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HEADQUARTERS APPLICATION

DRUG CONTROL MODULE

TEST PLAN

Deliverable # 9

USAID Project Number: 263-0170
[Develop a Detailed and Updated Management Information System for the Egyptian Health Insurance Organization, Cost Recovery Program]

Prepared by:
The MAXIMUS, Chemonics, Arabsoft Project Team

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SECTION 1

INTRODUCTION

1 INTRODUCTION

This document presents the test plan for the headquarters application of the Drug Control Module. This software is a part of the overall management information system being developed under a USAID contract to MAXIMUS, Inc. in cooperation with the Egyptian Health Insurance Organization. The purpose of this test plan is to:

- o review the steps of the software development life cycle that have brought this module to the point of beta test;
- o review the test environment and testing methods present during development of this software module;
- o present the requirements for this software module in an acceptance test plan; and
- o document the steps that will be taken to ensure that programs, once accepted, will be transferred to HIO facilities without introducing error.

This document represents Deliverable 9 under MAXIMUS Contract 263-0170-C-00-3042-00. This document serves as a basis for the acceptance test to be carried out by USAID and HIO in advance of full-scale implementation of this module at HIO facilities.

1.1 Test Objectives

The objective of this test plan is to provide a structured method from which USAID can verify that the software conforms to requirements and therefore meets contractual obligations. The requirements of the software were derived from the initial functional requirements provided in the contract, further analysis of existing HIO processes, and many meetings with user groups which included the use of prototypes as discussion vehicles.

With the presentation of this test plan, the contractor affirms that the application functionality conforms to that laid out in the functional design, as previously delivered to USAID and accepted by HIO. Occasional design changes may have been necessary as users reviewed prototypes. Exception areas, where the actual software differs from that of the functional design, are noted in Section 2.

1.2 Test Methods

Section 3 of this document contains the test criteria. These test areas are as follows:

1. Steps of the software development life cycle;

2. Review of the test process conducted to ready this software module for full-scale implementation and, therefore, acceptance testing by USAID; and

3. Specific requirement areas in need of testing for acceptance.

The acceptance test shall occur in an HIO facility where HIO users have had experience with the system. The individual(s) with USAID authority for the test may utilize this document to review each area of functionality and note discrepancies or deficiencies, if any are found. These shall be corrected prior to full-scale implementation. In addition, space is provided in the acceptance test plan for noting possible enhancement ideas. Though no action shall occur for these ideas at this time, it is useful to record these ideas during this structured review process so they can be analyzed later as a part of the HIO configuration control and enhancement process.

SECTION 2

EXCEPTIONS FROM THE FUNCTIONAL DESIGN

2 EXCEPTIONS FROM THE FUNCTIONAL DESIGN

Acceptance is defined as affirming that the software module provides the functions delineated in the functional and detailed designs; and that the software can operate in a facility setting with HIO users and live data. In some cases, system design may have altered slightly over the development process as prototypes were put in place and user feedback was collected. Any deviations from the designs are noted below with explanation so that the acceptance reviewer(s) can account for these exceptions during the test process.

One change that has been made to all of the modules has been the removal of the main menu option entitled 'Communications'. This option offered the user access to exporting data and transmitting over the network. This is done in order to avoid contention on the communication lines, as well as control in a well to limit access and thus reduce the risk of improper use of the option. Computer operators, thoroughly trained in communication functions, will monitor and manage communications through the COS menu.

Some major additions have occurred in the headquarters application of the Drug Control module since the functional design. Expansion has occurred to the drug database to match user requirements. Tables have been added to the specifications to accommodate these changes. New reports, inquires, and functions have been added to help the headquarters Medical Supply Department to present the drug data in varying formats.

SECTION 3

ACCEPTANCE TEST

3 ACCEPTANCE TEST

This section contains three parts; one for each of the acceptance test phases. The acceptance reviewer(s) should indicate the outcome of their review in the spaces indicated. Notes about discrepancies found should be made in the Discrepancies Logs starting on page 3-9. If enhancement ideas are noted, these should be recorded on the attached Enhancement Logs.

3.1 Software Development Life Cycle Steps Completed

Prior to reaching the point of acceptance testing, the listed software development steps have been completed for this module. The reviewer(s) should verify that these items have been completed. However, this verification does not equate to an acceptance of these individual documents, only that the necessary steps were taken. USAID review and acceptance of the individual documents is a separate process.

SOFTWARE DEVELOPMENT LIFE CYCLE CHECKLIST

Document	Reviewer Verification	Reviewer Notes
Functional Design	Doc. Date: Reviewer Initials:	
Detailed Design	Doc. Date: Reviewer Initials:	
System Documentation	Doc. Date: Reviewer Initials:	
Training Materials *	Doc. Date: Reviewer Initials:	
User Documentation *	Doc. Date: Reviewer Initials:	

* Documents shall exist in draft form at the point of acceptance testing. In this way, these documents can be assessed and refined as course experience and user feedback are provided during implementation.

3.2 Test Process Completed Prior to Acceptance Test

Testing of any software package is an iterative process. At the time of the acceptance test, the contractor has completed a full suite of testing for this software module. This testing has occurred in three phases; unit testing, integrated testing, and beta (live) testing.

First phase testing, or unit testing, has been accomplished by the lead programmer for this module. The programmer verifies that code, the format of the screens and reports, and actions of the function keys are consistent with defined standards. Code reviews are conducted from time to time by the Manager of Application Development to verify adherence to standards. During unit testing, the usage of literals on screens and reports, and column headings and their width have been desk checked to insure consistency with database definitions. Likewise, screen variables have been tested to ascertain that they are declared correctly and are compatible with the declarations in the database. The standards followed are defined in the contract deliverable entitled Programming Standards (version date: 8 December 1994).

To ensure data integrity, appropriate constraints are enforced for foreign keys as well as appropriate range of values to defined fields. List of values for fields adhere to these considerations and do not offer selections that will be rejected by the database. Tests have been conducted using expected values as well as unexpected values. The software protects the database by rejecting unexpected values and informing the user of their error with an appropriate message. In line algorithms have been tested for accuracy, assuring that calculations are correct and that the correct information is placed in the database. These tests for constraints, edits, messages and algorithms have occurred for this software application. Tests were conducted both by the lead programmer, and by the Technical Support Group. The Technical Support Group conducted testing against actual work scenarios; these work scenarios were developed as a part of the training materials development process.

The second phase of testing, system or integration testing, involves inspection of the software application as it relates and operates within the context of the larger information system. During this phase, the data are inspected to ensure that the same elements of information in the database are referred to in the same way across applications. The programs of this software application have been checked that they do not corrupt or otherwise interfere with the operation of the other system components in place thus far.

The third phase of testing is a beta test; testing in a live environment. In this phase, the application has been checked for user friendliness and to test the robustness of the software when multiple users are accessing the same tables. In addition, the beta test covers the range of combinations of work scenarios that typically occur in a live situation.

In the case of the headquarters application for the Drug Control Module, the software has been tested by HIO individuals responsible for drugs within the Medical Supply Department. The HIO is currently maintaining lookup tables as well as using the reports and inquiry screens which have been developed. All modifications to reports have been completed to satisfy user requirements.

The beta test phase has also been used to assess the fit of the application software and the introduction of automated processing to the daily work environment in the HIO polyclinic. Though not all individuals in a polyclinic have access to a terminal, the work flow must support the use of the software application just as the software must support the work flow.

Because the hardware for this module has not been installed at Roxy, it is difficult to determine the full extent to which the work flow will be impacted. However, HIO individuals have been traveling to Al Ahram for over a year now to use the system and are quite familiar with it. Consequently, it is anticipated that the work flow will be favorable impacted by this module.

3.3 Requirements Test

This section presents the requirements test plan for the headquarters application of the Drug Control Module. The form beginning on the next page lists the requirements which are to be tested for functionality. Performance and full database management requirements are not included in this test suite. At the time of the writing of this test plan, database loads are not in place to conduct performance tuning or test all database management functions. The contractor shall conduct performance and database management tests at a later date.

Any discrepancies from stated functionality should be noted on the Discrepancies Log included. Any enhancement ideas which surface during the test should be recorded on the Enhancement Log located in Appendix A. At the conclusion of the test the acceptance test form is to be signed by both the USAID and MAXIMUS representative. Signature indicates acceptance of the system pending resolution of any noted discrepancies.

Requirements Acceptance Test

Application: Drug Control at Headquarters

Test Date(s): _____

Total Number of Discrepancies: ____

USAID Representative Name: _____ Signature: _____

Contractor Representative: _____ Signature: _____

Requirements List		Acceptable
General		
1.	The module functions are available from a selection menu.	YES / NO
2.	The "look and feel" of the selection menu(s) follows that of other system applications.	YES / NO
3.	System security is controlled through user definitions and assignments.	YES / NO
4.	Multiple users can use the application at the same time and be tracked separately.	YES / NO
5.	Function keys react in a standard fashion as described in Appendix A of the Detailed Design.	YES / NO
6.	Procedures for system use fit into daily operating environment of facility.	YES / NO
7.	Use of application does not prevent/obstruct use of other applications of the MIS.	YES / NO
Data Inputs		
8.	Entry points exist for maintaining main Drug data.	YES / NO
9.	Entry points exist for Drug Groups.	YES / NO
10.	Entry points exist for Drug Generic Names.	YES / NO

11.	Entry points exist for Drug Vendor/Manufacturer/Licenser.	YES / NO

Drug Control at Headquarters Requirements Acceptance Test
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12.	Entry points exist for Drug Interaction (by groups and generics).	YES / NO
13.	Entry points exist for Drug Package Forms.	YES / NO
14.	Entry points exist for Drug Unit Forms.	YES / NO
15.	Entry points exist for Drug Strength Units.	YES / NO
16.	Entry points exist for Generic Names.	YES / NO
17.	Entry points exist for Vendor/Manufacturer Names.	YES / NO
18.	Entry points exist for Interaction Types and Severity Types.	YES / NO
19.	Entry points exist for Group Types and Names.	YES / NO
20.	Entry points exist for Drug Dispensing Rules.	YES / NO
21.	Entry points exist for Prescription Types.	YES / NO
22.	Entry points exist for Transaction Types.	YES / NO
23.	Entry points exist for Purchase Order Delivery Status Types.	YES / NO
24.	Entry points exist for Purchase Order Changed Status Types.	YES / NO
25.	Entry points exist for Returned Request Status Types.	YES / NO
26.	Entry points exist for maintaining the aggregation of Branch Annual Plan (accommodates HQ modified quantities).	YES / NO
27.	Entry points exist for performing Final Annual Plan.	YES / NO
28.	Entry points exist for preparing Tender Letters to Vendors.	YES / NO
29.	Entry points exist for preparing Branch Letters.	YES / NO
30.	Entry points exist for Tender Groups, Tender Items, and Item Drugs.	YES / NO

31.	Entry points exist for purging Drug Master table and related tables.	YES / NO
32.	Entry points exist for Drug Relation from one Vendor to another.	YES / NO

Drug Control at Headquarters Requirements Acceptance Test
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Data Edits

33.	Code options are available on screen when a coded field is being entered.	YES / NO
34.	Coded fields accept only those fields listed as coded options; appropriate user message is otherwise given.	YES / NO
35.	Date fields accept only valid dates; appropriate user message is otherwise given.	YES / NO
36.	Numeric fields accept only numbers; appropriate user message is otherwise given.	YES / NO

Data Queries/Outputs

37.	Queries on a specific drug.	YES / NO
38.	Queries on drugs related to specific Vendors/Manufactures/ Licenser.	YES / NO
39.	Queries on drugs related to a Specific Group.	YES / NO
40.	Queries on drugs related to a Specific Generic Name.	YES / NO
41.	Queries on Drug/Drug Interaction by Trade Name.	YES / NO
42.	Queries on Interaction by Drug Group Name.	YES / NO
43.	Queries on Interaction by Severity Type.	YES / NO
44.	Produce a Package Form listing.	YES / NO
45.	Produce a Unit Form listing.	YES / NO
46.	Produce a Strength Unit Form listing.	YES / NO

47.	Produce a Drug Form listing.	YES / NO
48.	Produce a Generic Names listing.	YES / NO
49.	Produce a Vendor/Manufacturer listing.	YES / NO
50.	Produce an Interaction Type listing.	YES / NO
51.	Produce an Interaction Severity Type listing.	YES / NO

52.	Produce a Drug Group Types listing.	YES / NO
53.	Produce a Group Names listing.	YES / NO
54.	Produce a Dispensing Rules listing.	YES / NO
55.	Produce a Prescription Types listing.	YES / NO
56.	Produce a Transaction Types listing.	YES / NO
57.	Produce a Purchase Order delivery Status listing.	YES / NO
58.	Produce a Purchase Order Changed Status listing.	YES / NO
59.	Produce a Returned Request Status listing.	YES / NO
60.	Produce an Essential Drug listing.	YES / NO
61.	Produce a Scientific Drug listing.	YES / NO
62.	Produce an Essential Drug by a Specific Drug Form listing.	YES / NO
63.	Produce an Essential Drug by a Specific Formulary Status listing.	YES / NO
64.	Produce an Essential Drug by Vendor/Manufacturer listing.	YES / NO
65.	Produce a listing of Drugs Related to Specific Groups.	YES / NO
66.	Produce a listing of all Interactions.	YES / NO
67.	Produce a listing of Interactions by Group.	YES / NO
68.	Produce a listing of Interactions by Generic Name.	YES / NO

69.	Produce a listing of the Annual Plan by Trade Names.	YES / NO
70.	Produce a listing of the Annual Plan by Tender Items.	YES / NO
71.	Produce a report of the Annual Plan Delivered.	YES / NO
72.	Produce a report of the Tender Letters.	YES / NO
73.	Produce a report of the Tender Items	YES / NO
74.	Query on Current Drug Balances in Polyclinics.	YES / NO
75.	Query on Monthly Drug Balances in Polyclinics.	YES / NO

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76.	Query on Yearly Drug Balances in Polyclinics.	YES / NO
77.	Query on the differences in Physical Inventory.	YES / NO
78.	Produce a report on Current Drug Balances in Polyclinics.	YES / NO
79.	Produce a report on Monthly Drug Balances in Polyclinics.	YES / NO
80.	Produce a report on Yearly Drug Balances in Polyclinics.	YES / NO
81.	Produce a report on Balances Delivered.	YES / NO
82.	Produce a report on Drugs related to a Specific Group, ordered by Trade Name or by Generic Name (accommodates producing the drug annual plan).	YES / NO

Discrepancies Log (page 1 of 2)

Application: Drug Control at Headquarters

Requirements List	Discrepancy

Discrepancies Log (page 2 of 2)

Application: Drug Control at Headquarters

Requirements List	Discrepancy

SECTION 4

STEPS FOR ERROR-FREE REPLICATION OF SOFTWARE TO SITES

4 STEPS FOR ERROR FREE REPLICATION OF SOFTWARE TO SITES

Once software is accepted, it is important that the same software be propagated to facility servers without the introduction of errors. To ensure this, the propagation process will occur in the computer operations laboratory at the HIO Headquarters MIS Center and use master tapes for server loading. The process which ensures error free propagation is described below.

All servers can be categorized by class in accordance to the facility type in which they will reside. There are polyclinic servers, hospital servers, and branch servers. A master tape is developed for each facility class. This master tape includes the database layout as well as the application programs. As new applications and tables are available, or software updates occur, the master tape is revised and tested.

The complete propagation process begins by installing a boot up version of UNIX on the target server. Next, the master tape for that facility class is copied onto the target server. The information which is loaded from this master tape includes the following:

- UNIX,
- Telecommunications Configurations and Programs,
- Oracle Server,
- SQL*Net,
- Oracle Database,
- Application Database, and
- Application Programs

This ensures that each facility gets the same version of all operating system, RDBMS, and telecommunications programs as well as all application programs. Specific adjustments are made to the target server to correctly identify its system name, node name, and network address. Finally, the database is tailored with site specific data such as beneficiaries and some look up tables.

This process is systematic and proceduralized. There are very few items which are specific to a site. However, the design of the database is such that it remains flexible so that tablespaces can be upgraded or moved between devices for performance gains at individual sites. Once loaded, the server is tested at the MIS Center laboratory before being delivered to the target site. In this way, propagation of not just application software, but system software and database contents are tightly controlled at the MIS Center, where staff with sufficient technical skill to

resolve problems are resident should their expertise be required.

APPENDIX A

Enhancement Log (page 1 of 2)

Application: Drug Control at Headquarters

Test Date: _____

Total Number of Enhancement Notes: _____

USAID Representative Signature: _____

Contractor Representative Signature: _____

Enhancement Note Number	Enhancement Description
1.	

Enhancement Log (page 2 of 2)

Application: Drug Control at Headquarters

Enhancement Note Number	Enhancement Description
1.	