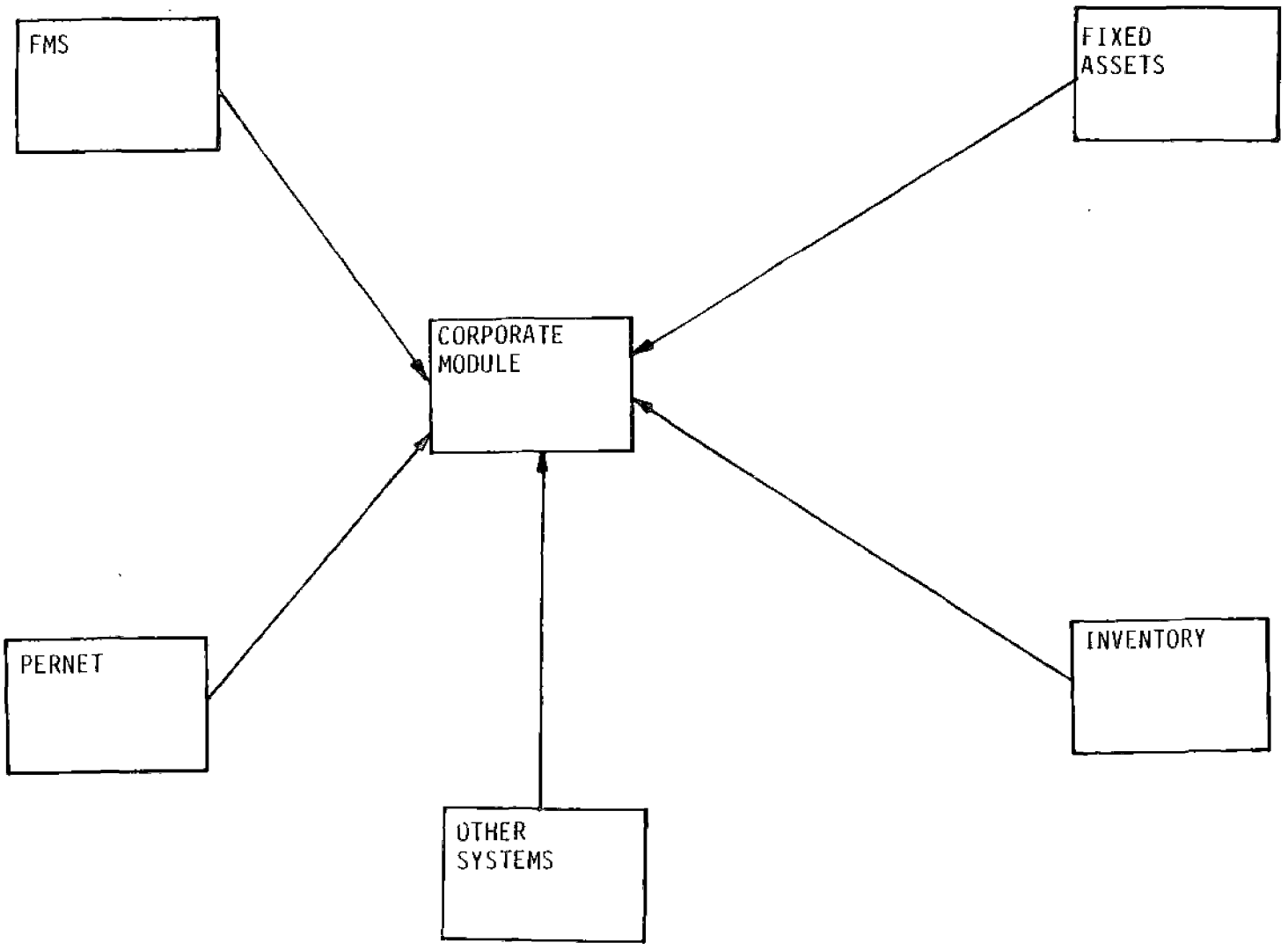
DIAGRAM 1. EXTERNAL AFFAIRS INFORMATION MODEL



2. A.R.C.S.

The Accounting, Reporting and Control System is a joint product offering of Computer Sciences Canada and Venn Ltd. It is primarily a financial control system with some capabilities for project management. It could be enhanced to meet the defined requirements and properly implemented by April 1, 1987.

Its technical architecture appears sound but is not yet proven in a federal government department. Application software packages for inventory and fixed asset modules, using the identical data base management system, could not be found during our study.

Interfacing with existing equipment would be simple since ARCS only operates on mini or super micro computers.

FMS Requirements Committee comments on this alternative were unfavourable due to the lack of an existing customer and the objective (financial control) of the system.

3. Build

A custom build option was assessed and costed based on the system model defined in Phase II of this study. It can be properly implemented by April 1, 1987.

It is assumed that the architecture, hardware and software would be chosen to satisfy the critical success factors. Current Central Agency direction is to avoid custom build projects. This is due to their risk of delay and cost overruns as proven by several recent large project results.

4. Government Financial System (GFS)

GFS is a product offering of American Management Sciences Inc.

It is an online, fully integrated series of modules for financial control, project management and operational planning. Additional modules are available for inventory and fixed assets. The package has been selected by National Defence, was installed in January of 1985, and is expected to be in production April of 1986. It can be properly implemented by April 1, 1987.

Interfacing with existing EDP equipment is feasible.

Our view of this alternative is that the costs of customization and implementation and the availability of competitive local support are deterring factors.

1.4 Recommendations

1.4.1 Alternative

Based on the preceeding assessments, the alternative which best satisfies the criteria success factors is AIDIS.

AIDIS can be customized and enhanced to meet External Affairs' specific needs. Because the system is fully operational, users can actually run the system and see its outputs. This will facilitate customizing efforts as well as provide a training base for External Affairs project team members.

The implementation approach and schedule for this alternative allows the department sufficient time to prepare itself and make formal arrangement for EDP services. Of all alternatives assessed, AIDIS requires the least preparatory work. We feel confident that the Treasury Board will support this alternative.

1.4.2 Implementation Approach

1.4.2.1 Preliminary Activities

Preliminary activities should start upon acceptance of this report by management. These activities are:

1. Information Systems Organization

As a first and paramount activity, the department should gain approval for key positions within the proposed Information Systems Organization (Overall Co-ordinator, Data Administration and Database Administrator). Staffing for these functions should be complete by January 1, 1986.

2. Cost Benefit Analysis

A formal cost benefit analysis should be prepared and submitted to Treasury Board. Information contained in the four volumes of this study can be supplemented by CIDA's actual costs of operation. The study should assess the costs under Service Bureau, Facilities Management and in-house facilities. CIDA have indicated they will provide details of their costs for both service bureau and facilities management approaches.

3. Systems Infrastructure

The remaining administrative systems should be scoped as to size, user interfaces and their data which will be used for corporate user purposes.

Data Administration policies should be developed to ensure all future departmental systems consistently identify common data elements. Only if this is done can corporate users effectively and efficiently obtain data to meet their needs. To allow individual areas to implement systems without such policies; will result in frustration and even inability of corporate users to bring together program data from all departmental sources.

commit sufficient resources to ensure proper representation and to build a base for ongoing support. Resources should be provided to the project as follows.

MFF	-	2 persons for functional review and testing
MFR	-	3 persons for all phases
MFS	-	3 to 4 persons for all phases
Program Branches	-	1 representative for functional review (part time)
Management	-	EDP policy committee as overall authority
	-	Project Manager
New	-	Data Administrator
	-	Data Base Administrator
Training	-	100 people at 3 days each

External Affairs PY input is estimated at 15.

1.6 Current EDP Plans

AIDIS requires a mainframe and could be operated in-house, via service bureau or facilities management approaches. The present Treasury Board preference is towards a service bureau or facilities management approach. Under either approach, Inventory and Fixed Asset Systems would also reside on the FMS machine.

The proposed administrative systems are supported by approved plans to acquire one large mini computer during the current fiscal year.

It is our view that the department should proceed with its planned acquisition for the following purposes.

Corporate Module

Corporate analysis and reporting modules should be resident to ensure any sensitive data is completely protected.

Personnel System

Data to be maintained on this system is of a confidential nature and should be retained within the department.

Post Applications

Development and maintenance of post systems requires facilities. Existing plans show the proposed on-site machine as the means for such work.

Communications

The on-site machine could be used to reformat TIDS data and transmit it to the FMS machine for update to financial records.

1.7 Summation

It is our opinion that the AIDIS alternative best meets the economic and non-economic criteria for success. Given a solid base in the crucial area of data administration, it can form the cornerstone for an overall network and provide corporate users with a significant improvement in information support. Its perceived acceptability to Treasury Board in terms of cost, risk and impact on PY requirements, combined with no impact on existing EDP plans, makes it both economically and politically viable.

For this to happen within the proposed timeframe, the department must move immediately to gain approval for the key management and data administration positions within the proposed Information Systems Organization.

2.0 INTRODUCTION

2.1 Study Objectives

The mandate of this study was to identify the requirements for a new headquarters FMS and determine the best approach to acquiring and implementing the system.

During our study, it became apparent that the critical needs of senior management went beyond the basic financial areas in the areas of operational planning and performance evaluation. Our recommendations, therefore, have gone beyond the defined scope to provide a strategy for meeting these essential needs, with FMS being the first supporting module to be implemented.

2.2 Project History

In March of 1985, External Affairs initiated a project to identify the requirements for a new headquarters FMS and to determine the best approach to implementing the system.

The study was divided into four phases. These were:

1. General Definition of Requirements

   This phase identified the current situation and related issues. System objectives and general requirements were then defined. During this phase, over 130 interviews were conducted ranging from the executive level (ADM) to first line supervisors in accounting operations.

2. Functional Architecture

   This phase resulted in a conceptual data model with supporting data dictionaries. The model defined the entities of a new FMS, their data attributes and relationships. In addition, a conceptual process model (office model) was developed to identify the sources of data and user interfaces.

3. Alternative Analysis

Based on the results of the first two phases, application software packages were assessed and evaluated. Cost estimates and implementation time frames were then developed for short list packages and a custom build approach.

In addition to the specific alternative solutions, several other factors (including LRSP and organizational impact) were observed and noted in the assessment report.

4. Recommendations

All facts, perceived risks and other factors were reviewed with MFR (the project authority), MFS, B. Lapine (OCG) and M. Eastman. Based on these reviews, and the criteria established during Phase III, recommendations are put forth in this report as to the choice of alternative and implementation strategy which will effectively and efficiently meet the needs of both operational and corporate users.

2.3 Critical Success Factors

To meet the objectives of corporate management, the FMS must take the lead role and establish a solid framework upon which to build. The system must have the following attributes to ensure success.

A. It can be built or modified to meet all identified requirements with minimal risk of delay or cost overruns.

B. It is acceptable to Senior Management in terms of implementation timeframe, cost and future potential.

C. Its architecture is sound and can form a foundation for the overall information model.

D. It should not preclude packaged alternatives for Pernet, Inventory, Fixed Assets and Corporate Information systems or modules.

E. Its technology can interface with the department's existing EDP investments.

F. It will be acceptable to and supported by the Treasury Board in terms of cost, risk and benefits.

3.0 ALTERNATIVES ASSESSMENT

In this section, each alternative is assessed against both the original criteria and the critical success factors. A summary table is provided in Section 3.5. Readers should also refer to Volume III, Chapter 4, for a summary of alternative features and ratings.

3.1 AIDIS

3.1.1 Original Criteria

AIDIS, as is, was found to meet 73% of mandatory requirements and 90% of the other needs.

In most cases, the missing mandatory items are single data elements or standalone modules. Please refer to Volume III, Schedule 4A and note the following observations.

OPF Allocations - AIDIS has on-line OPF facilities including budget, at the sub-activity level. Roll-ups are provided via batch reports. In that CIDA is organized by the planning element structure, AIDIS can work as is for External Affairs headquarters but changes are required to allow allocations to Posts (i.e. multiple allocations by RC).

Loans Payment Schedules - AIDIS performs all payment data and amount calculations in batch mode but does not produce schedules. Enhancements could be made to AIDIS or spreadsheet tools could be used to provide the necessary schedule. All required data is present.

AIDIS bilingual capabilities are perhaps the most advanced for a major federal government system. Language changes are made at any time, without loss of data, by pressing one function key. Documentation and courses are also fully bilingual.

3.1.2 Critical Success Factors

A. "It can be modified to meet all identified requirements."

Because the system has been proven and more importantly is modularized around a sound technical architecture, changes to one module have minimal impact on others. As an example, costing modules can be modified with no change to financial control structures or records.

B. "It is acceptable to Senior Management in terms of implementation timeframe and future potential."

The risk of missing an April 1, 1987, start-up date is lowest with this alternative if the technical architecture is adopted. The potential of AIDIS is best exemplified by noting that current project and contract management modules are two to three times greater in data content than that defined by External Affairs.

Because of the system's architecture and modularized approach, new facilities are normally easy to add.

C. "Its architecture is sound and can form a foundation for the overall information model."

The AIDIS architecture has been proven at CIDA. Existing downloading facilities and use of compatible modeling and analysis software (FCS -EPS) could form the basis for an overall model.

D. "It should not preclude packaged alternatives for Pernet, Inventory, Fixed Assets and Corporate Information systems or modules."

A wide variety of application software packages are available within an IDMS/CIDS/IBM/Amdahl environment.

E. "Its technology can interface with the department's existing EDP investments."

Transmission of data from posts via TIDS or directly from micro computers is possible and feasible. A software product (CMS) is available from Digital Equipment Canada which provides interface between an IDMS database and VAX minicomputers.

F. "It will be acceptable to and supported by the Treasury Board in terms of cost, risks and benefits."

The OCG representative has indicated that packaged alternatives are preferred over a custom build approach.

3.2 ARCS

3.2.1 Original Criteria

ARCS, as is, was found to meet 74% of mandatory requirements and 90% of the other needs.

Please refer to Volume III, Schedule 4A and note the following observations.

OPF Allocation

ARCS has no existing facilities to support OPF allocations.

Loans Payment Schedules

ARCS allows users to create receivables, issue advances and record receipts against receivables. Data elements and processes to provide loan schedules and full repayment needs are necessary enhancements.

Costing

If the sub-activity code were part of the coding block, ARCS could provide the necessary allocations. The module, however, should be deemed as a complete requirement for assessment purposes since allocations of costs will be made via algorithms not simply on a direct coding basis.

Foreign Exchange

Data elements must be added to budget, receipt and expenditure records.

Projects

ARCS has no distinct project management module. If project numbers are part of the coding block, dollar aggregations can be provided.

Misc A/R - Generate Invoices and CAJU

Invoices could be generated from ARCS report writing facilities. CAJV's are not treated as receivables by ARCS and, therefore, could not be fully automated without enhancement.

Local and Emergency support for ARCS are available from the Vendor.

Canadian content for ARCS is deemed to be 90%. The package was developed by a local entrepreneur but is marketed and supported to some extent by Computer Sciences Canada (a wholly owned subsidiary of Computer Sciences International, a U.S. firm).

At the time of this study, there are no existing customers of ARCS and, therefore, while training and education are available, it is unproven in the local environment.

ARCS allows a choice of language when signing on. Documentation was not fully bilingual at the time of this report.

3.2.2 Critical Success Factors

A. "It can be modified to meet all identified requirements."

ARCS uses a relational database (UNIFY) which facilitates many of the necessary changes. On the downside, the scope of changes necessary to meet OPF and project management is very high. Given that ARCS is not highly modularized, the impact of changes on other routines will be greater and probably require more extensive testing.

B. "It is acceptable to Senior Management in terms of implementation timeframe and future potential."

ARCS could be implemented by April 1, 1987, if work for the overall technical architecture commences on schedule and no significant requirement changes are identified.

The future potential of ARCS is limited by its hardware requirements (minicomputers). Given the transaction volumes and user base (50), new functions or additional users would probably necessitate a second processor if acceptable performance is to be obtained.

C. "Its architecture is sound and can form a foundation for the overall information model."

ARCS has an unproven architecture.

The DBMS could be used for the overall model.

D. "It should not preclude packaged alternatives for Pernet, Inventory, Fixed Assets and Corporate Information systems or modules."

C. "Its architecture is sound and can form a foundation for the overall information network."

The architecture would be built with these objectives in mind, including features for downloading and use of analysis tools.

Unless a solid foundation (standards, policies for data administration and organizational structure) is in place, all approaches should be considered high in risk. The scope and complexity of the overall information network are significant and pose high risk in areas of cost overrun and meeting requirements.

D. "It should not preclude packaged alternatives for Pernet, Inventory, Fixed Assets and Corporate Information systems or modules."

Technology would be selected with these objectives in mind.

E. "Its technology can interface with the department's existing EDP investments."

Technology would be selected with this objective in mind.

F. "It will be acceptable to and supported by the Treasury Board in terms of cost, risk and benefits."

The present direction of the central agency is one of discouraging custom build approaches. Their perception, based on historical realities, is that the costs and risks of such efforts are too high. Our impression is that the board will be very reluctant to support this alternative.

3.4 GFS

3.4.1 Original Criteria

As is, the Government Financial System (GFS) is inoperable but has the structure and core routines in place to meet all defined requirements.

Local and Emergency support is provided by AMS through their Ottawa office. National Defence have selected GFS and are currently working towards an April 1, 1986, start-up. The basic package was installed at their site in January of 1985. The system is deemed to be 100% foreign in content and requires translation of screens and documentation. A wide range of education packages and support is available.

3.4.2 Critical Success Factors

A. "It can be modified to meet all identified requirements."

Based on DND's experience to date, the package offers a reasonable risk solution and will meet the departments needs.

B. "It is acceptable to Senior Management in terms of implementation timeframe and future potential."

The package could be implemented for April 1, 1987, if sufficient trained resources are available. AMS offer additional modules for expansion and custom additions are possible. The entire package can be modified by the purchaser.

C. "Its architecture is sound and can form a foundation for the overall information model."

Standards and data administration policies would require full development with this alternative. The technical structure is proven and highly modularized.

D. "It should not preclude packaged alternatives for Pernet, Inventory, Fixed Assets and Corporate Information systems or modules."

GFS rates highest in this area. Inventory, fixed asset, and performance measurement modules are available and can be integrated with the financial system.

E. "Its technology can interface with the department's existing EDP investments."

This alternative is equivalent to AIDIS. Data transfer is possible and can be supplemented by existing software packages.

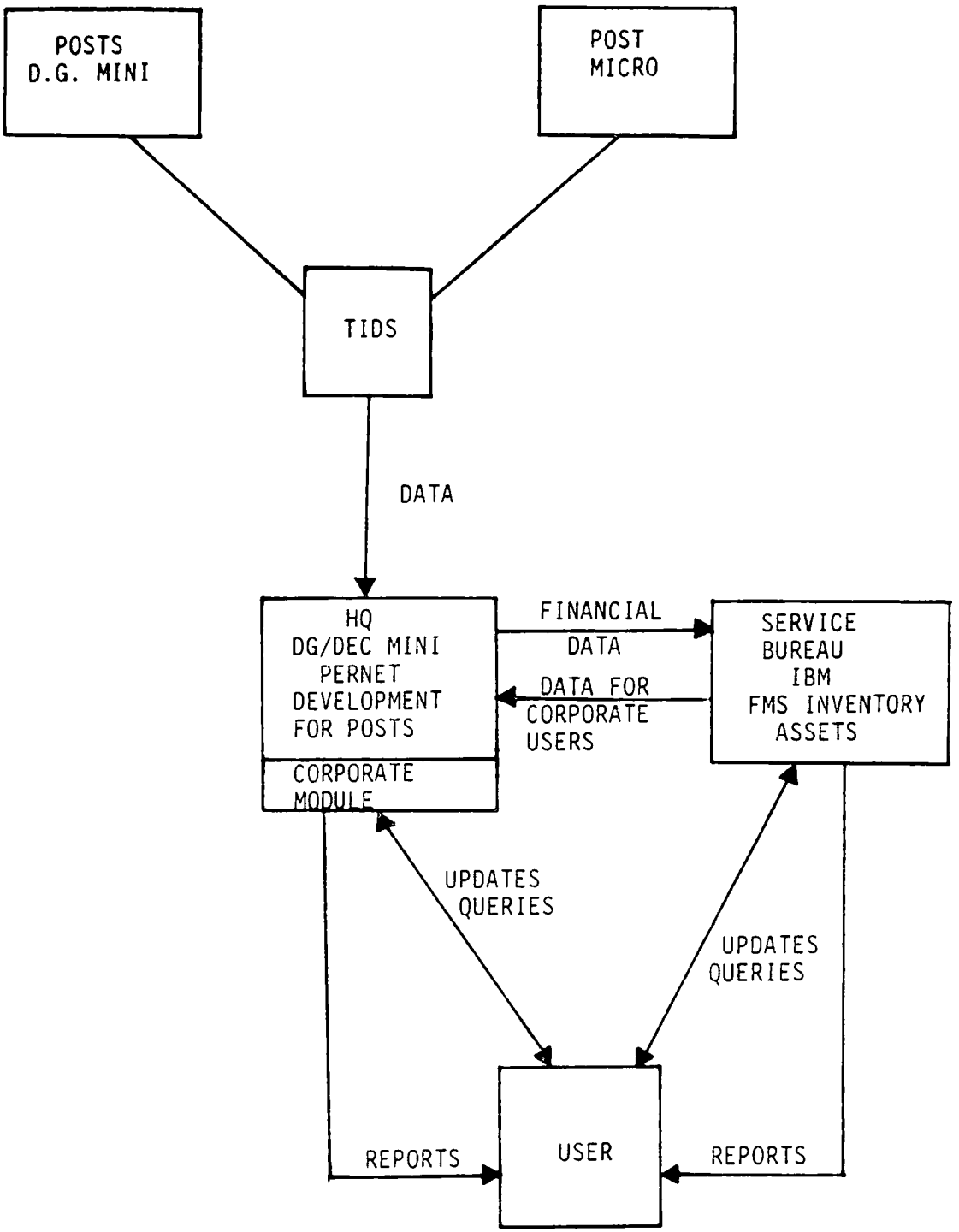
F. "It will be acceptable to Treasury Board in terms of costs, risks and benefits."

The product is favourably viewed by the Treasury Board. The potential deterrent is that estimated costs for GFS are significantly higher than for the AIDIS or ARCS packages. Our costing factor (25% of DND's effort) may be flattering to DND's complexity.

3.5 Summation

Our opinion of the alternatives is summarized as follows:

	AIDIS	ARCS	BUILD	GFS
A. Safely Meets Requirements	Good	Fair	Good	Good
B. Timeframe	Best	Good	Poor	Fair
C. Architecture	Proven	Limited	Best	Proven
D. Future Packages	Many	None	Some	Many
E. Current EDP Investment	Fair	Good	Good	Good
F. Treasury Board	Best	Fair	Poor	Good
G. Cost	Low	Low	High	High
H. Original Criteria	Fair	Fair	Best	Good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MICRO
TIDS
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HQ
DG/DEC MINI
PERNET
DEVELOPMENT
FOR POSTS
CORPORATE
MODULE
FINANCIAL
DATA
DATA FOR
CORPORATE
USERS
SERVICE
BUREAU
IBM
FMS INVENTORY
ASSETS
UPDATES
QUERIES
UPDATES
QUERIES
REPORTS
USER
REPORTS

Figure 3-1

4.2 Implementation Approach

4.2.1 Preliminary Activities

Prior to installing the AIDIS system for review and customization, the department should complete a series of preparatory activities. These activities are intended to establish an infrastructure which will reduce the risks of FMS project delays and cost overruns. In addition, the infrastructure will provide the guidelines and policies needed to ensure future administrative systems are controlled in terms of data administration and technical compatibility. Recommended preliminary activites are:

1. Scope Overall Administrative System Needs

   Volume II of this study identifies the entities which will be common to Pernet, FMS Inventory and Fixed Assets systems. This should be expanded to identify the volumes and user interface needs for remaining administrative systems and corporate module. This will allow the department to effectively determine its EDP resource needs and subsequently the most effective and efficient interfacing approach.

   This activity should commence and be finished in September of 1985.

2. FMS Cost Benefit Analysis

   In order to obtain Treasury Board program and funding approval, a cost benefit analysis should be prepared and submitted for approval. This should be done during September and October of 1985 and should assess the costs and benefits of three approaches. These are:

   1. Purchase equipment and operate in-house.
   2. Service bureau arrangement.
   3. Facilities management arrangement.

CIDA have used both service bureau and facilities management approaches. In addition, AIDIS has a costing module which determines usage and costs by user area. Discussions with R. Morris and CIDA indicate they are willing to provide full cost details to External Affairs for both approaches.

3. Infrastructure

Infrastructure activities should consist of:

System Architecture

This activity identifies the system's standards and performance criteria. The CIDA architecture should be adopted since it is proven and formed the basis for AIDIS and will save considerable costs (the $82,500 identified on Schedule 2E in Volume III).

Data Administration Policies

Policies related to the method and consistency of identifying data particularly coded elements, must be defined, approved and implemented. Unless this is done formally, future administrative and program systems run the risk of not being able to effectively share data. Assistance and/or samples could be obtained from CIDA to facilitate this exercise.

Internal Organization and Training

The External Affairs staff who will control and participate in the FMS project should be identified and provided with training on AIDIS. Technical resources should also be provided with training on IDMS, CICS and the AIDIS data base structure.

Infrastructure activities must be completed prior to beginning the FMS functional design changes.

SSC Coding Block

The AIDIS (SSC) coding block is:

Code vote	(3)
Responsibility	(3)
Planning Element	(3)
Line Object	(4)

Other coding elements such as project number, commitment number and FE are present but are not necessary for SSC purposes.

External Affairs should review its coding block and determine the extent to which full adaptation of the AIDIS approach is to be adopted.

Action plans to make the necessary changes should also be done in this phase.

4.2.2 FMS Activities

Contracting for Services

Based on the results of the cost benefit analysis and contingent upon completion of technical architecture and identification of External Affairs project control team, RFP's will need to be prepared and issued for AIDIS customization and computing services. Evaluation selection and SSC contracting should be completed by March 31, 1986.

Site Preparation

Terminals for programmers and testing resources should be ordered and installed along with the necessary communication lines, on-site printers and terminal controllers. Planning for this activity should be done concurrent with the RFP preparation.

System Installation

Upon award of the computer facilities contract, and upon completion of site preparation, the system is installed as is at the successful bidder's chosen site.

Functional Design

Because AIDIS is a fully operational system, it is not necessary to follow the traditional approach to this phase. The recommended approach is to use the system in an on-line mode to review the detailed processes, data content and data presentations (screens and reports). Users can best identify changes under this approach and construction activities can begin on a module by module approach as opposed to waiting for the full design.

This phase of the FMS project will contain the following activities:

Functional Review

External Affairs user area team members and contracted support personnel will review the current processing and data presentation (screens and reports) of AIDIS. Specific cosmetic and data content changes are documented.

Processing Review

Based on the conceptual model produced in this study (see Volume II) and the functional review, AIDIS record content and relationship changes are specified and documented. Edit and roll-up processes are reviewed with required changes documented.

Planning

Three plans should be developed during this phase. These are:

Detailed Implementation Plan

The scope of changes identified in activities 1 and 2 will permit more accurate estimates of testing and documentation

and training package changes as well as a more accurate scheduling of the construction phase.

Training Needs and Plans

The types of courses, user participation, logistics and facilities required are identified and mapped out in a detailed action plan.

Ongoing Resource Needs

Based on a hands-on review of AIDIS, estimates for ongoing support should be clarified and plans for their acquisition prepared. The cost benefit analysis will provide a base upon which to revise original estimates.

Construction

Construction can be done on a module by module basis after an initial data base change is made to AIDIS. This data base change will be based on the conceptual model in Volume II. Activities of this phase are:

Physical Data Base

New records and data elements would be added to accommodate the entity and element definitions of the conceptual model. Data dictionaries and data base schemas would be updated. Data base schemas should be evolved from the conceptual model to ensure a proper definition of the External Affairs version of AIDIS.

Program Specifications

Changes identified in the functional design phase are upgraded to program change specifications.

Coding

Programs are modified and unit tested according to the above specifications. The TIDS interface is developed.

Current versions of the CIDA maintenance and run manuals are also updated.

Functional Tests

Modules released from unit test are reviewed by end user representatives to ensure the functional requirements have been met. Problems identified are documented and returned for correction.

User Procedures

Desk procedures for FMS users are developed during this phase. In addition, changes to the system user manual are prepared based on approval from functional testing.

Training Courses

Customization of the system training modules begins during this phase. Revised user manuals and program specifications are used as inputs.

Implementation

The implementation phase, under the approach of this paper, would consist of:

System Testing

Tests are performed to ensure proper integration of modules and to ensure the data and technical integrity of the system. Approved modules are released to training and production environments.

Testing of programs to convert historical data is performed after all modules are accepted.

Training

Based on completion of user documentation training packages and facilities, user training is conducted.

Conversion

Historical data can be recorded via automated routines or direct data capture.

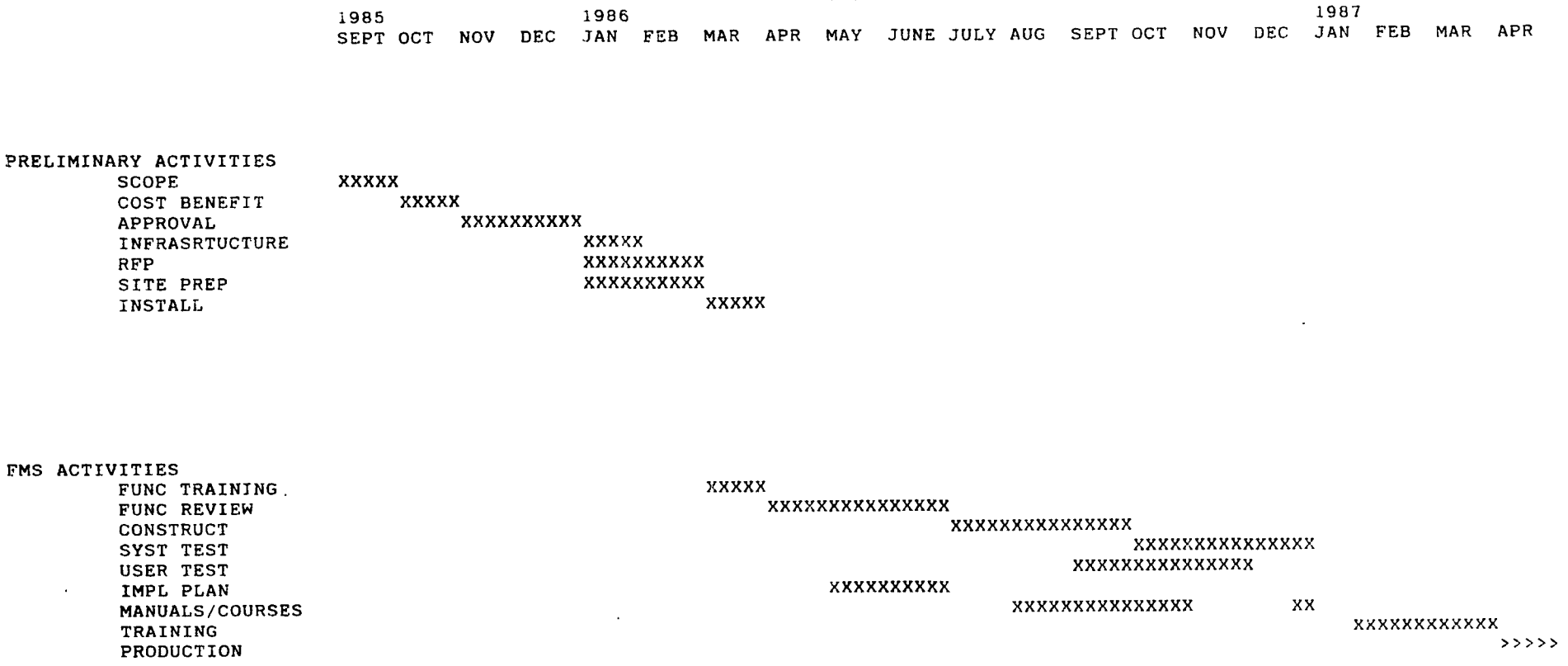
Production

System production files are opened and start-up data (coding dictionaries, security logs and initial budget records) is recorded by MFS and MFR. Regular transaction input can then begin.

4.2.3 Summary Schedule

The following diagram provides a summary of the implementation schedule.

FMS IMPLEMENTATION PLAN



5.0 RESOURCE REQUIREMENTS

5.1 Project Support

The new FMS is far greater in scope (project management, OPF, multi-year) and complexity (fully on-line in a mainframe environment) than the present system. The system will also form the cornerstone for an overall administrative system network, including a corporate user module. It is therefore essential that the department commit sufficient resources to the project with the objectives of proper functional representation and building ongoing support capabilities.

External Affairs personnel requirements for the FMS project are estimated as follows. All estimates are for fully dedicated staff.

User Areas

MFF	2 persons to participate in functional review and testing
MFR	3 persons to participate in or lead functional review, testing and implementation
MFS	3 or 4 analysts to participate in full project as a means of knowledge transfer for future support

Other Areas

Program Areas	1 representative (part time) from each program branch to participate in functional review with the emphasis on reporting requirements
Management	EDP policy committee as overall authority
	Project Authority
	Full time External Affairs Project Manager

User Training	Approximately 100 people should be trained at an average of three days each

Distribution of this initial training is seen as:

Program Branches	35
Corporate Areas	10
MFR	5
MFF	40
Other Areas	10

5.2 Ongoing Support

While dependent on the recent organizational review for MFS, ongoing support should cover the following areas:

Hotline and User Liaison (3)

An information centre concept would provide users with support for operational problems, new requirements, and information aggregation and output. This unit should be located in the MFR area.

Data Administration (2)

Policy and tables maintenance functions.

Program Maintenance

During the fiscal year, this area will require approximately 10 people to accommodate the normal influx of changes. Thereafter, a base of 3-4 individuals should suffice.

Data Base Administrator (2)

A senior technical resource with support analyst to ensure the integrity of the system and make changes to the data base

structure. Additional work would include performance evaluation and cost monitoring.

Terminal Operators (4)

Unitl such time as full decentralization of input is implemented, the current complement of MFF terminal operators should be retained.

6.0 ACKNOWLEDGEMENTS

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