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Review of the efficiency of the administrative and financial functioning of the United Nations

Programme budget for the biennium 1998–1999

Report of the Secretary-General on the activities of the Office of Internal Oversight Services

Report of the Office of Internal Oversight Services on the increase in costs of the Integrated Management Information System development contract

Note by the Secretary-General

1. Pursuant to General Assembly resolutions 48/218 B of 29 July 1994 and 52/227 dated 31 March 1998, the Secretary-General has the honour to transmit, for the attention of the General Assembly, the attached report, conveyed to him by the Under-Secretary-General for Internal Oversight Services, on the increase in costs of the Integrated Management Information System (IMIS) development contract.

2. The Secretary-General takes note of the findings and, as requested by the General Assembly in its resolution 52/214 of 18 December 1998, will submit comments on the report in an addendum to the tenth progress report on IMIS (A/53/573).

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Summary

A. Introduction

The present report is submitted in response to General Assembly resolution 52/227 dated 31 March 1998, in which the Assembly requested the Office of Internal Oversight Services (OIOS) to conduct a comprehensive analysis of the reasons for the increase in costs of the Integrated Management Information System (IMIS) development contract.

In May 1991, the Organization, through its standard contracting procedures, entered into a contract with a private company for the development and delivery of IMIS for implementation at Headquarters by January 1994. The contract was for a fixed-price amount of $17 million. Subsequently, as a result of 17 contract amendments for out-of-scope work, the overall contract cost has increased from $17 million to $45.7 million, or 169 per cent over the original contract cost.

B. Results in brief

The analysis by OIOS of the 17 contract amendments disclosed that the cost increases were due to three causes, as shown in the following table:

Analysis of the first 17 contract amendments

Causes	*Cost (millions of United States dollars)*	*Percentage of base contract*
Incomplete and/or incorrect specifications	11.0	64.5
Implementation and production support	8.0	47.1
Software maintenance	9.7	57.4
Total	**28.7**	**169.0**

Out-of-scope work resulting from incomplete and/or incorrect specifications of software requirements in the original contract amounted to $11 million, or 64.5 per cent of the original contract cost. In large and complex software development contracts such out-of-scope work is a common occurrence. In the case of IMIS, this cost increase was well within industry averages experienced for similar software development contracts. However, with careful planning and proper identification of needs, the cost increase could have been reduced.

Work relating to implementation and production support and software maintenance activities amounted to $17.7 million, or 104.5 per cent of the initial contract. Such work was not part of the original contract. Concerted and timely action to mobilize the necessary resources internally could have reduced the reliance on the contractor, and thereby resulted in some cost savings.

All of the above out-of-scope work, awarded to the contractor on the basis of estimated time and contracted rates, changed the fixed-price character of the contract and made management of the contract more complex.

The underlying reasons for the cost increases included:

(a) Initial underestimation of the level of effort required to develop, implement and maintain an integrated Organization-wide system;

(b) Lack of prior experience in developing a large and complex system, the non-existence of unified policies, procedures and processes and inadequate documentation of existing computerized and manual systems;

(c) Contracting on the basis of inadequate and/or incomplete specifications;

(d) Inadequate participation by main user departments in the development process and the lack of preparedness to undertake implementation and software maintenance tasks due to the unavailability of skilled staff;

(e) Delays in addressing deficiencies in each phase of the development and implementation process.

The Administration is optimistic that the challenge of implementing the remaining IMIS releases in all offices by August 2000 will be met. The Administration stated that the overall need for the current contractor's services will be largely limited to implementation tasks. OIOS noted that a strategy and plan for the implementation of the three releases have yet to be formalized, and the full complement of staff required for the implementation has yet to be identified and trained. To ensure that problems similar to those experienced previously will not recur, these issues need urgently to be addressed.

OIOS is also of the view that there is a potential for improving efficiency through streamlining existing work flows and processes by using IMIS more effectively. Such a process would require a strong commitment to IMIS by all user departments. This commitment is predicated on an efficient maintenance and technical support team and the provision of appropriate training to staff at all levels.

C. Recommendations

In order to reduce the risk of delays and cost escalation in the implementation of the remaining IMIS releases and to ensure that IMIS is effectively institutionalized, OIOS recommends that the Administration:

(a) Establish and communicate strategies and plans for the smooth implementation of revised Release 3 and Releases 4 and 5 and enforce management accountability for their implementation;

(b) Ensure that training of staff in the use and operation of IMIS is strengthened through the integration of IMIS training in the overall training programme of the Organization and that adequate resources are provided for that purpose;

(c) Establish strategies, plans, organizational structures and resources for effective systems maintenance and support;

(d) Direct heads of departments to identify further opportunities for streamlining administrative processes through the effective use of IMIS.

Contents

I. Introduction

1. The report is submitted in response to General Assembly resolution 52/227 dated 31 March 1998, in which the Assembly requested the Secretary-General to entrust the Office of Internal Oversight Services (OIOS) with conducting a comprehensive analysis of the reasons for the increase in costs of the Integrated Management Information System (IMIS) development contract.

2. The contract to develop IMIS was awarded following the standard United Nations bidding process. In May 1991, the United Nations entered into a fixed-price contract in the amount of $17 million with a private company for the development and delivery of the whole system. IMIS was to be installed and become operational at United Nations Headquarters by January 1994 and at all offices away from Headquarters by July 1994.

3. The contract was based on a set of provisions which assumed: the validity of systems specifications provided by the United Nations; extensive participation in the development process by the user departments; timely feedback and resolution of issues affecting the development and delivery of the system by the Steering Committee responsible for overseeing the development and implementation of IMIS; and limitation of changes that might expand the project scope.

4. Up to the end of January 1999, 17 amendments to the initial fixed-price contract had been issued requiring the contractor to perform additional work (referred to as out-of-scope work) costing $28.7 million. As a result, the overall contract cost increased from $17 million to $45.7 million — an increase of 169 per cent over the original contract cost. In analysing the contract amendments, OIOS attributed costs to major identifiable causes and attempted to identify the various reasons underlying those increases. For this purpose, OIOS reviewed in detail the contract and the 17 amendments together with the associated documentation; previous reports on the subject issued by the Secretary-General, the Board of External Auditors, the Advisory Committee on Administrative and Budgetary Questions; and other relevant documents. Clarifications were sought from the IMIS project team and others as needed.

II. Analysis of cost increases and related causes and reasons

5. Overall, OIOS found that the contract cost increases due to out-of-scope work and the reasons therefor were progressively documented in the 10 IMIS progress reports of the Secretary-General and in the reports of the Board of Auditors and the Advisory Committee, which were submitted to the General Assembly.

A. Changes to the contract

6. Under the initial fixed-price contract, the contractor was required to deliver IMIS as a complete package. In February 1992, about eight months after the contract was entered into, the Steering Committee came to the conclusion that taking delivery of the whole system at once would expose the Organization to undue risks. It was therefore decided to request the contractor to develop and deliver IMIS in five stages, or releases. A total of $12.6 million of the contract cost, which was previously identified under tasks, was redistributed internally to five releases, comprising: (a) Release 1, Personnel management; (b) Release 2, Staff entitlements and recruitment; (c) Release 3, Accounting, travel and general support services applications; (d) Release 4, Payroll, personal insurance management and time and attendance records; and (e) Release 5, Budget formulation and worldwide data transmissions. The remaining sum of $4.4 million in the contract remained allocated to business and work analysis, system environment setup and operation, project management and quality assurance.

7. The above change, effected through the second contract amendment, made in July 1992, resulted in a major realignment of the deliverables, although the contract price itself remained unchanged. Each release thus became a deliverable with indicative costs and a revised schedule for delivery. As further contract amendments were issued, the indicative amounts allocated to the various releases were further reallocated and the structure of the releases was also modified. This was done mainly through reductions in the allocations for work flow analysis, project management and quality assurance, and a reduction in the scope of work to be undertaken for Releases 3, 4 and 5.

8. The contract cost increases resulting from the earlier contract amendments could be linked to the specific releases. However, with the later amendments it became difficult to discern which cost increases applied to which release because of the overall integrated nature of the work undertaken, and because some of the out-of-scope work was related to more than one release.

9. In addition, as mentioned by the Board of Auditors in its report dated 29 December 1997 (A/52/755, para. 62), after issuance of the sixth contract amendment the list of

specific deliverables and the relevant work plans were not properly defined and updated, thereby rendering any monitoring of deliverables difficult. The Organization was essentially contracting for the supply of human resources at specified rates rather than for specific tasks or outputs.

10. The Administration, in an annex to the report of the Advisory Committee dated 12 March 1998 (A/52/828, annex II), explained that it was impossible to monitor work by each task because of the many changes in systems specifications, the need to rectify work already completed due to lapses both on the part of the contractor as well as the Organization, the practical necessity to very often perform work under the base contract and out-of-scope work simultaneously, and the constant changes in priorities. Consequently, although funding for the out-of-scope work was approved under the titles of Release 2 or 3, tasks performed were not always identified against those releases. Payments to the contractor were also not attributed to specific deliverables. However, the Administration stated that the contractor's staff worked under the close supervision of the IMIS project team, and the number of hours of services provided was closely monitored so that the contractor's monthly invoices for progress payments, which were based on the number of hours worked, could be certified for payment. The Administration further asserted that its monitoring of the contractor's work performance by task would not have been materially different from its monitoring of hours worked. Nonetheless, it acknowledged that those procedures were less than optimal and should have been properly documented and the contract amended accordingly. Subsequently, in the sixteenth and seventeenth contract amendments, the Administration defined the deliverables and also required the contractor to provide warranty for the out-of-scope work performed, which was not the case under earlier contract amendments. In addition, the deliverables under the seventeenth contract amendment are subject to a ceiling price.

11. OIOS noted that the additional costs arising from the contract amendments were based on estimated time and rates, adjusted for cost-of-living increments, as provided in the original contract. In July 1997, the rates for the out-of-scope work were increased. The Administration pointed out that even with this revision, the rates used were still lower than those proposed in 1991 by the other four competitors.

12. All out-of-scope contract amendments were approved by the Headquarters Committee on Contracts as sole-source awards on the recommendation of the Steering Committee that the work was needed immediately and that it required detailed knowledge of both the working environment and the software.

13. As the deliverables are clearly defined under fixed-price contracts, the contractor has an incentive to deliver the product as specified within the agreed time-frame, and the Organization is protected against undue price increases. In the view of OIOS, the issuance of contract amendments amounting to $28.7 million based on estimated time and material costs changed the fixed-price character of the contract. Further, for the later contract amendments, the focus of contract management changed significantly from managing acceptance of pre-defined deliverables at fixed prices to managing completion of tasks within a predetermined number of contracted hours. This also required significantly additional effort in contract management, which would not have been the case had the contract remained a fixed-price contract.

B. The systems development process

14. Vast and complex information systems such as IMIS are normally developed using a methodology commonly called the systems development life cycle (SDLC), which helps to manage the process of translating the business requirements of an organization into complete and reliable operational computer systems in a timely manner, within approved budget resources. SDLC is predicated on the assumption that the functional requirements, system specifications and delivered systems would be reviewed and approved by users closely participating in the development process. This requires the users to work closely with the project team and the contractor and to provide reliable and timely feedback at each stage of development. SDLC also assumes that appropriate resources are allocated to the project during each critical development phase.

15. The contractor's responsibilities as systems developer were well-defined and established under the original contract. The Organization's responsibilities were divided among the Steering Committee, the project team and the major user departments. However, the user departments did not fully assume their responsibilities until systems development had progressed to an advanced stage. This was due mainly to the failure on the part of the user departments to fully appreciate the criticality of their participation and to their own differing priorities, which were partly influenced by an evolving environment of resource constraints and increasing workloads. In addition, because of the separation or transfer of many experienced staff, some of the users also did not have comprehensive knowledge of the rules and procedures affecting their areas of operation. During the earlier phases, the Steering Committee also did

not effectively monitor and coordinate the user departments' role in the project.

16. The project team, under considerable pressure to complete the project on schedule, filled in the void created by the inadequate participation of the major user departments. This effectively breached the principle of user participation as foreseen in SDLC. The users' role in many instances had to be performed by the project team, even though its members were not fully knowledgeable about the operational needs. As a consequence, the development process as a whole went into a vicious circle. Systems developed at considerable cost were not acceptable to users because they did not meet either the contract specifications or the current business requirements of the Organization. In the process of making modifications or enhancements, some of the work already completed at considerable expense had to be discarded.

17. At the time the releases were delivered the user departments were not prepared to implement them because of their lack of full involvement in the development process and the lack of timely appreciation of the requirements for implementation, as well as the resultant failure to make the necessary preparations. The project team, therefore, also had to play a significant role in the implementation process. As a result, project management suffered and the project team, having to continually function in a crisis mode, became reactive instead of being proactive. Under the circumstances, the contractor was asked to undertake implementation and maintenance tasks. This in turn resulted in the diversion of contractor resources away from planned development activities, causing further delays and compounding the problems associated with the development activities. Moreover, the delay in the implementation and institutionalization of IMIS as an effective operational system meant that disparate existing systems had to be kept operational and emerging problems had to be resolved through interim solutions. Thus, freeing up appropriate resources for IMIS development, implementation and maintenance also became difficult. The chart shown in the annex illustrates the impact of the various problems associated with IMIS development and implementation.

C. Classification of cost increases by cause

18. The OIOS analysis of the contract amendments showed that the out-of-scope work can be attributed to three major causes: (a) incomplete and/or incorrect specifications; (b) implementation and production support; and (c) software maintenance. In analysing the contract amendments and attributing the costs to those three major causes, OIOS classified work elements on the basis of the text of contract amendments. Table 1 summarizes the cost of the out-of-scope work approved in each biennium by the three major causes.

19. The underlying reasons for the three identified causes are interrelated and contributed directly or indirectly in varying degrees to the increases in out-of-scope work. Because of these interrelationships, it was not possible to quantify the cost increases against each of the underlying reasons.

1. Incomplete and/or incorrect specifications

20. Cost increases amounting to $11 million (net) attributable to incomplete and/or incorrect specifications represented an increase of 64.5 per cent over the base contract. This increase is well within the range experienced in major systems development projects, even after accounting for the reduced scope of the final IMIS deliverables. However, with better planning, more effective user participation and the timely provision of appropriate resources, this increase in costs could have been reduced.

21. In 1989, the Administration had engaged a contractor to develop the initial functional specifications and external designs. The final functional specifications, which were developed with extensive user participation, were reviewed and approved by the users. These same specifications and designs were used as the basis for the IMIS development contract, but were subsequently found to be incomplete and inadequate to meet the evolving needs of the Organization.

22. The Board of Auditors, in its report dated 21 November 1994 (A/49/680, annex), stated that up to 1994, the contractor was provided some 30,000 additional work hours to address omissions in the design specifications as well as to provide enhanced and new functionalities (para. 23). In the same report, it was mentioned that the Administration, in response to this and other related audit comments, stated that: (a) in a system of the size and complexity of IMIS, it was normal for extra work to be identified and omissions found; and (b) the actual lack of uniformity in procedures, the lack of global and integrated policy approaches to issues in the departments and the lack of consistent processing systems had led to the fact that it was only when the development of the system was already advanced that new requirements were identified (para. 24). Moreover, the United Nations itself did not have any prior experience in developing a system of such magnitude. OIOS concurs with the Administration's view that modification of specifications and additions to functionalities are to be

Table 1
Analysis of out-of-scope work by major causes

Cause	*Contract amendments (thousands of United States dollars)* 1–4 (1992–1993)	5–11 (1994–1995)	12–14 (1996–1997)	15–17 (1998–1999)	Total	*Percentage of base contract*
Incomplete and/or incorrect specifications	2 507	320	3 737	4 402	10 966[a]	64.5
Implementation and production support	1 786	2 681	1 906	1 634	8 007	47.1
Software maintenance	0	5 040	2 227	2 501	9 768	57.4
Total	**4 293**	**8 041**	**7 870**	**8 537**	**28 741**	**169.0**

[a] The amount of $10.97 million is a net amount after taking into account: (a) a reduction of $4 million as a result of reductions in the scope of the contract; and (b) a penalty of $2.3 million payable to the contractor.

expected and are normally experienced in most major software development contracts.

23. The inadequate participation by IMIS users in the review, testing and acceptance phases of the system, in line with the SDLC methodology, and the lack of timely feedback and prompt resolution of open issues between the Organization and the contractor also contributed to increases in out-of-scope development work. For example, the contractor had to be paid a penalty of $2.3 million as a result of delays by the Organization in taking delivery of the initial design specifications for the first three releases. The penalty issue was reported in the sixth progress report submitted to the Assembly (A/C.5/48/12/Add.1, para. 42).

24. Another example relates to Release 3. The contractor started delivering Release 3 in July 1994. However, because of other priorities, the department concerned delayed testing of those systems for several months. Subsequently, a team of staff having appropriate experience was constituted to test the systems. The team found numerous deficiencies, resulting from both contractor errors and the provision of inadequate or incomplete specifications by the Organization. It also found that many new functionalities needed to be added to the system to cope with changes that had taken place over time. The contractor took responsibility for part of the deficiencies and performed more than 10,000 hours of warranty work. A good part of the system had to be redeveloped by the contractor as out-of- scope work, thereby contributing to increased costs and delays in other aspects of the development process.

25. As recognized above, omissions in initial specifications are a common phenomenon in the development of major systems. It is also common to introduce additional functionalities to a system as new vistas begin to emerge. Studies undertaken by professional organizations have shown that such cost increases are common within the industry. In a 1996 report, the Standish Group, a professional consulting firm established in the United States of America, stated that the industry average for cost overruns amounted to 189 per cent of original cost estimates.

2. Implementation and production support

26. The out-of-scope work authorized for the provision of implementation and production support amounted to $8 million. Most of this work should have been undertaken internally by the Organization as originally envisaged.

27. The scope of the initial contract required the contractor only to develop IMIS. System implementation support and maintenance activities were not within the scope of the contract. Implementation support, which is the process of moving the system from the development phase to the point of having an operational and functioning system that replaces the previous system, is basically the responsibility of the Organization in general and the users in particular. It principally involves converting data from existing systems for input to IMIS (including cleaning existing data and adding new data where necessary), modifying user profiles, preparing desk manuals and training users in the operation and use of the system. In the ninth progress report of the Secretary-General on IMIS, dated 8 December 1997 (A/52/711), the Administration acknowledged that when the project was initiated, there was a gross underestimation of

the level of effort required, particularly in the implementation phase. Hence, no strategy or meaningful plan was established at the outset for this important phase of the IMIS project. Consequently, the level of resources provided, including skilled personnel, was inadequate.

28. Furthermore, when each of the three releases was ready for implementation, the user departments concerned were not ready to take over the implementation responsibilities. The under-budgeting of resources for this phase was further aggravated by the loss of experienced and skilled staff to emerging peacekeeping missions as well as by staff separations, brought about partly by a contraction in the Organization's resources. Under the circumstances, and in order not to further delay the implementation of IMIS, the Administration found it necessary to assign major parts of the implementation tasks to the contractor.

29. An independent expert's report submitted in November 1992 to the Advisory Committee together with the fourth progress report (A/C.5/47/27) concluded that the Organization had not yet initiated a rigorous process for technical knowledge transfer from the contractor to the in-house staff responsible for the operation and maintenance of IMIS. The original project estimates made no provision for training, and only a small provision was made for technical training in the 1992–1993 biennial budget. It was only in the 1994–1995 biennium that a significant budget provision of approximately $5.1 million was made for the development and delivery of training. However, at that time the responsibility for training was not specifically assigned to any particular organizational unit. Consequently, the contractor was assigned a large part of the training task as out-of-scope work. Of the $7.2 million allocated for out-of-scope work in the implementation and production support areas, $2.1 million was for training tasks undertaken by the contractor. A significant portion of the contractor's effort was spent on developing training materials and help software.

3. Software maintenance

30. Because of the general unpreparedness for in-house maintenance work and the inadequate allocation of resources, much of the maintenance work had to be assigned to the contractor as out-of-scope work through contract amendments in the same manner as the implementation and production support tasks. The out-of-scope work relating to maintenance amounted to $9.8 million.

31. Like implementation responsibilities, maintenance of the software after takeover from the contractor is the responsibility of the Organization and should have been undertaken by in-house staff. Although it was implicit that this activity would have to be undertaken by in-house staff, no particular strategy or plan was devised for this purpose in the early planning stages of the project. Like all large and complex systems, IMIS required considerable maintenance work immediately upon takeover and implementation.

32. After the delivery of Release 1, it became apparent that the staffing structure of the project team was inadequate to meet the increasing demands for IMIS maintenance. Initially, there was also reluctance to request additional resources to perform these functions due to the ongoing contraction of overall staffing in the Organization. Subsequently, when additional project staffing was approved, there were considerable delays in the recruitment process, which apparently could not accommodate the urgent needs of the project. As the new positions were all temporary assistance posts, the conditions of service were not sufficiently competitive for the recruitment and retention of this category of specialized staff, who are in worldwide demand. The continued need to maintain old systems pending the full implementation of IMIS also made the redeployment of existing staff difficult. Table 2 below shows the project staffing situation between 1988 and 1997. Until 1993, there was only one staff member for the support and maintenance function, but the numbers increased rapidly from 1994 to 1997.

Table 2
Integrated Management Information System staffing situation from 1988 to 1997

	IMIS		
Year	*Core team*	*Support and maintenance*	*Total*
1988	1.5	1.0	2.5
1989	3.0	1.0	4.0
1990	9.0	1.0	10.0
1991	10.0	1.0	11.0
1992	9.0	1.0	10.0
1993	9.5	1.0	10.5
1994	10.0	5.3	15.3
1995	11.0	14.8	25.8
1996	12.0	20.5	32.5
1997	9.0	22.0	31.0

33. As a result of an underestimation when preparing the initial IMIS specifications, the contract provided for the development of only a small number of management and

operational reports. Because of the limited participation of users during the development process, this deficiency was not recognized and dealt with during that process. With the implementation of IMIS and its emergence as the principal repository of personnel- and finance-related data, the number and types of reports demanded by users increased significantly. The majority of users initially had to rely on technical staff to retrieve data from IMIS and generate the required reports in an ad hoc manner. The new group of maintenance and support staff had to spend a significant part of their time assisting users to develop reports, while at the same time familiarizing themselves with IMIS and slowly taking over the maintenance and support function from the contractor. This further contributed to the delay in taking over the software maintenance work from the contactor.

D. Other cost issues

34. The out-of-scope work relating to implementation and production support and software maintenance was not envisioned as being part of the scope of the initial contract. Normally, these tasks are undertaken internally. The contractor was paid for such out-of-scope work on the basis of hourly rates. If this work had been undertaken through mobilization of in-house staff, the overall cost to the Organization might have been lower. In responding to this same issue raised by the Board of Auditors in its report dated 21 November 1994 (A/49/680, para. 45), the Administration stated that the deployment of in-house staff to those two tasks would have only partially avoided cost increases. According to the Administration, there was insufficient in-house staff and, therefore, additional staff would have had to be recruited in any case. Because of the many variables involved, OIOS has not attempted to quantify the potential savings that could have resulted from the use of in-house staff.

35. As shown in table 3 below, the total expenditures on the IMIS project through the end of 1997 amounted to $70.4 million. The invoices submitted by the contractor up to that date amounted to $39.5 million, or 56.1 per cent of the total project expenditures. It should be noted that the overall level of effort on the part of the contractor during the last three bienniums remained at about the same level and that the contractor did not commit additional resources to complete the out-of-scope work earlier. Contractor resources were simply shifted from one activity to another. While this enabled the Organization to cope with the implementation issues arising from each release, it also contributed to delays in completing the project. The table also shows the extent of reliance placed on the contractor in bringing the project to fruition.

Table 3
Project and maintenance expenditures and contractor invoices
(thousands of United States dollars)

Biennium	*Total project and maintenance expenditures*	*Contractor invoices (as submitted)*	*Contractor invoices/total project expenditures (percentage)*
1988–1989	246	0	0
1990–1991	9 711	2 298	23.7
1992–1993	17 055	12 476	73.2
1994–1995	21 640	11 852	54.8
1996–1997	21 730	12 837	59.1
Total	**70 382**	**39 463**	**56.1**

III. Other implementation issues

36. A consultant was engaged to undertake a special study to help the Organization establish a long-term maintenance plan. The consultant, in a report issued in 1995, made four important recommendations to ensure that the maintenance and operations of IMIS would be properly organized and efficiently managed. These included a recommendation for a complement of 48 staff for a central software maintenance unit. Although the Steering Committee did not take specific decisions with respect to the consultant's recommendations, it was mentioned in the seventh progress report of the Secretary-General on IMIS, dated 21 November 1995 (A/C.5/50/35, paras. 100 and 101), that the Committee had decided to create a central technical maintenance unit consisting of 37 staff members. However, since existing systems needed to be operated in parallel until IMIS was fully implemented, only 8 existing staff positions could be redeployed to the unit. In commenting on the seventh progress report, the Advisory Committee stated that every effort should be made to identify within existing resources the full complement of posts needed to maintain the system. In the ninth progress report (A/52/711, paras. 30 and 31), the Administration noted the difficulties in filling vacant positions and resultant delays in taking on a more active role in the maintenance of IMIS.

37. One of the major concerns with the development of IMIS has been the undue reliance placed on the contractor

and the failure to institutionalize the necessary expertise within the Organization to independently sustain IMIS as the principal operational tool. The General Assembly, in its resolution 52/227, requested the Secretary-General to take appropriate action to reduce the dependency on the current contractor and to ensure that a comprehensive programme for IMIS training is included as part of the ongoing training programme, and that adequate and qualified staff are assigned to the implementation and operation of the system at all duty stations.

38. The Administration informed OIOS that all routine maintenance and operational functions had been taken over from the contractors by in-house staff. However, a backlog of maintenance remains to be completed. With the impending implementation of the remaining releases of IMIS at Headquarters and in offices away from Headquarters by August 2000 and the planned reduction in the use of the contractor's services, there will be considerable pressure on the IMIS project team as well as the user departments. Appropriate organizational arrangements need to be made to address the implementation and maintenance problems that are likely to arise from these developments in an effective and systematic way so as to avoid further delays and continued reliance on contractual services.

39. Training is another important implementation issue. As mentioned above, because of inadequate resources and preparedness, a large part of the training tasks were undertaken by the contractor. The Advisory Committee, in its report on IMIS dated 12 March 1998 (A/52/828, para. 7), commented that since the Organization has assumed responsibility for training, it should ensure that expertise available from the contractor has been mastered by those staff responsible for carrying out the training. OIOS also noted that some organizational units have been conducting IMIS training, sometimes with the assistance of the IMIS project team. As the responsibility for IMIS training has not been formally assigned to the Office of Human Resources Management, IMIS has not been included in its training programme. OIOS was informed that the IMIS project team is still responsible for coordinating as well as providing part of the training. Continuous training of staff at all levels in the use of IMIS is a key element for proper institutionalization of IMIS as an operational and management system.

40. The Organization has planned to implement the remaining IMIS releases at Headquarters by August 1999 and in the offices away from Headquarters by August 2000. The Administration has predicted that the successful implementation of the remaining releases in all the offices, as planned, would require unprecedented management and staff effort. With respect to the offices away from Headquarters, implementation will be even more difficult because IMIS will be migrated from various automated and manual processes for which appropriate conversion modalities have yet to be developed. This problem is further compounded by the fact that some of the systems in operation in those offices are currently being modified to be year 2000 compliant. One office is not expected to be year 2000 compliant, and the Administration has decided to implement Release 3 there as a priority. In addition, those offices will have to reorganize work flows, change the way in which they conduct their operations and train their staff to use IMIS. Moreover, the Administration has already stated that a limited level of contractual services will have to be engaged for the implementation of IMIS in the offices away from Headquarters.

41. According to a bulletin issued by the Secretary-General in 1995 (ST/SGB/276), heads of offices in the then Department of Administration and Management, being the principal owners and users of IMIS, are responsible for monitoring IMIS development activities; adherence to the approved schedule; ensuring that the software meets the functional and operational requirements and establishing related operational procedures; and ensuring that adequate staff resources are assigned in their offices to development-related activities, implementation, operation and maintenance of IMIS (para. 4). The heads of offices away from Headquarters were also assigned similar responsibilities for the implementation of IMIS in their respective offices (para. 5). Notwithstanding these instructions, there has been a heavy reliance on the project team and the contractor to undertake the assigned tasks. An appropriate group of staff has yet to be identified and trained to undertake the implementation activities and train the users, particularly in the offices away from Headquarters.

42. The implementation of the remaining releases in all locations within a short period of time will place heavy demands on the project team to coordinate the implementation. In the opinion of OIOS, the project team cannot afford to dissipate its resources by being directly involved in implementation, training and software maintenance, as has been the case in the past. Appropriate mechanisms need to be established for the monitoring of assigned implementation and operational responsibilities. Such mechanisms would provide early warning of emerging problems and issues, and would also help establish and strengthen accountability for assigned responsibilities.

IV. Conclusions and recommendations

43. The increase in the contract amount by $28.7 million, from $17 million to $45.7 million, can be attributed to three main causes. The first cause, incomplete and/or incorrect specifications, is directly associated with software development, albeit for out-of-scope and/or remedial work. The net increase of $11 million attributable to this cause represents an increase equal to 64.5 per cent of the initial contract amount and is well within industry norms. However, OIOS believes that with careful planning, proper identification of needs and more adequate preparations, cost increases could have been reduced.

44. The remaining increase of $17.7 million, attributed to the second and third causes, implementation and production support and software maintenance, was not directly related to software development. Those tasks normally should have been undertaken by the Organization internally. However, owing to the inadequacy of internal resources and in order to avoid further delays, the Organization had to resort to the use of the contractor's services at hourly rates, which the Administration considered to be competitive.

45. The underlying reasons for the three identified causes are many and interrelated. An initial underestimation of the level of effort required to develop, implement and maintain an integrated Organization-wide system resulted in the failure to properly plan the project and to marshal the necessary resources to bring the project to fruition. The contract itself was based on inadequate or incomplete specifications. This necessitated the revision of some of the completed work and the inclusion of additional functionalities. The inadequate participation of the main user departments in the development process from the beginning further impeded systems development and caused undue delays. Delays in promptly addressing deficiencies through concerted action in each phase of the development and implementation process led the Organization to place undue reliance on the contractor.

46. The Administration has stated that except for the limited implementation-related tasks, the contractor's services would no longer be required for any major additional tasks. The review also found that the IMIS project team, the main purpose of which is to coordinate the development and implementation of IMIS, continues to play a key role in routine IMIS operations and training. Insufficient progress has been made with respect to long-term operational support, software maintenance and staff training functions, and consequently the reliance on the IMIS project team and perhaps even the contractor is unlikely to diminish in the near future.

47. OIOS is of the view that there is a potential for improving efficiency by streamlining existing work flows and processes through a more effective use of IMIS. Such a process would require the strong commitment to IMIS by all user departments. This commitment is predicated on an efficient maintenance and technical support team.

48. Although the Administration is optimistic that the challenge of implementing the remaining IMIS releases will be met within the requested budget, there is no assurance that implementation problems similar to those experienced in previous years will not recur, resulting in the possibility of further cost escalations.

49. In order to ensure that the remaining IMIS releases are properly implemented within the planned time-frame and approved budget and that IMIS is properly institutionalized, OIOS makes the following recommendations:

• *Recommendation 1*. The Administration should, as a matter of urgency, establish and communicate to all user departments and offices an overall organizational strategy and a detailed plan for the implementation of revised Release 3 and Releases 4 and 5 and the effective institutionalization of IMIS. As part of this strategy and plan, the Administration should:

(a) Re-issue and reinforce Secretary-General's bulletin ST/SGB/276 so as: (i) to determine clear responsibilities and accountability for the implementation of the remaining IMIS releases; (ii) to ensure that appropriate staff resources are identified, trained and dedicated to the implementation tasks; and (iii) to establish an effective monitoring system to ensure that implementation problems are addressed promptly as they arise; and

(b) Transfer the responsibility for coordination and implementation of IMIS training to the Office of Human Resources Management from the IMIS project team. The Office of Human Resources Management should establish, in cooperation with other user departments and the project team, a comprehensive IMIS training plan for implementation. The Office should be provided with sufficient resources to undertake the function (AC98/36/01).

The Administration agreed with the recommendation and stated that implementation plans would be approved and communicated to the heads of all offices concerned. However, it considers the Secretary-General's bulletin to be comprehensive and therefore will be recirculating the bulletin and taking measures to ensure compliance with its provisions instead of issuing a new one. The Administration

also stated that IMIS training would be incorporated into the Organization's regular training programme and that resource provisions would be made in the proposed 2000–2001 programme budget.

• *Recommendation 2.* The Administration should take urgent steps to strengthen the maintenance and user support functions by: (a) reviewing the present state of the maintenance and support functions vis-à-vis the long-term needs of the Organization; (b) establishing an appropriate strategy and plans for the functions; (c) establishing clear organizational roles and responsibilities for the functions and mechanisms for efficient coordination so as to ensure that user requirements are met; and (d) ensure that an adequate level of resources is made available to implement the approved plan (AC98/36/02).

The Administration agreed with this recommendation and stated that a review of the resource requirements was under way in the context of preparing the 2000–2001 biennial budget.

• *Recommendation 3.* In order to realize the full potential of IMIS, the Administration should ask all heads of departments to review existing work methods and identify opportunities for further streamlining administrative processes with a view to improving efficiency (AC98/36/03).

The Administration, while agreeing with this recommendation, stated that the review of processes and of better ways of using IMIS is an ongoing process. Nonetheless, a formal programme for the implementation of the recommendation would be established next year when the implementation of IMIS was completed.

(*Signed*) Karl Th. **Paschke**
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for Internal Oversight Services

Annex

System development: delays and cost increases