



INTERNAL AUDIT DIVISION

AUDIT REPORT

Audit of Information Technology Systems supporting Contingent Owned Equipment Operations at the Department of Field Support

**3 March 2008
Assignment No. AT2007/600/01**

United Nations  Nations Unies

INTEROFFICE MEMORANDUM

MEMORANDUM INTERIEUR

INTERNAL AUDIT DIVISION · DIVISION DE L'AUDIT INTERNE

OFFICE OF INTERNAL OVERSIGHT SERVICES · BUREAU DES SERVICES DE CONTRÔLE INTERNE

TO: Ms. Jane Holl Lute, Officer-in-Charge
A: Office of the Under-Secretary-General
Department of Field Support

DATE: 3 March 2008

REFERENCE: IAD: 08- 01085

FROM: Dagfinn Knutsen, Director
DE: Internal Audit Division, OIOS



SUBJECT: **Assignment No. AT2007/600/01 - Audit of Information Technology Systems supporting Contingent**
OBJET: **Owned Equipment Operations at the Department of Field Support**

1. I am pleased to present the report on the above-mentioned audit.
2. Based on your comments, we are pleased to inform you that we will close recommendation 1 in the OIOS recommendations database as indicated in Annex 1. In order for us to close the remaining recommendations, we request that you provide us with the additional information as discussed in the text of the report and also summarized in Annex 1.
3. Your response indicated that you did not accept recommendations 2 and 3. In OIOS' opinion however, these recommendations seek to address significant risk areas. We are therefore reiterating them and request that you reconsider your initial response based on the additional information provided in the report.
4. Please note that OIOS will report on the progress made to implement its recommendations, particularly those designated as critical (i.e., recommendation 4) in its annual report to the General Assembly and semi-annual report to the Secretary-General.

cc: Mr. Philip Cooper, Director, DFS
Mr. Maxwell Kerley, Acting Director, LSD
Mr. James Mutiso, Officer-in-Charge, FBFD
Mr. Rudy Sanchez, Chief, CITS, DFS
Ms. Ellen Aamodt, Chief, COE and Property Management Support Section, SSS, LSD
Mr. Peter Griffith, Officer-in-Charge, FSSU, FBFD
Mr. Vijay Kapoor, Officer-in-Charge, MCMS, FBFD
Mr. Swatantra Goolsarran, Executive Secretary, UN Board of Auditors
Mr. Jonathan Childerley, Chief, Oversight Support Unit, Department of Management
Mr. Byung-Kun Min, Programme Officer, OIOS

INTERNAL AUDIT DIVISION

FUNCTION

“The Office shall, in accordance with the relevant provisions of the Financial Regulations and Rules of the United Nations examine, review and appraise the use of financial resources of the United Nations in order to guarantee the implementation of programmes and legislative mandates, ascertain compliance of programme managers with the financial and administrative regulations and rules, as well as with the approved recommendations of external oversight bodies, undertake management audits, reviews and surveys to improve the structure of the Organization and its responsiveness to the requirements of programmes and legislative mandates, and monitor the effectiveness of the systems of internal control of the Organization” (General Assembly Resolution 48/218 B).

CONTACT INFORMATION

DIRECTOR:

Dagfinn Knutsen, Tel: +1.212.963.5650, Fax: +1.212.963.2185,
e-mail: knutsen2@un.org

DEPUTY DIRECTOR:

Fatoumata Ndiaye: Tel: +1.212.963.5648, Fax: +1.212.963.3388,
e-mail: ndiaye@un.org

EXECUTIVE SUMMARY

Audit of Information Technology Systems supporting Contingent Owned Equipment Operations at the Department of Field Support

OIOS conducted an audit of Information Technology Systems supporting Contingent Owned Equipment Operations at the Department of Field Support from April to June 2007. The overall objectives of the audit were to (a) assess the systems' operating environment, functionality and ability to meet the needs of DFS in providing relevant, timely and accurate information to both Headquarters and field missions; (b) identify risks that are relevant to the COE-related information assets and assess general and application controls to mitigate these risks; and (c) determine whether the COE systems' interfaces and information exchange with other relevant ICT systems are adequate. The audit was conducted in accordance with the International Standards for the Professional Practice of Internal Auditing.

The existing information systems that collectively support the COE operations were found to be adequate overall for supporting DFS's needs for accurate, timely and relevant information. However, because several systems and a significant number of manual processes are involved in the process, vulnerabilities exist, which may compromise data security and integrity, and increase reliance on ancillary, stand-alone systems and manual controls.

TABLE OF CONTENTS

Chapter	Paragraphs
I. INTRODUCTION	1-8
II. AUDIT OBJECTIVES	9
III. AUDIT SCOPE AND METHODOLOGY	10-12
IV. AUDIT FINDINGS AND RECOMMENDATIONS	
A. Non-integrated ICT systems	13-23
B. Observations concerning ICT systems in the field	24-32
C. Other Audit Findings and Observations	33-43
V. ACKNOWLEDGEMENT	44
ANNEX 1 – Status of Audit Recommendations	
ANNEX 2 – Summary of the information flow in the Contingent Owned Equipment Operations of the Department of Field Support	

I. INTRODUCTION

1. The Office of Internal Oversight Services (OIOS) conducted an audit of the Department of Field Support's (DFS or Department) Information and Communication Technology (ICT) systems that support the Department's Contingent Owned Equipment (COE) operations, from April to June 2007. These ICT systems comprise several computer applications developed in-house, which collectively process and report on both logistics and financial information of the COE operations in all peacekeeping missions. The audit was conducted in accordance with the International Standards for the Professional Practice of Internal Auditing.
2. The entire COE process is governed by Memoranda of Understanding (MOU), which are contracts between the United Nations and Troop Contributing Countries or Nations (TCCs). The COE information flow and the ICT systems involved are described in summary form in Annex 2 to this report.
3. The Logistics Support Division (LSD), DFS creates, maintains, updates and is the primary user of information on COE logistics.
4. The MOU Claims Management Section (MCMS) of the Field Budget Finance Division (FBFD, formerly FMSS), DFS is the primary user of financial information on COE. MCMS validates TCC quarterly claims for payment of COE contributions.
5. During 2006 TCCs who provided COE to 14 missions, filed 897 claims for payment totaling \$381.5 million (consisting of both: "Major Equipment" and "Self Sustainment"). The actual amounts paid totaled \$364.3 million.
6. As part of its overall business planning and in response to another previous OIOS audit report, DFS advised that it was in the process of developing a departmental information management strategy.
7. OIOS' previous audit reports on COE issues included a report issued to the General Assembly¹. Over time, OIOS produced several mission-specific audit reports and other audit reports which addressed certain COE-related issues. The only ICT-specific issue addressed in these audits was the absence of automated calculating formulas in the MS-Excel spreadsheet discussed in paragraphs 20 and in Annex 2, paragraph 7(b)(iii).

¹ A/54/765 dated 23 February 2000 and A/54/765/Corr.1 dated 13 June 2000.

-
8. Comments made by DFS are shown in *italics*.

II. AUDIT OBJECTIVES

9. The major objectives of the audit were to:
- (a) Assess the operating environment of the COE systems listed in Annex 2, paragraph 7, their functionality and ability to meet the needs of DFS in providing relevant, timely and accurate information to both Headquarters and field missions;
 - (b) Identify risks relevant to the COE-related information assets and assess general and application controls to mitigate these risks; and;
 - (c) Determine whether the COE systems' interfaces and information exchange with other relevant ICT systems are adequate.

III. AUDIT SCOPE AND METHODOLOGY

10. The audit was conducted at Headquarters and at the United Nations Mission in Liberia (UNMIL). We interviewed key personnel and other users at DPKO's Communication and Information Technology Service (CITS), LSD, MCMS and the Information Management Unit (IMU) of FBFD at Headquarters. The COE ICT systems in the field were reviewed at UNMIL. Users provided systems demonstrations and we directly accessed systems to review their functionalities (Access was controlled through "Read-only" access privileges or through accessing copies of certain systems that were provided for this purpose). The audit also reviewed available documentation, and assessed operational risks to the systems and the data.

11. The audit did not review compliance with general COE procedures which were reviewed in other audits. Instead, only the COE ICT systems functionalities and controls were reviewed. The audit also did not review the new automated module for calculating the amounts due to TCCs², which was not yet implemented at the time of the audit. Lastly, the audit did not review the Integrated Management Information System (IMIS), where payments and accounting records are processed. COE-related transactions in IMIS are treated as any other accounting transactions.

12. Some specific equipment types which are not defined as COE (such as air transportation capability) are not governed by MOUs, but rather by "Letters of assist". They were therefore not within the scope of this audit.

² Paragraphs 19 and Annex 2, paragraph 7(b)(iii).

IV. AUDIT FINDINGS AND RECOMMENDATIONS

A. Non-integrated ICT systems

13. COE operations are supported by the six main ICT applications described in Annex 2. Each of these applications supports a specific segment of the COE operations, receives input from other systems (either manually, or through electronic data transfer processes known as “Interfaces”), and provides data for the system(s) that handle the next segment of operations.

14. The COE process starts with negotiating MOU terms with TCCs. FBFD raises related financial obligations in IMIS (a process that can take place prior to finalizing the MOU), and records the MOU in the PKDB system³. The MOU is then entered again into the MOU-VR database⁴, through a manual input process.

15. Upon completion of the initial inspection of the COE (after the arrival of the relevant contingent at the field location), data is entered into the MOU-ME database⁵. Data entry is manual. This database is used mainly for COE inventory management and periodic inspections.

16. At this stage of the process there are three databases that contain the MOU data. Two of these databases (the MOU-VR and the MOU-ME) are used by LSD in the field and at Headquarters. The third database (PKDB) is used by FBFD for monitoring and as a repository of MOUs.

17. The next segment of COE operations is the periodic inspection. This process is carried out in the field, and relies on detailed records on COE equipment from the MOU-ME database. Inspection results are recorded in the MOU-VR database, and provide the information for the periodic reimbursement process to TCCs, as well as to various logistics analyses performed at Headquarters.

18. MCMS staff who perform the periodic calculations of amounts payable to TCCs have access to both databases: the MOU-VR and the MOU-ME. The information from the verification reports, however, is transferred to the GCMS system⁶ manually.

19. Calculations of amounts payable to TCCs were still made in a spreadsheet application⁷, which was reviewed in a previous audit⁸. This

³ Annex 2, Paragraph 7(b)(i).

⁴ Annex 2, paragraph 7(a)(i).

⁵ Annex 2, paragraph 7(a)(ii).

⁶ Annex 2, paragraph 7(b)(ii).

⁷ Annex 2, paragraph 7(b)(iii).

⁸ Audit report dated 21 February 2006, audit assignment AP2005/600/19 – management audit of DPKO – financial management and budgeting. In recommendation number 23 OIOS recommended that DPKO automate the process of calculating the amounts payable to TCCs instead of relying on the manual spreadsheet process.

spreadsheet was due to be replaced with an automated module, as per the previous audit recommendation, shortly after the end of this audit. The new module was not reviewed in this audit.

20. On a separate track of information flow, LSD uses information on COE inspections to conduct analyses, based on which DFS management can take remedial action as needed. The analyses are done using spreadsheet-based applications⁹.

21. In the absence of one integrated information system supporting COE operations, there are several instances of manual processes and data transfers between systems. While the COE business cycle is carried out, the existence of multiple manual processes may not be cost effective. In addition, some technologies used in the COE systems (such as the PKDB¹⁰) are obsolete and not supported by outside vendors.

22. An integrated COE system which encompasses all aspects of COE operations could improve data security and integrity (discussed below in paragraphs 24-32), and reduce reliance on manual intervention, thus potentially reducing costs. Such a system should integrate with the new Enterprise Resource Planning (ERP) system approved in General Assembly resolution 60/293.

23. *DFS stated that while there was definitely a need to develop an integrated system to support all aspects of COE operations, the [new] ERP team has already planned to perform an in-depth analysis of a new integrated system that will achieve this.* Based on the action taken to date by the ERP team, which includes documenting of COE functional requirements to be addressed within the ERP development project, no recommendation is raised.

B. Observations concerning ICT systems in the field

Insufficient edit checks for data entry

24. The review at UNMIL found that there were basic controls in place over entering data into the MOU-ME and the MOU-VR databases. These controls ensure that data entered cannot be subsequently changed by users.

25. However, the data entry controls are insufficient: there were no controls embedded in the data entry process of the two databases used in the field to validate data entered. Although no actual data entry errors were detected during the audit, there is significant potential for incorrect data entering the system.

26. Insufficient automated edit checks during the data entry stage require additional resources for the data validation processes, which in turn result in higher-than-necessary operational costs. The review made at UNMIL in this regard is relevant to all peacekeeping missions in the field, because they all use replicas of the same databases.

⁹ Annex 2, paragraph 7(a)(iii).

¹⁰ Annex 2, paragraph 7(b)(i).

27. Discussions with LSD staff at Headquarters revealed that inspection sheets which contain data gathered during inspections are not captured electronically. Instead, after the data is entered into the MOU-VR database, inspection sheets are filed in field missions offices in hard copy form. The source documents of inspections/verifications are thus not available electronically.

Recommendations 1 and 2

(1) DFS should enhance the data validation functionality in the databases used in peacekeeping missions. DFS should conduct a cost-benefit analysis, to determine whether to (a) develop enhancements to existing data entry edit checks; or (b) design automated data entry edit checks in a new integrated COE system; and

(2) DFS should extend current procedures to scan inspection work sheets and maintain them in a database that will also provide retrieval tools.

28. *DFS partially accepted recommendation 1 and stated that enhancements to the current [COE] system will continue to be implemented by LSD, so long as they cost little or nothing. Such enhancements, according to DFS, will increase functionality and data entry edit checks. DFS additionally stated that LSD was actively engaged with the [new] ERP team to ensure inclusion of data entry edit checks with a new integrated COE system. DFS indicated that it was not necessary to conduct a cost-benefit analysis to determine whether to enhance current systems or to defer to a new future system with regard to data entry edit checks, since there would be an in-depth analysis of a new integrated [COE] system that would support all aspects of COE operations, as mentioned earlier in this report. Based on DFS' comment, recommendation 1 has been closed.*

29. *DFS did not accept recommendation 2 and stated that inspection work sheet data is first captured in "Verification reports" prepared in field missions and reviewed and approved by senior mission personnel before being captured in the MOU-VR¹¹ database. DFS added that there was no value in scanning inspection work sheets into a database because they are kept on files in the missions and are always available for verification.*

30. OIOS is unable to accept these explanations because (a) scanning the inspection sheets into a database will facilitate easy access to the "raw" data (currently only available in hard copy at the mission site), thus enhancing the audit trail; and (b) information maintained in electronic format is easier to recover when needed than hard copies are. Scanning the data thus enhances its resilience. OIOS therefore reiterates Recommendation 2 which will remain open pending receipt of documentation from DFS showing that this requirement was added to the functionalities identified for the new comprehensive COE system.

¹¹ Annex 2, paragraph 7(a)(i).

Inappropriate data confidentiality arrangements are being addressed

31. At UNMIL, although access to the COE databases was regulated through access authorizations, there was a default setting that allowed all users who have access to the Mission servers to “Read” COE-related information. As a result, contingent personnel from TCCs had “Read” access to information that pertained to their own contingent, as well as to information about other TCCs’ contingents deployed at UNMIL.

32. LSD staff at Headquarters indicated that the systems settings at UNMIL were changed in June 2007, eliminating contingent personnel access to COE data maintained in the mission. These changes were to be introduced in all field missions in the near future. OIOS acknowledges this enhancement of access controls.

C. Other Audit Findings and Observations

Insufficient management information support at UNMIL and insufficient documentation of ancillary logistics applications (spreadsheets) at Headquarters

33. The review at UNMIL found that while the databases in the field were adequate in that they contained all the pertinent COE data, they did not provide sufficient management information, such as statistics on contingents’ performance over time. Such information is currently generated by LSD at Headquarters, using spreadsheet-based analytical tools¹².

34. LSD management at Headquarters indicated that plans to provide the above tools to field missions were being considered, and that an administrative procedure on using them was being formulated.

35. LSD staff at Headquarters also stated that the said analytical tools were developed by interns, who used the Microsoft Visual Basic extension to MS-Excel, and who no longer work for the Organization. The developers did not provide documentation of this application, and LSD staff do not possess requisite knowledge to support and maintain it.

36. According to LSD, the Division maintains and encourages the use of an electronic “Discussion board” feature within the COE Lotus Notes-based databases. This feature allows field database managers to post discussion topics, which lead to consideration, approval by Headquarters and postings of “Reference library” or “Best practices” items that can then be adopted by field offices.

37. While acknowledging this initiative, OIOS is of the opinion that in regard to the spreadsheet-based analytical tools it is imprudent to rely on ICT tools that are not sufficiently documented. Relying on such tools poses risks to

¹² Annex 2, paragraph 7(a)(iii).

the validity of the information produced and to the ability to maintain and/or modify such tools when needed.

Recommendation 3

(3) The Logistics Support Division, DFS, should promulgate a plan to replace the analytical tools currently in use with standard tools that would be documented properly. Alternatively, the analysis functionality can be included in a new integrated COE system.

38. *DFS did not accept recommendation 3 and stated that while noting the finding that DFS has no capacity to support or maintain the analytical tools currently in use (because no documentation of these tool exists), they nevertheless proved reliable and accurate for reporting on trends. DFS added that in light of the ongoing ERP project it would not be cost-effective to replace the analytical tools as recommended by OIOS. Because OIOS suggested the including of the analysis functionality in a new integrated COE system as an alternative to replacing the analytical tools currently in use, OIOS reiterates recommendation 3 which will remains open pending receipt by OIOS of a detailed analysis of the functionality currently performed by the undocumented tools which will be included in the COE component of the new ERP system.*

Disaster recovery and business continuity arrangements and considerations

39. Users at UNMIL reported high availability of the COE databases, with infrequent and insignificant down time. While there was no formal disaster recovery plan at UNMIL, the Lotus Notes based databases are replicated daily at the United Nations Logistics Base (UNLB) in Brindisi, Italy, and could be recovered in most cases (UNLB's own disaster recovery plans were not reviewed). Although there was no written policy, disaster recovery is understood to be the responsibility of CITS/DFS.

40. Users Plans for disaster recovery and business continuity in regard to the GCMS system (at Headquarters) were presented by IMU. These plans describe the risks, the resources that are covered by the plan, the sequence of actions that need to be followed for recovery and the hardware operations responsibilities of the Information Technology Services Division – ITSD (these are detailed in a Service Level Agreement referenced in the IMU plan).

41. OIOS acknowledges the efforts to develop a disaster recovery/business continuity plan for GCMS. OIOS assumes that the plan targets “full” recovery (return to fully operational status). However, the written plan still needs to: (i) identify personnel responsible for taking action when needed, both at DFS and at ITSD; (ii) establish acceptable time frames until recovery or partial recovery; and (iii) test the plan.

Recommendations 4 and 5

(4) The Logistics Support Division, DFS, should formalize a disaster recovery/business continuity policy, and in cooperation with CITS develop a plan of action to restore business operations when disrupted.

(5) The Information Management Unit, FBFD should complement its current disaster recovery/business continuity plan by (i) identifying personnel who would be involved in disaster recovery operations; (ii) establishing acceptable "Down time"; and (iii) testing the plan.

42. *DFS accepted recommendation 4 and stated that CITS will coordinate with LSD to develop a disaster recovery/ business continuity plan for logistics systems by 30 June 2008. Recommendation 4 remains open pending receipt by OIOS of documentation of the said plan.*

43. *DFS accepted recommendation 5 and stated that as recommended by the audit: (i) the persons who would be involved in disaster recovery operations have been identified and notified; (ii) acceptable "Down time" has been defined and (iii) the plan will be tested during the first quarter of 2008. Recommendation 5 remains open pending receipt by OIOS of the list of persons involved in disaster recovery operations, and the results of testing the disaster recovery plan.*

V. ACKNOWLEDGEMENT

44. We wish to express our appreciation to the Management and staff of DFS from LSD, MCMS, FBFD/IMU, FBFD, and CITS for the assistance and cooperation extended to the auditors during this assignment.

STATUS OF AUDIT RECOMMENDATIONS

Recom. No.	C/O ¹	Actions needed to close recommendation	Implementation date ²
1	C	DFS should enhance the data validation functionality in the databases used in peacekeeping missions. DFS should conduct a cost-benefit analysis, to determine whether to (a) develop enhancements to existing data entry edit checks; or (b) design automated data entry edit checks in a new integrated COE system.	December 2007
2	O	DFS should extend current procedures to scan inspection work sheets and maintain them in a database that will also provide retrieval tools.	Not provided
3	O	The Logistics Support Division, DFS, should promulgate a plan to replace the analytical tools currently in use with standard tools that would be documented properly. Alternatively, the analysis functionality can be included in a new integrated COE system.	Not provided
4	O	The Logistics Support Division, DFS, should formalize a disaster recovery/business continuity policy, and in cooperation with CITS develop a plan of action to restore business operations when disrupted.	30 June 2008
5	O	The Information Management Unit, FBFD should complement its current disaster recovery/business continuity plan by (i) identifying personnel who would be involved in disaster recovery operations; (ii) establishing acceptable "Down time"; and (iii) testing the plan.	31 March 2008

1. C = closed, O = open

2. Date provided by DFS in response to recommendations.

Summary of the information flow in the Contingent Owned Equipment Operations of the Department of Field Support

1. COE deployment, maintenance and removal, as well as the reimbursement rates to the Troop Contributing Countries or Nations (TCC), are governed by Memoranda of Understanding (MOU) between the United Nations and the TCCs. The MOU determines the level of commitment of the TCC in terms of military personnel and COE (consisting of “Major Equipment” and “Self Sustainment”, detailed in the MOU as “Annex B”, and “Annex C”, respectively).
2. MOUs are standardized in regard to classification of equipment types and related rates of reimbursement, as shown in the Contingent Owned Equipment Manual of 22 December 2005¹³.
3. The Logistics Support Division (LSD), DFS, creates, maintains, updates and is the primary user of information on COE logistics.
4. DFS monitors the status of COE deployment on the basis of logistics information, and initiates remedial actions as necessary. These could include a request to TCCs to realign the COE inventory available at peacekeeping missions’ theatres with the provisions of the related MOU. Additionally, based on logistics information accumulated over time, it is possible to assert the degree to which different TCCs meet MOU obligations. This information is valuable for planning logistics of current and future peacekeeping missions.
5. The MOU Claims Management Section (MCMS) of the Field Budget Finance Division (FBFD, formerly FMSS), DFS, is the primary user of financial information on COE.
6. MCMS validates TCC quarterly claims for the payment of COE contributions. This process compares financial information from the MOU (COE types, quantities, period of deployment and standard rates) with data from periodic inspections made by COE personnel in the field (showing actual availability and operational condition of the COE in the field as transmitted to Headquarters in verification reports). TCC claims for payment are then validated or adjusted, as needed.
7. The information systems that support COE operations (COE ICT systems) are:
 - a. Logistics Systems:
 - (i) A Lotus Notes-based database named “MOU-VR database” is installed in each field mission location, and contains: (i) the MOU text and summary details of COE deployed in the mission; and (ii) the verification reports related to the MOU which are the basis for calculating reimbursement to TCCs;
 - (ii) A Lotus Notes-based database, known as the “MOU-ME database” is installed in each field mission location, and contains detailed information on all COE deployed in the mission. The MOU-ME database generates detailed inventory lists which are used for the inspection process. Certain data in this database, such as the painting status of equipment, also affect reimbursement to TCCs. This database is also used by other sections in the mission; and

¹³ General Assembly Resolution A/RES/59/298 dated 22 June 2005 and A/C.5/60/26 dated 11 January 2006

-
- (iii) Several analytical tools developed in MS-Excel take information from the above-mentioned Lotus Notes databases (through a manually-driven “Data exporting” function), and analyze it. These tools provide comprehensive, composite indicators of the adequacy of COE deployment in missions.
- b. Financial Systems:
- (i) A Paradox-based application previously named “PKDB” (Peacekeeping Database, see item 6(b)(ii) below) contains the MOU “Annex B” and “Annex C” detailed information, as well as the history of changes made to MOUs over time;
 - (ii) An MS-SQL-based application named GCMS (Government Claims Management System) was developed subsequent to the PKDB application. Certification of TCC claims for payment for COE contributions is performed by this application. (Note: the “PKDB” database is considered part of the GCMS system for ICT support purposes);
 - (iii) An MS-Excel spreadsheet which calculates the amounts due to TCCs. The calculating formulas in this spreadsheet were to be automated towards the end of this audit (June 2007), as recommended in a previous IAD audit report of 21 February 2006 (see paragraph 20 below). The current audit therefore did not validate the new automated module.