

SAFE Material

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TAB B

SAFE PROGRAM STATUS REPORT

June 22 - July 22, 1982

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SAFE PROGRAM STATUS REPORT

June 22 - July 22, 1982

I. PREFACE

The purpose of this document is to provide a status report on those SAFE activities since the 22 June 1982 meeting of the SAFE Steering committee. At that meeting, the Consolidated SAFE Project Office (CSPO) was asked for a 30 day status report of its activities to include, to the extent possible, insight into the software cost specifically with respect to the augmentation of any available software packages.

This report is organized into five sections including this preface. Section II provides background material that speaks to the precepts upon which the proposed redirection has been built. Section III provides information on the status of the seven evaluation phase tasks and Sections IV and V discuss the projected schedules and costs respectively.

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II. BACKGROUND

The approach to the development of SAFE adopted by the Consolidated SAFE Project Office (CSPO) recognizes the strong relationship that SAFE has to commercial data processing developments in the areas of office automation, electronic mail, and data base management systems. The approach seeks to determine how the marketplace may best support the SAFE requirements while achieving an integrated environment that is easy for the intelligence analyst to use. This is an interim report of progress made since 22 June to evaluate this approach.

Fundamental to the development of SAFE is 1) maximum use of available software and 2) incremental delivery of capabilities to the users. In order to make optimum use of applicable commercial and government software, an IBM-compatible hardware environment is to be provided. Communications support to the terminals will be by non-encrypted twisted wire pair in order to minimize cost and risk. Twisted wire point-to-point communications already exists at the CIA and is being installed in the new DIA building. Tasks performed during the evaluation phase will result in the selection of software packages to be used as part of SAFE. Each of the software selection tasks includes the determination of what augmentations (and their costs) are required to these packages in order to provide

the requested capabilities. Additionally, the studies determine how to put the software packages together to provide the combined set of services. Further, all of the software must function with the computer and communications hardware. The design for these integrated capabilities will be presented at a system design review in February 1983.

The costs and schedules to develop these augmentations and the risk of being able to achieve them will be assessed. High risk or high cost augmentations will be weighed against their value to determine if they should be developed. This process also applies to the issue of achieving the integrated user-interface. Where it is deemed that the risks or costs are excessive relative to the value received, augmentations to achieve the user-interface integration will not be attempted. The assessment of the value of augmentation will be made at appropriate intervals, primarily at design reviews throughout the project.

We expect the marketplace to be active in solving many SAFE-like problems through improved performance hardware or through software with greater capability. An incremental approach to the development of SAFE allows continuous monitoring of the marketplace.

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Once the software package selections, augmentations, costs and schedules have been determined, a project plan for SAFE can be established. This will be available in November 1982. Additionally, a management plan will be provided in August 1982. The management plan will address how this type of multivendor software acquisition, development and integration can be performed as well as how the government works with the contractors. The CSPO has organized itself into three segments: system development, quality assurance, and operational systems.

The CSPO is currently developing the detailed plan for providing an early capability. The plan will be available by 16 August. This plan will provide for opening the SAFE computer center at CIA in March of 1983. It will contain three facilities: an expanded Pilot Mail Operation for CIA, a separate capability for the DIA (using DIA message traffic), and an unclassified development facility (for integrated capability development).

Since the Steering Committee meeting of 22 June the CSPO has concentrated on specific tasks critical to the evaluation of the proposed development approach. The objectives of each of the evaluation areas and the status of reviews are summarized below. This evaluation process will continue through September.

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III. EVALUATION PHASE TASKS

A. DBMS Study

The objective of the DBMS selection subtask is to select an IBM compatible Data Base Management System (DBMS) and text handling package that best meets the needs of the SAFE project. The selection is based on adherence to SAFE requirements as defined in the selection criteria. The DBMS is to be selected from the broad spectrum of commercially available products on the basis of their inherent capabilities and their compliance with SAFE functional, maintenance, resource usage and environmental requirements.

If existing software does not cover the requirements, the study will identify enhancements to existing software and/or the need for additional software required to satisfy the SAFE Data Base Management System requirements.

The technical approach for evaluating and selecting DBMS and text packages insures that the systems currently available are considered and makes certain that no promising candidates are omitted. Furthermore, the approach insures that the systems of

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interest are subjected to a sufficiently exhaustive technical analysis to validate the recommendations and conclusions.

The technical approach to DBMS performance assessment includes effort to design a prototype data base that will exercise the important file structures and relationships for both the CIA and DIA customer. There will be two data bases defined, one for textual data and one for structured data.

An extensive literature search has been conducted which included the DATAPRO and AUERBACH reports, a DATAMATION listing and various internal TRW compilations. The list was screened to select those DBMS packages that are compatible with an IBM environment. This resulted in the identification of 19 structured DBMS's. Separately identified were a list of 14 possible text DBMS's.

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The candidate DBMS's are as follows:

<u>Structured DBMS</u>	<u>TEXT DBMS</u>
ADABAS	BASIS
BASIS	CONTEXT C-705
DATAKOM/DB	COSMIC
DL/1	DIALOG
GIM II	DOCU/MASTER
GIM III	IMDOC
GIS/2	INQUIRE
IDMS	LEXIS/NEXIS
IMS/VS	ORBIT III
INQUIRE	STAIRS/VS
MODEL 204	SUPER FAST STORAGE AND RETRIEVAL SYSTEM
OASIS	TEXT 204
ORACLE	JURIS
RAMIS II	ASPEN SEARCH
SEED	
SIBAS	
SYSTEM 2000	
TOTAL	
SQL/DS	

These DBMS's were analyzed to identify the structured and text DBMS's that will undergo detailed technical evaluation. This was accomplished by

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applying a set of mandatory requirements to the previously identified IBM compatible packages and then performing a preliminary technical evaluation where necessary to reduce the list to the following:

<u>Structured DBMS</u>	<u>Text DBMS</u>
ADABAS	BASIS
IDMS	DOCUMASTER
INQUIRE	INQUIRE
MODEL 204	STAIRS/VS
SYSTEM 2000	TEXT 204

The familiarization with the DBMS's selected for detailed evaluation has been started for all packages and has been completed for:

ADABAS
IDMS
INQUIRE (structured and text)
MODEL 204 (structure and text)
SYSTEM 2000

The remaining text systems are still under study.

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The detailed technical evaluation has progressed significantly against the following packages:

ADABAS

INQUIRE (structured and text)

MODEL 204 (structured and text)

SYSTEM 2000

Technical meetings were held with the vendors of each of the above packages to gain a complete and detailed understanding of the internal data structures and data access methods employed and to resolve other technical issues that were open as a result of reviewing the technical documentation. Initial performance projections were made based on the information gained.

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Cost data has not been captured yet for most systems but representative data is shown for Model 204:

Acquisition Cost:

Basic Package	65K
User Language	40
Host Language Interface	30
Utilities	20
One T.P. Interface.	15
Data Dictionary	20
Math Pack	<u>5</u>

Total license fee 195K for the first copy

There is a 20% GSA discount on the license fee only for government installations. Additional discounts may be available for multiple copies. A minimum of two copies per Agency will be required for an estimated acquisition cost of approximately \$650K.

At this point in the evaluation process, it is premature to give definitive answers concerning cost and the degree to which SAFE requirements can be met. Given the fact that the DBMS decision will be one the analysts will have to live with for the next fifteen to twenty years, the goal is to select the best available package based on an overall evaluation

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which includes what needs to be done to overcome the particular shortfalls of the package. The available list of candidates has been narrowed, however, and it is possible to describe a representative case which will be covered in much more detail as the study progresses. Model 204 is one of the DBMS finalists and significant research has already been done on this product. Although M204 may not be the chosen package, it is representative of the class of available DBMS's that would come closest to meeting SAFE requirements. As previously stated, no single DBMS will fully meet our needs. The following is a discussion of these areas where M204 is deficient and a possible approach to overcoming the deficiency. If a DBMS other than M204 is chosen, the actual deficiencies may be different but nevertheless similar in that a certain important subset of the requirements will not be met.

Capabilities not supported by Model 204 and preliminary estimates of associated cost and risk are shown in Table I, which is an example of the kind of output that will be included in the final report on all software package evaluations. If we decide to implement the changes needed to meet all of the identified DBMS requirements, the cost is estimated to be from \$2M to \$3M. It should be noted the original

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TABLE I

MODEL 204 DEFICIENCY ESTIMATES

<u>Shortfall</u>	<u>Cost (\$)</u>	<u>Risk</u>
<u>Geographic Search</u> - Search on coordinates for inclusion within specified geometric figure (i.e., polygon).	141 K	low
<u>Maintenance via Output Forms</u> - update of record content using output form display on screen.	71 K	medium
<u>Transaction Files</u> - ability to collect update transactions in a file and to cause deferred execution of file content.	71 K	low
<u>Archiving</u> - Deletion of aged documents from online files, storage on tape, ability to subsequently search and retrieve from tape.	71 K	low
<u>Distributed Data Base</u> - Ability to search and update multiple files that are distributed across several processors in a loosely coupled network.	282 K	high
<u>Integrity Checking</u> - to verify correctness of internal pointers throughout the data base.	71 K	medium
<u>Sync Point Recovery</u> - To be able to recover the data base to the last completed transaction from the last known consistent state.	141 K	medium
<u>Multifile Transaction Recovery</u> - To be able to recover the data base to a consistent state when transactions are involved that apply to more than one file.	141 K	high
<u>Field Level Security</u> - To allow field level access consistent with compartmentation restrictions.	71 K	low

Table I (page 1 of 3)

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TABLE I

MODEL 204 DEFICIENCY ESTIMATES

<u>Shortfall</u>	<u>Cost (\$)</u>	<u>Risk</u>
<u>Data Dictionary</u> - the following are shortfalls that can be corrected by the implementation of a separate data dictionary.	352 K	medium
Unsupported Data Structures:		
o Subfields - subdivisions of an already defined field (i.e., MO in DATE: MODYYR)		
o Repeating groups - logical collection of fields within a record that may consist of several instances.		
o Index term phrases - collection of fields that have a defined relationship to one another.		
o Non-contiguous zones - text fields that consist of several physically separated parts.		
o Overlapping zones - text fields with a non-empty intersection.		
Unsupported Data Dictionary Functions:		
o Field level validation - verify correctness of data entered in a field.		
o Triggers - when updating a field, the ability to cause related updates to occur elsewhere in the data base.		
o File level status - ability to collect and store statistics on files in the data base.		

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Table I (page 2 of 3)

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TABLE I
MODEL 204 DEFICIENCY ESTIMATES

<u>Shortfall</u>	<u>Cost (\$)</u>	<u>Risk</u>
<u>Linked file hit list</u> - The hit list resulting from a linked file search (e.g., "Find full professors and their straight 'A' students") should (but does not) preserve inter-record relationships.	225 K	high
<u>Linked file search response time</u> - M204 is much slower than required.	254 K	high
<u>Multi-file search</u> - Capability of searching several dissimilar files and concatenating the results.	56 K	medium
<u>Dynamic browse</u> - Records added to a file after a user starts displaying it. Should be (are are not) displayed.	113 K	medium
<u>Skip a record</u> - Capability to skip a specified number of records when browsing (displaying) a file.	56 K	medium
<u>Fast range search</u> - E.g., "Find employees whose salary is between 1000 and 2000." Response time requirement for range search cannot be met. Specific problems are:	564 K	high
o Character range search is very slow		
o Embedded and trailing don't cares (e.g., "Find all names starting with J") are very slow.		
o Numeric range search is slow.		
o Geographic search (e.g., "find all cities within 100 miles of Washington") is slow.		

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development cost of Model 204 is many times these cost figures. It is an advantage of the software integration development approach that only a small fraction of the original development cost is paid by the SAFE program as part of the package acquisition costs.

B. Other Software Package Study

The objective of this task is to identify which packages will be used in addition to the packages selected by the DBMS Study task to provide an integrated SAFE system. We will evaluate both government and commercial packages to determine which can best satisfy the functional requirements of SAFE. If the existing software packages do not cover the requirements the study will identify enhancements and/or the need for additional software required to satisfy the SAFE requirements. These three functional package studies cover the requirements for Mail Dissemination, Non-Mail Applications, and Operating Support Software. In a parallel Software Architecture study we will coordinate the activities of the DBMS study and the three functional package studies and describe how the selected packages will be combined into an integrated SAFE system. The Software Architecture effort will document the design in the

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software portion of the System Design Document. The document will include a traceability of all SAFE requirements to either existing software packages, augmentations to those existing packages, operating system software or custom software. In addition, the document will provide a description of package interfaces and sequencing, and a technical discussion of both local and system wide issues.

The Mail Dissemination study focuses on packages that can provide SAFE mail dissemination. This basic mail capability will include the following functions:

- Message analysis

The ability to receive electrical messages and interpret and decompose them into zones according to predefined rules.

- Mail dissemination

The ability to match incoming messages against user interest profiles and deliver mail based on those profiles.

- Mail viewing

The ability to format mail for display or hardcopy and to dispose of mail in a variety of ways.

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- Indexing

The ability to associate user-defined keywords with a given message and use those keywords for subsequent retrieval of the desired message.

The Non-Mail Application study will focus on packages that provide functional support for a SAFE user. This study will include evaluation of the following functions:

- Text editing
- Word processing
- Special file maintenance
- User interface presentation
- HELP/CAI (Computer Aided Instruction)
- Terminal interface
- Command language parsing/translation.

The Operating Support Software Study will focus on packages that provide functional support for the SAFE operators and for the package integration. This study will identify which package, including the host Operating System, will be used to provide the following capabilities:

- Initialization/Termination
- Operator interface
- Intra- and inter-machine communications

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- Failover
- Error collection and reporting
- Health monitoring
- Security processing
- Tape management
- Management Information System (MIS)
- Print job control
- Hardware configuration
- Terminal interface
- ODP link

The Software Architecture study will complete the system design. It will investigate the candidate operating system to resolve potentially critical design issues and to validate the allocation of functions to the operating system. The complete system design will be compiled from the DBMS, mail, non-mail applications and operating support software inputs. Potential functional overlaps, interface discrepancies, and requirements gaps will be identified and resolved. In conjunction with the system engineering studies on design validation (below), we will trace the requirement specifications to specific software packages. The integrated system approaches to critical issues such as data integrity, recovery, security and user language processing will be documented in the System Design Document along with

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operating system issues such as network communication,
file sharing and terminal interface.

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~~SECRET~~1. Mail Dissemination Study

We have identified 14 mail packages, twelve vendor-provided and two government provided. A list of all 14 is contained in Table II. We have established contact between TRW/CSPO and all vendors and have requested written materials, and we have had technical presentations conducted with SISC (MAILBOX), IBM (PROFS), CCA (COMET204), and Government (AIM, PMO).

Meanwhile, we have conducted the first pass evaluation of all 14 packages and selected seven packages (five vendor and two government) for submission to the second pass evaluation. They are:

- COMET204
- MAILBOX (STSC)
- OMNICON
- PROFS
- TOSS
- AIM
- PMO

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TABLE II. ELECTRONIC MAIL SOFTWARE PACKAGES

AIM

Agency (in-house development)
Ron H.

MAILBOX

I.P. Sharp Associates
Los Angeles, California
(213) 277-3878
Peter Forman

COMET204

Computer Corporation of
America
Arlington, Virginia
(703) 522-1717
Chuck Tuebner

MAILBOX

STSC, Inc.
Bethesda, Maryland
(301) 984-5100
Richard Paulson

CYBERGRAM

Cybertek Computer Products, Inc.
Culver City, California
(213) 649-2450
Mary Cope

OMNICON

On-Line Software International
River Edge, New Jersey
(201) 488-770
Mariel Cruise

EMAIL

ADR
Princeton, New Jersey
(201) 874-9100
Jackie Cullins

PMO

Agency (In-house Development)
Gene C.

INFOMAIL

BBN Information Management
Cambridge, Massachusetts
(617) 497-2929
Bob Harvey

PROFS

IBM
Los Angeles, California
(213) 642-1490
Bruce Barton

INFOPLEX

Compuserve, Inc.
Columbus, Ohio
(614) 457-8600
Lynn Galli

QUICK-COMM

GEISCO
Arlington, Virginia
(703) 276-4053
Don Henn

MAILBOX

Dialcom, Inc.
Siver Spring, Maryland
(301) 588-1572
Ken Norris

TOSS

National Business Systems
Hartford, Connecticut
(203) 677-8396
Jy Chang

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The following areas of functional requirements were met by the seven selected packages:

- Message Analysis

None

- Mail Dissemination

PMO

- Mail Viewing

COMET204 TOSS

MAILBOX ADM

OMNICON PMO

PROFS

- Indexing

MAILBOX TOSS

OMNICON AMD

PROFS PMO

The following preliminary cost data shows the range of prices for this kind of software:

- COMET 204 (CCA) - \$57K/computer if purchased alone
\$35K/computer if purchased with
DBMS M-204
- MAILBOX (SISC) - \$40K/computer
- PROFS (IBM) - No purchase cost; rental \$370/mo
for each computer
- TOSS (NBS) - \$7,200/computer

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2. Non-Mail Application Study

The survey of available packages has produced an initial set of eleven which cover the following areas of functional and derived requirements:

a. Text editing/formatting

- ATMS: An IBM product which supports text entry, editing, formatting, storage and retrieval of documents. This package supports an interface to STAIRS (text search package) and the IBM DCF formatter.
- DCF: (Document Composition Facility): an IBM product which provides text formatting.
- DLF: (Document Library Facility): an IBM product which provides document storage and retrieval by name.
- WYLBUR: A Rand Corporation product which provides text editing with extensive macro features.

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- b. Command language/user interface/maintenance
- QBE: (Query by Example): an IBM product which provides an interface to support searching, sorting, creation of files, maintenance and browse.
 - IXF: (Interactive Extension Facility): an IBM product which provides a general purpose menu-driven interface to application software.
- c. HELP/CAI
- Interactive Instructional Authoring System: an IBM product for generating CAI-type instructional material.
 - Interactive Instructional Presentation System: accompanies the above to provide a system for presenting instructional material.
- d. General Packages
- SyncSort: produced by SyncSort Inc. as a general sort/merge package.
 - DMS (Development Management System): an IBM product which provides support for developing applications to run under CICS.
 - IMS/ADF: (Application Development Facility): an IBM product which provides support for developing data base applications.

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C. User Language

A User Language Specification (ULS) was produced and delivered on 10 May 1982. It contained the majority of the user interface and commands for the CIA user. The emphasis of these activities is to complete this work for the DIA user. The set of user interface issues to be addressed for DIA and the approaches to be taken for each, are being generated and coordinated with CSPO before detailed updates to the ULS are performed. These additions are to be derived from the DIA unique functions identified in the system requirements specification.

In addition to the ULS baselining, a set of user interface scenarios will be prepared to demonstrate and validate the language. These scenario definitions will be a joint effort of TRW and CSPO, and expand the set already prepared by TRW.

Preparations for the baselining of the ULS are well underway. A list of the DIA capabilities that need to be addressed for the ULS has been generated and implementation approaches are being considered. Two of these approaches, for linked file search and geographic search, have been prepared and will be coordinated with CSPO. An analysis has been performed to determine what issues must be resolved before the user interface can be implemented.

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These are subject to coordination and prioritization before updates to the ULS are generated. A preliminary analysis of the software studies has been performed to determine a list of areas which are highly subject to change based on the pending selection of vendor software packages.

Software packages being evaluated in the DBMS, Mail, and Non-Mail Studies will be analyzed to determine their ability to provide the SAFE user interface. If existing packages do not cover the requirements, enhancements or translations will be identified. This task will support the evaluation of appropriate software packages, support the identification of enhancements, and support identification of cost schedule and risk assessment associated with each enhancement.

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D. Requirements Closure

The objective of the Requirements Closure Task is to update and baseline the system level requirements. The technical approach includes coordinating all currently identified requirements issues pertaining to these specifications with the CSPO and update the specifications to reflect the corresponding changes. Incomplete requirements in the areas of the DIA communications systems interfaces will also be specified. The requirements will then be allocated for implementation in a specific delivery. As continued software package evaluation and trade-off analyses are performed and requirements changes are directed by the CSPO, the specifications will be updated to reflect these changes.

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E. Conversion Analysis Support

The objective of Conversion Analysis Support is to specify the requirements for data base and program/product conversion (conversion of the DIA online system data base and functional conversion of the DIAOLS programs/products) and to define the corresponding design approach which implements these requirements. Existing programs/products and data will be analyzed to verify that they are appropriately described in the Conversion Requirements Specification (CRS). A conversion plan will then be developed to identify all necessary conversion software.

The relationship between this task and the software evaluation and architecture subtasks is significant in that the selection of software packages can impact the conversion approach and the amount of conversion that must be performed for the DIA system. Also, the relationship between this task and the user language task is crucial because a large amount of the conversion activities will of necessity be performed by means of command procedures.

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This effort will identify critical design areas which need to be addressed by the overall design and establish the system level architecture based on the software evaluation studies and resolution of the critical design issues. It will define the hardware architecture and establish design concepts for all external and device interfaces. Then the task will validate the overall design to ensure that the requirements are covered, the design is end-to-end complete, and that potential performance problems are identified and resolved. It will also coordinate the documentation of the design in the System Design Document (SDD) and coordinate the preparation and conduct of the System Design Review. A preliminary system test plan will also be developed to identify the integration and test approach which will be used for the Integrated Capabilities.

We have formulated a preliminary list of critical design areas. TRW personnel attended discussions on AIM with ODP and CSPO to learn more of current system architecture. The current architecture for systems that will form a part of the SAFE early capability system as well as other similar packages currently operational within the ODP computing center is being analyzed. Information received to date on the architectures of AIM, PMO, TADS and CAMS II revealed

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several problems which need resolution in order that the SAFE system can serve a larger user community. A preliminary paper has been prepared which focuses on the architectural questions that need further investigation as potential enhancements, alternatives, or design changes to serve the larger user population are considered.

It is clear that there is a wide range of possible architectures to pursue. We plan to prioritize some major architecture issues in order to reduce the range of alternatives. The software evaluation criteria will be reviewed with respect to potential architectural environments in which the software may reside. A list of critical system design issues will be published to coordinate the system design activity.

IV. SCHEDULE

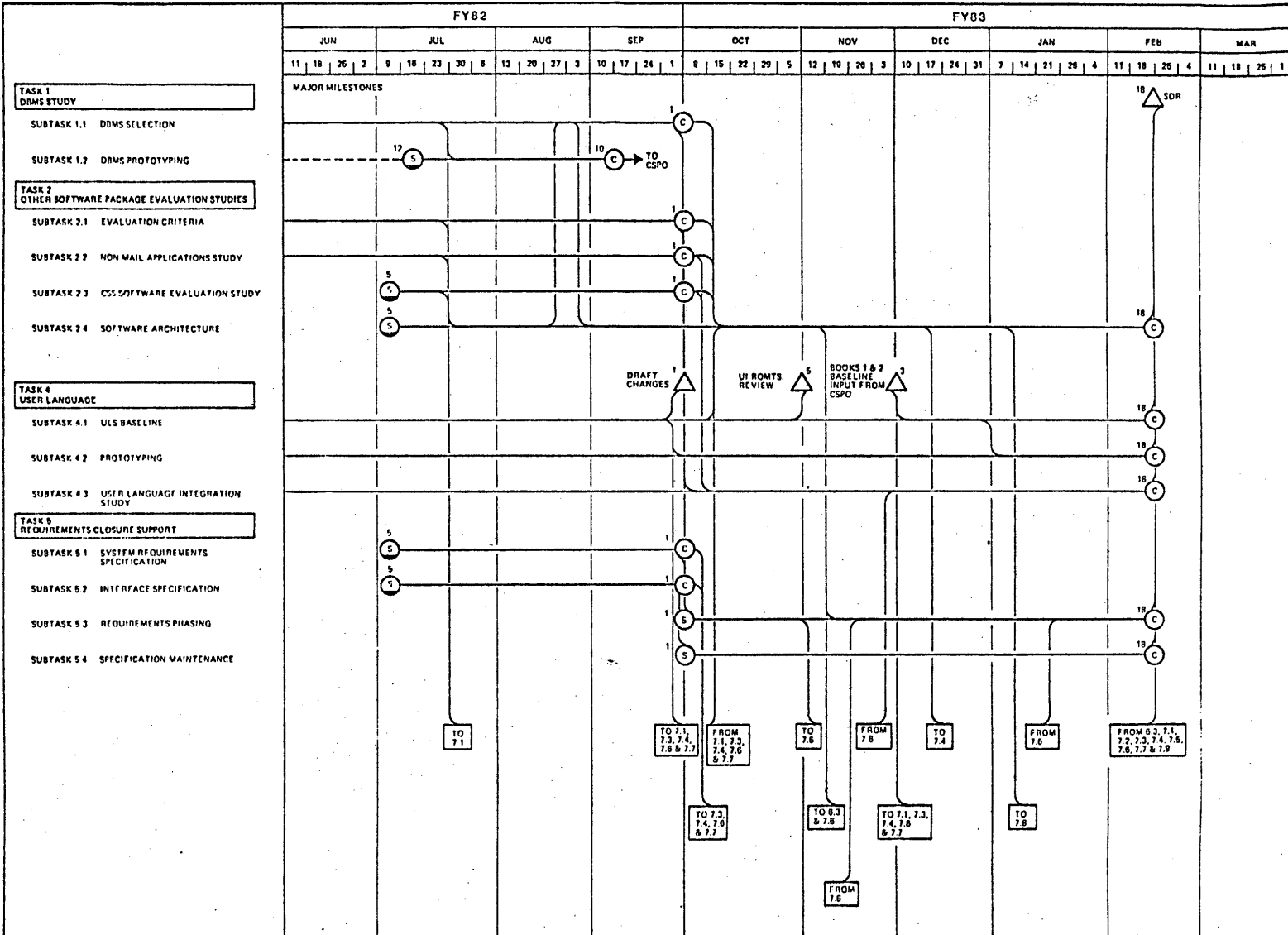
The development schedule has been divided into several phases. The first phase is for study prior to the generation of a system design. It is called the evaluation phase. During this period, July-Sept 1982, software packages for use in SAFE shall be identified as well as the augmentations to them required to achieve the needed functions. The phasing of the functional deliveries as integrated capabilities will also be determined.

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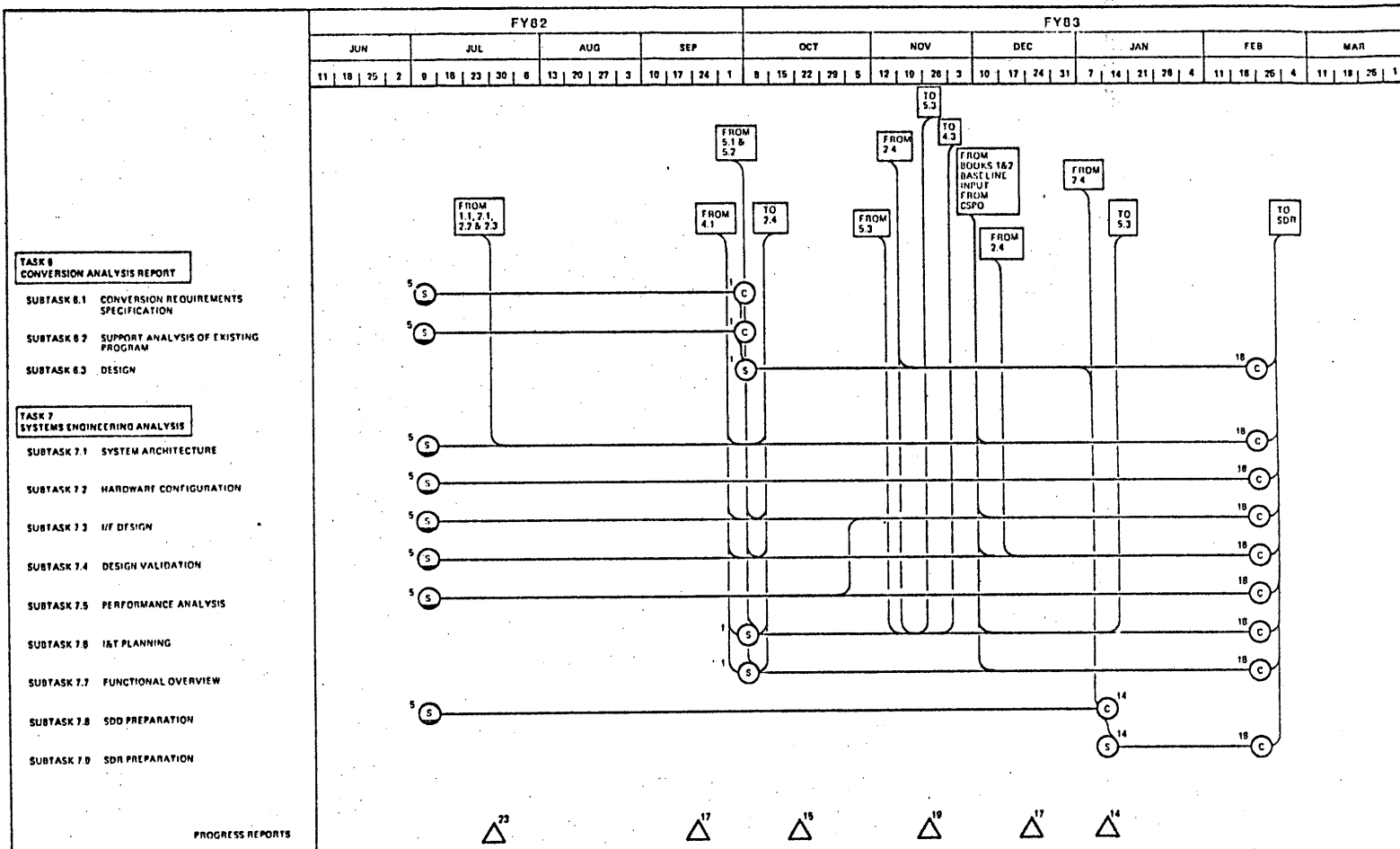
Table III illustrates the proposed scheduling of The Evaluation Phase tasks. This is followed by a system design phase, Sept 1982-Jan 1983. During this period the system design will be generated based on the results of the study during the evaluation phase. A project plan will be developed by November 1982. It will contain detailed costs and schedules for the project. A formal presentation of the design, costs, and schedules will occur in Feb 1983 at the system design review. At present four deliveries of integrated capabilities are proposed. They are discussed below.

Occurring simultaneously with the evaluation phase is planning for an early capability. This capability is off-the-shelf with very little development. It primarily provides expanded user access to the currently installed Pilot Mail Operation (PMO) for the CIA. The number of users will be increased from 45 to 300; 150 users will be able to access the system simultaneously. PMO, developed by Chase, Rosen, and Wallace, Inc. (CRW), draws upon capabilities of Interim SAFE. It provides a partial version of the mail operation intended for SAFE. PMO, in conjunction with ODP's Automated Information Management (AIM) software package will provide both mail support functions and electronic mail (message routing). The AIM software is supported in the VM/CMS operating system. This operating system provides text editing, text composition, and file handling services. PMO runs under the MVS operating system. All this software operates on IBM-compatible

TASK SUMMARY SCHEDULE



TASK SUMMARY SCHEDULE (Continued)



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hardware. CIA message traffic to this system will be provided from the CIA Communications Center. All CIA terminals will have the capability of accessing the Ruffing Computer Center. COMTEN communications switching hardware will be used to achieve this capability. A duplicate of this service will be provided to the DIA. Until the new DIA building is ready for equipment installation, the DIA capability will be housed in the CIA SAFE computer center, but separate from the CIA machines. Access to the DIA message traffic will be provided by providing telecommunication lines from the Pentagon. Terminal access will be from Arlington Hall Station and the Pentagon. A third facility to be housed in the CIA Computer Center, during this phase, is an unclassified (and therefore separate) development system for the integrated capability.

The project plan for the early capability will be completed by 16 August 1982. A detailed design review is scheduled for the week of 27 September 1982. The early capability will be operational in March 1983.

An enhanced capability is scheduled to be operational by October 1984. As described in TAB A this has been viewed as a follow-on to the early capability in which the PMO and AIM software is augmented. Specific enhancements include: the on-line text search software (COLTS), from Interim SAFE, is moved from the MVS operating system to the VM/CMS operating system,

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an enhanced word processing capability is provided, a prototype of the SAFE User Language interface is provided, PMO is integrated with AIM under the VM operating system, an improved message dissemination algorithm is provided, and the number of users is expanded to 500 in both the CIA and DIA systems.

Integrated Capability One is scheduled for March 1985. In this delivery an inverted index search for structured data is provided. Enhanced mail analysis algorithms are available. Conversion of the CIA's central index (RECON) is provided as well as conversion of the DIA's structured file environment (specifically the AIF, DIOBS, and Crisis Management file systems). An integrated user interface is provided.

Integrated Capability Two is scheduled for December 1985. This will include combined text searching and structured file searching for mail as well as inverted text file searching for retrospective intelligence analysis activities. The number of users supported is expanded to 1000 for each Agency. Conversion of the installation files and order of battle files will be completed.

In Integrated Capability Three, scheduled for December 1986, additional functions and modifications to the previous capabilities are provided. Conversion of the DIA files continues with incorporation of the CRD, HUMINT, and SIGINT file systems. User experience with the previous deliveries

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will generate new requirements which shall be reflected in this and subsequent deliveries.

With the delivery of Integrated Capability Four, in September 1987, it is expected that all SAFE capability previously contracted for will have been provided. SAFE development should subsequently reflect normal system operations and maintenance activity. The level of this activity will be directly related to changes in the missions and functions of the user organizations.

V. COSTS

The cost profile (Table IV) for SAFE is based on the best estimates available from the analysis of the integrated software approach. It was developed by discussions with TRW, CIA/ODP, and by drawing on the CSPO (CIA/DIA) experience gained over the past three years of SAFE development.

The FY 83 funding level is within the President's proposed budget now before Congress. The remaining profile is under funded by \$28 million when compared to the President's FY83 budget but is within the program submissions of both agencies for FY84-FY88.

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Table V is a breakout of cost for the software integration approach to SAFE implementation. Emphasis is on reducing costs associated with major software development and shifting those costs into hardware procurement. Under the previous approach to SAFE implementation (major software development) software costs were more than double the \$30 million and hardware costs were less than half the \$75 million.

Table VI provides funding profiles by Agency as reflected in the FY84 program submissions.

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(Table IV)

COST/FUNDING PROFILE SUMMARY
(IN MILLIONS OF 1982 DOLLARS)

	4th Qtr FY82	FY83	FY84	FY85	FY86	FY87	TOTAL
IBM OPTION (BUY/ PURCHASE PLAN)	1.5	32.0	29.0	31.0	24.5	17.0	135*
DIA/CIA PRESIDENT'S FY83-87 BUDGET	6.0	32.1	16.7	19.8	16.5	16.2	107.3
DIA/CIA FY84 PROGRAM	6.0	32.1	29.1	30.9	25.4	18.2	141.7

*SOFTWARE DEVELOPMENT UNCERTAINTY MAY ADD UP TO \$15M, POSSIBLY OFFSET BY BETTER NEGOTIATED PRICES ON HARDWARE, INCLUDED HERE AT LIST PRICE

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(Table V)

COST/FUNDING PROFILE
(IN MILLIONS OF 1982 DOLLARS)

SOFTWARE INTEGRATION OPTION (BUY/PURCHASE PLAN)

	TOTAL
SOFTWARE	31.9*
CONVERSION	6.5
COMMUNICATIONS	.7
HARDWARE	
- COMPUTER EQUIP	75.0*
- TERMINALS	13.1
- PRINTERS	3.5
ADMINISTRATIVE	
- DEV FACILITY	1.5
- RELOCATION	1.6
- CONTRACTOR TRAVEL	.5
- STAFF TRAVEL	.7
	135.0

*SOFTWARE DEVELOPMENT UNCERTAINTY MAY ADD UP TO \$15M, POSSIBLY OFFSET BY BETTER NEGOTIATED PRICES ON HARDWARE, INCLUDED HERE AT LIST PRICE

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(Table VI)

DIA/CIA 1984 PROGRAM SUBMISSION
(\$ MILLION)

	4th Qtr FY82	FY83	FY84	FY85	FY86	FY87	TOTAL
- DIA	3.0	12.8	13.0	17.1	14.4	10.7	71.0
- CIA	3.0	19.3	16.1	13.8	11.0	7.5	70.7

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COST/FUNDING PROFILE SUMMARY
(\$ MILLION)

	4th Qtr FY82	FY83	FY84	FY85	FY86	FY87	TOTAL	
DEVELOPMENT APPROACH	2.0	10.0	13.1	14.0	11.5	11.1	61.7	1
INTEGRATION APPROACH (BUY/PURCHASE PLAN)	.7	13.1	12.8	17.0	14.5	8.8	66.9	2
DIA/CIA	.8	18.9	16.2	14.0	10.0	8.2	68.1	
PRESIDENT'S FY83-87 BUDGET	3.0	12.8	8.0	11.3	9.2	9.0	53.3	
DIA/CIA	3.0	19.3	8.7	8.5	7.3	7.2	54.0	
FY84 PROGRAM	3.0	12.8	13.0	17.1	14.4	10.7	71.0	
	3.0	19.3	16.1	13.8	11.0	7.5	70.7	

1982 DOLLARS

- 1. SOFTWARE DEVELOPMENT
UNCERTAINTY MAY ADD \$5M
- 2. SOFTWARE DEVELOPMENT
UNCERTAINTY MAY ADD \$15M

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COST/FUNDING PROFILE SUMMARY
(\$MILLION)

	FY82	FY83	FY84	FY85	FY86	FY87	TOTAL
BURROUGHS OPTION	410	225	275	280	210	220	1250
IBM OPTION (BUY/ PURCHASE PLAN)	175	320	290	310	245	170	1360
DIA/GIA PRESIDENT'S FY86-87 BUDGET	610	321	187	108	185	182	1073
DIA/GIA FY84 PROGRAM	610	321	291	308	264	182	1417

1982 DOLLARS

- 1. SOFTWARE DEVELOPMENT
UNCERTAINTY MAY ADD \$6M
- 2. SOFTWARE DEVELOPMENT
UNCERTAINTY MAY ADD \$16M

GROUP 1
EXCLUDED FROM AUTOMATIC
DOWNGRADING AND
DECLASSIFICATION
PROCESSING
DATE 10/16/2008 BY 60322/UC/STP

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