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PROGRAMME BUDGET FOR THE BIENNIUM 1988-1989

Establishment of an integrated management information system: revised estimates under section 28

Report of the Secretary-General

INTRODUCTION

1. At the forty-second session of the General Assembly, the Secretary-General submitted a report concerning the design of a master plan for and the development of an integrated management information system (IMIS). 1/ The Advisory Committee on Administrative and Budgetary Questions (ACABQ), having considered the report of the Secretary-General, recommended that the Secretary-General proceed in the first instance with the design of the master plan for IMIS and, on the basis of the outcome of the design, resubmit his proposal for the subsequent phases of the project. 2/ The present report is submitted in conformity with the recommendation of ACABQ. The report describes the existing situation, explains the objectives, stages, scope and benefits of the IMIS project, which will take approximately three and a half years to complete (1989-1992) at a total estimated cost of $31,593,500, outlines the proposed method for financing the project and seeks an appropriation amounting to $6,204,200 for 1989.

I. BACKGROUND

2. In its report, the Group of High-level Intergovernmental Experts to Review the Efficiency of the Administrative and Financial Functioning of the United Nations expressed the view that, through increased efficiency, the sizeable share of the budget of the Organization devoted to administrative and related functions could be reduced without affecting the quality of services provided. In the view of the Experts substantial gains in efficiency could be realized through measures aimed at eliminating duplication, suppressing hierarchical layers and the use of modern automation equipment. 3/

3. The progress reports on the implementation of the recommendations of the Group of High-level Intergovernmental Experts as endorsed by the General Assembly in its resolution 41/213 4/ have described a number of changes that have been made in the administrative structure of the Department of Administration and Management and indicated the initiatives being taken with respect to information systems in the administrative areas. With the new structure in place, priority has been given to reviewing the methods of work in the administrative areas in order to simplify current processes and procedures, shorten lines of communications, improve information flows, reduce delays and facilitate further delegation of authority to programme managers while at the same time introducing greater accountability. The improvements sought in the administrative areas cannot be accomplished in an ad hoc fashion and are dependent on reliable, comprehensive information systems. It is believed that IMIS is essential and that a carefully laid out plan is needed.

4. As had been envisaged in the report of the Secretary-General to the Assembly at its last session, 1/ external consultants were engaged to assist in undertaking a preliminary analysis for the design and implementation of an integrated management information system. The analysis consisted of three phases, namely (a) a review of the current situation; (b) the identification of the major components that would constitute IMIS and of the hardware and software configuration needed to operate such a system; and (c) a plan for the implementation of IMIS. The course of action outlined in the report is derived from the consultants' analysis.

II. THE CURRENT SITUATION

5. In performing its administrative functions, the United Nations operates without much of the sophisticated automation aids available in today's world. Information systems development has not kept up with the state of the art or the needs of the Organization. In the area of administration and management, there are, at Headquarters alone, 22 independent computerized information systems. Many of these systems require the same data and therefore partially duplicate each other and overlap. They provide limited support to the administrative functions of the Organization. They employ a level of data-processing sophistication widely used two decades ago. While efforts have been made over the years to improve and enhance them, the resources required to support and maintain these aged systems provide little or no return in automated assistance.

6. There is therefore widespread dissatisfaction with the existing data-processing systems that are meant to support the administrative functions of the Organization, particularly in the financial and personnel areas. The systems very rarely share common data; they are old and unresponsive and, in some cases, there are no systems at all. In the area of staffing for example, there is at present no system which encompasses posts at all duty stations. Complete and current information on vacancies is therefore not available, nor can comprehensive statistical information be derived for planning and monitoring purposes. The functions pertaining to personnel administration are hampered by the lack of an accurate current incumbency table linking staff members, posts and job classifications. There is no central source of current personnel data. The

existing accounting system no longer serves the requirements of the central accounts function or the needs of programme managers for timely financial status reports. Cash receipt vouchers recorded in the treasury information-processing system must be re-entered and reconciled in the general accounting system.

7. In addition to problems which are simply a result of the aging of the systems, there are problems attributable to the piecemeal development of systems designed to serve individual functional requirements and to meet particular needs without adequate regard to the benefits of integration. This situation extends beyond Headquarters to the systems installed in the overseas offices. At the United Nations Office at Geneva, for example, not only are the systems similar in characteristics and functionality to those operating at Headquarters, but they are, in certain cases, modified versions of those systems. The United Nations Office at Geneva currently operates and maintains its own versions of the Headquarters' accounting and payroll systems because the special requirements of the Office are not satisfied by the Headquarters systems, thereby incurring additional computer and staff costs.

8. This situation has had serious repercussions throughout the Organization resulting in an ever increasing paper flow between the various offices and organizational units in the administrative areas in order to update each data base; additional human resource costs arising from multiple data entry in the various automated systems using identical data elements; inconsistent definitions of data elements often resulting from the proliferation of identical data elements in different applications; and the inability to respond in a timely fashion to necessary system changes as a result of the proliferation of applications. The problems are compounded by further fragmentation of administrative and management systems as various offices both at Headquarters and away from Headquarters have developed and installed their own local systems. This lack of integrated systems planning and development particularly affects the Organization in the area of administration and management where most information is interrelated and needs to be shared across organizational boundaries and among duty stations. At present the compilation of information for planning, management and decision-making is a lengthy, labour-intensive effort.

9. Responsibility for ensuring the provision of the administrative services needed to support the work programmes of the various substantive units rests with the relevant administrative units, be they executive offices in the larger departments at Headquarters, administrative offices in smaller departments and offices or divisions of administration at the regional commissions and other main duty stations away from Headquarters. These units initiate many of the staffing actions and financial transactions that are ultimately executed by the Department of Administration and Management. They plan, receive and manage allotments and initiate personnel actions, travel, purchasing and other financial transactions. They are instrumental in the preparation of the medium-term plan and the programme budget. They manage posts and share responsibility for the administration of staff members by means of personnel management authority delegated to them.

10. To perform their tasks, they require current data on the status of such key elements as obligations, expenditures, the staffing table, candidate rosters, procurement budgets and required staffing actions. In addition, because they

initiate such a volume of transactions and correspondence, they require the facilities of good office automation and personal computer hardware/software for word-processing, storage of text and records, communication of data and text, downloading of mainframe data and data analysis. In theory, the data which they need to perform their tasks should be available on computers for their review. In practice, the data are either not timely (for example, the status of the accounts or the post incumbency reports) or are available only in non-electronic formats (for example, travel transactions, personnel fact sheets or attendance records). These offices therefore individually automate their own files primarily on personal computers. They keep data for allotment control, staffing table control, the budget process, overtime control and even output control, as well as other functions. They maintain their own financial records in order to have up-to-date management information as accounting reports arrive too late to be of use for programme management purposes. A comprehensive IMIS will eliminate the need for these individual systems and the activities associated with their maintenance and the reconciling of their data with central data.

11. In short, the administrative support systems in the United Nations are fragmented and no longer serve the needs of the Organization. What the Organization requires is a consolidated, corporate data base of information which would be current, consistent and reliable, easily accessible and conducive to improved efficiency and productivity.

12. The reasons for the current state of affairs which would not appear to be limited to the United Nations but also seem to be prevalent among many large organizations, both public and private, are manifold and have been documented in the in-depth evaluation of the programme on electronic data-processing (EDP) and information systems services submitted to the Committee for Programme and Co-ordination (CPC) at its twenty-seventh session in 1987, 5/ i.e. tendency to deal with short-term problems to the detriment of careful long-term planning, decentralization of EDP staff working in the administration and management area and the absence of an overall administration and management systems plan.

13. In addition, it must be borne in mind that the systems in place today were, by and large, developed in the 1970s, and their capacity was limited by the technology then available. At the time it was normal for each computer program to use files (i.e., a collection of records) that were unique to a particular application. If another computer program was written for a new application which required portions of the same file (i.e, part or all of the same records), the data had to be created again in the files of the new application. This led to the storage and manipulation of a great deal of redundant data. Moreover, each office created its own files in the format best suited to its unique functional activities. Multiple files containing the same data made it difficult to establish whether or not a file contained the most up-to-date data. The piecemeal developments that took place were influenced by the limited technology available at the time, namely file management systems. Such systems could maintain data for use by one or more applications but normally for only one purpose. They were used primarily for accessing, retrieving and updating files, usually for a single application. Although a file management system can provide the capability to minimize data redundancy, modify elements within a file and centralize the storage of data, the

principal intent of such a system is to perform functions such as information retrieval, report generation and inquiry for a single application. The fact that each singular application requires the storage of data which are also resident in other files for other applications inevitably results in redundancy and all its inherent problems. The benefits that can accrue from the utilization of modern data base management systems (DBMS), as will be described later, were not available then.

III. SCOPE

14. The management of the activities of the Organization is not a collection of independent planning, budgeting, staffing and evaluation activities. Programme managers, executive officers and the central management in the Department of Administration and Management are concerned with the totality of administrative and management functions and the relationships between these functions. They need an integrated information base in place of the fragmented, incomplete, sometimes inconsistent and inaccessible stores of data. With the technology available today it is possible to develop administrative and management systems that will collectively be an integrated management information system providing the necessary support for managing the Organization. The major benefit of IMIS will be an improvement in the overall quality of management of the United Nations.

15. The design of IMIS was based on the following objectives:

(a) The capture, on a more universally available and much more current basis than at present, of financial data which provide for good expenditure information and trend analysis;

(b) The development of a personnel system to expedite the processes performed by the Office of Human Resources Management with particular emphasis placed on the recruitment and placement processes, the need to develop and retain staff and the early identification and filling of vacancies;

(c) The provision of training to staff members to ensure that they are fully capable of using computer technology;

(d) The improvement of monitoring of programme implementation;

(e) The simplification of existing procedures, particularly in the personnel area, to increase efficiency and possibly eliminate some links in the existing chains of approval;

(f) Increased delegation of authority to, and greater accountability on the part of, executive and administrative Offices at all locations;

(g) Efficient processing in a multi-location environment.

16. In addition, the following were identified to serve as guiding principles in the design and development of IMIS:

(a) It must incorporate modern design features, such as on-line updating and data retrieval, data base organization, user interfaces designed for ease of use and end-user programming taking advantage of high-level programming languages;

(b) It must produce efficiencies and facilitate improvements in management effectiveness;

(c) It must contain powerful and extensive administrative reporting capabilities, particularly for financial and personnel reporting and administrative data (financial, personnel, assets, procurement), all of which will be accessible for analysis to support management decision-making;

(d) It must maintain audit trails for all changes to financial and personnel records, must limit access to authorized staff only and must provide appropriate reporting and controls for audit purposes;

(e) It must be global in scope and modular in nature. That is, it must support administrative functions at overseas duty stations as well as at Headquarters and the technical environment of computing hardware, software and communications facilities must support efficient and effective communications between United Nations offices;

(f) It must be integrated; the technical environment must be compatible across subsystems and across duty stations;

(g) It must be maintainable; it must be possible, with a modest effort, to ensure that changes and additions to subsystems respect the overall integrity, and that IMIS does not deteriorate over time.

IV. COMPONENTS AND CHARACTERISTICS OF THE SYSTEM

17. IMIS will consist of 15 applications areas (components). These components and their characteristics were evolved from an analysis of existing administrative processes, procedures and systems. All the activities in the area of administration and management were analysed, grouped into functions and broken down into their subordinate processes. All currently operational automated systems were identified, together with all persons or things about which the systems maintain information (i.e., data entities). The degree to which the requirement of the functions and their processes were being satisfied by these automated systems was ascertained as was the utilization made by the systems of the various data entities. From this analysis emerged logical groupings of data and activities to support the functions and processes in the area of administration and management, i.e. the applications areas.

A. Applications areas

18. The 15 application areas and their main features will be:

(a) The programme management application area, which will provide automatic support to all involved in the planning, budgeting, implementation and subsequent monitoring and evaluation of the programmes of the Organization;

(b) The post classification and control application area, which will provide automated support to the staff responsible for staffing-table control and the classification of posts;

(c) The human resources application area, which will provide the Organization with a comprehensive information base on all individuals employed by the Organization at any given time be they staff members, consultants or experts. It will provide the Office of Human Resources Management with tools to plan and co-ordinate all personnel policy and procedures and the application of Staff Regulations and Rules;

(d) The insurance application area, which will provide the Organization with a comprehensive information base on all insurance matters involving the United Nations or its personnel;

(e) The procurement and inventory application area, which will provide the Organization with a single source of processing for all activities related to the purchasing of goods and services including procurement related to technical co-operation activities. It will provide an opportunity for the Organization to establish a common information base for its inventory;

(f) The property management application area, which will provide automated support for those involved in maintenance and repairs of buildings and vehicles and other property, the management of space and the provision of technical services;

(g) The travel and transportation application area, which will support the common service functions involved in managing the movement of individuals and material on behalf of the Organization;

(h) The commercial management application area, which will support the finance and administrative activities of the revenue-producing areas of the Organization;

(i) The safety and security application area, which will provide automated support to those organizational units and staff responsible for enforcing the security measures at each location and for the general welfare and safety of delegations, staff, affiliates and visitors;

(j) The mail and communications application area, which will support the operational, administrative and financial activities associated with mail operations and the electronic services functions of the Organization;

(k) The records management application area, which will provide automated support to archives and records management activities. It will maintain information about all official Organization rules/records, including the personnel-related official status files. The coverage includes paper-based

documents, microfiche/microfilm and electronic (computer and word processor) files/records;

(l) The personal accounts application area, which will complement both the payroll application area and the financial management application area by handling the processing of advances, claims, income tax reimbursements and non-normal pay actions for employees and certain other individuals;

(m) The payroll application area, which will calculate pay and other remuneration for all Organization staff members, at all grades and levels in all of the Organization's geographic locations. It will support the payment of wages and salaries for consultants, fellows and other short-term and specialized personnel;

(n) The financial management application area, which will provide automated support to staff who are involved with the management of cash, authorization and control of expenditures, and accounting, all in accordance with the Financial Regulations and Rules. It will receive, store, consolidate and report financial data created by itself and by the other IMIS application areas;

(o) The evaluations and audits application area, which will support the activities of the Internal Audit Division, the Financial Management and Control Division and other organizational units responsible for reviewing, evaluating and reporting on the soundness, adequacy and application of financial, administrative and operational regulations and rules.

B. Integrated management information system profile

19. Following the identification of the application areas, the data-processing characteristics of each was reviewed in detail. The strengths and weaknesses of the current technical environment were identified. Information on the products and services available in the information technology industry was collected and analysed. Out of these analyses emerged a profile of IMIS with the following characteristics;

(a) IMIS will be a fully integrated system. With few exceptions, each of the 15 defined components will interface with each other. IMIS users will be able to pass freely from one module to another, across application area boundaries if necessary, in executing their business activities. Users will be able to use, subject to defined security and control measures, any application area, subsystem or module they need to assist them in their work;

(b) The IMIS data base will consist of various subject data bases 6/ which will be independent of any application area within IMIS. Whereas one application area may represent the source for the creation of a subject data base, all other application areas will be able to access the data created and update certain components of the data base. No single application area and no single user will "own" the subject data bases. Users will be able to create their own working files, but these files will not constitute the organization or "corporate" data base. Data will be captured once and stored in single occurrences in the IMIS data

base. IMIS users will have total access to all subject data bases, subject to the prevailing security and control measures in effect. Data integration involves maintaining only one version of information which is used by all application systems that need access to it. This eliminates the need for redundant entry of data and, in so doing, eliminates the need for reconciliation among different systems. It also eliminates wasted effort stemming from one unit of an organization operating with information that has been made obsolete by the actions of another organizational unit;

(c) Each IMIS application area will be on-line to the user community. Data will be entered, validated and approved on-line. It will be entered as and when available and will not be accumulated and later batched for input. Subject to the detailed design requirements for each application area, the data bases will be automatically updated on line, after certification or authorization has been given and recognized by the system. Data-base inquiry and data retrieval will be done whenever needed;

(d) IMIS will provide for extensive information reporting. Standard reports will be designed into the system and executed on demand by users through menu selection screens i.e., a list of alternative actions which will enable the user to choose among the proposed alternatives. Information will also be displayed on screens as part of the system menus. It will be easy to print the displayed data and produce ad hoc reports in response to user enquiries;

(e) IMIS will create electronic documents automatically as part of the on-line data entry processes as and when data become available. Initial creation will not require all data to be available. Such documents will be automatically "transmitted" to the in-basket of the individual next responsible for its processing. Electronic documents will be designed to conform to the Financial Regulations and Rules as regards certification and approval and the separation of these responsibilities. Paper documents will not be required for data input but paper documents will be generated if and when required. All United Nations administrative forms and other p inted records will be produced automatically by the IMIS system on request by the users;

(f) IMIS will provide for all levels of necessary security. Access to IMIS or any area thereof will be controlled through the use of identifiers and passwords. Data-base updating will be restricted to authorized users. IMIS will maintain tables of passwords, authorized users, etc. and record and report on attempts to breach security. The IMIS software, edit rules and audit trails will provide for the security and integrity of the system and the data bases;

(g) IMIS will combine both text and data processing. The IMIS subject data bases will contain numeric, coded, descriptor (e.g., titles, short descriptions) and full text data. The IMIS technology architecture will integrate data processing and office automation requirements;

(h) The IMIS technical architecture will consist of tools and techniques necessary both to meet the needs of the users and to support the development, operation and maintenance of the system. A DBMS will handle all file management

and provide the degree of integration required. 7/ An active data dictionary will control the IMIS data entities and elements and provide data-base integrity. This software tool will support both the developers of IMIS and all the users of the system in identifying and locating all data resident in IMIS. Fourth-generation language tools will assist the developers and maintenance staff. The same tools will support the end-user enquiry, retrieval and reporting requirements. Micro-to-mainframe software will support the downloading and uploading of data to and from the IMIS subject data bases. The IMIS computer programmes will be developed and maintained at one central location only. Any local processor used for running parts of IMIS will have a read-only code provided. The IMIS technical and user documentation, including "Help" facilities, will be maintained on the system and will be accessible on line;

(i) All United Nations locations using IMIS will need to operate on or have access to compatible hardware which is currently not the case and, while operating on compatible hardware, all offices must also operate with compatible operating systems which is not the case at present;

(j) The user community will need far better access to computer terminals.

C. Centralized or decentralized environment

20. Taking into account the considerations outlined in the preceding paragraphs, there are basically two feasible technical environment scenarios i.e., the combination of hardware, software and communications equipment that will be capable of supporting the operation and maintenance of IMIS.

21. The first scenario revolves around the existence of a large, centrally located mainframe computer. A single copy of the IMIS computer programs and the data base would reside on this computer. Users, irrespective of their office location, be they at Headquarters or at any other location, would have direct on-line access to the IMIS system provided by multi-function workstations connected via the United Nations global communications network to the central mainframe. The central facility would be accessible 24 hours a day to meet the time zone spread throughout United Nations duty stations and to provide the services required by all users.

22. In the second scenario, a central, Headquarters-located mainframe computer would be connected, via telecommunications lines, with local mainframe processors located, as required, at the relevant regional sites. The central processor would maintain the corporate IMIS data base and provide IMIS computer services for the New York user community and any other location where the requirements and/or volume of processing would not warrant a separate local mainframe processor. The central processor would be used to maintain the IMIS programs and data base and provide the environment for the development of the system. The processors, located at each regional office, would be absolutely compatible, from a hardware and software perspective, with the central processor. Read-only copies of the IMIS system would be downloaded from the central machine and executed on these local processors. No enhancements or modifications to the IMIS programs would be performed on the regional processors. The regional processors' data base comprises downloaded

corporate data and locally captured and processed data. Data captured and processed on the regional computer would be regularly transmitted to the central processor to update the corporate data base. Users at all locations would access and use the IMIS system and data through multi-function workstations. Users at locations without a regional computer would be connected to another computer. Each regional computer would provide a pass-through mode to enable a user to connect with the central corporate data base for inquiry, retrieval and reporting.

23. An advantage of the first scenario is that the Organization would have to concern itself with only one single set of IMIS software, i.e., operating system software, data-base management and fourth-generation language software, and the IMIS application programs. The control procedures for the development, installation, and maintenance of this total software set would be relatively simple compared to the second scenario. Another major advantage of this technical environment is that the IMIS data base would be completely up to date at any instance in time. This would result from the fact that all users would be on-line to the centrally held data base and updates would be made on-line. There are, however, two basic weaknesses - heavy data transmission and, as a consequence, very heavy dependency on the reliability, availability and performance of the communications network; major failures in the network would deny users access to IMIS. In addition, the system would have to be staffed and supported 24 hours a day.

24. An advantage of the second scenario is that all the IMIS software would be read-only on the regional computers. Any changes, modifications or enhancements would be made at the central machine location and copied to each regional office which would have its own computer. This read-only software concept would eliminate the difficulties the Organization faces today whereby different offices are developing different systems or different versions of similar applications. A major advantage of the second scenario is that local office needs would be better addressed. The problems inherent with different time zones would be reduced. Built in back-up would also be an inherent advantage of this alternative. Major IMIS components could continue to function in the event of a major breakdown at one or more sites. Another advantage is the reduced volume of data transmission from the overseas offices to Headquarters. As a consequence the total user community would be less dependent on the communications network. Nevertheless, this second scenario would present a more complex set of control procedures for the development and maintenance of the IMIS software than does the first alternative. Another area of apparent weakness concerns the updating of the data bases. In this scenario the centrally located corporate data base would be updated only after local data bases have been updated. It is estimated that the central, corporate data base might be a day behind the local data bases.

25. In consideration of all the above strengths and weaknesses and the fact that both scenarios are in the same order of magnitude with respect to estimated costs, the second scenario is considered to have the greatest benefit for the support of IMIS.

D. Alternatives for the development of IMIS

26. There are three basic alternatives open to the Organization for the development and implementation of IMIS: using commercial software, custom-building IMIS and utilizing software already available in the United Nations system.

27. The first approach, commercial software, often referred to as "off-the-shelf software", involves the acquisition and use of commercially available software packages which can meet the requirements expected of each of the 15 IMIS components and can be linked in such a manner as to achieve the degree of integration required. An important characteristic of this alternative is that the software acquired is subject to little or no modification by the Organization, except for changes to display screens, report headings and other such adaptation.

28. The second alternative involves a classic approach to system development, that is, building a fully customized IMIS. IMIS is designed and developed based on an agreed detailed set of requirements. Modern, DBMS-integrated, system development tools are used to produce prototypes, to develop and implement the production system. The use of prototyping and these tools would reduce the effort to develop IMIS as compared to the current United Nations practices of using Cobol, Fortran, PL1 and other language processors for systems development. Under the custom-built approach the resultant IMIS would precisely address all agreed user requirements.

29. The third alternative is a variant of the custom-built approach. In this alternative, use is made of application software that currently exists in other international organizations and is based on modern DBMS products. Where there is a close match between an application already developed in the system and one or more of the IMIS components in terms of functionality, then the application would be adapted for IMIS use. In areas where there is no good match or where there is currently no developed software, the Organization would custom-build the appropriate IMIS component. This alternative, like the one above, allows the Organization to develop an IMIS which addresses all the user requirements.

30. The first alternative, using commercial software, is not considered practical. There are few packages available that would satisfy the core requirements of a DBMS-based IMIS without substantial modifications. It would also be limited to a series of separate applications linked only to pass data transactions and as such would not achieve the degree of integration required. As regards the second alternative, it is estimated that 28,000 work-days would be required to design, develop and implement all the IMIS requirements.

31. To determine the feasibility of the third alternative, an inventory of existing software in a number of international organizations was carried out. This revealed that most administrative systems in place in the system were developed in the mid-1970s, are vertically developed applications, do not use any DBMS software and would not therefore meet the requirements for IMIS development. There are however a few organizations where modern software, using DBMS, has been implemented and is relevant to IMIS. The third alternative would therefore seem feasible. It has been estimated that the effort required under the third alternative would amount to 20,500 work-days.

32. Thus the third alternative would seem to have a distinct advantage and is the one that it is proposed to pursue.

V. IMPLEMENTATION

33. IMIS will be a highly integrated computer system covering all functional areas in administration and management. It will be a large-scale computer system entailing a substantial cost to the Organization and will undoubtedly have an impact on the work environment of United Nations staff at all levels. It must be developed using modern tools and a formal methodology which differ from the implementation methods currently used in the Secretariat. Its integrated components do not permit the development of the system in a vertical fashion whereby each application area of IMIS (e.g., programme management, human resources, financial management, etc.) is built individually in a sequential fashion and interfaces are constructed as and where required between the resulting systems. Conversely, the "horizontal" development is one where subsets (modules) of each application area are built as a unit. This approach requires an analysis of the dependencies between the application areas and of the data requirements for each module to be developed. It satisfies both the requirements for modularity and true integration of IMIS.

34. The implementation plan is a project approach designed to address the systematic implementation of IMIS, first at Headquarters, then at each regional location. A project team completely responsible for the development and delivery of IMIS would be set up. The team would be disbanded once the final components are delivered. The line organizations, which play their roles in its development, then become fully responsible for the operation and ongoing maintenance of IMIS.

35. In consideration of the cost of acquisition of the mainframe software and the support effort required to install and maintain software, it is intended to limit the IMIS technical environment to a single, but comprehensive, set of software products. The set would include one operating system, one teleprocessing monitor and one integrated DBMS which must be capable of being run, without alteration, on each IMIS mainframe computer.

36. Implementation of IMIS can be broken down into three phases. The first would involve designing and implementing modules which provide a functional core for IMIS and modules providing bridges with existing systems. In the second phase, modules whose existence and utility are contingent upon the design and implementation of the modules built in the first phase, would be built. The third phase would involve the modules which have little dependency outside their own application area. It is estimated that the percentage of effort required in terms of work-days for the technical system development of the three phases is 65, 17 and 18 per cent respectively. Although it might appear that the amount of effort to be expended on the first phase compared to the other phases is inordinate, it should be noted that phases II and III are intended to provide additional functions while phase I will include the detailed design and overall framework for IMIS.

37. At this stage, it is not intended to pursue the development and implementation of IMIS beyond phase I. It would seem more reasonable to concentrate on the

development of a functional core. The further development of IMIS (phases II and III) would depend upon the experience gained in the development and utilization of the functional core.

38. In the development and implementation of IMIS, priority will be given to the following application areas: programme management, post classification, human resource management, personal account, payroll and financial management. While ideally IMIS should encompass all the functions of the 15 application areas, it is intended to proceed cautiously, in an incremental fashion, in order to mitigate the impact on the Organization and distribute the cost of implementation.

39. The main activities which have to be executed in order to develop and implement phase I of IMIS are outlined below.

(a) Establishment of the project structure. The principal focus of this activity is to determine and set up an appropriate project infrastructure which will last throughout IMIS development and implementation. The major tasks include the determination of the appropriate project structure, establishment of a steering committee and user acceptance teams, the identification of suitable project staff and user representatives and the staffing of key positions. In addition, project management controls and standards are determined;

(b) Development of a detailed project plan. This involves the development of detailed plans covering the requirements definition, general and detailed design, development and implementation of phase I of IMIS. Throughout the project, the project plans must be refined, reviewed and revised as each major activity is completed. The principal tasks include development of project plans, review and approval and revision and publication of plans and orientation of project team members;

(c) Preparation of request for proposal. Following the acceptance of the software evaluation findings and recommendations, a request for proposal for assistance in the development of IMIS can be prepared and issued. The tasks include preparation of the request, preparation of selection criteria, review of responses, selection of a suitable consultant and contract negotiation;

(d) Acquisition of selected United Nations system software. The purpose is to complete the negotiations for the acquisition of the selected software along with relevant documentation;

(e) Acquisition of IMIS development software. This includes the DBMS, a fourth-generation language, Enquiry/Retrieval/Reporting software and other related system development aids. The tasks include identification of DBMS-related products, negotiation with vendor for prices/discounts, contracting for software and support;

(f) Assessment of United Nations computer centres. This involves a technical assessment of the New York Computing Service and the other United Nations computer centres with a view to confirming that United Nations computer centres can support IMIS;

(g) Establishment of the IMIS development environment. This is concerned with the establishment of the full technical environment, with communication links to all regions, necessary to commence the actual development of IMIS. Major tasks include set-up of hardware, software, communications, provision of communication links to each region, staffing of the technical support team, training of the technical support staff, DBMS training, data base training and fourth-generation language training;

(h) Establishment of a development team. The project team is expanded by the inclusion of technical and user analysts who will undertake the various design, development and implementation tasks. The external contractors are introduced to the Organization. The major tasks include the introduction of development staff, the orientation of development staff and the assignment of duties/responsibilities. At the completion of this activity the principal development activities of IMIS can proceed;

(i) Establishment of production prototype. The objective is to install the selected applications, populate a data base and provide a working prototype for the development of IMIS. The tasks include the installation (on development environment computer) of United Nations system software, the creation of an IMIS prototype data base, the collection of representative United Nations data and entering data on the prototype data base;

(j) Prototype workshop. This involves the orientation and training of all development staff in the fundamentals of the prototype. The standards and methodology for development of IMIS, using prototyping, are established;

(k) Definition of detailed requirements. Development team analysts define the technical and functional detailed requirements. The requirements are developed and confirmed with the users, using the prototype as the base. The tasks include data collection, analysis of requirements, validation of functional specifications, review of requirements with users, modification of the prototype, confirmation of user requirements, definition of performance objectives, definition of security goals;

(l) Establishment of system volumetrics. The purpose is to establish transaction activity and volumes, file sizes, data-transmission volumes and other volumetrics that are necessary to undertake hardware sizing and configurating for central site hardware, regional computer centres and the telecommunications network;

(m) Confirmation of hardware configurations. Using the volumes established and consolidating all the IMIS technical requirements, the hardware/software technicians on the project team, in conjunction with staff from the Electronic Services Division, determine the precise configurations of each regional computer and the central site. The tasks include determination of each central processing unit (CPU) configuration, determination of CPU peripherals, determination of number and type of workstations and establishment of upgrade requirements to the global communications network;

(n) Preparation of equipment installation plan. This is carried out by the project's technical team in conjunction with the Electronics Services Division.

The tasks include determination of locations for first regional machine, determination of installation priorities for remaining regions, preparation of the equipment installation plan and review and approval of plan by the Steering Committee;

(o) Acquisition of IMIS Hardware (on phased basis). A request for proposal or series of requests are prepared and issued for the additional computer, operating system software and communications equipment required. The tasks include preparation of the request(s), preparation of selection criteria, review of bids and selection of suitable contractor(s);

(p) Confirmation of IMIS development phasing. The tasks include the review of system priorities, revision of phased development, determination of installation phasing on region-by-region basis, review and approval by the user acceptance team and Steering Committee and revision of project plans;

(q) Development of user training plans. The purpose is to identify the training needs, to develop training material and to prepare training plans and schedules. The tasks include identification of user training needs, identification of groups to be trained, determination of resources required, preparation and production of training material/courses and preparation of detailed training plans and schedules;

(r) Basic user training. The focus is to introduce IMIS users to concepts, e.g., an integrated IMIS, on-line practices, electronic documents, use of equipment, etc.;

(s) Development of conversion/transition plan. This involves the design and development of conversion procedures for the movement of data between existing systems and the phased installed IMIS subsystems and the collection and take-on of "new" IMIS data. Because IMIS will be developed in phases and introduced gradually into the regions, there will be periods in time when some regions will be using IMIS in whole or part and some not at all. The importance of this activity is that this situation is recognized and that plans for the conversion of data and migration from the current systems to IMIS are developed, agreed and published early. The tasks include identification of data to be converted and of new data elements, the development of new data take-on procedures, the preparation of the conversion/transition plan, the review and approval of plans by user departments and the Steering Committee and updating project plans;

(t) IMIS design. This involves the refinement of the general design of IMIS, as reflected in the prototype and the functional specifications, into detailed specifications. The major tasks include confirmation of prototype general design and of data base design, modification of acquired United Nations system software design and of prototype data base design, preparation of detailed design specifications, modification of specifications of prototype software, development of specifications for custom-built modules and preparation of conversion specifications;

(u) Development of test/user trials plans. This activity is concerned with the development by the project team of the IMIS system test plans. In addition,

the user analysts on the team, in conjunction with user department representatives, draw up the plans for user (operational) trials and acceptance tests. It is important to note that the user trials and acceptance tests are the responsibility of the user departments, not the IMIS project team. When developed and agreed, the plans for user acceptance tests and operational trials are included in the project plans;

(v) Development. The development activity, the largest resource-consuming activity, results in the transformation of the detailed design specifications and the prototypes into a fully functional, operating IMIS. The major tasks are planning of work allocation and assignment, modification of acquired system software (prototypes), development of custom-built modules, programming, development of conversion software, unit testing and updating of documentation;

(w) Current system bridging. This associated development activity involves the application of modifications to those current systems which will continue in operation and have to interface with the phase I IMIS delivered systems;

(x) Establishment of test data-base environment. This activity results in the IMIS data base being set up with "live" data ready for system test and user trials. The procedures for reorganization, loading/unloading, recovery and privacy/controlled access are developed and incorporated in the operating procedures section of the IMIS system documentation during this activity;

(y) Development of operational procedures. The procedures serve as a basis for the system test and the user training activities;

(z) System test. This is conducted by the project's development team and design team. It involves the full integration testing of all systems, subsystems and modules comprising the phased delivery product. The tasks include integration testing, security testing, system/data-base recovery tests, volume tests, data-conversion testing;

(aa) Establishment of operational support structure. This deals with the identification and establishment of the structure necessary to support the operational running of IMIS and its maintenance at each United Nations location where the system and its data bases are installed. The major tasks include identification of support structure for central site covering system programs/data-base maintenance, equipment operations, "Help" desk; identification of support structure for each regional site covering equipment operations, local data-base maintenance, "Help" desk; staff of, initially, central site and first regional site;

(bb) User training/acceptance trials. The tasks include orientation workshop, hands-on training, recording required system changes, application of changes, formal user acceptance;

(cc) Data conversion. The tasks include conversion of existing system data files, running of data conversion programmes, validation of integrity of conversion, capture of new (take-on) data, execution of data entry modules, running

of validation modules, updating of data bases, validation of the integrity of the data base;

(dd) Operational readiness trials. This activity, which commences during the data conversion stage, involves the execution of readiness trials, the completion of hands-on user training, the final testing of all system procedures. The activity concludes with formal acceptance of the system and the commencement of operational running of IMIS;

(ee) Post-implementation review. Three to six months after the implementation of IMIS, a performance review is undertaken. Minor refinements are carried out during this phase while more major changes are identified and scheduled for implementation. The tasks include preparation of evaluation criteria, collection of evaluation data, measurement of system performance, evaluation analysis and preparation of evaluation report.

VI. ESTIMATED COSTS

40. It is estimated that the design and development of phase I of IMIS will cost $31,593,500, broken down as follows:

		1989	1990	1991	1992	TOTAL
		(thousands of United States dollars)				
		$	$	$	$	$
(a)	Technical development (technical system development team)	3 191.5	5 011.5	4 303.0	819.0	13 325.0
(b)	Hardware	552.0	552.0	1 104.0	1 104.0	3 312.0
(c)	Operating system software	350.0	255.0	510.0	415.0	1 530.0
(d)	DBMS software	350.0	245.0	490.0	385.0	1 470.0
(e)	Existing software	3 500.0	-	-	-	3 500.0
(f)	Terminals	175.0	1 312.5	1 487.5	525.0	3 500.0
(g)	Project team staff	1 381.7	1 381.7	1 381.7	691.4	4 836.5
(h)	Travel	30.0	36.0	36.0	18.0	120.0
	TOTAL	9 530.2	8 793.7	9 312.2	3 957.4	31 593.5

A. Technical system development ($13,325,000)

41. The Organization has neither the resources nor the technical expertise required to develop IMIS. It is intended therefore to contract out this task on a competitive basis to a specialized firm, which will act as the technical system development team and will consist of systems architects, systems designers, programmers and analysts who will undertake the various design, development and implementation tasks for IMIS. The time and cost required for technical system development will not be precisely known until the selection process is undertaken. In the meantime, it has been estimated, as stated in paragraph 31, that 20,500 work-days would be required for the whole IMIS and 13,325 days for phase I. The cost per work-day has been estimated at $1,000. In order to ensure that support for the maintenance of IMIS is available after it is delivered to the Organization, it is intended to arrange for one system architect, three programmers and three trainers from the Secretariat to work with the technical system development team.

B. Hardware ($3,312,000)

42. The operation of IMIS will require that all United Nations locations using IMIS operate on or have access to compatible hardware which is currently not the case, as stated in paragraph 19 (i). Absolute compatibility from a hardware and software perspective will be required. Under the circumstances, the machines currently in use in overseas offices will not be able to support IMIS and new machines will be required. The amount of $3,312,000 relates to six computers with 16 Mbytes of memory at $552,000 per unit, representing the the book value for new equipment. It is anticipated that a computer will not be required in each of the eight main duty stations. As indicated in paragraph 22, the needs of certain regional sites could be met from the central processor.

C. Operating system software ($1,530,000)

43. This amount includes provision for six sets of operating system software 8/ at an estimate of $350,000 for the first copy with discounts anticipated for additional copies.

D. DBMS software ($1,470,000)

44. This amount includes provision for six sets of DBMS software at an estimate of $350,000 for the first copy with discounts anticipated for additional copies. The DBMS will also include a set of end-user software tools comprising on-line query language, report writer, graphics display and statistical analysis and decision support. End-user query and report writing will be provided as an inherent feature of the fourth-generation language software package linked to DBMS.

E. Acquisition of existing software ($3,500,000)

45. In pursuance of the third alternative referred to in paragraphs 29, 31 and 32, a review was carried out to determine to what extent existing computer systems in other organizations might be utilized for IMIS, principally in the areas of personnel, payroll and finance. From this review it emerged that the systems of the Food and Agriculture Organization of the United Nations (FAO) at Rome and those of the World Health Organization (WHO) and the World Intellectual Property Organization (WIPO) at Geneva might serve as a starting point for the development of IMIS and would warrant detailed review. An evaluation of the technical features of these systems and their applications was therefore undertaken with a view to determining the suitability of their functions in relation to the requirements of IMIS. In addition a similar evaluation of the systems operating at the Organisation for Economic Co-operation and Development (OECD) was also undertaken. It was concluded from these evaluations that the system being developed by FAO, a personnel/payroll/financial system, had sufficient elements in common with the characteristics and requirements envisaged for IMIS and could therefore be utilized by the United Nations as a foundation on which it could build its IMIS. Discussions with FAO were subsequently initiated with a view to determining modalities for obtaining the FAO system. FAO, having invested a substantial amount of time, effort and resources in developing its system, has indicated its readiness to make it available to the United Nations and would expect to recover some of the costs it incurred in the development of its system. These discussions are being actively pursued with a view to arriving at an arrangement that would be reasonable and beneficial to both organizations. In the meantime, an amount of $3,500,000 is included in the present report, it being understood that the actual amount to be paid and the terms and conditions attached to such a paymnent would be submitted to ACABQ.

F. Terminals ($3,500,000)

46. As previously indicated, the user community will need far better access to computer terminals. It is estimated that some 2,000 terminals will be required by those using IMIS, bearing in mind that all transactions will be on-line. The basic requirement is for multi-function workstations which can handle text and data processing, connect to the host mainframe, are capable of being used as a computer screen, support the display of the IMIS screens, and are configurable to support the download/uploading of the IMIS data and the execution of the integrated DBMS software designed to run on personal computers. The present cost estimates make provision for 1,000 terminals at an estimated cost averaging $3,500 per unit, including installation and cabling, anticipating that some 1,000 terminals in the Organization would be available and be suitable for meeting the IMIS requirements.

G. United Nations project team staff ($4,836,500)

47. In order to ensure the successful implementation of IMIS, a project team approach has been proposed with the establishment of a project team which would be responsible for the development and delivery of all the phases of IMIS. The

project team would be disbanded once the final components are delivered. The project team would consist of:

(a) A project director who would be responsible for managing the daily activities for all aspects of IMIS development;

(b) Three secretaries who would provide the necessary administrative and secretarial support to the project team;

(c) Three project co-ordinators who would be responsible for organizing and controlling the involvement of the user community in the three functional areas (human resources, finance and budget and general services), and ensuring that the requirements in these areas are met by the technical system development team;

(d) Twenty-one regional co-ordinators who would have the same responsibility as the three project co-ordinators, but on a regional and part-time basis;

(e) One technical co-ordinator who would be responsible for ensuring that the technical environment satisfies the requirements of the technical system development team and the requirement of an operational IMIS;

(f) Three technical specialists who would be responsible in the areas of hardware, system software and communications to assist the technical co-ordinator.

48. It is intended to staff these positions (see annex I) with staff already on board who would be detached from their current responsibilities and assigned to the project. At the same time and bearing in mind the vacancy situation and the post reductions envisaged, it would be necessary to have these staff replaced for the duration of their assignment to the project. Temporary assistance in the amount of $4,836,500 would be required.

H. Travel ($120,000)

49. As IMIS is to be an organization-wide effort and be designed to meet the administrative requirements of all offices at main duty stations, it can be expected that a certain amount of travel between the various sites will be necessary. The provision included here is based on the assumption that there will be 20 trips by United Nations staff and 20 by members of the technical system development team at an average cost of $3,000 per trip.

VII. FINANCING ARRANGEMENTS

50. IMIS will encompass all the administrative activities of the Organization. Its financing therefore should not be solely restricted to the regular budget. It is therefore proposed that the IMIS expenditures be financed as follows: 65.1 per cent from the regular budget, 7.4 per cent from peace-keeping and 27.5 per cent from the special accounts for programme support costs to which are credited overhead income generated by expenditures relating to technical

co-operation and to general trust funds as well as reimbursement for administrative support provided by the Organization to extrabudgetary entities such as those of the United Nations Development Programme and the United Nations Children's Fund. This formula is based on the distribution of 1986-1987 expenditures between the regular budget, peace-keeping activities (excluding troop payments) and technical co-operation and general trust funds and administrative support provided by the Organization to extrabudgetary entities on the other.

51. Under the formula outlined above the distribution of IMIS costs would be as follows:

	1989	1990	1991	1992	TOTAL
	(thousands of United States dollars)				
	$	$	$	$	$
Regular budget	6 204.2	5 724.7	6 062.2	2 576.3	20 567.4
Peace-keeping	705.3	650.7	689.1	292.8	2 337.9
Special Account for programme support costs	2 620.7	2 418.3	2 560.9	1 088.3	8 688.2
TOTAL	9 530.2	8 793.7	9 312.2	3 957.4	31 593.5

52. Under the above formula, an appropriation of $6,204,200, including $1,381,700 for staff costs, is requested for the biennium 1988-1989. It is further proposed, given the project approach envisaged and the need for maximum flexibility, that the appropriations be granted under section 28A of the budget. In addition an amount of $358,400 is requested under section 31, Staff assessment, to be offset by an equivalent amount under income section 1, Income from staff assessment.

53. At the same time it is intended to seek voluntary contributions for IMIS. As the extent to which such contributions might be forthcoming cannot be ascertained, they have not been taken into consideration in the financing arrangements outlined above. However, voluntary contributions, if received, will be used not to expand the scope of IMIS but in lieu of funds from the regular budget, peace-keeping activities and the special account for programme support costs.

VIII. CONCLUSION

54. The introduction of an IMIS of the scale proposed is a daunting task, one that will radically alter the way the Organization manages and executes its administrative tasks. IMIS will result in substantial productivity gains but, as is the case for any new system, such gains can be realized only after IMIS is in place and has undergone a shakedown period. At this stage, it is to be expected that, with modern systems in place, without the current duplication of tasks and a sizeable reduction in manual checking and cross-checking, significant productivity gains will be experienced which will, in the Department of Administration and

Management and all associated executive and administrative offices at all locations, yield further savings beyond those envisaged in the context of the post reduction exercise.

55. While any assessment of the effectiveness of the introduction of IMIS must focus first on the Department of Administration and Management and all associated executive and administrative offices, the impact on the rest of the Organization should not be overlooked. Benefits to the programme activities will accrue in two ways. In the first instance, a more effective administration - that is, one which deals with personnel and financial problems more expeditiously - will mean that programme managers will have to devote less of their own time and energy and less of their resources to dealing with the consequences of delay. In the second, the data on programme and financial performance which will be made available from IMIS will serve both to enhance programme delivery and to eliminate the need for programme-by-programme individual record-keeping. While the impact of these are, at this point, not quantifiable, they can be expected to be significant.

56. Beyond substantial improvements in the management and performance of administrative tasks in the Secretariat and staff savings, the development of IMIS will also offer an opportunity to provide management at all levels, not simply in the Department of Administration and Management but at all locations, with analytical tools and decision-support systems that would enhance decision-making. IMIS is therefore seen as an indispensable element in the ongoing efforts to modernize the Organization, enhance the productivity of its staff and provide better management.

Notes

1/ A/C.5/42/18.

2/ A/42/7/Add.6.

3/ A/41/9, paras. 42 and 43.

4/ A/42/234, A/C.5/42/2, A/43/286, A/C.5/43/1.

5/ E/AC.51/1987/11, paras. 108-115.

6/ Systems can be designed using one of two approaches: application data bases or subject data bases. With application data-bases, all of the data required by a system are captured and used (e.g. payroll system data for the payroll system and all personnel system data in the personnel system). This approach leads to the duplicate capture of redundant data since a system will generally require data that are common to another system (e.g. payroll system needs data describing personnel) with all the related extra effort of the duplicate development, maintenance and reconciliation.

Notes (continued)

With subject data bases, the system captures and uses data about a subject, such as personnel. Then application systems access or update multiple subject data bases. This approach provides for faster development because the data are captured only once and will be available for subsequent systems without requiring the developer to recapture it.

There are other advantages to subject data bases: the subjects of any organization, and their data (the subject data bases), tend to be more stable than the requirements of their applications. Therefore, systems designed with a focus on subject data-bases will be more stable than systems focused solely on application requirements, and an essential component of system analysis and design using subject data-bases is that these systems share the subject data. This encourages the integration which is so important to the co-ordinated management of the Organization.

This subject data base approach requires careful analysis and co-ordination to ensure that the content of the subject data bases is appropriate for their shared use and that the systems have the proper components (processes and activities) to create, maintain and read the subject data bases effectively.

7/ The DBMS approach was introduced to mitigate these redundancies and permit greater efficiency in the storage and usage of information. The key concept employed in a DBMS is that there is one version of a file and that data can be tied together in such a manner as to allow any application program based upon security clearances to access any or all parts of the data, regardless of location, access method or record format. With a DBMS, the applications programmer no longer has to be concerned about the location and structure of the data. With most DBMS products, the languages supported are those commonly used so the programmer can concentrate on turning out programs to access and process data without the severe constraints placed on earlier generations of programmers. This in itself will tend to increase productivity.

A DBMS also reduces the effort necessary for non-programming personnel to use the data located in the data base. Several DBMS vendors have even created query languages designed specifically to meet the needs of non-programming users. These query languages are designed to operate efficiently within the confines of the DBMS and the operating system.

Some aspects of the functionality of a DBMS are: logical and physical separation of the computer programs and data definition; the computer application program need not be concerned with the storage structures and is insulated from changes in those structures; support of existing COBOL programmes, although certain modifications will be necessary; maintenance of the data base via utility programs; capabilities for automatic restart and recovery operations in case of system failure; generation of performance reports and fine-tuning capabilities; enforcement of the control of redundancy through a data dictionary; query of the data through human-language facilities; enhanced security and integrity of data.

Within DBMS, a data dictionary is a central library for defining all the data elements, fields, entities, synonyms, cross-references, etc. and the relationships between them.

Data-base management systems incorporate logic for resolving simultaneous attempts to update the same data, for automatically storing audit trails as files are updated and for recovering file updates if the system fails. While individual on-line applications can be relatively stable, the need for protection of file integrity provided by data-base management software becomes critical if a number of different applications are updating a shared pool of data.

With these languages the developer can tell the computer what is wanted without necessarily telling the computer how to do it. The simple reason for the need for non-procedural application development languages is that there is not enough productivity using third-generation tools.

Fourth-generation languages, on the other hand, are designed specifically to deliver improved productivity. They actually consist of a number of development tools that reduce the time required to write an effective software application. At the centre of this development universe is an integrated data dictionary which has been described in the preceding section.

Productivity improvements are provided by the automated data dictionary, screen formatting, and fourth-generation language capabilities of data-base management software. These capabilities relieve programmers of the need to deal with record formats or physical file indexes and make it much simpler to set up screen displays or report formats. Fourth-generation languages make it possible for users to formulate simple queries and report requests directly rather than submitting programming requests.

8/ The operating system software is a product that automatically manages the operations of a computer and handles such functions as controlling access to the computer and managing inputs to and outputs from the computer.

Annex

UNITED NATIONS PROJECT TEAM STAFF

Title	Location	Grade	Work-months 89	90	91	92	$US '000 1989	1990	1991	1992
Project director	New York	D-1	12	12	12	6	88.8	88.8	88.8	44.4
Secretary	New York	G-7	12	12	12	6	48.0	48.0	48.0	24.0
Secretary	New York	G-6	12	12	12	6	36.2	36.2	36.2	18.1
Secretary	New York	G-6	12	12	12	6	36.2	36.2	36.2	18.1
Project co-ordinator	New York	P-5	12	12	12	6	80.6	80.6	80.6	40.3
Project co-ordinator	New York	P-5	12	12	12	6	80.6	80.6	80.6	40.3
Project co-ordinator	New York	P-5	12	12	12	6	80.6	80.6	90.6	40.3
Technical co-ordinator	New York	P-5	12	12	12	6	80.6	80.6	80.6	40.3
Technical specialist	New York	P-4	12	12	12	6	69.4	69.4	69.4	34.7
Regional co-ordinator (3)	G va	P-4	18	18	18	9	156.0	156.0	156.0	78.0
Regional co-ordinator (3)	Vienna	P-4	18	18	18	9	134.7	134.7	134.7	67.4
Regional co-ordinator (3)	ECA	P-4	18	18	18	9	103.2	103.2	103.2	51.6
Regional co-ordinator (3)	ESCAP	P-4	18	18	18	9	89.0	89.0	89.0	44.5
Regional co-ordinator (3)	ESCWA	P-4	18	18	18	9	129.6	129.6	129.6	64.8
Regional co-ordinator (3)	ECLAC	P-4	18	18	18	9	81.3	81.3	81.3	40.7
Regional co-ordinator (3)	Nairobi	P-4	18	18	18	9	86.9	86.9	86.9	43.5
TOTAL							1 381.7	1 381.7	1 381.7	691.4
TOTAL, 1989-1992										$4 836 500
