Office of Internal Oversight Services

INTERNAL AUDIT DIVISION

REPORT 2015/171

Audit of the implementation of the interface between Umoja and Galileo

Overall results relating to the audit of the implementation of the interface between Galileo and Umoja were initially assessed as partially satisfactory. Implementation of three important recommendations remains in progress.

FINAL OVERALL RATING: PARTIALLY SATISFACTORY

11 December 2015
Assignment No. AT2015/615/02

CONTENTS

AUDIT REPORT

Audit of the implementation of the interface between Galileo and Umoja

I. BACKGROUND

1. The Office of Internal Oversight Services (OIOS) conducted an audit of the implementation of the interface between Umoja and Galileo.

2. In accordance with its mandate, OIOS provides assurance and advice on the adequacy and effectiveness of the United Nations internal control system, the primary objectives of which are to ensure (a) efficient and effective operations; (b) accurate financial and operational reporting; (c) safeguarding of assets; and (d) compliance with mandates, regulations and rules.

3. The Galileo inventory management system is an in-house developed application which automated the management of United Nations-owned equipment as part of the supply chain process within the United Nations field operations. The application was physically hosted by the United Nations Global Service Centre (UNGSC) in Brindisi, Italy. Support to the Galileo system was provided as a joint effort between the Department of Field Support (DFS) and the United Nations International Computing Centre (UNICC).

4. Umoja is an implementation of the SAP enterprise resource planning software, an application that supports management activities related to finance, budget, human resources, supply chain, central support services, and other core business functions. This system will replace and integrate numerous existing legacy information systems in use across the Secretariat.

5. In addition to renewing the way the United Nations manages and supports core business functions, one of the benefits of implementing Umoja was to support compliance with the International Public Sector Accounting Standards (IPSAS), which were adopted by the United Nations in 2013. However, due to some delays experienced during the implementation of Umoja, in 2012 the Secretariat decided to use the existing legacy information systems, and parts of Umoja, to generate IPSAS-compliant opening balances, which happened before the full deployment of Umoja. As a result of this decision, some of the critical IPSAS data for the procurement and receipt of equipment (for peacekeeping and special political missions only) originated in Umoja but was then transferred to Galileo, where the actual accounting and tracking of this data took place. The interface only enabled one-way transfer of purchase orders and receipts from Umoja to Galileo. There was no transfer of data back to Umoja from Galileo.

6. In July 2012, DFS and UNICC signed a project agreement to implement enhancements to Galileo to accommodate IPSAS requirements, and to implement an interface for the procurement and receipt processes done within the Umoja system. The main changes to be implemented, identified at a high level in conjunction with the Umoja team, were changes to the receipt and inspection process to allow data feeds from Umoja, expose selected Galileo data through a staging area, and ensure visibility of Umoja data through the same staging area. This was an interim solution until Umoja is fully implemented by 2017, at which point Galileo will be fully decommissioned.

7. The enhancements to Galileo for IPSAS, which were completed as part of the DFS and UNICC project agreement, relied heavily on the accuracy of data transferred from Umoja into Galileo. These enhancements included a new codification structure for expendables in the item master file into five different types, standardized descriptions across all items and units of measure in Galileo (from 58 units of measure to 7).

8. Comments provided by DFS and UNGSC are incorporated in italics.

II. OBJECTIVE AND SCOPE

9. The audit was conducted to assess the adequacy and effectiveness of governance, risk management and control processes put in place by DFS, Department of Management (DM) and UNGSC in providing reasonable assurance regarding the **effective implementation of the interface between Umoja and Galileo**.

10. The audit was included in the OIOS work plan for 2015 in view of the high risks associated with the interface between Umoja and Galileo in UNGSC, its potential impact at other locations, and the risks associated with the accuracy of data for IPSAS compliance.

11. The key controls tested for the audit were: (a) project management; and (b) information and communications technology (ICT) support system. For the purpose of this audit, OIOS defined these key controls as follows:

a) **Project management –** controls that provide reasonable assurance that the implementation of the interface is managed efficiently and effectively; and

b) **ICT support system** – controls that provide reasonable assurance that the implementation of the interface meets the business needs of the Organization.

12. The key controls were assessed for the control objectives shown in Table 1. Certain control objectives (shown in Table 1 as "Not assessed") were not relevant to the scope defined for this audit.

13. OIOS conducted the audit from 29 June to 10 July 2015 in UNGSC, Brindisi, and from 17 to 28 August 2015 in DFS and the Umoja Office in New York Headquarters. The audit covered the period from 1 November 2013 to 30 June 2015 and included a review of the processes in UNGSC at Brindisi, Italy, and DFS/Property Management Unit and the Umoja Office, in New York Headquarters.

14. OIOS conducted an activity-level risk assessment to identify and assess specific risk exposures, and to confirm the relevance of the selected key controls in mitigating associated risks. Through review of design and implementation of processes, procedures and plans, interviews with business users, stakeholders, and testing of applications, OIOS assessed the existence and adequacy of internal controls and conducted necessary tests to assess their effectiveness.

III. AUDIT RESULTS

15. The governance, risk management and control processes examined in DFS, DM and UNGSC were initially assessed as **partially satisfactory**[1] in providing reasonable assurance regarding the **effective implementation of the interface between Umoja and Galileo.** OIOS made three recommendations to address issues identified in the audit.

[1] A rating of **"partially satisfactory"** means that important (but not critical and/or pervasive) deficiencies exist in governance, risk management or control processes, such that reasonable assurance may be at risk regarding the achievement of control and/or business objectives under review.

16. DFS, DM and UNGSC had established some good control practices in the implementation of the interface between Umoja and Galileo, such as: (i) adequate project governance; (ii) adequate technical documentation; and (iii) overall good ICT support. However, there were some important control weaknesses due to inadequate: (i) decommissioning plan for Galileo; (ii) monitoring of data transfer; and (iii) business continuity planning.

17. The overall rating is based on the assessment of activities presented in Table 1 below. The final overall rating is **partially satisfactory** as implementation of three important recommendations remains in progress.

Table 1: Assessment of key controls

Business objective	Key controls	Control objectives			
		Efficient and effective operations	**Accurate financial and operational reporting**	**Safeguarding of assets**	**Compliance with mandates, regulations and rules**
Effective implementation of the interface between Umoja and Galileo	(a) Project management	Partially satisfactory	Partially satisfactory	Not assessed	Partially satisfactory
	(b) ICT support system	Partially satisfactory	Partially satisfactory	Not assessed	Partially satisfactory
FINAL OVERALL RATING: PARTIALLY SATISFACTORY					

A. Project management

Project governance was adequate

18. According to the project management framework of the United Nations Secretariat, ICT initiatives should be supported by adequate governance mechanisms with clear identification of roles, responsibilities, authorities, and reporting. In addition, DFS adopted the project management methodology "Projects in Controlled Environments, Version 2" (PRINCE2) to implement the interface between Umoja and Galileo. PRINCE2 required a project brief document detailing the modalities of the project governance, including the purpose and activities of the project board, governance decisions, responsibilities for assurance, and issues and risks evaluation. PRINCE2 also required that proper closure activities should be performed.

19. The following were noted with regard to project management:

(i) DFS, DM and UNGSC followed good project management practices for the development of the interface, in accordance with the project management framework of the Secretariat and PRINCE2 methodology.

(ii) Detailed project requirements were well documented in the project brief and project initiation documents;

(iii) There was adequate documentation regarding the assignment of project assurance responsibilities and the management of issues and risks;

(iv) Project activities were well documented in the form of meeting minutes, decision trails, and action plans;

(v) A risk register was established defining risk categories, assignees, risk details, impact, mitigation measures and status; and

(vi) The project was properly closed in accordance with PRINCE2 requirements and included: (a) confirmation or acceptance by the stakeholders about the fulfilment of project objectives; (b) acceptance of deliverables by stakeholders; (c) tracking and monitoring of project expenditures; and (d) lessons learned report.

20. Based on the review conducted and evidence provided, OIOS concluded that the overall project governance for implementing the interface was generally adequate.

Need to develop a decommissioning plan for the Galileo system and the interface

21. In order to implement IPSAS by 1 June 2013, DFS and the Umoja Steering Committee made the decision to accept the risk of using Galileo (instead of Umoja) for managing plant, property, equipment and inventory for field missions, and to temporarily interface records from Umoja to Galileo. This decision was made as an interim solution until Umoja was fully implemented, after which the Galileo system would be decommissioned.

22. The following risks and weaknesses were identified in the interim solution to interface Umoja with Galileo:

(i) Master files in Umoja and Galileo did not match. This mismatch was inherent in the design of the interim solution because Galileo contained more details for ensuring IPSAS compliance in peacekeeping and special political missions. However, this condition presented challenges in ensuring the overall consistency of master data for assets and inventory;

(ii) There were instances where purchase orders and receipts data did not match between the two systems because the data was manually changed in Galileo to correct errors;

(iii) The interim solution was designed to interface only purchase orders related to goods. However, the interface omitted goods-related purchase orders that did not have a valid product identification number (i.e., when users omitted to enter the product identification number while creating a requisition);

(iv) End-users were confused by the coexistence in Galileo of configurations supporting both the previous accounting standards (United Nations System Accounting Standards) and IPSAS; and

(v) The Finance Section at UNGSC did not have a role in processing and/or monitoring accounting transactions in Galileo (i.e., recording general ledger entries, reconciliations, etc.). Consequently, the Property Management Section of UNGSC processed these transactions without additional oversight over the assets' data for financial reporting purposes.

23. These conditions stemmed from a management decision to accept the risks associated with the use of the Umoja interface as an interim solution. However, given that there was no plan in place or timeline established to decommission the Galileo system, the Organization was exposed to risks of data errors and omissions leading to potential cases of inaccurate financial reporting.

(1) DFS, in coordination with the Umoja Office, should submit a proposal to the Umoja Steering Committee establishing a time bound plan to decommission Galileo and transfer the processing of all plant, property, equipment and inventory transactions to Umoja in all missions and offices.

DFS accepted recommendation 1 and stated that the Umoja Steering Committee, in its meeting of 1 September 2015, endorsed prioritizing the decommissioning of Galileo. DFS will submit a draft proposal with a time bound plan to decommission the system to the Umoja Steering Committee by the second quarter of 2016. Recommendation 1 remains open pending receipt of the finalized proposal and plan for the decommissioning of Galileo.

B. ICT support system

Technical documentation was generally adequate

24. The professional standards defined in the Control Objectives for Information and Related Technology (COBIT) framework recommend the issuance of formal and clear documentation for enhancements to ensure the transfer of adequate knowledge and skills for supporting ICT systems in an effective and efficient manner.

25. DFS and the Umoja Office prepared detailed technical documentation for the administration and configuration of the enhancements of the Galileo system, including the interface with Umoja. In addition, system and business requirements were adequately documented and reflected in the configuration that was implemented in the system. Based on the review conducted and evidence provided, OIOS concluded that the technical documentation for the interface between Umoja and Galileo were generally adequate.

Testing of the interface was generally adequate

26. COBIT recommends the adoption of testing standards for changes to existing ICT systems including test plans, unit, regression and integration testing, and validation against requirements.

27. DFS and the Umoja Office conducted tests of the interface. The closure report of the Umoja product integration test cycle showed that test scripts and testing scenarios for the interface were adequately conducted. End-to-end testing from Umoja to Galileo was successfully completed for a full range of scenarios including: (i) procurement of goods; (ii) mission receipt of materials; (iii) deliveries with discrepancies; (iv) return of materials; (v) virtual receipts; (vi) reversals after invoicing; and (vii) receipts against inbound delivery with reversal after payment.

28. Based on the review conducted and evidence provided, OIOS concluded that the testing performed on the interface was generally adequate.

Need to implement monitoring of purchase orders

29. The accuracy and completeness of data interfaced from Umoja to Galileo was critical in preventing errors and omissions in data processing through all the systems involved, and to ensure accurate financial reporting.

30. Previous OIOS audits of Umoja showed that when users omitted to enter a valid product identification number in their requisitions (i.e., shopping carts), the resulting purchase order data would

either not be captured by the interface or would be rejected in Galileo after the interface completed its processing. The solution devised by the Umoja Office was to enforce training of users on how to enter data when raising requisitions. However, a review of service desk tickets related to the interface (from January through May 2015), and data interfaced for purchase orders and receipts of plant, property, equipment and inventory (since Umoja go-live in November 2013), showed that the solution was not effective. The review showed that:

(i) There were 1,394 instances of purchase orders missing a material identification number, which resulted in purchase orders and receipts not being captured by the interface. Some of these purchase orders and receipts dated back to 2013;

(ii) There were 355 instances of purchase orders with an incorrect plant identification number (entered at Headquarters on behalf of missions), which resulted in these purchase orders and receipts not being captured by the interface;

(iii) There were 92 service desk tickets related to the interface during January through May 2015. Of these, 54 tickets were due to purchase orders and receipts either being omitted or rejected by the interface. These instances were resolved in a variety of ways depending on the status of data processing (i.e., by manual intervention in Galileo; by deleting the purchase order in Umoja and re-entering the data; or by creating records directly in Galileo which, according to the interface requirements, should have not been done); and

(iv) The only alerts for purchase orders and receipts not captured by the interface were triggered if a user opened a service desk ticket, or when goods arrived at the warehouse and no receipt was available in Galileo in order for the Receipt and Inspection Unit to record the receipt of goods.

31. Inadequate monitoring of data that should be interfaced between Umoja and Galileo exposed the Organization to potential errors and omissions, delays in recording transactions, and inaccurate financial reporting.

(2) DFS should require all missions and offices that enter data affecting the interface between Umoja and Galileo to: (i) generate regular reports in Umoja to monitor purchase orders; (ii) review the reports to identify potential instances of purchase orders omitted by the interface or those that would be rejected in Galileo due to incomplete or incorrect data in the product identification number and plant data fields; and (iii) require missions and offices to clear errors on a regular basis.

DFS accepted recommendation 2 and stated that it will request all missions and offices to engage in data monitoring and cleansing activities to ensure the accuracy of the Galileo and Umoja interface data. Recommendation 2 remains open pending receipt of evidence demonstrating that missions have been requested to generate regular reports from Umoja to monitor purchase orders, identify potential omissions in data interfaces and clear any errors.

Overall ICT infrastructure management at UNGSC was generally adequate

32. The information technology infrastructure library (ITIL) recommends an integrated approach for managing ICT infrastructure which includes: (i) processes for standardization, planning and delivery; (ii) user support requirements; (iii) information security requirements; and (iv) backup processes.

33. The following were noted with regard to ICT infrastructure management in UNGSC:

(i) Processes were defined in accordance with ITIL to standardize the selection, planning, delivery and support of ICT services;

(ii) Adequate support was provided to users of the interface;

(iii) UNGSC had obtained the ISO/IEC 20000 and 27001 certifications on ICT service and information security management; and

(iv) The backup data centre was certified in accordance with a globally recognized standard (Uptime Institute Tier III), for measuring the return on investment and performance.

34. Based on the evidence reviewed, OIOS concluded that the overall ICT infrastructure supporting the Umoja interface to Galileo was generally adequate.

Disaster recovery testing was generally adequate

35. ICT technical procedures of the United Nations Secretariat on disaster recovery require periodic testing (at least annually), to determine the disaster recovery plan's effectiveness and the Organization's readiness to execute the plan. Furthermore, the DFS policy on ICT security, business continuity and emergency preparedness require that during a recovery, specific and predetermined functions must be performed in order to promptly recover, minimize losses and document them for insurance purposes, and preserve evidence for potential investigation and disciplinary purposes.

36. In October 2014, the Board of Auditors identified the need to ensure that the UNGSC infrastructure would be able to provide evidence that UNGSC Brindisi and its secondary site in Valencia are functioning as active-active or active-passive data centre facilities. Accordingly, a data centre-wide failover project was created, which included Galileo and its business objects and data. An assessment of the underlining network, systems and storage infrastructures was performed. The failover exercise was aimed at validating disaster recovery procedures from the Field Technology Operations Centre (FTOC) data centre in Brindisi to the FTOC data centre in Valencia. During the failover exercise, a number of issues were identified in the infrastructure supporting Galileo and the interface.

37. UNGSC addressed and resolved the issues related to the failover exercise and provided sufficient evidence to that effect. Therefore, OIOS did not make any recommendation in this area.

Business continuity planning was incomplete

38. The DFS policy on ICT disaster recovery and business continuity required that a business continuity plan (BCP) be developed and endorsed by the ICT data owner. The BCP should contain the results of a risk assessment, business impact analysis and a comprehensive mission-wide strategy that includes specific risk-reducing measures and definition of roles and protocols. The plan should also cover user guidelines, roles and responsibilities, procedures, communication processes, and the testing approach. It should address all functions and assets required to continue as a viable organization.

39. At the time of the audit, there were several versions of a draft BCP available in UNGSC. The draft versions did not include updates for the business impact analysis, disaster recovery plan for applications and infrastructure, and roles and responsibilities of the crisis management team that would be required to ensure the continuity of the interface between Umoja and Galileo and the associated business processes. UNGSC was working on an overall organizational BCP. However, this plan was not expected to be in place for several months.

40. The absence of a complete UNGSC BCP, including specifications on actions to be taken to ensure continuity of the interface and its associated business processes, exposed UNGSC to the risk of not being able to adequately support the interface in case of unforeseen internal or external events that could negatively impact its operations and support.

(3) UNGSC should ensure that the business continuity plan is strengthened and finalized in a time bound manner by: (i) updating the business impact analysis; (ii) developing the disaster recovery plan for applications and infrastructure; (iii) defining roles and responsibilities of the crisis management team at different stages; and (iv) improving version control. Until such a plan is created, UNGSC should document and establish interim measures for ensuring the continuity of the interface between Umoja and Galileo.

UNGSC accepted recommendation 3 and stated that it has completed the ICT Business Process Map and started the update of the business impact analysis. Thereafter, risk assessment will be performed by December 2016. The ICT disaster recovery plan was developed and approved in July 2015; roles and responsibilities were updated and version control is in place through the established document management process. Recommendation 3 remains open pending receipt of the updated business impact analysis.

IV. ACKNOWLEDGEMENT

41. OIOS wishes to express its appreciation to the Management and staff of DFS, DM and UNGSC for the assistance and cooperation extended to the auditors during this assignment.

(*Signed*) David Kanja
Assistant Secretary-General, Acting Head
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ANNEX I

STATUS OF AUDIT RECOMMENDATIONS

Audit of the implementation of interface between Galileo and Umoja

Recom. no.	Recommendation	Critical[2]/ Important[3]	C/ O[4]	Actions needed to close recommendation	Implementation date[5]
1	DFS, in coordination with the Umoja Office, should submit a proposal to the Umoja Steering Committee establishing a time bound plan to decommission Galileo and transfer the processing of all plant, property, equipment and inventory transactions to Umoja in all missions and offices.	Important	O	Finalized proposal and plan to decommission Galileo.	30 September 2016
2	DFS should require all missions and offices that enter data affecting the interface between Umoja and Galileo to: (i) generate regular reports in Umoja to monitor purchase orders; (ii) review the reports to identify potential instances of purchase orders omitted by the interface or those that would be rejected in Galileo due to incomplete or incorrect data in the product identification number and plant data fields; and (iii) require missions and offices to clear errors on a regular basis.	Important	O	Evidence of enforcement of monitoring interfaced data.	31 December 2016
3	UNGSC should ensure that the business continuity plan is strengthened and finalized in a time bound manner by: (i) updating the business impact analysis; (ii) developing the disaster recovery plan for applications and infrastructure; (iii) defining roles and responsibilities of the crisis management team at different stages; and (iv) improving version control. Until such a plan is created, UNGSC should document and establish interim measures for ensuring the continuity of the interface between Umoja and Galileo.	Important	O	Updated business impact analysis.	31 December 2016

[2] Critical recommendations address critical and/or pervasive deficiencies in governance, risk management or control processes, such that reasonable assurance cannot be provided with regard to the achievement of control and/or business objectives under review.
[3] Important recommendations address important (but not critical or pervasive) deficiencies in governance, risk management or control processes, such that reasonable assurance may be at risk regarding the achievement of control and/or business objectives under review.
[4] C = closed, O = open
[5] Date provided by DFS and UNGSC in response to recommendations.

APPENDIX I

Management Response

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Rec. no.	Recommendation	Critical[1]/ Important[2]	Accepted? (Yes/No)	Title of responsible individual	Implementation date	Client comments
1	DFS, in coordination with the Umoja Office, should submit a proposal to the Umoja Steering Committee establishing a time bound plan to decommission Galileo and transfer the processing of all plant, property, equipment and inventory transactions to Umoja in all missions and offices.	Important	Yes	Chief, Contingent Owned Equipment and Property Management Support Section	Third quarter of 2016	DFS' comments are reflected in the draft report. The Department does not have any further comments.
2	DFS should require all missions and offices that enter data affecting the interface between Umoja and Galileo to: (i) generate regular reports in Umoja to monitor purchase orders; (ii) review the reports to identify potential instances of purchase orders omitted by the interface or those that would be rejected in Galileo due to incomplete or incorrect data in the product identification number and plant data fields; and (iii) require missions and offices to clear errors on a regular basis.	Important	Yes	Chief, Contingent Owned Equipment and Property Management Support Section	Fourth quarter of 2016	DFS' comments are reflected in the draft report. The Department does not have any further comments.
3	UNGSC should ensure that the business continuity plan is strengthened and finalized in a time bound manner by: (i) updating the business impact analysis; (ii) developing the disaster recovery plan for applications and infrastructure; (iii) defining roles and responsibilities of the crisis management team at	Important	Yes	Chief, The Service for Geospatial, Information and Telecommunications Technologies	Fourth quarter of 2016	UNGSC's comments are reflected in the draft report. The Centre does not have any further comments.

[1] Critical recommendations address critical and/or pervasive deficiencies in governance, risk management or control processes, such that reasonable assurance cannot be provided with regard to the achievement of control and/or business objectives under review.

[2] Important recommendations address important (but not critical or pervasive) deficiencies in governance, risk management or control processes, such that reasonable assurance may be at risk regarding the achievement of control and/or business objectives under review.

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Rec. no.	Recommendation	Critical[1]/ Important[2]	Accepted? (Yes/No)	Title of responsible individual	Implementation date	Client comments
	different stages; and (iv) improving version control. Until such a plan is created, UNGSC should document and establish interim measures for ensuring the continuity of the interface between Umoja and Galileo.					